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**Patents and Plants:
Rethinking the Role of International Law in Relation to the
Appropriation of Traditional Knowledge of the Uses of Plants (TKUP)**

by

IKECHI CHIBUZO MADUKA MGBEOJI

Submitted in partial fulfillment of the requirements
for the degree of Doctor in the Science of Law

at

Dalhousie University
Halifax, Nova Scotia
November, 2001

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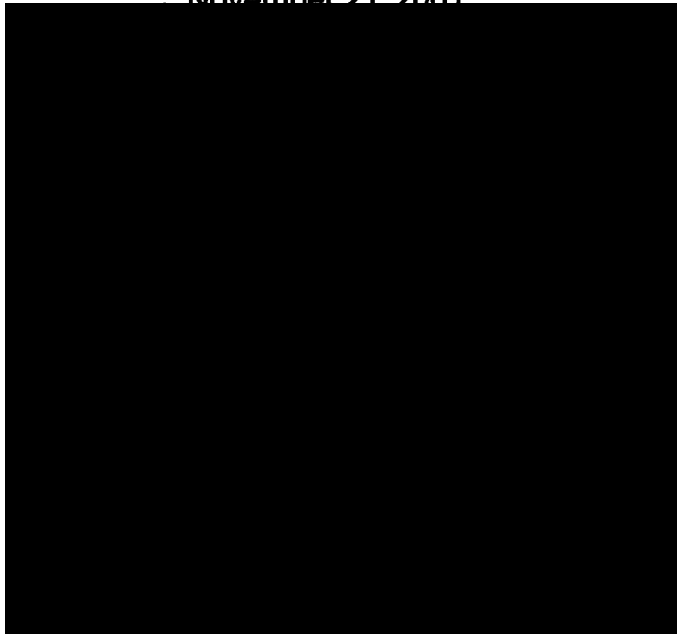
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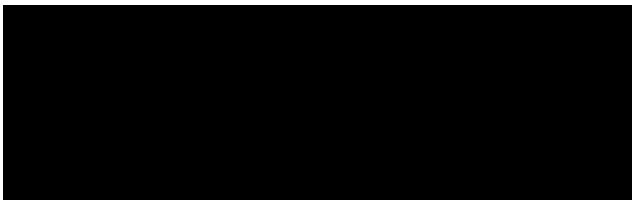
AUTHOR: IKECHI CHIBUZO MADUKA MGBEOJI

TITLE: Patents and Plants: Rethinking the Role of International Law in Relation to the Appropriation of Traditional Knowledge of the Uses of Plants (TKUP)

DEPARTMENT OR SCHOOL: LAW

DEGREE: JSD **CONVOCATION:** MAY **YEAR:** 2002

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ABSTRACT

Legal control and ownership of plants and traditional knowledge of the uses of plants (TKUP) is often a vexed issue, particularly at the international level because of the conflicting interests of states or groups of states in the matter. The most widely used form of juridical control of plants and TKUP is the patent system which originated in Europe. This thesis rethinks the role of international law and legal concepts, the major patent systems of the world and international agricultural research institutions as they affect legal ownership and control of plants and TKUP. The analysis is cast in various contexts and examined in multiple levels. The first context and level of analysis deals with the Eurocentric character of the patent system, international law and institutions. The second involves the cultural and economic dichotomy between the industrialized Western world, otherwise known as the North and the industrializing world, otherwise known as the South. The North-South divide is not always neat but used here as a convenient tool of analysis. The third considers the phenomenal loss of human culture and plant biodiversity.

In examining these issues within the delimited contexts, this thesis makes the argument that the Eurocentric character of the patent system and international law, cultural and gender-biases of Western epistemology and the commercial orientation of the patent system are factors which facilitate and legitimize the appropriation and privatization of plants and TKUP from the South by the North. The thesis also argues that the phenomenon of appropriation thrives in a cultural milieu where non-Western forms of knowledge are continually marginalized and ridiculed as “folk knowledge” or “culture-bound” knowledge.

The implications of appropriation of plants and TKUP in an age of rapid biodiversity loss and homogenization of cultures traverse the gamut of sustainability of the earth, human rights and distributive justice. It has therefore become pertinent to re-examine and re-define the role of patents and international law in the emerging process, bearing in mind the complexities of the issues and the imperatives of a fair and equitable regime on plants and TKUP. Given the inter-relatedness of human rights, the commonality of mankind and indivisibility of the global environment, these processes are of universal import and ought to be addressed holistically. This thesis therefore argues that in the interest of our well being, if not very survival, international law and the patent concept must have a socially mediated core and an ethic of respect, inclusiveness and diversity of cultures and values.

In substance, this thesis recommends that the patent system may achieve credibility by instituting a regime of absolute standard of novelty for plant and TKUP inventions and strict interpretations of the criteria for patentability. Second, a regime of defensive communal patents should be considered, especially for the benefit of traditional communities. Third, in deciding whether inventions relating to plants should be granted patent protection, the environmental safety and broader human rights implications of such inventions, such as the “right” to food and a safe and sustainable environment should be considered. Lastly, the cultural dichotomy between Western epistemology and non-Western epistemology should no longer be used to as a mechanism for the appropriation of plants and TKUP.

DEDICATION

**To the memory of my dearly beloved mother:
Mrs. Victoria Alumugbo Mgbeoji who passed away on 6th January 2001**

**and my dearest sister:
Eziaha Ocheze Mgbeoji who passed away in September 2000**

Though dead, You Live in My Heart Forever

Fare Well!!!

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ABBREVIATIONS

APEC	Asia-Pacific Economic Cooperation
ARIPO	African Regional Industrial Property Organization
CBD	Convention of Biological Diversity
CCM	Common Concern of Mankind
CGIAR	Consultative Group on International Agricultural Research
CHM	Common Heritage of Mankind
CITES	Convention for the International Trade in Endangered Species
CPC	Community Patent Convention
CSD	Commission on Sustainable Development
DNA	Deoxyribonucleic Acid
EPC	European Patent Convention
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GATT	General Agreement on Trade and Tariffs
GDP	Gross Domestic Product
GNP	Gross National Product
HYVs	High Yield Varieties
IARCs	International Agricultural Research Centres
IBPGR	International Board for Plant Genetic Resources
ICDP	Integrated Conservation and Development Project

ICJ	International Court of Justice
ICJ Reports	International Court of Justice Reports
ILC	International Law Commission
ILM	International Legal Materials
ILO	International Labour Organization of the United Nations
ILR	International Law Reports
IMF	International Monetary Fund
IUCN	International Union for the Conservation of Natural Resources
ISA	International Search Agency
LNTS	League of Nations Treaty Series
NAFTA	North America Free Trade Agreement
NIEO	New International Economic Order
OAPI	African Intellectual Property Organization
OAU	Organization of African Unity
PBRs	Plant Breeders' Rights
PCIJ	Permanent Court of International Justice
PCT	Patent Cooperation Treaty
PIC	Prior Informed Consent
RADIC	African Journal of International and Comparative Law
RAFI	Rural Advancement Foundation International
RNA	Ribonucleic Acid
TKUP	Traditional Knowledge on the Uses of Plants

TRIPs	Agreement on Trade-Related Aspects of Intellectual Property Rights
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNGA	United Nations General Assembly
UNTS	United Nations Treaty Series
UPOV	Union pour la Protection des Obstantions Vegetales
US	United States
WHO	World Health Organization of the United Nations
WIPO	World Intellectual Property Organization
WTO	World Trade Organization

ACKNOWLEDGMENTS

This thesis owes a lot to the ideas and inspiration of other people. This is particularly so in a subject as complex and controversial as patents on plant life forms and traditional knowledge of the uses of plants. It is therefore proper for me to express my gratitude to those whose ideas I have borrowed or critiqued and also express my deep appreciation to the numerous persons who have assisted me in working towards the completion of this thesis.

First, I sincerely thank my supervisor, Professor Teresa Scassa. From the earliest formulations of the thesis topic, through its gestation and maturation, she has provided incredible support, made pertinent suggestions and detailed commentaries. I have often barged into her office without prior notice and received well-considered advice, instead of a frown for my impertinence. She has been splendid, graceful and resourceful. Her unflagging support also secured me research funding and international exposure which have contributed immensely in clarifying the views expressed in this thesis and in expanding my horizon. I cannot thank her enough.

I cannot fail to thank the other members of my supervisory committee, Professors David VanderZwaag and Hugh Kindred. David is an encyclopedia of knowledge and his boundless zeal and enthusiasm for international environmental law is better experienced than described. He facilitated my contacts with a lot of useful individuals and institutions, especially the United Nations Environment Programme. Through his and Teresa's efforts, I was privileged to attend the 15th Global Biodiversity Forum in Nairobi, Kenya. From there, I secured the Carl Duisberg Fellowship for research at the Environmental Law Centre of the World Conservation Union, IUCN, Bonn, Germany. In addition, David has been wonderful in shaping my focus on the fundamental problems and theoretical issues of international environmental law.

Professor Hugh Kindred and his lovely wife Sheila have been a source of strength, guidance and comfort. Apart from Hugh's complete mastery of the intricacies of international law, in my view, his greatest asset and contribution towards this thesis and to my intellectual development is the human touch with which he has brought to bear on the principles and ethos of international law. Without discounting the value of forms and structure, at least, as useful tools of analysis, Professor Hugh Kindred has in the course of supervising this thesis and beyond, made the important point that there is a higher calling and essence of international law. Simply put, international law must serve a socially just and acceptable purpose. Law is for the stability and progress of humanity. It is this often ignored insight and stance which largely underpins this thesis. In short, I could not have had a better, well-rounded, resourceful, supportive and diligent supervisory committee.

Several other professors at Dalhousie Law School helped to shape and enrich the views expressed in this thesis. They include Esmeralda Thornhill who has shepherded me through the law school and offered immense insights on varied issues and aspects of scholarship. Other professors who shared their friendship with me include Dick Evans and

Aldo Chircop. A lot of provocative issues which later found their way into this thesis were discussed by Dick Evans and I along the corridors of the Weldon Law Building. I thank Aldo for his invaluable support and friendship. I am also grateful to Professors Bruce Archibald, Richard Devlin and Philip Girard for their efforts in their successive capacities as Chair of Graduate Studies at Dalhousie Law School. These gentlemen went the extra mile to secure funding for my researches and took personal interest in my work. I thank them immensely.

Without the magnanimity of the Killam Trustees, this thesis would never have been written. I am also grateful to the Dalhousie Law School for granting me the Fielding Sherwood Memorial Fund with which I secured myself a laptop. The government of Germany also contributed to the success of this thesis, especially, for awarding me the Carl Duisberg Fellowship. While in Germany, I had the privilege of working with several experts at the Environmental Law Centre (ELC) of the World Conservation Union, IUCN: Dr and Dr. (Mrs) Françoise Burhenne-Guilmin, Dr. Alexander Timoshenko, Tomme Young, Dr. Nazrul Islam, Dr. Wang Xi, Isabel Martinez and Charles Di Leva. The librarians at the ELC, particularly Annie Lukacs were extraordinarily resourceful. In the course of searching for ideas and materials, I must mention the devoted help of my friends such as Graham Dufield at Oxford University, Yaw Osafo at IUCN and Mita Manek at the UNEP office in Nairobi, Kenya.

The librarians at Dalhousie Law School made an otherwise dreary and frustrating search for documentation an interesting endeavour. I therefore thank Julia Lavigne, Anne-Marie White, Annemarie Hay, Brenda Gillis, Debbie Ritchie, Carla Gobiessi-Lynch, David Michaels and of course, Ann Morrison.

Sheila Wile tolerated all my hyper-active queries with unflinching grace. She has been a priceless friend, confidante and guide. I am grateful to her. In addition, the secretarial staff were friends and pillars of goodness to me. These include Molly Ross, Sandra Harnum and Julie Dergal. They have been my family in Halifax.

Special thanks too must go to the “Nigerian Legion” at Dalhousie University with whom I have spent many happy times: Chioma Ekpo, Shedrack Agbakwa, Pius Okoronkwo, Annie Brisibe, Bonny Ibhawoh, Ralph Njoku, Julius, Hassan, Ikechukwu, Mohammed, Tayo, Richard, Fisayo, Wale Akanbi, Miriam and Fanny Ene, and George Mbamalu. I am also appreciative of the support of many other Nigerian friends outside Halifax, especially, Professor Obiora Okafor whose kindness is beyond my gratitude. My thanks too to Annette and Ojiako. I have not forgotten Ugochukwu Ukpabi, Sonke Udemgba, Obi Aginam, Enyinnaya, Osuofia, Iloranwata, Tony Brown Ikweme, Chika and Chinwe Onwuekwe, Chidi Oguamanam, Remigius, Chinedu Idike and a host of other members of the “clan.” I cannot forget members of the “Black Caucus” at Dalhousie University who indulged my wicked sense of humour: Mahogany, Maki, Gina, Teah, Tessia, Angu, Stephen, Emmanuel, Karan, Jenipher, Lita and Shauntay. Special thanks to my friend, confidante and supporter-in-chief, Barbara Hinch. You are a rare gem.

I must also thank the other JSD students and colleagues in residence during my stay in Halifax for their support and good banter: David Dzidzornu, Wathis Sothibandu, Gloria Chao, David Parker, Anderson and Stuart Gilby. Special mention must be made of Professor Stuart Kaye who gave me a piece of golden advice on how to complete the JSD. According to him, “approach it like a regular job: 8am to 5pm every working day!” I tried to do so. Thanks Stuart and David.

Finally, I must thank my family: surviving parent-Elder Levi Mgbeoji and siblings-Ihuoma, Eze, Ebere and Uchenna. In the course of writing this thesis, I was devastated by the sudden deaths of my dearly beloved sister and mother. My family and friends have offered solace, inspiration and encouragement. My brother-in-law, Samuel Ohiara and my nephews have been wonderful. I thank them for not forgetting me, their “special uncle.” Of course, I must mention the pastor and members of the Seventh-Day Adventist church in Halifax whose prayers have been very helpful to me during the most trying moments. My thanks too to the “in-laws”: Sir T.T. Onyeaso, Nwachukwu, Obiora, Adaeze, Nwakaego, Buchi and Udoka, Chinaenye and Okey.

I could not have completed this thesis without the love and kindness of my dearly beloved fiancée and now wife, Nkeiru Onyeaso. She helped keep my sanity in the face of the tragic and untimely deaths of my sister and mother. This thesis is a testament of the healing powers of love and I love her beyond measure. Those wonderful dried-fish from my mother-in-law, Mrs. Kate Onyeaso have been helpful. Mama, thanks.

Overview and Analytical Framework

Although the importance of plants to human civilization is beyond debate, there is controversy on the issue of their ownership and control.¹ Human values attached to plants depend on empirical knowledge or perceived notions of the utility and function of plants. Most of the modern knowledge about the uses of plants is rooted in what may be called traditional knowledge of the uses of plants, hereinafter referred to as TKUP. Regrettably, knowledge of the uses of plants is often incomplete and sometimes poor. There are however, concepts and institutions designed to facilitate the disclosure of knowledge and also to reward those who contribute to inventiveness and innovations. Perhaps the most well-known of such concepts and institutions is the patent system. The concept of patents is generally controversial and sometimes paradoxical.² The complexities of the patent concept and the policy dilemma it often poses is perhaps best exemplified in its emerging relationship and

¹Jack Kloppenburg Jr, *First the Seed— The Political Economy of Plant Biotechnology, 1492-2000* (Cambridge: Cambridge University Press, 1988) at xii & 49. [hereinafter, Kloppenburg]

²According to a scholar of the patent system, John Jewkes:

[I]t is easy enough to perceive the weaknesses, even the absurdities, of the patent system and the reasons why conflicting opinions as to its value are to be found. Its very principles are paradoxical...it is a crude and inconsistent system. ...the standards of patentability, the patent period, the conditions attached to the patent have varied greatly from time to time in the same country and many as between different countries. The patent system lacks logic. It postulates something called 'invention' but in fact no satisfactory definition of 'invention' has ever appeared, and the courts, in their search for guiding rules, have produced an almost incredible tangle of conflicting doctrines...The system, too, is wasteful. It gives protection for 16 years (or thereabouts) whilst in fact over nine-tenths of the patents do not remain active for the whole of this period...It is almost impossible to conceive of any existing social institution so faulty in so many ways. It survives only because there seems to be nothing better."

See, John Jewkes, D. Sawers & S. Stillerman, *The Sources of Invention* (London: Macmillan, 1969) at 25-54.

interaction with plants and plant-derived resources.³

In recent times, the debate on this phenomenon has been conducted within the borders of a hypothesis that the major patent systems of the world enable and institutionalize the appropriation of plants and TKUP. As Naomi Roht-Arriaza has argued, “the appropriation of the scientific and technical knowledge of indigenous and local peoples, of the products of that knowledge...has become both notorious and contested.”⁴ This thesis examines the structure and processes by which powerful states, prodded by multinational corporations, have used international institutions and a malleable patent system to appropriate and privatize plant life forms and TKUP. The inquiry is set within the background of a dwindling and homogenizing plant genetic and species diversity.

The issues examined bear directly on the stability, security and fairness of the modern global legal and economic order.⁵ The thesis also discusses the causes and effects of the asymmetrical flow of plant germ plasm and TKUP from the industrializing states to the

³Carlos Primo Braga, “The Economics of Intellectual Property Rights and the GATT: A View From The South” (1989) 22 *Vanderbilt Journal of Transnational Law* 243; Ian Brownlie, “Legal Status of Natural Resources in International law” (1979) *Recueil de Cour* 1; Jonathan Carlson, “Strengthening the Property-Rights Regime for Plant Genetic Resources: The Role of the World Bank” (1996) 6 *Transnational Law and Contemporary Problems* 91.

⁴Naomi Roht-Arriaza, “Of Seeds and Shamans: The Appropriation of the Scientific and Technical Knowledge of Indigenous and Local Communities” (1996) 17 *Michigan Journal of International Law* 919. [hereinafter, Arriaza]

⁵Anthony Stenson & Tim Gray, *The Politics of Genetic Resource Control* (London: Macmillan Press, 1999) [hereinafter, Stenson & Gray]; Klaus Bosselman, “Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity” (1995) 7 *Colorado Journal of International Environmental Law and Policy* 111 [hereinafter, Bosselman]; Inamul Haq, “The Problem of Global Economic Inequity: Legal Structures and Some Thoughts on the Next 40 Years” (1979) 9 *Georgia Journal of International and Comparative Law* 507.

industrialized states in an age of globalization. Some of the probable consequences of this phenomenon include plant genetic erosion and food insecurity, infringement of various individual and collective human rights,⁶ environmental security and the integrity of human life and environment as a whole. These are without doubt, controversial and much debated aspects of law. At the heart of the debate is also the issue of policy directions which the patent system may take for the benefit of society.⁷

Arguments for deliberate changes in the social policy of the patent concept are grounded in both history and necessity. This thesis posits that the patent regime has always been a tool of political economy. Accordingly, the appropriation and privatization of plants and TKUP is a subject which may be influenced by policy changes in the patent system. This thesis therefore attempts to re-construct a framework for a more equitable, or at least, less predatory and appropriative patent law relationship with plants and TKUP.⁸

The central thrust of this thesis is that international law and institutional processes of the major patent systems, particularly of the United States of America, have largely created, sustained and legitimated a regime of appropriation and consequent privatization of plants and TKUP. This has been achieved through a twin process of deliberate changes in patent law

⁶Sevine Ercmann, "Linking Human Rights, Rights of Indigenous People and the Environment" (2000) 7 *Buffalo Environmental Law Journal* 15.

⁷See for example, Van Zyl Smit, *The Social Creation of a Legal Reality: A Study of the Emergence and Acceptance of the British Patent System as a Legal Instrument for the Control of New Technology* (Ph. D Thesis, University of Edinburgh, 1980)

⁸Thomas Franck & Steven Hawkins, "Justice in the International System" (1989) 10 *Michigan Journal of International Law* 127.

rules and a manipulation of pertinent international institutions.⁹ However, these two critical agents work and operate in a cultural context; to wit, the subtle, insidious and persistent denigration of the intellectual inputs into plant improvement and development of TKUP by traditional and local farmers, especially women.¹⁰ In other words, apart from exploitative and permissive laws and institutions, cultural biases afford the social context in which plants and TKUP are continually transformed into “free-for-all” commodities for appropriation by multinational corporations.¹¹

Scholarship on the role of international institutions and municipal patent laws on this question, especially, on the incendiary subject of “biopiracy” has been dominated by anthropologists, geographers, political scientists, ecologists, agricultural economists and environmental activists.¹² This trend enriches the mosaic of discourse and captures the

⁹Michael Goldman, ed, *Privatizing Nature-Political Struggles for the Global Commons* (London: Pluto Press, 1998)

¹⁰D. M. Warren., et al, eds, *The Cultural Dimensions of Development: Indigenous Knowledge Systems* (London: Intermediate Technology Publications, 1995)

¹¹Rosa Luxemburg, *The Accumulation Of Capital* (London: Routledge, 1951)

¹²See for example, Stenson, & Gray, *supra* note 5; Tom Greaves, ed, *Intellectual Property Rights for Indigenous Peoples: A Source Book* (Oklahoma: Society for Applied Anthropology, 1994); Stephen Brush, & Doreen Stabinsky, (eds.), *Valuing Local Knowledge: Indigenous People and Intellectual Property Rights* (Washington/Covelo: Island Press., 1996); Graham Dutfield, “Implementing the Biodiversity Convention.” Available online at <http://www.users.ox.ac.uk/~wgtrr/impcbd2.htm> accessed on 9/13/99; Graham Dutfield, “Report on the Fourth International Congress of Ethnobiology, Lucknow, India, November 1994” available online at <http://users.ox.ac.uk/~wgtrr/congeth.htm> accessed on 9/14/99; Graham Dutfield, “Report on the Second Conference on Cooperation of European Support Groups in the UN Decade of Indigenous Peoples, Almen, Netherlands, May 3-5 1996, available online at <http://users.ox.ac.uk/~wgtrr/almen.htm> accessed on 9/13/99; Graham Dutfield, “The Costa Rica Biodiversity Law: A Brief Summary” available online at <http://users.ox.ac.uk/~wgtrr/crley.htm> accessed on 9/21/99; The Crucible Group, *People, Plants, and Patents: The Impact of Intellectual Property on Trade, Plant Biodiversity, and Rural Society* (Ottawa: IDRC, 1994); The Crucible Group, *Seeding Solutions: People, Plants, and Patents Revisited* (Ottawa: IDRC, 2000);

imagination of many. However, there is also a tendency for commentators who are not well-versed in the intricacies of international law and the technicalities of domestic patent laws to gloss over or misapprehend relevant principles of law and their policy underpinnings. A prime example of this flaw is perhaps the pervading misconception surrounding the notion of Common Heritage of Mankind as it relates to patents on plants and TKUP. Other evidence of this trend is the continuous construction of the patent concept as an inflexible and ossified concept of law.

Consequently, it seems that in spite of the profuse literature on such issues as appropriation and privatization of plants and TKUP, “bio-piracy”, common heritage of mankind, *et cetera*, more heat than light has been generated. This thesis analyses these issues from the standpoint of a legal scholar but without jettisoning the rich cultural and social contexts in which law operates and seeks its own validity.¹³ In the task, the legal rules which create, sustain and invigorate the normative order are examined, indeed, interrogated within the theory that law is a purposive instrument for moderating human behaviour and facilitating socio-cultural interaction. It is apposite at this stage to define the concept of traditional knowledge of the uses of plants as explored and examined in this thesis.

“Biopiracy Update: A Global Pandemic” *RAFI Communique*, September/October 1995; “Controversy Still Steaming over ‘Counterfeiting’ Basmati: Indian Government Prepares to Challenge Basmati Patent in US” *RAFI Geno-Type*, 4 January 2000, Bob Dillen, & Maura Leen, “Biopatenting and the Threat to Food Security: A Christian and Development Perspective” *CIDSE Press Release*, Brussels, 10 February, 2000; “Mexican Bean Biopiracy: US-Mexico Legal Battle Erupts over Patented ‘Enola’ Bean Plant Breeders’ Wrongs Continues...” *RAFI Geno-Types*, 17 January 2000; Vandana Shiva, “Biopiracy: Need to Change Western IPR Systems” *The Hindu*, Wednesday, July 28, 1999, page 3.

¹³Pat Mooney, *The Seeds of the Earth: A Private or Public Resource?* (Ottawa: Inter Pares, 1979); Pat Mooney & Cary Fowler, *Shattering: Food, Politics and the Loss of Genetic Diversity* (Tucson: The University of Arizona Press, 1990)

0.1: The Concept of Plants and Traditional Knowledge of the Uses of Plants (TKUP)

Plants may be defined as those members of the taxonomic kingdom which are distinguished by their multicellular status, the ability to produce their own food from inorganic matter by the process of photosynthesis and the possession of rigid cell walls containing cellulose.¹⁴ The definition of TKUP is a little more problematic. Generally speaking, the literature on TKUP largely seems to prefer such phrases like “indigenous peoples’ knowledge”,¹⁵ “local knowledge”,¹⁶ “ethno-botany”,¹⁷ “tribal people’s knowledge,”¹⁸ “folk knowledge”¹⁹ or such similar adjectives which are loaded with controversial and contested meanings. This thesis rejects the aforementioned terms and phrases and will, subject to some necessary qualifiers, settle for the term, “traditional knowledge”²⁰ of the uses of plants

¹⁴*Webster's Unabridged Dictionary* (New York: Random House, 1997) at 1481. For detailed analysis of the nature, function and scope of plants, see, Chapter 2, *infra*.

¹⁵Chris Cunneen, & Terry Libesman, *Indigenous People and the Law in Australia* (Sydney: Butterworths, 1995).

¹⁶Stephen Brush & Doreen Stabinsky, *supra* note 12.

¹⁷See for example, Michael Balick & Paul Alan Cox, *Plants, People and Culture-The Science of Ethnobotany* (New York: Freeman and Company, 1996); Rajiv Sinha, *Ethnobotany- The Renaissance of Traditional Herbal Medicine* (Jaipur: Ina Shree Publishers, 1996); Erwin Ackerknecht, *Medicine and Ethnology* (Maryland: The Johns Hopkins Press, 1991)

¹⁸Kerry Ten Kate & Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing* (London: Earthscan Publications., 1999) at 29.

¹⁹George Meyer, ed, *Folk Medicine and Herbal Healing* (Illinois: Charles Thomas Publisher, 1981)

²⁰George Foster, *Traditional Societies and Technologies Changes* (Delhi: Allied Publishers, 1973); Martha Johnson, ed, *Lore-Capturing Traditional Environmental Knowledge* (Ottawa: Dene Cultural Institute

(TKUP).

First, although the term “indigenous peoples”, with its useful idiom of “indigeneity,” constitutes a powerful platform and “moral high ground” of sorts in the struggle for human equality and social dignity²¹ by indigenous peoples, some definitions of the term at international law may be unnecessarily restrictive in scope. For example, Convention 169 of the International Labour Organization defines “indigenous peoples” as:

[T]hose who have descended from populations that inhabited a country at the time of conquest, colonization, or the establishment of present state boundaries, and who irrespective of their legal status, retain some or all of their own social, economic, cultural, and political institutions.²²

and the International Development Research Centre, 1992); Peter Morley, & Roy Wallis, eds, *Culture and Curing-Anthropological Perspectives on Traditional Medical Beliefs and Practices* (University of Pennsylvania Press, 1978)

²¹Since the dismantling and de-legitimization of the moral and legalistic justifications for colonization of peoples by European powers, international human rights discourse and practice have shifted focus to the consequences of post-colonialism of which the historical and contemporary injustices afflicted on indigenous peoples has assumed prominence. This trend was given greater impetus by the Martinez Cobo report of the late 1980s. See, Martinez Cobo, *Study of the Problem of Discrimination Against Indigenous Populations* U.N. Doc. E/CN.4/Sub.2/1986/7 Add. 4, U.N. Sales No. E.86.XIV.3.3. [hereinafter, Cobo report] See also, *The United Nations Draft Declaration on the Rights of Indigenous Peoples*, U.N. ESCOR, Commission on Human Rights, 11th Sess., Annex I, U.N. Doc. E/CN.4/Sub.2 (1993); Heather Archer, “Effect of United Nations Draft Declaration on Indigenous Rights on Current Policies of Member States” (1999) 5 *Journal of International Legal Studies* 205; James Anaya, “Environmentalism, Human Rights and Indigenous Peoples: A Tale of Converging and Diverging Interests” (2000) 7 *Buffalo Environmental Law Journal* 1; Sevine Ercmann, *supra* note 6; Lakshman Guruswamy, Jason Roberts & Catina Drywater, “Protecting the Cultural and Natural Heritage” (2000) 7 *Buffalo Environmental Law Journal* 47; Rainer Grote, “The Status and Rights of Indigenous Peoples in Latin America” (1999) 59 *ZaorRv-Heidelberg Journal of International Law* 497.

²²*International Labour Organization Convention 169 Concerning Indigenous and Tribal Peoples in Independent Countries*, 1989, 7th June, 1989, reprinted in (1989) 28 I.L.M. 1382 [hereinafter, ILO 169] See also, Dudmundur Alfredsson, “The Rights of Indigenous Peoples With a Focus on the National Performance of the Nordic Countries” (1999) 59 *ZaorRv-Heidelberg Journal of International Law* 529. Of course, there are other definitions of indigenous people at international law. See for example, “Indigenous and Tribal Peoples” online > ecocouncil.ac.cr/indig, accessed on 24/11/01. See also, Cobo Report, *supra* note 21 at 29.

Obviously, this definition has more direct reference “to the histories of the Americas,²³ New Zealand, and Australia, and ignores African and Asian historical realities.”²⁴ Thus, excluding a sizable part of the populations whose experiences in the prevailing regime on patents are similar to that of the “indigenous peoples” as narrowly defined by ILO Convention 169.²⁵ It

²³Colin Samson, *et al*, eds., *Canada's Tibet— The Killing of the Innu* (London: Survival, 1999) at 4. “The Innu have the highest suicide rate in the world as one of the world’s most powerful nations occupies their land, takes their resources and seems hell-bent on transforming them into Euro-Canadians...In April 1999 the UN’s Human Rights Committee described the situation of indigenous people as the ‘most pressing issue facing Canadians’, the Committee condemned Canada for its practice of ‘extinguishing’ aboriginal people’s rights.” *Ibid*. Similar observations and conclusions have been made and reached in respect of indigenous peoples in the United States, Latin America, Australia and New Zealand. The Innu in Canada are 13 times more likely to commit suicide than the average Caucasian Canadian. See, *Choosing Life: Special Report on Suicide Among Aboriginal People* (Ottawa: Minister of Supply and Services, Canada, 1995). Indigenous peoples have well-documented phenomena of alcoholism and social/family dysfunction attributed to colonization and domination. See, note 21 *supra*.

²⁴Michael Halewood, “Indigenous and Local Knowledge in International Law: A Preface to Sui Generis Intellectual Property Protection.” (1999) 44 *McGill Law Journal* 952. [hereinafter Halewood]; Mark Hannig, “An Examination of the Possibility to Secure Intellectual Property Rights for Plant Genetic Resources Developed by Indigenous Peoples of NAFTA States: Domestic Legislation under the International Convention for Plant Varieties” (1996) 13 *Arizona Journal of International and Comparative Law* 175. This is without prejudice to the enormous normative benefits which have accrued from the use and invocation of the phrase “indigenous peoples”, particularly, in their historical and extant struggles against domestic oppression and assimilative processes by the dominant and colonizing cultures. The literature on this is enormous. For a brief overview, see, Janet McDonnell, *The Dispossession of the American Indian 1887-1934* (Bloomington: Indiana University Press, 1991); Helen Venne, *Our Elders Understand Our Rights: Evolving International Law Regarding Indigenous Rights* (Penticton, British Columbia: Theytus Books Ltd, 1998); James Crawford, ed, *The Rights of Peoples* (Oxford: Oxford University Press, 1988); Catherine Brolman, *et al*, eds, *Peoples and Minorities in International Law* (Dordrecht: Martinus Nijhoff, 1993); Sarah Pritchard, ed, *Indigenous Peoples, the United Nations and Human Rights* (London: Zed Books Ltd, 1998); Mary Ellen Turpel, “Indigenous People’s Rights of Political Participation and Self-Determination: Recent International Legal Development and the Continuing Struggle for Recognition” (1992) 25 *Cornell International Law Journal* 579; Maivan Clech Lam, “Making Room for Peoples at the United Nations: Thoughts Provoked by Indigenous Claims to Self-Determination” (1992) 25 *Cornell International Law Journal* 603; Raidza Torres, “The Rights of Indigenous Populations: The Emerging International Norm” (1991) 16 *Yale Journal of International Law* 127. But see, R.H. Barnes, *et al*, (eds.), *Indigenous Peoples of Asia* (Ann Arbor, Michigan: Association for Asian Studies, Inc., 1995) [Showing that the concept of indigeneity may also apply to Asia, as for example, the Ainu of Japan]

²⁵See, *Draft Report of the World Intellectual Property Organization (WIPO) Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, Geneva, Switzerland. [hereinafter, WIPO Report]. Copies of this report are available from WIPO headquarters at, WIPO, 34 Chemin des Colombettes,

would therefore be better to adopt a more inclusive concept which recognizes that traditional knowledge is not always “indigenous.” As the recent WIPO report notes, “...traditional knowledge is not necessarily indigenous. That is to say, indigenous knowledge is traditional knowledge, but not all traditional knowledge is indigenous.”²⁶ For example, traditional knowledge by African communities of the uses of plants endemic to Africa is not indigenous knowledge. It is traditional knowledge.

Second, although the term “tribal knowledge” appears in the ILO Convention 169, it is not defined in any international legal instrument but has pejorative meanings²⁷ and overtones of primitivity²⁸ and racial inferiority.²⁹ Accordingly, this thesis rejects such

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²⁶WIPO Report, *supra* at 28.

²⁷*The Illustrated Oxford Dictionary* defines a “tribe”, as a “group of primitive families or communities, linked by social, economic, religious, and blood ties having a common culture and dialect, or a recognised leader.” Ironically, some of the so-called tribes, like the Yorubas and Igbos of Nigeria number over 40 million respectively and occupy territories larger than a long list of European countries. Needless to say, it would be considered insulting to describe such peoples or countries as the Irish, Welsh, English, Scottish and the Dutch as tribes. (DK Publishing, London)

²⁸*The Oxford English Dictionary* defines “tribe” as “a race of people, frequently applied to a group of primitive people, especially, a primary aggregation under a chief or headman.” [Second Edition, Volume XVIII, 1987] at 503.

²⁹ *The Convention Concerning the Protection and Integration of Indigenous and Other Tribal and Semi-Tribal Populations in Independent Countries* (otherwise known as ILO 107), 26 June 1957, reprinted in 328 U.N.T.S. 247, is perhaps the worst international law instrument which positively denigrates non-Western cultures and peoples as devoid of culture and desperately in need of “development.” This convention is explicitly based on the notion that non-Western cultures, knowledge and practices are backward and primitive. Widespread rejection of this racist and denigrating convention led to its revision in ILO 169. See, Richard Guest, “Intellectual Property Rights and Native American Tribes” (1995-6) 20 *American Indian Law Review* 111.

terminologies as they perpetuate the notion of an inherent inferiority of non-Western intellectual contributions to the conservation and improvement of plants and TKUP.

The term “traditional knowledge”, in spite of its shortcomings, seems better. First, it is less offensive than the afore-mentioned terminologies. Second, it embraces a wider scope of individuals, communities and cultures living in a largely non-urbanized set-up or “traditional lifestyles” as the Convention on Biological Diversity styles it.³⁰ A rider must be quickly added; that is, the term “traditional knowledge” should not be understood as denoting or even connoting notions of heritage, antiquity, stagnation and immutability of the knowledge in question. As the Four Directions Council of the First Nations of Canada has pointed out:

[W]hat is ‘traditional’ about traditional knowledge is not its antiquity but the way it is acquired and used. In other words, the social process of learning and acquiring which is unique to each indigenous group, lies at the heart of its ‘traditionality.’ Much of this knowledge is actually quite new, but it has a social meaning and legal character, entirely unlike the knowledge indigenous people acquire from settlers and industrialized societies.³¹

Modern international law³² and informed opinion³³ on the subject accept and recognize the

³⁰Art 8 (j) CBD. This refers to communities or individuals whose cultural and economic lifestyles are deeply intertwined with their customary uses of the territories which they occupy.

³¹Graham Dutfield, “The Public and Private Domains: Intellectual Property Rights in Traditional Ecological Knowledge” Oxford Electronic Journal of Intellectual Property Rights, online > <http://users.ox.ac.uk/~mast>. Accessed on 9/21/99. Alternatively, see, Russell Barsh, “Forests, Indigenous Peoples and Biodiversity: Contribution of the Four Directions Council” Submission to the Secretariat of the Convention on Biological Diversity (1996).

³²For example, Article 8 (j) of the CBD provides that:

[E]ach contracting party shall, as far as possible and as appropriate subject to national legislation, respect, preserve, and maintain knowledge, innovations and practices of indigenous and local communities...”

dynamism and modernity of traditional knowledge.

In sum, this thesis will define TKUP as that body of existing and evolving knowledge and innovations of individuals and communities operating outside the dominant Euro-centric paradigm. This body of knowledge deals with the various uses and properties of plants, and the derivatives or combinations thereof. Generally speaking, this body of knowledge “has not been recognized as being either “scientific” or valuable to the dominant culture and so has been freely appropriated by others.”³⁴ Having thus defined the concept of TKUP it is now apposite to delimit the boundaries of this thesis and the issues addressed.

0.2: Delimiting the Boundaries of the Inquiry

The phenomenon of appropriation and privatization of plants and TKUP refers to the asymmetrical movement of plants and TKUP from the so-called South to the North through the processes of international institutions and the patent system. This process is characterized by the non-recognition of the intellectual contributions of holders and practitioners of traditional knowledge towards the improvement of the plants or creation of the TKUP in question. It also deals with the monopolization of the economic rewards which inevitably flow from the unauthorized commercialization of the appropriated plant life forms and/ or the

[Emphasis added] The reference here to innovations implies a dynamic improvement in such body of knowledge.

³³The Crucible Group, *People, Plants and Patents: The Impact of Intellectual Property in Trade, Plant Biodiversity and Rural Society* (Ottawa: IDRC, 1994).

³⁴Arriaza, *supra* note 4.

relevant TKUP.

This practice raises diverse but serious issues and consequences traversing the gamut of conservation of biological diversity and mutually supporting human cultures, genetic resources in agriculture, integrity of plants life forms, justice in the international economic order and the concept of development. In the appropriation of plants and TKUP, capital interests across the industrialized world have largely employed two distinct but mutually reinforcing methods, namely, institutional and juridical mechanisms and a culture of gendered and denigration of non-Western contributions to plant use.

The first mechanism has been primarily effective since the establishment of the International Agricultural Research Centres (IARCs). The IARCs have essentially been pipes through which plant germplasm flowed from the South to the North. Another aspect of the first mechanism implicates the patent system. Since the institution of the IARCs and the consequent development of commercial seed business in the North, there has been a deliberate relaxation and weakening of the traditional conditions for patentability of inventions. This process serves the interests of the seed companies and the emerging biotechnology industry and hence, the appropriation and privatization of plants and TKUP. This is what John Frow has described as the “intense process of commercialization and privatization of knowledge.”³⁵

Apart from diminishing the residual stock of what may have been construed as information or resources in the “public domain”,³⁶ the process raises the unexplored question

³⁵John Frow, “Public Domain and Public Rights in Culture” (1998) 13 *Intellectual Property Journal* 39. [hereinafter, Frow]

³⁶The concept of public domain is an ill-defined space of what remains after all other rights covered

of what remains of a state's inherent right to determine for itself in a democratic manner, the nature of social values which ought to find expression in its laws, particularly, patent laws. In an age of globalization with its externally dictated minimum standards and scope of what may be patented, domestic sovereignty to determine what may be patented seems to have been usurped by "global" trade institutions whose deliberations are usually shrouded in secrecy.

Questions also arise as to whether this emerging order adequately addresses "grassroots" concerns of the particularities, perspectives, localisms and contingencies inherent in the inevitability of domestic application of global rules which facilitate the appropriation and privatization of plants and TKUP.³⁷ Given that patent laws have international implications, there is the corollary issue in international law of state responsibility for domestic juridical and cultural institutions which facilitate or condone the phenomenon of appropriation and privatization of another state's plants and TKUP.

by intellectual property regimes have been unitised, privatised and commercialized. See, David Lange, "Recognizing the Public Domain" (1981) 44 *Law and Contemporary Problems* 4; Jessica Litman, "The Public Domain" (1990) 39 *Emory Law Journal* 968.

³⁷Peter Drahos, "Indigenous Knowledge and the Duties of Intellectual Property Owners" (1997) 11 *Intellectual Property Journal* 179 at 180. [hereinafter, Drahos on Indigenous Knowledge] Notwithstanding contemporary principles of private international law on the question of extra-territorial adjudication and enforcement of patents, it seems possible, if not probable that the process of globalization of the patent regime would provide for extra-territorial judicial enforcement of patent suit injunctions. For further examination of this issue, see, John Adams, "Litigation Beyond the Technological Frontier: Comparative Approaches to Multinational Patent Enforcement" (1996) 27 *Law and Policy in International Business* 277. However, there is a renewed interest in the World Intellectual Property Organization (WIPO) to negotiate and conclude a treaty on settlement of disputes between states on matters related to intellectual property rights (IPRs), particularly, patents. See, *Draft Treaty on the Settlement of Disputes in the Field of Intellectual Property*, International Bureau of WIPO, WIPO Doc. SD/CE/V/2 (April 8, 1993). See also, Thomas Vanaskie, "The European Patent Conventions: State Sovereignty Surrendered to Establish a Supranational Patent" (1977) 1 *A.S.I.L.S. International Law Journal* 73.

Second, there are issues of the probable consequences of appropriation and privatization of plants and TKUP, particularly the economic, political and cultural rights of peoples outside the dominant Western paradigm. It has not yet been resolved what implications appropriation and privatization of plants and TKUP holds for the emerging “right” to sustainable development, especially, for the “developing” part of the world. There are also questions of global food security. These are complex issues which are still in a state of flux and thus complicate theorizing and analysis.

In the examination and analysis of these issues, there are certain theoretical postulates underpinning this thesis. The first is that the patent system in its norms and institutions has developed in the historical context of capitalism with a bias for the accumulation and multiplication of capital. In this sense, the subordination of plants and TKUP is only a logical step in the process. This thesis details and analyses the institutional and juridical processes involved in the subordination of plants and TKUP as private property. The processes have been subtle and complex but it is important to keep the narrative and analytical thread fairly simple.

First, it should be noted that although the patent system was originally conceived as a mechanism for rewarding individual inventors, the corporatization of the inventive process has dramatically reduced the inventor to the status of a regular paid worker. In this sense, the patent system seems to serve the benefits of an employer of capital rather than the individual inventor. In effect, discounting the profits derived by the employer of labour, patents are ultimately national assets. Whatever benefits the individual inventor gets are merely collateral and contingent upon his/her status as an employee or, by his/her inability to commercialize

the invention. In essence, the patent system is a policy tool and its theoretical postulations are by and large a reflection of perceived state interests, especially for states powerful enough to impose their interests on other states. Within this theoretical context, it therefore follows that whatever rules are designed for patents, whether inter or intra-state, are essentially a matter of the state's respective perception of its political economics. As already noted, this is particularly the case where the state in question has the clout to project an extra-territorial enforcement of patents issued by it. It is within this theoretical paradigm that changes in the patent law and system, whether municipal or, international, must be understood.

Second, the contemporary patent system did not emerge in the world as a mature system. Shorn of its globalist pretensions, the patent system is a product of a European social, economic and political culture. Accordingly, a study of the implications of the globalized patent regime on the regime on plants and TKUP must acknowledge and address the intra and inter-cultural implications of a globalizing patent system. The implicit point here is that an analysis of the issues raised above must *ex necessitate*, adopt a layered and multi-dimensional approach.

The importance of this approach in the explication and analysis of the issues is to provide the reader with an awareness of the broader contexts in which the law of patents has found vigour and shaped the contours of international law. Of course, the scope and depth of the political, economic, social, scientific, cultural, ethical and historical issues involved may be a little superficial as no expertise in those disciplines is claimed, but the purpose in their discussion is to augment and clarify the legal materials dealt with in this thesis. In any event, as the preceding pages have observed, scholars from disciplines other than law have already

augmented, indeed, filled out the missing meta-legal gaps in the phenomenon at hand.

At the juridical level, this thesis examines the principles of patent law, and the structure and process of international instruments on patent law as they implicate various domestic patent law systems. This aspect of the thesis will analyze and explore the principles of international law as it affects the creation and modification of international law on patents, particularly the incorporation and application of international patent law treaties and conventions into domestic law. After all, it is on the domestic terrain that the efficacy and ramifications of international agreements on patents are played out. Given global differences of culture and economics, the complexity of the question of appropriation and privatization of plants and TKUP cannot be overstated. Hence, the imperative for a broadened scope of inquiry and analysis.

On this broadened canvas, the thesis explores the impact of the globalized patent system on the integrity of earth's plant resources and the marginalized human cultures which largely bear the burden of maintaining earth's diverse but rapidly diminishing plant life forms. Within this context, there is a need to explore the influence of the major religious and philosophical viewpoints on the laws on plants and TKUP. The obvious inference here is that patents have an enormous impact on the global environment and the question whether the patent system is an appropriate incentive mechanism for the conservation of biological diversity remains open, if not controversial.

Law is a purposive institution and instrument and also functions as sites and locations for negotiation and resolution of societal and international conflicts or interests. In these sites, the interests of those with substantial property usually prevail. However, the larger question

remains whether law without social justice is worth its name. The point here is that although the doctrinal bias of the patent law system is a positivist's delight; regrettably, it is also a source of frustration to those engaged in a normative and purposive study of law. A strict doctrinal approach would not only restrict the questions that may be asked, but circumscribes the ambit of any normative prescriptions derivable from a fundamental de-construction and re-construction of the institution of patents as it affects plants and TKUP.

The theory and practice of patent law and system itself reveals a purposive socio-economic and political instrumentality.³⁸ It is also within an instrumentalist conception of the patent system that the modern extension of patents into plant life forms and TKUP has been premised. However, the inescapable reality is that within the context of the global system, patent laws and institutions are largely designed to protect and serve the values and interests of states, particularly, the so-called North. The pertinent question however, is whether this body of values and interests is reconcilable with non-Western values and interests. And even if so, whether the values and interests in question are compatible with the demands of the need for a regime respectful of the integrity of plant resources; particularly in an age of globalization. Within the context of the globalization of the patent system, particularly, patents on plants and TKUP, some scholars have raised some issues needing to be examined, evaluated and if need be, re-considered.³⁹

From a strictly analytical philosophical point of view, especially, proceeding from the

³⁸Robert Samuel Summers, *Instrumentalism and American Legal Theory* (Ithaca: Cornell University Press, 1982) at 20. [hereinafter, Summers on *Instrumentalism*]

³⁹Drahos, On Indigenous Knowledge, *supra* note 37 at 190.

Judeo-Christian conception of plants as the property of mankind, ownership of patents on plant life forms, like other forms of property, is about relations between legal persons *inter se*. It is also about property relations between plants and human beings.⁴⁰ To say the least, it is doubtful whether this conception of property rights,⁴¹ may be easily reconciled with a conception of plants as part of the entire ecosystem, with intrinsic worth of their own just like humanity.

It is this unease with conceptions of plants as mere economic units which probably impels the need for a normative, distributive and efficiency assessment of the ramifications of the contemporary appropriation and privatization of plants and TKUP. This critical approach, as this thesis postulates, brings “into play values in one way or another so as to reach ought conclusions of some kind. They concern themselves with either prescription or justification.”⁴² Thus, the position taken in this thesis and the method of analysis examines the policy basis of international principles of patent law as such policies affect plants. It also explores the interface created when parochial conceptions of property assume the juridical character of global axiom and legal norm. In other words, since the Western system of property ownership (including patents) is basically about the right to exclude others, what is the position of many

⁴⁰Peter Drahos, *A Philosophy of Intellectual Property* ((Dartmouth: Aldershot, 1996) at xi. (hereinafter, Drahos). See also, Alex Geisinger, “Sustainable Development and the Domination of Nature: Spreading the Seed of the Western Ideology of Nature.” (1999) 27 *Environmental Affairs* 43.

⁴¹L.C. Becker, *Property Rights-Philosophic Foundations* (London: Boston, 1977); J. Waldron, *The Private to Private Property* (Oxford: 1988); L. Lindhal, *Property and Change* (Boston: 1977); A.M Honore, “Ownership” in A.G. Guest, (ed.), *Oxford Essays in Jurisprudence* (Oxford: 1961).

⁴²Drahos, *supra* note 40 at 3.

non-Western property frameworks which define ownership in terms of the right to use (and not necessarily to exclude others)?

Further, given that patent rights “are liberty-intruding privileges of a special kind and ...promote factionalism and dangerous levels of private power,”⁴³ the implications of an expanded patent regime on plants for the concept of distributive justice at the global level cannot be ignored. The fear, as Peter Drahos has noted, is that, “for highly scientific/technological societies guided by cunning, very little is likely to remain free from appropriation.”⁴⁴ Drahos’ argument may be more prophetic than alarmist given recent juridical developments which continue to blur the distinction between what is patentable and what may not be patented.⁴⁵ Without dabbling into prophecy, what is becoming apparent is that unless a normative approach is taken to address the issue, it is probable that in addition to plants and TKUP “all kinds of abstract information in the public domain will fall into private ownership.”⁴⁶

An instrumentalist⁴⁷ approach towards the evaluation of the role of the international

⁴³Drahos, at 5.

⁴⁴*Ibid.*

⁴⁵Philippe Ducour, *Patenting the Recombinant Products of Biotechnology and Other Molecules* (London: Kluwer Law International, 1998)

⁴⁶Drahos, *supra* note 40 at 209. See also, R. Eisenberg, “Patenting the Human Genome”, (1990) 39 *Emory Law Journal* 721; T. Roberts, “Broad Claims for Biotechnological Inventions” [1994] 9 *European Intellectual Property Review* 373.

⁴⁷John Dewey, *Philosophy and Civilization* (Gloucester: Peter Smith, 1931)

patent system and the supporting institutions which conduce to the appropriation and privatization of plants and TKUP is thus of eminent value. Patents as property must serve some moral value but cannot be the basis of moral value itself.⁴⁸ As Summers noted, it is not enough to say that legal regimes, as legal instruments, exist to serve some ends;⁴⁹ it would be better to engage in a vigilant and critical scrutiny of law as a means to an end.⁵⁰ In sum, while the doctrinal approach provides the foundation and core of the thesis, it moves beyond doctrinal exegesis to examine the substantive and normative content of the emerging global patent regime.

In effect, this thesis argues for a re-orientation of international patent law.⁵¹ Legal concepts and institutions which merely constitute an avenue for the maximization of individual wealth at the expense of the overall integrity of the earth⁵² and its supporting but marginalized human cultures and societies deserve critical re-consideration.⁵³ This objective demands a

⁴⁸Konstantinos Adamantopoulos, ed, *An Anatomy of the World Trade Organization* (The Hague: Kluwer Law International, 1997) at 1.

⁴⁹Summers on *Instrumentalism*, *supra* note 38 at 21.

⁵⁰Summers on *Instrumentalism* at 42.

⁵¹Terry Nardin & David Mapel, eds, *Traditions of International Ethics* (Cambridge: Cambridge University Press, 1992) at 10.

⁵²M. Kenney, *Biotechnology: The University Industrial Complex* (New Haven: Yale University Press, 1986)

⁵³Jules Coleman, *Markets, Morals and the Law* (Cambridge: Cambridge University Press., 1988) at 114.

radical shift in values.⁵⁴ As Chistine Frader-Frechette has urged, “we must shift from the individual to the community, from property to common heritage, from uniformity to diversity and poly-culture, from short-term, quick returns view to a long-term sustainable approach, from exploitation to conservation of nature, from large scale projects to those of human scale.”⁵⁵

0.3: Outline of Thesis

Towards a coherent presentation and analysis of the myriad issues raised above, this thesis is arranged into five chapters. Chapter 1 is an anatomy of the structure and process of the relationship between various national patent systems and the patchwork of international instruments seeking the harmonization of national patent regimes. It also provides a multi-dimensional analysis of the evolution and globalization of the patent concept within the milieu of the North-South divide. Further, there is a doctrinal analysis of the sources of international law on patents and their status and effect at the domestic level.

The underlying theory in this aspect of the analysis is that although the patent system is intrinsically international in an increasingly interactive world, it is most importantly, aggressively nationalistic. It serves instrumentalist goals of states, especially powerful multinational corporations capable of influencing and using the machinery of their parent state

⁵⁴R. Rajagopalan, “Common Heritage: The Ecovillage Approach” in R Rajagopalan, ed, *Common Heritage and the 21st Century* (Malta: International Ocean Institute, 1998) at 159.

⁵⁵Kristin Shrader-Frechette “Environmental Ethics and Global Imperatives” in Robert Repetto, ed, *The Global Possible* (New Haven: Yale University Press, 1985) at 97.

to influence the domestic patent regimes of other states. Accordingly, powerful states prodded by influential industries such as the biotechnology and pharmaceutical firms, tend to favour patent laws which suit and serve their perceived national interests. In this context, the forced globalization of the patent concept owes more to the influence of American corporations.

In consequence, domestic standards of patentability, competing priorities, values, and interests of weaker states have been squelched. In this milieu of competition and conflicts, the interests of powerful corporations and states which converge with capitalistic interests seems to prevail. However, the nature of this conflict would in turn affect the domestic status and effect of international instruments on patents. Weaker states determined to preserve their authority to legislate locally and also to protect their threatened national interests may not enthusiastically embrace supra-national institutions concerned with the promotion of foreign interests. The principles of international instruments on patents will ultimately pass through the filter of domestic jurisdictions of states and the embedded national priorities, preferences and values.

Chapter 1 is split into ten sections. Section 1 traces the origin of the modern system of patents from the Italian peninsula. The salient point here is that the modern patent system is culturally Eurocentric. However, this does not mean that the medieval Europeans were the only or first people to conceive of or institutionalize a regime of patents. Anthropological evidence is conclusive that the Andamans of the Indian Ocean already had a conception of patents. What distinguishes the Eurocentric patent system is the emphasis on exclusivity of use of an invention and the pre-eminence of the individual in the social process of creation or

invention of new objects.

Section 2 defines the concept of patents while section 3 examines the diffusion of the patent system from Italy to mainland Europe and the consequent imposition of the patent concept on other diverse people. The latter objective was largely achieved by colonialism and the migration of Europeans to the Americas, Africa, Asia and Oceania. Of course, there are a few exceptions like Japan which volitionally instituted the patent system. However, a decisive majority of states outside the Eurocentric paradigm received their patent systems by colonial fiat, imperialist threats or coercion.

Section 4 deals with the historical evolution and development of the patent system in the cultural hearth of Europe. The objective here is to demonstrate the inextricable link between European cultural values and philosophies on the patent system. Section 5 examines the law on patentable subject matter. Although this issue is dealt with in greater detail in Chapter 4, the objective here is to show that the law on patentability has never remained the same. Rather, it has moved in directions dictated by industry. Section 6 examines the various theoretical justifications for the patent system. This section critiques the dominant theories on patents such as the natural rights theory, the reward theory, contract/disclosure of secrets theory, encouragement of invention and prospect theories. It argues that patents are fundamentally instruments of state political economics.

Section 7 takes the argument further by revisiting and interrogating the pervading notion that patents encourage inventiveness. It is more probable that with or without patent systems, inventions would always occur. However, the patent concept probably catalyzes the commercialization of patented products as it offers promises of enormous profits through the

process of limited exclusivity of the patented product.

Section 8 explores the North-South dimensions of the patent system. It shows how the resultant tensions and interface underpin the current debates on whether the patent systems of powerful states appropriate plants and TKUP of weaker states. Section 9 examines the principles of international law applicable to the regime of patents, particularly, how international patent law obligations are enforced at the domestic level. It also deals with the roles of international bodies such as the United Nations in creating and resolving differences to the patent concept. In sum, it describes the status and effect of international instruments on patents at the domestic level.

Chapter 2 analyzes the evolution, development and status of the regime on plants. The objective is to offer a background for subsequent analysis on the methods by which international institutions and the patent system appropriate and privatize plants and TKUP. This chapter has seven sections. Section 1 examines and evaluates the nature, value and functions of plant life forms. Section 2 explores the various religio-philosophical conceptions of plant life forms as they have shaped and influenced legal norms on plants. In this section, brief attention focuses on the major and “minor” philosophical conceptions of plants. Emphasis is placed on the Judeo-Christian conception of plants which has had the most abiding and pervasive influence on the legal norms, institutions, prejudices and attitudes on plant life forms.

Section 3 devotes attention to the influence of a gendered and racist conception of science and development which forms the sub-text to the marginalization of non-European paradigms of knowledge. In other words, the process of appropriation and privatization of

plants and TKUP is not strictly a legal phenomenon, rather, it operates within a social structure of inbuilt prejudices and biases. These deny the intellectual contributions of traditional farmers and breeders, particularly women.

Section 4 deals with the phenomenon of plant distribution across the globe and its overall impact and influence on the politics of control of plant life forms. Most of the world's plant life forms occur in the so-called South. The phenomenon in question is not solely a function of the whims of geography but also a consequence of the enormous efforts spanning the millennia in the conservation and improvement of plants by local and traditional farmers and breeders. However, the diversity of plant life forms is currently under severe threat from the processes of globalization and homogenization of cultures.

Section 5 deals with the issue of the multiple causes of the modern loss of plant life forms. Certain factors are identified and examined. These include the culture of consumerism, the inequitable global economic regime, over-population, agribusiness/bio-prospecting and biotechnology, climate change, and the homogenization of cultures. These problems constitute enormous challenges to the fledgling body of international environmental law. Section 6 explores how international environmental law has responded to the challenges of the erosion and loss of plant life forms. Towards this end, it examines in greater detail the provisions of and contributions to the jurisprudence on plants and TKUP, of the Convention on Biological Diversity.

Chapter 3 deals particularly with the genesis and legal structure of the institutional means for the appropriation and privatization of plants and TKUP. The chapter is divided into five parts. The introductory part deals with the concept and mechanism of appropriation and

privatization. The major institutionalized process for appropriation of plants are the International Agricultural Research Centres (IARCs) which practically functioned and still functions as conduit pipes for funneling plant germplasm from the South to the North. This mechanism has largely operated under the nebulous and erroneous notion that plants from the South constitute part of the common heritage of mankind.

Section 2 details the early beginnings of the appropriation and privatization of plants and TKUP. Section 3 tackles the question of whether the notion of Common Heritage of Mankind is part of the accepted principles of international law, and if so, whether it is applicable to plant life forms and TKUP. The conclusion of this section is that the notion of Common Heritage of Mankind does not apply to plants and TKUP. Section 4 examines the appropriative role and functions of the IARCs. It also explores the role of the Food and Agriculture Organization (FAO) in the politics of plant life forms and how international law has responded to the question of the legal status of plant germ plasm stored in *ex situ* gene banks. As in the preceding chapters, the analysis is conducted within the context of the North-South divide.

Chapter 4 specifically deals with the various methods by which the discordant values and policies of various patent regimes, particularly the United States patent system, have been adjusted and retooled to suit the interests of seed companies, pharmaceutical, and biotechnology industries. It is divided into two main parts. Given the differences between the law of patents on plants and TKUP, part one deals specifically with plants and the development of the legal regime on patents on plants, particularly, as it affects the appropriation and privatization of plants through the patent law mechanism. Part two is

concerned with the appropriation and privatization of TKUP through the patent process.

The entire chapter is split into eight sections. Attention is paid to the vagueness of and inconsistencies in the law on the elements of patentability. All sections examine the various ways in which domestic legislative and judicial activities, especially in the United States and Western Europe have been designed to facilitate or at least conduce to the appropriation of plants and TKUP. Similarly, the loopholes in the absence of a global standard on novelty and other juridical curiosities which facilitate the appropriation and privatization of TKUP are discussed and examined.

Section 1 is introductory. The second section examines the changing concept of patentability as it relates to plants. Section 3 relates the phenomenon to TKUP. Section 4 examines the nature and quality of international law's response to the challenge of appropriation. Here, the normative thrusts at the "soft law" level and other emerging hard law commitments are juxtaposed and scrutinized. This section also constitutes a review and critique of the modern ideas on how to stem the tide of appropriation. It gives a couple of examples on how the patent system may be adjusted to accommodate the interests of marginalized cultures and societies who conserve plant diversity and TKUP. Particular regard is paid to the concepts of communal patents and a modified version of Plant Breeders' Rights (PBRs).

The thesis concludes with Chapter 5. The questions which are dealt with in this concluding chapter largely relate to the issue of the actual and probable consequences of an appropriative patent regime on plants and TKUP. These questions include but are not limited to the law of state responsibility as they affect appropriation and global food security. There

are also questions of bio-safety and the influence of patents on modified plants and the general environment. Section 5 deals with the option of registering TKUP and section 6 examines the regime of communal patents. Section 7 explores Plant Breeders' Rights (PBRs). The chapter ends with a summative section. The thesis is summed with the postulation that the patent system must be made to serve a socially desirable end and not the narrow interests of a few powerful forces in the human global community.

CHAPTER ONE

The Evolution and Anatomy of the Patent System: The North-South Context

1.1: Origin of the Patent System

In spite of the popular but nonetheless erroneous belief that the patent system originated in industrial England in the post-medieval era,⁵⁶ the modern concept of patents was in fact conceived in Florence under circumstances which Owen Lippert has likened to “blackmail.”⁵⁷ In 1421, the medieval Florentine architect and inventor, Filippo Brunelleschi invented an iron clad sea-craft christened the “Badalone” which he claimed could transport marble across the lake Arno for the construction of the now famous suspended dome of the

⁵⁶Stephen Ladas, *Patents, Trademarks, and Related Rights: National and International Protection* (Mass: Harvard University Press, 1975) at 6. [hereinafter, Ladas] For the argument on the British origin of patents, see, J. Gordon, “Patent Law Reform” (1906) 55 *Journal of the Society of Arts* 26. This contention is based on the so-called patents issued to John Kemp in 1331 for him to bring to England his servants and apprentices to practice the art of weaving in England. Given that this and similar patents were designed to import existing trades to England, such claims lack merit. Although conventional wisdom locates the origins of the modern patent system on the Venetian Act of 1474, some scholars like Erich Kaufert have argued that the Venetian law had its roots in the Germanic patents on mining water technology issued in Tyrole in 1409. See, Harold Wegner, “TRIPS Boomerang-Obligations for Domestic Reform” (1996) 29 *Vanderbilt Journal of Transnational Law* 535 at 538. [hereinafter, Wegner] Compare with, Mladen Vukmir, “The Roots of Anglo-American Intellectual Property Law in Roman Law” (1991) 32 *IDEA* 123. These arguments lack solid support.

⁵⁷Owen Lippert, “One Trip To The Dentist Is Enough” in Owen Lippert, ed, *Competitive Strategies for the Protection of Intellectual Properties* (Vancouver: The Fraser Institute, 1999) at 131. Prior to the Florentine case of Brunelleschi, it seems that the first recorded classical reference to the idea of patents was Aristotle’s account of the proposal by Hippodamus of Miletos. The idea was rejected by Aristotle who feared that it would lead to social instability. See, Robert Merges, Peter Menell & Mark Lemley, *Intellectual Property in the New Technological Age* 2nd ed., (New York: Aspen Law & Business, 2000) [hereinafter, Merges, *Intellectual Property*] In addition, the Greek historian Phylarchus in the *Banquet of the Learned* traces the concept of rewarding novel inventions with a monopoly right to the accounts of the Greek colony of Sybaris known for luxurious living and indulgence circa 500 B.C. According to Phylarchus, the Sybarites granted a monopoly of one year to whoever prepared the most unusual and outstanding dish. See, H. Foster & Robert Shook, *Patents, Copyrights & Trademarks* (New York: John Wiley & Sons, 1989) 3. Similarly, the early Romans rewarded their inventive citizens by exempting them from normal civic duties such as conscription in warfare.

cathedral in Florence. Contrary to the existing tradition of disclosure of new scientific discoveries and inventions, Brunelleschi refused to disclose his invention unless the city granted him a limited right to sole commercial exploitation of the sea-craft. Florence yielded to his unprecedented demands and on June 19, 1421, granted him a public letter to that effect.⁵⁸ However, to his and Florence's mutual embarrassment, the "Badalone" dramatically sank on its first trip on lake Arno.⁵⁹ For a long time thereafter, Florence stopped issuing patents. Recovering from this watery debut and failure, the concept of patents drifted to neighbouring Venice where it became anchored in what is perhaps, the first substantive patent statute in the world.⁶⁰

The Venetian patent statute of March 19, 1474 was radical and pioneering in several respects.⁶¹ It offered protection for a period of ten years to all inventions which passed the

⁵⁸According to Maximillian Frumkin, the Brunelleschi patent "was a real invention patent, as good in subject matter as any of those dealt with in 1947 by the British Patent Office." See, Ulf Anderfelt, *International Patent Legislation and Developing Countries* (The Hague: Martinus Nijhoff, 1971) at 4 [hereinafter, Anderfelt]; See also, Buce William Bugbee, *The Early American Law of Intellectual Property: The Historical Foundations of the United States Patent and Copyright Systems* (Unpublished Doctoral Thesis) (Ann Arbor, Michigan: University of Michigan Press Press., 1961) at 70. [hereinafter, Bugbee]; M.L. Blakeney & J. McKeough, *Intellectual Property-Commentary and Materials* (Sydney: The Law Books Co. Ltd, 1987).

⁵⁹Bugbee, *supra* at 8.

⁶⁰Moureen Coulter, *Property in Ideas: The Patent Question in Mid-Victorian Britain* (Missouri: The Thomas Jefferson University Press, 1991) at 7. [hereinafter, Coulter]

⁶¹The Venetian Statute of 1474 was enacted with a large majority (116 for to 10 against and 3 abstaining). Although it was written in old Venetian dialect which is somewhat difficult to translate, Professor Luigi Sordelli's translation which is reproduced below is the most widely accepted version. The overt masculinization of inventions is also obvious. Owing to its seminal status, the Act is reproduced in extenso.

[T]here are in this city, and also there come temporarily by reason of its greatness and goodness, men from different places and most clever minds, capable of devising and inventing all manner of ingenious contrivances. And should it be provided, that the works and contrivances invented by

examinations of the General Welfare Board. In addition, it also provided for punishments for unauthorized use or infringements of patent grants.⁶² Further, Venice instituted a registry of patents in 1474.⁶³ Before delving further into the spread and development of the patent concept, it is pertinent at this stage to define the concept of patents.

1.2: Defining Patents

The term “patent” as an adjective derives from the Latin verb *patere*, which means “to be open.” In relation to a document, it means an “open letter addressed to the public.”⁶⁴

them, others having seen them could not make them and take their honor, ~~men~~ of such kind would exert their minds, invent and make things which would be of no small utility and benefit to our State. Therefore, decision will be passed that, by authority of this Council, each person who will make in this city any new ingenious contrivance, not made heretofore in our dominion, as soon as it is reduced to perfection, so that it can be used and exercised, shall give notice of the same to the office of our Provisioners of Common. It being forbidden to any other in any territory and place of ours to make any other contrivance in the form and resemblance thereof, without the consent and license of the author up to ten years. And, however, should anybody make it, the aforesaid author and inventor will have the liberty to cite him before any office of this city, by which office the aforesaid who shall infringe be forced to pay him the sum of one hundred ducates and the contrivance immediately destroyed. Being then in liberty of our Government at his will to take and use in his need any of the said contrivances and instruments, with this condition, however, that no others than the authors shall exercise them. [emphasis supplied]

See, Ladas, *supra* note 56 at 6-7. It should be noted that invention was primarily a masculine affair. The impact of this gendered conception of inventiveness on plants and TKUP is further explored in Chapter Two.

⁶²Coulter, *supra* note 60 at 9. Note that by taking the grant of patents outside the wide ambit of royal favour, the Venetian statute was far ahead of the Stuart Statute of Monopolies which it antedated by over a hundred years. On this basis, the patent granted Jacopo Acontio in 1565 for an actual invention is probably the first English patent as against the earlier grants made for the introduction or importation of already existing skill, trade or industry into England. See, Lynn White Jr., “Jacopo Acontio as an Engineer” (1967) 72 *American Historical Review* at 432. See note 56, *supra*.

⁶³Christine Macleod, *Inventing the Industrial Revolution: The English Patent System, 1660-1800* (Cambridge: Cambridge University Press, 1988) at 11. [hereinafter, Macleod] Galileo Galilei received a patent under that statute in 1594.

⁶⁴William Aldous, et al, eds, *Terrell on The Law of Patents* (London: Sweet & Maxwell, 1982) at 1.

Through such “open letters”, European monarchs in the Middle Ages conferred special privileges, status or titles on individuals or groups of people like guilds.⁶⁵ In modern times, patents have retained their original character as governmental grants or privileges.⁶⁶ Machlup has defined a patent title or grant as that “which confers the right to secure the enforcement power of the state in excluding unauthorised persons, for a specified number of years, from making commercial use of a clearly defined invention.”⁶⁷ What the patentee gets is “the right to exclude other persons for a limited time from making a commercial use of the invention without his/her consent.”⁶⁸

1.3: The Diffusion and Colonial Migration of the Patent System

The diffusion and spread of the patent concept from the Italian peninsula was not by accident. Rather, a combination of certain factors which led to the decline of Italian pre-eminence in technology facilitated and encouraged the diffusion of skilled artisans and

⁶⁵Fritz Machlup, *An Economic Review of the Patent System* (Study of the Subcommittee on Patents, Trademarks, and Copyrights of the Committee on the Judiciary, United States Senate, 85th Congress, Second Session. Study No. 15) at 1. [hereinafter, Machlup] An example is patents of nobility.

⁶⁶Laurinda Hicks & James Holbein, “Convergence of National Intellectual Property Norms in International Trading Agreements” (1997) 12 *American University Journal of International Law and Policy* 769. [hereinafter, Hicks & Holbein]

⁶⁷Machlup, *supra* 65, *ibid.* See also, J.M. Laine, “Infringement of Patents by Intention” (1901) 17 *The Law Quarterly Review* 201; Paul Mathely, “The New French Patents Acts” (1979) *Industrial Property Law* 124; Dana Rohrabacher & Paul Crilly, “The Case for a Strong Patent System” (1995) 8 *Harvard Journal of Law and Technology* 263.

⁶⁸Machlup, *supra* note 65 at 2. It is the right to exclude which largely defines Eurocentric conceptions of property. This issue is dealt with in Sections 1.4 and 1.6, *infra*.

consequent spread of the patent idea from Italy to central and Western Europe. First, the discovery by medieval seafarers and merchants of a direct sea route to India led to the bypassing of the Italian peninsula and consequently, a decline of commerce in the area. Second, the evolution of modern statehood and the rise of Christian doctrines incompatible with the dominant Roman Catholicism challenged the temporal authority of the papacy in medieval Italy.⁶⁹

The Church's intolerance of these new Christian beliefs and interpretations of the Bible led to a persecution of Italian artisans and innovators who were mostly unorthodox in their religious, scholarly and scientific beliefs. Hence, by a combination of these two factors, Italian artisans started drifting to Western Europe for the proverbial greener pasture and for their personal safety. Of course, these Italian migrants did not leave the patent concept behind them; they took it with them to central and Western Europe.

For instance, six of the first nine patents in Brussels were granted to Italians (mainly Venetians).⁷⁰ As Maximillian Frumkin noted, "one way or another, Italian influence shows like a thread in all incipient patent systems"⁷¹ of Europe. It is therefore no exaggeration to say that the foundations of most European patent systems were built on Italian immigrant skills and

⁶⁹Macleod, *supra* note 63 at 11; Robert Merges, *Intellectual Property*, *supra* note 57 at 125.

⁷⁰Bugbee, *supra* note 58 at 87.

⁷¹Quoted in Macleod, *supra* note 63 at 1. For an account of the migration of the patent concept to the United States of America, see Bugbee, *supra* note 58; Kenneth Burchfiel, "Revising the "Original" Patent Clause: Pseudo-history in Constitutional Construction" (1989) 2 *Harvard Journal of Law and Technology* 155.

concepts. The patent system spread first to Germany and then to other European states such as Russia in 1812, Belgium and the Netherlands in 1817, Spain in 1820, the Vatican in 1833, Sweden in 1834, Portugal in 1837.⁷² However, there were some European states like Switzerland which detested the patent system. It bears noting that although the various patent systems in medieval Europe world mutually influenced one another in content and organization, those states designed patent systems and policies in accord with their perceived national interests.⁷³

The method of the spread of the patent concept from Europe to other parts of the globe may be categorized into three. The first was by a direct transplant through migration of Europeans and their consequent colonization of a host of American, African, Australian, and Asian⁷⁴ indigenous peoples. In this particular process, the patent concept was part of the “baggage”⁷⁵ which the colonizing Europeans brought with them and imposed on the pre-

⁷²Frederick Abbott, Thomas Cottier & Francis Gurry, eds, *The Making of The International Intellectual Property System* (The Hague: Kluwer Law International, 1999) at 228. [hereinafter, Abbott on IPR]

⁷³C. Macleod, “The Paradoxes of Patenting: Invention and Its Diffusion in 18th and 19th Britain, France and North America” (1991) *Technology and Culture* 905. For example, the institution of patents was primarily used as means or mechanism for luring foreign skills and industries without fidelity to the criterion of absolute novelty. For instance, in France, article 3 of the original patent law of 1791, provided that “whoever [is] the first to bring into France a foreign discovery shall enjoy the same advantages as if he were the inventor.” See note, 94, *infra*

⁷⁴Sesto Vecchi & Michael Scown, “Intellectual Property Rights in Vietnam” (1992) 11 *Pacific Basin Law Journal* 67; Dereje Worku, “Patents and the Process of Innovation in East African Countries” (1990) 21 *International Review of Industrial Property and Copyright Law* 38; Gaius Ezejiofor, “The Law of Patents: A Review” (1973-4) 9 *African Law Studies* 39.

⁷⁵Bugbee, *supra* note 58 at 141-145. See also, Dan Rosen, “A Common Law for the Ages of Intellectual Property” (1984) 38 *University of Miami Law Review* 769. For a brief but useful account of the

existing indigenous laws on property and ownership. Needless to say, the concept of ownership and property in European culture and jurisprudence, including distinctions between the corporeal⁷⁶ and incorporeal⁷⁷ are neither inherently universal⁷⁸ nor global by character. As section 4 here argues, the transplanting of foreign legal culture has significant juridical, philosophical, and ideological ramifications.

The second category of the spread of the patent concept was through the process of direct, independent, and volitional borrowing of the concept by independent states without overt or covert external political threat or colonization by European states or the United States of America. This is particularly the case with Japan. Although non-European and never colonized, it independently adopted the patent concept. As Rahn has observed of the Japanese patent law and institution:

migration of both the common law and the patent concept to the British commonwealth, see, A.L. Goodhart, ed, "The Migration of the Common Law" (1960) 76 *The Law Quarterly Review* 39-90. For most of the British commonwealth countries, their original patent laws were, of course, fashioned by the British colonialists. See, T. Ekuu Sagoe, "Industrial Property Law in Nigeria" (1992) 14 *The Comparative Law Yearbook of International Business* 312; Mark Sklan, "African Patent Statutes and Technology Transfer" (1978) 10 *Case Western Reserve Journal of International Law* 55. [hereinafter, Sklan]

⁷⁶ *Justinian's Institutes* (Peter Birks & Grant McLeod, Trans.) (Ithaca, New York: Cornell University Press, 1987) at 22.

⁷⁷ *The Institutes of Gaius* (F. De Zulueta, ed.) (Oxford: Clarendon Press, 1946) Book 11, 12-14. There is a difference between the Roman and modern conception of corporeal and incorporeal rights. The Roman law distinctions is believed by some classicists to have originated from the Stoics and the Epicureans. See, John Austin, *Lectures on Jurisprudence* (5th edition., London: 1885), Lecture XIII. Roman law on the subject, with minor exceptions, was a conflation of object with ownership. Needless to add, the two are distinct concepts.

⁷⁸ Alex Castles, "The Reception and Status of English Law in Australia" (1963) 2 *Adelaide Law Review* 1; Liwei Wang, "The Current Economic and Legal Problems Behind China's Patent Law" (1998) 12 *Temple International and Comparative Law Journal* 1; William Cornish, "Patents and Innovation in the Commonwealth" (1983-5) 9 *Adelaide Law Review* 171.

[T]he first legal system introduced from the West was the patent system... In 1871, only three years after the Restoration [of the Meiji government], it introduced the Summary Rules of Monopoly, (*Sembai ryaku kisoku*), a code of 19 articles, which began with the words: he who makes a new invention of anything whatsoever, will from that time on receive permission to sell it exclusively.⁷⁹

The third category of the spread of the patent concept relates to those states which although politically independent and often disdainful or suspicious of the patent concept, were however coerced by external political pressure to create and enforce a system of patents in their domestic jurisdictions.⁸⁰ Notable in this category are China,⁸¹ Korea,⁸² The Netherlands and Switzerland.⁸³ Today, there is hardly any country that does not have a patent law.⁸⁴

⁷⁹Abbott, *supra* note 72 at 857. See also, Toshiko Takenaka, "The Role of the Japanese Patent System in Japanese Industry" (1994) 13 *Pacific Basin Law Journal* 25. For a concise account of the evolution of the Japanese patent regime, see, John Gadsby, "The Progress of Japanese Patent Law" (1911) 27 *The Law Quarterly Review* 60.

⁸⁰Paul Liu, "U.S. Industry's Influence on Intellectual Property Negotiations and Special 301 Actions" (1994) 13 *Pacific Basin Law Journal* 87.

⁸¹Ruey-Long Lin, "Protection of Intellectual Property in the Republic of China" (1986-87) 6 *Chinese Yearbook of International Law and Affairs* 120; Chung-Sen Yang & Judy Chang, "Recent Developments in Intellectual Property Law in the Republic of China" (1994) 13 *Pacific Basin Law Journal* 70; Andrew Walder, "Harmonization: Myth and Ceremony: A Comment" (1994) 13 *Pacific Basin Law Journal* 163; William Alford, "Don't Stop Thinking About...Yesterday: Why There Was No Indigenous Counterpart to Intellectual Property Law in Imperial China" (1993) 7 *Journal of Chinese Law* 3 [hereinafter, Alford, Don't Stop]; William Alford, "Making the World Safe for What? Intellectual Property Rights, Human Rights and Foreign Economic Policy in the Post-European Cold War World" (1996-7) 29 *International Law and Politics* 135 [hereinafter, Alford, Safe]; Richard Baum, "Science and Culture in Contemporary China: The Roots of Retarded Modernization" (1982) 22 *Asian Survey* 1166; Jianyang Yu, "Protection of Intellectual Property in the P.R.C.: Progress, Problems, and Proposals" (1994) 13 *Pacific Basin Law Journal* 140. In ancient China, Confucian teachings on the virtue of open circulation of knowledge and social solidarity stood against the privatization of knowledge inherent in the patent concept.

⁸²Sang-Hyun Song & Seong-Ki Kim, "The Impact of Multilateral Trade Negotiations on Intellectual Property Laws in Korea" (1994) 13 *Pacific Basin Law Journal* 118. It was the American Chamber of Commerce which actively lobbied for the enactment of a patent law and institution in Korea.

⁸³Eric Schiff, *Industrialization Without National Patents-The Netherlands, 1869-1912, Switzerland*,

In sum, the patent concept, with its rather dramatic origins in the Italian peninsula, preceded the industrial revolution in Europe. Further, the patent concept in its early years meant different things to different states. As subsequent pages will demonstrate, the patent concept, whether adopted by the majority of European states or rejected by others such as Switzerland, ultimately served an instrumentalist purpose as articulated by the often competing interests of states, particularly, in Europe.

1.4: The Historical Evolution and Development of the Modern Patent System

The modern patent concept in its substance, procedure and political economics owes significant debts to the era spanning from the Medieval ages till late nineteenth century European industrialization.⁸⁵ Until the latter part of the nineteenth century, intellectual property was a farrago of diverse notions of rights presumably founded on or derived from intellectual exertions. It was from the inchoate assemblage of notions of property interests in the so-called creations of the mind that the modern patent regime derives. The irony here is that the pioneering clarity and integrity of the Venetian patent system became tarnished with excessive instrumentalism in the application of patent systems by states.

Certain substantive principles were already evident by the end of the nineteenth

1850-1907 (New Jersey: Princeton University Press, 1971). [hereinafter, Schiff]

⁸⁴For a list of all the patent laws of the various countries of the world, see, John Sinnott, *World Patent Law and Practice* [Volumes 2b, 2c, 2d] (New York: Matthew Bender, 1977) [hereinafter, Sinnott]

⁸⁵Brad Sherman & Lionel Bently, *The Making of Modern Intellectual Property Law- The British Experience, 1760-1911* (Cambridge: Cambridge University Press, 1999) at 209. [hereinafter, Sherman & Bently]

century. First, in shaping the substance of patent law, ideas and discoveries of “natural” phenomena or laws, were debarred from the scope of patentability. Second, although the terms “invention” and “manufacture” had not yet acquired clear juridical meanings, early patent law and practice was heavily dominated by, if not exclusively restricted to mechanical inventions and artifices.⁸⁶

Third, prior to the evolution of corporate legal personalities and commercial capitalization of the industrial and inventive process, the patent concept was anchored on the individualism of the inventive process.⁸⁷ Fourth, given the requirements of the fledgling industrialization in the Middle ages, the requirement of industrial repeatability or industrial applicability of patented subjects became a regular feature of patent law and practice.⁸⁸ Fifth, the requirement of registration of patents also originated during the period in question,

⁸⁶Seaborne Davies, “The Early History of the Patent Specification” (1934) 50 *The Law Quarterly Review* 86 at 95. [hereinafter, Seaborne Davies]; Jerome Reichman, “Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System” (1994) 13 *Cardozo Arts & Entertainment Law Journal* 475. As subsequent sections will demonstrate, there are no universal standards of novelty.

⁸⁷This may also be attributed to the influence of the *Calico Printers Act* of 1787 on patent law. According to Sherman and Bently, “the 1787 Act recognized the *individual* as the source of the design.” See, Sherman & Bently, *supra* note 85 at 61. As Erle J. held in *Jefferys v Boosey* (1854) 10 ER 702, “... a person to be entitled to the character of an inventor must *himself* have conceived the idea embodied in the improvement. It must be the product of *his* own mind and genius and not of another’s.” (Emphasis added)

⁸⁸The Designs Laws in England initiated the bureaucratic control of the patent system. According to Sherman & Bently, the first of such laws was the *Calico Printers’ Act* of 1787. See, Wyndham Hulme, “The History of the Patent System Under the Prerogative and at Common Law” (1896) 12 *The Law Quarterly Review* 141; Wyndham Hulme, “The History of the Patent System Under The Prerogative And at Common Law-- A Sequel” (1900) 16 *The Law Quarterly Review* 441. As an aside, Nedd Ludd’s rebellion in 1811 against the emerging industrial revolution in the English Midlands now marks the pejorative term of “Luddites” reserved for those opposed to new technologies, particularly, genetic modification of plant life forms.

precisely, from the provisions of the British Designs laws regulating ownership of new textile designs. By this law, it was incumbent on applicants for ownership of new textile designs to specify their designs and show how those designs differed from previously registered designs.⁸⁹

The requirement of registration thus laid the foundations for the corollary procedural requirement of specification of patent applications. The requirement that the applicant for a patent describe his or her invention clearly and completely is judicially associated with the 1778 opinion of Lord Mansfield in *Liardet v. Johnson*.⁹⁰ The specification is a technical outline and description of the invention sought to be patented. In theory, the specification is a form of consideration for the patent grant. In this sense, a patent has been said to be as good as its specification. Specifications largely transformed the patent system, at least in theory, from a mechanism for importing existing technologies (in the immediate post-Venetian patent system era) into an institution for rewarding those inventors who created new and useful machines.

⁸⁹The system of registration was designed to curtail arguments on originality. Prior to that, patents were being routinely granted on already patented inventions. See, Seaborne Davies, *supra* note 86 at 96; Dundas White, "The New 'Investigation' for Patents" (1903) 19 *The Law Quarterly Review* 307. Note also that these requirements are particularly suited to peoples with pronounced culture of writing. As argued in subsequent chapters, the system of registration when applied globally, nullifies or at least, enables the appropriation of inventions of peoples of cultures lacking systems of registration of inventions and of written publications. For a short but informative account of the influence of the British textile laws on the fledgling patent regime, see, Kathy Bowrey "Art, Craft, Good Taste and Manufacturing: The Development of Intellectual Property Laws" (1997) 15 *Law in Context* 78. Needless to add, the history of British industrialization, and impliedly, global industrialization, would be incomplete without reference to the British textile industry. Note 88, *supra*.

⁹⁰(1778) 1 Web Pat Cas 53. For a detailed account of the history of the specification requirement, see, Seaborne Davies, *supra*. See *Bainbridge v. Wigley* (1810) 171 ER 636; Wyndham Hulme, "On the Consideration of the Patent Grant, Past and Present" (1897) 13 *The Law Quarterly Review* 313.

However, the political economics of the early patent system obscured the law and procedure of patents. As states deliberately engaged in what J.W. Baxter has aptly termed a regime of “invention by importation, as distinct from inspiration,”⁹¹ the patent system became a pliable tool to advance perceived state interests. For instance, William Cecil, (Lord Burghley- and first secretary of state to Queen Elizabeth the First) by granting patent rights to skilled and entrepreneurial Europeans wishing to emigrate to establish their businesses in England, applied the patent system as a “strategic international trade policy.”⁹² This was exemplified in the case of the *Clothesworkers of Ipswich* decided in 1614 where the court held that:

[I]f a man hath brought in a new invention and a new trade within the Kingdom in peril of his life and consumption of his stock, etc., or if a man hath made new discovery of anything, in such cases, the King...in recompense of his costs and travail may grant by charter unto him that he alone shall use such trade or traffic, not the knowledge of the skill to use it for a certain time because at the first, the people of the kingdom are ignorant.⁹³

This practice was not limited to the British Isles. In continental Europe, the early French patent system was a regime of privileges without pretensions to originality or inventiveness

⁹¹J.W. Baxter, *World Patent Law and Practice*, vol. 2 (London: Sweet & Maxwell, 1976) at 7.

⁹²Robert Merges, *Intellectual Property*, *supra* note 57 at 125. See also, Cruikshank & Fairweather, *The Law of Patents, Designs and Trademarks* (International Patent Agency: Glasgow, 1907) at 1. [hereinafter, Cruikshank]. Similarly, in his letter to Thomas Cromwell, Sir Antonio Guidolti proposed a scheme to bring Italian silk-weavers to England but on the condition that a patent should be granted on silk-weaving for 20 years. See, Macleod, *supra* note 63 at 52; Wyndham Hulme, “On the History of Patent Law in the Seventeenth and Eighteenth Centuries” (1902) 18 *The Law Quarterly Review* 280; James Bakewell, “The American and British Systems of Patent Law” (1891) 7 *The Quarterly Law Review* 364. Compare with, Wood Renton, “Patent Right in England and the United States” (1891) 26 *The Law Quarterly Review* 150.

⁹³*The Clothesworkers of Ipswich Case*, 78 E.R.147. Reproduced in Cruikshank, at 6.

as a criterion for the grant of patents. For instance, in France, article 3 of the original patent law of 1791, provided that “whoever [is] the first to bring into France a foreign discovery shall enjoy the same advantages as if he were the inventor.”⁹⁴ In the same vein, early Dutch patent law did not require novelty as a criterion for the grant of patents; merely being the first importer or introducer of the trade or art sufficed.

The prevailing motive and underlying policy amongst the often competing states of Europe was the economic welfare of the state and the attainment of a pre-eminent position in the sciences and technology, especially in textiles, mining, metallurgy and ordnance. In other words, it was the invention and not the inventor per se who was the primary focus of the patent system. Ironically, the very states which attained their technological prowess by this national chauvinism, if not a mercantilist instrumentation of the patent system (for example, Britain) showed enormous concerns at the “leakage” of their technical prowess to other states (like the United States).⁹⁵

The discretionary nature of patent grants sometimes degenerated to egregious abuses, especially, by necessitous British monarchs who desperately needed to keep their fawning courtiers or sustain their high-living. For example, as Holdsworth records:

[James] the First was always hard up; and for a consideration he was prepared to grant many privileges both of the governmental and of the industrial varieties. Of the second of these varieties of grants the following are a few examples: grant of an exclusive right to export calfskins; grant of an exclusive right to import cod; grant of

⁹⁴(As quoted in) Edith Penrose, *The Economics of the International Patent System* (Connecticut: Greenwood Press, 1974) at 70. [hereinafter, Penrose]

⁹⁵Robert Merges, *Intellectual Property*, *supra* note 57 at 125.

an exclusive right to make farthing tokens of copper.⁹⁶

This abuse contributed immensely to the malodorous air of privilege attached to early English patents. In consequence, “Parliament, whose members represented many trades injured by these special privileges,”⁹⁷ enacted the famous Statute of Monopolies of 1623.⁹⁸ For this reason, the Statute of Monopolies has been fondly but erroneously called, the *Magna Carta* of the Right of Inventors.⁹⁹

In spite of the *Statute of Monopolies* and similar juridical initiatives, by the mid-nineteenth century, the patent concept had become a cesspool of bureaucratic bungling, complex and expensive process of registration and general juridical confusion.¹⁰⁰ Coupled with a rising public preference for a regime of *laissez-faire* in trade and ideas, there was a

⁹⁶W.S.Holdsworth, “The Commons Debates 1621” (1936) 52 *Law Quarterly Review* 481.

⁹⁷Robert Merges, *Intellectual Property*, *supra* note 57 at 125. See the famous suit in *Darcy v. Allin* otherwise known as the *Case of Monopolies*, 77 E.R. 1263 or (1602) Co. Rep. 84. See also, Richard Gardiner, “Industrial and Intellectual Property Rights: Their Nature and the Law of the European Communities” (1972) 88 *The Modern Law Review* 507.

⁹⁸*Statute of Monopolies* (21 Jac. 1., cap 3.) Although the Statute of Monopolies has received favourable reviews by scholars, it did not in fact dispense with monopolies per se. The Royalty maintained residual powers to grant monopolies for the importation of arts or products in England. See, Bugbee, *supra* note 58 at 104.

⁹⁹George Francis Takach, *Patents: A Canadian Compendium of Law and Practice* (Edmonton: Juriliber, 1993) at 3; Penrose, *supra* note 94 at 7; J. Vojacek, *A Survey of the Principal National Patent Systems* (New York: Prentice Hall, 1956) at 97-981; Ladas, *supra* note 56 at 6.

¹⁰⁰For a judicial account of the patent controversy of the nineteenth century see, *Attorney-General v. Adelaide Steamship Co.*, [1913] A.C. 781.

widespread call for the abolition of the patent system in England,¹⁰¹ continental Europe and in the United States.

In 1863, the parliament in Germany condemned the patent system as being “injurious to common welfare” and the Government of Prussia opposed the adoption of the patent system by the North German Federation. Otto von Bismarck, then Chancellor of the North German Federation captured the popular opinion when he noted that it was better to abolish the patent system “rather than to engage in hopeless attempts to reform the system.”¹⁰² In Switzerland, economists of great competence characterized the patent system as “pernicious and indefensible”¹⁰³ and a group of Swiss industrialists argued rather passionately that “in the interest of the general prosperity of industry and trade, patent protection, that cup of sorrows”¹⁰⁴ should pass them.

Opinions such as this won the day in the Netherlands and Japan. Hence the Dutch abolished it in 1869 and Japan which had adopted her patent law in 1872 abolished it 1873. Across the Atlantic, the United States’ House of Representatives followed suit and enacted a bill abolishing the patent system. However, by a handful of votes the bill failed passage at

¹⁰¹Sherman & Bently, *supra* note 85 at 131-2. See also, Macleod, *supra* note 63 at 186.

¹⁰²Schiff, *supra* note 83 at 21; Stephen Ladas, *supra* note 56 at 285.

¹⁰³Abbott, *supra* note 72 at 228. For a detailed account of the patent controversy, see, Fritz Machlup & Edith Penrose, “The Patent Controversy in the 19th Century” (1950) 10 *Journal of Economic History* 1-29.

¹⁰⁴Schiff, *supra* note 83 at 87.

the Senate.¹⁰⁵

Opposition to the patent system began to collapse in 1873 as a probable result of the great economic depression and the consequent rise of protectionism, economic nationalism, heavy and intensive lobbying by manufacturers, and above all, the willingness of the patent advocates to accept compulsory licensing as part of the “reformed” patent law.¹⁰⁶ Britain relented in 1874, Germany in 1877 and Japan re-enacted a patent law in 1885. Switzerland enacted a patent law in 1887.¹⁰⁷ Since then, the philosophy and ideology of patents have in spite of its controversies, remained on the ascendancy.

1.5 The Law on Patentable Subject Matter¹⁰⁸

Generally speaking, patent laws are very technical in nature. This complexity and technicality is further compounded by their exploitation by states as an instrument of both domestic and international economic policy. First, although patent laws are primarily designed to protect and reward inventions, key elements of the patent concept such as “invention”¹⁰⁹

¹⁰⁵Bugbee, *supra* note 58 at 109.

¹⁰⁶Schiff, *supra* note 83 at 34.

¹⁰⁷Schiff, *ibid*.

¹⁰⁸This sub-section is merely summative, if not cursory. A fuller analysis of the evolution of the criteria for patentability is contained in Chapter Four.

¹⁰⁹Early patent law grappled with the distinction between “invention” and “discovery.” As a leading thinker then argued, “a discoverer is one thing and an inventor is another. The discoverer is one who discloses something which exists in nature, for instance, coal fields, or a property of matter, or a natural principle: such

have no clear and pre-determined meaning.¹¹⁰ Often, terms such as “invention”, “novelty”, “manufacture”, not only lack clear meanings within respective national patent law jurisdictions, they also lack a universal standard. Part of the consequence, if not cause of this phenomenon is that the courts have tended to “create” patent law rather than “interpret” the law, as it were.¹¹¹ This may be the case, particularly, in the United States where the expansion of the patent concept to include plants and knowledge of the uses of plants is more or less, a judicial initiative.¹¹²

The decision whether to grant a patent or not, especially, with respect to the so-called “natural substances” reveals the malleability of the patent system.¹¹³ The question which arises

discovery never was and never ought to be the subject of a patent...however much effort may have gone into the discovery ...no one could be said to have invented these.” See, T. Webster, *On Property in Designs and Inventions in the Arts and Manufactures* (London: Chapman & Hall, 1853) at 7. (As cited in Sherman & Bently at 45). According to R. Godson, “a principle was a mere idea, and therefore could not be a fit subject for a patent.” See, R. Godson, “Law of Patents”(19 Feb. 1833) 15 *Hansard* col. 977.(As quoted in Sherman & Bently, at 45.)

However, there was no agreement as to what constituted ‘principle.’ As Rooke J. observed in the steam engine case instituted by the inventor James Watt, “the term principle is equivocal-it might be used to refer to radical elementary truths of a science-such as the natural properties of steam, its expansiveness and condensability.” See *Boulton and Watt v. Bull* (1795) 126 ER 651. See also, C.J. Hamson, *Patent Rights for Scientific Discoveries* (Indianapolis: Bobbs-Merrill, 1930) But see, Lawson Mckenzie, “Scientific Property” (1953) 118 *Science* at 767. The doctrinal crisis in early patent law was so pervasive “that it was said in 1835 that there was no law of patents in England.” See, Sherman & Bently, *supra* note 85 at 82.

¹¹⁰Ladas, *supra* note 56 at 21; Blanco White, *Patents for Inventions* [5th ed.,] (London: Stevens & Sons, 1983) at 156-168; Donald Banner, ed, *Developments-1988: The John Marshall Law School Center for Intellectual Property Law* (The John Marshall Law School, 1988) at 155-390.

¹¹¹This issue is explored in Chapter Four.

¹¹²This issue is further explored in Chapter Four. It is arguable however that the courts have been interpreting existing legislation rather than creating new law.

¹¹³For example, while purified vitamin A has been held patentable, purified Tungsten was held not patentable. Neither of them occurs naturally in the pure state. See, *Terrell on Patents, supra* note 64 at 14.

thus is whether the courts are designed as institutions for setting public policy or whether they exist to interpret public policy as provided for in legislation. In the absence of any clear legislative or executive initiative in this regard, it seems that in most cases, especially in the United States patent law, the courts have by various decisions become a policy-making institution in matters related to patentability.¹¹⁴

What is more interesting, and indeed, the primary focus of this thesis is how the deliberate ambiguities and manipulation of the patent system have affected and legitimated the appropriation of plants and TKUP.¹¹⁵ This observation is more acute in the context of the influence and consequence of United States' patent law and procedure across the globe. Notwithstanding the attempts at harmonization of patent laws and procedure, there is no international patent system in the strict sense of the world. Rather, states, while maintaining an essentially nationalistic patent system of varying degrees of effectiveness, also attempt to harmonize their respective national patent laws and systems. In this process, powerful states and important global actors, mainly from the United States, with what seems to be a possessive interest in globalizing their concept of patents appear to have the edge.

¹¹⁴For example, the inclusion of process patents into the realm of patentable subjects in the United States and Western Europe was a judicial creation. See, *Terrell on Patents, supra* at 73. In theory however, the courts have always protested that patent grants are construed like all other documents. See, William Schuyler Jr, "Recent Developments and Future Prospects on the National Level in the United States of America" in *WIPO Lectures*, Montreux 1971 (Geneva: 1971) at 66. [hereinafter, *WIPO Lectures*] The reality however is that the patent system has a cultural life and an ideology which it seeks to expound and expand. See, Robert Merges & Richard Nelson, "On the Complex Economics of Patent Scope" (1990) 90 *Columbia Law Review* 839.

¹¹⁵This issue is addressed fully in Chapter Four, *infra*.

1.6: Philosophies and Theories of Patents

Too often, in the institutionalization of patent systems across the globe, the cultural contingency and philosophical underpinnings of the patent ideology is suppressed, ignored or taken for granted. Yet, the patent system is not a philosophical neither is it ideologically or culturally neutral. In its internationalization and operation outside the shores of its European origins, the patent concept has often had to confront differences of culture, philosophy, economics and ideology. The implication, of course, is that the philosophy and underpinning ideology of the patent concept is not necessarily a global value. The patent system is thus as local, if not as culture-bound or ethnic, as other comparable legal concepts and has attained its global status by means other than its presumed “inherent globality.”

Patents thus constitute and represent a congealed form of a particular cultural ideology, philosophy and jurisprudence of property and economics.¹¹⁶ As conceptions of property evolve, the content of the patent concept equally changes. Prior to the emergence of the phenomenon of property in the so-called “mental labour” or intellectual exertions, property was largely construed as dominion over corporeal things.¹¹⁷ The preoccupation with physical possession in property rights meant that occupancy was the major means by which

¹¹⁶The concept of property has since the hazy origins of jurisprudence dominated legal thought. The literature is enormous and beyond the ambit of this dissertation. However, the following texts would reward reading : Kenneth Vandeveld, “The New Property of the Nineteenth Century: The Development of the Modern Concept of Property” (1980) 29 *Buffalo Law Review* 325; Emily Sherwin, “Two-and Three-Dimensional Property Rights” (1997) 29 *Arizona State Law Journal* 1075; Joseph Singer & Jack Beerman, “The Social Origins of Property” (1993) Vol. VI, No. 2, *Canadian Journal of Law and Jurisprudence* 217; R.S. Bhalla, “The Basis of the Right of Property” (1982) 11 *Anglo-American Law Review* 57; R.S. Bhalla, “Legal Analysis of the Right to Property” (1981) 10 *Anglo-American Law Review* 180.

¹¹⁷Note 70, *supra*. Incorporeal rights were rare, limited to fees tail and easements.

things corporeal could be acquired in law.¹¹⁸

Since intellectual exertions or mental labour, as it were, could not be the subject of physical occupation, it was quite difficult to justify their existence in law as a form of property.¹¹⁹ How then did proponents of “intellectual property” surmount this jurisprudential barrier?¹²⁰ An ingenious argument was propounded to the effect that although both were of different categories, “the labours of the mind and productions of the brain are as justly entitled to the benefit and emoluments that may arise from them, as the labours of the body are.”¹²¹ This is the origin of the so called labour theory of patents.

Scholars such as John Locke went further to expound this theory in terms of possessive individualism arguing that “every man has a property in his own person. The labour of his body, and the work of his hands, we may say are properly his.”¹²² The Lockean theory which has influenced modern patent law does not however explain the phenomenon

¹¹⁸William Blackstone, *Commentaries on the Laws of England* (London: A. Strahan, 1809) , Book 11, chapters 13-19.

¹¹⁹*Supra* notes 76 and 77.

¹²⁰See, Lord Camden, in *Donaldson v Beckett* (1774) 17 *Parliamentary History* col. 999 (as quoted in Sherman & Bently at 29).

¹²¹Adam Smith, *The Wealth of Nations* (1776) (Edwin Canaan, ed.,) (London: Grant Richards, 1904) at 103.

¹²²J. Locke, *Two Treatises of Government* (1690) (P. Laslett, ed.,) (Cambridge: Cambridge University Press, 1967), section 27.

of an employer's property in the "inventive genius" of his/her employee.¹²³ It seems that the corollary of this theory is that financial losses arise from mental labour as much as in physical labour, and thus, ought to be recompensed. In other words, mental exertions are as fungible and as commodified as raw labour in the marketplace.¹²⁴

At the socio-cultural plane, the metamorphoses and crystallization of intellectual exertions into subjects and objects of ownership¹²⁵ covered by patents may be attributed to two socio-economic factors which have largely defined the Western world, namely; the rise of individualism¹²⁶ (and until recent times, the pre-eminence of man)¹²⁷ and second, the

¹²³Kenneth Swan, "Patent Rights in an Employee's Invention" (1959) 75 *The Law Quarterly Review* 77.

¹²⁴Sherman & Bently, *supra* note 85 at 26.

¹²⁵Otherwise known and described as commodification, this is the process and ideology of transforming otherwise inter-human and human-nature relationships into corporeal articles of trade with ghostly objectivity and a life of their own. A worker's labour, for instance, thus becomes a commodity. The rationalizing ideology has been capitalism which is as ideological as other socio-economic ideologies. Under this ideology, cooperative and communal interests are transformed into articles of trade and subordinated to self-interest in the "free-market." This is probably why the contemporary narrative framework of the patent system is incapable of adequately addressing some of the ethical and moral concerns raised by its expansion into life-forms and other non-mechanical manifestations of life. For an excellent analysis and evaluation of the phenomena of commodification of human labour and the environment, see, Norman Spaulding III, "Commodification and Its Discontents: Environmentalism and the Promise of Market Incentives" (1997) 16 *Stanford Environmental Law Journal* 293. See also, L. Bently & B. Sherman, "The Ethics of Patenting: Towards a Transgenic Patent System" (1995) 3 *Medical Law Review* 275.

¹²⁶Biblically, the Christian foundations of individuality springs from the admonition that "the soul that sinneth shall die." (Ezekiel 28: 2-49). Founded on the notion of equality of human souls, (then construed mainly as "male souls"), this and similar passages in the Bible foretelling the inevitability of a judgment day in which all souls, prince and pauper alike, will stand before God on equal terms, undermined the claims of medieval European princes to innate pre-eminence. See, Ullman, *infra* note 128.

Historically, "Individualism" is "a nineteenth century word." See, Will Kymlicka, "Individual and Community Rights" in Judith Baker, ed, *Group Rights* (Toronto: University of Toronto Press, 1994) at 17. [hereinafter, Will Kymlicka] The first use of the term was in its French form "*individualisme*." It grew out of the general reaction to the French Revolution. See, Alan Gilbert, *Democratic Individuality* (Cambridge: Cambridge University Press., 1990); Theodore M. Benditt., *Rights* (New Jersey: Rowman and Littlefield,

development of capitalism. Ullman's magisterial work on the former concludes that individualism has some basic elements; viz, the dignity of man, autonomy or self direction, privacy or private existence within the public world, and self development.¹²⁸ These may be categorized under the concepts of abstract individualism, political individualism, economic individualism, religious individualism, ethical individualism, epistemological individualism, and methodical individualism.¹²⁹

The concept of individualism is a celebrated and cherished ideal of the Western world. In the words of Oscar Wilde, "for the full development of life to its highest mode of perfection...what is needed is individualism."¹³⁰ In short, Man, in the gender specific term of the word, was the supreme being on the face of the earth. It is thus no coincidence that the earliest promoters of the patent system were elitist men, the gentry and the so-called

1982), Steven Lukes, *Individualism* (Oxford: Basil Blackwell., 1973).

¹²⁷Man, here refers to the gender specific term of the word as the early patent institution, like most other juridical institutions was largely a masculine affair. See, Rosemary Coombe, "Challenging Paternity: Histories of Copyright" (1994) 6 *Yale Journal of Law and the Humanities* 407. Indeed, as earlier noted, even the Venetian Patent Act of 1474 cannot escape this stricture as it construed inventiveness as a male affair.

¹²⁸Walter Ullmann, *The Individual and Society in the Middle Ages* (Baltimore: John Hopkins Press, 1966) at 45-72. [hereinafter, Ullmann]

¹²⁹Ullman, *supra* at 74.

¹³⁰Oscar Wilde, *The Soul of Man Under Socialism* (1891) in *Oscar Wilde's Plays, Prose Writings and Poems* (London: Everyman's Library) at 258. But see Edmund Burke in Will Kymlicka, *supra* at 126 at 1. However, it is a subject of modern debate whether the romantic notion of the individual inventor accords with contemporary realities, or at any rate, whether this paradigm tells the whole story of creativity. See, Angela Riley, "Recovering Collectivity: Group Rights to Intellectual Property in Indigenous Communities" (2000) 18 *Cardozo Arts & Entertainment Law Journal* 175.

“gentlemen of science”¹³¹ whose “common interest lay in the promotion and professionalization of scientific activity”¹³² for personal gain and pleasure.

Adding flame to this raging sense of individualism was the Calvinist emphasis on the so-called work ethic and the virtue in earthly accumulation of wealth.¹³³ As Jeremy Bentham argued, “individualistic rationalism of capitalism is to be supreme also in the realm of law since egoism is the basic axiom of the legal system even as it is of the economic system.”¹³⁴ Thus, the primacy of the individual,¹³⁵ the dominance of capitalism in Western jurisprudence as manifested in the patent concept, evidence that “intellectual property is a reflection of the Western concern for the rights of the individual.”¹³⁶

Therefore, the notion of a systematized legal entitlement of exclusive and individual right to the so-called creations of the mind has been “linked to the advent of modern

¹³¹J. Morrell & A. Thackeray, *Gentlemen of Science: Early Years of the British Association for the Advancement of Science* (Oxford: Clarendon Press, 1981) at 3-12.

¹³²Sherman & Bently, *supra* note 85 at 110.

¹³³R. H. Tawney, *Religion and the Rise of Capitalism* (Baltimore: Penguin Books, 1947)

¹³⁴William Seagle, *Men of Law-From Hammurabi to Holmes* (New York: Macmillan, 1947) at 254.

¹³⁵Pierre Trudeau, “The Values of a Just Society” in Thomas Axworthy, ed, *Towards a Just Society* (Toronto: Viking Press 1990) 363-4. See also, Brian Morris, *Western Conceptions of the Individual* (New York: St. Martin's Press, 1991); Shlomo Avineri & Anver de Shalit, (eds.) *Communitarianism and Individualism* (Oxford: Oxford University Press); Brian Lee Crowley, *The Self, the Individual and the Community* (Oxford: Clarendon Press, 1987).

¹³⁶Bugbee, *supra* note 58 at ii. [underlining mine]

capitalism, individualism, industrial organization and the technological age.”¹³⁷ An erroneous but often unchallenged assumption here is the lionization of the individual in the inventive process. Inventions and innovations however, do not spring *ex nihilo*. Inventors, artists, and other creative people draw from the stock of pre-existing human knowledge and culture. Isaac Newton spoke well when he noted that if he had actually “seen further” than the rest of his scientific peers, it was because he stood on the shoulders of other giants of science. Put simply, creativity is tied to tradition and the existing stock of knowledge.¹³⁸

In contrast to the underlying patent conception of the inventive process as a solitary and individual effort, the communal way of life of most non-Western societies, at least in theory, emphasizes the “informal” modes and more importantly, in these narrative and existential frameworks, information is for the most part construed as a public good.¹³⁹ Although Lowie’s anthropological study shows that the concept of patents was highly developed amongst the Andaman Islanders, the Kai, the Koryak and the Plains Indians,¹⁴⁰ there is a fundamental difference between this exceptional kind of patent and the more

¹³⁷Abbott, *supra* note 72 at 130.

¹³⁸ As Abbott notes, “societies, for centuries, evolved on the basis of informal transfers of knowledge and technological advances in know-how, from masters to students, from fathers to sons, from mothers to daughters.” Abbott, *ibid*.

¹³⁹Drahos, *supra* note 40 at 61; Thomas Franck, “Community Based on Autonomy” in Jonathan Charney, *et al*, ed., *Politics, Values and Function in International Law in the 21st Century* (The Hague: Martinus Nijhoff Publishers, 1997) at 57.

¹⁴⁰Drahos, *supra* note 40 at 15. See, R.H. Lowie, *Primitive Society* (New York, 1920) at 235-243. [hereinafter, Lowie]

generally known European patent system.

As Peter Drahos points out, “these societies (the former) were in contrast to Western approaches, more concerned with restricting the transferability of such rights”¹⁴¹ and not with the idea of an exclusive right of an individual-as-creator in the invention. The economic implication is that the Western approach and conception commodifies and “thingifies”¹⁴² the processes and outputs of human labour and imposes private “toll-gates” or “fences” around knowledge on the concept of *ius excluendi* and *ius prohibendi*.¹⁴³ *Ex necessitate*, the patent system in its Western foundations¹⁴⁴ raises cultural and philosophical differences with non-Western societies.¹⁴⁵

As already evident, the patent system was designed to promote the employment of capital and industry in new profitable directions. This ideology of the patent system remains a characteristic feature of the contemporary patent law system and indeed, a refrain for the

¹⁴¹*Ibid.* See, Byron Good, *Medicine, Rationality and Experience-An Anthropological Perspective* (Cambridge: University Press, 1994) at 5-20. See also, Ann McElroy & Patricia Townsend, *Medical Anthropology in Ecological Perspective* (Boulder, Colorado: Westview Press, 1989).

¹⁴²Norman Spaulding, *supra* note 125 at 312.

¹⁴³G.W.F. Hegel, *Philosophy of Right* (1821; T.M.Knor tr., Oxford University Press: Clarendon, 1952, 1st ed., 1967 reprint) at 151.

¹⁴⁴Michael Gadbow & Timothy Richards, eds, *Intellectual Property Rights: Global Consensus, Global Conflict?* (Boulder, Colorado: Westview Press, 1988) at 18.

¹⁴⁵Susan Tiefenbrun, “Piracy of Intellectual Property in China and the Former Soviet Union and its Effects Upon International Trade: A Comparison” (1998) 46 *Buffalo Law Review* 1; Tao-Tai Hsia & Kathryn Haun, “Laws of the People’s Republic of China on Industrial and Industrial Property” (1973-4) 38 *Law and Contemporary Problems* 274.

proponents of an expanded and rigorous global patent regime. Various theories have been posited to explain and rationalize the ideology and philosophy of the patent system. Like the elusive search for a unifying scientific theory of the universe, the patent system has defied a unified theory.¹⁴⁶ However, Penrose distinguishes four theories on patents; namely, the natural right theory, the contract/disclosure of secrets theory, the reward theory and the incentive theory. On the other hand, Oddi, in his seminal work on the subject, has distinguished between the classical and post-classical theories of patents. These theories of and approaches to patents require a closer examination, albeit briefly.

1.6.1: The Natural Rights Theory of Patents

This theory argues that an inventor has a natural right in his/her invention and that the society, represented by the state, has an obligation to recognize, protect and enforce that right. The natural right theory of patents found expression in the aftermath of the famous French Revolution.¹⁴⁷ This theory has some inconsistencies which render it indefensible as a justification for or explanation of the patent concept. First, it requires an acceptance of the notion that ideas are possible subjects of exclusive ownership; a position difficult to maintain

¹⁴⁶For a succinct account and analysis of the problematic nature of theories on patents, see, Samuel Oddi, "Un-Unified Theories of Patents-- The Not-Quite-Holy Grail" (1996) 71 *Notre Dame Law Review* 267. [hereinafter, Oddi, Theories]

¹⁴⁷Penrose, *supra* note 94 at 32; Machlup, *supra* note 65 at 3. The French patent law of 1791 reads thus: [E]very novel idea whose realization or development can be useful to society belongs primarily to him who conceived it, and it would be a violation of the rights of man in their very essence if an industrial invention were not regarded as the property of its creator. *Ibid.* Interestingly, de Boufflers, the French jurist who drafted the French patent law of 1791 admitted that the natural rights theory of the French patent law was for sheer propaganda. See, Anderfelt, *supra* note 58 at 16.

in ordinary societal relations and experience. Second, it posits that patents are not privileges of governments but an inherent right of an inventor. Various limitations on patents such as patentable subjects, duration of patents and compulsory licensing render such a proposition unsustainable.

According to Edith Penrose, international patent law is not based on natural law theory but is a “social policy” determined by a balance of national costs and benefit.¹⁴⁸ The natural rights theory of patents has also been forcefully rejected in the Secretary-General of the United Nations’ Report on the subject.¹⁴⁹ According to the report:

[P]atent legislation has never been based solely on the concept of the patent as the confirmation of an inherent, rather than the creation of a statutory property right. Such a concept would have left no room for such restraints on the patent grant as its fixed duration, its exclusion for inventions in certain fields...and the forfeiture or compulsory licensing of patents for failure to work them.¹⁵⁰

Virtually all patents jurisdictions in the world decline to grant patent protections to inventions considered to be dangerous to the overall societal well-being.¹⁵¹ Even the United States, the

¹⁴⁸Penrose, *supra* note 94 at 89.

¹⁴⁹*The Role of Patents in the Transfer of Technology to Developing Countries Report of the Secretary-General, United Nations* (New York: Martinus Nijhoff, 1964) at 9.

¹⁵⁰U.N Report, *supra* at 9. Adding greater force to this observation, P.J. Michel noted that “patent systems are not created in the interest of the inventor but in the interest of the national economy. The rules and regulations of the patent system are not governed by civil or common law but by political economy.” as quoted in, S. Vedaram, “The New Indian Patents Law” (1972) 3 *International Review of Industrial Property and Copyright Law* 39 at 41.

¹⁵¹For a detailed consideration of the regime under the Trade-Related Aspects of Intellectual Property (TRIPs), see, M. Bruce Harper, “TRIPs Article 27.2: An Argument for Caution” (1997) 21 *William & Mary Environmental Law and Policy Review* 381.

champion for a strong patent system, does not afford nor practice a natural rights theory of patents.

For example, inventions in the atomic energy and space/aeronautic fields are not patentable in the United States.¹⁵² Inventions deemed to be detrimental to the national security of the United States are not patentable and may be kept secret or withheld by the government of the United States as long as “national security”¹⁵³ requires. In sum, the natural rights/ethical theory of patents “is virtually dead in learned circles”¹⁵⁴ and thus does not explain nor justify the concept of patents.

¹⁵²The Atomic Energy Act of (1988) 42 U.S.C. sub-section 2181 (a) provides that “no patent shall hereafter be granted for any invention or discovery which is useful solely in the utilization of special nuclear material or atomic energy in an atomic weapon.” See also, National Aeronautics and Space Act of 1958, 42 U.S.C. 2457; Virginia Geoffrey, “Do the Atomic Energy Act and the NASA Act Promote Adequate Advancement?” (1961) 43 *Journal of Patent Office and Society* 624.

¹⁵³Section 181 of the United States Patent Act provides *inter alia*:

[W]henever the publication or disclosure of an invention by the granting of a patent, in which the Government does not have a property interest might, in the opinion of the Commissioner, be detrimental to the national security, he shall make the application for patent in which such invention is disclosed available for inspection to the Atomic Energy Commission, the Secretary of Defense, and the chief officer of any other department or agency of the Government designated by the President as a defense agency of the United States...If, in the opinion of the Atomic Energy Commission, the Secretary of a Defense Department, or the ...the publication or disclosure of the invention by the granting of a patent therefor would be detrimental to the national security, the Atomic Energy Commission, the Secretary of a Defense Department...shall notify the Commissioner and **the Commissioner shall order that the invention be kept secret and shall withhold the grant of a patent for such a period as the national interest requires...[Emphasis mine]**

¹⁵⁴Schiff, *supra* note 83 at 3.

1.6.2: The Reward Theory

This theory argues that inventions are made because the patent system offers a reward to inventors. Therefore, as the argument goes, without the reward promised by the patent system, there would be no inventions.¹⁵⁵ There are some obvious flaws with this thesis. First, the emphasis on monetary gain is somewhat generalized. Not all inventions are motivated by lucre or expectations of material fortune. Moreover, commercialization of inventions and inventiveness *per se* are two distinct phenomena and ought not be confused.

The better argument for patents would seem to be that patents probably serve as a useful incentive for the commercialization and industrialization of inventions. Thus, the crucial role which patents probably perform is to offer a profit incentive, encouragement and security to those desirous of commercializing inventions. Irrespective of the existence or otherwise of a reward mechanism, inventions would always occur. Another reason why the reward theory does not explain or justify the phenomenon of inventiveness is that history is replete with accounts of similar or same inventions simultaneously created by different inventors living and working at different places. For example, Polzunov in Russia had invented a steam engine before James Watt.¹⁵⁶ Watt got a patent and Polzunov did not. Assuming, as it sometimes happens, that these inventors were in the same country, which of the inventors

¹⁵⁵Penrose, *supra* note 94 at 32.

¹⁵⁶Melvin Kranzberg, "The Technical Elements in International Technology Transfer: Historical Perspectives" in John McIntyre & Daniel Papp, eds, *The Political Economy on International Technology Transfer* (New York: Quorum Books, 1986) at 31 [hereinafter, McIntyre & Papp]; Samuel Oddi, "The International Patent System and Third World Development: Reality or Myth?" (1987) 63 *Duke Law Journal* 831, [hereinafter, Oddi, "Reality or Myth"]; Samuel Oddi, "TRIPS-Natural Rights and a Polite Form of Economic Imperialism" (1996) 29 *Vanderbilt Journal of Transnational Law* 415.

would claim the reward promised by the patent system? The reward theory cannot therefore constitute a theoretical basis for the patent system.

1.6.3: The Contract/Disclosure of Secrets Theory

The contract theory posits that the patent concept is instituted to serve as a form of contract between the inventor and the state. In return for disclosing the secret of his/her invention, the state grants the inventor limited monopoly over the use of the invention. This theory has been assailed by critics on several fronts. First, it has been pointed out that when secrecy of inventions is possible, inventors and industrialists would probably prefer other forms of legal protection of innovations such as trade secret laws.

Second, it is a matter of fact that even if the inventor held his/her invention secret, other inventors would eventually hit upon that same idea because inventions are ultimately called forth by the needs of the society. As the saying goes, necessity is the mother of invention. Once again, the theory in question confuses commercialization of inventions with the encouragement of inventiveness. Third, there is no way of objectively certifying that the monopoly granted the inventor is actually equal to what the society may benefit from the invention. Several inventions which have later proved to be of immense usefulness to society were somewhat "ahead of their time" when they were first made and patented, and earned nothing, at least, money-wise, for their creators. A good example is the fax machine which was invented in 1842 but was only commercialized in the early 1980s.¹⁵⁷

¹⁵⁷Samuel Oddi, "Beyond Obviousness: Invention Protection in the Twenty-First Century" (1989) 38 *The American University Law Review* 1097. [hereinafter, *Beyond Obviousness*] Other examples include the

1.6.4: Encouragement of Invention Theory

This is the general argument by patent advocates that patents encourage inventiveness. However, without preempting the arguments made in Section 1.7 *infra*, patent economists are almost unanimous in their findings that there is inconclusive evidence to show that patent systems actually have any causal or organic relationship with inventiveness.¹⁵⁸ Surveys of business leaders (with the notable exception of pharmaceutical companies) typically place a low ranking on patents as a stimulant for research and development.¹⁵⁹

1.6.5: Post-Classical Theories of Patents

As earlier indicated, Samuel Oddi's approach distinguishes between the classical and post-classical theories of patents. The theories already discussed above fall into the category of classicism. On the other hand, the prospect theory,¹⁶⁰ the race-to-invent theory and the rent

automatic transmission which was invented in 1904 but was only commercialized in 1937; the cotton picker-(1850-1942); magnetic recording-(1898-1939); penicillin-(1928-1944); radar-(1904-1935); silicone-(1904-1948); television-(1905-1940) and xerography-(1937-1950). For an analogy of the patent grant to a hunting license, see Allan Topol, "Patents and Hunting Licenses-- Some Iconoclastic Comments and an Irreverent Solution" (1968) 17 *The American University Law Review* 424.; B. V. Hindley, *The Economic Theory of Patents, Copyrights, and Registered Industrial Designs* [Background Study to the Report on Intellectual and Industrial Property] (Ottawa: Economic Council of Canada, 1971)

¹⁵⁸William Lesser, *Sustainable Use of Genetic Resources Under the Convention on Biological Diversity-Exploring Access and Benefit Sharing Issues* (CAB International, Oxford, 1997) at 167.

¹⁵⁹Lesser, *supra*. See also, *The Impact of Intellectual Property Rights Systems on the Conservation and Sustainable of Biological Diversity and on the Equitable Sharing of the Benefits from its Use*, UNEP/CBD/COP/3/22, 1996. But see, Barkev Sanders, "The Economic Impact of Patents" (1958) 2 *Patents, Trademark, Copyright Journal of Research & Education* 340.

¹⁶⁰This theory owes more to the famous article by Edmund Kitch published in 1977. See, Edmund Kitch, "The Nature and Function of the Patent System" (1977) 20 *Journal of Law and Economics* 265.

dissipation theory may be classified as the post-classical theoretical justifications of the patent system. Edmund Kitch's well known article analogised the patent grant to the United States' mineral claims system. This theory has received substantial criticisms.¹⁶¹

Professor Robert Merges and Richard Nelson floated their "race-to-invent" theory in 1990. According to them, the patent system may be anchored on the theory that society would benefit from granting patents with a relatively narrow scope in order to permit innovations.¹⁶² Samuel Oddi has argued that the most recent theory advanced on patents is the rent dissipation theory. The essence of this theory is that "patents should minimize rent dissipation at the invention (conception) and innovation (improvement) stages."¹⁶³ None of the theories of patents as presently understood offers an explanation for patents. Although scholarship on the subject has ranged from faith to agnosticism and even absolute dismissal of the purported benefits of the patent system, the instrumentalist character of the patent system remains obvious.¹⁶⁴

¹⁶¹For a recent criticism of the prospect theory, see, Roger Beck, "The Prospect Theory of the Patent System and Unproductive Competition" [as cited in Oddi, "Theories" *supra* note 146 at 269]; Douglas McFetridge & Douglas Smith, "Patents, Prospects, and Economic Surplus: A Comment" (1980) 23 *Journal of Law and Economics* 197.

¹⁶²Robert Merges & Richard Nelson, "On the Complex Economics of Patent Scope" (1990) 90 *Columbia Law Review* 839; Robert Merges, "Commercial Success and Patent Standards: Economic Perspectives on Innovation" (1988) *California Law Review* 803.

¹⁶³Oddi, "Theories", *supra* note 146.

¹⁶⁴Steven Cheung has captured the spectrum of views on the economic analyses of the patent system. He writes:

[O]ne view—advanced by Bentham (1795) and shared by Say (1803), Mill (1848), and Clark (1907)—holds that patent rights are absolutely necessary to encourage inventions. A second view, advanced

1.7: Patents and Inventiveness: The Contested Link in North-South Context

There is a general assumption, almost an axiom among patent lawyers, that patents have a causal or organic link with inventiveness and industrialization.¹⁶⁵ An English patent attorney in attributing the success of the English industrial revolution to the patent concept declared that “the patent system was our invention, and it gave us the first place among nations in industry for over 200 years.”¹⁶⁶ A German patent attorney also vouched that “the countries whose industries take foremost place, also rank highest in patent policy.”¹⁶⁷

by Taussig (1915) and shared by Pigou (1920), maintains that a system of patents is largely superfluous. Third, Plant (1934), with modern followers, argued that a patent system is actually detrimental. Finally, Arrow (1962), ...argued that although property rights in ideas are clearly useful, they are nonetheless inferior to direct government investment in inventive activities.

(as cited and quoted in Oddi, “Theories” *supra* note 142 at 268..

¹⁶⁵Robert Sherwood, Vanda Scartezini & Peter Dirk Siemsen, “Promotion of Inventiveness in Developing Countries Through a More Advanced Patent Administration” (1999) 39 *The Journal of Law and Technology* 473; Robert Sherwood, “Human Creativity for Economic Development: Patents Propel Technology” (2000) 33 *Akron Law Review* 1; Donald Gregory, Charles Saber & Jon Grossman, *Introduction to Intellectual Property Law* (Washington: BNA Books, 1994); William Kingston, *Innovation, Creativity and the Law* (Dordrecht: Kluwer Academic Publishers., 1990).

¹⁶⁶H. Stafford Hatfield, *Inventions and Their Use in Science Today* (London: 1939) as quoted in Eric Schiff, *supra* note 83; Harvey Bale, “Patent Protection and Pharmaceutical Innovation” (1996-7) 29 *International Law and Politics* 95. Another concurring voice enthused that “it was not ...by accident that the patent system had its origin in England, nor that the industrial revolution was the inevitable consequence.” See, H.G. Fox, as quoted in Schiff at 9. Fox continues, “the dross of abuse and impropriety in the monopoly system had to be refined in the furnace of experience before the gold of the present patent system emerged to take its place as the greatest contributory factor to modern industrial progress.” *Ibid.*

¹⁶⁷Quoted in Schiff, *supra* note 83 at 12. These emotional tributes to the patent system are not limited to the British or continental Europeans. Across the Atlantic, a United States patent attorney vowed that “the strongest evidence of the value of the American patent system is our industrial economy, which has been built largely upon a groundwork of patented inventions.” *Ibid.* Adding a flavor of democratic heroism to this ode to patents, another American patent attorney declared that “the defence of the democratic world depends largely on American industry, which owes its present strength in large part to traditional American patent policy.” See, Karl Lutz, “A Proper Public Policy on Patents: Are We Adopting the Soviet View?” (1951) 37 *American Bar Association Journal* 943. According to the American Patent Society, “the patent system is the

Taking these statements *ex facie*, it is tempting to conclude that the patent system is one of the greatest achievements of human ingenuity without which mankind would languish in primitivity and anarchy. Surprisingly, the proof, if any, of the causal relationship between patents and inventiveness and the concomitant economic progress is questionable, and at best very meager. On a closer analysis, the hypothesis that patents propel inventiveness is founded on a concoction of anecdotal¹⁶⁸ inferences and debatable assumptions on complex factors. Thus, in spite of repeated generalized assertions¹⁶⁹ of an automatic causal link between patent regimes and inventiveness, the “most well-reasoned studies of patent systems”¹⁷⁰ have failed to establish a link between inventiveness and the patent system.

The most fundamental difficulty in making any rational claim for or against the alleged causal relationship between patents and inventiveness is the impossibility of disaggregating other factors or ingredients of technological inventiveness from the supposed impact of the patent system. These other factors include, *inter alia*, “local resource endowment, education of the labour force, availability of capital, and dynamism of the local market.”¹⁷¹ In the

foundation of American enterprise. It has ...contributed to the achievement of the highest standard of living that any nation has ever enjoyed.”Schiff, *ibid*.

¹⁶⁸Robert Merges, “Battle of Lateralisms: Intellectual Property and Trade” (1990) 8 *Boston University International Law Journal* 239; Robert Sherwood, *Intellectual Property and Economic Development* (Colorado: Westview, 1990) at 2. But see, Robert Sherwood, “Intellectual Property Systems and Investment Stimulation: The Rating of Systems in Eighteen Developing Countries” (1996-7) 37 *IDEA* 261.

¹⁶⁹Schiff, *supra* note 83.

¹⁷⁰Abbott, *supra* note 72.

¹⁷¹Abbott, *supra* note 72 at 223; Richard Carr, “Our Patent System Works— A Reply to the Melman

circumstances, there are no scientific tools by which a comparison could be made “between what has happened and what would have happened under different circumstances”¹⁷² were there not a patent system.

Further, there are other motives apart from profit desire which enable and motivate inventiveness. Many scientists and inventors value their personal enjoyment of experimenting with complex things, reputation, joy of living and curiosity, interest in work, academic honors and awards, publication of their findings, and respect from their peers much more than the profits of patented inventions. Accounts of inventors like Dr. Salk who invented the Polio vaccine and gave it to the world freely are legion. Beyond money, there are sublime motivations for inventions.¹⁷³

Furthermore, the pervasive phenomenon of serendipity,¹⁷⁴ which litters the tale of most

Report” (1960) 4 *Patent, Trademark, Copyright Journal of Research and Education* 5. But see, Siegfried Greif, “Patents and Economic Growth” (1987) 18 *International Review of Industrial Property and Copyright Law* 191.

¹⁷²Anderfelt, *supra* note 58 at 28.

¹⁷³Ikechi Mgbеoji, “Patents and Traditional Knowledge of the Uses of Plants: Is a Communal Patent Regime Part of the Solution to the Scourge of Biopiracy?” (2001) 9 *Indiana Journal of Global Legal Studies* 1. For example, as late as 1975, Cesar Milstein and Georges Kohler decided not to patent their path-breaking and commercially valuable invention of mono-clonal antibody-producing hybridum cells. See, Bhupinder Chimni, “Hard Patent Regime Completely Unjustifiable” in Subrata Chowdhry, *et al*, eds, *The Right to Development in International Law* (Dordrecht: Martinus Nijhoff, 1992) at 315; Andrew Currier, “To Publish or to Patent, That is the Question” (2000) 16 *Canadian Intellectual Property Review* 337. See also, Robert Golden, “Biotechnology, Technology Policy, and Patentability: Natural Products and Invention in the American System” (2001) 50 *Emory Law Journal* 155.

¹⁷⁴The “serendipity phenomenon” is the faculty of making unexpected discoveries or inventions by accident. The word “serendipity” was coined by Horace Walpole upon the title of the fairy tale—*The Three Princes of Serendip* where the heroes were always making accidental discoveries. Serendip was also an ancient name for modern Sri Lanka (Ceylon).

inventions all over the world, does not accommodate itself within the narrow confines of the “patents propel technology” hypothesis. As the *Time Magazine* special edition on inventions noted, “in the history of scientific and technological endeavor, there are few if any cases in which the end was exactly what was intended.”¹⁷⁵ The list of serendipitous inventions is endless and in many cases the inventors do not even recognize or appreciate the full import of their inventions.¹⁷⁶

Furthermore, as a matter of both historical and modern reality, the expensive nature of the patent process,¹⁷⁷ the complexity of the law¹⁷⁸ and the radical change in the social structure of inventive activities casts doubts on the axiom that the patent system is designed

¹⁷⁵*Time Magazine*, [Canadian Edition] December 4, 2000, “The Best Inventions of the Year” at 21. Serendipitous inventions include Roentgen’s X-Ray; Fleming’s penicillin, Goodyear’s vulcanization of rubber, Edison’s phonograph, Bessemer’s steel-making, Maybach’s carburetor, Macintosh’s raincoat, Daguerre’s photographic process, Nobel’s dynamite and plywood.

¹⁷⁶*Time*, *ibid.* Other famous accidental inventions include “Post-it-Notes”, “Coca-Cola”, “Scotchguard”, “teflon,” “Gore-Tex,” “cornflakes,” chemotherapy, and “Slinky.” In addition, there is the related phenomenon of spin-off inventions. These are collateral or derived products or effects. Some of the famous examples include inorganic paint, walking wheel chair, maintenance-free lubricated bearings and sight controlled switch are all spin-off inventions from the United States National Aeronautical and Space Agency (NASA).

¹⁷⁷Macleod, *supra* note 63 at 76. The average cost of obtaining a patent in mid-18th century England was the princely sum of 350 pounds. Recent studies indicate that excluding maintenance fees, it costs an average sum of USD40,000 to secure a patent in Japan, Germany USD17,265, Norway USD15,785, Finland USD14,000, Austria USD14,625, France USD8,335, United Kingdom USD7,090. Berrier, *ibid.*

¹⁷⁸Anthony Bourget, “Protecting Inventions in the Former Soviet Union” (1991-2) 10 *Wisconsin International Law Journal* 1; Adolf Dietz, “Trends Toward Patent Rights in Socialist Countries?” (1971) 2 *International Review of Industrial Property and Copyright Law* 155; M. Hoseh, “The U.S.S.R Patent System” (1960) 4 *Patent, Trademark, Copyright Journal of Research and Education* 220; S.J. Soltysinski, “New Forms of Protection for Intellectual Property in the Soviet Union and Czechoslovakia” (1969) 32 *The Modern Law Review* 408.

for the individual inventor without an arsenal of financial support.¹⁷⁹ In addition, the “historical necessity” argument for patents is erroneous and misconceived. In a classic study of the relationship between patents and the British industrial revolution, W.H. Price concluded that “in the mechanical process that took place in the 16th and 17th centuries, patents were not the leading factors. Some of the most successful mechanical innovations of the period did not enjoy any patent.”¹⁸⁰ Similar studies by Ashton,¹⁸¹ Deane¹⁸² and Mathias,¹⁸³ “all hesitate to assert a causal relationship”¹⁸⁴ between patents and the industrial revolution. Indeed Ashton’s studies showed that on some occasions, the patent system blocked the “way to new contrivance.”¹⁸⁵ And in his view, discovery and innovation might have “developed equally

¹⁷⁹Macleod, *supra* note 63 at 104.

¹⁸⁰W.H. Price, *English Patents of Monopoly* (Boston: 1906) at 62; Macleod, *ibid.*

¹⁸¹T.S Ashton, *The Industrial Revolution, 1760-1830* (Oxford: Oxford University Press, 1948)

¹⁸²Phyllis Deane, *The First Industrial Revolution* (Cambridge: Cambridge University Press, 1965)

¹⁸³Peter Mathias. *The First Industrial Nation: An Economic History of Britain* (New York: Charles Scribner’s Son, 1969)

¹⁸⁴Coulter, *supra* note 60 at 3. According to Coulter, “the question of whether patents for invention “served as a stimulus to or a drag upon inventive activity during the industrial revolution will probably remain open.”Coulter, *supra* at 23. But see, Gerald Mossinghoff, “The Importance of Intellectual Property Protection in International Trade” (1984) 7 *Boston College International & Comparative Law Review* 235.

¹⁸⁵Ashton, *supra* note 181 at 10. The example of James Watts’s quarter century domination of steam engine construction in Britain comes handy in Ashton’s conclusions. But see, David Landes, *The Unbound Prometheus: Technological Change and Industrial Development in Western Europe from 1750 to the Present* (Cambridge: Cambridge University Press, 1969) at 199; H.I. Dutton, *The Patent System and Inventive Activity During the Industrial Revolution* (Manchester: Manchester University Press, 1984) at 104.

rapidly without the patent system.”¹⁸⁶

Schiff’s study of inventiveness and patent institutions in eighteenth century Netherlands and Switzerland led him to conclude that “inventive activity can be quite vigorous in countries without a patent system.”¹⁸⁷ The Netherlands repealed its patent laws in 1869 and the Swiss had no national patent law until 1888, yet both countries during their “patentless” periods witnessed inventiveness and industrialization. In his view, a study of history shows that “patents have not been synonymous with inventions.”¹⁸⁸ In modern times, certain industries such as the brewing, pottery, and automobile industries which largely operate outside the patent regime, have made enormous strides in innovativeness and inventions. In sum, it seems that the preponderance of reasoned opinion and empirical research is that “the industrialization of a country can proceed smoothly and vigorously without a national patent system.”¹⁸⁹

Early European industrial history fails to support the argument of a direct causal link between the patent system and inventiveness. According to Anderfelt, “in a study of the birth and decline of early patent systems in some continental countries, ...the conclusion (by Frumkin) appears to be that the patent institution followed rather than preceded the economic

¹⁸⁶Coulter, *supra* note 60 at 23.

¹⁸⁷Schiff, *supra* note 83 at 5. For a modern examination and rebuttal of the “patents-propel-inventiveness thesis”, see, Samuel Oddi, “Reality or Myth?” *supra* note 156.

¹⁸⁸Macleod, *supra* note 63 at 158.

¹⁸⁹Schiff, *supra* note 83 at 124.

and cultural development and later lost its importance when these activities became less intensive.”¹⁹⁰ With respect to the Venetian patent system, Anderfelt’s study argues that:

[T]he existence of the Venetian Patent Act, and of early patent systems in some other continental countries, is interesting from another point of view. The idea so cherished by the patent advocates, that there exists a more or less organic relationship between the existence of a patent law and the economic and industrial performance of a country, cannot be supported at all by this early experience. In Venice the patent system was introduced when that State was already at the height of its development.¹⁹¹

Thus, the argument by patent advocates that the patent system is coterminous with industrialization or that the patent system is a historical necessity is not supportable by the history of industrialization.¹⁹² Technological feats outside Europe have been consistently performed and recorded without the aid of the patent system. As John Needham’s epic work on Chinese civilization¹⁹³ argues, “imperial China is an example of a society that achieved spectacular outcomes in science and innovation without the instrumentality of a patent system or a customary equivalent.”¹⁹⁴

¹⁹⁰Anderfelt, *supra* note 58 at 6.

¹⁹¹*Ibid.* For the early German experience, see, H. Pohlman, “The Inventor’s Right in Early German Law” (1961) 43 *Journal of the Patent Office Society* 121.

¹⁹²According to one of the chief proponents of the “historical necessity” argument, “the patent system is not the result of inspired thinking but is a dictate of historical necessity.” See, H.G. Fox, *Monopolies and Patents: A Study of the History and Future of the Patent Monopoly* (Toronto: University of Toronto Studies, Legal Series, Extra Vol., 1947) at 190. But see, Anderfelt, *supra* note 58 at 27.

¹⁹³John Needham, *Science and Civilization in China* (Vols.1-2) (Cambridge: Cambridge University Press, 1954); John Needham, *The Grand Titration* (London: 1969). See also, W.P. Alford, “Don’t Stop” *supra* note 81.

¹⁹⁴Drahos, *supra* note 40. Some of the seminal Chinese inventions include, paper in A.D. 105 and

Similar technological progress were recorded under the Arab and Pharaonic¹⁹⁵ civilizations, respectively, without the aid of a patent system.¹⁹⁶ The import, according to Drahos, is that the “connection to intellectual property, science and economic development is contingent and local rather than necessary and universal.”¹⁹⁷ Accordingly, it would be simplistic and sweeping to attribute modern industrial attainments to the patent system.

The stronger argument for a patent system has been articulated by Judge Simon Rifkind, Co-Chairman of the famous United States President’s Commission on the Patent System. In his words:

[T]he really great, creative geniuses of this world would have contributed their inventions even if there were a jail penalty for doing so. But that in itself would not have been sufficient. The patent system is more essential to getting together the risk capital which is required to exploit and to develop and to apply the contributions of the genius inventor than to provide a stimulus for the actual mental contribution. It is to the former that the economic incentive is indispensable. The money will not be risked unless there is some sense of assurance that a benefit will be obtained.¹⁹⁸

printing in the 6th Century, gunpowder, and the magnetic compass. But see, Liwei Wang, “The Chinese Traditions Inimical to the Patent Law” (1993) 14 *Northwestern Journal of International Law and Business* 15. (Arguing that the Chinese contributions were not “science” but “technique”!)

¹⁹⁵According to patent historian Erich Kaufer, “in Egypt and other ancient civilizations, no patent-like institutions have been discovered, and it is likely that none existed.” See, Harold Wegner, *supra* note 56 at 537.

¹⁹⁶Harold Dorn, *The Geography of Science* (Baltimore: Johns Hopkins University Press, 1971)

¹⁹⁷Drahos, *supra* note 40 at 15.

¹⁹⁸*Report of the President’s Commission on the Patent System*, reproduced in, Hearings Before Subcommittee No. 3 of the Committee on the Judiciary House of Representatives, 90th Congress on H.R. 5924, H.R. 13951, and related Bills for the General Revision of the Patent Laws, Title 35 of the United States Code, and For Other Purposes, Serial No. 11, Part 1 (Washington: U.S. Government Printing Office, 1968) at 170. Compare with, Jay Erstling, “The Protection of Intellectual Property—of Metaphysics, Motivation, and Monopoly” (1991) 3 *Sri Lanka Journal of International Law* 51.

Judge Rifkind's acute observation makes eminent sense. Surprisingly, most advocates of the patent system have engaged in a perennial confusion of commercialization of inventions with inventiveness.

Apart from conflating inventiveness with commercialization of inventions, the patents-propel-inventiveness hypothesis romanticizes the inventive process. Remarkable changes in both the social and legal structure of inventiveness and ownership of inventions compel a sober re-appraisal of the hypothesis in question. First, it is necessary to appreciate that the patent system was originally designed for the individual inventor: the proverbial "basement" or "garage" inventor who worked in loneliness and expended his/her scarce resources in the search for socially useful contrivances.¹⁹⁹ This is largely the tale of the heroic individual inventor.

However, starting from the era of the British guilds and continuing till the modern age whereby scores of scientists and inventors labour for pay in corporate and public owned legal entities, the practice of "collective invention" has reduced the legendary lonely inventor to the margins of history.²⁰⁰ Today, the paradigm of the individual inventor, as Edith Penrose declared since 1974 is more or less an anachronism.²⁰¹ The modern reality is collective inventions and corporate/public ownership of inventions. In arriving at this interesting conclusion, Anderfelt's three-pronged test is pertinent. That is, (1) who is doing research

¹⁹⁹Anderfelt, *supra* note 58 at 29.

²⁰⁰Robert Merges, *Intellectual Property*, *supra* note 57 at 124 (and the texts cited therein.)

²⁰¹Edith Penrose, *supra* note 94 at 191.

today?; (2) who is supplying the financial means?; (3) who is exploiting the results?²⁰² With respect to the first question, it is obvious that the inventor largely remains the individual but the context in which the individual inventor now carries out the task of inventing things has changed.

Nowadays, inventive activities are practically carried out by inventors employed by industry or public research institutions.²⁰³ The point is that “these inventors do not live from the particular results of their inventive activities but from a regular income.”²⁰⁴ In effect, the formerly self-employed inventor has to a large extent become an employee of industry.²⁰⁵ In a critical sense, the regime of employer-ownership of patents marks the ultimate subversion of the classical or romantic *raison d’etre* of the patent system.

By dispossessing the employee of the fruit of his/her own genius in the guise of

²⁰²Anderfelt, *supra* note 58 at 30. For a fuller analysis of the template shift in the social nature of inventiveness, see, I. de Sola Pool, “The Social Environment for Sustained Technological Growth” in W. Anderson, *et al*, eds, *Patents and Progress: The Sources and Impact of Advancing Technology* (Illinois: Richard Irwin, 1965).

²⁰³Mary Holman, “An Economic Analysis of Government Ownership of Patented Inventions” in L.J. Harris, ed, *Nurturing New Ideas: Legal Reports and Economic Roles* (Washington: 1969) at 155. See for example, Article 60 (1) of the *European Patent Convention*; Section 2 (4) Patents and Design Decree 1970 of Nigeria. For a list of all patent laws in the world and their provisions on employer-ownership of inventions, see, John Sinnott, *World Patent Law and Practice*, [Vols. 2B-F] (New York: Matthew Bender, 1976).

²⁰⁴Anderfelt, *supra* note 58 at 30. For an expert and learned analysis of the law on employee inventions, Dr. Fredrik Neumeyer’s works on the subject remain peerless. See, Fredrik Neumeyer, *The Law of Employed Inventors in Europe*, Study No. 30, Senate Sub-Committee on Patents, Trademarks and Copyrights on the Committee of the Judiciary, 87th Congress, 2nd Session., Washington, 1963; Frederik Neumeyer, “Employees’ Rights in their Inventions-- A Comparison of National Laws” (1962) 44 *Journal of Patent Office and Society* 674; Fredrik Neumeyer, *The Employed Inventor in the United States -- R & D Policies, Law, and Practice* (Mass: M.I.T. Press, 1971).

²⁰⁵The regime of corporate ownership of employee inventions is traceable to the Patent Act of 1897 of the Austro-Hungarian Empire. See, Stephen Ladas, *supra* note 56 at 324.

employed remuneration, the capitalist instinct of the patent system is laid bare. Under this massive outlay of capital and the employment of inventors by capital, “few inventions today can be exclusively attributed to the work of a single individual...contemporary research is increasingly in the form of teamwork, and often scientists from different fields cooperate on a particular project.”²⁰⁶ The consequence is that in modern times more than 90% of all patents are granted to employers instead of the real inventors. Thus, by recognizing an employer’s property in the invention of the employee (under some circumstances), the patent system contradicts its original purpose which consisted in providing incentives to individual inventors for their “inventive genius.” As Soltysinski notes, “the recognition of the employer’s right to inventions made by his employee has resulted in depriving the latter of all benefits associated with a patent.”²⁰⁷

In most cases, apart from the regular salary and the usual raise in remuneration (which other employees with no connection to the inventions also receive as part of their regular entitlements), the individual inventor gets no special personal incentive from the patent system. In the final analysis, it is difficult to disagree with Bhupinder Chimni’s summative analogy that “to say that the potential of a patent actually stimulates invention is a lot like

²⁰⁶Anderfelt, *ibid.* Lending further weight, Melman’s studies conclude that “the resulting condition of interdependence in inquiry renders the concept of inventor obsolete to a considerable extent.” See, S. Melman, “The Impact of the Patent System on Research” Study No. 11, United States’ Senate, Committee on the Judiciary, Studies of the Sub-Committee on Patents, Trademarks and Copyrights (Washington: Government Printing Office, 1958) at 18.

²⁰⁷S.J. Soltysinski, *supra* note 178. Ironically, whether under the capitalist system or the embattled communist system, the lot of the employed inventor remains the same. In Soltysinski’s words, “in a socialist, as well as in a capitalist state, the patent for an employee’s invention usually belongs to the employer.” *Ibid.*

saying that you can spur the donkey on by offering a carrot to its rider.”²⁰⁸

In the circumstances, if the individual inventor remains desirous of getting his/her “just reward” for an invention, s/he may have to look beyond the patent system. Precisely, s/he would have to depend on his/her bargaining strength vis-a-vis the employer corporation or the public employer as the case may be. Of course, it cannot be denied that providers of infrastructure conducive to inventiveness contribute towards innovation. The fact, however, remains that the patent system itself not does proclaim that it exists to serve those interests. Rather, it pretends to be a reward mechanism for the inventor qua the inventor.

Furthermore, it is often argued that states, particularly, poor countries, which desire foreign direct investment (FDI) should institute strong patent regimes to attract investment and thus improve their economy and standard of living. Even though this thesis seems attractive, it is a simplistic response to a more complicated problem. In any event, there is little empirical support for this argument. A study by the United Nations Transnational and Management Division shows that there is little or no empirical evidence to support the view

²⁰⁸Bhupinder Chimni, “Hard Patent Regime Completely Unjustifiable” *supra* note 173. Bemoaning his plight under this regime, a world-renowned scientist and prolific inventor, Dr. Charles Draper noted as follows:

[T]hirty years of work on various problems have inspired a number of innovations resulting in patents carrying my name either as inventor or co-inventor. My direct income has been substantially nothing compared to the total gross income derived from sales of devices based on the ideas covered by the patents...the total business generated for industry amounts to several billion dollars. My personal returns have been not more than a few thousand dollars.

See, “The Patent System from a Scientist’s Point of View” (1961) *Patent, Trademark, Copyright Journal of Research & Education* 64 at 74. For an analysis of how the modern regime impacts on the “small inventor”, see, Ben Hattenbach, “GATT TRIPs and the Small American Inventor: An Evaluation of the Effort to Preserve Domestic Technological Innovation” (1995) 10 *Intellectual Property Journal* 61; John Stedman, “The Employed Inventor, the Public Interest, and Horse and Buggy Law in the Space Age” (1970) 45 *New York University Law Review* 1.

that patents encourage FDI.²⁰⁹ In fact, studies have found out that:

[T]he countries with the weakest levels of IPR's protection—the People's Republic of China, Taiwan, Brazil, Argentina, Thailand, etc—over the past decade have routinely been the recipients of the largest net FDI inflows. There has been a significant correlation between the United States Trade Representative's (USTR) list of worst IPRs violators and the highest levels of U.S. foreign direct investment.²¹⁰

Finally, turning to the question of paucity of data to support the “patents propel technology” hypothesis, the near unanimous verdict of intellectual property rights (IPR) economists who have studied the phenomenon is one of doubt, if not polite rejection. According to Frederick Abbott,

[T]here is a serious gap in economic data and analysis which might demonstrate the positive impact of patent protection as claimed by the patent holders. This gap is well-known and accepted among intellectual property rights (IPR) economists and public policy specialists. Since the value of patents to the international economic system has not been empirically demonstrated, there is no concrete basis for analyzing the trade-off in values that patent holders have suggested.²¹¹

²⁰⁹United Nations Transnational Corporation and Management Division, United Nations Department of Economics and Social Development, *Intellectual Property Rights and Foreign Direct Investment*, U.N. Doc.ST/CTC/SER.A/24, U.N. Sales No. E93, II.A.10 (1993).

²¹⁰Frederick Abbott, “Commentary: The International Intellectual Property Order Enters the 21st Century” (1996) 29 *Vanderbilt Journal of Transnational Law* 471. See also, Christopher Mayer, “The Brazilian Pharmaceutical Industry Goes Walking from Ipanema to Prosperity: Will the New Intellectual Property Law Spur Domestic Investment” (1998) 12 *Temple International and Comparative Law Journal* 377. (Noting that in Brazil, “despite the ban on patents, foreign investments in the pharmaceutical industry rose from 113million USD in 1971 to 644million USD in 1979. This increased investment tends to defeat the argument that in the absence of patent protection, foreign investment from the pharmaceutical industry would be negligible”). Although the existence of a strong patent system will naturally increase profits for the investor, it seems that the crucial criteria for FDI is a large and stable market with effective demand for the services or products of the foreign investor.

²¹¹Abbott, *supra* note 72 at 1792. For a study of the impact of the patent system in Australia, see, T.D. Mandeville, D.M. Lamberton & E.F. Bishop “Economic Effects of the Australian Patent System” in Abbott, *ibid* at 660.

In the considered view of the famous economist, Sir Arnold Plant, “the science of economics, as it stands today, furnishes no basis of justification for this enormous experiment in the encouragement of a particular activity by enabling monopolistic price control.”²¹² Other notable economists and scholars have affirmed the views of Sir Arnold Plant.²¹³ Perhaps, the last word on this issue should be reserved for Fritz Machlup whose commissioned study on the subject remains a *locus classicus*. In his oft-cited conclusive opinion:

[N]one of the empirical evidence at our disposal and none of the theoretical arguments presented either confirms or confutes the belief that the patent system has promoted the progress of the technical arts and the productivity of the economy. Scholars must not lack the courage to admit freely that there are many questions to which definite answers are not possible, or not yet possible. They need not be ashamed of coming forth with a frank declaration of ignorance...No economist, on the basis of present knowledge, could possibly state with certainty that the patent system, as it now operates, confers a net benefit or a net loss upon society.²¹⁴

In sum, it seems that although inventions will be made, with or without the patent system, the relevance of the patent system, if any, is in getting together the risk capital needed to exploit and develop the invention in question. This function is quite different from the questionable assertions that the patent system necessarily encourages inventiveness.

²¹²Arnold Plant, “The Economic Theory Concerning Patents for Inventions” (1934) 1 *Economica* 30; reprinted in Sir Arnold Plant, *Selected Economic Essays and Addresses* (Boston: Routledge, 1974) at 35.

²¹³For a similar conclusion see, D. Vaver, “Intellectual Property Today: Of Myths and Paradoxes” (1990) 69 *Canadian Bar Review* 98. But see, Richard Carr, “Our Patent System Works— A Reply to the Melman Report” (1960) 4 *Patent, Trademark, Copyright Journal of Research and Education* 5.

²¹⁴Fritz Machlup, *supra* note 65 at 19. See also, Oddi, “Reality or Myth”, *supra* note 156. But see, Adrienne Catanese, “Paris Convention, Patent Protection, and Technology Transfer” (1985) 3 *Boston University International Law Journal* 209.

1.8: The North-South Implications of Patents

If the patent system is as deficient in empirical support as the immediate preceding section has sought to demonstrate, the next question is how have its contradictions played out in the global forums, particularly within the context of conflicting international economics, cultures and philosophies?²¹⁵ Part of the answer probably lies in examining the contending factors in the political economics of state interests.²¹⁶ Indeed, surveys of various national patent laws reveal an instrumentalist approach towards a protection and sustenance of each state's perceived technological and economic needs. Patents also function as a juridical anchor for the state's notions of distributive justice and public morality.²¹⁷

The first factor to be considered is largely economic in character. Given the structure and realities of statehood, it is in the economic and political interest of every state to maximize the economic returns on its resources and also to stay ahead of other states in

²¹⁵For a detailed account of the making of the modern international patent system and its ramifications, see, Ulf Anderfelt, *supra* note 58. For a contemporary analysis of some of the issues raised by the emerging regime of globalised patents, see, Keith Aoki, "Neocolonialism, Anticommons Property, and Biopiracy in the (Not-so-Brave) New World Order of International Intellectual Property Protection" (1998) 6 *Indiana Journal of Global Legal Studies* 11. [hereinafter, Aoki]

²¹⁶Abbott, *supra* note 72; Julie Park, "Pharmaceutical Patents in the Global Arena: Thailand's Struggle Between Progress and Protectionism" (1993) 13 *Boston College Third World Law Journal* 121; Glenn Butterson, "Pirates, Dragons and U.S Intellectual Property Rights in China: Problems and Prospects of Chinese Enforcement" (1996) 38 *Arizona Law Review* 1081; Carolyn Corn, "Pharmaceutical Patents in Brazil: Is Compulsory Licensing the Solution?" (1991) 9 *Boston University International Law Journal* 71.

²¹⁷Evan Ackiron, "Patents for Critical Pharmaceuticals: The AZT Case" (1991) 17 *American Journal of Law and Medicine* 145. For a comparison of the instrumentalist nature of various patent laws, see, for example, Article 4, Argentina Law No. 111 on Patents on Invention, October 11, 1864; Argentina Law No. 20.794, Transfer of Technology Decree-Law 19.231; Argentina Foreign Investments Law No. 21.382, Australian Patents Act 1952-1969; Sections 1&2, Austrian Patent Act, 1970; Bahamas Industrial Property Act of 1965, Belgian Patent Act of May 24, 1854. See generally, John Sinnott, *supra* note 84.

technological advancement and in its standard of living. As such, the patent concept is not an instrument of inter-state conviviality or camaraderie. It is an instrument for the pursuit of perceived national economic interest. As Abbott explains:

[P]atent holdings worldwide are largely in the hands of enterprises based in a small group of industrialized countries. The claim that patent holders should be entitled to 'super-returns' based on the value of invention also is a claim that a higher proportion of global wealth should be allocated to industrialized country enterprises.²¹⁸

In effect, despite all the emphasis and stress on the "law of patents," national patent systems have always been based on the perceived economic considerations of states.²¹⁹ As an instrument in inter-state economic and technological competition, the enforcement of patent norms may often operate to the economic detriment of weaker states. Accordingly, when powerful states of the North²²⁰ use their undoubted leverage to coerce and compel states in

²¹⁸Abbott, *supra* note 72 at 235; Mark Lemley, "The Economic Irrationality of the Patent Misuse Doctrine" (1990) 78 *California Law Review* 599.

²¹⁹Anderfelt, *supra* 58 at 100. For example, in 1880, when Great Britain was the undisputed technological giant in the world, it supported the abolition of the obligation for domestic working of foreign patents. By 1911 when it had lost its pre-eminent position, it advocated a policy of domestic working of foreign patents or at least, compulsory licensing of foreign patents. France and Italy have also been known to engage in similar turn-around. See, Anderfelt, *ibid*.

²²⁰The term "North" as used in this thesis refers to the countries of North America, Europe, New Zealand, Japan, and Australia. They are also called the "rich" or the "advantaged" countries of the world. For the purposes of convenience, they may further be categorized as members of the Organization for Economic Cooperation and Development (OECD) which has 24 member countries, namely; Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. See, *OECD in Figures: Statistics on the Member Countries, 1988 edition: Supplement to the OECD Observer No. 152, at 4-5* (June/July 1988); Helen Weidner, "The United States and North-South Technology Transfer: Some Practical and Legal Obstacles" (1982-3) 1-2 *Wisconsin International Law Journal* 205; Akilagpa Sawyerr, "Marginalisation of Africa and Human Development" (1993) 5 *R.A.D.I.C.* 176.

the South²²¹ to institute strong patent regimes on the ostensible theory that “patents will promote inventiveness” in the South, it is an exercise which invites suspicion. As Alan Gutowski cogently points out, “for the sake of clarity, if not honesty, developed countries would do well simply to abandon their high moral tone and address issues of IP as matters of domestic and international economic policy.”²²² In economic terms, the South argues that at best, different levels of and subjects of patent protection may be “more appropriate at different stages of economic development”²²³ and thus, would prefer a less stringent patent

²²¹The term “South” refers to the countries of Africa, Asia (excluding Japan), Latin America and Oceania. They are also called the “developing countries,” “less-developed,” or the “third world,” countries of the world. Considering the similar experiences of indigenous minorities of North America, it may also be convenient to imply that there is a “South” in the North. See, Melville Watkins, “North-South Relations” (1975) 5 *Alternatives: Perspectives on Society and Environment* 33. For an excellent analysis of the nature of the economic and cultural divide between the North and South, see, Nassau Adams, *Worlds Apart: The North-South Divide and the International System* (London: Zed Books, 1993); Geir Lundestad, *East, West, North and South: Major Developments in International Politics 1945-1986* (Norwegian University, 1988). It should be noted that as a concept, “the third world is far from a homogenous group. There exists no strict criteria for qualifying as a developing country...In the United Nations, they form the Group of 77 States, although the group at present consists of more than 130 states. See, Ignaz Seidl-Hohenveldern, *International Economic Law* (Dordrecht: Martinus Nijhoff, 1989) at 4; Winston Langley, “The Third World: Towards a Definition” (1981) 2 *Boston College Third World Law Journal* 1.

²²²Robert Gutowski, “The Marriage of Intellectual Property and International Trade in the TRIPs Agreement: Strange Bedfellows or a Match Made in Heaven?” (1999) 47 *Buffalo Law Review* 713. [hereinafter, Gutowski]

²²³Abbott, *supra* note 72 at 223. See also, Michael Gadbow & Leigh Kenny, “India” in Michael Gadbow & Timothy Richards, *supra* note 144 at 1. This phenomenon is not limited to India. Michael Gadbow’s studies show that most countries of South-East Asia and Latin America generally favour laws which contribute to their respective economies even when such stance may probably cause losses to nationals of other countries. The obvious inference is that patent laws are largely designed to serve the peculiar values and national interests of respective states, hence, the struggle by powerful states of the North to “tighten the noose.” On the competing interests of states in patents, see also, Simon Broder, *A Comparative Study of the United States Patent Office and the German Patent Office* (Michigan, Ann Arbor: University Microfilms, 1960, Unpublished Doctoral Dissertation) at 224; Laurence Harrington, “Recent Amendments to China’s Patent Law: The Emperor’s New Clothes?” (1994) 17 *Boston College International & Comparative Law Review* 337.

Even among the developed countries of the North, patents constitute a form of rent paid to the more powerful States. See, O.J Firestone, *Economic Implications of Patents* (University of Ottawa Press, Ottawa,

system, if any, at all. In substantive law and procedure, attempts at institutionalizing a so-called international patent system usually reflect the congealed national interests of powerful states²²⁴ of the North, particularly the United States. The underlying conflict is that the South's level of economic development does not justify a strong patent regime. Of course, states of the North reject such construction of the patent system.

Ironically, history bears out the position and attitude of the South. As already evident in the preceding pages, the patent law policies of European countries at their earlier years of industrialization, reveal a clear instrumentalist policy of appropriation of ideas and technologies from other states in order to attain pre-eminence.²²⁵ Even the United States, which now acts as the moral chastiser of recalcitrant states of the South unwilling to adopt strong patent laws, was a notorious "pirate" of foreign technology and flouted patent norms

1971). In his findings, 94 per cent of patents in Canada are issued to foreigners-mainly Americans. Thus, Canada which belongs to the category of developed States finds itself more in the position of a less-developed economy tending to import technology and paying rent to American firms who largely have no interest in working the patents in Canada but are keen on ensuring a continued monopoly of the Canadian market by importation of the finished product.

²²⁴While most states profess to share the common criteria of novelty, utility, inventive step and industrial applicability, legal definitions as to scope, entitlements, fields of technology and exceptions still vary considerably and have not been harmonized in international law, at least until the TRIPS Agreement. This aspect is discussed in Section 1.9, and Chapter Three, *infra*. Indeed, the differences in both the law and practice of patents are largely economic and cultural. For example, the United States' isolated use of "first to file" system is not a "doctrinal eccentricity but an economic policy; this policy practically discriminates against foreign inventors. See Alford, "Making the World Safe for What", *supra* note 81 at 46. On the Japanese experience, see, Edmund Kitch, "The Japanese Patent System and U.S Innovators" (1996-7) 29 *International Law and Politics* 177.

²²⁵Jeffrey Berkman, "Intellectual Property Rights in the P.R.C. : Impediments to Protection and the Need for the Rule of Law" (1996) 15 *Pacific Basin Law Journal* 1; Liwei Wang, "China's Patent Law and the Economic Reform Today" (1991) 9 *Pacific Basin Law Journal* 254; Kevin Murphy, "Reform of the Patent System in Canada" (1976) *Annual of Industrial Property Law* 81.

in defiance of then technologically-superior European states.²²⁶ As Alford has noted,

[T]hroughout its period as a developing country, and some would argue, even thereafter, the United States was notorious for its singular and, in many regards, cavalier attitude toward the intellectual property of foreigners...the criticisms that the American government and interest groups level at China today could readily have been applied to this nation a century ago...The plans for much of the machinery that powered Lowell, birthplace of the American industrial revolution, were shamelessly lifted by none other than Raph Lowell, himself from Great Britain.²²⁷

Further, while Britain as a one-time global leader in technology forbade the export of:

[E]ngines, parts, and skilled persons, the US imported all three regardless...The decision was made in the US that at that stage of economic development, the best policy for the US was lax enforcement of foreign intellectual property.²²⁸

As the United States' Congress itself admitted, "when the United States was still a relatively young and developing country, it refused to respect international intellectual property rights on the grounds that it was freely entitled to foreign works to further its social and economic development."²²⁹ The interesting point here as Anderfelt has observed is that:

[W]hen developing countries today are told of the necessity of having an "adequate" patent system ("adequate" meaning accepting at least the minimum requirements of the international patent system) and the "historical examples" of the now industrialized countries are now referred to in support, the fact that several of the

²²⁶D. Jeremy, *Transatlantic Industrial Revolution: The Diffusion of Textile Technologies Between Britain and America, 1790-1830s* (California: 1981)

²²⁷William Alford, "Making the World Safe for What", *supra* note 81 at 147

²²⁸[Underlining mine] See, Merges, *supra* note 57 at 245; Anderfelt, *supra* note 58 at 3.

²²⁹US Congress, *Office of Technology Assessment, OTA-CIT-302* (Washington, D.C., US Government Printing Office, April 1986) at 228. See also, Dru Brenner-Beck, "Do as I say, Not as I Did" (1992) 11 *Pacific Basin Law Journal* 84. See also, Abdulqawi Yusuf, "TRIPs: Background, Principles and General Provisions" in Carlos Alberto Correa & Abdulqawi Yusuf, eds, *Intellectual Property and International Trade* (The Hague: Martinus Nijhoff, 1998) at xvii.

latter at certain periods used their patent systems chiefly as an incentive to “importers” of foreign-made inventions is understandably never mentioned.²³⁰

Perhaps, what makes the contemporary struggle for economic and technological pre-eminence more intense is the fact that,

[T]he new world economy is increasingly been driven by intellectual capital: knowledge, inventions, expressions of creativity and the accumulated education, training and skills embodied in the scientific, engineering, and professional workforce...intellectual capital is surpassing in importance the components of the physical capital-land, natural resources and manual labour-as the main source of wealth creation.²³¹

Thus, at the heart of the global divide is a struggle over economic profits from patented products as stringent patent laws ensure the promotion of the industries in the North and the creation of an ever-expanding market for those patented goods.²³²

As technology becomes a significant component of national wealth and increased

²³⁰Anderfelt, *supra* note 58 at 13.

²³¹Abbott, *supra* note 72 at xxvii. See also, Francis Gurry, “The Evolution of Technology and Markets and the Management of Intellectual Property Rights” in Abbott, *ibid*. Hence, the number of patents filed annually all over the world has shown a rapid increase. According to Abbott, “by the of 1993, a total of 3.9 million patents were in force throughout the world...the total number of patent applications worldwide have risen from 1,371,806 in 1989 to 1,965,487 in 1993, an increase of 43.3 %.”Abbott, *ibid*. See also the comments of Professor Walter Hamilton in 1941: Walter Hamilton, *Senate Temporary National Economic Committee., 76th Sess., Investigation of Concentration of Economic Power: Patents and Free Enterprise 164* (Comm. Print 1941). Interestingly, there is considerable force in the perception that the United States is losing competitive advantage in the heavy industries to some countries in Asia and Latin America, hence, the increasing emphasis on intellectual property, particularly, patents. See, Samuel Oddi, “Beyond Obviousness”, *supra* note 157.

²³²Amy Carroll, “Not Always the Best Medicine: Biotechnology and the Global Impact of U.S. Patent Law” (1995) 44 *The American University Law Review* 2433 at 2439. But see, Robert Gutowski, *supra* note 221.

global economic interdependence expands the frontiers of trade,²³³ the economic rent to be collected by a stringent and global application of patent norms becomes a compelling national priority of technologically-advanced states. Hence, the coercion²³⁴ used by the North in beating the South into line on the question of broad patent protections shows clearly whose economic interests such a regime serves.²³⁵ In this process, as Paul Liu observes, “a strong invisible hand, ...the influence of ..industries and industrial organization is evident.”²³⁶

The problem, as already hinted, is that national policies on patents (absent formidable external pressures to the contrary) are dependent on a cost/benefit analysis of the economic ramifications of patents. It seems that on the whole, strong patent regimes confer a net economic loss for the South. Conversely, strong patent laws constitute a net economic gain for the North. For instance, studies show that foreigners hold over 90-95% of all patents

²³³Myers McDougall, *et al*, “Theories About International Law: Prologue to a Configurative Jurisprudence” (1968) 8 *Virginia Journal of International Law* 188.

²³⁴The methods of compulsion include unilateral trade sanctions, diplomatic pressure, and by inter-linking demands for strong patent protection with unrelated interests such as “developmental aid” programs. See, Paul C.B. Liu, “U.S Industry’s Influence on Intellectual Property Negotiations and Special 301 Actions” *supra* note 80.

²³⁵Thomas Mesevage, “The Carrot and the Stick: Protecting U.S. Intellectual Property in Developing Countries” (1991) 17 *Rutgers Computer and Technology Law Journal* 421; Stefan Kirchanski, “Protection of U.S. Patent Rights in Developing Countries: U.S Efforts to Enforce Pharmaceutical Patents in Thailand” (1994) 16 *Loyola L.A. International and Comparative Law Journal* 569; Edgar Asebey, & Jill Kempenaar, “Biodiversity Prospecting: Fulfilling the Mandate of the Biodiversity Convention” (1995) 28 *Vanderbilt Journal of Transnational Law* 703. (Arguing that “...in fact, the international patent law system is often deceptively harmful to developing countries, causing them to exchange real rights for rights which are mostly theoretical.”) See also, Oddi, “Reality or Myth” *supra* note 156 and notations at note 4 thereof for a list of overwhelming findings against the appropriateness of the patent systems for the South.

²³⁶*Supra* note 80.

granted in the South and most of these patents are not being worked in the countries of the South²³⁷ but constitute a monopoly market for imported patented goods. The situation becomes more acute in the light of contemporary international patent law which construes importation of the patented products as sufficient local working of an invention. In the words of J.H. Reichman,

[E]vidence shows that foreign patents typically become vehicles for import monopolies in the developing countries, while locally-worked patents seldom produce the desired diffusion of technical knowledge needed to permit future competition by local firms and agencies. Arguably, domestic recognition of foreign intellectual property can thus inhibit rather than stimulate local innovation, and it can thus enhance the comparative advantages of the industrialized countries in the production of new and old technologies.²³⁸

In effect, patents are deductions from the national wealth of the already beleaguered countries of the South.²³⁹ The inescapable conclusion seems to be that countries of the South “have

²³⁷Amy Carroll, *supra* note 232. See also, Peter Nanyenya-Takirambudde, *Technology Transfer and International Law* (New York: Praeger, 1980); David Haug, “The International Transfer of Technology: Lessons That East Europe Can Learn from the Failed Third World Experience” (1992) 5 *Harvard Journal of Law and Technology* 209; Paul Haar, “Revision of the Paris Convention: A Realignment of Private and Public Interests in the International Patent System” (1982) 8 *Brooklyn Journal of International Law* 17.

²³⁸J.H. Reichman, *Intellectual Property in International Trade: Opportunities and Risks of a GATT Connection* (1989) 29 *Vanderbilt Journal of Transnational Law* 747. [hereinafter, Reichman, *GATT Opportunities and Risks*] This situation is not limited to the South. An overwhelming majority of the patents in Australia and Canada are owned by American and Japanese multinational corporations who have no real interest in domestic working of those patents. See, Christopher Arup, *Innovation, Policy and Law: Australia and the International High Technology Economy* (Cambridge University Press, 1993) at 52-74. An obvious consequence of this phenomenon, especially for states like Canada and Australia with an educated workforce in the sciences and possessed with the necessary supporting infrastructure for technological innovations is that inventors, potential and actual, who probably would have hit upon those inventions and ideas independently, are precluded from putting those ideas to work because the foreign patents have priority.

²³⁹As Abbott notes, such lost economic opportunities operate on the hypothetical plane and is almost impossible to accurately quantify. However, estimates range from \$43 billion to \$61 billion for the year 1986 in the United States. The industries most affected are chemicals, pharmaceuticals, and computer software. See, Frederick Abbott, “Protecting First World Assets in the Third World: Intellectual Property Negotiations in the GATT Multilateral Framework: (1989) 22 *Vanderbilt Journal of Transnational Law* 689. [hereinafter,

nothing to gain from granting patents on inventions worked and patented abroad except the avoidance of unpleasant foreign retaliation in other directions.”²⁴⁰ As Amy Carroll has argued, “the United States and other developed countries are winning the North-South patent debate not based on the merits of their argument, but rather because of their economic upper-hand.”²⁴¹

Accordingly, the argument that broad patent protection in the South would propel development and technological prowess in that part of the world is of doubtful validity. Frederick Abbott hit the nail on the head in his observation that the “debate stands on firmer ground if premised on the recognition that the industrialized countries are trying to protect an increasingly important component of their national wealth.”²⁴² However, as a special issue of *The Economist* observed, “it is not at all obvious that the developing countries are obliged,

Abbott, *Protecting First World Assets*]

²⁴⁰Edith Penrose, *supra* note 94 at 116-7; Alan Deardoff, “Welfare Effects of Global Patent Protection” (1992) 59 *Economica* 35. For counter arguments, see, Edmund Kitch, “The Patent Policy of Developing Countries” (1994) 13 *Pacific Basin Law Journal* 166; Richard Tapp & Richard Posek, “Benefits and Costs of Intellectual Property Protection in Developing Countries” (1990) 24 *Journal of World Trade* 75. While admitting a lack of “expertise in the structure and strategies of or challenges faced by the countries” of the South, these authors nonetheless argue that it is in the self-interest to participate in the international patent system. Kitch, *supra* at 167.

²⁴¹Amy Carroll, *supra* note 232 at 2474; Michael Gadbow, “Intellectual Property and International Trade: Merger or Marriage of Convenience?” (1989) 22 *Vanderbilt Journal of Transnational Law* 223; Kevin McCabe, “The January 1999 Review of Article 27 of the TRIPs Agreement: Diverging Views of Developed and Developing Countries Toward the Patentability of Biotechnology” (1998) 6 *Journal of Intellectual Property Law* 41.

²⁴²Abbott, *Protecting First World Assets*, *supra* note 239 at 699. But see, Robert Sherwood, “The TRIPs Agreement: Implications for Developing Countries” (1996-7) 37 *IDEA* 491. According to an UNCTAD Report, “the nationals of developing countries hold in their own countries no more than 1 per cent of the world stock of patents, and in other countries two thirds of one per cent of foreign-owned patents.” See, *The Role of the Patent System in the Transfer of Technology to Developing Countries*, U.N. Doc. TD/B/AC.11/19.

either morally or for the sake of sound economics, to meet the rich nations' demands."²⁴³ This is one half of the crux of the economic debate on the North-South conflict on patents on plants and TKUP.

Apart from the evidently unpersuasive argument on the supposed technological leap which strong patent regimes would miraculously bring to fruition for states of the South, the argument itself is an oversimplification of an otherwise complex question. As Amy Carroll notes, "it would be overly simplistic to conclude that developing countries can be brought in line with developed countries, in terms of economic and social welfare, merely by implementing a stronger legal framework for granting and enforcing IP rights."²⁴⁴ In the midst of debilitating diseases, illiteracy, political instability and unspeakable economic exploitation in many countries of the South, it would take far more than a compendium of strong patent laws in such countries to "induce" inventiveness. The cases of Korea, India, Taiwan, Hong Kong, and Singapore which, in spite of weak patent laws, but by huge investments in education, research and development, general public infrastructure and export-oriented economy transformed themselves into emerging technological giants are in point here.²⁴⁵

²⁴³"Something Old, Something New" Special Survey on World Trade, *The Economist*, September 22, 1990 at 34-35. But see, Jerome Reichman, "From Free Riders to Fair Followers: Global Competition Under the TRIPS Agreement" (1996-7) *International Law and Politics* 11. [Hereinafter, Reichman, Free Riders]

²⁴⁴Amy Carroll, *supra* note 232.

²⁴⁵Ruth Gana, "Has Creativity Died in the Third World? Some Implications of the Internationalization of Intellectual Property" (1995) 24 *Denver Journal of International Law and Policy* 109 at 113. [hereinafter, Gana, Creativity]; Gutowski, *supra* note 221 at 751. See also, Ruth Gana, "Prospects for Developing Countries under the TRIPS Agreement" (1996) 29 *Vanderbilt Journal of Transnational Law* 735. (arguing that "without the specific conditions of strong property systems, free market capitalism, and the zealous protection of corporate interests, it is unlikely that modern intellectual property in and of itself has

Indeed, modern scholarship has shown that until countries of the South reach a certain threshold level of industrial and social “development”, patents tend to impede the “economic advancement” of such countries. Hence, Penrose’s argument that states which have not attained such minimum level of “development should be exempt from any international patent arrangement.”²⁴⁶ As already noted, it was through “piracy,”²⁴⁷ as the industrial history of the fledgling European states and United States amply demonstrate, that the industrial development threshold was attained.

Given the economic losses which this approach entails for the North, it is natural that persuasion, and if need be, coercion is used to maintain a regime more favorable to the North. However, in the words of J.H. Reichman, “imposition of foreign legal standards on unwilling states in the name of ‘harmonization’ remains today what Ladas deemed it in 1975, namely, a polite form of economic imperialism.”²⁴⁸ Whether it is polite or rude, such economic

the potential to transform developing countries into the technology producers they aspire to become.”)

²⁴⁶Penrose, *supra* note 94 at 233. Dru Brenner-Beck, *supra* note 229 at 103; Amy Carroll, *supra* note 232 at 2471. According to the U.N. Report, “the role of patents is limited...partly because much of the technology required by these [developing] countries is not at that latest stage of technological advance which is covered by patents.” See U.N. Report *supra* note 242.

²⁴⁷But see, Reichman, “GATT Opportunities and Risks” *supra* note 238 at 777.

²⁴⁸Reichman, “GATT Opportunities and Risks” *supra* note 238 at 747. See also, Frank Emmert, “Intellectual Property in the Uruguay Round-- Negotiating Strategies of the Western Industrialized Countries” (1990) 11 *Michigan Journal of International Law* 1317; Carlos Correa, “Harmonization of Intellectual Property Rights in Latin America: Is There Still Room for Differentiation?” (1996-7) 29 *International Law and Politics* 109. But see, Kirstin Petersen, “Recent Intellectual Property in Developing Countries” (1992) 33 *Harvard International Law Journal* 277.

imperialism has been further exacerbated by the contemporary pace of globalization.²⁴⁹ Some of the underlying issues, particularly, cultural and philosophical differences, which also play out in this conflict are next examined.

The corporate-driven train of globalization has not yet closed philosophical and cultural differences apparent in the patent laws of states. Forced attempts at harmonization or unification of disparate national patent laws²⁵⁰ merely paper over deep cracks which follow the notorious North-South²⁵¹ schism. Law is a mirror of societal values²⁵² and the patent

²⁴⁹Mark Weisbrot, "Globalization for Whom" (1998) 31 *Cornell International Law Journal* 631. The phenomenon of globalization refers to the multi-faceted process of global liberalization in which international issues, mainly economic, political and socio-cultural, are as prominent as national and local matters and vice-versa in the integration of markets across the world. See, Alex Seita, "Globalization and the Convergence of Values" (1997) 30 *Cornell International Law Journal* 429. Seita locates the origins of globalization in the immediate post-war creation of both the United Nations, and the "Bretton Woods" institutions of the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (World Bank); and the General Agreement on Trade and Tariffs (GATT). For an analysis of the ideological character and basis of globalization, see, Alex Geisinger, *supra* note 40.

²⁵⁰The concepts of harmonization and unification are different. The former refers to the establishment of a uniform set of laws for a certain area of territories. The latter refers a search for uniform solutions to specific international problems transcending national territories. See, Ladas, *supra* note 56 at 14-15.

²⁵¹No-Hyoung Park, "The Third World as an International Legal System" (1987) 7 *Boston College Third World Law Journal* 37. [hereinafter, Park] The term "Third World" was first coined in France in the early 1950's at a time of bi-polarity in world security paradigm. Thus, the United States and its Western European allies were regarded as the First World. The defunct Soviet Union and its client states in East Europe were regarded as the Second World. The so-called "Non-Aligned" states of Africa (excluding apartheid South Africa), Asia (excluding Japan), and Latin America constituted the Third World. See, W. Tieya, "The Third World and International Law" in, R. MacDonald & Douglas Johnston, eds, *The Structure and Process of International Law* (Dordrecht: Martinus Nijhoff); Inamul Haq, "The Problem of Global Economic Inequity: Legal Structures and Some Thoughts on the Next Years" *supra* note 5; Paul Brietzke, "Insurgents in the "New" International Law" (1994-5) 13 *Wisconsin International Law Journal* 1. (Discussing the role of conflicts and divide such as the North-South phenomenon in influencing international law); Douglas Matthews, "International Inequality: Some Global and Regional Perspectives" (1988-9) 7 *Wisconsin International Law Journal* 261.

²⁵²David Schiff, "Socio-Legal Theory: Social Structure and Law" (1976) 39 *The Modern Law Review* 287; Irene Watson, "Law and Indigenous Peoples: The Impact of Colonialism on Indigenous Cultures" (1996)

concept is no exception.²⁵³ Interestingly, as Stephen Ladas pointed out, “discussion on unification or harmonization of law has suffered from an initial false assumption that law is a simple single conception.”²⁵⁴ Under this imperialistic and “one-size-fits-all” assumption, the conception of law which is regarded as material is the Eurocentric paradigm. All other cultures are assumed to be anarchic, primitive and backward. Of course, this is hardly the case in real life. All non-western cultures have laws and law-creating mechanisms independent of the dominant Eurocentric jurisprudence.

Non-Western jurisprudence survived its contact with European jurisprudence. By ignoring these crucial factors,²⁵⁵ hegemonic attempts at compulsory unification and harmonization of the international patent system creates a phenomenon of juridical “inter-culture”²⁵⁶ and an illusion of global legal harmony. Hence, given the inadequacy of the

Cross Currents (Australia: La Trobe University Press.,) 107; Richard Guest, “Intellectual Property Rights and Native American Tribes” (1995-6) 20 *American Indian Law Review* 111.

²⁵³Robert Gordon, “Critical Legal Histories” (1984) 36 *Stanford Law Review* 57 (arguing that the concepts of law and society are not necessarily separate). As Ivan Head has also argued, “...some of the applications of legal principles, designed as they often were in the industrialized countries, are not always in the best interest of developing countries.” See, Ivan Head, “The Contribution of International Law to Development” (1987) 25 *The Canadian Yearbook of International Law* 29 at 30. See also, Philip Jessup, “Diversity and Uniformity in the Law of Nations” (1964) 58 *American Journal of International Law* 343.

²⁵⁴Stephen Ladas, *supra* note 56 at 14.

²⁵⁵Ladas, *ibid.* (Arguing persuasively that apart from legislative texts, there are three other basic components of harmonization or unification of laws which “global legislators” must confront. The three factors are, judicial and administrative decisions which construe the legislative texts, traditional techniques and modes of handling legal materials and third, philosophical, political and ethical ideas and ideals as to the end of the law by which the texts, decisions, or techniques are continuously shaped.) *Ibid.*

²⁵⁶For further analysis of the phenomenon of “inter-culture” in international law see, Park, *supra* note 251 at 39. See also the late Polish jurist, Manfred Lachs, “The Development and General Trends of International Law in our Time” (1980) 169 *Recueil Des Cours* 240-41; Josef Kunz, “Pluralism of Legal and

dominant jurisprudential paradigm to explain the effects of socio-cultural/legal interfaces such as the issue at hand, some scholars have argued for “new forms of scholarly representation”²⁵⁷ to address the myriad issues raised.

As the patent law concept marches into the socio-cultural heath of the South to displace indigenous cultures and law,²⁵⁸ the resultant friction remains to be examined. Law can best be understood as part, if not reflection of the larger socio-cultural milieu and tradition in which it derives, lives, and evolves.²⁵⁹ The point here is that states should have the right to determine for themselves by their own democratic institutions whether they need patent laws or not, and the scope and nature of such patent laws, if any. The creation of domestic patent laws, especially when modeled on foreign needs, should not be at the instigation and coercive threats of external actors such as multinational corporations with no

Value Systems and International Law” (1955) 49 *American Journal of International Law* 370; Compare with Article 9 of *Statute of the International Court of Justice; Barcelona Traction (Belgium v. Spain)*, (1970) I.C.J. 273-74 (Gros. J., dissenting).

²⁵⁷See, Rosemary Coombe, “The Cultural Life of Things: Anthropological Approaches to Law and Society in Conditions of Globalization” (1995) 10 *American University Journal of International Law and Policy* 791 at 792; Rosemary Coombe, “Critical Cultural Legal Studies” (1998) 10 *Yale Journal of Law and the Humanities* 463.

²⁵⁸On the various legal norms governing this concept in traditional paradigms of the South, see generally, *Draft Report of the World Intellectual Property Organization (WIPO) Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, Geneva, Switzerland, *supra* note 25. The cultural question relates to the “values and attitudes which bind the system together and determine the place of the legal system in the culture of the system as a whole.” Park, *supra* note 194 at 38. The role of culture in international law has its own share of juridical and scholarly controversy. See, Kotaro Tanaka, “The Character of World Law in the International Court of Justice” (1971) 15 *Japanese Annual of International Law* 1; Philip Jessup, “Non-Universal International Law” (1973) 12 *Columbia Journal of Transnational Law* 415.

²⁵⁹Oliver Wendell Holmes Jr, “The Path of the Law” (1897) 10 *Harvard Law Review* 469. (“if you want to know why a rule of law has taken its particular shape, and more or less if we want to know why it exists at all, we go to tradition.”)

altruistic interest in the well-being of such states.

As a social fact, the patent laws of states often reflect their social values and priorities. This is especially the case where the state in question has the wherewithal and clout to resist foreign coercion or bullying. For example, it is not surprising that even the Japanese patent system, which was voluntarily adopted by Japan, reflects Japanese socio-cultural and philosophical ideology and conceptions of property and its social role.²⁶⁰

Although the Japanese patent system is often touted as “strong” a recent critical analysis of the system reveals that the Japanese patent law and institution:

[L]imits the scope of exclusive rights which can be obtained, and thus encourages minimal claiming, licensing, and other ‘cooperative’ behaviors...it marks a stark contrast with the more individualistic, pioneer-oriented US system. To that extent, the patent system (Japanese) reflect deep-seated cultural differences.²⁶¹

According to Dan Rosen and Chikako Usui, “by all conventional measures, Japan should be a bastion of protection for intellectual property. And yet, compared with many Western countries and particularly the United States, the Japanese version of intellectual property law

²⁶⁰Dan Rosen & Chikako Usui, “The Social Structure of Japanese Intellectual Property Law” (1994) 13 *Pacific Basin Law Journal* 32; Samson Helfgott, “Cultural Differences Between the U.S. and Japanese Patent Systems” (1990) 72 *Journal of Patent and Trademark Office Society* 231-38. For Japan and some countries of Asia, the attitude in question is a reflection of the strong Confucian influence on social behavior and philosophy. Information is largely construed as a public good in Confucian thinking and philosophy. Confucianism also posits a good society based on mutual consideration for the needs of others. In contrast, Western individualism is a philosophy of “every person for himself or herself.” According to Dan Rosen and Chikako Usui, “to say that Japan is a group-oriented culture and America is an individualistic one is a cliché, but there is enough truth in the stereotypes to retain them despite the exceptions that can be found.” Rosen & Usui, *ibid.* See also, Leighton McDonald, “Can Collective and Individual Rights Coexist?” (1998) 22 *Melbourne University Law Review* 310.

²⁶¹Robert Merges, *supra* note 168 at 242.

is porous and the attitude is often ambivalent.”²⁶²

All forms of law are value driven. It would be idle to pretend that the socio-cultural values embedded in the patent concept lose their “localness” or their parochialism merely because, by diverse methods, the patent concept has assumed a global status. There are thus inherent conflicts in the imposition on or in transplanting foreign legal concepts to different cultural frameworks.²⁶³ At best, the globalized, albeit inherently “ethnic” status of a legal concept like the patent regime, is one which Bonaventura De Sousa Santos has characterized as one of “globalized localism.”²⁶⁴ The deep and complex issue here is that the conundrum of globalized locality represented by the patent concept in its expanding role on plants and TKUP in the context of the North-South divide “is one which implicates the discipline of international law and human rights.”²⁶⁵

²⁶²Rosen & Usui, *supra* note 260 at 33-34. See also, Toshiko Takenaka, “Does a Cultural Barrier to Intellectual Property Trade Exist? The Japanese Example” (1996-7) 29 *International Law and Politics* 153.

²⁶³Gana, *Creativity*, *supra* note 245 at 113; Brian Barron, “Chinese Patent Legislation in Cultural and Historical Perspective” (1991) 6 *Intellectual Property Journal* 313. For an excellent analysis of the cultural and ideological conflicts embedded in inter-culturalism, see J.M. Balkin, *Cultural Software: A Theory of Ideology* (New Haven: Yale University Press, 1998).

²⁶⁴Boaventure De Sousa Santos, *Toward a New Common Sense: Law, Science and Politics in the Paradigmatic Transition* (New York, 1995) at 263. For an analytical perspective on inter-culturalism and globalization see, William Twining, “Globalization and Legal Theory-Some Local Implications” (1996) 49 *Current Legal Problems* 1.

²⁶⁵Gana, *Creativity*, *supra* note 245 at 112. It is therefore not surprising that some scholars have proposed a human rights solution to the problem of appropriation of TKUP. See, Rosemary Coombe, “Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity” (1998) 6 *Indiana Journal of Global Legal Studies* 59. For a thorough examination of the human rights implications of the globalization trend, see, Robert McCorquodale & Richard Fairbrother, “Globalization and Human Rights” (1999) 21 *Human Rights Quarterly* 735. See also, David Gerber, “Prometheus Born: The High Middle Ages and the

Regrettably however, the harmonization and internationalization of patent laws ignores the cultural, environmental and human rights implications of a forcefully contrived trade-based international framework for patents on plant life forms. It is perhaps pertinent at this stage to highlight some areas of difference in the socio-cultural dimensions of the North-South divide on the patent question.

First, the individualism and capitalistic outlook in the patent system may stand in contrast with non-Western communitarian values and conceptions of property ownership. This does not imply that there are no conceptions or regimes of intellectual property among non-Western societies. Studies and fact-finding missions show the existence of sophisticated but parallel regimes of ownership and control of inventions and innovations.²⁶⁶

Robert Lowie's dated but path-breaking anthropological researches indicate that:

[C]ontrary to what might be supposed, the notion of patents ...is well developed ... (amongst the Andamans) ..., and its prominence among certain peoples reduces the dogma of a universal primitive communism to a manifest absurdity. That this fact has not been adequately grasped by earlier writers is in part due to that rationalistic prejudice which is the bane of all historical inquiry. To minds steeped in the spirit of an industrial era it is difficult to conceive that privileges without obvious utilitarian benefits may be highly prized and sometimes distinctly rank as wealth.²⁶⁷

However, the essence of property rights (including patent rights) under Western jurisprudence

Relationship Law and Economic Conduct" (1994) 38 *St. Louis University Law Journal* 674.

²⁶⁶For a recent compendium of non-Western philosophies and ideologies on ownership and property, see, *Draft Report of the World Intellectual Property Organization (WIPO) Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, Geneva, Switzerland; *supra* note 5. For an analysis of the jurisdictional problems associated with intellectual property in an age of globalisation, see, Keith Aoki, "(Intellectual) Property and Sovereignty: Notes Toward a Cultural Geography of Authorship" (1996) 48 *Stanford Law Review* 1293.

²⁶⁷Robert Lowie, *Primitive Society* (London: Routledge & Kegan Paul; 1960) *supra* note 140 at 224-5.

is the right to exclude others; an absolutist conception of human relation to other individuals in reference to things.²⁶⁸

On the other end of the spectrum, most non-Western societies construe recognition of property interest in incorporeal things in a far more holistic and communal sense. This is usually in the sense of the “right to be recognized as “owner” but not necessarily the right to exclude others from use.”²⁶⁹ In other words, a greater emphasis on usage and management of the property which serves an instrumentalist design against the appropriation of such knowledge by persons or entities outside the ambits of that particular locale. Ownership of property is thus fundamentally about notions of societal cohesion and distributive justice. These distinctions between the regimes have radical consequences as it often constitutes a formidable gulf between *meum* and *teum*²⁷⁰ (mine and yours) on property, ownership and access to the property in question. Property in the non-Western sense is about community, indeed, an instrumentalist subordination of property interests to the larger aims of the society.

²⁶⁸For a brilliant analysis of the evolution and maturation of the jurisprudence of property in the Western world and its utilitarian ideology, see, Morris Cohen, “Property and Sovereignty” (1927) 13 *Cornell Law Quarterly* 8. (The essence of private is always the right to exclude others.) The concept of property has however displayed amazing capacities for fluidity and flexibility. As Keith Aoki has pertinently noted, “property” in the West has been and continues to be an empty vessel into which we have poured an incredibly wide variety of meanings.” Keith Aoki, *supra* note 266 at 1319.

²⁶⁹Gana, *Creativity*, *supra* note 245 at 132; Sherry Hut & Timothy Mckeown, “Control of Cultural Property as Human Rights” (1999) 31 #2 *Arizona State Law Journal* 363; Adrienne Van Nieherk, “Indigenous Law and and Narrative: Rethinking Methodology” (1999) 32 *The Comparative and International Law Journal of South Africa* 208. For further analysis of the various notions of patents amongst non-Western societies, see, Lowie, *supra* note 140 at 224-232.

²⁷⁰Amanda Park, “Cultural Appropriation and the Law: An Analysis of the Legal Regimes Concerning Culture” (1993-4) 8 *Intellectual Property Journal* 82.

The problem however with the forced imposition of foreign patent standards on all states irrespective of their socio-cultural values, priorities, ideologies of development, and a myriad of other variables is that it creates an ideological and legal mono-culture. As Ruth Gana has argued:

[W]hat the internationalization of intellectual property implies, ultimately, is that there is only one way to participate in the international economy and that is by playing in accordance with prescribed rules, regardless of its impact on a group of peoples. It is a message that is not unfamiliar in the history of world affairs, and yet it is a message which, so history informs us, has caused devastation of unimagined proportions to human society.²⁷¹

It is a system which also denies legitimacy and efficacy to the creativity of peoples of the South, particularly women in the development of plants and creation of TKUP.²⁷² Since the patent system cannot or has not yet accommodated the values and world-view of non-Western societies, there is bound to be tension within the unified internationalizing framework of the contemporary patent regime. In sum, the contemporary global divide on the role of the patent system generally and in plants and TKUP is much more than a struggle over intellectual "wealth"²⁷³ of states. Rather, it is also a complex question about the socio-cultural and human rights implications of legal transplants and concepts in an age of corporate globalization.

²⁷¹Gana, *Creativity*, supra note 245 at 142. Compare with Fred Cate, "Sovereignty and the Globalization of Intellectual Property" (1998) 6 *Indiana Journal of Global Legal Studies* 1.

²⁷²For a thorough analysis of the interface between Western property regimes and traditional societies, see, Rosemary Coombe, "The Properties of Culture and the Politics of Possessing Identity: Native Claims in the Cultural Appropriation Controversy" (1993) Vol. VI, No. 2 *Canadian Journal of Law and Jurisprudence* 249.

²⁷³Rodolpho Sandoval & Chung-Pok Leung, "A Comparative Analysis of Intellectual Property Law in the United States and Mexico, and the Free Trade Agreement" (1993) 17 *Maryland Journal of International Law and Trade* 145.

1.9: International Law and the Structural Framework of Patent Systems

Patent protection remains grounded in the national legal systems of each state and to some extent in regional arrangements. However, it is also fair to say that until recent times the international patent system, if any, was a struggle by states and interested entities to extend the reach of the property interest immanent in the patent concept beyond the borders of states.²⁷⁴ As subsequent analyses in this section will demonstrate, the patent concept has arguably undergone three theoretical and juridical stages of evolution of internationality. The first was of course, the primitive era of patents. This was quickly followed by the internationalisation of patents. The last and modern era is the contemporary linkage of trade and intellectual property rights in the early 1990s as the overall culmination of the neo-liberal process of globalization with coercive powers.

The first era has been dealt with in the preceding sections. The process of internationalization of the patent concept, as the preceding pages have indicated, started almost simultaneously with the origin of the patent concept itself. However, formal internationalization of patent systems by treaty process probably started over a century ago with the Paris Convention of 1883.²⁷⁵

²⁷⁴The sheer number of international instruments on patent law and institutions is legion. However, the most notable include the *Paris Convention for the Protection of Industrial Property* of March 20, 1883, as revised at Stockholm on July, 1967, 828 U.N.T.S.305, [hereinafter, Paris Convention;] *Patent Cooperation Treaty*, June 19, 1970, 1160 U.N.T.S. 231, hereinafter, PCT; *Convention Establishing the World Intellectual Property Organization*, opened for Signature July 14, 1967. Reprinted in 828 U.N.T.S. 3. For a justification of the international patent system, see, Warren Wolfeld, "International Patent Cooperation: The Next Step" (1983) 16 *Cornell International Law Journal* 229.

²⁷⁵*Paris Convention, supra*. For a detailed history and analysis of the Paris Convention, see, G.H.C. Bodenhausen, *Guide to the Application of the Paris Convention for the Protection of Intellectual Property, as Revised at Stockholm in 1967* (BIRPI, Geneva, 1968) [hereinafter, Bodenhausen]; Friedrich-Karl Beier,

The Paris Convention was drafted after preparatory work in 1873 and 1878, at a diplomatic Conference in Paris in 1880 and ratified by 11 states²⁷⁶ in 1884. It entered into force one month after the deposit of the instruments of ratification, on July 7, 1884. It created a union for the protection of industrial property. There are four categories of rules created by the Convention. The first category deals with rules of international public law regulating rights and obligations of member states, organs of the organisation and the constitutional character of the organisation. The second category deals with those provisions which require or permit member states to legislate within the field of industrial property.²⁷⁷ Without preempting the content of subsequent analysis, this territorial discretion has been removed by the norms of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPs).²⁷⁸ The third category deals with substantive laws in the field of industrial property regarding the rights and obligations of private parties. The final and fourth category contains provisions on rules of substantive law regarding rights and obligations of parties.

Perhaps, the most important contribution to patent law jurisprudence by the Paris

“One Hundred Years of International Cooperation—The Role of the Paris Convention in the Past, Present and Future” (1984) Vol 15 *International Review of Industrial Property and Copyright Law* 1.

²⁷⁶Belgium, Brazil, France, Guatemala, Italy, Netherlands, Portugal, Salvador, Serbia, Spain and Switzerland. As at April 1999, 153 states were parties to the Paris Convention, See, Abbott, *supra* note 72 at 657.

²⁷⁷Bodenhausen, *supra* note 275 at 13.

²⁷⁸For an analysis of this phenomenon, see, Drahos, *supra* note 37 at 188. See also, Peter Drahos, “Global Property Rights in Information: The Story of TRIPs at the GATT” (1995) 13 *Prometheus* 12.

Convention is its introduction of the “national treatment”²⁷⁹ and “right of priority”²⁸⁰ principles which create a regime of formal equality between nationals of all member states.²⁸¹ However, the Patent Cooperation Treaty²⁸² of 1970 (PCT) represents the first major step following the Paris Convention towards a truly procedural internationalized patent system. It should be noted that neither the PCT nor any other “global” patent treaty or convention for that matter

²⁷⁹Article 2, *Paris Convention*, *supra* note 274. Principally, the principle of the right of priority prescribes that if a patent application is filed in any union state within one year of the “home country” or other first union filing (and assuming simple formalities are met), the application is effectively back-dated to the first filing. In other words, there is a one year grace period for patentees to file their patents outside their home countries. On paper, the principle of national treatment seems fair but “the capacity of citizens of different countries to exploit a reciprocally globalized set of duties and rights for intellectual property will vary dramatically.” Drahos, *supra* note 37 at 190. It is akin to saying that an Olympian athlete and a cripple are all potential gold medallists in a compulsory 100 metres dash.

²⁸⁰Article 4, *Paris Convention*, *ibid*. On the other hand, the “national treatment” principle ensures that foreigners receive the same privileges under national patent laws as nationals of the home country of a member State. But see, Harold Wegner & Jochen Pachenberg, “Paris Convention Priority: A Unique American Viewpoint Denying “The Same Effect” to the Foreign Filing” (1974) 5 *International Review of Industrial Property and Copyright Law* 361; Robert Pritchard, “The Future is Now—The Case for Patent Harmonization” (1995) 20 *North Carolina Journal of International Law and Commercial Regulation* 291.

²⁸¹Wegner, *supra* at 539.

²⁸²*Patent Cooperation Treaty*, *supra* note 274. Prior to the PCT, an inventor seeking to patent an invention would have to file the application in a first country and if that country was a party to the Paris Convention, the application was entitled to a 12 months priority (grace period) over other similar applications for the same invention. If within this period, the applicant failed to conclude the formalities for the grant of the patent in those states where the right of priority existed, s/he lost the right of novelty and other persons may proceed to apply for patent on that invention. It was an all or nothing system but the PCT changed that regime. The PCT is a clearing house of sorts. As already evident, patents remain substantively governed by national and regional patent laws and arrangements.

Thus, under the PCT, when applying for a patent the applicant files the application at a Receiving Office (RO) which is a national or regional patent office where the filing would ordinarily take place. The inventor specifies or designates the countries in which he seeks a patent. A copy of the application is remitted to the International Search Agency (ISA) which conducts a search of the prior art on the application in the affected states. While the search for priority art is on, a regime of priority for that patent application automatically starts. See, Edward Mckie, “Patent Cooperation Treaty: A New Adventure in the Internationality of Patents” (1978-9) 4 *North Carolina Journal of International Law and Commercial Regulation* 249.

creates a so-called global patent. There is no such thing; rather the PCT facilitates the granting of national and regional patents. In other words, the PCT, at least on paper, gives the foreign applicant the much needed time to protect his/her invention internationally.²⁸³ The essence of the PCT is to streamline the administrative processes involved in filing a patent application in different countries. It is however a matter of doubt whether the PCT has lived up to its objectives.

Yet, the patent concept once again betrays its nationalistic instrumentality as some countries like the United States do not permit their citizens to apply for patents abroad until a national security review is first completed on the invention.²⁸⁴ Notwithstanding the existence of the PCT and similar non-regional international legislative instruments designed to harmonize the procedure for the grant of patents, Europe has obviously remained at the forefront of the internationalization and harmonization²⁸⁵ of patent laws and procedure.

²⁸³A search report is sent to the applicant within sixteen months of the application. The application is published 18 months after the priority date but if the applicant withdraws the application before the publication, the publication will not take place. At the end of twenty months following the priority date, the application enters the national phase where fees are paid in the designated states where the applicant seeks a patent.

²⁸⁴Before filing for patent protection in a foreign country for an American invention, the inventor in the United States must first obtain a license from the Commissioner of Patents. See, 35 U.S.C. 184; *Beckman Indus., Inc v. Coleman Instruments, Inc.*, 338 F. 2d 573 (7th Cir. 1964); R. Carl Roy, "The History of the Patent Harmonization Treaty: Economic Self-interest as an Influence" (1993) 26 *John Marshall Law Review* 457. Interestingly, because much more patent applications are filed in the North than in the South, the principles of national treatment and right of priority which underpin patent harmonization legislation inexorably favor the North.

²⁸⁵*Convention on the Unification of Certain Points of Substantive Law on Patents for Inventions*, Nov. 27, 1963, European Treaty Series No. 47.(Otherwise known as the Strasbourg Convention). The Strasbourg convention is the blueprint for the EPC. See also, David Bainbridge, *Intellectual Property* (London: Pitman Publishing, 1992) at 8.

The European patent system is based on two continental agreements, namely, the 1973 Munich Convention on the European Patent or European Patent Convention (EPC),²⁸⁶ and the 1975 Luxembourg Convention on the Community Patent or Community Patent Convention (CPC),²⁸⁷ which is an integral part of the Agreement relating to community patents, signed in 1989.²⁸⁸ The EPC does not create a uniform protection right but it does facilitate gaining protection in as many of the signatory states as s/he wishes.

On the other hand, the Community Patent introduced by the EPC is intended to bring together the bundle of protection rights resulting from the grant of a European patent and merge them into a single, unitary and autonomous right of patent protection valid throughout the community of member states of the European Union. This type of patent is governed only by the provisions of the 1989 Agreement relating to community patents. This Convention has

²⁸⁶*Convention on the Grant of European Patents*, done Oct. 5, 1973, reprinted in (1973) 13 I.L.M. 270. This treaty has been signed by all EC Member States except Portugal. The EPC is a procedural agreement that allows applicants to apply through the EPO to receive multiple national patents for each member of the EPC. See, Cynthia Ho, "Building a Better Mousetrap: Patenting Biotechnology in the European Community" (1992) 3 *Duke Journal of Comparative and International Law* 173.

²⁸⁷*Convention for the European Patent for the Common Market*, done Dec. 15, 1975, reprinted in 19 O.J.Eur. Comm. (No. L. 17) 1 (1976). For a negotiating history of the CPC see, Romuald Singer, "The European Patent Enters a New Phase" (1970) 1 *International Review of Industrial Property and Copyright Law* 19; Friedrich-Karl Beier, "The European Patent System" (1981) 14 *Vanderbilt Journal of Transnational Law* 1; Daniel Lachat, "The Luxembourg Conference on the Community Patent Convention" in *1978 Annual of Industrial Property Law* (Commonwealth Law Reports, 1978) at 13.

²⁸⁸Note that Article 36 of the Treaty of Rome establishing the European Union provides a framework for the protection of patents in the European Union. See, *Treaty Establishing the European Community*, 25 I.L.M. 503 (1957). See also, *European Convention Relating to the Formalities Required for Patent Applications*, done Paris, December 11, 1953, Treaty Series No. 43 (1955); *European Convention on the International Classification of Patents for Invention*, Paris, December 19, 1954, reproduced in, Treaty Series No. 12 (1963).

yet to take effect owing to delays in ratification by member states.²⁸⁹

The concept of regional frameworks for patent protection is not limited to Europe. In Latin America, the Andean Pact²⁹⁰ has similar effects and provisions as comparable multilateral regional arrangements. In addition to the Andean Pact, the *Mercado Comun del Sur* (MERCUSOR) is a free trade organization in Latin America²⁹¹ with Brazil, Argentina, Uruguay and Paraguay as member states. Established in 1991, it seeks an elimination of trade barriers and the creation of a common market.

However, the treaty of Asuncion creating the MERCUSOR²⁹² is unlike its European counterpart, in that it does not contain rules relating to industrial property. However, at an Inter-parliamentary Committee meeting in June 1992, at Asuncion, it was “agreed that the topic of industrial property should be discussed ... including patent exploitation.”²⁹³ Although

²⁸⁹Abbott, *supra* note 72 at 779. James Fawcett & Paul Torremans, *Intellectual Property and Private International Law* (Clarendon Press., Oxford, 1998) at 27.

²⁹⁰*Agreement on Andean Subregional Integration*, May 26, 1969, reprinted in 8 I.L.M. 910 (1969). See also, Decision 344 regarding Common Provisions on Industrial Property, reproduced at page 825 of Abbott, *supra*. The Andean Group has Bolivia, Colombia, Ecuador, Peru and Venezuela as members. There is also the fledgling, *ASEAN Framework Agreement on Intellectual property Co-operation of 15th December 1995*, concluded in Bangkok, Thailand. See text of agreement reprinted in (1996) 6 *Asian Yearbook of International law* 505. This regional framework comprises Member states of the Association of South East Asians Nations.

²⁹¹Wilfrido Fernandez, “MERCUSOR and its Implications for Industrial Property” in Abbott, *supra* at 443.

²⁹²*Treaty Establishing a Common Market Between the Argentine Republic, the Federative Republic of Brazil, the Republic of Paraguay, and the Eastern Republic of Uruguay*, 30 I.L.M. 1041 (1991). [hereinafter, the Asuncion Treaty] The Asuncion treaty establishing MERCUSOR is comprised of 24 articles and four annexes.

²⁹³Fernandez, *supra* note 291 at 448.

the MERCUSOR member-states have their respective patent laws, there is no uniform criteria for the patentability and scope of inventions.

The North American Free Trade Agreement (NAFTA)²⁹⁴ is another regional framework on patents. It also seeks a harmonized patent regime for member states.²⁹⁵ Another regional actor in the global patent field is the Asia-Pacific Economic Cooperation (APEC) which in 1995, adopted the Osaka Action Agenda on harmonization of patent laws among member-states. Other regional actors include the African Regional Industrial Property Organization (ARIPO). This organization was created at a Diplomatic Conference held at Lusaka, Zambia in December 1976.²⁹⁶ At present its membership is of 14 countries: Botswana, Gambia, Ghana, Kenya, Lesotho, Malawi, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe. Membership is open to Ethiopia, Liberia, Mauritius, Nigeria and Seychelles all of which participate in its activities.

The objectives of the ARIPO include *inter alia*, to promote the harmonization and development of the patent regime appropriate to the needs of the members and of the region as a whole. Second, to evolve a common view on patent matters. There is a patent Documentation and Information Center of the organization at Harare. The organization has

²⁹⁴*North American Free Trade Agreement*, 32 I.L.M 612 (1992).

²⁹⁵Abbott, *supra* note 72 at 441.

²⁹⁶The agreement entered into force on February 15, 1978. Its original name was Industrial Property Organization for English-Speaking Africa (ESARIPO). In December 1985, it changed its name to ARIPO by decision of its Council. ARIPO has its headquarters in Harare, Zimbabwe.

also developed model laws on patents to assist member states.²⁹⁷ It is significant that in 1993, the Administrative Council of the Organization agreed in principle that PCT applicants may designate for an “ARIPO patent” states which are party to both the PCT and the Harare Protocol of ARIPO. As a result, it has been possible for PCT applicants to designate for an “ARIPO patent,” patent applications in states such as Ghana, Lesotho, Sierra Leone, Swaziland, Uganda, Zimbabwe, Malawi, and Sudan.²⁹⁸

Another African organization on the harmonization of patent laws and procedure is the African Intellectual Property Organization otherwise known by its acronym, OAPI. This organization consists of 12 French-speaking African Countries. The agreement creating this organization was signed in Libreville in 1962. Subsequent revision of this agreement occurred in 1982 in Bangui. The Bangui agreement was also revised on 24 February 1999. The last revision was undertaken so as to bring the OAPI in line with the requirements of the Agreement on Trade-Related Aspects of Intellectual Property Rights.²⁹⁹ In addition to the multilateral and regional arrangements on patents, there are numerous bilateral and inter-

²⁹⁷Similarly, a protocol on patents within the framework of ARIPO, adopted at a special meeting held in Harare in December 1982, entered into force on April 25, 1984. This protocol provides for the processing and granting of patent application on behalf of Contracting States designated. See, Abbott, *supra* note 72 at 477.

²⁹⁸Abbott, *ibid*. This is probably the closest to an automatic extra-territorial patent.

²⁹⁹See Agreement to Revise the Bangui Agreement on the Creation of an African Intellectual Property Organization of 2 March, 1977, Bangui, 24 February, 1999. See also, Tshimanga Kongolo, “The New OAPI Agreement as Revised in February 1999” (2000) 3 *Journal of World Intellectual Property* 5; Tshimanga Kongolo, “Towards a More Balanced Coexistence of Traditional Knowledge and Pharmaceuticals Protection in Africa” (2001) 35 No.2 *Journal of World Trade* 349.

regional agreements on patents between various states and groups of states.³⁰⁰

There are also non-governmental organizations (NGOs) and international institutions whose policies and operations impact on the global regime on patents. These include, the World Bank, United Nations Conference on Trade and Development (UNCTAD), United Nations Environment Programme (UNEP), United Nations Development Programme (UNDP), Food and Agricultural Organization (FAO), International Telecommunications Union (ITU), World Health Organization (WHO), World Intellectual Property Organization (WIPO), and the World Trade Organization (WTO).³⁰¹

With respect to WIPO³⁰² with headquarters in Geneva, it is a specialized agency of the United Nations and is responsible for promoting creative intellectual activity and the attendant laws and institutions. In plain language, its major function is to spread the intellectual property

³⁰⁰Abbott, *supra* at 482. These include, Partnership Agreement Between the African, Caribbean and Pacific States and the European Community and Member States, as concluded in Brussels on 3 February 2000. EU Document CE/TFN/GEN/23-OR ACP/00/0371/00 and the Scandinavian Patent Community.

³⁰¹While the World Bank is increasingly getting involved in the question of building infrastructure for the take off and maintenance of patent regimes in the South, the UNCTAD is concerned with the role of trade and investment in enhancing economic development in the developing countries; a role tied up with patents. In the same vein, the UNEP and the UNDP are both concerned with achieving sustainable development in the international community and in promoting the interests of developing countries. Of course, this has implications for the patent concept, particularly, in the contemporary question of patents on plant resources. High on the agenda of the UNEP is the protection of biological diversity and this objective inevitably deals with the relationship between the patent system and biodiversity. On the other hand, the WHO seeks to promote improvements in health care around the world, and as such, the extent of patent protection on pharmaceutical products are of interest to it since patents on pharmaceutical products affect the price and availability of drugs.

³⁰²The World Intellectual Property Organization (WIPO) is a metamorphosed version of the International Bureau of the Paris Convention, BIRPI. See, Faryan Afifi, "Unifying International Patent Protection: The World Intellectual Property Organization Must Coordinate Regional Patent Systems" (1993) 15 *Loyola L.A. International & Comparative Law Journal* 453.

gospel to often incredulous states of the South.³⁰³ It also functions as the administrative organ for the Paris convention and administers a host of other international legislative instruments and agreements that deal with patents.³⁰⁴

In sum, there is no coherent international patent system in the strict sense of the term. Rather, what exists is a multiplicity of international, regional, multilateral and bilateral agreements seeking to harmonize the process of granting patents. These combinations of international patent instruments also seek, in varying degrees, to standardize national laws on patents. As earlier argued, the desirability of these goals are in themselves matters of debate and legitimate concern. This is particularly important because patents are not founded on human rights, global morality, or obligations *erga omnes*. Rather, the patent concept is purely a matter of national economic policies which may not mesh with one another nor be respectful of domestic peculiarities and priorities.

Therefore, the globalization or forced unification and harmonization of patent norms through trade-based global institutions, as recent global trends portend, raise fundamental questions of the nature of state sovereignty and the domestic implications of foreign usurpation of a state's eminent domain. These concerns are of particular relevance to weak and marginalized states and societies. Ironically, these are the same societies and states with

³⁰³Robert Merges, *supra* note 57 at 241; Donald George Daus, "Towards Order and Progress: Brazil's Patent Law" (1979) *Industrial Property Law* 13.

³⁰⁴In addition to the Paris Convention, these include *Strasbourg Agreement Concerning the International Patent Classification*; *Budapest Treaty on the International Recognition of the Deposit of Microorganisms for the Purposes of Patent Procedure* and the *International Union for the Protection of New Varieties of Plants (UPOV)* December 2, 1961, 815 U.N.T.S. 89.

a preponderance of Earth's plant and cultural diversity. Before examining the wider implications of this, it is pertinent to analyze the politics and economics behind the forced attempts at harmonizing patents laws. It is also helpful in the analyses to discuss, albeit briefly, the nature and application of international law governing the domestic enforcement of such international patent law instruments.

1.9.1 The United Nations Framework and Patents

Prior to the emergence of the World Trade Organization (WTO), the politics of the internationalization of the patent concept was often played out at international forums for patents, particularly, the United Nations and related agencies. These agencies and forums have a preponderance of numerically superior but economically weak states from the South. Hence, the attempts by the South to forge norms favourable to them at these forums. For example, following the "Brazilian resolution"³⁰⁵ of 1961, it was clear that a battle line had been drawn between the North and the South on questions on patents.³⁰⁶ Subsequently, in the March 1964 final report by the Secretary General entitled: *The Role of Patents in the Transfer of Technology to Developing Countries*,³⁰⁷ the various differences between the

³⁰⁵In November 1961, Brazil introduced a draft resolution, entitled "The Role of Patents in the Transfer of Technology to Underdeveloped Countries" (U.N. Doc. A/C.2/L.565, November 8, 1961) which heavily criticized the international patent system.

³⁰⁶General Assembly, Official Records, 16th Sess, 2nd Committee, 778th Meeting, December 7, 1961. The Brazilian resolution was substantially amended but its primary result was the passing of a resolution mandating the Secretary-General to hold an international conference on the patent question.

³⁰⁷Doc. E/3861/Rev. 1, March 1964.

North and the South on the patent question were raised and thoroughly debated.

Despite the inconclusive nature of this report on many contested points (on a North-South basis) concerning the nature of international rules on patents, it was generally well received. This may not be unrelated to the ambiguous nature of its conclusions which left ample room for often contradictory interpretations in line with the North-South divide. Again, the March 1964 report was further dealt with by the Third Committee (on Financing of Trade and Invisibles)³⁰⁸ and this latter committee affirmed the findings of the March 1964 report.³⁰⁹ In subsequent forums at the UNCTAD and ECOSOC, it became obvious that the underlying tensions and conflict between the North and the South on the question of patents had not been resolved. Thus, in 1965, Brazil again introduced another draft resolution on the same subject as it had in 1961.³¹⁰

Without delving further into the particularities of these deliberations on the international patent system, a careful observation and analysis of the positions of the various states shows a clear fault-line in the approach to the patent question. Thus, while the more populous and numerous states of the South wanted a more liberal international patent regime, the North preferred a stronger international patent regime. Further, given their numerical superiority over the North, the states of the South were at the very least, able to prevent

³⁰⁸Doc. E/Conf. 46/141. Vol. 1, Part 3, Annex A. IV.26. See also, Anderfelt, *supra* note 58 at 185.

³⁰⁹Doc. E/Conf. 46/141. Vol. 1, Part 3, Annex F, Report of III Committee.

³¹⁰See, Doc. A/C.2/L.824, November 26, 1965. The co-sponsors were Austria, the Dominican Republic, Mexico and Peru.

further strengthening of patent laws. Indeed, it may be fair to assert that the South had reasonable chances of extracting major concessions from the North on the operations of the international patent system.³¹¹

Following perceptions that the United Nations forums, including the WIPO, were heavily influenced by the preponderant States of the South, a shift on norm-creating forums for patents occurred.³¹² The North relocated intellectual property functions from the UN agencies and forums to the framework of the newly-minted World Trade Organization (WTO) where it has effective control of the agenda and norm-making functions.³¹³ Accounts of the evolution of Uruguay Round under the GATT³¹⁴ framework which ultimately produced the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)³¹⁵ under

³¹¹For a thorough analysis of this trend, see generally, Anderfelt, *supra* note 58 at 175-240. Anderfelt's magisterial work on the subject concludes with the observation that "the present international patent system is inadequate for the needs and requirements of developing countries." Anderfelt, *supra* at 278.

³¹²The perception by the North that WIPO was leaning towards the interests of the South may be attributed to the following reasons. First, WIPO, unlike the WTO framework lacks the coercive abilities for weak patent protection. Second, WIPO has a history of assisting the South in preparing laws, and the development of personnel in patent matters. Third, WIPO, unlike the WTO has always operated on the principle of one state-one vote and the balance of power inside WIPO is thus in favour of the more numerous States of the South. See, Abbott, *supra* note 72 at 366.

³¹³*Agreement Establishing the Multilateral Trade Organization* [World Trade Organization], December 15, 1993, reprinted in (1993) 33 I.L.M. 13. See also, William Walker, "Uruguay Round TRIPS: A Bibliographic Essay" (1989) 22 *Vanderbilt Journal of Transnational Law* 911; Carlos Primo Braga, "The Economics of Intellectual Property Rights and the GATT: A View from the South" *supra* note 3; Thomas Dillon, "The World Trade Organization: A New Legal Order for World Trade?" (1995) 16 *Michigan Journal of International Law* 349; Michael Doane, "TRIPS and International Intellectual Property Protection in an Age of Advancing Technology" (1994) *American University Journal of International Law and Policy* 465.

³¹⁴*General Agreement on Tariffs and Trade*, October 30, 1947, 55 U.N.T.S. 187.

³¹⁵*Agreement on Trade-Related Aspects of Intellectual Property Rights*; reprinted, 33 I.L.M. 1197

the jurisdiction of the WTO have been exhaustively treated elsewhere.³¹⁶

The TRIPS agreement contains probably the most radical and stringent patent legislation in the world with a view towards the near-unification and harmonization of patent laws. It requires the availability of product and process patents for all new and useful products in all fields of technology, without discrimination of subject matter. Article 27 (1) of the TRIPs Agreement provides as follows:

[S]ubject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes, in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.

The exceptions stated in paragraphs 2 and 3 are that:

2. [M]embers may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.
3. Members may also exclude from patentability;
 - 1.1: diagnostic, therapeutic and surgical methods for the treatment of humans or animals;
 - 1.2: plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than

(1994). [hereinafter, TRIPs Agreement]

³¹⁶Friedrich Beier, & Gerhard Schrickler, eds, *GATT or WIPO? New Ways in the International Protection of Intellectual Property* (Munich: Max Planck Institute, 1989); Jagdish Bhagwati & Mathias Hirsch, eds, *The Uruguay Round and Beyond—Essays in Honor of Arthur Dunkel* (Ann Arbor, Michigan: The University of Michigan Press, 1999); John Croome, *Reshaping the World Trading System—A History of the Uruguay Round* (The Hague: Kluwer Law International, 1999); Asif Qureshi, *The World Trade Organization—Implementing International Trade Norms* (Manchester: Manchester University Press, 1996); David Hartridge & Arvind Subramanian, “Intellectual Property Rights: The Issues in GATT” (1989) 22 *Vanderbilt Journal of Transnational Law* 893; Hans Kunz-Hallstein, “The United States Proposal for a GATT Agreement on Intellectual Property and the Paris Convention for the Protection of Industrial Property” (1989) 22 *Vanderbilt Journal of Transnational Law* 265.

non-biological and micro-biological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective sui generis system or by a combination of thereof.”³¹⁷

Although it allows for the exclusion from patentability of products that protect human, plant, or animal life and health, or products that are harmful to the environment from patent protection, opinion is sharply divided as to whether the exceptions are sufficient.

In full bloom the TRIPs agreement marks the widest and most stringent patent law in the world. It is also a significant victory for the industries of the North in the process toward commodification and privatization of plants and TKUP. As Ruth Gana argues, “it is no secret that the main impetus behind the TRIPS agreement is to secure enforcement of U.S. intellectual property rights abroad.”³¹⁸ This process is also a reflection of the power and influence of the corporate world in shaping the agenda and law on patents. Further, it evidences the usurpation of domestic and international competence in law-making by powerful multinational corporations.

This phenomenon is one which has unresolved implications on biodiversity, particularly as articulated in the recent Convention on Biological Diversity.³¹⁹ Pertinent issues

³¹⁷Article 27, TRIPS, *supra* note 315. In addition, member states are not allowed to grant compulsory licenses for non-working of the patents. Note that for purposes of defining “non-working”, an importation or marketing of the patented product is construed as sufficient local working of the invention. Further analysis of the implications of the TRIPs agreement is contained in Chapters 2, 3, and 4.

³¹⁸Gana, *Creativity*, *supra* note 245 at 113. See also, Alan Gutterman, “The North-South Debate Regarding the Protection of Intellectual Property Rights” (1993) 28 *Wake Forest Law Review* 89; Marshall Leafer, “Protecting United States Intellectual Property Abroad: Toward a New Multilateralism” (1991) 76 *Iowa Law Review* 273.

³¹⁹*Convention on Biological Diversity*, December 29, 1993, opened for signature 5th June 1992

include sustainable use of plants, human rights, global food security, and qualitative environment.³²⁰ For the avoidance of doubt, it should be noted that international patent organizations have their own respective and individual legal personalities under international law and are thus to be distinguished from their constitutive member-states.³²¹ They are also subjects of international law and are thus bound by any rules incumbent upon them under general rules of international law, “under their constitutions or under international agreements to which they are parties.”³²²

On the issue of domestic implications of the TRIPS agreement, it seems that given the political economics of patents, relevant principles of international law assume a greater sensitivity for states when they seek to apply such agreements at the local level.³²³ Before analyzing the issues raised above, it is pertinent at this stage to explain the sources of international norms on patents and also their status and effect at the domestic level.

(Entered into force Dec. 29, 1993) reprinted in (1993) I.L.M. 813. [hereinafter, CBD]

³²⁰Cheryl Hardy, “Patent Protection and Raw Materials: The Convention on Biological Diversity and its Implications for U.S. Policy on the Development and Commercialization of Biotechnology” (1994) 15 *University Pa. Journal of International Business Law* 299.

³²¹*Reparation for Injuries Suffered in the Service of the United Nations* (1949) *ICJ Reports* 174.

³²²*Interpretation of the Agreement of 25 March 1951 Between the WHO and Egypt* (1980) *ICJ Reports* 67.

³²³However, in the case of *In Re: The Uruguay Round Treaties Opinion*, [1995] 1 CMLR 205 of 15 November 1994, the European Court of Justice held that the EU and its member states have concurrent jurisdiction and competence to conclude and accede to the TRIPs agreement.

1.9.2: The Status and Effect of International Patent Instruments at the Domestic Level

Although international law provides the overarching framework for interfacing national and regional regulatory systems, it is at the domestic level of respective state patent law jurisdictions that such norms are played out. International law draws an effective distinction between accession to treaties and conventions and domestic applicability of such treaties. This section largely deals with the latter. However, before examining the status and effect of international patent norms, particularly, the TRIPs agreement, at municipal levels and the mechanisms for their domestic efficacy and application, it is pertinent to first categorize and determine the sources of international law on patents.

Strictly speaking, the sources of international patent law³²⁴ do not differ from those of general principles of international law.³²⁵ Article 38 of the Statute of the International Court of Justice attempts a summative list and categorization of primary and secondary sources of international law. The statute provides the following as evidences and sources of general international law thus:

- (a) international conventions, whether general or particular, establishing rules expressly recognized by the contesting states;
- (b) international custom, as evidence of a general practice accepted as law;
- (c) the general principles of law recognized by civilized nations;
- (d) judicial decisions and the teachings of the most highly qualified publicists of the

³²⁴For an illuminating account of the sources of general international law, see the dated but classic work of, Clive Parry, *The Sources and Evidences of International Law* (Manchester University Press, 1965).

³²⁵For a concise account of the development of international law see, Louis B. Sohn, "The Shaping of International Law" (1978) 8 *Georgia Journal of International and Comparative Law* 1.

various nations³²⁶

Categories (a) to (c) contains the so-called primary sources while category (d) relates to the subsidiary sources of international law. On the question of customary international law, the most accepted definition is that it consists of widespread state practice³²⁷ and accompanying *opinio juris sive necessitates*.³²⁸ Benedetto Conforti argues that evidence of custom may be found in treaties, participation of states in the resolutions of international organisations,³²⁹

³²⁶Article 38, I.C.J. Statute; *Statute of the International Court of Justice. Concluded at San Francisco, 26 June 1945. Entered into force, 24 October 1945.* 1976 Y.B.U.N. 1052. Article 38 is probably an approximation of the sources of international law and largely provides a legal construct in which the ICJ has to operate. Although the Committee of jurists which drafted the Statute of the Court in 1920 included in a draft provision that the items listed in the first paragraph of Article 38 should be applied in *ordre successif*, it is not clear whether the said article actually intends a hierarchical order. For an excellent analysis of this interesting point of law see, Michael Akehurst, "The Hierarchy of the Sources of International Law" (1974-5) 47 *British Yearbook of International Law* 273; M. Dixon, *Textbook on International Law* (London: Blackstone Press, 1993) at 19. There are also instances where unilateral declarations made publicly by the high authorities of a States may constitute a source of international law. See, *Nuclear Tests Case*, (1971) I.C.J. Reports 15.

³²⁷*North Sea Continental Shelf Cases* (1969) I.C.J. Reports at 41-44; *Asylum Case* (1950) I.C.J. Reports 266; *Rights of Passage Case* (1960) I.C.J. Reports 6. For an excellent philosophical inquiry into the nature of customary law and its resilience and flexibility, see, Lon Fuller, "Human Interaction and the Law" (1969) 14 *American Journal of Jurisprudence* 1; Lon Fuller, "Law as an Instrument of Social Control and Law as a Facilitation of Human Interaction" (1975) 1 *Brigham Young University Law Review* 89; Anthony D'Amato, *The Concept of Custom as a Source of International Law* (Ithaca: 1971)

³²⁸This is a belief by the state that its compliance is required by international law. See, *Nicaragua v. United States (Merits)* (1986) I.C.J. Reports 98; *Lotus Case* (1927) PCIJ Series A, No. 10. The concept of *opinio juris* has been criticized by Lauterpacht on the grounds that it is circular: to wit; states are only bound by custom if they believe themselves to be bound. See H. Lauterpacht, "Sovereignty over Submarine Areas" (1950) 27 *British Yearbook of International Law* 376.

³²⁹For an excellent analysis of the normative and legal character of resolutions and their declaratory function as customary international law see, Jorge Castaneda, *Legal Effects of United Nations Resolutions* (New York: Columbia University Press, 1969); Rosalyn Higgins, *The Development of International Law Through the Political Organs of the United Nations* (Oxford: 1963); F. Blaine Sloan, "The Binding Force of a Recommendation of the General Assembly of the United Nations" (1948) 25 *British Yearbook of International Law* 1; F. Blaine Sloan, "General Assembly Resolutions Revisited (Forty Years Later)" (1987) LVII *British Yearbook of International Law* 39; Jochen Frowein, "The Internal and External Effects of

diplomatic exchanges, statutes, domestic court decisions, and municipal administrative acts.³³⁰

On the category of treaties, a treaty by definition requires two or more states bound *vis-a-vis* each other.³³¹ A treaty may also encompass an agreement between a state and an international organization.³³² In any event, there is no rule “of international law which might preclude a joint communique from constituting an international agreement.”³³³ The most important principle in the interpretation of treaties is the doctrine of *pacta sunt servanda*. This is codified under Article 26 of the Vienna Convention on the Law of Treaties. It provides that “every treaty in force is binding upon the parties to it and must be performed in good faith.”³³⁴

Resolutions by International Organizations” (1989) 49 *Heidelberg Journal of International Law* 778; D.N. Saraf, “Resolutions of International Organizations: Binding Norms?” (1990) 14 *Cochin University Law Review* 1. However, in view of the greater relevance of this probable source of customary international law to the question of indigenous and traditional peoples vis-a-vis the phenomenon of bio-piracy and patents, further discussion and analysis of this issue should abide Chapters 3 and 4, *infra*.

³³⁰Nirmala Naganathan, “What Constitutes Custom in International Law?” (1971) 1 *Colombo Law Review* 68; Benedetto Conforti, *International Law and the Role of Domestic Legal Systems* (Dordrecht: Martinus Nijhoff Publishers, 1993) at 61. [Hereinafter, Conforti].

³³¹*Anglo-Iranian Oil Company Case*, [1952] ICJ Reports 93. On reservations to bilateral treaties see, *Delimitation of the Continental Shelf Between the United Kingdom and France*, (1979) 18 United Nations Report of International Arbitral Awards 3. On reservations to multilateral treaties see the advisory opinion of the International Court of Justice in the case of *Reservations on the Convention on Genocide* (1951) ICJ Reports 15. In *Belilos v. Switzerland* 132 Eur. Ct. H.R. (Ser. A) (1988), the European Court decided that a reservation entered into by the Swiss government on the European Convention on Human Rights was not permissible because the reservation was of a general character. The ratio here is that where a reservation or interpretative declaration to a treaty undermines the essence of that treaty, such a reservation would probably be construed as invalid.

³³²*South West Africa Cases*, (1962) I.C.J. Reports 310.

³³³See the jurisdictional phase of the decision of the ICJ in the, *Aegean Sea Continental Shelf Cases*, (1978) ICJ Reports 3. See also, Eduardo Jimenez de Arechaga, “The Work and the Jurisprudence of the International Court of Justice, 1947-1986” (1987) 58 *British Yearbook of International Law* 1.

³³⁴*Vienna Convention on the Law of Treaties*, reprinted in, 1155 U.N.T.S. 339

The importance of treaties here is that international law on patents is predominantly grounded on treaties and to some extent, on customary international law.³³⁵ Thus, other sources of international law have been subservient to, indeed, of marginal utility as sources or evidences of international law on patents. This phenomenon or preference for *lex scripta* may be due to the specialized nature of patent law, or as Abbott has argued, by reason of neglect by international lawyers.³³⁶

Domestic judicial precedents, especially from the United States, may also have extra-territorial persuasive authority. In addition, with the emergence of international arbitrations on patent disputes, it is foreseeable that such decisions will make jurisprudential contributions to the international regime on patents.³³⁷ Furthermore, scholarly works on patents (it would be invidious to name names) and the rules of equity may arguably constitute sources or

³³⁵R. Y. Jennings, "The Progressive Development of International Law and its Codification" (1947) XXIV *British Yearbook of International Law* 301. See also, Chin Lin & Olufemi Elias, "The Role of Treaties in the Contemporary International Legal Order" (1997) 66 *Nordic Journal of International Law* 1.

³³⁶Abbott, *supra* note 72 at 488.

³³⁷On judicial precedent as sources of international patent law, according to the "Appellate Body Report on "Japan - Taxes on Alcoholic Beverages," November 1, 1996, WT/DS8/AB/R, WT/DS10/AB/R, WT/DS13/AB/R, at 14,

[A]dopted panel reports create legitimate expectations among all relevant parties to a dispute." In effect, the panel agreed that a certain kind of implied or expected *res judicata* may apply in the interpretation of multilateral agreements on patent law. Another doctrine of importance is the rule of consistent application.

See, Thomas Cottier & Krista Schefer "The Relationship Between WTO law, National and Regional Law" in Abbott, *supra* note 72 at 558. This doctrine prescribes that where a national rule allows for different interpretations, national or regional law has to be construed in accordance with international obligations. See the European Court of Justice in, *Werner & Leifer Case*, C-70/94 [1995] ECR I-3189.

evidences of international law on patents.³³⁸ The same argument may be made for the category of general principles of law recognized by civilized nations.³³⁹

In addition, the proliferation of international resolutions and declarations on patents may also constitute sources and evidences of emergent international patent law, particularly, on the question of appropriation and privatization of TKUP. Indeed, as Benedetto Conforti has observed,

[T]he proliferation of norms is undoubtedly the most striking development in international relations in recent years.³⁴⁰ The staggering number of resolutions passed by international organizations,...although non-binding in character, constitute an essential reference point for the assessment of international customary norms and to the interpretation of treaty rules.³⁴¹

Having dispensed with the categories of the sources and evidences of international law on patents, albeit briefly, it is now pertinent to examine the status and effect of such international legal norms, especially treaties, at the municipal level.

Notwithstanding the many centuries of international law, the question of domestic application of international law, especially, treaties on trade and patents such as the TRIPs

³³⁸Abbott, *supra* at 496.

³³⁹For an interesting analysis of the category of “general principles of law recognized by civilized nations” see, M. Cherif Bassiouni, “A Functional Approach to “General Principles of International Law” (1990) 11 *Michigan Journal of International Law* 768. (Note citations therein)

³⁴⁰This important aspect of this thesis is dealt with in Chapters 2 and 3, *infra*.

³⁴¹Conforti, *supra* note 330 at 4.

agreement, remains problematic.³⁴² The place of a treaty in the internal legal order of a state is determined by its constitutional law.³⁴³ Generally speaking, there are two theories on the application of international treaty law at the domestic level; the monist theory and the dualist theory. The latter conceives of international law as inoperative unless and until the domestic legal system has by various means and processes incorporated it as part of state domestic law. This may also be influenced by state political and economic interests.

On the other hand, the monist theory conceives of international law and domestic law as operating within a unified structure and hierarchy of norms. Of course, in this ladder of norms, international law sits at the apex. Hence, international law, under this monist conception, at least in theory, has direct effect and applicability in domestic jurisdictions without the need of any transformative legislation. Shorn of theoretical obfuscation, the question in monism or dualism deals with the various means whereby international treaty law becomes part of domestic law.³⁴⁴ That is to say, is it through a process of transformation³⁴⁵

³⁴²*Competence of the General Assembly for Admission of a State to the United Nations* (1950) I.C.J. Reports 4.

³⁴³Quincy Wright, "The Legal Nature of Treaties" (1916) 10 *American Journal of International Law* 706.

³⁴⁴Carlos Manuel Vazquez, "The Four Doctrines of Self-Executing Treaties" (1995) 89 *American Journal of International Law* 695. [hereinafter, Vazquez]; Ignatius Seidl-Hohenveldern, "Transformation or Adoption of International Law into Municipal Law" (1963) 12 *International and Comparative Law Quarterly* 88.

³⁴⁵Lord Atkin seems to have summarized the position thus in the locus classicus of *Attorney-General for Canada v. Attorney-General for Ontario* [1937] A.C. 326. In his words "within the British Empire there is a well-established rule that the making of a treaty is an executive act, while the performance of its obligations, if they entail alteration of the existing domestic law, requires legislative action." See also, *The Parlement Belge* 4 P.D. 129 (1879); *Rayner v. Department of Trade*, [1990] 2A.C. 419; *Arab Monetary Fund*

or by direct application? In theory, the question above should be resolved by reference to the constitutional law of the state in question. The category of states which require transforming domestic legal instruments for the applicability of international treaty law is comparatively straight-forward and less problematic. What is required in such states is an act or instrument re-enacting the applicable treaty in question as if it was an act of the municipal legislature.

The category of monist states invokes unsettled points of law and indeed, politics and national self interest. In monist states like the United States, treaties theoretically have direct applicability once ratified and prevail over previous laws unless subsequently amended by the domestic legislator.³⁴⁶ Generally speaking, modern constitutions tend to place treaties above the constitutions of states.³⁴⁷ State practice on monism is not uniform on the subject and academic opinions on the subject lack unanimity.

Indeed, contrary to theoretical formulations, the legislature of some monist states³⁴⁸

v. Hashim [1991] 1 All E.R. 316. For further disquisition on the subject, see, F.A. Mann, *Studies in International Law* (London: Clarendon Press, 1973) 328-333.

³⁴⁶*Foster v. Neilson*, 27 U.S. 253 (1829). See also, *United States v. Perchem* 32 US (7 Pet.) 51 (1833); Richard Wilder, "The Effect of the Uruguay Round Implementing Legislation on U.S. Patent Law" (1995-6) 36 *IDEA* 33.

³⁴⁷*General Sani Abacha & Ors., v. Chief Gani Fawehinmi* [2000] Part 660 Vol. 6 *Nigerian Weekly Law Report* 228.

³⁴⁸Sec 102 (a) (1), *An Act to Approve and Implement the Trade Agreements Concluded in the Uruguay Round of Multilateral Trade Negotiations, The Uruguay Round Agreements Act* 1994 19 U.S.C. 3512. As the United States' Court of Appeals held in, *Suramerica de Aleaciones Laminadas, C.A v. United States*, 966 F.2d. 660 (Federal Circuit. 1992) "... the GATT does not trump domestic legislation; if the statutory provisions at issue here are inconsistent with the GATT, it is a matter for Congress and not this Court to decide and remedy." According to Vazquez, a research by Professor Hudec on American case-law on the subject reveals that in 14 cases where the issue came up for consideration, the courts consistently affirmed that local law trumped the GATT. Eight of such cases avoided the issue and 6 affirmed the supremacy of federal law over the GATT. See Vazquez, *supra* note 347 at 111.

often reserves for itself the ultimate powers of determining the rank of a treaty vis-a-vis domestic legislation.³⁴⁹ In making this determination, it is not unusual for considerations of the net gain of the international instrument to be accorded great weight. Thus, some scholars and jurists have argued that there is no hard and fast rule on distinctions between the so-called dualist and monist theories on applicability of treaty law in the domestic legal order.³⁵⁰

In addition, some interpretative rules such as the doctrine of non-self-executing treaties makes hazardous any attempt at definitive theorization on the law on the purported direct application of agreements such as the TRIPs in the so-called monist states. Theoretically, before an international treaty obligation would have direct effect under the European Community framework, that obligation must be precise and unconditional.³⁵¹ This means that the implementation of a trade agreement such as TRIPs must not be subject to any further measures implying “a measure of discretion on the part of the Community organs or the member-states, as the case may be.”³⁵² Thus, apart from some discretionary room in the

³⁴⁹Henry Schermers, “Some Recent Cases Delaying the Direct Effect of International Treaties in Dutch Law” (1989) 10 *Michigan Journal of International Law* 266.

³⁵⁰Myers McDougal, “The Impact of International Law upon National Law: A Policy Oriented Perspective” (1959) 4 *South Dakota Law Review* 25; John Jackson, “Status of Treaties in Domestic Legal Systems: A Policy Analysis” (1992) 86 *American Journal of International Law* 2.

³⁵¹Vazquez, *supra* note 347 at 105. There has been considerable scholarly activity in this vexed issue of international. However, neither scholarly exertions nor international trade diplomacy has brought any resolution to the matter. See, Frederick Abott, “GATT and the European Community: A Formula for Peaceful Coexistence” (1990) 12 *Michigan Journal of International Law* 1.

³⁵²Pierre Pescatore, “The Doctrine of Direct Effect: An Infant Disease of Community Law” (1983) 8 *E.L.R.* 158. See also, Vazquez, *supra* at 105.

TRIPs agreement, it would seem that in theory, if the TRIPS agreement passes the test outlined above, it would be directly applicable and binding upon the community as law.³⁵³

In actual cases however, at least with regard to the GATT agreement which is the immediate predecessor of the WTO/TRIPs agreement, there is need for sobriety in rushing to any judgment on the presumed direct applicability of the TRIPs agreement in the so-called monist jurisdictions.³⁵⁴ The Decision of 22 December 1994 by the Council of the European Community on the matter is to the effect that "...by its nature, the Agreement (Uruguay Rounds) establishing the WTO, including annexes thereto, is not susceptible to being directly invoked in Community or Member State courts."³⁵⁵ The short point here and the inevitable conclusion is that under the TRIPs agreement on patent law, patent right holders under the European Economic Community framework, notwithstanding the purported theoretical

³⁵³Vazquez, *supra* at 114. For further analysis of this aspect of European Community law, see, David Demiray, "Intellectual Property and the External Power of the European Community: The New Extension" (1994) 16 *Michigan Journal of International Law* 187.

³⁵⁴See for example, *International Fruit Company v. Produktschap voor Groenten en Fruit* (Case 21-24/72) ; Preliminary Ruling of 12 December 1972; [1972] ECR 1219; *GA Mayras Case*, [1972] ECR 1219. For an empirical analysis of the situation in Germany, see Ernst Pakuscher, "The Patent Court of the Federal Republic of Germany and the European Patent Conventions" (1980) 4 *Comparative Law Yearbook* 167. But see the European Court of Justice in, *Fa. Alfons Lutticke v. Hauptzollamt Sarrelouis*, Case 57/65, (1971) 10 Com. Mark. Law Report 674. (Holding that :

the obligation [of the Paris Convention] is not qualified by any condition nor made subject, in its carrying out or its effects, to the intervention of any act of either of the Community institutions or of the member States. The prohibition is thus complete, legally complete, and consequently capable of producing direct effects in the legal relationship between the member States and their subjects." *Ibid.*

See also, Stephen Ladas, *supra* note 56 at 211.

³⁵⁵*Council Decision Concerning the Conclusion on Behalf of the European Community, as Regards Matters Within its Competence, of the Agreements Reached in the Uruguay Round of Multilateral Negotiations* (1986-1994) (94/800/EC), OJ No L 336/.23rd December 1994 at 2.

postulations of monism, may not be entitled to invoke the provisions of the agreement in their private capacity in municipal courts.³⁵⁶

In effect, the traditional regime of statist nationalism on patent law rights defies and modifies international treaties on patents.³⁵⁷ Save for the clear rule that states which fail to take necessary measures at the domestic level to allow the application of treaties are in breach of international law, the line between self-executing and non-self-executing treaties on patent law “is a matter of controversy and much confusion...even vague and volatile.”³⁵⁸ In spite of the TRIPs agreement, it would be premature to announce or declare the existence of an international patent law and system.

Hence, national juridical institutions stand at the interface between the national constitutional legislative framework and the international instruments of patents.³⁵⁹ They (the domestic juridical institutions) may for a variety of reasons unrelated to the alleged “non-self-executing” nature of treaties, frustrate or modify the intended effect of such treaties on

³⁵⁶Vazquez, *supra* note 347 at 117. For a general analysis of the relationship between individual and international law, see, J.M. Udochi, “The Individual as a Subject of International Rights and Duties” (1963) 2 *Columbia Journal of Transnational Law* 54.

³⁵⁷John Jackson, “The Great 1994 Sovereignty Debate: United States Acceptance and Implementation of the Uruguay Round Results” (1997) 36 *Columbia Journal of Transnational Law* 157.

³⁵⁸Vazquez, *supra* note 347 at 121; Henry Schermers, “Some Recent Cases Delaying the Direct Effect of International Treaties in Dutch Law” *supra* note 352. Compare with, Jordan Paust, “Self Executing Treaties” (1988) 82 *American Journal of International Law* 760.

³⁵⁹For a comprehensive and excellent analysis of the various methods of and schools of thought on the domestic applicability of treaties, see the collection of essays in, Stefan Riesenfeld & Frederick Abbott, eds, *Parliamentary Participation in the Making and Operation of Treaties: A Comparative Study* (Dordrecht: Martinus Nijhoff, 1994) at xi.

patents at the municipal level. To further complicate theorizing on the matter, the confidential, if not secretive nature of the negotiation of the TRIPs agreement leaves little or no reliable *travaux préparatoires*, to guide domestic courts in determining precisely the intention of the member states regarding the direct applicability or otherwise of the agreement.

Thus, although it is good law that treaties should be interpreted in an internationalist sense,³⁶⁰ instead of the parochial,³⁶¹ the *realpolitik* of the TRIPs agreement, compels the view that international law has not yet developed any hard and fast rules on the direct applicability of treaties, especially, multilateral trade agreements such as the TRIPs agreement. In effect, as regards the so-called monist states, no automatic judicial enforcement of the TRIPs agreement is to be presumed. On the other hand, with respect to the so-called dualist regimes, the TRIPs agreement is subject to the various transformative or adoptive legal regimes of states.

Summary

This chapter has traced the gradual development and evolution of the patent system from a narrow Euro-centric economic instrument designed to reward the individual inventor to its modern status as a corporate/national instrument for the accumulation of capital profit. Between the quantum leap, a great many implications and complications have arisen.

³⁶⁰Advisory Opinion No. 17, *Interpretation of the Convention Between Greece and Bulgaria Respecting Reciprocal Emigration*, (1930) P.C.I.J (ser. B) No. 17, at 32 (July 31).

³⁶¹*Society for the Propagation of the Gospel in Foreign Parts v. New Haven*, 8 Wheat. 464 (1823) at 490; *Volkswagen A.G. v. Schlunk*, 486 U.S. 694, 700 (1988).

Although there is no international patent system in the strict sense of the term, corporate-driven attempts at harmonization or standardization of disparate patent laws have made appreciable progress. Whether this process is desirable and whose interests it serves are matters of legitimate concern and debate. As an economic tool with profound implications, it is within the context of the human environment, particularly the phenomenon of appropriation of plants and TKUP, that the debate on standardization of patent laws finds eloquent expression.

Chapter Two will examine the status of the plant regime in contemporary international law. It is difficult to appreciate the underlying tensions in the discourse on appropriation unless the debate and analysis is set within the context of the role of international law in the protection of plants. As with the patent regime which has just been examined, international law on the conservation and use plants and TKUP is no less Euro-centric and gendered. Chapter Two thus affords the political, gendered, juridical, cultural, geographical and scientific contexts for the subsequent analysis in Chapters Three and Four of the methods and institutions by which international law has aided and legitimated the appropriation and privatization of plants and TKUP by the industrialized states of the North.

CHAPTER TWO

International Law, the Concept of Development, and the Erosion of Plant Genetic Diversity and TKUP

2.0: Introduction

Plant life forms have always been integral to human civilization. This chapter examines the nature, function and value of plant life forms. It also forms a background to further analysis on the impact of patents on plants and also evaluates the various influences which have shaped the nature of legal norms relating to plants. The present tragedy of plant life forms and the responses which the global community have postulated to address and redress the situation are also examined. The texts, contexts and sub-texts of the various legal norms, institutions and prejudices which underpin the regime on plant life norms are explored with a view towards a deeper appreciation of the nature of the crisis in governance of plant life forms.

This chapter is divided into eight sections. Section 1 deals with the nature of and values attached to plant life forms. It also examines the utilitarian and non-utilitarian functions and roles which plants perform. These varied aspects of plants have often inspired and nurtured certain religious and philosophical attitudes and conceptions which have in turn affected plants, most often, in a devastating and negative manner. Section 2 examines those various religious and philosophical conceptions on plants which have significantly inspired the juridical postulations and institutions governing the plant regime. Section 2 is subdivided into five parts; namely, the Indian Vedic and Asiatic philosophies on plants,

indigenous American/Oceanic people's conception of plant life forms, African traditional religious conceptions of plant life forms, Islamic conception of plant life forms and, of course, Judeo-Christian philosophical postulates on plant life forms. The main objective of this section is to demonstrate the enormous impact which religious views, particularly, Judeo-Christian philosophy, and of late, Oriental religious philosophies, have had and continue to have on the development and evolution of legal norms and institutions on plants.

With particular reference to the dominant paradigm of Judeo-Christian influences on legal norms and on the concept of development, section 3 examines the huge material attainments which the Judeo-Christian conception of nature has wrought with the concomitant environmental costs. Religious views have more often than not, been woven into the fabric of legal norms and institutions on the plant regime. Given that these religious cum juridical legal norms and institutions are in a constant state of flux, it also follows that international law, particularly on the environment, has not remained static. Instead, it has moved with the changing interpretations, re-interpretations and sometimes rejection of hitherto orthodox views. However, the plant regime is not yet a fine synthesis of all diverse religious and philosophical conceptions on plants.

Section 4 sketches the terrain of the global distribution of plant diversity in its functional relationship with the diversity of human cultures and philosophies. The contribution of section 4 to this discourse is to show that human cultural diversity is practically synonymous with plant diversity. Conversely, a culturally homogenous world is a recipe for a narrow plant genetic base. If concerns to conserve earth's rapidly diminishing

plant diversity are to escape the paralyzing clutches of idle rhetoric, it follows that human cultural diversity must be respected and promoted. Further this section affords an insight into the dynamics and politics of control of plant life forms by states.

Section 5 examines the latent and patent causes of the modern phenomenon of the extinction of plant species diversity. It attempts to construct a unified theory on the causes of plant diversity extinction and argues that the present tragic loss of plant diversity must be tied in with the prevailing paradigm of development and its troubling deference to the forces of production, multiplication and accumulation of capital profits. In other words, those factors which contribute to the extinction and erosion of plant species diversity are more or less symptoms of a questionable economic model of development. Within this unified theory, section 5 enumerates and analyzes factors such as the prevailing theory and praxis of development, the culture of consumption, the inequitable global trading system and economic order, over-population, agri-business and monocultural farming, climate change, the introduction of exotic species and cultural homogenization.

Given its enormous importance, the Convention on Biological Diversity (CBD) is examined in section 6. This section examines normative initiatives as the ecosystem approach, the concept of sustainable use of plant life forms within the context of state sovereignty, fair and equitable sharing of the benefits of plant life forms. Section 6 briefly examines the various forces at play in the formulation and sustenance of legal norms and institutions on plant life forms. It adopts a rather cynical approach to the utility of institutionalized environmentalist resistance to the continued despoliation of plant life forms.

Chapter 2 concludes with a summary of the arguments and analyses made. It opines that, although the CBD is a great juridical contribution towards the conservation and equitable use of plant life forms, there is still more work to be done. Principally, unless the concept of development is de-constructed and re-constructed, the despoliation of plant life forms may continue. Finally, chapter 2 sets the tone and the stage for further inquiries in Chapters 3 and 4 on how international institutions and the patent system serve as the instruments of industrialized states for the commodification and appropriation of plant life forms.

2.1: The Nature, Value and Function of Plant Life Forms

The decimation and extinction of bioiversity has assumed importance in recent global discourse. Biodiversity may be defined as the “variability among living organisms from all sources including, amongst others, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, this includes diversity within species, between species and ecosystems.”¹ It encompasses genetic diversity,² species diversity³ and

¹Article 2, *Convention on Biological Diversity*, entered into force on December 29, 1993, reprinted in (1992) 31 I.L.M 813. [hereinafter, CBD]. See also, Jonathan Charney, “Biodiversity: Opportunities and Obligations” (1995) 28 *Vanderbilt Journal of Transnational Law* 613. [hereinafter, Charney]. Harvard biologist, Edward O. Wilson, has defined biodiversity as :

[T]he variety of organisms considered at all levels, from genetic variants belonging to the same species through arrays of species of genera, families and still higher taxonomic levels: includes the variety of ecosystems, which comprise both the communities or organisms within particular habitats and the physical conditions under which they live.

See, Edward Wilson, *The Diversity of Life* (Cambridge, Mass.: Harvard University Press, 1992) at 393 [hereinafter, Wilson]. There is no accurate data on the immensity of biodiversity. It has been estimated that there are probably 1.4 million known species or organisms on this planet. Of this number, 750,000 are insects, 41,000 are vertebrates and 250,000 are plants; the rest correspond to a complex of invertebrates, fungi and micro-organisms. See, Ranee Panjabi, “International Law and the Preservation of Species: An Analysis of the Convention on Biological Diversity Signed at the Rio Earth Summit in 1992” (1993) 11 *Dickinson Journal of International Law* 187 [hereinafter, Panjabi on the CBD]. Compare with Cyril de Klemm, “The Convention on Biological Diversity: State Obligations and Citizens Duties” (1989) 19 *Environmental Policy and Law* 50.

²Genetic diversity means the variety of genes. Inside the nucleus of every animal or plant cell are chromosomes which are thread-shaped bodies consisting largely of DNA (Deoxyribonucleic acid) of four strings, each of which comprises about a billion nucleotide pairs. If stretched out fully, the DNA would be roughly 1-meter long. The full information contained in a DNA if translated into ordinary-size letters of printed text would fill all 15 editions of the *Encyclopaedia Britannica*. Genes confer particular characteristics on the organisms that inherit them. Each gene is in effect a chemical instruction controlling a particular characteristic. These characteristics may include resistance to disease, rapid growth, an environmental adaptation to a particular factor, capacity to grow straight, etc. Genes vary and the variant of the same gene is called an allele. Thus, differences in the genetic make-up of a species are caused by different alleles of each gene. A particular combination of genes is known as a genotype and a given set of chromosomes is called a genome. The term gene pool means the total number of genes within a group of interbreeding plants or animals; that is, the pool of genes within a population-the population encompasses its wild and cultivated relatives.

³Species diversity refers to the variety of species within an ecosystem.

ecosystem⁴ diversity. In simpler terms, biodiversity is the total variety of life on earth. In the midst of the manifold complexity and diversity of life forms, the limitations of scientific knowledge about life forms marks a sharp contrast.

According to Kalyan, “scientists have only a rudimentary knowledge of biological diversity...a comprehensive, rigorous, and a general theory of biodiversity is lacking.”⁵ In addition, there is also a powerful concept which adds a fourth layer of complexity to the dimension of biological diversity; to wit, human cultural diversity and its implications.⁶ This thesis focuses on terrestrial plant life forms which estimates place at 250,000.⁷

The value and utility of plant life forms are varied and immense.⁸ Plants have utilitarian, aesthetic, and moral functions.⁹ In addition, they have an intrinsic value. The

⁴An ecosystem can be defined as the physical environment and all the organisms in a given area, together with the webwork of interactions of those organisms with that physical environment and with each other. All three-genetic, species and ecosystem diversity- interrelate.

⁵Kalyan Chakrabarti, *Conservation and Development* (Calcutta: Darbari Prokashan, 1994) at 153. [hereinafter, Kalyan]

⁶Human cultural diversity is almost synonymous with biodiversity. Thus, the extinction of human culture is mutually implicated in the loss of biological diversity and vice-versa. See, Neil Gunningham & Mike Young, “Toward Optimal Environmental Policy: The Case of Biodiversity Conservation” (1997) 24 *Ecology Law Quarterly* 243. This issue is dealt with in sections 4 and subsection 5 (g), *infra*.

⁷Compare with, Charlotte De Fontaubert, *et al*, “Biodiversity in the Seas: Implementing the Convention on Biological Diversity in Marine and Coastal Habitats” (1998) 10 *The Georgetown International Environmental Law Review* 753.

⁸Wilson, *supra* note 1 at 281; Holly Doremus, “Patching the Ark: Improving Legal Protection of Biological Diversity” (1991) 18 *Ecology Law Quarterly* 265 [hereinafter, Doremus]

⁹Katharine Baker, “Consorting With Forests: Rethinking Our Relationship to Natural Resources and How We Should Value Their Loss” (1995) 22 *Ecology Law Quarterly* 677.

utilitarian function of plant resources is invaluable¹⁰ and can hardly be overstated. For example, plants provide food, medicines, contribute in balancing the ecosystems, stabilizing soil, regulating climate and providing timber.

On health and the related components, traditional medicine forms the basis of primary health care of at least 80 per cent of the population of the South, a number far in excess of 3 billion.¹¹ The World Resources Institute estimates that “Indians dwelling in the Amazon Basin make use of some 1,300 medicinal plants, including antibiotics, narcotics, abortifacients, contraceptives, anti-diarrheal agents, fungicides, anesthetics, muscle relaxants, and many others.”¹² Almost a quarter of all doctors’ prescription in the North have their origins in plant species. The dramatic cases of the rosy periwinkle,¹³ yew tree,¹⁴ Camerounian

¹⁰James Salzman, “Valuing Ecosystem Services” (1997) 24 *Ecology Law Quarterly* 887.

¹¹Erin Newman, “Earth’s Vanishing Medicine Cabinet: Rain Forest Destruction and Its Impact on the Pharmaceutical Industry” (1994) 20 *American Journal of Law and Medicine* 479. [hereinafter, Newman]; Amy Guerin Thompson, “An Untapped Resource in Addressing Emerging Infectious Diseases: Traditional Healers” (1998) 6 *Indiana Journal of Global Legal Studies* 257.

¹²Kenton Miller, *et al.*, “Deforestation and Species Loss: Responding to the Crisis” in J.T. Matthews, (ed.), *Preserving the Global Environment* (1991) at 97. For an account of the rape and despoliation of the Amazon, see, Georges Landau, “The Treaty for Amazonian Cooperation: A Bold New Instrument for Development” (1980) 10 *Georgia Journal of International and Comparative Law* 463.

¹³The rosy periwinkle is a plant found only in Madagascar. It has well publicised curative properties for childhood leukaemia and Hodgkins disease.

¹⁴The Yew tree (*Taxus brevifolia*), found in the old-growth forests of the Pacific Northwest, contains taxon, which is an anti-cancer drug. See, Panjabi on the CBD, *supra* note 1 at 193; Doremus, *supra* note 8 at 277.

vine,¹⁵ Rauwolfia,¹⁶ and thousands¹⁷ of other miraculous plants¹⁸ merely understate the virtually mundane and irreplaceable reliance on plants for medication by humanity since time immemorial. Plants constitute a complex chemical storehouse that contains many actual and undiscovered potential uses in modern medicine.¹⁹ Indeed, of the 250,000 plants known to be in existence, only 10 percent have been tested for medicinal purposes.²⁰

On food and global food security, the statistics are awesome. For example, four crops, namely, wheat, rice, maize and barley together make up 90 per cent of the world's annual production of grain. The unpopular or barely used varieties of crops also constitute a formidable insurance for the more commercialized or popular species. For example, seemingly "worthless" species of rice, maize have saved hundreds of thousands of hectares

¹⁵This rare Camerounian vine in test tubes tests contains chemicals like Michellamine B capable of blocking the reproduction of the AIDS virus. See, "Scientists say Rare Vine Offers Hope for AIDS Cure, *AIDS Weekly*, May 17, 1993 at 13; Newman, *supra* note 11 at 482.

¹⁶The roots of tropical shrubs of the Rauwolfia genus produces reserpine which is used as a sedative and for the treatment of high blood pressure. See Newman, *supra* note 11 at 480.

¹⁷The stupendous potential of tropical plant to yield complex chemicals is a function of their evolutionary circumstances as they have had to develop complex chemical arsenals to repel predators. Newman, *ibid.* See also, Wilson, *supra* note 1 at 285.

¹⁸Digitalis, a drug derived from the purple foxglove is used to treat congestive heart failure and other cardiac ailments. Similarly, curare, a poison used by Yanomani Indians for hunting and fishing is used as a muscle relaxant.

¹⁹According to the Chiang Mai Declaration, "we recognise the vital importance of medicinal plants in healthcare...the value of the medicinal plants used today and the great potential of the plant kingdom to provide new drugs."

²⁰Kathryn Rackleff, "Preservation of Biological Diversity: Toward a Global Convention" (1992) 3 *Colorado Journal of International Environmental Law and Policy* 405.[hereinafter, Rackleff]

of farms in Indonesia, India, Sri Lanka, Vietnam, the Philippines and the United States.²¹ Further, the 1845/6 blight attack on potatoes which hit Europe killed and/or exiled 2 million Irish to America was only halted when new potato genes were introduced from the South American Andes (the original home of the potato).

Genes from cassava in South America have increased yields in Africa and India by up to 18 times. Southeast Asia's oil palm crop are descended from only four palms taken from West Africa to Java in 1848. Modern yields in palm oil have been improved and increased over three-fold by breeding from genetic material from its native home of West Africa. The tomato and sugarcane industries cannot survive without the contributions of their native relatives. The United Nations estimate that only 20 species supply 90 per cent of the world's food and just three-wheat, maize and rice-provide more than half.²² However, reliance on a few species of crops for global food supply is a risky exercise.

The economic significance or worth of plant life forms is staggering. The World Bank estimated in 1990 that agriculture comprised 31 per cent of the Gross Domestic Product (GDP)²³ of low-income economies and 12 per cent of middle-income economies.²⁴ Similarly,

²¹Robert Prescott-Allen, *Genes From the Wild* (Earthscan: 1988) at 17. [hereinafter, Prescott-Allen]

²²*Global Outlook 2000* (New York: United Nations, 1990) at 95.

²³GDP measures the total output of goods and services for final use produced by residents and non-residents, regardless of the allocation to domestic and foreign claims. GDP is calculated without making deductions for depreciation of 'manmade' assets or depletion and degradation of natural resources. For further critique of the GDP model as a parameter for measuring human development, see, Sections 2 (2) (a) and (b), *infra*.

²⁴World Bank, *World Development Report: Development and the Environment* (1992) at 222.

world trade in agricultural products amounted to \$3 trillion in 1989.²⁵ The combined annual global market for plant life forms is conservatively estimated at US500-800 billion²⁶ but economic utility alone hardly captures the importance of plants.²⁷

In addition to their immense economic value, plants play essential roles as regulators of the global climate and environment. The inter-related nature of plants with the general environment validates the thesis that the entire ecosystem is dynamic.²⁸ Furthermore, plant resources have immeasurable aesthetic value as many species of plants constitute a source of wonder, inspiration, and joy to human beings as a result of their beauty, intriguing appearance, variety or fascinating behaviour.²⁹ It is therefore not surprising that plants have influenced human conceptions of the universe in various ways, particularly, in the religious, moral, ethical and aesthetic dimensions.

²⁵Paul Roberts, "International Funding for the Conservation of Biological Diversity: Convention on Biological Diversity" (1992) 10 *Boston University International Law Journal* 303.

²⁶Kerry Ten Kate & Sarah Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing* (London: Earthscan Publications Ltd, 1999) at 1.[hereinafter, Kate & Laird]

²⁷Royal Gardner, "Diverse Opinions on Biodiversity" (1999) 6 *Tulsa Journal of Comparative and International Law* 303.

²⁸Contemporary ecology has embraced the theory that there is an inherent and abiding conflict in nature in the struggle by organisms for survival. Thus, nature is characterized by change, not constancy. See Daniel Botkin, "Adjusting Law to Nature's Discordant Harmonies" (1996) 7 *Duke Environmental Law and Policy Forum* 25; Bryan Norton, "Change, Constancy, and Creativity: The New Ecology and Some Old Problems" (1996) *Duke Environmental Law and Policy Forum* 49.

²⁹Paul Roberts, *supra* note 25 at 307. Perhaps, it was in this sense that Lord Byron versified thus:

"There is pleasure in the pathless woods...

I love not Man less, but Nature more,

From these our interviews.

See, Lord Byron, "Child Harold's Pilgrimage" Chapter I, stanza 179. See also, William Coleridge, *The Ancient Mariner*, Part VII.

Often, these varied conceptions of plants have impacted plants in ways probably unintended but nonetheless significant. For instance, religio-philosophical conceptions and perspectives on plants have influenced the norms and institutions regulating global access to, (mis)use and control of plants. A brief consideration of the dominant or major religio-philosophical conceptions of plants is now apposite.

2.2: Religio-Philosophical Conceptions of Plants

Human conceptions of plants, particularly, in the Oriental context, may be said to have oscillated between the often-competing dynamics of secular politics and religion. This dynamic is evident in the context of the historical competition for temporal power between religious and non-religious agencies and institutions and the creation of the necessary legal norms to effectuate any dominant ideas or conceptions.³⁰ The Orient has been celebrated for its holistic conception of all life forms. The ideology of nature as an organic entity and humanity as only but a part of the integral whole, is perhaps a unified theory of life. To paraphrase Indian jurist Krishnan Iyer, it is: “a vision of the unity in diversity, and the happy synthesis of materialism and spiritual universality-[that] God inhabits all creations.”³¹ This theory largely forms the creedal essence of most religious conceptions of nature, particularly, in the Oriental, native American and traditional African religious contexts. Thus, under this

³⁰P. Leelakrishnan, *et al.*, “Law Fiddles While Forest Habitat Burns” (1988) 12 *Cochin University Law Review* 1 at 3.

³¹Krishnan Iyer, “Wounded Nature versus Human Future” (1995) 19 *Cochin University Law Review* 1 at 2. [hereinafter, Krishna Iyer]. See also, James Harding, “Ecology as Ideology” (1973-4) 3 *Alternatives* 18.

philosophical paradigm, plants are not capable of being legitimate subjects of private ownership, domination or control, let alone, commoditization.

On the other hand, in the Western Judeo-Christian context, plants and other manifestations of sub-human life forms are considered as raw materials for the satisfaction, if not indulgence, of human appetite and need. In other words, the *raison d'être* of plant life forms is to serve the changing needs of mankind. It thus follows that plants can be owned as property and conveyed into the marketplace as objects of trade and one of the mechanisms for the acquisition and accumulation of surplus capital. Given the influence of the various religious philosophies on the development and evolution of institutions, attitudes and legal norms which underpin the regime on plant life forms, particularly patents, it is perhaps prudent at this stage to briefly elucidate some of the major religio-philosophical conceptions of nature and their implications on the global regime on access to and control of plants.³²

2.2.1: Oriental Religio-Philosophical Conceptions of Plant Life Forms

First, the ancient Indian Vedic religions conceived of nature as the manifestation of Brahman. In this conception human existence is the highest life form in a progressive process towards the long march of the Soul-the *atman*-to the Absolute Infinite which is posited as the celestial destination of all life forms. Thus, the ancient Indian Upanishads and

³²See generally, Fran Trippett, *Towards a Broad-Based Precautionary Principle in Law and Policy: A Functional Role for Indigenous Knowledge Systems (TEK) Within Decision-Making Structures* (Dalhousie University; Unpublished LL.M Thesis, 2000) at 2-55. [hereinafter, Trippett]

particularly, Hinduism spoke of the communion of humanity with all creation.³³ In this sense, the ancient Indian *Rig Veda* postulated that God sleeps in the mineral, awakens in the vegetable, walks in the animal and thinks in man. By this theory, a norm of respect for the intrinsic worth and integrity of all life forms was developed.

A caveat is in order here. As Krishna Iyer cautions, “this is not a return to crude nature worship nor primitive animistic pantheism.”³⁴ Instead, it is an appreciation that what is at stake “is consonance with nature and commitment to future generations which are the first charge on our power to use natural resources.”³⁵ It is a conception of the universe as a single entity with only one unitary interest: an abiding and respectful human inter-relationship with all manifestations of life irrespective of presumed utility or lack thereof to the human life form.³⁶ Thus ontologically, there is no divide between humanity and nature.

Similarly, Buddhism³⁷ with its ethical imperative of equity and belief in reincarnation was equally benign to all life forms. The Buddhist doctrine dwells on the concepts of non-

³³In Hinduism some trees have divine status; e.g., the Hindu god, Vanadevata. See, Krishna Iyer, *supra* note 31 at 45-48; Rana Singh ed., *Environmental Ethics-Discourse & Cultural Traditions* (The National Geographical Society of India., Varanasa, 1993)

³⁴Krishna Iyer, *supra* note 31 at 4.

³⁵Krishna Iyer, *ibid*; Lloyd Burton, “Indigenous Peoples and Environmental Policy in the Common Law Nation-States of the Pacific Rim: Sovereignty, Survival, and Sustainability” (1998) *Colorado Journal of International Law and Policy* 156.

³⁶Patricia Fry, “A Social Biosphere: Environmental Impact Assessment, the Innu, and their Environment” (1998) 56 *University of Toronto Faculty of Law Review* 177.

³⁷Padmasiri de Silva, *Environmental Philosophy and Ethics in Buddhism* (London: Macmillan Press Ltd, 1998) [hereinafter, Da Silva]. On Confucianism, see Wei-Bin Zhang, *Confucianism and Modernization-Industrialization ad Democratization of the Confucian Regions* (London: Macmillan Press Ltd, 1999)

self, unsatisfactoriness and impermanence of existence of life forms on earth. In its emphasis on the pursuit of enlightenment, it advocates the pursuit of what is “right”: right view, right resolve, right speech, right action, right livelihood, right effort, right mindfulness, and right concentration. Thus, Buddhism is clearly non-anthropocentric and perceives of humanity as part of a general chain of life. Furthermore, Taoism like Confucianism and other forms of Oriental religious philosophies, abhors materialism and promotes a regime of “social harmony.” Similar views and perspectives are echoed in the religions and philosophies of indigenous American nations and peoples.

2.2.2: Indigenous American/Oceanic Nations’ Conceptions of Plants

Generally speaking, the indigenous nations of the Americas share a holistic view of all life forms strikingly similar to Oriental views. For example, Andeans have a holistic perspective which does not distinguish “between an individual person, the flora and fauna, or biodiversity in general. All are considered as an indissoluble whole which within the cosmos achieves a concept of God-what the Incas call ‘Pacha Kamaq.’”³⁸ Anthropological researches are replete with many instances of a holistic conception of the universe by indigenous peoples of the Americas³⁹ While the details may differ amongst the thousands

³⁸Elias Carreno Peralta, “A Call for Intellectual Property Rights to Recognize Indigenous People’s Knowledge of Genetic and Cultural Resources” in Anatole Krattiger, *et al.*, eds, *Widening Perspectives on Biodiversity* (Gland, Switzerland: IUCN, 1994) at 288. [hereinafter, *Widening Perspectives*]; Janet McDonnell, *The Dispossession of the American Indian-1887-1934* (Indianapolis: Indiana University Press, 1991) 1.

³⁹Roger Moody, ed, *The Indigenous Voice: Visions & Realities* (1988) at 40-46. See also, Barry Boyer, “Building Legal and Institutional Frameworks for Sustainability” (1993) 1 *Buffalo Environmental Law Journal* 63; Allison Mitcham, “The Wild Creatures, The Native People, and Us: Canadian Literary-Ecological

of indigenous American nations, their conceptions and perspectives on the link and inter-relationship between humanity and plants share the same broad pattern of holism. These views also permeate the life philosophy of the Maoris of New Zealand⁴⁰ and the Aborigines of Australia.⁴¹ As the next paragraphs demonstrate, similar views are manifest in traditional African religions and philosophy.

2.2.3: Traditional African Religious Conception of Plants

In African indigenous religions, it is believed that all life forms are creatures of God.⁴² Departed spirits of the dead, the unborn and even diabolical agents such as witches and wizards are believed to have the capacity to inhabit plants, animals and sacred groves. A particularly effective method of reverence for, if not conservation of, other organisms,

Relationships" (1977-8) 7 *Alternatives* 20; Dorothy Spencer, *Disease, Religion and Society in the Fiji Islands* (Seattle: University of Washington Press, 1941). Interestingly, the Maori of New Zealand use the same word for 'land' as for placenta-*whenuia*- to symbolize human relationship with "Mother Earth."

⁴⁰A. Tunks, "Tangata Whenua Ethics and Climate Change" (1997) 1 *New Zealand Journal of Environmental Ethics* 67-123.

⁴¹The word aborigine comes from the latin, "*ab origine*" which means "from the beginning." See, Chris Cunneen & Terry Libesman, *Indigenous People and the Law in Australia* (Sydney: Butterworths, 1995) at 3. [Hereinafter, Cunneen & Libesman]. See generally, Michael Goldman, ed. *Privatizing Nature-Political Struggles for the Global Commons* (London, Pluto Press, 1998). [hereinafter, *Privatizing Nature*]

⁴²According to the Spokesperson of the San People of Botswana:
[O]nce upon a time, humans animals, and the wind and the sun and stars were all able to talk together. God changed this, but we are all still part of a wider community. We have the right to live, as do the plants, animals, wind, sun and stars; but we have no right to jeopardise their existence.
Quoted in, Tracy Dobson, "Loss of Biodiversity: An International Environmental Policy Perspective" (1992) 17 *North Carolina Journal of International Law and Commercial Regulation* 277. [hereinafter, Dobson]

particularly plants and animals, was through the “taboo system”⁴³ and the “sacred groves” or “evil forests.” In fact, in most places in Africa, these “sacred groves” or habitats “represent the few remaining examples of closed-canopy forests.”⁴⁴ The taboo norms are usually woven around religious beliefs in their efficacy and normative suasion.

2.2.4: Islamic Conception of Plants

In Islam, it is believed that the Almighty Allah created mankind and the entire universe and made mankind a steward of the entire earth. This stewardship has been said to be the “divine rationale for the existence of mankind on the face of this planet.”⁴⁵ The *Quran* declares that “He (Allah) it is who hath placed you as viceroys of the earth.”⁴⁶ As noted Islamic scholar Omar Bakhashab has argued, “in the Islamic perspective, people in a community can be compared to passengers on a ship, having a common responsibility. Each passenger has to ensure the ships’ safeguard not only for his own safety but that of others as

⁴³Johan Colding & Carl Folke, “The Taboo System: Lessons About Informal Institutions for Nature Management” (2000) 12 *The Georgetown International Environmental Law Review* 413. [hereinafter Colding & Folke]. Taboo is an Anglicization of the Polynesian word *tapu*. It refers to the concept of prohibition or ban imposed by social custom or as a protective measure. See Colding & Folke, *ibid* and the annotated texts for further reading and discussion of the taboo system.

⁴⁴Taboos need not be permanent. For example, taboos may exist against the collection of certain species at some periods of their life-cycle. Many plants are “taboo” in different parts of Africa. For example, the peepal tree (*Ficus religiosa*) and the Khejri tree (*Prosopis cineraria*). Colding & Folke, *supra* at 452.

⁴⁵Omar Bakhashab, “Islamic Law and the Environment: Some Basic Principles” (1988) 3 *Arab Law Quarterly* 287. [Hereinafter, Omar].

⁴⁶The Holy Quran, 6: 165. [An’am-the cattle] [English Translation].

well.”⁴⁷ With reference to plants, humanity is placed in a position of divinely-mandated stewardship.

2.2.5: Judeo-Christian Conception of Plants

The Judeo-Christian conception of nature⁴⁸ and the place of humanity in the schemata of life forms may be summarized by the biblical injunction and mandate to wit:

[T]hen God said, let us make man in our image, after our likeness and let them have dominion over the fish of the sea, and over the birds of the air, and over the cattle, and over all the earth, and over every creeping thing that creeps upon the earth.⁴⁹

It is arguable that the Judeo-Christian philosophy goes beyond mere placement of humanity in stewardship position and asserts a regime of absolute human control and dominion over plants and other “sub-human” life forms. In effect, man, in the gender specific term of the word, by virtue of a “heavenly and divine” mandate, sits atop a supposed hierarchy of life forms.

In this heavenly ordained pyramidal structure, man, in the gender specific term of the world comes first, followed by women, children, animals, birds, fish, plants and microscopic life forms. On his olympian pedestal, man’s unquestionable authority of dominion emanates from the sublime celestial abode of God Almighty. In recent times, this flawed theory has

⁴⁷Omar, *supra* note 45 at 289.

⁴⁸Richard Bond, “Salvationists, Utilitarians, and Environmental Justice” (1977) 7 *Alternatives* 31.

⁴⁹Genesis 1:26-27.

been rejected and re-interpreted. However, modern emphasis and interpretation is now placed on the role of mankind as stewards instead of irresponsible and self-centred lords of other life forms. The status and function of stewardship carries enormous responsibility implicating human culture, science, international law and the environment. Given the profound effects of classical Judeo-Christian philosophy on laws and institutions governing plant life forms, further analysis of the subject is pertinent.

2:3 The Influence of Judeo-Christian Philosophy on the Laws, Attitudes and Institutions Governing the Environment and Plant Life Forms

Following on the concept of a gendered human pre-eminence in the scheme of life, and the conception that humanity stands apart from nature, certain consequences manifesting and reinforcing themselves in the attitudes, institutions and legal norms are apparent. First, it is very arguable that the gendered hierarchy contributed to the masculinization of knowledge, particularly, empirical knowledge, otherwise known as science. Until recent times, science was a masculine affair: a discourse amongst gentlemen.⁵⁰ Women were believed to be incapable of “scientific” abilities and early “scientific” forays by women, especially in Europe, were dismissed as “witchcraft” or “magic.” In some cases, the “witches” were hounded and burnt to death.

Even in modern Western societies where it is often believed that women have been

⁵⁰Jack Morrell & Arnold Thackray, *Gentlemen of Science: Early Correspondence of the British Association for the Advancement of Science* (London: Royal Historical Society, 1986); Evelyn Keller, *Reflections on Gender and Science* (New Haven: Yale University Press, 1985); Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution* (New York: Harper and Row, 1980).

“empowered”, it is remarkable that to date, academic honours and degrees are denominated in the masculine gender.⁵¹ An impact of this on plant life forms is that the scientific contributions of women, especially, local farmers and breeders, has largely remained unappreciated, unrecognized and unrewarded. However, it is becoming increasingly clear that the most important scientific endeavour of all times underpinning human existence—the improvement and conservation of plant life forms through farming and selective breeding—is largely an accomplishment by women who toil daily in the farm fields, especially in the South.

Further, the scientific world, especially in its early days, operated on the assumption that there was no “science” amongst peoples and races of the South. Thus, given this traditional marginalization of both women and non-Western paradigms and narrative frameworks of empirical knowledge, the intellectual contributions of women traditional farmers in the South suffer acute multi-layered marginalization. Hence, the prevalent non-recognition of the unquantifiable intellectual contributions of women farmers and breeders to the improvement and conservation of plant resources through intellectual property rights cannot be divorced from a gendered and racist conception of scientific abilities. This regime, particularly with respect to traditional women, persists notwithstanding the platitudinous

⁵¹For example, “Bachelor of Science” and “Master of Science” are the degrees awarded in science disciplines, irrespective of gender differences. On the demonization of women’s scientific contributions, see, Brian Easlea, *Witch-Hunting, Magic, and the New Philosophy: An Introduction to Debates of the Scientific Revolution, 1450-1750* (Brighton, Sussex: Haverfield Press, 1980). In addition to its gender bias, science, especially in its early ages, also has inbuilt cultural biases, sometimes manifesting undisguised racism. For example, the famous British scientist, Boyle, vowed to annihilate New England Indians for their “ridiculous notions about the workings of nature.” In his view, the American Indians were a “discouraging impediment to the empire of man over the inferior creatures of God.” Easlea, *ibid.*

references in isolated preambles in some treaties.⁵²

These factors⁵³ contributed immensely in influencing international law on life forms on earth.⁵⁴ For example, Principle 1 of the Rio Declaration on the Environment declares that human beings are at the centre of concerns for sustainable development.⁵⁵ The Stockholm Declaration, especially the preamble, is practically an ode to the supposed pre-eminence of man on earth.⁵⁶ In this paradigm, other life forms derive their functional utility by the way and manner in which they satisfy human needs and indulge the appetite of mankind. Since the conquest, colonization and domination of hitherto non-Judeo-Christian cultures by this philosophy, an anthropocentric⁵⁷ conception of plants remains dominant in legal norms and institutions of the plant regime. Thus, the African Convention on the Conservation of Nature and Natural Resources summarizes the manifold diversity of all life forms as “assets” to mankind.⁵⁸ Unresolved tensions arising from the interface between anthropocentric views

⁵²For example, the preamble to the CBD recognizes the “vital role that women play in the conservation and sustainable use of biological diversity.” See, CBD, *supra* note 1.

⁵³Thomas Kuhn, *The Structure of Scientific Revolution* (Chicago: University of Chicago Press, 1970)

⁵⁴Note 55, *infra*.

⁵⁵*Rio Declaration on Environment and Development*, reproduced in, 31 I.L.M. 874 (1992).[hereinafter, Rio Declaration]

⁵⁶See, *Stockholm Declaration of the United Nations Conference on the Human Environment*, reproduced in, 11 I.L.M. 1416 (1972) [hereinafter, Stockholm Declaration]

⁵⁷Judith McGeary, “A Scientific Approach to Protecting Biodiversity” (1998-9) 14 *Journal of Natural Resources and Environmental Law* 85. [hereinafter, McGeary].

⁵⁸See, Preamble, *African Convention on the Conservation of Nature and Natural Resources*, reprinted in 1001 U.N.T.S. 3. [hereinafter, *African Convention on Nature*]

and non-anthropocentric conceptions of life forms persist in international law.⁵⁹

However, in recent times, international law seems to have witnessed a gradual shift from this anthropocentric conception of life forms to a recognition of the intrinsic worth of other life forms and the role of mankind as trustees or stewards. For example, the World Charter for Nature, although a non-binding instrument, recognizes that “mankind is a part of nature” and that “every form of life is unique, warranting respect regardless of its worth to man.”⁶⁰ The Convention on Biological Diversity also recognizes and affirms the intrinsic value of plant life forms irrespective of their utility to mankind.⁶¹ Even so, there are still anthropocentric concepts in the plant regime.

Third, the chauvinism inherent in the postulated divine origins of the religions which originated in the Middle East-Islam, Christianity and Judaism-(self-proclaimed as divinely ordained rules of existence handed down to a particular group of human beings) influenced early international law. For Christianity in particular, especially after its metamorphosis into and adaptation as the moral fibre of the juridical base of governance in Europe, the emergent states practically adopted the “family of Christianity” as the basis for the fledgling

⁵⁹For a seminal analysis of this phenomenon, see, Lynn White, Jr., “The Historical Roots of Our Ecological Crisis” 155 *Science* (March 10, 1967) 1203.

⁶⁰Preamble, *World Charter for Nature*, reprinted in 21 I.L.M. 455 (1983). [hereinafter, *World Charter for Nature*]

⁶¹Preamble, CBD, *supra* note 1.

international law.⁶²

This also became the theoretical justification for the acquisition and colonization⁶³ of the so-called “backward territories,”⁶⁴ and sometimes, afforded legal justification for extermination of the “heathens” who were outside the charmed circle of those redeemed by virtue of their Christian faith and heritage.⁶⁵ Remarkably, modern scholarship has barely dealt with this influence of religion, particularly, Christianity on early international law.⁶⁶

Consequent upon the hierarchical conception of human cultures and races, disdain and contempt for non-Western traditions, cultures and philosophical conceptions of nature became a feature of early international law. Thus, non-Western conceptions of plant life forms enjoyed the status of primitivity. The point here is that a subtle racial hierarchy has

⁶²Malcolm Shaw, *International Law* (Cambridge: Grotius Publications Ltd, 1986) at 12. [hereinafter, Shaw]. Be that as it may, history records the existence of notions of “international law” as in treaties between the city-states of Lagash and Umma in 2000 B.C. Ramses II of Egypt and King of the Hittites also signed treaties.

⁶³For instance, the weakest or the smallest European states or principalities was immune from colonization by members of the same Christian, caucasian family. On the other hand, some huge empires and kingdoms of Africa and the Americas were laid to waste and colonized; a situation which would never have come into being if they were caucasian Christians. In the case of nomadic peoples of Australia and North America, the territories where they have lived in for thousands of years before colonization were construed as *terra nullius* and, in some cases, the peoples were practically exterminated or charitably “civilized” into extinction. Yet, nomadic Europeans like the Saamis in the Nordic countries were comparatively left alone. See, Colin Samson, *et al*, eds, *Canada's Tibet—The Killing of the Innu* (London: Survival, 1999). Compare with, Dudmundur Alfredsson, “The Rights of Indigenous Peoples With a Focus on the National Performance of the Nordic Countries” (1999) 59 *ZaorRv-Heidelberg Journal of International Law* 529.

⁶⁴Mark Lindley, *The Acquisition and Government of Backward Territory in International Law- Being a Treatise on the Law and Practice Relating to Colonial Expansion* (New York: Negro Universities Press, 1969)

⁶⁵Shaw, *supra* note 62.

⁶⁶See however, Mark Jarvis, ed, *The Influence of Religion on the Development of International Law* (Dordrecht: Martinus Nijhoff Publishers, 1991)

since become the defining threshold for articulating and evaluating human development. Development has thus largely been conceived of and pursued as a lineal process with the West at the vanguard and “backward peoples” of the South taking the rear.

Epistemologically, Western science, for no reason other than the different cultural hearth in which traditional non-Western philosophy and science emerged, relegated most non-Western traditional thoughts and narrative frameworks to the “realm of the natural, the mystical and the irrational.”⁶⁷ In juxtaposition, Western science was uniquely positioned as empirical and rational. In other words, development and civilization, as the improved well being of all became “equated with the Westernisation of economic categories; Western ideology has been promoted as a universal ideal and attainable by all regardless of differences in culture.”⁶⁸ The implications of this for the denigration of TKUP is examined in Chapters 3 and 4 but suffice it to note here that it constituted the social context for the appropriation of plants and TKUP.

In effect, the definition of the terms “undeveloped,” “underdeveloped”, and “developing”, means a debatable continuum of movement by non-Western peoples and their societies toward Western values, world-view and way of life. Hence, the creation of legal norms and institutions by European imperialists and colonialists to assimilate non-Western traditional societies into the “mainstream” Western ideology and culture in the name of

⁶⁷Vandana Shiva, *Staying Alive-Women, Ecology and Development* (London: Zed Books Ltd., 1988) at 31. [hereinafter, Shiva, *Staying Alive*].

⁶⁸Shiva, *Staying Alive, supra* at 1; Makau Wa Mutua, “Savages, Victims and Saviours: The Metaphor of Human Rights” (2001) 42 *Harvard International Law Journal* 201.

“development.”⁶⁹ The ILO Convention 107 of 1957 is perhaps one of the best known assimilationist international instruments embodying this philosophy.⁷⁰

However, modern scholarship confirms that the “universal” empiricism of Western science is in fact “controlled by the social world of scientists and not by the natural world.”⁷¹ The implication of this for plant life forms is that a homogenized approach in both human dietary preferences and agricultural practices is in vogue and constitutes a formidable threat to the sustenance of the diversity of crops. Similarly, there is the implicit notion that scientific innovations in plant improvement can only be undertaken within Western empiricism and the outcomes rewarded with exclusive rights under the limited context of a patent system which as Chapter 1 has argued, is Eurocentric.

In consequence, non-Western scientific contributions to plant improvement are generally perceived as folk knowledge unworthy of recognition. Plant life forms which have witnessed thousands of years of cumulative intellectual interventions and improvements,

⁶⁹David Slater, “Contesting Occidental Visions of the Global: The Geopolitics of Theory and North-South Relations” (1994) [December] *Beyond Law* at 97; Kalyan, *supra* note 5. See also, Anita Chistina Butera, “Assimilation, Pluralism and Multiculturalism: The Policy of Racial/Ethnic Identity in America” (2001) 2 *Buffalo Human Rights Law Review* 1.

⁷⁰For example, Article 12 of ILO Convention 107 of 1957 provides that “measures should be taken to facilitate the adaptation of workers belonging to the population concerned (traditional and indigenous peoples) to the concepts and methods of industrial relations in a modern society.” See, *The Convention Concerning the Protection and Integration of Indigenous and Other Tribal and Semi-Tribal Populations in Independent Countries* (otherwise known as ILO 107), 26 June 1957, reprinted in 328 U.N.T.S. 247. [hereinafter, as ILO 107]

⁷¹Shiva, *Staying Alive*, *supra* note 67 at 32. For example, “scientific” farming once ridiculed organic farming and traditional medicine and alternative treatment as unscientific, primitive and uneconomical. The tide of opinion has changed in modern times. Another remarkable tumble is the scientific support for the pesticide DDT which, soon after Rachel Carson’s groundbreaking novel, *Silent Spring*, began to crumble.

especially in the hands of women farmers, become relegated to the pale of “raw germplasm” and “wild species” unless and until they have been “improved” in Western laboratories by “real scientists.” Recently, however, there is a movement towards a rejection of this policy of assimilation and civilization by acculturation, particularly at the socio-cultural level.

According to I.L.O. Convention 169 of 1989:

[C]onsidering that the developments which have taken place in international law since 1957, as well as developments in the situation of indigenous and tribal peoples in all regions of the world, have made it appropriate to adopt new international standards on the subject with a view to removing the assimilationist orientation of the earlier standards.⁷²

Yet, the underlying values and tensions in this anachronistic regime continue to surface in modern discourse on patents on plants and plant-related traditional knowledge. In other words, the prevailing concept of development has not lost its vigour.

Fourth, the Judeo-Christian conception of plant life forms as a resource is a visualization of those life forms as inert, uniform and mechanistic, separate from and inferior to man: an object for human domination. In effect, mankind is deemed to stand apart from nature and the latter, particularly the forest is considered savage in its primitivity and those who live in the “forest” are by parity of reasoning, savages. Interestingly, the English word

⁷²*International Labour Organization (No. 169) Concerning Indigenous and Tribal Peoples in Independent Countries*. Concluded at Geneva, 27 June 1989, 28 I.L.M. 1382 (1989). [underlining added] It should be noted that this convention has not yet come into effect.

“savage” comes from the Latin word, *sylvaticus*, meaning, “of the woods.”⁷³ This conception of nature as dormant, unproductive and wild⁷⁴ did not enjoy uniform acceptance and approval in early Western thought. Francis Bacon and his school of reductionist perception of nature and science suffered critiques from early scientists and thinkers such as Paracelsus, Goethe, and Francis of Assisi. These voices were however drowned out by the booming majoritarian view of human supremacy and dominion over the earth. As part of the unwritten but dominant philosophical basis of Western science, nature was construed as a composition or complexes of material substances with measurable analytic parameters ready for human manipulation and analysis and private ownership.⁷⁵ Accordingly, contemporary refrains on a better “scientific understanding” of nature may be an euphemism for ultimate human control and subjugation of nature.⁷⁶

With the attendant industrial revolution, came a limitless appetite for resource exploitation and accumulation, and profit maximization was created.⁷⁷ While this ideology has brought about an unprecedented level of material progress and phenomenal consumption

⁷³Michael Balick & Paul Alan Cox, *Plants, People and Culture-The Science of Ethnobotany* (New York: Freeman and Company, 1996). In many European myths, the forest was considered to be the abode of witches and gremlins: a place of evil.

⁷⁴George Foster, *Traditional Societies and Technological Changes* (New Delhi: Allied Publishers, 1973)

⁷⁵But see, Charles, Prince of Wales, “We Must Go With the Grain of Nature” 2000 Reith lecture, reprinted in *The Times* (London) May 18, 2000; John Passmore, *Man's Responsibility for Nature: Ecological Problems and Western Traditions* (New York: C. Scribner's and Sons, 1974) at 4.

⁷⁶Vandana Shiva, *Staying Alive*, *supra* note 67 at xvii.

⁷⁷Rosa Luxemburg, *The Accumulation of Capital* (London: Routledge, 1951)

of resources and accumulation of capital, it has also savaged the environment. Interestingly, modern concerns about the undesirable environmental consequences of avaricious exploitation of nature are often construed as mere problems with neo-liberal economics⁷⁸ or imperfections of the market.⁷⁹

Another inference from the Judeo-Christian philosophy of human separateness from all other life forms is the juridical delineation between “nature” and “mankind.” While both are not in a state of gladiatorial conflict *per se*, Western-inspired legal norms draw a line between areas of human habitation and the so-called wilderness. This bifurcation has thus given rise to the creation of nature parks, often accompanied by forcible ejection of disempowered and marginalized societies from the land where they had thrived and contributed to the diversity of plant life forms. Although this issue is dealt with in greater detail in the next section, it should suffice to note at this stage that the imposition of Western concepts of wilderness and natural parks is an ubiquitous feature of many continental laws

⁷⁸Phrases like the “polluter pays”, “incentive-based approach,” *et cetera*, have taken their place in international environmental law. These econo-juridical concepts practically equate damage to the environment with the supposed financial costs of repairing the damage. This of course implies that there are monetary equivalents for environmental pollution and degradation and that all life forms have a monetary value. See for example, *Council Recommendation on the Implementation of the Polluter-Pays Principles*, 14 November 1974, C(74) 223; reprinted in, Philippe Sands, Richard Tarasofsky & Mary Weiss, eds, *Documents in International Environmental Law* (Manchester: Manchester University Press, 1994) [hereinafter, Sands, *et al*]. See also, Catherine O’Neill & Cass Sunstein, “Economics and the Environment: Trading Debt and Technology for Nature” (1992) 17 *Columbia Journal of Environmental Law* 93. [hereinafter, O’Neill & Sunstein]. This philosophy largely underpins such international environmental instruments such as the *Montreal Protocol on Substances that Deplete the Ozone Layer*, 26 I.L.M. 1550 (1987). See also, *Council Recommendation on the Uses of Economic Instruments in Environmental Policy*, 31 January 1991, C(90) 177. Reproduced in Sands, *et al*, *ibid*, at 1185.

⁷⁹It is becoming increasingly usual to read of economic phrases and concepts such as “market-based”, “demand side management”, “technological optimism”, “non-adversarial dialogue” and similar coded language in contemporary literature on international environmental law.

ostensibly designed to protect plants. The African Convention on Conservation of Nature and Natural Resources, for example, defines a strict nature reserve as an area “where it shall be forbidden to reside, enter, traverse or camp, and where it shall be forbidden to fly over at low altitude without a special permit from the competent authority.”⁸⁰ It also defines a national park as an area:

[E]xclusively set aside for the propagation, protection, conservation and management of vegetation and wild animals as well as for the protection of sites, landscapes or geological formations of particular scientific or aesthetic value, for the benefit and enjoyment of the general public.⁸¹

As earlier noted,⁸² in modern times there seems to be a giddy and ill-defined questioning of the assumptions, prejudices, legal norms, and institutional network which sustain the dominant notions of development. Hence, irresponsible anthropocentrism has witnessed severe attacks, especially by high-profile institutions and even individuals, including Prince Charles of the United Kingdom. Human domination of nature without a balancing sense or obligation of duty, trust and stewardship is increasingly losing favour in juridical and normative circles.⁸³ The *ancien regime*, as it were, now seems excessively functional, mechanical and short-sighted. As the philosopher Neil Evernden has argued, “to describe a

⁸⁰Article 4, *African Convention on Conservation of Nature*, *supra* note 58.

⁸¹*Ibid.*

⁸²See notes 60 & 61, *suprae*.

⁸³See, Christopher Stone, “Should Trees Have Standing? Toward Legal Rights for Natural Objects” (1972) 45 *Southern California Law Review* 450. See also, Olga Moya, “Adopting an Environmental Justice Ethic” (1996) 5 *Dickinson Journal of Environmental Law and Policy* 215.

tree as an oxygen-producing device or a bog as a filtering agent is equally violent, equally debasing to the being itself.”⁸⁴

The disenchantment with and shortcomings of the anthropocentric theory of plants may also have spawned a new breed of philosophies which have borrowed a considerable body of ideas and inspiration from the South, particularly, the Orient. For example, “biocentrism” which views humanity as equal to all other forms of life acknowledges the global morality of their competitive struggle for existence.⁸⁵ Similarly, “ecocentrism” focuses on the interaction of living entities with their environment. Even the radical concept of deep ecology developed by Arne Naess was inspired by the Vedantic doctrine of non-duality.⁸⁶ Indeed, Japanese Zen Buddhism has strongly influenced Western environmental movements such as *Friends of the Earth* and *Greenpeace*.⁸⁷

The danger however, is that there seems to be an excessive romanticization of the supposed environmental virtues of Orientalist concepts of life forms and the role of humanity in the scheme of life. The short point here is that the appropriation and extinction of plant

⁸⁴Neil Evernden, *The Natural Alien, Humankind and the Environment* (1985) at 23.[hereinafter, Evernden]. See also, Prince Charles, *supra* note 75.

⁸⁵McGeary, *supra* note 57 at 94. See generally, Frederick Ferre & Peter Hartell, eds, *Ethics and Environmental Policy-Theory Meets Practice* (Athens & London: The University of Georgia Press., Athens and London, 1994) [hereinafter, Ferre & Hartell]; Robert Repetto, ed, *The Global Possible* (New Haven: Yale University Press, 1985). [hereinafter, Repetto]

⁸⁶Kalyan, *supra* note 5 at 30. See also, B. Devall & G. Sessions, *Deep Ecology: Living as if Nature Mattered* (Utah: Gibbs Smith, 1985); C. Merchant, *Radical Ecology: The Search for a Livable World* (London: Routledge, 1992), M. Bookchin, *The Ecology of Freedom: The Emergence and Dissolution of Hierarchy* (New York: Cheshire Books, 1991)

⁸⁷Kalyan, *ibid.*

life forms is a hydra-headed problem and it would be simplistic to assume that a quick embrace of non-anthropocentric views on nature is the Holy Grail to environmental justice and plant diversity. More importantly, the impact of the recent incorporation of non-Western values into the corpus of laws and philosophies governing plant resources may be exaggerated. As the present writer has argued elsewhere, the process in question merely turns the philosophical bases of present-day international environmental law into a “coat of many colours.”⁸⁸ Following on this metaphor, the fabric and stitching materials remain Eurocentric. For example, the current loss of plant life forms has generally been perceived as a disaster for humanity: the intrinsic worth of plants is of no consequence.

However, in order to fully appreciate the dynamics of the global politics on patents on plant resources, particularly, the development of legal norms and global institutions of patents on plants and traditional plant-related knowledge, it is pertinent to expatiate on the natural and artificial geography of plant resource distribution across the world. Without understanding the nature and peculiarities of the geographical distribution of plant resources, it may be difficult to appreciate the politics on plant life forms and why certain legal norms on plant resources have recently assumed controversial dimensions. Interestingly, recent attempts in international forums to address and halt the phenomenal erosion and extinction of plant life forms are largely predicated on the geographical imbalance on the distribution and preponderance of plant diversity across the globe.

⁸⁸Bruce Parry, *Environmental Law- A Guide to Concepts* (Toronto: Butterworths, 1996) Book review by Ikechi Mgbogji, (2000) 9 *Dalhousie Journal of Legal Studies* 344.

2.4: A Human Geography of Plant Life Forms: The North-South Context

In both species and genetic diversity, plants are not evenly distributed across the face of the earth. Most of the delicacies today described as “European” or “all-American” or “Kenyan,” are by no means of European or American origin or Kenyan. The potato is indigenous to the Andes. Maize is indigenous to Central America. Of the 20 major food crops, none originated in North America or Australia and only two of the major food crops in the world—rye and oats, originated in the Euro-Siberia area.⁸⁹ Virtually “all of the developed countries’ foodstuffs originated in the tropical countries.”⁹⁰ Corn, rice, potatoes, sugar, citrus fruit, bananas, tomatoes, coconuts, black peppers, nutmeg, pineapples, chocolate, coffee and vanilla all originated from the tropics. Further, over two-thirds of existing plant species are located in the South. Rice originated from Asia and Africa. Wheat has its origins in the Middle-East.

In effect, the natural distribution of plant diversity is heavily skewed in favor of the South. More importantly however, no state is self-sufficient in plant genetic diversity. The size of states is irrelevant in measuring species or genetic endowment. For example, Brazil with only 6.3 % of the world’s surface land area has 22 % of the planet’s flowering plants. Botanists report that one twenty-acre tract in Malaysia supports 750 tree species. This is

⁸⁹Klaus Bosselman, “Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity” (1995) 7 *Colorado Journal of International Environmental Law and Policy* 111 at 116. [hereinafter, Bosselman]

⁹⁰Ratcliff, *supra* note 20 at 411.

more than all the tree species diversity in the United States of America.⁹¹ The African State of Madagascar contains about one quarter of the plant species in Africa. Madagascar is also home to more than 50 species of coffee, “whose caffeine-free beans and disease-resistant qualities could prove valuable to both future consumers and plant breeders.”⁹² Jack Kloppenburg has captured the stark imbalance in plant distribution thus:

[O]f crops of economic importance, only sunflowers, blueberries, cranberries, pecans, and the Jerusalem artichoke originated in what is now the United States and Canada. An all-American meal would be somewhat limited. Northern Europe’s original genetic poverty is only slightly less striking; oats, rye, currants, and raspberries constitute the complement of major crops indigenous to that region. Australia has contributed nothing at all to the global ladder.⁹³

According to William Lesser, “the United States, a major food crop producer, is completely dependent on foreign germplasm, including potatoes from Latin America, corn from Central America, soybean and rice from China, and wheat from Syria and environs.”⁹⁴In fact, for

⁹¹Newman, *supra* note 11 at 486.

⁹²Ratcliff, *ibid.* Some of the food crops can in their respective capacity fulfil unimaginable roles. For example, the winged bean, grown in New Guinea, has been called a “one species-supermarket: the entire plant—roots, seeds, leaves, stems and flowers—is edible, and a coffee-like beverage can be made from its juice. It has a nutritional value equal to that of soybeans.” *Ibid.*

⁹³Jack Kloppenburg Jr, *First the Seed-- The Political Economy of Plant Biotechnology, 1492-2000* (Cambridge: Cambridge University Press, 1988) at 47-48.[hereinafter, Kloppenburg]

⁹⁴William Lesser, *Sustainable Use of Genetic Resources Under the Convention on Biological Diversity-Exploring Access and Benefit Sharing Issues* (Oxford: CAB International,1997) at 14. [hereinafter, Lesser] A short list of major plant resources shows their sources of origin:

(1.) America--Sunflower, tepary bean; (2.)Meso-America-- maize, tomato, sieva bean, scarlet runner bean, Cotton, Avocado, Papaya, Cacao, Cassava, Sweet potato, Common bean; (3.) Lowland South-- America; Yam, Pineapple, Cassava, Sweet potato, Cotton; (4.) Highland South America--Potato, Peanut, Lima bean, Cotton bean, Cotton, Llama, Alpaca; (5.) Northern Europe--Oats, Sugarbeet, Rye, Cabbage; (6) Africa--African Rice, Yam, Sorghum, Pearl Millet, Yam, Watermelon, Cowpea, Coffee, Cotton, Sesame; (7) Near East--Wheat, Barley, Onion, Pea, Lentil, Chickpea, Fig, Date, Flax, Pear, Pomegranate, Grapes, Olive, Apple, Central Asia--common millet, Buckwheat, Alfalfa, Hemp, foxtail millet, Grapes, Broad bean, pea, Egg plant, Cucumber, Cotton, Sesame; (8) China--Soybean, Cabbage, Onion, Peach, Foxtail millet; (9) South East Asia--Oriental rice.

plant species diversity, North America posts an 85% dependency on the South.

Even before the seminal studies of Nicolai Vavilov on the issue, this extraordinary phenomenon and its economic, security and manifold implications has long occupied the attention of the North. Vavilov's travels and studies came to the conclusion that the genetic centres of the world were in the South.⁹⁵ Since Vavilov published his findings in 1925, the global politics of plant resources⁹⁶ has assumed a North-South character with an array of cultural prejudices, institutions, legal norms and scientific mechanisms designed to relocate the genetic centre of the world and extract surplus profit from this process by putting the appropriated plant life forms into the stream of commerce as commodities of trade.⁹⁷

The causes of the profusion of plant diversity in the South are both natural and artificial. As a general rule of geography, moving from the poles to the equator, species richness naturally increases in magnitude. This is largely as a result of the warmer and humid climate which is favourable to the multiplication of life forms.⁹⁸ Speciation is thus partly induced by geography. In other words, geographical variety and the imperative of evolution

Banana, Citrus, Yam, Mango, Thin, sugarcane, Taro, Tea; (10) South Pacific-Coconut, Breadfruit, Noble sugarcane.

⁹⁵Nicolai Vavilov, *The Origin, Variation, Immunity and Breeding of Cultivated Plants*, translated by K. Chester (New York: Ronald Press, 1951).

⁹⁶See, Anthony Stenson, & Tim Gray, *The Politics of Genetic Resource Control* (London: Macmillan Press, 1999) [hereinafter, Stenson & Gray]

⁹⁷Nicolai Vavilov, "Studies on the Origin of Cultivated Plants" (1925) 16 #2 *Bulletin of Applied and Plant Breeding* 1-248.

⁹⁸Panjabi, "On the CBD," *supra* note 1 at 196.

confers species differences upon hitherto same species. As a rule of evolution, species mutate and diversify in line with geographical diversity. Hence, a part of the explanation for the South's incredible plant species diversity lies in its complex geography.

But nature is not the only agent at work. Human impact plays a critical role in the multiplication and sustenance of plant species. Plant diversity correlates with cultural diversity. For example, of the nine countries that account for 60 percent of human languages, six of these centres of phenomenal cultural diversity are also mega-diversity countries with exceptionally high numbers of unique plant species.⁹⁹ Furthermore, the domestication of plants leads to increased variety of numbers.¹⁰⁰ This is due to the phenomenon of polyploidy, that is, the doubling or multiplication of chromosome numbers. Since agriculture began ten thousand years ago, selective breeding of plants has been done to yield stronger, healthier and higher yielding plants; thus increasing the diversity of plant species.¹⁰¹ The greater the cultural diversity of the local farmers, the more likely they are to breed plants for various cultural purposes such as religion, social festivals, *et cetera*, thus multiplying the diversity of plants. Thus, "agro-biodiversity is not a strictly natural phenomenon but derives from human activities. Indeed, farmers make selections to enrich biodiversity all the time."¹⁰² In

⁹⁹Colding & Folke, *supra* note 43 at 415.

¹⁰⁰Erich Isaac, *Geography of Domestication* (Prentice-Hall, New Jersey, 1970); Bailey Stevens, *The Recovery of Culture* (New York: Harper & Brothers Publishers, 1949)

¹⁰¹Lara Ewens, "Seed Wars: Biotechnology, Intellectual Property, and the Quest for High Yield Seeds" (2000) 23 *Boston College International & Comparative Law Review* 285. [hereinafter, Lara Ewens]

¹⁰²Annie Patricia Kameri-Mbote & Philippe Cullet, "Agro-Biodiversity and International Law—A Conceptual Framework (1999) 11 *Journal of Environmental Law* 257 at 260. [hereinafter, Mbote]

this wider context, “cultural diversity and natural diversity are closely linked concepts.”¹⁰³

In sum, the immense geographical diversity¹⁰⁴ and cultural complexity of the South practically compel farmers to breed plants which are suitable for various geographical and cultural imperatives. In dismissing the culturally-biased notion that plant diversity in the South is solely a function of geographical whim, Kloppenburg notes that:

[I]n fact, the land races of the Third World, are most emphatically not simple products of nature. Traditional agriculturists have made very great advances in crop productivity. Domesticated forms of species are frequently very different in form from their wild or weedy relations.¹⁰⁵

Indeed, the famous plant breeder Norman Simmonds lent his weight to this considered view when he admitted that, “probably, the total genetic change achieved by farmers over the millennia was far greater than that achieved by the last hundred or two years of more systematic science-based effort.”¹⁰⁶ Further, Robert Leffel, the Program Leader of the United States Department of Agriculture for Oil-seed Crops added credence to this view when he noted that “in our modest moments, today’s soybean breeders must admit that a more ancient

¹⁰³Elias Carreno Peralta, “A Call for Intellectual Property Rights to Recognize Indigenous People’s Knowledge of Genetic and Cultural Resources” in Krattiger et al, *Widening Perspectives*, *supra* note 38 at 288.

¹⁰⁴For example, “on one uphill traverse of a rice field in Liberia, farmers grew fourteen different varieties of rice, each matched to the degree of slope, amount of insulation, and type of soil in the particular paddies.” see, Craig Jacoby & Charles Weiss, “Recognizing Property Rights in Traditional Biocultural Contribution” (1997) 16 *Stanford Environmental Law Journal* 74 at 84. [hereinafter, Jacoby & Weiss]. Similarly, recent studies hat the Epugao of Luzon in the Philippines can identify 200 varieties of sweet potatoes and the Andean farmers cultivate thousands of clones of potatoes, more than 1000 of which have names. See Walter Reid & Kenton Miller, *Keeping Options Alive: The Scientific Basis for Conserving Biodiversity* (World Resources Institute, 1989) at 57.

¹⁰⁵Kloppenbug, *supra* note 93 at 185.

¹⁰⁶Norman Simmonds, *Principles of Crop Improvement* (New York: Longman, 1979) at 11.

society made the big accomplishment in soybean breeding and that we have merely fine-tuned the system to date.”¹⁰⁷

While the link between cultural diversity and plant diversity is irrefutable,¹⁰⁸ it is equally true that modern science and plant-breeding efforts can also contribute towards the improvement of plant species and genetic diversity. However, the important threshold to be settled is to determine which human interests and values motivate and inspire artificial mediation in plant species and genetic diversity. In this context, it would seem that modern concerns about the industrialization of plants have proceeded on the basis that profit motives alone may disregard cultural sensibilities, environmental issues and eliminate plants ignorantly considered to be weeds. In addition, there are concerns that excessive commercialization of plant-breeding efforts invests the market with awesome powers to determine which plants thrive or perish. Given the limitations of scientific knowledge and the idiosyncracies of “market forces” it would seem imprudent to offer additional incentives like patents to an already powerful institution such as the market.

With respect to indiscriminate conversion of primordial communities into parks and reserves, there is a compelling need for care and balance in determining which areas of land are set aside as nature parks. Appearances may be deceptive. As Henry Thoreau advised,

¹⁰⁷Cited in Kloppenburg, *supra* note 93 at 185. Other authorities such as Jack Harlan credits the American Indian with a “magnificent performance” in the improvement of maize, potato, manioc, sweet potato, peanut and the common bean. Kloppenburg, *ibid*.

¹⁰⁸ According to Kate and Laird, “the majority of the world’s diversity is closely tied to traditional management, and livelihood practices, and many ‘natural’ areas bear the mark of the interconnection between cultural and biological diversity.” Kate & Laird, *supra* note 26 at 3.

“what we call wilderness is a civilization other than our own.”¹⁰⁹ According to David Wood:

[V]irtually all existing environments have in part been shaped by human habitation and use and their continuation requires human involvement...in fact, forests are cultural artefacts. Present day biodiversity exists in Central Africa not in spite of human habitation, but because of it. A review of evidence suggests that human influence in tropical vegetation is far greater than previously thought.¹¹⁰

Sir Ghilean Prance, the former Director of the Royal Botanical Gardens, Kew, has also observed that:

[T]he Amazonian Indians, by an ingenious method of shifting cultivation developed gradually over several millennia, preserved the soils, the wildlife and the ecosystem as a whole...the indigenous peoples are an integral part of the Amazonian paradise, a fact that has much to teach people from modern industrialized society.¹¹¹

Similar words of caution have been issued with respect to the ‘impregnable jungles’ of the Costa Rican rain forest, hitherto thought to be the heart of pristine jungle.¹¹² On North America, Jeffrey McNeely, the chief scientist of the World Conservation Union (IUCN) notes that:

¹⁰⁹Harriet Ketley, “Cultural Diversity versus Biodiversity” (1994) 16 *Adelaide Law Review* 99. Thus naturalness may in some cases be a culturally constructed concept. Policy-makers should therefore exercise caution before demarcating any particular habitat as “nature” park devoid of human interaction with “nature.” The phenomenon is very complex. See, Dan Perlman & Glenn Adelson, *Biological Diversity: Exploring Values and Priorities in Conservation* (Massachusetts: Blackwell Inc, 1997) [hereinafter, Perlman & Adelson]

¹¹⁰David Wood, “Conservation and Agriculture: The Need for a New International Network of Biodiversity and Development Institutes to Resolve Conflict” in Krattiger, eds, *Widening Perspectives*, *supra* note 38 at 425.

¹¹¹Ghillelan Prance, “The Amazon: Paradise Lost” in Les Kaufman & Kenneth Mallory, eds, *The Last Extinction*, Kaufman, Les & Kenneth Mallory, (Cambridge, Mass: The MIT Press, 1993) at 88. [hereinafter, Kaufman & Mallory]

¹¹²David Takacs, *The Idea of Biodiversity: Philosophies of Paradise* (Baltimore: Johns Hopkins Press, 1996)

[T]he wilderness of North America had been thoroughly occupied for thousands of years by a rich diversity of different groups...the Yellowstone National Park established in 1872 was a territory previously occupied by Shoshone, Crow, and Blackfoot Indians.¹¹³

William Denevan have also demonstrated that the so-called wilderness which the early European settlers of North America met was actually the product of forest management of the Native American Indians.¹¹⁴ The concept of primitive and “unspoilt” wilderness which shaped international law on conservation of plant life would thus need a reappraisal.¹¹⁵ It is not every human use of forests which creates disaster for forests.¹¹⁶ It seems that the better question should be how human populations use forests¹¹⁷ and their ethic of conservation of plants.¹¹⁸ Policy makers often lose sight of the blurred lines of inter-relationship between

¹¹³Jeffrey McNeely, *et al*, eds, *Protecting Nature: Regional Reviews of Protected Areas* (IUCN, Gland: 1994) at 5.

¹¹⁴W.L Thomas Jr., ed, *Man's Role in Changing the Face of the Earth* (Chicago: University of Chicago, 1956). For similar evidence in the Pacific and Caribbean, see, John Young, *Sustaining the Earth* (Cambridge, Mass: Harvard University Press, 1990). [hereinafter, Young]

¹¹⁵See for example, *The 1933 Convention Relative to the Preservation of Fauna and Flora in their Natural State*, 172 L.N.T.S. 241. This convention spawned the “natural parks” syndrome in Africa.

¹¹⁶See, Tiyanjana Maluwa, “Environment and Development in Africa: An Overview of Basic Problems of Environmental Law and Policy” (1989) 1 *African Journal of International and Comparative Law* 650.

¹¹⁷The IUCN categorizes these protected areas into six. The first in the IUCN category encompasses areas construed as “strict nature reserve/wilderness area” managed for “scientific” purposes. The second category is made up of the “national parks” managed for ecosystem and recreation. The third category is made up of natural monuments and natural landmarks. Category four is for habitat and species management area. The fifth category is the protected landscape/seascape protected area. The sixth category is the protected area mainly managed for the sustainable use of natural resources. See, Van Der Zon, ed, *Biological Diversity* (The Hague: The Netherlands, 1995) at 20. [hereinafter, Van Der Zon]

¹¹⁸John Mugabe, “Technology and Biodiversity in Kenya: Technological Capabilities and Institutional Systems for Conservation” in Krattiger, *et al*, *Widening Perspectives supra* note 38 at 81.

those human societies and plants.¹¹⁹

Early international law instruments¹²⁰ on plant conservation pretended that traditional and indigenous peoples were an affliction on the land.¹²¹ While this erroneous attitude may be changing,¹²² it formed the basis for the forceful ejection of forest-dwellers from the forests¹²³ and traditional ways of life.¹²⁴ However, modern international law now recognizes the benefits of traditional management style of forest-dwellers.¹²⁵

For example, the concept of Integrated Conservation and Development Projects

¹¹⁹Mugabe, *ibid.* In this objectification of marginalized peoples and cultures, the experience of Kenyan Masai's is particularly well-known. Of course, in this cliched approach to environmental governance, "management" of such reserves would be under the control government appointed "experts" who, apart from college qualifications, may probably lack intimate knowledge of the environment in question.

¹²⁰For example, the *Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere* defines "strict wilderness reserves as denoting "a region under public control characterized by primitive conditions of flora, fauna and habitation. This convention mandates all governments of the American republics to explore the possibility of establishing this type of "wilderness" reserves as soon as possible after the effective date of the convention. See, Article 1, of the *Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere, ibid.*

¹²¹Sara Dillon, "Trade and the Environment: A Challenge to the GATT/WTO Principle of "Ever-Freer Trade" (1996) *St. John's Journal of Legal Commentary* 351. [Noting that there are still strong views that "pre-technological societies are the most serious threats to the environment, ...in their subsistence-level economic activities.] [hereinafter, Sarah Dillon]

¹²²But see, Ton Van der Zon, *supra* note 117.

¹²³For an account of the colonial Indian forest regime, see, E.P.Stebbing, *The Forests of India* (reprint) (New Delhi: J.Reprints Agency, 1982) at 62.

¹²⁴Gabriel Muyuy Jacanamejoy, "Community Participation in the Conservation of Biodiversity" in Krattiger, *Widening Perspectives, supra* note 38 at 231.

¹²⁵But see, *Convention on Nature and Wild life Preservation in the Western Hemisphere, supra; Convention on the Conservation of European Wildlife and Natural Habitats*, Sept. 19, 1979, Berne, European Treaty Series No. 104; (1982) U.K.T.S. 56; *ASEAN Agreement on the Conservation of Nature and Natural Resources*, 9 July 1985, Kuala Lumpur; reproduced in Sands, *et al, supra* note 78 at 958.

(ICDPs) seems to be in vogue.¹²⁶ ICDPs are designed to incorporate the local and indigenous peoples in the management of the forests. Modern international law also seems to have come to terms with the merits of traditional knowledge in its own right and a recognition of the inseparability of traditional and indigenous populations from their land.¹²⁷ For example, Articles 13, 14, 15 and 16 of the ILO Convention 169 of 1989 (although it has not yet come into effect) now forbid forcible removal of traditional and local communities from their ancestral homelands.¹²⁸

2.5: Causes of the Contemporary Extinction of Plant Species

The phenomenon of extinction of plant species diversity is often natural.¹²⁹ Within the natural standard, scientists have calculated that since 1600 when the keeping of records on plant diversity started, the rate of extinction of vascular plants may be put at 0.2% of the

¹²⁶Micheal Wells, ed, *Investing in Biological Diversity -A Review of Indonesia's Integrated Conservation and Development Projects* (Washington: The World Bank, 1999)

¹²⁷See for example, Article 8 (j) of the CBD, *supra* note 1.

¹²⁸For example, Article 14 of ILO no. 169 provides that "state parties recognize the rights of ownership and possession of the peoples concerned over the lands which they traditionally occupy." See generally, *Convention (ILO no. 169) Concerning Indigenous and Tribal Peoples in Independent Countries*, *supra* note 72. See also, Article 8 (j) of the CBD, *supra* note 1.

¹²⁹The natural rate of extinction is an estimate of the rate of extinction that would occur in the absence of human influence. The natural rate of extinction is approximately one to three species per one hundred years. Scientists estimate that the rate of extinction is 1,000 to 10,000 times faster than the natural rate of extinction. For a discussion of five major mass extinctions of the Pharezoic period, see David Jablonski, "Causes and Consequences of Mass Extinctions: A Comparative Approach" in David Elliot, ed, *Dynamics of Extinction* (1986) at 183.

total number of plants estimated to be in existence.¹³⁰ Given that only a fraction of the species on earth have been identified, the number of unrecorded extinctions may be more. Since the age of industrialization and the phenomenal increase of human population, it is estimated by scientists that human induced plant diversity loss has increased dramatically. Evidence of this is starkly borne out by the loss of forest cover across the globe and the unprecedented conversion of plant habitat for human use. For example, Ethiopia's forest cover and its famous cedar forests have dropped from 30% to 1%. India's forest cover has shrunk from over 50% to 14%. Although this question is dealt with in greater detail in Section 2.5 (2), it would suffice to note at this stage that loss of forests is today a matter of global concern.

Given the generally accepted concept of the inter-dependency of species and ecosystems, the consequences of the extinction of species include the so-called cascade effect.¹³¹ This is the concept that loss of a species within an ecosystem may cause a collapse or a malfunctioning of other species within the entire ecosystem.¹³² For example, in the tropical moist forests of South America, 900 species of figs provide essential nutrition to spider monkeys, peccaries, and toucans. The existence of the figs depends on pollination by wasps. Without the wasps, spider monkeys, peccaries and their predators such as jaguars

¹³⁰Reid & Miller, *supra* note 104.

¹³¹See, Tracy Dobson, *supra* note 42 at 280-1.

¹³²For further examples of the cascade effect, see Roberts, *supra* note 25 at 309-10.

would disappear.¹³³

Although human influence on plants could be generally beneficial, it is also true that in some cases, human influence on and “market” preferences for various species of plants could yield terrible consequences for plant genetic diversity.¹³⁴ John Ryan estimates that by 2005, three-quarters of Indian rice fields may be sown with only 10 varieties of rice as against the 30,000 which had been used in the past fifty years.¹³⁵ Similarly, in Indonesia, 1,500 varieties of rice have disappeared within the past 15 years. 6 varieties of corn account for 71% of the corn fields and about nine varieties of wheat occupy about 50% of the wheat fields in the United States. The consequences of narrow plant genetic base can be horrific.¹³⁶

The extraordinary rate of loss of biodiversity is a function of a complex web of causes

¹³³June Starr & Kenneth Hardy, “Not by Seeds Alone: The Biodiversity Treaty and the Role for Native Agriculture” (1993) 12 *Stanford Environmental Law Journal* 85.

¹³⁴Krishnan Iyer, *supra* note 31; James Karr, “Protecting Ecological Integrity: An Urgent Social Goal” (1993) *Yale Journal of International Law* 297 [hereinafter, Karr]; Monique Manguet & Rene Letolle, “Why is the Environment Deteriorating? Why Is The Deterioration Speeding up at the End of the 20th Century?” (1993) 51 *European Yearbook* 31; David Spence, “Paradox Lost: Logic, Morality, and the Foundations of Environmental Law in the 21st Century” (1995) 20 *Columbia Journal of Environmental Law* 145. [hereinafter, David Spence]

¹³⁵John Ryan, *Life Support: Conserving Biological Diversity* (Worldwatch Paper 108) Washington, D.C: Wordwatch Institute, 1992) at 14. [hereinafter, John Ryan]

¹³⁶For example, the potato came to Europe from South America in the 18th century. Enjoying an initial success it helped to triple the population of Ireland. Soon, local predators overwhelmed its narrow genetic base and unleashed the fungus *Phutophthora infestans* in 1846. The result was disastrous. Half the crop was lost, two million Irish died, two million more emigrated and the rest were thrown into abject poverty. See, David Tillford, “Saving the Blue Prints: The International Regime for Plant Resources” (1998) 30 *Case Western Reserve Journal of International Law* 373. [hereinafter, Tillford] Similar but less drastic examples include the “Victoria blight” of 1946, and the American Corn Blight of 1970.

primarily originating from the dominant concept of development.¹³⁷ This manifests itself in consumerism, especially in the North, high debt burden of the South arising from an unfair global trading system, urban development,¹³⁸ drainage of wetlands,¹³⁹ construction of super-highways and dams,¹⁴⁰ biotechnology/bio-prospecting and agri-business techniques,¹⁴¹ over-population,¹⁴² global warming,¹⁴³ and global cultural homogeneity. Given the importance of

¹³⁷As Holmes Rolston III warns, "to continue the developmental pace of the last century for another millenium will produce sure disaster." See, Holmes Rolston III, "Rights and Responsibilities on the Home Planet" (1993) 18 *Yale Journal of International Law* 251; Mulford Sibley, "The Relevance of Classical Political Theory for Economy, Technology and Ecology" (1973-4) 3 *Alternatives* 14; Les Kaufman, "Why the Ark is Sinking" in Kaufman & Mallory, *supra* note 117. See also, Ryan Winter, "Reconciling the GATT and WTO with Multilateral Environmental Agreements: Can We Have Our Cake and eat it Too" (2000) 11 *Colorado Journal of International Environmental Law and Policy* 223.

¹³⁸Peter Victor, "The Environmental Impact of Economic Activity: A Multi-disciplinary View" (1971-3) 1 *Alternatives* 20; Richard Falk, "Toward a World Order Respectful of the Global Ecosystem" (1991-2) 19 *Boston College Environmental Affairs Law Review* 711; Charles Perrings, *Economy and Environment-A Theoretical Essay on the Interdependence of Economic and Environmental Systems* (Cambridge: Cambridge University Press, 1987)

¹³⁹Michael Blumm, "Wetlands Protection and Coastal Planning: Avoiding the Perils of Positive Consistency" (1978) 5 *Columbia Journal of Environmental Law* 69; "People and Wetlands: The Vital Link" 7th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands (Ramsar, Iran, 1971), San Jose, Costa Rica, 10-18 May 1999, Resolution VII.8, Guidelines for Establishing and Strengthening Local Communities' and Indigenous People's Participation in the Management of Wetlands. Online < <http://users.ox.ac.uk/~wgtrr/ram-res.html> accessed on 9/21/99. The irony here is that the so-called developing nations are determined to pursue the same destructive path to "development" as the "developed world." See, "Brazil Will not Let Amazon Become 'Untouchable Sanctuary.'" Reuters News Agency, January 23, 2000, *The Globe and Mail*, 23 January 2000; Robert Carter & David Lasenby, "Values and Ecology: Prolegomena to an Environmental Ethics" (1977) 6 *Alternatives* 39.

¹⁴⁰For example, a 1980 study in Brazil showed that road construction accounted for 26% of deforestation in the Amazon. See, Grainger, "The State of the World's Forests" (1980) 10 *Ecologist* 6.

¹⁴¹Bosselman, *supra* note 89; Walter Reid, ed, *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development*, (1993) at 3.

¹⁴²See generally, Brian Nickerson, "The Environmental Laws of Zimbabwe: A Unique Approach to the Management of the Environment" (1994) 14 *Boston College Third World Law Journal* 189.

¹⁴³See generally, "Climate Change and Biodiversity" IUCN--The World Conservation Union. (September 1998) Report of the Ninth Global Biodiversity, 1997, Kyoto, Japan 1997 (Gland: 1997)

these factors, a few comments on them in their respective capacities is useful for subsequent analysis.

The prevalent concept and practice of economic development is a paradox. Springing from post-Renaissance Calvinist interpretations of Christian doctrines on the work ethic and life made more abundant by production and consumption of material goods, it has virtually pervaded the entire globe. In seeking to create what Kenneth Galbraith has termed the “affluent society”¹⁴⁴ with unprecedented levels of material goods and appetite for consumption, the impact on the environment has been profound. With emphasis on the production of material goods, development in this paradigm is largely measured in terms of effective capacity to produce and consume resources.¹⁴⁵ Hence, the preoccupation with accumulation of wealth as reckoned in Gross National Product (GNP) and Gross Domestic Product (GDP).¹⁴⁶ As the Holy Grail to the good life, virtually all global financial institutions

¹⁴⁴John Kenneth Galbraith, *The Affluent Society* (Boston: The Riverside Press, 1958) See also, R.H. Tawney, *Religion and the Rise of Capitalism* (Baltimore: Penguin Books, 1947)

¹⁴⁵But see, Theo Van Boven, “Human Rights and Development: The UN Experience” in David Forsythe, ed, *Human Rights and Development-International Views* (New York: St Martins Press, 1989) at 121.

¹⁴⁶Kabita Chakma, “Development, Environment and Indigenous Women in the Chittagong Hill Tracts of Bangladesh” in Krattiger, *Widening Perspectives* supra note 38 at 233.[hereinafter, Chakma]. In this context, Marc Williams has argued that , “development is still contained within the capitalist political economy” measured in the rate of consumption, acquisition of wealth and ‘disposable’ income. In this paradigm, the perceived limitations to the continuous consumption of limited global resources is not the finiteness of the resources themselves but and indictment of the ‘present state of technology and social organization.’See Marc Williams & Lucy Ford, “The WTO, Social Movements and Global Environmental Management” in Rootes, ed, at 269.

are propagating this gospel with near-apostolic fervour.¹⁴⁷ More often than not, the results have been less than salutary for the environment.¹⁴⁸ In a sense, this economic and philosophical ideology conflates the exploitation of nature with development.¹⁴⁹

¹⁴⁷Ibrahim Shihata, "The World Bank and the Environment: A Legal Perspective" (1992) 15 *Maryland Journal of International Law and Trade* 1; Sharon Venne, *Our Elders Understand Our Rights: Evolving International Law Regarding Indigenous Rights* (Penticton, British Columbia: Theytus Books Ltd, 1998). According to Vandana Shiva, "the "development" of Brazil by transnational banks and corporations is the primary cause for the destruction of the richness of Amazonian rainforests: the highest expression of life. Natives of Africa and Amazonia had survived centuries with their ecologically evolved, indigenous knowledge systems. What local peoples had conserved through history, Western experts and knowledge destroyed in a few decades, a few years even." See, Shiva, *Staying Alive*, *supra* note 67 at 26.

¹⁴⁸For example, the World Bank supplied 30 per cent of the 1.55 billion USD spent in the "accelerated development" of the Rondonia region of Brazil. The money was spent on building expensive highways through the biodiversity rich Rondonia region to attract agricultural mono-culturists. Some critics argue that the entire project was an unparalleled ecological disaster for the region and for biodiversity. Another example is the Narmada Valley Project. The Narmada is the 1312km long river and India's largest west-flowing river serving over 20 million people for centuries. In the opinion of the World Bank, the Narmada was "least used" and the remedy for this perceived under-use was to build 2 dams across the river, 28 small dams and 3000 other water projects including irrigation projects for industrial farming, pisciculture, *et cetera*. The World Bank was to dole out US\$450 million for the big dams. The environmental impact of this "modernization" project was highlighted and a successful lobby put it in abeyance.

Another World Bank project, the Carajas iron mining project in Brazil burned wood in the smelting process, resulting in massive air pollution and deforestation of the indigenous tribes environment. For further analysis of several World Bank projects, see Bruce Rich, "The Multilateral Development Banks, Environmental Policy, and the United States" (1985) 12 *Ecology Law Quarterly* 685-88; Stephan Schwartzman, *Bankrolling Disasters: International Development Banks and the Global Environment* (San Francisco: Sierra Club, 1986). Ironically, the process of "development" is also fuelled by the policies and indeed, the *raison d'etre* of the World Bank and other influential and powerful "developmental" institutions and multinational corporations. See, Scott Holwick, "Transnational Corporate Behaviour and its Disparate and Unjust Effects on the Indigenous Cultures and the Environment of Developing Nations: *Jota v. Texaco*, a Case Study" (2000) 11 *Colorado Journal of International Environmental Law and Policy* 183.

Recently however, the bank has apparently started to address environmental concerns arising from its "development" projects through the institution of audits and Environmental Impact Assessments (EIAs). See Cindy Buhl, *A Citizen's Guide to the Multilateral Development Banks and Indigenous Peoples* (Washington: The Bank Information Centre, 1994) at 4. See also, Hugo Stokkle, & Arne Tostensen, eds, *Human Rights in Development: Global Perspectives and Local Issues* (The Hague: Kluwer Law International, 1999); Ronald Theodore Libby, *The Ideology and Power of the World Bank* (Ann Arbor, Michigan: Unpublished Doctoral Thesis, 1985).

¹⁴⁹Perhaps, starting from the United Nations Conference on the Human Environment in Stockholm in 1972 and re-emphasised in the report of the World Commission on Environment and Development chaired by Gro Harlem Brundtland of Norway, the direct link between human economic pursuits under the dominant paradigm and the conservation of biological diversity assumed the status of a global creed of sorts. See,

Development as so defined and pursued is the rate at which objects and services are commodified and traded. As Shiva contends, the grand “ideology of western development is in large part based on a vision of bringing all natural resources into the market economy for commodity production.”¹⁵⁰

Conversely, other narrative frameworks of living are considered primitive and poor. That is to say, this paradigm perceives indigenous and local peoples in their self sustaining environment as poor. Yet, most of the significant things in the lives of human beings do not lend themselves to quantitative or economic measurement as in GDPs and GNPs. According to Sara Dillon, “one has a moral responsibility to question the willingness ...to accept GNP and GDP as adequate measures of the material security of most people, despite the fact that these measures tell us little about the way the majority of working people live.”¹⁵¹ As Chakma further notes:

[S]ustainable living, allowing a modest consumption of natural resources, is called poverty...thus the ideology of development views people living within a subsistence economy as poor. They consume organic food grown without the use of chemical

Stockholm Declaration on the Human Environment, supra note 56; World Commission on Environment and Development, *Our Common Future* (1987). [hereinafter, Brundtland Report]; Jeffrey Kovar, “A Short Guide to the Rio Declaration” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 119; Maurice Strong, “Beyond Rio: Prospects and Portents” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 21; Timothy Wirth, “The Road From Rio-Defining a New World Order” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 37.

¹⁵⁰Shiva, *Staying Alive, supra* note 67 at 9. See also, T. De la Court, *Beyond the Brudtland: Green Development in the 1990s* (London: Zed Books, 1990) at 15.

¹⁵¹Sara Dillon, *supra* note 121 at 363. In this context, there has been recent scholarship advocating a replacement of Gross National Product with indicators which take into account social, environmental, and other factors besides transactions with only a monetary value. See also, Kele Onyejekwe, “GATT Agriculture, and Developing Countries” (1993) 17 *Hamline Law Review* 77.

fertilizer and high-tech agricultural tools and methods instead of consuming commercially produced and processed food. They are conceived as poor as they live in self-built houses of bamboo and timber.¹⁵²

Apart from the gargantuan resources needed to attain and sustain the standard and style of living promoted by the use of consumption-index as a measure of development,¹⁵³ it seems that the crucial question is whether the lineal and consumption-driven model of development is capable of sustaining itself. It is remarkable that in this context, studies of traditional peoples' economic systems conducted by the International Institute for Sustainable Development show that among North American indigenous populations, those societies deliberately under-produced and avoided the accumulation of surplus capital so as to increase the resilience of the natural resource base, reduce the risk of resource depletion and thus ensure the survival of the people.¹⁵⁴

Yet, the lineal notion of development marches on full speed into traditional systems which sustain plant diversity marches. The results are often undesirable. As the Brundtland report laments, "it is a terrible irony that as formal development reaches more deeply into rainforests, and other isolated environments, it tends to destroy the only cultures that have proved able to thrive in these environments."¹⁵⁵ Of late, there has been a slight re-thinking

¹⁵²Chakma, *supra* note 146 at 233.

¹⁵³For example, when asked whether he hoped to approximate Britain's standard of living after India achieved independence, Mahatma Gandhi replied: "it took Britain half the resources of the planet to achieve this prosperity; how many planets will a country like India require?" See, De la Court, *supra* note 150 at 15.

¹⁵⁴See, Fran Trippett, *supra* note 32 at 118-120.

¹⁵⁵*Brundtland Report*, *supra* note 149 at 115.

of this paradigm.¹⁵⁶

However, international institutions devoted to economic development continue to pursue policies designed to facilitate the production of surplus economic value,¹⁵⁷ at the expense of marginalized cultures and peoples.¹⁵⁸ For example, the World Bank in a July 1991 study by its Office of Environmental Affairs conceded that its policies and programs have often negatively impacted on the ecology of native peoples and proposed that “the Bank takes a conscious, substantive look at those problems ... which until recently, development planning has not adequately addressed.”¹⁵⁹ In sum, the contemporary ideology of development which squeezes the last drop of sustenance from the earth¹⁶⁰ is the root of the loss of plant species.¹⁶¹ The manifestations and spin-off effects of this regime may be broken down as follows.

¹⁵⁶See, *Declaration of the Hague*, 11th March, 1989, U.N. Doc. A/44/340-E/1989, 28 I.L.M. 1308 (1989) (Noting that “today, the very conditions of life on our planet are threatened by the severe attacks to which the earth’s atmosphere is subjected.”); *The Langkawi Commonwealth Heads of Government Declaration on Environment*, adopted at Langkawi (Malaysia), 21 October 1989, reproduced in (1990) 5 A.J.I.L. 589. See for example, *UN Study on the International Dimensions of the Right to Development*, U.N. Doc.E/CN.4/1334, para.27; *United Nations Declaration on Social Progress and Development* UNGAR 2542 (XXIV) of 11 December 1969) and UNGAR 32/130 of 1977.

¹⁵⁷*Trends in International Environmental Law*, edited by the Editors of the Harvard Law Review, (American Bar Association, America, 1992).

¹⁵⁸Katarina Tomasevski, “The Influence of the World Bank and IMF on Economic and Social Rights” (1997) 66 *Nordic Journal of International Law* 385.

¹⁵⁹See, *World Bank, International Implications for Donor Countries and Agencies of Meeting Basic Human Rights*, 1977 (Unpublished). See also, *World Bank Operational Directive 4.00 Annex A: Environmental Assessment*, 1989. Reproduced in Sands *et al*, *supra* note 79 at 1323.

¹⁶⁰John McIntyre & Daniel Papp, eds, *The Political Economy on International Technology Transfer* (New York: Quorum Books, 1986) at 47. [Hereinafter, McIntyre & Papp]

¹⁶¹See, “The Realisation of the Right to Development” Consultation, Geneva, 8-12 January 1990, HR/PUB/91/2.1991. See also, Report of UNSG Doc E/CN.4/1991/11

2.5.1: The Culture of Consumerism

The phenomenon of consumerism is both a catalyst and a product of the prevailing concept of development. Ecological prudence does not characterize the consumption pattern of most of the world, particularly the North.¹⁶² For example, the United States, representing 6% of the world's population, consumes 30% of the world's mineral production. The consequences for plant habitats are devastating.¹⁶³ According to the 1991 World Development Report, per capita energy consumption in the G-7 nations¹⁶⁴ is at least four times that of the rest of the world. The ruinous consumption pattern in the North and its global implications is probably the greatest threat to the diversity of plants in the South. Using timber as an example, Norman Myers calculated that U.S. consumption of tropical hardwoods increased ninefold between 1950 and 1973. Most of these hardwoods came from forests in South-East Asia chopped down to produce "wooden floors, snack trays, and salad

¹⁶²Recently, the Vice President of the United States re-iterated that "Americans won't sacrifice 'way of life' to conservation." See, "U.S. Won't Cut Energy Use; Produce More-- V.P.Cheney Says" *National Post*, May 1, 2001, at A1. However, a research team at the University of Sao Paulo has shown that the globalization of the American lifestyle with its large homes, numerous appliances and two or three cars per family "would be impossible to sustain." Panjabi, "On the CBD", *supra* note 1 at 214. The average adult American discards 1429 pounds of garbage per annum.

¹⁶³Kevin Jones, "United States Dependence on Imports of Four Strategic and Critical Minerals: Implications and Policy Alternatives" (1988) *B.C. L. Rev.* 217. For example, in order to produce the four million tons of zinc imported into America between 1983 and 1987, 48 billion tons of rock had to be mined, processed and disposed of in Malaysia with terrible impacts on the diversity of plants there. It is the policies and development paradigm of the North which determines the fate of plant diversity. In this context, the concern by the West for the loss of plant resources in the South is considered by some scholars to be insincere. See, Neil Middleton, Phil O'Keefe and Sam Moyo, *The Tears of the Crocodile-From Rio to the Reality in the Developing World* (London, Pluto Press., 1993). Similarly, the United States consumes 25% of the world's energy and emits 22% of all carbon dioxide produced.

¹⁶⁴United States, Japan, Canada, Germany, France, Italy, and Britain. For juridical support, see, *Chapter 5 of Agenda 21, Adopted by the U.N. Conference on Environment and Development (UNCED) at Rio de Janeiro, 13 June 1992. U.N. Doc.A/CONF. 151/26 (vols. 1, II, & III) (1992). [hereinafter, Agenda 21]*

bowls.”¹⁶⁵

The paradox here is that regulation of this unsustainable consumption,¹⁶⁶ is practically in the hands of those who actually benefit most from this regime. As Morris Cohen warned:

[I]t is only a shallow philosophy which would make human welfare synonymous with the indiscriminate production and consumption of material goods. If there is one iota of wisdom in all the religions or philosophies which have supported the human race in the past it is that man cannot live by economic goods alone but needs vision and wisdom to determine what things are worthwhile and what things it would be better to do without. This profound human need of controlling and moderating our consumptive demands cannot be left to those whose dominant interest is to stimulate such demands.¹⁶⁷

2.5.2: Inequitable Global Economic Regime

With respect to the complex problem of the unfair and feudalistic global trading system which partly results in the high debt burden of many impoverished countries of the South and a ruinous pace of loss of forest cover, the statistics are scary. In 1990, the cumulative foreign debt of the South was estimated at \$1.34 trillion, and it is increasing.¹⁶⁸

¹⁶⁵Norman Myers, *The Primary Source* (New York: Norton, 1984). Contemporary data shows that “Haiti, Sri Lanka, El Salvador, Ghana, Nigeria, and Bangladesh have lost all or nearly all of their primary rain forest. Latin America has lost 37% of its tropical forests and Africa has lost fifty-two percent.” See, O’Neill & Sunstein, *supra* note 79 at 98-99.

¹⁶⁶David Takacs, *supra* note 118. See also, Anil Agarwal, “Human-Nature Interactions in a Third World Country” in George James, ed, *Ethical Perspectives on Environmental Issues in India* (New Delhi: A.P.H. Publishing Corporation, 1999) at 31. Agarwal observes that more than a quarter of all Central American forests have been destroyed since 1960 for cattle-ranching. While domestic consumption of beef in Central America has fallen dramatically, between 85-95 per cent of the beef produced is shipped to the United States for hamburgers and pet food. French appetite for peanut oil caused the great Sahelian drought of 1968-74 which claimed more than 100,000 thousand lives in Africa. *Ibid.*

¹⁶⁷Morris Cohen, “Property and Sovereignty” (1927-8) *Cornell Law Quarterly law* 30.[hereinafter, Cohen]

¹⁶⁸See, O’Neill & Sunstein, *supra* note 79.

According to O'Neill and Sunstein, the ratio of debt to gross national product was recently 111% for the low-income countries and interest payment on these debts are crippling.¹⁶⁹ The net effect is that poor countries of the South pay far more than they receive as "foreign aid" in servicing the monumental debts. Much of the debts in question were acquired under era of illegitimacy of governance and arms race¹⁷⁰ which marked the age of Cold War.

Indeed, some experts believe that "even after deducting all forms of World Bank and IMF aid and other government and private bank funding, there is a net cash flow of 50 thousand million US dollars each year from the poorest nations of the world to the richest nations."¹⁷¹ This phenomenon is partly a function of the effects of colonial and neo-colonial structures underpinning modern global trade. In this context it should be noted that the colonial powers in Africa, Asia, and Latin America basically designed the colonies as suppliers of plant "raw materials" such as timber, cocoa, tea, coffee and other so-called "cash crops." The direct effect of this paradigm in the post-colonial era is that the South, which harbours a majority of the earth's plant diversity, was, more or less, organized to feed the

¹⁶⁹O'Neill & Sunstein, *ibid*; Walther Lichem, "From North-South to One World: The Challenge for Europe" (1988) 36 *European Yearbook* 44; Stephen Vosti & Thomas Reardon, eds., *Sustainability, Growth and Poverty Alleviation-A Policy and Agro-ecological Perspective* (Baltimore: The John Hopkins University Press, 1997) at xviii.

¹⁷⁰John Williamson, "The Outlook for Debt Relief or Repudiation in Latin America" (1986) 2 *Oxford Review of Economic Policy* 1; George Ayittey, "How the Multilateral Institutions Compounded Africa's Economic Crisis" (1999) 30 *Law and Policy in International Business* 585.

¹⁷¹For an excellent analysis of the North-South divide on these issues, see Raneer Panjabi, "The South and the Earth Summit: The Development/ Environment Dichotomy" (1992) 11 *Dickinson Journal of International Law* 77 at 88; Raneer Panjabi, *The Earth Summit at Rio-Politics, Economics, and the Environment* (Boston: Northeastern University Press, 1997)

industrial machineries and factories of the North.

Hence, forests are cleared feverishly and mindlessly ravaged to plant and harvest “cash crops” which are sold at ridiculously low prices to the North (largely fixed by multinational corporations based in the North) in order to purchase finished goods and service a huge debt portfolio of a Sisyphean disposition.¹⁷² Interestingly, while the South ravages its forests to to expand the scope of mono-cultural “cash crop” farming,¹⁷³ the industrial entities of the North continue to benefit from the inescapable low price of commodities. In effect, a vicious cycle of environmental massacre continues unabated¹⁷⁴ with unrelieved poverty and a debt crisis¹⁷⁵ as some of the obvious products.¹⁷⁶ It may not be out

¹⁷²The literature on this is immense. According to O’Neill & Sunstein, “in 1987 to 1988, primary, non-fuel commodities comprised 39.3% of exports from severely indebted middle-income countries and 52.5% of exports from severely indebted low-income countries.” O’Neil & Sunstein, *supra* note 79, *ibid*. There are varied estimates on the extent of forest cover left. See, Matthew Royer, “Halting Neotropical Deforestation: Do the Forest Principles Have What It Takes?” (1996) 6 *Duke Environmental Law and Policy Forum* 105.

¹⁷³Nathalie Chalifour, “Global Trade Rules and the World’s Forests: Taking Stock of the World Trade Organization’s Implications for Forests” (2000) 12 *The Georgetown International Environmental Law Review* 575.

¹⁷⁴Between 1980 and 1989, commodity prices declined 33% and there has not been any noticeable improvement in prices. *Ibid*. See also, Todd Johnston, “The Role of International Equity in a Sustainable Future: The Continuing Problem of Third World Debt and Development” (1998) 6 *Buffalo Environmental Law Journal* 35. [hereinafter, Johnston]

¹⁷⁵Various suggestions including debt forgiveness, debt-for-nature swap, debt-for-equity-swap, *et cetera* have been proposed as possible solutions to this crisis. See, Catherine Fuller & Douglas Williamson, “Debt-for-Nature Swaps: A New Means of Funding Conservation in Developing Nations” (1988) 11 *International Environmental Reporter* 301.

¹⁷⁶Sara Dillon, *supra* note 122 at 366. For further analysis of the prevailing trading order see, Batram Brown, “Developing Countries in the International Trade Order” (1994) 14 *Northern Illinois University Law Review* 347; Bradley Boyd, “The Development of a Global Market-Based Debt Strategy to Regulate Lending to Developing Countries” (1988) 30 *Georgia Journal of International and Comparative Law* 461. To further exacerbate the crisis, the World Bank has long been engaged in creating “export-based” economies for the economies of the biodiversity-rich countries of the South.

of place to speak of a new form of feudalism in defining this relationship between the corporate powers of the North and the farming populations of the South. According to Obiora

Okafor:

[A] global neighborhood in which about 20% of the population (the North) control and enjoy about 80% of its resources, whilst the other 80% of the population (the South) control and enjoy less than 20% of the said resources...[is] an international society exhibiting essential forms of medieval feudalism.¹⁷⁷

Neo-feudalism aside, the impact of loss of forest cover on plant diversity is profound. Prior to the era of human pastoral existence, it has been estimated that global forest cover ranged from five billion hectares to 6.2 billion hectares. Today the original grand figure of 5-6 billion hectares has shrunk to 3.4 billion and the size is still shrinking at an annual rate of 0.3%. Without a doubt, all pertinent statistics indicate an absolute decline in global forest cover.

The magnitude of the problem has not been reflected in international juridical or normative efforts to address the problem. In 1983, the International Tropical Timber Agreement (ITTA),¹⁷⁸ a weak “commodity” instrument designed to deal with with the conservation and management of forests was signed. The ITTA agreement (revised in 1994), with its bias for the timber harvesting industry has thus not really salvaged global forests

¹⁷⁷Obiora Chinedu Okafor, “The Status and Effect of the Right to Development in Contemporary International Law: Towards a South-North “Entente” (1995) 7 *RADIC* 865. See also, Jan Tinbergen, *Rio-Reshaping the International Order—A Report to the Club of Rome* (New York: E.P. Dutton, 1976)

¹⁷⁸International Tropical Timber Agreement 1994. Available online >sedac.ciesin.org/entri/texts/ITTA.1994. Accessed on 26/11/01. See also, Canadian Council on International Law, *Global Forests and International Environmental Law* (Boston: Kluwer Law, 1996) at 361; Brian Johnson, “Responding to Deforestation: An Eruption of Crisis—An Array of Solutions” (Washington, D.C: World Wildlife Fund and the Conservation International, 1991).

since it took provisional effect on 1st April 1985. The ITTA establishes the International Tropical Timber Organization (ITTO) which seems to be polarized along North-South lines with the inescapable inequities. In spite of the weaknesses in and mercantilist bent of the ITTA, the 1992 United Nations Conference on Environment and Development (UNCED) “failed to produce a legally binding convention and had to settle with an Authoritative Statement of Forest Principles.”¹⁷⁹ The United Nations’ Commission on Sustainable Development (CSD) and Economic and Social Council (ECOSOC), have respectively established the Inter-governmental Panel on Forests (IPF) and the ad-hoc open ended Inter-governmental Forum on Forests (IFF).

These initiatives have culminated in the subsidiary body of the ECOSOC on forests known as the United Nations Forum on Forests (UNFF) established on October 18, 2000.¹⁸⁰ In spite of these international initiatives, it seems that the forest regime, if any, lacks policy coherence regarding an enabling international environment. In addition to international juridical paralysis or weakness on the forest front, the influence of the ITTO and IITA are severely limited because extraction of timber barely tells the whole story behind

¹⁷⁹David VanderZwaag & Douglas Mackinlay, “Towards a Global Forests Convention: Getting Out of The Woods and Barking Up The Right Tree” in Canadian Council on International Law, *Global Forests and International Environmental Law* (Boston: Kluwer Law, 1996) at 1. See also, *Non-Legally Binding Authoritative Statement of Principles for a Global Consensus on the Management, Conservation, and Sustainable Development of all Types of Forests*. Adopted by the UN Conference on Environment and Development at Rio de Janeiro, 13 June 1992. U.N. Doc. A/CONF. 151/26 (Vol. III) (1992), *reprinted in* 31 I.L.M. 881 (1992).

¹⁸⁰ECOSOC Resolution, E/2000/L/32, Resumed Substantive Session of 2000, New York. See also, Report of the Inter-governmental Forum on Forests on Forests, E/CN.17/2000/14 of March 2000. For a broad treatment of the problems associated with the global forest regimes, see, Canadian Council on International Law, *Global Forests and International Environmental Law* (Boston: Kluwer Law, 1996), *ibid*.

deforestation. Factors responsible for loss of forest cover include ranching, mono-cultural farming, hydropower, domestic use of wood for charcoal and firewood. Deforestation would thus require a holistic solution.

2.5.3: Overpopulation

Paul and Anne Erlich, leading population experts, write that the explosive growth of the human population is “the most significant terrestrial event of the past million millennia ...No geological event in a billion years ...has posed a threat to terrestrial life comparable to that of human overpopulation.”¹⁸¹ The increase in human population is not necessarily evenly spread across the world. For instance, the average woman in the North bears two children, whereas her counterpart in the South has between six and eight. The result is that 90% of the world’s population growth is occurring in the developing world.¹⁸²

The politics and economics of population control is complex and mere reductions of number per se would not address the issue. For example, serious concerns have recently been expressed in Japan, Russia, Sweden, Canada and other parts of the North on the declining domestic human population. In some cases, generous economic incentives geared towards reversing that trend have been instituted. Moreover, population increase or decrease does not resolve the question. There are issues of age distribution, skills of the members of the

¹⁸¹Henry Steck, “Power and the Liberation of Nature: The Politics of Ecology” ((1971-2) | *Alternatives* 4. [hereinafter, Henry Steck] See also, Anup Shah, *Ecology and the Crisis of Overpopulation-Future Prospects for Global Sustainability* (United Kingdom: Edward Elgar, Cheltenham, 1998).

¹⁸²O’Neill & Sunstein, *supra* note 79 at 102. See generally, *Chapter 5 of Agenda 21*, *supra* note 164.

populations, land space of states and other factors which bear on the desired direction of growth of various states. More importantly, there is the question of appetite for consumption of material goods and services which may impose greater strain on the environment than mere numbers of population. As Henry Steck has argued:

[T]o focus only on a growing population as the chief villain as many are inclined to do is to ignore the impact of an economic system where both consumer wants and economic incentives for the producer create a combined drive for production at the lowest cost and for higher consumption...even should a stationary state economy, or zero population growth be achieved, therefore, the question of the distribution of resources would remain on the agenda of uncompleted business between have and have-not nations internationally and have and have-not social strata within nations.¹⁸³

According to Joel Cohen “the effects of human population on conservation depends strongly on economic and social factors as well as on human numbers, density, and growth rates.”¹⁸⁴

The ratio of consumption between the North and the South is 61:1 and studies show that on the average, a Swiss consumes 40 times as much as his/her Somalian counterpart.¹⁸⁵ Indeed, “15 per cent of the world’s population in the richest countries enjoy 79 per cent of the world’s income.”¹⁸⁶ Therefore, it is not enough to pursue an aggressive and simplistic

¹⁸³Henry Steck, *supra* note 181 at 8.

¹⁸⁴Joel Cohen, “Conservation and Human Population Growth: What are the Linkages?” in S.T.A Picket, *et al.*, (eds.), *The Ecological Basis of Conservation: Heterogeneity, Ecosystems, and Biodiversity* (New York: Chapman & Hall, 1997)

¹⁸⁵See also, Shekah Singh, “Sovereignty, Equity and the Global Environment” in George James, ed, *supra* note 166 at 131. Shekah also notes that the attention placed on the population of the South is misplaced as one person from the North consumes as much as 40 people from the South. See also, Andrew Ringel, “The Population Policy Debate and the World Bank: Finitude v. Supply-Side Demographics” (1993) 6 *Georgetown International Environmental Law Review* 213.

¹⁸⁶Cohen, *supra* note 184 at 33. See, *Statement by Dr. Mahathir Mohammad, Prime Minister of Malaysia*, UNCED, Rio, June 13, 1992.

campaign of population control without adequate considerations of the effects of age distribution and consumption patterns among a given population.

2.5.4: Agri-Business, Bio-prospecting and Biotechnology

The industrialization of agriculture has wrought tremendous havoc on plant species diversity. Industrialized agriculture involves the destruction of plant habitat to create “a conveyor-belt” mechanism for intensive animal husbandry and agriculture. It also relies heavily on plant mono-cultures for greater profitability and avoidance of “economic inefficiencies” associated with diversity of crop species on a farm. It is estimated that at least 38 per cent of the loss of forest cover in the Amazon is attributed to ranching and agri-business. The irony here is that industrial agriculture *is* in fact an uneconomical method of farming. For example, raising one million dollars worth of cattle for market requires the destruction of one hundred square kilometers of Amazonian forest. In comparison, extracting one million dollars worth of rubber destroys only 6.8 square kilometers of Amazonian forest.”¹⁸⁷

In addition to the degradation of the land by intensive agricultural farming¹⁸⁸ this

¹⁸⁷Newman, *supra* note 11 at 489. Jeffrey McNeely, *Economics and Biological Diversity: Developing and Using Economic Incentives to Conserve Biological Resources* (IUCN: Gland, Switzerland, 1988) at 49. See also, Ghilleen Prance, in Kaufman & Mallory., eds, *supra* note 117 at 80.

¹⁸⁸In the United States, this partly caused the American Dust Bowl of the 1930's ably depicted in John Steinbeck's classic, *The Grapes of Wrath*.

regime encourages the narrowing of the genetic base of agriculture.¹⁸⁹ For example, the excessive commodification of potato in the United States of America has reduced the cultivars there to only 12 out of the over 2,000 varieties known to humanity. In fact, 40% of the potatoes cultivated in America are one variety, the Russet Burbank. This is because, industrial food processors such as the McDonald corporation and McCain need the Russet Burbank for its size. Forty per cent of all McDonald “fries” must be two to three inches long, another 40% must be over three inches; and the remaining 20% can be under two inches: the Russet Burbank perfectly meets this marketing requirement.¹⁹⁰ This phenomenon drives other species of potatoes into the margins.

This is further fueled by intellectual property rights, such as patents and plant breeders rights (PBRs) on plants. A report by the CBD Secretariat indicates that since the era of strong intellectual property rights over plant varieties, “vast numbers of traditional crop varieties have disappeared.”¹⁹¹ Intellectual property rights over plants sometimes often act as perverse incentives. They may encourage the development of only “commercially viable” plant varieties at the expense of plant genetic diversity. They may also encourage the excessive commercialization of a few plant varieties, thus pushing other plant varieties into

¹⁸⁹Vandana Shiva, *The Violence of the Green Revolution* (Zed Books Ltd., London, 1991) [hereinafter, Shiva, *Green Revolution*]

¹⁹⁰Shiva, *Green Revolution*, at 203.

¹⁹¹UNEP/CBD/COP/3/22, Sept. 22, 1996 at 12.

disuse and extinction.¹⁹²

Furthermore, recent studies confirm that the regime of agri-business based on narrow genetic base is the single biggest threat to plant species diversity. According to *Conservation International*, this factor “is far surpassing logging, mining and slash and burn agriculture”¹⁹³ as agents in destroying plant species and genetic diversity. It seems that the lessons of history have been lost here. It was the rise and pervasiveness of industrialized agriculture which largely drove into extinction, the plant species diversity of traditional European crops. For example, 97% of the vegetable varieties sold by commercial seed houses in the United States at the beginning of the century are now extinct, as are 87% of the pear and 86% of the apple varieties.¹⁹⁴

Adding strength to this narrowing of plant species and genetic diversity is the twin-process of bio-prospecting and biotechnology. Virtually “all the major pharmaceutical firms are already at work screening the genetic resources found in Brazil, Costa Rica, China, Micronesia and other biologically diverse countries.”¹⁹⁵ However, it is becoming clear that

¹⁹²The Green Revolution refers to the unprecedented increase in wheat yield as a result of the discovery made by Norman Borlaug that a wheat variety known as Norin 10, when crossed into some Mexican wheat lines produced a dwarfed wheat strain which responds dramatically to heavy fertiliser application. The impact of this discovery was so radical that it affected the food supply of one quarter of the global human population and earned Borlaug a Nobel prize for peace. Tilford, *supra* note 136 at 393.

¹⁹³*Conservation International News*, Vol. 5 # 1, Spring 2000 at 3.

¹⁹⁴Cary Fowler & Pat Mooney, *Shattering: Food, Politics and the Loss of Genetic Diversity* (Tucson: The University of Arizona Press, 1990) at 63.

¹⁹⁵*Biodiversity Prospecting: Using Genetic Resources for Sustainable Development* (Washington: WRI, 1993); Judith Jones, “Regulating Access to Biological and Genetic Resources in Australia: A Case Study of Bioprospecting in Queensland” (1998) 5 *The Australasian Journal of Natural Resources Law and Policy* 89.

the screening process used to evaluate the economic and industrial utility of plants exacts a huge toll on plant species and the ecosystem as a whole; sometimes leading to the extinction of rare plant species.¹⁹⁶

This is because most plant-derived drugs are too complex in their chemical structure to be synthesised in laboratories. Therefore, the trees which produce them must be “harvested.” As a Glaxo spokesman noted, “it is hard to find a chemist that can compete with nature.”¹⁹⁷ In scouring the forests for complex plant-derived chemicals, plant species could be easily decimated. For example, the production of one kilogram of taxol (an anti-cancer drug made from the *Pacific Yew* tree) requires 20,000 pounds of bark, or 2500 to 4000 *Pacific Yew* trees.¹⁹⁸ Similarly, alkaloids like vincristine and vinblastine derived from the Madagascar rosy periwinkle used for the treatment of childhood leukemia and Hodgkin’s disease must be extracted from the plants which produce them. In this case, large amounts of the rosy periwinkle have to be used to produce the alkaloids. For example, fifteen tons of rosy periwinkle leaves yields one ounce of vincristine. This alkaloid sold in 1991 for \$100,000 per pound. As a result of the high demand for the plant, the entire native rosy

¹⁹⁶Edgar Asebey & Jill Kempenaar, “Biodiversity Prospecting: Fulfilling the Mandate of the Biodiversity Convention” (1995) 28 *Vanderbilt Journal of Transnational Law* 703. [Hereinafter, Asebey & Kempenaar]. But see, John Adair, “The Bioprospecting Question: Should the United States Charge Biotechnology Companies for the Commercial Use of Public Wild Genetic Resources” (1997) 24 *Ecology Law Quarterly* 131.

¹⁹⁷Christopher Hunter “Sustainable Biosprospecting: Using Private Contracts and International Legal Principles and Policies to Conserve Raw Materials” (1997) 25 *Environmental Affairs* 129. [hereinafter, Christopher Hunter]

¹⁹⁸Doremus, *supra* note 8.

periwinkle habitat in Madagascar has been depleted.¹⁹⁹

In another dramatic case, a kilogram of twigs, barks and fruit from a Malaysian gum tree yielded a chemical capable of blocking the HIV-1 virus in human immune cell in a laboratory. When this was realized and the scientists went back to Malaysia, the plant specie had disappeared.²⁰⁰ Even the much-publicized Merck-Inbio agreement is a threat to plant species diversity in Costa Rica. As Asebey & Kempenaar have noted:

[I]nbio contracted to supply Merck roughly 2000 natural products extracts for screening, yet Merck's annual through-put²⁰¹ is far greater. Merck's screening equipment requires at least 5,000 samples per week to operate efficiently and it is not uncommon for United States pharmaceutical companies such as Merck to have a weekly through-put of 10,000.

Thus, the indiscriminate screening of plant materials for pharmaceutical commercialization, otherwise called gene-rush, has depleted and in some cases driven plant species into extinction.²⁰² With regard to biotechnology,²⁰³ there is mounting evidence that it positively contributes to the spread of genetic uniformity in agriculture and the concomitant loss of crop

¹⁹⁹Newman, *supra* note 11 at 482. The pharmaceutical giant, Eli Lilly now has farms in Texas where it cultivates rosy periwinkles. See, Naomi Roht-Arriaza, "Of Seeds and Shamans: The Appropriateness of the Scientific and Technical Knowledge of Indigenous and Local Communities" (1996) 17 *Michigan Journal of International Law* 940.

²⁰⁰Newman, *ibid.*

²⁰¹This refers to the number of samples that a laboratory can screen for bioactivity in any given period. See Christopher Hunter, *supra* note 197.

²⁰²*Population, Environment, and Development in Tanzania* (United Nations, New York., 1993). In one particularly egregious case, the entire adult population of *maytenus buchananni*- source of the anti-cancer compound *maytansine* was harvested when a mission sponsored by the United States National Cancer Institute collected 27,215 kg in Kenya for testing in its drug development programme.

²⁰³This is dealt with in Chapter 4.

genetic diversity.²⁰⁴

2.5.5: Climate Change and Plant Diversity Loss

There is mounting evidence that the world's average temperature has been increasing rather rapidly. The atmosphere has been warming up at about .3 to .6 degrees centigrade on average and .8 degrees centigrade on the land for the last decade. It is conservatively estimated that the global temperature will increase by 1 degree to 3.5 degrees centigrade over the next 100 years.²⁰⁵ Although these figures seem fractional, their import may be quite radical. For example, "even a 1 degree centigrade change is a rate unprecedented over the last ten thousand years."²⁰⁶

Although the distinction between natural variability of the global climate and human-induced change has not been drawn with mathematical exactitude, there is growing consensus that human activities, indeed, industrial activities and bush-burning, have an influence on global climate, particularly, the so-called greenhouse effect of some gases

²⁰⁴Stenson & Gray, *supra* note 96 at 38.

²⁰⁵IUCN-- The World Conservation Union, October 1999. *Report of the Eleventh Global Biodiversity Forum: Exploring Synergy Between the UN Framework Convention on Climate Change and the Convention on Biological Diversity* (Gland: IUCN) at 7. This estimate is indeed very conservative. Latest estimates are much higher.

²⁰⁶IUCN, 1997 Kyoto, *supra* note 143 at 19. See also, *Convention on the Protection of the Ozone Layer*, 22 March 1985, Vienna. 26 I.L.M. 1529 (1987). Since 1860, the ten warmest years in recorded history occurred within 15 years.

released into the atmosphere.²⁰⁷ The consequences of this change on plant diversity may be severe. Apart from the more dramatic “acid rain”, there is mounting evidence that some parts of Africa and Asia are getting drier while other areas are getting wetter with the concomitant droughts and floods and eventual devastation of plant habitats. In 1998 for example, *El Nino* spawned forest fires in Indonesia and Brazil, drought in Guyana and Papua New Guinea, and flooding in China, Bangladesh, Ecuador, Peru and Kenya.²⁰⁸ Notwithstanding the United Nations Framework Convention on Climate Change in 1992,²⁰⁹ the impact of global temperature increase on plants is a matter of unresolved complexity.

2.5.6: Cultural Homogenization

As already noted, cultural diversity and plant diversity are linked in numerous ways.²¹⁰ This linkage is becoming increasingly undermined by emerging forces of global cultural homogenization. As the dominant concept of development pervades the globe,

²¹⁷Another significant contributor to the greenhouse effect is the petroleum sector. See, *Biodiversity and the Petroleum Industry— A Guide to the Biodiversity Negotiations* (London: IPIECA, 2000)

²¹⁸IUCN, 1997 Kyoto, *supra* note 143 at 20. Increases in global temperature also cause rises in the ocean volumes, thus submerging coastlines and wetlands with their plant diversity such as mangroves.

²¹⁹*United Nations Framework Convention on Climate Change*, concluded at Rio de Janeiro, 29 May 1992. Entered into force 21 March 1994. 31 I.L.M. 849 (1992). It has been signed by 154 governments. The Convention remains inoperative. On December 11, 1997, delegates from 160 nations agreed to the Kyoto Protocol to the Climate Convention which calls for the first ever legally binding commitments to reduce carbon dioxide and other greenhouse gases. See, Rane Panjabi, “Can International Law Improve the Climate? An Analysis of the United Nations Framework Convention on Climate Change Signed at the Rio Summit in 1992” (1993) *North Carolina Journal of International Law and Commercial Regulation* 491.

²¹⁰Simone Bilderbeek, *et al*, eds, *Biodiversity and International Law-The Effectiveness of International Environmental Law* (Amsterdam: IOS Press., 1992) [hereinafter, Bilderbeek]

marginalized cultures and the concomittant plants which support them face imminent extinction. Essentially, industrial processes thrive on streamlining methods of production. As Timothy Swanson has argued, industrial human society craves standardisation.²¹¹ Hence, the existence of variety of processes and narrative frameworks is perceived as economically “wasteful.”

As “market forces” determine which plants and the supporting human cultures live or thrive, the implicit assumption is that the market is omniscient and therefore knows best. There are serious problems with this logic. First, there is the inbuilt cultural bias of the so-called free market. In other words, when the so-called free-market is used as the divining rod for plant resources, it is simply an euphemism for a culturally-biased judgment of which plants and the supporting human cultures would perish. Second, assuming but not conceding that the utilitarian conception of plants is sound, it is a well-known fact that modern human knowledge of the utility of plants is at best marginal. A substantial number of plants have not yet been fully appreciated for their utilitarian value. Thus, the wisdom of the free-market in this case is merely the institutionalization of cultural prejudices and a valorization of ignorance.

Although there is a growing consensus that indigenou and traditional practices are often better attuned to ecological preservation,²¹² it is equally true that in the name of

²¹¹Timothy Swanson, *Global Action for Biodiversity* (London: Earthscan Publications Ltd, 1997) [hereinafter, Swanson, *Biodiversity*]

²¹²See, Article 8 (j) of the CBD, *supra* note 1.

development and civilization, well-meaning but, perhaps misguided governmental agencies and missionaries are busy all over the world trying to assimilate indigenous and traditional peoples into a homogenized Eurocentric culture. Thus, in addressing the problem of plant diversity erosion and extinction, there is the need for a long and hard look at the biases towards cultural uniformity. It may be necessary for human systems of knowledge and institutions to become more tolerant of heterogeneity. As Swanson has warned:

[T]here cannot be plant diversity without cultural and developmental diversity. The West must learn to recognise and accept the fact that there are other viable regimes of development apart from theirs and the South must have the courage to stand up and affirm the merit and credibility of their contributions to human development.²¹³

Thus, it is not only plants that are being crushed into extinction by this process but traditional peoples and their time-proven ways of life face the threat “of being civilized into extinction.”²¹⁴ The loss of knowledge of the uses of plant resources associated with this homogenization of culture is impossible to evaluate. Local, traditional and indigenous dietary patterns are rapidly changing, leaving profound negative impacts on the sustainability of various agricultural crops which, hitherto, supported and nourished traditional and indigenous cultures and civilizations. For example, Africa has more native cereals than any other continent. It has its own species of rice, as well as finger millet, pearl millet, sorghum,

²¹³Timothy Swanson, *supra* note 211 at 5.

²¹⁴Curtis Horton, “Protecting Biodiversity and Cultural Diversity Under Intellectual Property Law: Toward a New International System” (1995) 10 *Journal of Environmental Law and Litigation* 1 at 4. [hereinafter, Horton] In Brazil alone, one Indian ethnic group disappears each year. This process has continued since 1900. At least, “90 percent of the 6,000 languages now being spoken are expected to die out within roughly 100 years.” *Ibid.* Another obvious consequence is an incalculable loss of knowledge spanning millennia. See also, *The Declaration of Belem*, Online<<http://users.ox.ac.uk/~wgtrr/belem.htm> accessed on 9/2/99.

tea, guinea-corn, millet and several dozen wild cereals whose grains have been eaten and cultivated for thousands of years.²¹⁵ Over 2,000 native grains, roots, fruits and other plants of Africa which have fed people for thousands of years have been ignored by mainstream agriculture to the detriment of the local species.²¹⁶

2.6: International Environmental Law and the Challenge of Loss of Plant Life Forms

In the light of the rapid diminution of plant life forms, international law has in the past decades attempted to formulate a legal response.²¹⁷ Critics may label this a post-industrial concern,²¹⁸ but since the late 1800's the environmental impact of consumerism started to engage the attention of thinkers in the North.²¹⁹ With respect to plants, in 1929, the health of plants occupied the attention of European states.²²⁰ Apart from the initiatives of

²¹⁵For further analysis of the linkage between culture and plant diversity, see D.M. Warre, Slikkerveer, L.J and D. Brokensha, eds., *The Cultural Dimensions of Development : Indigenous Knowledge Systems* (London: Intermediate Technology Publications); Daniel Sitarz., ed. *Agenda 21: The Earth Summit Strategy To Save Our Planet* (Boulder, Colorado: Earth Press, 1993)

²¹⁶*Lost Crops of Africa: Grains*, vol. 1.(Washington: National Academy Press., 1996)

²¹⁷For an account of legislative intervention in African natural resources, see Victor Orsinger, "Natural Resources of Africa: Conservation by Legislation" (1971-73) 5 *African Law Studies* 29.

²¹⁸Daniel Esty, *Greening the GATT: Trade, Environment, and the Future* (Washington: Institute for International Economics. 1994)

²¹⁹P. Van Heijnsbergen, *International Legal Protection of Wild Fauna and Flora* (Amsterdam: Ohmsha Press, 1997) [hereinafter, Heijnsbergen] It is a matter of philosophical conjecture whether the current trend has given rise to the phenomenon of "biojurisprudence" as some scholars would posit. See, Roman Tokarczysk, "Biojurisprudence: A Current in Jurisprudence" (1996) 7 *Finnish Yearbook of International Law* 341.

²²⁰*International Convention for the Protection of Plants*, 1929, 126 L.N.T.S. 305)

1929 and 1951,²²¹ which largely focused on phytosanitary health, the existence in international law of a general principle of conservation in the field of flora must be inferred by induction from a sequence of international legal instruments.²²²

This thesis is anchored on the provisions of such international instruments specifically, the *Convention on Nature and Wildlife Preservation in the Western Hemisphere* of 1940,²²³ the 1968 *African Convention on Nature and Natural Resources*,²²⁴ the *Convention Relative to the Preservation of Fauna and Flora in their Natural State*,²²⁵ the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*,²²⁶ which all provide for and acknowledge the need for the preservation and conservation of plant diversity.

Similar provisions are contained in “soft law” international legal instruments such as the Stockholm Declaration,²²⁷ the Rio Declaration²²⁸ and the World Charter for Nature of 1982.²²⁹ Therefore, with respect to international law on conservation, there is sufficient

²²¹*International Plant Protection Convention, of December 5, 1951*, reprinted in, 150 U.N.T.S. 67.

²²²See, Ian Brownlie, *Principles of Public International Law* (Oxford: Clarendon Press, 1982) at 19.

²²³*Supra* note 115.

²²⁴*Supra* note 58.

²²⁵*Supra* note 110.

²²⁶*Convention on International Trade in Endangered Species of Wild Fauna and Flora*, March 3, 1973, 993 U.N.T.S. 243.

²²⁷*Supra* note 56.

²²⁸*Supra* note 55.

²²⁹*Supra* note 60. See also, Gurdip Singh, *Global Environmental Change and International Law* (New Delhi: Aditya Books Limited, 1991)

evidence of uniformity, consistency, generality and extensiveness in the acceptance of the legal norms on protection, conservation and preservation of plant life forms.²³⁰ Furthermore, prior to the CBD era, it is fair to say that the preservation and conservation principle occurred primarily in the preamble of international conventions and in their articles, thus forming the heart of the treaty and not an exception thereto.

As Hall had argued, introductory clauses in treaties are sources of international customary law.²³¹ Article 31 of the Vienna Convention on the law of treaties lends weight to this view as it obliges States to take into account preambular provisions in the context of construing treaties.²³² Moreover, as Heijnsbergen has pointed out, “the preservation principle generally concerns treaties of a law-making character rather than contractual treaties, which character makes them more suitable to generate customary law.”²³³

R.R. Baxter²³⁴ and Ian Brownlie²³⁵ are also of the considered view that a treaty to which a substantial number of states are parties is powerful evidence of customary law. Constant recitation of principles (such as the preservation principle) in treaties is a material

²³⁰Heijnsbergen, *supra* note 219 at 67.

²³¹See, W.E. Hall, *A Treatise on International Law* (London: Butterworth, 1977) at 41.

²³²Article 31 (2), *Vienna Convention on the Law of Treaties*, 1155 U.N.T.S. 331.

²³³Heijnsbergen, *supra* note 219 at 76.

²³⁴R.R. Baxter, “Multilateral Treaties as Evidence of Customary International Law” (1965-66) 41 *B.Y.I.L.* 278.

²³⁵Ian Brownlie, *Principles of International Law* (Oxford: Clarendon Press, 1979) 7.

source of international customary law.²³⁶ Accordingly, by a combination of repetitions in preambles and wide state acceptance of the principle of plant conservation, it is correct to say that prior to the CBD, international law, at least in principle, provided for the conservation of plant life forms.

Given that the *International Treaty on Plant Genetic Resources for Food and Agriculture*, adopted by the Food and Agriculture Organization (FAO) Conference on 3 November 2001 has not been ratified by states nor come into effect, the Convention on Biological Diversity, (CBD) is without a doubt the most significant and comprehensive international instrument regulating the use and conservation of plants. In the light of the template shifts in the jurisprudence on plant life forms attributed to the CBD, it is pertinent at this stage to explore some of the major juridical and normative innovations introduced by it.

²³⁶Georg Schwazemberger, *Manual of International Law*, Vol. 1 (London: Stevens and Sons, 1960) at 286; P. Birnie & A.E Boyle, *International Law and the Environment* (Oxford: Clarendon Press, 1992) at 487; M.J. Glennon, "Has International Law Failed the Elephant?" (1990) 84 *American Journal of International Law* 30.

2.7: The Convention on Biological Diversity and the Evolving Regime on Plants²³⁷

The Convention on Biological Diversity²³⁸ is probably the most detailed and important juridical initiative on the conservation, sustainable use and equitable sharing of the benefits of plant life forms and plant-based traditional knowledge. Although the true meaning and import of the CBD²³⁹ is still in a state of flux, the general refrain seems to be that the CBD marks a historical commitment by all the nations of the world to “conserve biological resources, to use biological resources sustainably and to share equitably the benefits arising from the use of genetic resources.”²⁴⁰ The CBD itself leaves no doubts as to its objectives.

Article 1 of the CBD states that:

[T]he objectives of the Convention, to be pursued in accordance with its relevant provisions, are the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights

²³⁷This section deals only with those aspects of the CBD which bear upon the issues raised in this thesis, particularly, access to plant resources, equitable sharing of the benefits of plant resources and the general implications of the international patent system on plants and plant-based traditional knowledge. For a general overview and analysis of the CBD, see, Cyrille de Klemm & Clare Shine, *Biological Diversity Conservation and the Law—Legal Mechanisms for Conserving Species and Ecosystems* (Gland: IUCN, 1993) [hereinafter, Klemm & Shine]

²³⁸CBD, *supra* note 1. For a negotiating account of the CBD, see Melinda Chandler, “The Biodiversity Convention: Selected Issues of Interest to the International Lawyer” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 141. [hereinafter, Chandler]. Compare with, *International Treaty on Plant Genetic Resources for Food and Agriculture*, adopted on 3 November 2001. Available online >fao.org/ag/cgrfa/IU, accessed on 26/11/01.

²³⁹Lyle Glowka, *et al.*, eds., *A Guide to the Convention on Biological Diversity* (Gland, Switzerland: IUCN, 1994) at 1. [hereinafter, Glowka]

²⁴⁰Glowka, *supra* at ix; Francoise Burhenne-Guilmin & Susan Casey-Lefkowitz, “The Convention on Biological Diversity: A Hard Won Global Achievement” (1992) 3 *Yearbook of International Environmental Law* 44.

over those resources and to technologies, and by appropriate funding.²⁴¹

The character of the CBD however shows it leaves much latitude to states as to how they may achieve its goals. As such the convention imposes few specific obligations on states or well-defined targets to be met or fulfilled.²⁴² The CBD originated from the efforts of the World Conservation Union-IUCN in the 1980's to articulate a global convention for the protection of biological diversity.²⁴³ In 1987, the United Nations Environment Programme (UNEP) Governing Council recognized the need for a convention to rationalize the various treaties with provisions bearing on biodiversity. This was principally a recognition of the unhelpful reality that various conventions on the environment and biological diversity were piecemeal and treated specific issues of aspects of biological diversity.²⁴⁴ Thus, the CBD is

²⁴¹Article 1, CBD, *supra* note 1.

²⁴²There is thus a controversial debate as to whether the CBD is a "framework" convention or not. Commentators like Catherine Tinker have argued that "the CBS is not a framework" convention, which requires further elaboration to be operational. It is a specific treaty with duties and obligations structured within a fully-operational system." See, Catherine Tinker, "Responsibility for Biological Diversity Conservation under International Law" (1995) 28 *Vanderbilt Journal of Transnational Law* 777 at 7. [hereinafter, Tinker] Other scholars however disagree and argue that the convention is couched in generalities, leaving states with ample room to flesh out the specifics as they may deem fit taking into account the broad objectives of the convention. However, because the CBD does not contain many hard law rules but broad policy objectives which are to be fleshed out by future protocols or by national initiatives, it may be described as a framework convention. See Swanson, *Biodiversity*, *supra* note 211; Lee Kimball, "The Biodiversity Convention: How To Make It Work" (1995) 28 *Vanderbilt Journal of Transnational Law* 763; Charney, *supra* note 1 at 619.

²⁴³Catherine Tinker, "Introduction to Biological Diversity: Law, Institutions, and Science" (1994) 1 *Buffalo Journal of International Law* 1.

²⁴⁴Other conventions on biological diversity protection adopt a sectoral or species-based approach. For example, the Ramsar Convention deals specifically with wetlands alone. See, *Convention on Wetlands of International Importance, especially as Waterfowl Habitat*, Ramsar, 996 U.N.T.S. 245; (1972) 11 I.L.M. 963; M.J. Bowman, "The Ramsar Convention Comes of Age" (1995) XLII *Netherlands International Law Review* 1. Similarly, *Convention on International Trade in Endangered Species*, *supra* note 226 addresses trade in endangered species. Other conventions may even be limited by geography. See for example, *The Convention*

the first global legal instrument governing biological diversity in all its ramifications.²⁴⁵

It seems that given the scope, universality and diversity of the issues raised by plant life forms, a framework convention with room for subsequent specific agreements was preferred. As the Report of the Fourth Global Biodiversity Forum notes, “the Convention on Biological Diversity is a framework for general principles and obligations. There is little of the detailed structure that is necessary to implement its provision.”²⁴⁶ However, the CBD contains several specific and ground-breaking normative initiatives which warrant further examination.

First, a major contribution of the CBD to the jurisprudence of plant resources conservation and utilization is the recognition of the ecosystem approach to plant conservation.²⁴⁷ This is a holistic conception of the environment whereby the human environment is conceived as a super-organism in which there are multiple and complex inter-relationships between species and habitats.²⁴⁸ Various resolutions and declarations have in

on Nature and Wildlife Preservation in the Western Hemisphere, supra. See, Kathleen Rogers & James Moore, “Revitalizing the Convention on Nature Protection and Wild Life Preservation in the Western Hemisphere” (1995) 36 *Harvard International Law Journal* 465. Others include the *African Convention on the Conservation of Nature and Natural Resources* 1968, *supra* note 58; *Convention on the Conservation of European Wildlife and Natural Habitats, supra* note 115.

²⁴⁵See, Rakleff, *supra* note 20; Robert Ward, “Man or Beast: The Convention on Biological Diversity and the Emerging Law on Sustainable Development” (1995) 28 *Vanderbilt Journal of Transnational Law* 823.

²⁴⁶*Report of the Fourth Global Biodiversity Forum*, 1996, Montreal, Canada (Gland: 1996) at 35.

²⁴⁷Oliver Houck, “On the Law of Biodiversity and Ecosystem Management” (1997) *Minnesota Law Review* 869; Martin Belsky, “Using Legal Principles to Promote the “Health” of an Ecosystem” (1996) 3 *Tulsa Journal of Comparative and International Law* 183.

²⁴⁸Deborah Brosnan, “Ecosystem Management: An Ecological Perspective for Environmental Lawyers” (1994) 4 *Journal of Environmental Law* 135.

recent times incorporated this approach.²⁴⁹ To a large extent, this validates some of the non-Western conceptions of nature as an organic whole instead of a composition of discrete units. Moreover, this is a quantum leap from the species-based or sectoral approach of pre-CDB international law on plant conservation.

Second, the attempt to re-conceptualize biological diversity as a common heritage of mankind was rejected at the earliest stages of negotiation of the CBD. This was perhaps a follow-up on the Stockholm Declaration and other soft law instruments which re-affirmed state sovereignty over plant life forms. For example, Principle 21 of the Stockholm Declaration notes that:

[S]tates have in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdictions or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdictions.²⁵⁰

Thus, Article 3 of the CBD reproduces almost *verbatim* Principle 21 of the Stockholm Declaration. The Article provides thus:

[S]tates have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.²⁵¹

²⁴⁹For example, *Charter for Nature*, *supra* note 60.

²⁵⁰*Stockholm Declaration*, Report of the UN Conference on the Human Environment, UN Doc. A/CONF.48/14 reprinted in 11 I.L.M. 11 (1972), *supra* note 56.

²⁵¹Article 3, CBD, *supra* note 1.

This same principle is echoed in Article 15 of the CBD. Given the importance of Article 15 to further discussion on this question of access to plant life forms, the pertinent parts of the article is reproduced *in extenso*:

[R]ecognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.

2. Each Contracting Party shall endeavor to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention...

4. Access, where granted shall be on mutually agreed terms and subject to the provisions of this Article.

5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that party.

7. Each Contracting party shall take legislative, administrative or policy measures ...with the aim of sharing in a fair and equitable way the results of the research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.²⁵²

The ramifications of the ringing reiteration of Articles 3 and 15 of the CBD that plant life forms are an inherent part of state sovereignty has not been lost on scholars and commentators. According to Rane Panjabi “one of the most important achievements of this Convention lies in its clear endorsement of the fact that biodiversity is a national resource and not part of the common heritage of mankind.”²⁵³ Walter Reid adds:

[F]rom the standpoint of global biodiversity conservation, the most important thing is that it confirms under international law that biodiversity is a sovereign national resource and that governments have the authority to determine the conditions under

²⁵²Article 15. CBD, *ibid*.

²⁵³Panjabi, *supra* note 1 at 222.

which access to that resource is granted. The distinction...could not be sharper or its implications for conservation more profound.²⁵⁴

By emphatically rejecting the categorization of plant life forms as common heritage of mankind,²⁵⁵ the CBD's preference for the concept of common concern of mankind, brings into focus the controversial nature and divisive political economics of plant life forms. While the concept of common heritage of mankind imposes a global juridical right over plant life forms irrespective of the pretensions of national boundaries and state sovereignty, the concept of common concern of mankind seems to invoke no legal obligations.²⁵⁶

The concept of common concern of mankind first found expression in international law in the African Convention on the Conservation of Nature and Natural Resources. Chronologically it seems to have pre-dated the concept of common heritage of mankind. Yet, its normative content and juridical weight, if any, remains relatively unexplored and undefined. It seems however to contain the seeds for a less nationalistic conception of plant life forms in international law. Although its potentials practically remain unexplored, it is

²⁵⁴Walter Reid, Vice President, World Resources Institute, *Testimony before Canadian House of Commons Standing Committee on the Environment*, November 23, 1992, House of Commons, Issue No. 47, Third Session, 34th Parliament, 1991-92.

²⁵⁵The concept of common heritage of mankind as purportedly applied to plant resources is dealt with in Chapter Three. For a fuller discussion of this concept in international law, see, Kemal Baslar, *The Concept of the Common Heritage of Mankind in International Law* (The Hague: Martinus Nijhoff, 1998)

²⁵⁶Paragraph 3 of the CBD preamble provides that the conservation of biological diversity is a common concern of mankind." See, Preamble, CBD, *supra* note 1. See Article 8, *African Convention on the Conservation of Nature and Natural Resources* 1968, *supra* note 58. See also, Abdulqawi Yussuf, "International Law and Sustainable Development: The Convention on Biological Diversity" (1995) *African Yearbook of International Law* 109.

arguable that given the global character of plant life forms, the artificiality of national boundaries and the “global citizenship” of most modern crop plants, insistence on primitive nationalism in relation to plant life forms is no longer supportable nor realistic.

Therefore, the need for a truly global approach to access and use of plant life forms seems compelling. In this regard, the short shrift meted out to the concept of common concern of mankind as applied to plant life forms, may be a huge set-back towards the goal of the CBD to propagate a global approach to resolving questions of access to and use of plant life forms by all mankind. The CBD’s preference for a legal regime of near-exclusive sovereign right of states over plant life forms within their respective jurisdictions²⁵⁷ is understandable. However, it may not provide answers to the question of the global significance of plant life forms.

The CBD regime on plant life forms involves creating national strategies and plans, policies and programmes on access to plant life based on mutually accepted terms between “supplier” states and “user” entities. Under modern international law on plant life forms, responsibility for conservation of plants seeks a balance between state

²⁵⁷The term “exclusive sovereign right” should be used advisedly as the limits and contours of the concept is a matter of intense debate in international law, particularly, with respect to the limits imposed by the principles of state responsibility, sustainable use of shared resources, *et cetera*. The modalities for working out the finer details of domestic state sovereignty is not devoid of complex, if not controversial constitutional and property law issues. For a consideration of this issue as it affects an African country, see, Amokaye Oludayo, “The Convention of Biological Diversity, Access to and Exploitation of Genetic Resources and the Land Tenure System in Nigeria” (1999) 11 *African Journal of International and Comparative Law* 86. The short point is that ownership of plant resources is inextricably tied to control and ownership of land in the domestic legal order. Further, there are unexplored complications relating to the question of the quantum of international “interest” in domestic abuse or use plant resources. See, Jackton Ojwang, “Kenya’s Place in International Environmental Law Initiative” (1993) 5 *African Journal of International and Comparative Law* 781.

sovereignty,²⁵⁸ international co-existence and co-operation.²⁵⁹ To put it rather optimistically, what the principle of Common Concern of Mankind (CCM) implies seems to be that while recognizing state sovereignty over plants, the primary state obligation is to ensure that domestic activities related to plants take into consideration the interests or “concerns” of other states in that resource. Whether this is an extension of the international law principle of *sic uteri tuo ut alienum non laedas*²⁶⁰ remains conjectural.²⁶¹

Given that it is a modern international obligation of states to conserve and engage in sustainable use of plants, it could be argued that a violation of such clearly-defined treaty obligations, constitutes (at least in theory) an internationally wrongful act.²⁶² In other words, the obligations created in this case are not necessarily founded on the doctrine of *sic uteri tuo ut alienum non laedas*. Indeed, a strong case may be made to the effect that wrongful use or wanton destruction of plant life forms contrary to the express obligations created by the CBD

²⁵⁸Catherine Tinker, *supra* note 242. Traditionally, the concept of state responsibility was developed to address state-alien relationships.

²⁵⁹Marian Miller, “Sovereignty Reconfigured: Environmental Regimes and Third World States” in Karen Litfin, ed, *The Greening of Sovereignty in World Politics* (Mass: The MIT Press, 1998). The new FAO treaty on plant use also reaffirms the concept of CCM over plants.

²⁶⁰This is the injunction to use one’s property in a manner that does not injure another’s property. See, *Barcelona Traction, Light and Power Company, Ltd* (Belg. V. Spain), 1970 I.C.J. 4.

²⁶¹See, *The Diversion of Water from the Meuse Case, (Netherlands v. Belgium)*, 1937 P.C.I.J. (Ser. A/B) No. 70, at 4. (Reproduced in, Lakshman Guruswamy *et al*, eds, *Supplement of Basic Documents to International Environmental Law and World Order* (Minnesota: West Publishing Co., 1994) at 1232. [hereinafter, Guruswamy]

²⁶²See, Ian Brownlie, *Principles of Public International Law*, 4th ed., (Oxford: Oxford University Press, 1990) at 437-40; *Jean-Baptiste Caire v. United Mexican States*, (1929) 5 R.I.A.A. 516; *Report of the International Law Commission on the Work of its Forty-fifth Session*, U.N. GAOR, 48th Sess., Supp. No. 10, at 79, U.N. Doc. A/48/10 (1993).

would raise question of liability under the pertinent rules of state responsibility as articulated by the United Nations International Law Commission, hereinafter, ILC.

The ILC distinguishes internationally wrongful acts from activities not contrary to international law.²⁶³ While the former gives rise to state responsibility, the latter gives rise to liability for injurious consequences.²⁶⁴ In the ILC approach, primary rules constitute the actual obligations. According to Article 2 of the ILC's 2001 Draft on State Responsibility:

[T]here is an internationally wrongful act of a State when conduct consisting of an action or omission is attributable to the state under international law; and that conduct constitutes a breach of an international obligation of the State.²⁶⁵

²⁶³Some scholars dispute the validity of this distinction. See Phillip Allott, "State Responsibility and the Unmaking of International Law" (1988) 29 *Harvard International Law Journal* 1. [hereinafter, Allott on State Responsibility]; Allan Boyle, "State Responsibility and International Liability for Injurious Consequences of Acts Prohibited by International Law: A Necessary Distinction?" (1990) 39 *International and Comparative Law Quarterly* 1; Daniel Magraw, "Transboundary Harm: The International Law Commission's Study of 'International Liability'" (1986) 80 *American Journal of International Law* 305. But see, J. Combacau & D. Alland, "Primary and 'Secondary' Rules in the Law of State Responsibility: Categorizing International Obligations" (1985) 16 *Netherlands Yearbook of International Law* 81; Gunther Handl, "Liability as an Obligation Established by a Primary Rule of International Law" (1985) 16 *Netherlands Yearbook of International Law* 49.

²⁶⁴Shabtai Rosenne, ed, *The International Law Commission's Draft Articles on State Responsibility* (1991); Marina Spinedi & Bruno Simma, eds., *United Nations Codification of State Responsibility* (1987). For further analysis of the so-called secondary rules, see, *Report of the International Law Commission on the Work of its Forty-second Session*, U.N. GAOR, 42nd Sess., Supp. No. 10. U.N. Doc. A/42/10 (1990). From this distinction, it seems clear that unlike state responsibility, liability will not attach unless there is actual fault and harm. See, Andrea Gattini "Smoking/No Smoking: Some Remarks on the Current Place of Fault in the ILC Draft Articles on State Responsibility" (1999) 10 *European Journal of International Law* 397. For further analysis, see, James Crawford, "Revising the Draft Articles on State Responsibility" (1999) 10 *European Journal of International Law* 435.

²⁶⁵A revised version of the ILC Draft Articles was recently adopted at the 53rd Session of the ILC. For the text and Articles and commentaries see, *Official Records of the General Assembly, Fifty-sixth Session, Supplement No. 10 (A/56/10) Chap V*. These are reproduced with a critical apparatus in, James Crawford, *The ILC's Articles on State Responsibility: Introduction, Text and Commentaries* (Cambridge: CUP, Forthcoming). See also, *ILC Draft Articles on State Responsibility, A/CN.4/L.602/Rev.*, 26 July 2001 [hereinafter, ILC Report on State Responsibility]. Available online >law.cam.ac.uk/rcil/ILCSR. See also, Pierre-Marie Dupuy, "The International Law of State Responsibility: Revolution or Evolution?" (1989) 11 *Michigan Journal of International Law* 105; Pierre-Marie Dupuy, "Reviewing the Difficulties of Codification : On Ago's

Given the obligations of States to conserve plants, it would follow that derelictions of such duty would fall under the category of the ILCs primary rules. On the other hand, secondary rules determine the legal consequences of failure to abide by the primary rules.²⁶⁶

Under international law, three threshold tests are used in determining state responsibility; namely, was there a duty at international law? Was the duty breached? Can responsibility be attributed to a state for the violation of international law? It should however be noted that “acts by non-state entities, such as a citizen or official for whose acts a state is not responsible, do not give rise to State responsibility.”²⁶⁷ There may however be difficulties in making attributions of wrongfulness to states where the act or omission in question are not directly by organs or officials of a State, particularly, in the case of plant conservation.

Further, there is even greater difficulty in asserting or determining liability for infractions or derelictions of any obligations, as it were, of soft law²⁶⁸ commitments by states.

Classification and Obligations of Means and Obligations of Result in Relation to State Responsibility” (1999) 10 *European Journal of International Law* 371.

²⁶⁶Allott strongly critiques this point. See, Allot, “On State Responsibility” *supra* note 263; Vaughan Lowe, “Precluding Wrongfulness or Responsibility: A Plea for Excuses” (1999) 10 *European Journal of International Law* 405.

²⁶⁷Catherine Tinker, *supra* note 242 at 785; Alain Pellet, “Can a State Commit a Crime? Definitely Yes!” (1999) 10 *European Journal of International Law* 425.

²⁶⁸The term “soft law” has no clear cut definition at international law. It may however be used to categorize those ambiguous obligations found in binding international agreements. It may also be used for those non-binding standards of conduct found in declarations, resolutions and other such non-binding instruments. The concept of soft law is dealt with in Chapter Four in relation to the vexed issue of “biopiracy”. However, see, Christine Chinkin, “The Challenge of Soft Law: Development and Change in International Law” (1989) 38 *International and Comparative Law Quarterly* 580. On the relationship between soft law and treaty law obligations, see, Alan Boyle, “Some Reflections on the Relationship of Treaties and Soft Law” (1999) 48 *International and Comparative Law Quarterly* 901.

Indeed, this is more pertinent to the CBD given that its obligations are largely couched in generalities, broad objectives, caveats and other qualifiers importing little specificity in terms of state obligation. However, it would seem that the obligation to conserve and use in a sustainable manner plant life forms within the control and jurisdiction of a state are clear and specific enough to warrant liability for any infraction or dereliction of that obligation by states. However, international environmental law has not yet articulated the framework and mechanism for bringing offending states to justice in cases of wanton and reckless destruction or endangerment of the integrity of plant life forms.

In the absence of a regime of accountability for destruction of plant life forms, Brazil's rebuff of the North's "concern" over its rapid destruction of the Amazon for "developmental" purposes readily comes to mind. The practicalities of implementing a regime of fidelity to international obligations such as the duty to conserve plant life forms are complex. Ultimately it seems that in spite of international obligations, states would have the final say in determining how to balance their national priorities with their obligations to conserve plant life forms under their national jurisdictions.

It is perhaps in recognition of this conundrum that the principles of sustainable development and precaution have been embedded in the CBD and other international environmental law instruments. However, these juridical initiatives are not without their own severe problems including conceptual incoherence and anarchy, ideological imperialism, and dubious presumption. Some further explanation and analysis would be pertinent. The current

mantra of sustainable development²⁶⁹ may be traced to the report of the Brundtland Commission.²⁷⁰ Its status as part of the emerging body of international environmental law is no longer in doubt.²⁷¹ In the same token academic exertions and international legal literature on the concept are ubiquitous.²⁷² What is a matter of doubt is the ideological and theoretical coherence of the concept of sustainable development, indeed, the meaning of sustainable

²⁶⁹Rebecca Hoelting, "After Rio: The Sustainable Development Concept Following the United Nations Conference on Environment and Development" (1994) 24 *Georgia Journal of International and Comparative Law* 117; David Hunter, *et al.*, "Environment and Trade Concepts and Principles of International Law: An Introduction" (1995) 3 *Global Environmental Law Annual* 99.

²⁷⁰The Brundtland Commission defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" See, *Our Common Future*, *supra* note 149 at 43. Needless to say, this definition is manifestly anthropocentric and lays more emphasis on "development" than sustainability. It is equally presumptuous as it pretends that present generations can and should determine the needs of future generations. Given modern inroads into space travel, nuclear energy and *et cetera*, it is difficult to fathom how generations of human beings can or should pretend to determine the needs of future generations.

²⁷¹Binding international legal instruments which affirm the place of the concept of sustainable development in the jural field include the *Convention on Biological Diversity*, *supra*; note 1, *Climate Change Convention*, *supra* note 209; *Agreement Establishing the World Trade Organization*, (1994) 33 I.L.M. 1. Regional instruments which also recognise the concept of sustainable development include, *The North American Agreement on Environmental Cooperation*, reprinted in (1993) 32 I.L.M. 1480; *Treaty on European Union*, Maastricht, 7 February 1992, Official Journal, 1992, C 191 (29 July 1992). International judicial imprimatur may also be found in the advisory opinion of the ICJ in the case of *Legality of the Threat of Use of Nuclear Weapons*, [Advisory opinion] (1997) 35 I.L.M. 809; the separate opinion of Justice Weeramantry in the *Case Concerning the Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* (1998) 37 I.L.M. 162 at para 29. For a broader account of the role of the International Court of Justice in the environmentalist trend, see E. Valencia-Ospina, "The International Court of Justice and International Environmental Law" (1992) 2 *Asian Yearbook of International Law* 1.

²⁷²For a succinct account and analysis of the literature on the concept of sustainable development, see, Philippe Sands, "International Law in the Field of Sustainable Development" (1994) LXV *British Yearbook of International Law* 303. [hereinafter, Sands, "Sustainable Development"] See also, Patricia Birnie, "Environmental Protection and Development" (1995) 20 *Melbourne University Law Review* 66; Edith Brown Weiss, "In Fairness to Future Generations" (1992) 8 *American University Journal of International Law and Policy* 19.

development.²⁷³

First, the notion of sustainable development is vague and as Sara Dillon argues, “because of its vagueness, sustainable development has fostered diversionary debates over what level of “development”²⁷⁴ is in fact “sustainable.”²⁷⁵ Priya Kurian adds that the phrase “sustainable development” is so ambiguous that it means all things to all people.”²⁷⁶ McCloskey concurs in despair, that “the idea of sustainable development is a fine phrase without much meaning.”²⁷⁷

²⁷³Interestingly, the concept itself has been the subject of terminological anarchy. See Sands, “Sustainable Development” *supra* at 305. There are also doubts whether the concept means an “objective”, or a “process”, or principle” or all of these things put together.

²⁷⁴This presupposes that the prevailing ideology of “development” is a universal truth. But see, Priya Kurian, “International Environmental Policy: Redefining for Theory and Practice” in Robert Bartlett, *et al.*, eds, *International Organizations and Environmental Policy* (Connecticut: Greenwood Press, 1995) at 1. [hereinafter, Kurian]. (Arguing that “the progressive, secular, and materialist philosophy on which modern life rests ...is deeply flawed and ultimately destructive to ourselves.”) But see, Richard Stewart, “Economics, Environment, and the Limits of Legal Control” (1985) 9 *Harvard Environmental Law Review* 1. (Arguing that environmentalism is not necessarily opposed to economic activity); Peter Lallas, *et al.*, “Environmental Protection and International Trade: Toward Mutually Supportive Rules and Policies” (1992) 16 *Harvard Environmental Law Review* 271.

²⁷⁵Dillon, *supra* note 122 at 371. But see, Jayne Daly, “Toward Sustainable Development: In Our Common Interest” (1995) *Pace Law Review* 153; J.B. Ruhl, “Sustainable Development: A Five Dimensional Algorithm for Environmental Law” (1999) 18 *Stanford Environmental Law Journal* 31. At the core of the problem is that the concept of sustainable development is an improbable compromise seeking to satisfy divergent and opposed values and interests. For example, on the matter of intra-generational equity, the question may be asked whether the concept will require a re-distribution of resources so that those who maintain a position of privilege would off-set the need for further ravaging of the earth in industrial activities in order to satisfy the needs of the needy.

²⁷⁶Priya Kurian, *supra* note 278.

²⁷⁷ Michael McCloskey, “The Emperor Has No Clothes” (1999) 9 *Duke Environmental Law and Policy* 153 at 157.

Furthermore, Moldan and Billharz²⁷⁸ have pointed out that sustainability is inherently value-laden and is not applied in a vacuum. It operates in the value system of a society. In modern times, economic development and sustainability have been largely understood within the paradigm of capitalism. This approach has its weaknesses. As Billharz and Moldan have argued, “the current concepts of indicators and indicator frameworks (of sustainable development) originate mostly within northern industrial countries and are shaped by their cultural orientation.”²⁷⁹ The point is that respectively, the concepts of “sustainability” and “development” are fundamentally matters of economic ideology and social values and both are probably in a state of mutual conflict; unless of course, there is a fundamental re-definition of the meaning of “economic development.”²⁸⁰

Given the dominance of the profit motive in the capitalist framework, money plays a major role in the contemporary measurement of sustainability. However, dollars and cents *per se* hardly constitute a complete narrative framework for the phenomenon of development. In the words of Billharz and Moldan, “many natural and social assets and processes are not traded in the market. The use of monetary value as the common denominator for

²⁷⁸Bedrich Moldan & Suzanne Billharz, (eds.), *Sustainability Indicators: Report on Indicators of Sustainable Development* (Toronto: John Wiley & Sons., 1997)

²⁷⁹Moldan & Billharz, *supra* at 71.

²⁸⁰Dillon, *supra* note 122; Donald Brown, “After the Earth Summit: The Need to Integrate Environmental Ethics into Environmental Science and Law” (1992) 2 *Dickinson Journal of Environmental Law and Policy* 1; Dan Tarlock, “Environmental Law: Ethics or Science?” (1996) 7 *Duke Environmental Law and Policy Forum* 193; Walter Kuhlman, “Making the Law More Eco-centric: Responding to Leopold and Conservation Biology” (1996) 7 *Duke Environmental Law and Policy Forum* 133.

comprehensive approaches thus faces serious methodological difficulties.”²⁸¹ In this context, it is hard to disagree with Sara Dillon that “it would be difficult to imagine a better gift to the multinational corporate order than the concept of “sustainable development.”²⁸² Without yielding to cynicism, it seems fair to say that the concept of sustainable development has largely remained an empty mantra, indeed, an oxymoron designed to achieve an improbable compromise.²⁸³

Perhaps, in an attempt to remove the sting of some of the above criticisms, the element of equity has become a familiar refrain in the discourse on exploitation of plant life forms. Thus, sustainable use of plants as well as other life forms, as defined by the Global Biodiversity Strategy means “husbanding biological resources so that they last indefinitely, making sure that biodiversity is used to improve the human condition and seeing that these resources are shared equitably.”²⁸⁴ However a survey of the global regime on plant resources

²⁸¹Moldan & Billharz, *supra* note 281.

²⁸²Dillon, *supra* note 122. Compare with, Mukul Sanwal, “Sustainable Development, the Rio Declaration and Multilateral Cooperation” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 45.

²⁸³Ronnie Lischutz, “Wasn’t the Future Wonderful? Resources, Environment, and the Emerging Myth of Global Sustainable Development” (1991) 2 *Colorado Journal of International Environmental Law and Policy* 35.

²⁸⁴Abdulqawi Yusuf *supra* note 256 at 125. See also, Article 10 (c) of the CBD, *supra* note 1. For an interesting analysis of a practical inquiry into the mechanics of sustainable development in a sub-Saharan African community see, Philippa England, “Tree Planting, Sustainable Development and the Roles of Law in Bongo, North-East Ghana” (1995) 39 #2 *Journal of African Law* 138.

shows a dichotomy of approach.²⁸⁵ In addition, the concept of environmental equity among nations²⁸⁶ is of increasing importance, especially as evidence shows that the poor bear a disproportionate burden of environmental costs.²⁸⁷

As an aside, it may be idle to consider the issue of sustainable use of plant resources in Euro-centric regimes which concerns themselves primarily with agitations of daily existence without juridical recognition of the legal interests of generations unborn in the utilization of those same resources. In this regard, the *Children's case*,²⁸⁸ wherein the Supreme Court of the Philippines granted 42 children the standing to sue as representatives of themselves and future generations to protect their right to a healthy environment is filled with promise. Speaking for the Supreme Court of the republic of the Philippines, Justice Hilario Davide held that:

[W]e find no difficulty in ruling that they can for themselves, for others of their generation and for the succeeding generations, file a class suit. Their personality to sue on behalf of the succeeding generations can only be based on the concept of inter-generational responsibility insofar as the right to a balanced and healthful ecology is

²⁸⁵While some international instruments ostensibly emphasize conservation of plant resources, others lay emphasis on sovereignty. Compare the *African Convention on the Conservation of Nature and Natural Resources*, *supra* note 58 with the CBD, *supra* note 1.

²⁸⁶Sun Lin, ed, *UNEP's New Way Forward: Environmental Law and Sustainable Development* (Nairobi: UNDP, 1995) [hereinafter, Sun Lin]

²⁸⁷Sun Lin, *supra* at 12.

²⁸⁸*Juan Antonio Oposa, et al v. The Honourable Fulgencio Factoran Jr., Secretary of the Department of the Environment and Natural Resources et. al., Supreme Court of the Philippines*, G.R. No. 101083; reprinted in, 33 I.L.M. 173 (1994).

concerned.²⁸⁹

If the concept of sustainability is to rise above the quality of mere material for scholarly exertions, it seems inescapable that the domestic laws on standing to sue and access to environmental justice will have to witness a positive sea-change. Otherwise, decisions such as the *Children's case* would remain exotic curiosities in the annals of environmental jurisprudence.

With regard to the precautionary principle,²⁹⁰ as already noted, a state's inability or refusal to adopt precautionary principles in the handling of plant life forms, especially genetically modified plants may now give rise to certain juridical consequences. However, issues of what action is to be taken to fulfill the obligation of precaution at international law remains controversial. It may thus be said in summary that international liability for obligations created by the CBD is a work in place requiring enormous goodwill from states and other vested interests.²⁹¹

Another significant contribution of the CBD to international jurisprudence on plant conservation is that it makes the municipal order the focal point of action. This is ostensibly

²⁸⁹The children were suing to stop large scale leasing of forests for timber-logging, particularly original rainforests tracts. Since the decision granted standing, an executive order has cancelled sixty five of the original leases, including those in the old-growth rainforests. See, Ted Allen, "The Philippine Children's Case: Recognizing Standing for Future Generations" (1993) 6 *Georgetown Environmental Law Review* 713.

²⁹⁰The question of precautionary principle at international law is dealt with in Chapter 4 in relation to the question of release of patented genetically modified plants into the environment.

²⁹¹Edward Christie, "The Eternal Triangle: The Biodiversity Convention, Endangered Species Legislation and the Precautionary Principle" (1993) 10 *Environmental and Planning Law Journal* 470. See also, Christian Dominice, "The International Responsibility of States for Breach of Multilateral Obligations" (1999) 10 *European Journal of International Law* 353.

a surrender to the demands and sensibilities of the South during the negotiation stages of the CBD. This posture may be discerned from the rejection of such words such as 'global' and like terms in the text of the CBD. It is also arguably, another manifestation of the South's complete rejection of any connotation of plant resources as a Common Heritage of Mankind (CHM) which it perceived of as a manifestation of neo-colonialism.²⁹²

The benefits of the national focus include the fact that it is at the national and sub-national levels that meaningful impact may be made in the conservation of plants. In any case, it is probable that the so-called global values and priorities on plants may amount to impositions of foreign values. Moreover, of all matters of environmental protection, the conservation of plants is perhaps the least amenable to top-down solutions symptomatic of the so-called global approaches to environmental problems.

Of course, there are drawbacks to the rather instinctive rejection of the denotations of global responses or prioritization of values on the conservation of plant resources. First, the parochial and nationalistic conception of plant conservation is very short-sighted and naive as it ignores the fact that indeed global economic forces are principally to blame for the tragedy of plant life forms at the domestic terrain. Second, the nationalistic approach may create disharmony and inconsistency arising from the uneven abilities of the various state parties to implement their treaty obligations.²⁹³

²⁹²Edward McWhinney, "The International Law-Making Process and the New International Economic Order" (1976) 14 *Canadian Yearbook of International Law* 57.

²⁹³*Ibid.*

The CBD seeks to impose obligations on the governance of plant resources based on the principle that states have uneven capacities and resources to prosecute the tall order of conserving plants. Thus, the Convention accommodates and appreciates the uneven resources and infrastructure needed for conservation by qualifying the numerous obligations of states. Without prejudice to the principle of *pacta sunt servanda* which underpins treaty obligations,²⁹⁴ it would seem that under the principle of common but differentiated responsibilities, states have the latitude to comply with the Convention depending on their resources and capability.²⁹⁵

However, state practice amply shows that states may evade their legal obligations, particularly, those pertaining to the governance of the environment.²⁹⁶ Non-compliance may of course, arise from lack of capacity to implement contracted obligations or from a myriad of reasons. A state is obliged in international law to refrain from acts which would defeat the object and purpose of a treaty to which it has acceded to or expressed the consent to be

²⁹⁴Article 26, *Vienna Convention*, *supra* note 232.

²⁹⁵This is otherwise known as the principle of common but differentiated responsibilities. It is remarkable that this elasticity was first employed in the 1982 UNCLOS. See, *United Nations Convention on the Law of the Sea* (With Annex V). Concluded at Montego Bay, 10 December 1982; entered into force, 16 November 1994. U.N. Doc. A/CONF.62/122; *reprinted in* 21 I.L.M 1261 (1982). However, this device has been criticized by a host of writers as importing inconsistencies in the implementation of environmental treaties.

²⁹⁶The mechanisms of avoidance include non-compliance with their treaty obligations or defiance. See, Jung-Gum Kim & John Howell, *Conflict of International Obligations and State Interests* (Martinus Nijhoff: The Hague, 1972). Of course, the entering of reservations to treaties and conventions is well-know and may be held unacceptable under certain treaties. See, Articles 19 & 20, 21, 22 and 24, *Vienna Convention*, *supra* note 231. In the cases where reservations are disallowed, States may employ the use of interpretive statements or clauses. More often than not, this is largely designed to appease local forces. For example, in signing the CBD, the United States attached an interpretive statement approved by the powerful biotechnology and pharmaceutical industries in the United States.

bound.²⁹⁷ Whatever the case may be, a consequence of non-compliance is that international environmental law is weakened and loses legitimacy and efficacy.

The CBD has also contributed to the jurisprudence of plant life forms by creating a regime for fair and equitable sharing of the benefits of plants.²⁹⁸ One of the three major objectives of the CBD is to institutionalize an equitable Access-and-Benefit-Sharing (ABS) mechanism as an intrinsic part of the emergent regime on the conservation and use of plants.²⁹⁹ Without a doubt, the *ancien regime*, as it were, was more or less, a winner-takes-all situation whereby the North freely appropriated and profited from the South's conservation and improvement of plants. The CBD thus creates a new regime or concept of sharing of the benefits derived from such life forms. As already indicated, this is a fundamental departure from the "former system whereby the South derived no benefit from its genetic resources while Northern companies...derived ...enormous profits."³⁰⁰ Naturally, this radical change of the pre-existing regime elicited a considerable degree of opposition.

Perhaps, the most innovative contribution of the CBD to the jurisprudence on plants is the unprecedented recognition of the contributions of local communities and indigenous

²⁹⁷ Article 18. *Vienna Convention on the Law of Treaties*, *supra* note 232.

²⁹⁸ Glowka, *supra* note 239 at 4.

²⁹⁹ See generally, John Mugabe, *et al.* (eds.), *Access to Genetic Resources— Strategies For Sharing Benefits* (Bonn: IUCN-ELC, 1997)

³⁰⁰ Panjabi, "On the CBD", *supra* note 1 at 220. The financial interests are staggering. The World Resources Institute estimates that the retail value of drugs derived from plants approximates to \$43 billion per year and the pharmaceutical industry grows at more than ten per cent per year. See, Al Gore, "Essentials for Economic Progress: Protect Biodiversity and Intellectual Property Rights" (1992) October, *The Journal of NIH Research* 5.

peoples, particularly women, to the conservation and genetic improvement of plant resources.³⁰¹ The preamble to the CBD recognizes the:

[C]lose and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, ...and the vital role that women play in the conservation and sustainable use of biological diversity.³⁰²

More importantly, Article 8 (j) specifically mandates the Contracting Parties to make laws which will respect, preserve and maintain such knowledge. The said Article states thus:

[E]ach Contracting Party shall, as far as possible and as appropriate, subject to its national legislation, respect, preserve, and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices arising from the utilization of such knowledge, innovations and practices.³⁰³

To a large extent, this sea-change purges international environmental and patent law of the latent notion that traditional and local communities have made no intellectual contributions of merit to the conservation and improvement of plants. This unfortunate attitude (which held sway until recent times) was probably responsible for the dis-empowerment of traditional and local communities by dispossessing them of their ancestral lands and the zealous attempts over hundreds of years to “educate” and “civilize” them.

Indeed, vestiges of such pre-modern views are still extant in some recent scholarship

³⁰¹The ILO Convention No. 169 had blazed the trail but as at 31st December 1992, its provisions were not yet in effect. See, paragraph 7 of the preamble of Convention No. 169, *supra* note 72.

³⁰²Preamble, CBD, *supra* note 1.

³⁰³Article 8 (j), CBD, *ibid*.

on the role of traditional and local communities in the conservation and development of plants. One commentator has recently postulated that the basis of the recognition of state sovereignty over plant genetic resources rests on the “forbearance” exercised by local communities in preserving plant genetic resources. According to this “forbearance” theory, as it were:

[T]he philosophy underpinning the convention seeks to reward those who exercised forbearance and thus *preserve* biodiversity. ..the sacrifice which developing nations make in forbearing from development arguably equates to the sacrifice of expending labour under the Lockean labour theory from “fruits of one’s labour.” It should be equally just to recognize a property right resulting from forbearance in this context.³⁰⁴

The obvious implication of this thesis is that since thousands of years ago when farming began, traditional farmers, growers and other people, particularly women, involved in the improvement of crop genetic base have done nothing save to sit idly by while plants grew or withered away as the whims of fate willed. Yet, the wheat, tomato, maize and other numerous plants used as food or medicine are products of millennia of efforts and rational intervention and mediation by farmers and local peoples involved in improving and conserving plant life forms.³⁰⁵ Accordingly, the “forbearance” theory is inconsistent with the reality of plant improvement and conservation.

³⁰⁴Daniel Jenks, “The Convention on Biological Diversity-An Efficient Framework for the Preservation of Life on Earth?” (1995) 15 *Northwestern Journal of International Law and Business* 636 at 642. See also, Jeffrey Kushan, “Biodiversity: Opportunities and Obligations” (1995) 28 *Vanderbilt Journal of Transnational Law* 755.

³⁰⁵Gregory Maggio, “Recognizing the Vital Role of Local Communities in International Instruments for Conserving Biodiversity” (1997-8) 16 *Journal of Environmental Law* 179. [hereinafter, Maggio]

Further, the “forbearance” theory posits that the CBD and local and indigenous peoples are concerned with the “preservation” of plant resources. This is utter nonsense. There is a world of difference between conservation and preservation. The dynamic and evolving nature of plant conservation and improvement belies the argument on “preservation.” The fact of the matter is that there is hardly any real unmodified plant genetic resource, especially for food crops. Plants in the farmfields in their *in situ*³⁰⁶ state are in a state of conservation instead of preservation. It is only with respect to *ex situ*³⁰⁷ gene banks that the term “preservation” may be used. In any event, the CBD does not deal with plant resources frozen and preserved in gene banks.

Finally, the CBD makes broad in-roads in articulating the link between intellectual property rights, particularly patents³⁰⁸ on plants. Given the controversial nature of this subject, it is not surprising that it was “one of the most divisive issues in the negotiations of the CBD.”³⁰⁹ From both a policy and legalistic point of view, Article 16 (5) of the CBD seems elusive. The article provides thus,

³⁰⁶*In-situ* conservation means the conservation of ecosystems and natural habitats and the maintenance and recovery of viable populations of species in their natural surroundings and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties. See Article 2, CBD, *supra* note 1.

³⁰⁷*Ex-situ* conservation means the conservation of components of biological diversity outside their natural habitats.

³⁰⁸*Report of the Fourth Global Biodiversity Forum, supra* note 246 at 35.

³⁰⁹Chandler, *supra* note 238 at 161. Chandler observes that during the negotiation of the CBD, the gene-rich-technology-poor countries of the South sought to use the convention and their plant genetic wealth as a means of gaining access to and transfer of technology, the handling of biotechnology and the sharing of its benefits. This may be evident from articles 9 and 15 of the CBD, *supra* note 1. Naturally, the North resisted this move.

[T]he Contracting Parties recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention, shall cooperate in this regard subject to national legislation and international law to ensure that such rights are supportive of and do not run counter to its objectives.³¹⁰

Article 16 (2) is equally pertinent on the question of patents on plant genetic resources. It provides thus:

[I]n the case of technology, subject to patents and other intellectual property rights, such access and transfer shall be provided on terms which recognize and are consistent with the adequate and effective protection of intellectual property rights.³¹¹

While the meaning of these provisions remain a matter of speculation and conjecture (even within the CBD Secretariat itself),³¹² the greater flaw in the CBD seems to be its omission of the co-called “informal plant resources” innovation. This omission drew the dissatisfaction of some of the countries of the South, particularly Ethiopia. According to the statement by the Government of Ethiopia,

[W]e express dissatisfaction with the provisions protecting patents and other intellectual property rights without commensurate regard for informal innovations, especially in Article 16, paragraph 2, which opens the way for use by countries with the technological know-how of genetic resources and innovations from countries without the know-how in patents and other intellectual property rights and for taking them out of the reach of even those countries which created the very genetic

³¹⁰Article 16 (5) of the CBD, *ibid*

³¹¹Article 16 (2), CBD. *ibid*.

³¹²See for example, *The Impact of Intellectual Property Rights Systems on the Conservation and Sustainable Use of Biological Diversity and on the Equitable Sharing of Benefits From its Use*-UNEP/CBD/COP/3/23, 1996; *The Relationship Between Intellectual Property Rights and the Relevant Provisions of the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS Agreement) and the Convention on Biological Diversity*. UNEP/CBD/ISOC/5, 11 May 1999.

resources and innovations.³¹³

Similarly, Declaration of Malta of 1997, a non-binding instrument echoes similar views.³¹⁴ It calls for:

[A] re-evaluation of the value of unpaid labour (and notes that)...current trends to reinforce patent and other intellectual property rights complicate the issue. The concept of intellectual property needs to be re-examined and extended to the traditional knowledge of the poor, local communities and indigenous peoples.³¹⁵

Further, it warns that “the increasing appropriation of knowledge and genetic resources threatens the knowledge systems of the indigenous peoples and local communities; the public right to information, the conservation and sustainable use of biological resources.”³¹⁶ The next chapter examines the processes by which plants and plant-based traditional knowledge are appropriated by global institutions ostensibly designed to facilitate research in plant. However, before delving into that, the arguments made in this chapter are summarized.

³¹³*Report of the Intergovernmental Committee for a Convention on Biological Diversity, U.N. Environmental Programme, 7th Negotiating Sess., 5th Session of the International Negotiating Committee., U.N. Doc. UNEP/Bio.Div/N7-INC.5/4 (1992). [hereinafter, Report of the Intergovernmental Negotiating Committee.] The government of Ethiopia thus suggested that at a later date, the following paragraph be added to Article 16; to wit:*

[W]here a technology, an organism or genetic material which is patented or legally protected in any other way as an intellectual property has incorporated an organism or organisms, a genetic material or materials, a technology or technologies or any other traditional practice or practices originating in another country or countries, the patent or other intellectual property right shall not be valid in the country or countries of origin of any of its component parts; and the benefits accruing from the application of the patent or other intellectual property right in other countries shall be equitably shared between the holder or holders of the protected right and the country or countries of origin. *Ibid.*

³¹⁴Declaration of Malta, done at the 25th *Pacem in Maribus* conference held in Malta in November 1997; reproduced in, R. Rajagopalan, (ed.), *Common Heritage and the 21st Century* (International Ocean Institute, Malta, 1998)

³¹⁵Rajagopalan, *supra*, at 7-11.

³¹⁶Rajagopalan, *supra* at 15.

2.8: Summary

The preceding pages have sought to tease out and analyse various issues which constitute both the text and sub-texts of the legal norms and philosophical bases of the law on conservation of plants. To recapitulate, plants constitute the catalyst for the emergence of human civilization as presently known. Further, the global distribution of plants is by no means even. In relation to this, the gendered and racist approach of early science to the phenomenon of development was a factor in the creation of a system which has practically constituted itself into a menace to the sustenance and survival of plant life forms and by ultimate implication, human survival itself. The dominant concept and practice of development is at the root of ³¹⁷what Senator George Mitchell has termed, perhaps with a touch of exaggeration, an “ecological holocaust.”³¹⁸

In addition, the influence of religion³¹⁹and the concept of development³²⁰have been

³¹⁷Gary Meyers, “Surveying the Lay of the Land, Air, and Water: Features of Current International Environmental and Natural Resources Law, and Future Prospects for the Protection of Species Habitat to Preserve Global Biological Diversity” (1992) 3 *Colorado Journal of International Environmental Law and Policy* 479.

³¹⁸George Mitchell, *World On Fire* (1991) at 116.

³¹⁹Lynn White Jr, *supra* note 59. But see, Thomas Derr, “Religious Responsibility for the Ecological Crisis: An Argument Run Amok” (1975) 18 #1 *Worldview* 43.

³²⁰Cynthia Giagnocavo & Howard Goldstein, “Law Reform or World Re-form: The Problem of Environmental Rights” (1990) 35 *McGill Law Journal* 345. In the same vein, Vice President Al Gore has argued that:

[I]t will not be enough to change our laws, policies and programs. The solutions we seek must stem from a new faith in the future, a faith that justifies sacrifices in the present, and from a new courage to choose higher values in the conduct of human affairs. We must also display new reverence for our place in the natural world. Quoted in Dobson, *supra* note 42 at 308.

See also, M.P.A Kindall, “Talking Past Each Other at the Summit” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 69 at 71.

examined in the context of the issues raised. Regardless of the agreed causes of the current debacle, it seems that in the quest for new solutions to old and new problems,³²¹ values and priorities would have to be re-thought.³²² New ethics may be invoked.³²³ These wield tremendous influence on human conception of and relationship with the environment. In turn, they impact on legal norms. The problem however seems to be that in the metamorphoses of divergent cultural, ethical and social values from mere political postulations³²⁴ to consensual and binding international law, the interests and perceptions of societies/states with the requisite political and economic might to transform rhetoric to law probably prevails. Naturally, some tokens of compromise may arise in the course of this dynamic. Law and the institutions for governance of plants thus become sites for negotiation and bargains.³²⁵ The weak and marginalised stakeholders may yet be heard.³²⁶ Chapter 3 will examine how international agricultural institutions appropriate plants and TKUP.

³²¹David Schlosberg, *Environmental Justice and the New Pluralism: The Challenge of Difference for Environmentalism* (Oxford: Oxford University Press, 1999) at 3.

³²²Alexander Gillespie, *International Environmental law, Policy and Ethics* (Oxford: Clarendon Press, 1997) at 1.

³²³George James, ed, *Ethical Perspectives on Environmental Issues in India* (New Delhi: A.P.H. Publishing Corporation, 1999)

³²⁴*The Declaration of Environmental Interdependence*, adopted at the end of the Inter-parliamentary Conference on the Global Environment, April 12-May 2, 1990; *The Inter-parliamentary Conference on the Global Environment*, Final Proceedings, 101st Congress, 2nd Session, Senate Document 101-31 Report to the Senate of the United States (Washington, D.C) at 15.

³²⁵See generally, Christopher Rootes, ed, *Environmental Movements: Local, National and Global* (London: Frank Cass, 1999) at 1. [hereinafter, Rootes]

³²⁶Rootes, *supra* at 222. See, Paul Ekins, *A New World Order: Grassroots Movements for Global Change* (London: Routledge, 1992).

CHAPTER THREE

The Role of Common Heritage of Mankind Concept and International Institutions in the Appropriation of Plants and TKUP

3:0 The Concept and Mechanisms of Appropriation of Plants and TKUP

As already shown in Chapter 2, nature and human mediation have combined to produce the phenomenal preponderance of plant life forms in the South.¹ However, since realizing this fact and appreciating its wider implications, there has been a well designed and executed process on the part of the North to redress the imbalance. A substantial instrument in this process has been to appropriate as much of the South's plant germ plasm and TKUP as possible with the consequential benefits in agriculture. As Kloppenburg argues, "the development of modern industrialized agriculture in the advanced capitalist economies has been predicated on the systematic and continuous appropriation of plant genetic resources from source areas of genetic diversity that lie principally in the Third World."²

Over the centuries and with increasing commercialization of plants and products of TKUP, the processes and mechanisms of appropriation of plants and TKUP have been facilitated by institutions specially designed by powerful states of the North. The concept of appropriation as dealt with in this thesis refers to the commercial use of plants and TKUP without compensation and/or acknowledgment of the intellectual inputs in the improvement of the plants or in the creation of TKUP as the case may be or without the prior informed

¹See, Chapter Two, *supra*.

²Jack Kloppenburg, *First the Seed--The Political Economy of Plant Biotechnology, 1492-2000* (Cambridge: Cambridge University Press, 1988) at 189. [hereinafter, Kloppenburg]

consent of the owner(s) of the plants or TKUP in question.³ Appropriation of plants also deals with the use of intellectual property laws and systems, to gain an exclusive monopoly and control over those genetic resources and knowledge of the uses of those plant life forms without the consent of the holders of such knowledge.⁴ This practice has recently gained the rather inflammatory description of “bio-piracy,”⁵ especially by outraged and indignant activists and traditional peoples.

Central to the process of appropriation of plants and TKUP are three mutually reinforcing systems. The first is socio-cultural in nature and pertains to the undeclared but nonetheless extant cultural and gendered denigration and denial of the intellectual input of traditional farmers and breeders, particularly women, in the improvement of plants and creation of TKUP. In other words, this process is probably a cultural hangover and vestige of the pre-modern attitudes and notions that traditional and non-European peoples were inferior in their intellectual capacity and thus innovations in such marginalized and ridiculed epistemological frameworks were unscientific and inherently inferior to Western empiricism.

To worsen a bad situation, a majority of the innovations and improvements in the

³Valentina Tejera, “Tripping Over Property Rights: Is It Possible to Reconcile the Convention on Biological Diversity With Article 27 of the TRIPs Agreement?” (1999) 33 *New England Law Review* 967 at 971. [hereinafter, Tejera]

⁴*RAFI Communique*, December 1996 at 1; Vandana Shiva, “Biopiracy: Need to Change Western IPR Systems” *The Hindu*, Wednesday, July 28, 1999, at 3; Luiza Villaema, “Indians Want Patent: Chiefs Prepare International Law Suit Against Scientist who Registered Indigenous Knowledge” *ISTOE Magazine*, No. 1581, Sao Paulo, 19 January, 2000; “Aussies ‘Pirate’ Other’s Genius?” online ><http://www.rafi.org/pr/release11.html> accessed on 8/27/99.

⁵Lakshmi Sarma, “Biopiracy: Twentieth Century Imperialism in the Form of International Agreements” (1999) 13 *Temple International and Comparative Law Journal* 107; “Biopiracy Update: A Global Pandemic” *RAFI Communique*, September/October 1995; David Orr, “India Accuses US of Stealing Ancient Cures” *The Times* (London), 31 July 1999, at 2; Mario Osava, “Brazil Biodiversity: Crackdown on Eco-Pirates” *IPS*, August 14, 1999. “RAFI’s List of Bioprospectors and Biopirates” *RAFI Communique*, September/October 1995.

farming fields in traditional societies are undertaken by women and these contributions are more often than not ignored in those cultural settings which ought to have championed the struggle for legitimation and recognition of those enormous contributions. In effect, gender discrimination and suppression within the traditional society itself adds another layer to the external oppressive denigration of traditional epistemology. This constitutes the prevalent, albeit, unstated and subtle social context in which appropriation of plants and TKUP is conducted. Consequently, plants and TKUP created or modified in traditional frameworks of knowledge have been systematically relegated to the status of “raw materials”, “wild germ plasm”, “folk-knowledge” and “ethno-botany.”

The second process of appropriation deals with the mechanisms by which powerful and influential states of the North established International Agricultural Research Centres (IARCs) as ostensible “research institutions” and “gene-banks” for the South’s germplasm. By this process, an enormous quantity, quality, and diversity of plant life forms were transferred from the South into the gene-banks strategically located in several countries of the industrialized North. In this ingenious transfer of plant life forms, a hazy web of the notion of common heritage of mankind was woven around those institutions to legitimize what otherwise was an asymmetrical and illegitimate appropriation of plant life forms. What is striking in this grand international sleight of hand is that in international law, experts are unanimous in their view that the notion of common heritage of mankind is not applicable to plant germplasm located within state territories. Accordingly, the phenomenal transfer of plant germplasm from the South to the North without adequate compensation or even a token recognition of the intellectual contributions towards the improvement of the appropriated

germ plasm lacks lawful basis.⁶

The third and perhaps most radical method of appropriation is the patenting of plants and TKUP through the instrumentality of the patent system which has itself witnessed fundamental changes designed to facilitate and legitimize the appropriation of plants and TKUP. This has been largely made possible by a deliberate lowering of the threshold for patentability and several other ways of re-writing of traditional principles of the patent law system in order to accommodate the expansive interests of commercial seed merchants, pharmaceutical and biotechnological industries. As Chapter 2 has already demonstrated, it would be unhelpful to proceed as if intellectual property rights, particularly, patents have no impact on the plant and TKUP regimes. More often than not, the impact has been disastrous for practitioners of TKUP and other peoples operating in different cultural settings from the dominant Eurocentric empiricism. As the Bellagio Declaration on the Rights of Indigenous Peoples notes:

[I]ntellectual property laws have profound effects on issues as disparate as scientific and artistic progress, biodiversity, access to information, and the cultures of indigenous and tribal peoples. Yet all too often those laws are constructed without taking such effects into account, constructed around a paradigm that is selectively blind to the scientific and artistic contributions of many of the world's cultures and constructed in fora where those who will be most directly affected have no representation.⁷

Perhaps, it may be argued that the last phase of this process of appropriation may be the

⁶Anthony Stenson, & Tim Gray, *The Politics of Genetic Resource Control* (London: Macmillan Press, 1999) at 10-11. [hereinafter, Stenson & Gray]

⁷Bellagio Declaration, Online <<http://users.ox.ac.uk/~wgtrr/bellagio.htm> accessed on 9/9/99. [hereinafter, Bellagio Declaration]

sterilization of plant crops through hybridization by the so-called “terminator” technology.⁸

In spite of increasing global disquiet on the appropriation of plants and TKUP, it would seem that it is in the interests of the North, particularly the United States, to maintain the status quo. For example, while most of the industrialized world signed the CBD, the United States under President Bush (Snr) declined to adopt the convention for a variety of reasons including (i) the question of patent rights and (ii) disincentives to the development of new biotechnology products.⁹ The sharpest criticism by the United States against the CBD came from the pharmaceutical industry which felt that the regime of national sovereignty over plant genetic resources as re-affirmed by the CBD would discourage bio-prospecting and hurt their profits.¹⁰ As Vandana Shiva has argued, the North’s position was to ensure free access to the South’s plant diversity and TKUP.¹¹

This Chapter examines the role of international institutions in facilitating and legitimating the appropriation of plant life forms and TKUP. The entire analysis in this chapter is divided into five sections. Section I deals with the socio-cultural background to the phenomenon of both institutional and juridical appropriation of plants and TKUP. Such factors such as the “ethnicization” of traditional knowledge and outright denial of the

⁸Emily Kaiser, “Monsanto Promises not to Develop Seed-Sterilizing ‘Terminator’ Gene.” *National Post*, Tuesday, October 5, 1999.

⁹*United States’ Declaration Made at the United Nations Environment Programme for the Adoption of the Agreed Text of the Convention on Biological Diversity, issued May 22, 1992, (1993) 31 I.L.M. 848.*

¹⁰Daniel Jenks, “The Convention on Biological Diversity-An Efficient Framework for the Preservation of Life on Earth?” (1995) 15 *Northwestern Journal of International Law and Business* 636. [hereinafter, Jenks]

¹¹Ranee Panjabi, “International Law and the Preservation of Species: An Analysis of the Convention on Biological Diversity Signed at the Rio Earth Summit in 1992” (1993) 11 *Dickinson Journal of International Law* 187 at 224. [hereinafter, Panjabi on the CBD]

scientific basis of traditional knowledge are identified as the socio-cultural factors and prejudices which undermine the scientific legitimacy of traditional knowledge frameworks and thus facilitate the appropriation of products of that system of knowledge.

Section 2 takes an historical survey of the origins of appropriation of plants and TKUP starting with the so-called Colombian Exchange of the fifteenth century and extending until modern times in the form of appropriation through juridical methods. Section 3 examines the role of the notion of common heritage of mankind in the delegitimization of the scientific basis of traditional knowledge. It argues that there is no generally accepted principle of common heritage of mankind in international law. Hence, the notion that plants and TKUP constitute a part of the common heritage of mankind has no juridical basis. Rather, it is a political and rhetorical tool deployed by both the North and the South as and when it suits their respective interests.

Section 4 involves an analysis of the origins, development and entrenchment of the International Agricultural Research Centres (IARCs) as an institutionalized mechanism for the transfer of plant germ plasm from the South to the North without pay or recognition of the intellectual property interests of traditional farmers, particularly women, who have toiled over the millennia to improve those plants. It is argued that until recent times, the IARCs were the largest and most effective institutional mechanism for the appropriation of Southern germ plasm.

Section 5 details and discusses the role of the Food and Agriculture Organization (FAO) in the global politics on control of plant germ plasm and TKUP. It examines the juridical status of the concept of Farmer's Rights, the role of international law in the vexed

question of the legal status of Southern plant germ plasm housed and stored in *ex situ* gene banks located in the North. This section also makes brief comments on the newly adopted (it was adopted and opened for signature on 3 November 2001) *FAO International Treaty on Plant Genetic Resources for Food and Agriculture*. In sum, sections one to five deal with the appropriation of plants and germ plasm through international institutions funded and controlled by the North.

3:1 The Socio-Cultural Background to Appropriation of Plants and TKUP: The Sub-text of Gender and Cultural Prejudice

As earlier suggested, the appropriation of the South's plant life forms and TKUP has more or less operated on the wheels of two principal mechanisms; namely, the creation of the IARCs and the regime of patents on plants and TKUP. Both processes, particularly, the latter, derive their vitality from a deliberate process of socio-cultural denigration of the intellectual contributions of local and traditional farmers and healers, particularly women, to the improvement of plant crops and creation of TKUP.

The methods and processes of de-legitimizing the intellectual inputs of local and traditional farmers and healers is a direct function of the gendered and prejudiced assumptions of early science and colonial institutions which may not have been fully exorcised from the language and cultural life of modern science. Two methods are clearly discernible in this socio-cultural process of de-legitimizing and understating the intellectual contributions of non-western epistemology. The first process may be discerned from the denigrating and insidious lingual characterization of non-western epistemology as "ethnic"

knowledge. In other words, Eurocentric conceptions of non-western contributions seek to “ethnicize” the empirical knowledge of non-Eurocentric narratives and scientific frameworks. The object here is to present non-Eurocentric paradigms of knowledge as “culture-specific” in contrast with Western science which is presented as “de-cultured” and “universal.”¹²

The second process thrives on the implicit concept that non-European knowledge frameworks are inherently inferior to Western empiricism. Although it is a historical fact that as early as the 16th century, Francisco de Vitoria had argued that the legal principles and concepts of indigenous peoples deserved respect, his views were in the minority.¹³ Most of the colonisers of traditional and indigenous non-Caucasians held rather poor views of the natives whom they dismissed as “a barbarous race, possessing inferior rational capacities.”¹⁴ In the words of a modern writer, “the Indians had an inalienable right to be slaves.”¹⁵

Gradually however, the doctrine of racial inferiority of the colonized peoples was “replaced” with an insidious doctrine and attitude of benevolent guardianship which operated on the assumption that the colonized non-Europeans had the mental capacity of children.

¹²William Lesser, *Sustainable Use of Genetic Resources Under the Convention on Biological Diversity: Exploring Access and Benefit Sharing Issues* (Oxford: CAB International, 1997) at 113. [hereinafter, Lesser]

¹³Others like Bartolome las Casas opined that the natives were creatures of God and endowed with the same rational capacities as the invading Europeans. Similarly, Pope Paul III in the Papal Bull of 1537 clearly noted that the Indian were human beings with the same rational abilities as the Europeans. See, Felix Cohen “The Spanish Origin of Indian Rights in the Law of the United States” (1942) 31 *Georgetown Law Journal* 12.

¹⁴Guillermo Floris Margadant, “Official Mexican Attitudes Towards the Indians: An Historical Essay” (1980) 54 *Tulane Law Review* 967. See also, Edwin Williamson, *The Penguin History of Latin America* (London: Penguin, 1992)

¹⁵Margadant, *supra* at 964.

Given the unclear difference, if any, between discrimination and benevolent, patriarchal protection, it is not surprising that until modern times, traditional knowledge frameworks languished in the margins and merely served as objects of curiosity for Western anthropologists keen on exploring the supposed primitiveness of non-European peoples and societies.

With reference to the first level or process of denial of the internal logic and merit of non-Western empiricism, vestiges of the supposed notion of “ethnicness” of non-Western epistemology are extant. Thus, it is virtually the tradition in modern discourse on traditional and indigenous peoples’ knowledge to describe the study and knowledge of plants by Eurocentric scientists as “botany” while implicitly denigrating non-Western study and knowledge of plants as “ethno-botany”¹⁶ In the same vein, traditional knowledge is characterized as “folk-lore”¹⁷ while Western empiricism is characterized as being “scientific.” It is immaterial whether users of these discriminatory and prejudicial words and phrases in fact mean any harm. Law is about coded and clear rules of social behaviour and more often than not, these codes are transported and validated in and by language. Moreover, in the absence of any proof of the inherent inferiority or non-empiricism of non-western epistemological paradigms, the ethnicization and denigration of traditional knowledge is unfounded.

Indeed, it is remarkable that neither the pervasive and abiding notion of the “ethnic”

¹⁶The term “ethno-botany” was coined by the American botanist, John W. Harshberger in 1895 to describe studies of plants used by primitive and aboriginal peoples.

¹⁷Martha Johnson, ed, *Lore-Capturing Traditional Environmental Knowledge* (Ottawa: Dene Cultural Institute & International Development Research Centre, 1992) [hereinafter, Johnson]

character of traditional knowledge nor its supposed illogicality and inferiority is supported by reason or facts. In the first place, it is a well-known fact that the products of the so-called “ethnic” knowledge of traditional peoples and cultures which ought to have been “culture-specific” command global validity irrespective of where such products are applied or used.

The examples are legion but a few will suffice. For instance, the serpent tree which has been in use in India for thousands of years as a herbal remedy for some types of mental illnesses is used today to make drugs such as *reserpine* for epilepsy and high blood pressure. Hallucinogenic and pain relieving plants such as *papavar somniferum* and *erythroxylon coca*¹⁸ which were used as such by Indians are still used in modern days to produce morphine and cocaine.¹⁹ Of course, given their widespread use, especially in Europe and the United States, it would be absurd to suggest that those “ethnic” plants and their products such as morphine and cocaine have efficacy only on people living in “ethnic” cultural frameworks.

Similarly, quinine, which is used all over the world for the treatment of malaria is also an “ethnic” product of the traditional knowledge of the uses of the tree, *cinchona officinalis*. It has also been proven that the “ethnic” plant *withania somnifera* has an anti-tumour property; *gymnema sylvestre* has curative properties against diabetes and *centella asiatica* is anti-leprotic. In addition, *embelia ribes* is good as antihelminthic, *messua ferrae*

¹⁸According to eminent anthropologist, Prof. Vogel, until 1884 when Kohler distilled cocaine from coca leaves, accounts by native Americans of the immense powers of the coca leaves were dismissed. Physicians using coca to relieve pain of patients were made subjects of ridicule, as being incapable of judging a remedy’s qualities. Pharmacists making preparations of the drug were looked upon askance; as being concerned in a fraud, while the natives who employed it in their daily life, as well as the travelers who were impressed by what they had observed of its effects, were regarded as involved in ignorance, or imbued with superstitious imaginings. See, Virgil Vogel, “American Indian Influence on the American Pharmacopeia”, in Johnson, ed, *supra* at 103.

¹⁹Rajiv Sinha, *Ethnobotany-The Renaissance of Traditional Herbal Medicine* (Jaipur, India: Ina Shree Publishers, 1996)

is good for respiratory disorders and *carum coticum* lowers the blood pressure. The list is virtually endless and all these herbs have pharmacological properties consistent with the insights of the “ethnic” cultures which developed them.²⁰

As noted in Chapter Two, over a quarter of modern drugs prescribed all over the world are directly derived from plant life forms and most of them are products of the much denigrated “ethnic” knowledge of the uses of plants. Over 80% of peoples in the South rely on plants for their medicinal supplies; hence, the efforts of the World Health Organization to incorporate traditional healers in the dispensation of health care to billions of people all over the world.²¹ The absurdity in the characterization of TKUP as “ethnic” knowledge and thus lacking in universal empirical validity is perhaps best demonstrated in the global use of hitherto “ethnic” food crops. Virtually every urban neighbourhood in the world has a coffee shop. Yet, coffee is an “ethnic” crop from Ethiopia and Kenya. Maize was brought into Spain by Columbus in 1496 and today it is a major component of the diets of several countries of the world, especially, countries of East Africa. Similarly, the popular drink Coca-Cola which is probably the most universally recognizable “face” of global commerce is partly derived from two “ethnic” crops: the West African Kola nut and Gum Arabic from Sudan in Africa.

Popular food crops and drinks aside, before the settling of Europeans in North America, native Shoshone Indian women of Nevada chewed stoneseed for birth control

²⁰Sinha, *supra*. For example, years before James Linds’ experiment on scurvy, the American Indians had known the cause and cure of scurvy.

²¹George Meyer, Kenneth Blum & John Cull, eds, *Folk Medicine and Herbal Healing* (Illinois: Charles Thomas Publisher., 1981)

purposes.²² Western scientists initially scoffed at the idea of birth-control through stoneseed. Later, modern science confirmed that stoneseed contains oestrogen which regulates ovulation. Today, stoneseed forms the basic ingredient for modern birth control pills. The revolutionary implications on human rights and the empowerment of women wrought by this “culture-specific” “folk-lore” is common knowledge. The magnitude of TKUP has not yet been exhausted. As the Director-General of the WHO in 1977 Halfdan Mahler pointed out, “let us not be in doubt: modern medicine has a great deal still to learn from the collector of herbs.”²³ In sum, the notion that the so-called “ethnic” knowledge of traditional peoples is “culture-specific” while Western science has universal applicability is ridiculous.

Until late, modern medicine and science scoffed at and ridiculed the practices of traditional medicine. This attitude probably started changing after the end of colonialism as the ex-colonies began to re-evaluate their cultures and made some attempts to save it from the patronizing and denigrating tendencies and postures of the colonizing Europeans. Over the years, it has become orthodox wisdom in certain enlightened quarters in the North that non-western epistemology²⁴ is no less empirical than its Western counterpart. In some cases,

²²Reflecting the general Euro-centric off-hand dismissal of TKUP in those times, the scientist Norman Hines as late as 1936 dismissed the claims of the Shoshone women as useless. Without deigning to verify their claims, he maintained that “no drug has yet been discovered which, when taken by mouth, will induce temporary sterility.” See, Johnson, *supra* note 17 at 111. However, other doctors were not so blinded. Dr. Benjamin Barton of the medical faculty of the University of Pennsylvania declared in 1798 that the Indians had knowledge of the some of the most inestimable medicines. He wrote a treatise on sixty indigenous plant remedies and fourteen of his students wrote dissertations on native remedies and practice. It is equally interesting to note that the discoverer of insulin, Dr. Frederick Banting was tremendously inspired by the Indians of British Columbia who used extracts from the devil’s club-*fatsis horrida* for the treatment of diabetes. Johnson, *ibid*.

²³*Supra*. See also, Erwin Ackerknecht, *Medicine and Ethnology* (Baltimore, Maryland: The Johns Hopkins Press, 1991)

²⁴N. Ezeabasili, *African Science: Myth or Reality* (New York: Vantage Press, 1977)

the former has demonstrated ingenious holism and breadth of vision. It is perhaps in recognition of the reductionist nature of Western empiricism and its ignorance or neglect of the cultural dimension of technological development that Western science is increasingly becoming multi-disciplinary in its approach. Of course, both systems have their limitations and strengths²⁵ and can complement each other.²⁶

With reference to the second issue concerning the alleged inherent inferiority of non-western knowledge frameworks and the lack of empiricism thereof, Vogel and other writers are persuaded that American Indian medicine was at least equal, and probably superior in many respects, to that of sixteenth century Europe.²⁷ Indeed, Professor Brown has observed that:

[T]he impressive knowledge of the Native American peoples about a wide variety of natural phenomena is not however accidental, nor has its acquisition been haphazard. It is based on generations of systematic inquiry. It is the accumulation of and transmittal of repeated observations, experiments and conclusions. Some of the elements of the scientific method were inherent in their processes.²⁸

²⁵Carl-Martin Edsman, ed, *Studies in Shamanism* (Uppsala: Almqvist & Boktryckeri, 1962); Andreas Lommel, *Shamanism-The Beginnings of Art* (Mcgraw-Hill Book Company, Toronto., 1967); J.B. Loudon, ed, *Social Anthropology and Medicine* (London: Academic Press, 1976)

²⁶In January 1975, the Board of the American Association for the Advancement of Science passed the following Resolution:

[B]e it resolved that the Council of the Association (a) formally recognizes the contributions made by Native Americans in their own traditions of inquiry to the various fields of science, engineering, and medicine, and (b) encourages and supports the growth of natural and social programs in which traditional Native Americans approaches and contributions to science, engineering, and medicine are the subject of serious study and research.

See, David Landy, ed, *Culture, Disease, and Healing-Studies in Medical Anthropology* (New York: Macmillan Publishing Co. Inc, 1977)

²⁷Johnson, *supra* note 17 at 252.

²⁸David Landy, *supra* note 26 at 252.

Examples of the empirical basis of TKUP are legion. For instance, Michael Balick notes that around the Ganges and the foothills of the Himalayas, the natives, by observing how the Mongoose ate the *chotachand* shrub before engaging cobras in combat deduced that the plant was an antidote to snakebite.²⁹

The short point here is that non-western knowledge frameworks are no less empirical but merely suffer a cultural denigration. In effect, as Michael Balick argues a “deeper reluctance to explore indigenous knowledge systems may be attributed to cultural prejudice dating to the years when the Western powers reigned over colonies.”³⁰ During the period of colonial imperialism, Balick argues that Western medicine:

[W]as taken as a prime exemplar of the constructive and beneficial effects of European rule. This western medicine was to the imperial mind, one of its most indisputable claims to legitimacy. Since western medicine was regarded as *prima facie* evidence of the intellectual and cultural superiority of Europeans, the figure of the medicine man or shaman was often viewed as inimical to social and cultural progress. Indeed the perjorative term ‘witch doctor’ has come to stand for savagery, superstition, irrationality and malevolence.³¹

If cultural biases are eschewed, Michael Balick argues that “indigenous traditions and science are epistemologically closer to each other than Westerners might assume.”³² Quoting F.S.C.

Nortrop, Peter Morley also argued that:

[O]ne must seriously ask oneself whether superstition and myth, in the derogatory or non-scientific connotations of these words, are not due to our judging a given people

²⁹Michael Balick & Paul Alan Cox, *Plants, People and Culture-The Science of Ethnobotany* (New York: Freeman and Company, 1996)

³⁰Micheal Balick, *supra*.

³¹Balick, at 36.

³²Balick, *supra* at 2.

from our conceptual standpoint, rather than theirs...when the trouble was taken to find their concepts, then it became evident that everything made sense and that their behaviour and cultural norms followed as naturally and consistently from their particular categories of natural experience as ours do from our own. I believe it is just as much an error to suppose that there were no people anywhere who insisted on empirically, and hence scientifically, verified basic concepts before Galileo. Prevalent as the latter is, it is nonetheless nonsense.³³

Morley further argues that “ throughout the vast range of traditional medical systems are many beliefs and practices which contain an element of techno-empirical knowledge.”³⁴ Yet, the tendency has been to denigrate and at best consider traditional medical practice as “primitive.”³⁵ On the question of the input of the indigenous farmers to cultivating and saving germ plasm, Lesser observes that recent studies clearly show that indigenous farmers and breeders were clearly aware of the formalized findings of Mendel on genetic traits and breeding. In his view, local knowledge is ‘empirical in a pragmatic sense’³⁶ In sum, the characterization of traditionally-modified plants and TKUP as “raw material”³⁷ or “ethnic” knowledge with local and parochial validity is not only objectionable but unfounded.

³³Peter Morley, “Culture and the Cognitive World of Traditional Medical Beliefs: Some Preliminary Considerations” in, Peter Morley & Roy Wallis, eds, *Culture and Curing-Anthropological Perspectives on Traditional Medical Beliefs and Practices* (Pennsylvania: University of Pennsylvania Press, 1978) at 1. [hereinafter, Morley]

³⁴Morley, *supra* at 4.

³⁵Morley, *supra* at 6. But see, O.N Muchena & E. Vanek, “From Ecology Through Economics to Ethno-science: Changing Perceptions on Natural Resource Management” in, D.M Warren, *et al*, eds., *The Cultural Dimensions of Knowledge: Indigenous Knowledge Systems* (London: Intermediate Technology Publications)

³⁶Lesser, *supra* note 12 at 114

³⁷Cheryl Hardy, “Patent Protection and Raw Materials: The Convention on Biological Diversity and its Implications for U.S. Policy on the Development and Commercialization of Biotechnology” (1994) 15 *University of Pennsylvania Journal of International Business Law* 299; Daniel Jenks, *supra* note 10; John Adair, “The Bioprospecting Question: Should the United States Charge Biotechnology Companies for the Commercial Use of Public Wild Genetic Resources?” (1997) 24 *Ecology Law Quarterly* 131.

3.2: The Early Beginnings of Institutionalized Appropriation of Plants (1492-1941)

Inasmuch as the Westphalian paradigm conferred states with sovereign jurisdiction over their respective municipalities, no state has been wholly self-sufficient for its food or medicinal needs. The world is interdependent on plant life forms. Thus, the irreplaceable and multiple roles, values, and functions of plants have often necessitated a large measure of international interaction and co-operation on plants and derivatives from plants.³⁸ However, a critical analysis of the directional flow and methods of transfer of plants from one state or region to the other reveals an asymmetrical and inequitable regime. In other words, the movement and transfer of plant germ plasm and products has been largely from the South to the North with the South having little or nothing to show for the interaction.

Further analysis of the methods of transfer and “exchange” of plant life forms between the North and the South equally reveals the existence of a potent regime which is a brilliant combination of subterfuge, inequality in bargaining power created by and sustained by colonialist and neo-colonialist structures and a manipulation of both international patent law and institutions to facilitate free and unhindered flow of plant germ plasm from the South to the North.

What is indeed intriguing in the process is that although North-South relations are notoriously controversial and emotive, especially in the light of colonial context and neo-colonialist tendencies, historians and other analysts have largely tended to focus on the looting, pillaging and theft of artefacts of Southern gold, silver, ivory, wood, *et cetera* by the colonialists. Yet, neither land, nor gold and silver artefacts and ornaments were the only

³⁸Chapter 2 (1), *supra*.

motives which propelled colonialism. Exotic plants were also a factor. However, as Kloppenburg has noted, “little note has been taken of the appropriation of plant genetic resources”³⁹ by the forces of colonialism.

Even Karl Marx’s revolutionary and profound insight into and analysis of material dialecticism in global capital history, paid little attention to the role of plants in colonialism nor did he explore the asymmetrical movement of plant resources and its radical import in changing the power and political structure across the globe.⁴⁰ Other eminent historians, political philosophers, economists and other scholars have largely devoted their energies to explicating on and scrutinizing the phenomenal plunder and hemorrhage of human and mineral resources suffered by colonized territories and peoples.

It may be argued that unlike gold and silver, plants are renewable resources. It seems more probable that the real cause for this under-statement of the role of plants is the near prosaic nature of plant transfer from one state to the other. Save in exceptional circumstances, the history of plant transfer is no match for the high drama and colour associated with the historical phenomenon of state-sponsored looting and pillaging of gold and silver by swashbuckling European explorers, pirates, and *conquistadors*. Simply put, plant theft seems benign, if not mundane. Without being trivial, it is probable that if the famed

³⁹Kloppenburger, *supra* note 2 at 154.

⁴⁰In his material dialectics argument, Marx acutely observed that:

[T]he discovery of gold and silver in America, the extirpation, enslavement and entombment in mines of the indigenous population of that continent, the beginnings of the conquest and plunder of India, and the conversion of Africa into a preserve for the commercial hunting of black skins, are all things which characterize the dawn of the era of capitalist production. These idyllic proceedings are the chief moments of primitive accumulation ... These treasures captured outside Europe by undisguised looting, enslavement, and murder flowed back to the mother-country and were turned into capital there.

See, Karl Marx, *Capital* Volume 1 (New York: Vintage Books, 1977) at 915-918.

state-sponsored pirate, Sir Francis Drake had upon return from his voyages, had the temerity to present the British Queen with a bowl of cotton seeds, rubber-seeds or peanuts and the like, no knighthood or state honour would have gone his way.

Yet, plants have always formed the substratum on which diverse human civilizations have prospered and rested. For example, since the times of Christopher Columbus, it is a historical fact that:

[T]he New World supplied new plants of enormous culinary, medicinal, and industrial significance: cocoa, quinine, tobacco, sisal and rubber. More than this, the Americas also provided a new arena for the production of Old World's plant commodities (e.g., spices, bananas, tea, coffee, sugar, indigo).⁴¹

The profound implication here is that the asymmetrical movement of plant life forms from the South to the North largely underpinned and indeed, redefined the structure and configuration of global economy, human population, cultural, scientific, and international legal order. For example, having destroyed its own forests (before the age of iron ships) the historical might of the United Kingdom, which was largely a function of its command of the seas, would have been otherwise were there no Indian forests to keep Her Majesty's navy and merchant marine afloat.

Similarly, it is remarkable that "a single coffee tree reaching the Amsterdam botanic gardens in 1706 from Ethiopia via Ceylon and Java became the basis for the New World coffee industry."⁴² Furthermore, and perhaps, more poignantly, the developmental trajectory of the United States, its sustained use of enslaved labour of people of colour and the

⁴¹Kloppenburg, *supra* note 2 at 154.

⁴²William Lesser, *supra* note 12 at 14.

consequential contribution of that disreputable practice to the discourse and law on human rights and equality would probably not have occurred if there were no sugarcane, cotton-farms, *et cetera*. Plants gave basis to those manifestations of the complexity of human spirit and thus created the institutions and laws which afforded a site for examination of the ramifications and contents of the soul of humanity.

The case of quinine is probably the perfect example of the process and wider implications of appropriation of plants and TKUP.⁴³ As already evident, the grand irony here is that it was the same quinine which enabled European colonizers to penetrate, survive and ultimately colonize the malaria-infested parts of Africa, Asia and Latin America. The inescapable point is that plants have always played critical roles in redefining, reconfiguring and revitalizing the global balance of power and indeed, affording the locus for the interrogation and re-examination of the meaning of human dignity or lack thereof.

For purposes of historical convenience rather than exactitude, the origins of the appropriation of plants may be placed in the “Colombian Exchange” of 1492, when

⁴³Quinine, is the well-known anti-malarial which comes from the bark of the Peruvian *cinchona* tree. Andean indigenous groups supposedly learned of the bark’s powers while observing feverish jaguars eating the cinchona bark. In 1636, an Incan healer cured the Spanish viceroy’s wife of her recurrent malaria fevers using bark from the bush. The Countess of Chichon’s wife was so excited that she distributed what she called the “Countess’ powder” to the people of Lima who suffered the fever. Jesuit priests sent the remedy to Europe with the name “Jesuits Powder” and soon after Cardinal Lugo dispersed the miraculous medication and purveyed it under the name “Cardinal’s powder.” Rome in that era was the malarial capital of the world. Surrounded by marshes, its ‘*mal aire*’ (bad air) led to the disease’s name “malaria.” The unhealthy conditions of the Vatican meant that the seat of Christianity was nearly abandoned several times, after the deaths of various Popes and dozens of cardinals. By 1650, the mysterious remedy had become known at the Vatican and awakened interest in other European capitals. In 1679, Britain’s Robert Talbot had quina plants sent from Peru and began to market the powder derivative of the bark. In 1820, French chemists Pelletier and Caventou, isolated quinine or “chinchonia,”- named in honor of viceroy Chinchon’s wife-from the bark of the quina tree. They honoured the Countess, but nobody ever remembered the Inca doctors who discovered its curative properties, who genetically developed the plant and used it for many years. See, Abraham Lama, “Law to Protect Native Intellectual Property” *IPS News Bulletin*, 12 January 2000, online<<http://www.ips.org> accessed on 2/21/00.

Christopher Columbus' forays into the Americas with some plant germ plasm marked the introduction of "exotic" plant species. As already noted, since then, the face of the earth, in both the spread and distribution of human populations and in the realignment of geopolitical power has radically changed. Columbus returned to Europe with maize in 1493 and in 1494, he was back in the Americas with wheat, olives, chickpeas, onions, radishes, sugar cane, and citrus fruits (for scurvy) to support a European colony.⁴⁴

Subsequent voyages added potatoes to the diet of Europe, and with it, a phenomenal increase in European population on both sides of the Atlantic and thus a radical re-configuration of the world.⁴⁵ As Kloppenburg further notes:

[M]aize and potatoes had a profound impact on European diets. These crops produce more calories per unit of land than any other staple but cassava (another New World crop that spread quickly through tropical Africa). As such, they were accepted, though often reluctantly, by peasantries increasingly pressed by enclosures and landlords, and by a growing urban proletariat.⁴⁶

Soon after Columbus' sporadic and disorganized transfer of plants from the "New World" to the "Old World" and from parts of the New World to other parts of the same New World, the critical importance of "exotic" plant germ plasm has never been lost on the political leaders of the fledgling North. In Europe, a worldwide network devoted to the collection of germ plasm from the South was quickly put in place; hence, the origin of the botanical

⁴⁴Kloppenburg, *supra* note 2 at 155.

⁴⁵As a result of the abundance of food-potatoes-the European population nearly doubled in a space one century (1750-1850).

⁴⁶Kloppenburg, *supra* at 155. The Irish and indeed, the entire British practically relied on potatoes for subsistence.

gardens, particularly, by the British.⁴⁷ These institutions routinely collected the world's plant resources, of which the decisive majority were tropical or subtropical in origin. Given that most of these tropical and subtropical territories and peoples were under European colonial yoke, the asymmetrical transfer of germ plasm from the colony to the mother-country was more or less perceived as "an internal affair" of the colonial empires. For example, germ plasm from British colonies in Asia and Africa were routinely transferred not only to the Royal Botanical Gardens in the United Kingdom but to other parts of the British empire as if the empire was one juridical entity; if not *de jure*, at least *de facto*.

Thus, scientists, breeders and plant germ plasm collectors, particularly, from the North collected and transferred a huge quantity and quality of economically useful and rare plant life forms to botanical gardens, gene banks, research institutions and breeding programmes which were scattered across the various outposts of the colonial empires. In the absence of legal restrictions of this *de-facto*, if not *de jure* "intra-state" transfer of germ plasm, the unfounded notion has recently emerged, especially amongst environmental activists⁴⁸ and many social scientists that plants, even in the post-colonial era formed a part of the so-called Common Heritage of Mankind.⁴⁹

However, a sober analysis of state practice and other forms and evidences of international law clearly shows that there has never been a regime of common heritage of

⁴⁷The imperial botanical gardens stretched from Australia, Africa, the Caribbean, India, to virtually all corners of the globe. See, Lucile Brockway, *Science and Colonial Expansion: The Role of the British Botanic Gardens* (New York: Academic, 1979)

⁴⁸Pat Mooney, *Seeds of the Earth: A Private or Public Resource?* (Ottawa: Inter Pares, 1979)

⁴⁹John Mugabe, *et al*, eds., *Access to Genetic Resources– Strategies For Sharing Benefits* (Bonn: IUCN-ELC, 1997) at 7. [hereinafter, Mugabe]

mankind as respects plant germ plasm. The unsupportable theory that plants are part of the Common Heritage of Mankind has wrought enormous mischief and confusion on the fledgling regime of access to plants and equitable sharing of the benefits of plants. Having regard to the important points of law involved and the ubiquitous nature of the issue in modern discourse and debates on patents on plants and TKUP, it is pertinent at this stage to clarify the issues and demonstrate the fallacy in the theory that plants were until recent times, part of the Common Heritage of Mankind.

3:3 The Appropriation of Plants and Concept of Common Heritage of Mankind

The concept of Common Heritage of Mankind, hereinafter, CHM,⁵⁰ entered the lexicon of international law a few decades ago.⁵¹ Since then, there has been ambiguity in defining it.⁵² Notwithstanding, the uncertainties surrounding the meaning of its constitutive terms, one major factor remains constant: that is, the narrowness of the scope of the concept of CHM. The concept of CHM⁵³ has only attained juridical mention within the ambit of

⁵⁰Christopher Joyner, "Legal Implications of the Concept of the Common Heritage of Mankind" (1986) 35 *International and Comparative Law Quarterly* 190. [hereinafter, Joyner]

⁵¹Rudiger Wolfrum, "The Principle of the Common Heritage of Mankind" (1983) 43 *ZaorV Heidelberg Journal of International Law* 312. [hereinafter, Wolfrum]. While some scholars attribute the origins of the common heritage concept to Ambassador Pardo of Malta in 1967, others point to Aldo Cocca's statement some months earlier at the deliberations for peaceful uses of the outer space in 1967. It seems however that Ambassador Pardo was the first to articulate the concept of common heritage of mankind as a potential principle of international law. In any event, the notion of CHM does not pre-date 1967 and as such, the concept is of very recent vintage. The implication is that it could not have governed transaction on plants prior to its debut.

⁵²For an examination of the confused state of thinking on the concept of CHM, see, Stephen Gorove, "The Concept of Common Heritage of Mankind": A Political, Moral or Legal Innovation" (1972) *San Diego Law Review* 390. [hereinafter, Gorove]

⁵³Aldo Cocca, "Mankind as the New Legal Subject: A New Juridical Dimension Recognized by the United Nations" (1971) *Proceedings of the 13th Colloquim on the Law of Outer Space* 211. The notion of "mankind" as a full-fledged legal entity has not yet come into juridical existence.

claims of communal rights on areas or resources which lie outside the limits of state jurisdictional authority: a sort of *res communis humanitatis*.⁵⁴ In other words, it is a term and concept applied to the so-called global commons.⁵⁵ These include the ocean floor,⁵⁶ outer space,⁵⁷ the moon⁵⁸ and Antarctica.⁵⁹

It is thus apparent that the notion of CHM is the very opposite of principles of international law governing access to, control or dominion over assets or properties which fall within the jurisdiction of a recognized state. In effect, sovereignty and jurisdiction over a territory is an infeasible aspect and character of statehood and whatever falls within the boundaries of a state is subject to the amplitude and magnitude of state jurisdiction.⁶⁰ This is a well-known principle of international law and it would be invidious to start citing

⁵⁴There are however, some differences between CHM and the notion of *res communis humanitatis*. For further analysis of this issue, see, Malcolm Shaw, *International Law* [2nd ed.] (Cambridge: Grotius Publications Ltd, 1986) 276 [hereinafter, Shaw]; Cheng Bin, "The Legal Regime of Airspace and Outer Space: The Boundary Problem, Functionalism versus Spatialism: The Major Premises" (1980) 5 *Annals of Air & Space Law* 323. Attempts to extend the concept of CHM to the vexed issue of transfer of technology has however failed. See, *The Draft International Code of Conduct on the Transfer of Technology of May 6, 1980*, (1978) 17 I.L.M. 462.

⁵⁵Ian Brownlie, *Principles of Public International Law*, 3rd ed., (Oxford: Clarendon Press, 1972) at 258-286.

⁵⁶Jon Van Dyke & Christopher Yuen, "Common Heritage v. Freedom of the Seas: Which Governs the Seabed?" (1982) 19 *San Diego Law Review* 493.

⁵⁷Leslie Tennen, "Outer Space: A Preserve For All Humankind" (1979) 1 *Houston Journal of International Law* 145.

⁵⁸Carl Christol, "The Common Heritage of Mankind Provision in the 1979 Agreement Governing the Activities of States on the Moon and Other Celestial Bodies" (1980) 14 *International Lawyer* 429.

⁵⁹Christopher Joyner, "Antarctica and the Law of the Sea: Rethinking the Current Legal Dilemmas" (1981) *San Diego Law Review* 415.

⁶⁰For fuller discussion, see, James Crawford, *The Creation of States at International Law* (Oxford: Clarendon Press, 1979); *Rainbow Warrior Incident* (1985) *International Law Reports* 74.

authorities in support thereof.⁶¹

Ideologically, the notion of CHM is a political and rhetorical tool of convenience used by both the North and the South whenever it suits their respective interests. For example, the concept of CHM was a counterpart of the doomed movement by the South for a New International Economic Order (NEIO). Thus, in that context it was primarily designed by the South to deny the technologically advanced North the legal right to exploit and lay claims of rights of ownership over the last frontiers of the world, particularly, the ocean seabed and the continent of Antarctica.⁶² The North clearly saw through this gimmick and rejected the initiative.

Conversely, the North which has largely rejected the notion of CHM as a principle of international law has been quite enthusiastic in proclaiming that the CHM concept applies to plants. As Kloppenburg explains:

[C]ommon heritage and the norm of free exchange of plant germ plasm have greatly benefitted the advanced capitalist nations, which not only have the greatest need for and capacity to collect exotic plant materials but also have a superior scientific capacity to use them.⁶³

Conversely again, when the South believed that its agricultural outputs could be dramatically improved by adopting the North's intensive method of farming and appropriating the so-called High Yield Varieties (HYVs) created from the South's germ plasm through genetic

⁶¹However, for sources on further reading on this subject, see, Jennings & Watts, eds, *Oppenheim's International Law* Vol. #1, 9th ed, (London: Longman, 1992) at 563-580.

⁶²Bradley Larschan & Bonnie Brennan, "The Common Heritage of Mankind Principle in International Law" (1982-3) 21 *Columbia Journal of Transnational Law* 305. [hereinafter, Larschan & Brenna]

⁶³Kloppenburg, *supra* note 2 at 167.

modification, it enthusiastically declared all plant life forms (including the HYV's) a Common Heritage of Mankind. The North rejected this characterization of genetically modified HYV's as CHM. Henry Vogel has articulated and analyzed the North-South politics and rhetorics on CHM within the concept of the conflict between privatization of the benefits of plant resources and socialization of the costs of access to those resources. In his words:

[G]enetic resources are a prime example of privatization having more to do with power relationships in the contemporary world than with neo-classical economic science. Until quite recently, Northern industry has been able to privatize the benefits of bio-technologies that derive from genetic resources while at the same time, socializing the cost of access to those genetic resources. Genetic resources were free under the doctrine known as the 'common heritage of mankind.' Being on the opposite sides of the trade, Southern countries have long wanted to privatize genetic resources but socialize access to bio-technologies. Rather than arguing for a symmetrical reform and the privatization of profits and costs, both the North and the South would like asymmetrical reform: the privatization of just their profits and the socialization of just their costs. For the North this would mean that the South gives up its genetic resources but recognizes its intellectual property rights(IPRs); for the South this would mean that the North gives up its IPRs but recognizes a Southern claim on the use of its genetic resources. In the struggle for inefficiency and inequity, the North is winning.⁶⁴

Accordingly, the CHM notion has become an ideological tool in the politics of and struggles for resources across the globe. Leaving ideology aside, the question remains whether in international law, there is a settled principle of common heritage of mankind, and if so whether such principle governs the regime on plant resources. In answering this question, particularly the second limb, reference must be had to the pertinent sources of international

⁶⁴Josef Henry Vogel, "An Economic Analysis of the Convention on Biological Diversity: The Rationale for a Cartel" (on file with the author). [hereinafter, Vogel] Persons interested in this article may reach Professor Vogel at: henvogel@earthling.net.

law, particularly, the primary sources namely, treaties and custom.⁶⁵ With reference to the first limb of the question posed above, it seems that notwithstanding the substantial confusion which has afflicted the concept of common heritage of mankind, five major characteristics may be said to delimit the contours of the notion of CHM.⁶⁶

First, the area in question to which the concept of CHM may apply must be free from appropriation of any kind and hypothetically, must be managed by all states.⁶⁷ Second, under the CHM regime, it follows that all peoples would be expected to co-manage the common space in their capacity as representatives of mankind simpliciter.⁶⁸ In other words, there can be no supervening national interests wherever the concept of CHM is deemed to be applicable. The third factor seems to be that whatever economic benefits accrue from this global management of a common space would vest in the global community.⁶⁹ These are the necessary inferences from the element or quality of the term “common” as used in the notion of CHM.

The fourth element is that the area of common global ownership must be a

⁶⁵See, Article 38 of the *Statute of the International Court of Justice. Concluded at San Francisco, 26 June 1945. Entered into force, 24 October 1945.* 1976 Y.B.U.N. 1052.

⁶⁶Most of these characteristics are derived from Ambassador Pardo's thesis in his historic statement. See, “Declaration and Treaty Concerning the Reservation Exclusively for Peaceful Purposes of the Seabed and the Ocean Floor, Underlying the Seas Beyond the Limits of Present National Jurisdiction, and the Use of Their Resources in the Interests of Mankind,” UN Doc. A/AC.105/IC.2/SR (17 Aug. 1967). See also, A. Pardo, *The Common Heritage: Selected Papers on Oceans and World Order 1967-1974* (1975).

⁶⁷For a comprehensive analysis of the concept of CHM in international law, see, Kemal Baslar, *The Concept of the Common Heritage of Mankind in International Law* (The Hague: Martinus Nijhoff, 1998) [hereinafter, Baslar]

⁶⁸Gorove, *supra* note 52.

⁶⁹Joyner, *supra* note 50 at 192.

completely demilitarized zone where only peaceful activities are conducted.⁷⁰ The final element concerns the conduct of scientific activities in the area under the CHM principle. Such research must be freely and openly permissible and the physical environment and ecology of the area in question must not be impaired.⁷¹ Even a cursory examination of this elements and an extrapolation to the principles of state sovereignty clear shows the inapplicability of the notion of CHM to plant life forms within the boundaries of states.

Although the concept of CHM has enjoyed mention and recognition in some treaties, especially treaties dealing with the deep seabed,⁷² the moon,⁷³ outer space and celestial bodies,⁷⁴ and the continent of Antarctica,⁷⁵ some scholars doubt whether CHM is now a generally accepted principle of international law. In other words, there seems to be a debate, perhaps semantic, whether recognition of the concept or notion of CHM in treaty law is

⁷⁰Baslar, *supra* note 67 at 83. See also, D. Shraga, "The Common Heritage of Mankind: The Concept And Its Application" (1986) 15 *Annales D'Etudes Internationales* 45.

⁷¹Baslar, *ibid.*

⁷²For example, Part XI of the 1982 Law of the Sea Convention provides that "the Area [i.e. the sea-bed and ocean floor beyond the limits of national jurisdiction] and its resources are the common heritage of mankind." See, Article 137, *United Nations Convention on the Law of the Sea (With Annex V)*. Concluded at Montego Bay, 10 December 1982. Entered into force, 16 November 1994. U.N. Doc. A/CONF.62/122; reprinted in 21 I.L.M. 1261 (1982) [hereinafter, 1982 UNCLOS]. See also, *Declaration of Principles Governing the Sea-Bed and the Ocean Floor, and the Subsoil Thereof, Beyond the Limits of National Jurisdiction; adopted by the United Nations General Assembly*, 17 December 1970. U.N. Doc. A/RES/2749 (XXV), 10 I.L.M. 220 (1971).

⁷³*Agreement Concerning the Activities of States on the Moon and other Celestial Bodies*, December 5, 1979, (1979) 18 I.L.M. 1434. [hereinafter, Moon Treaty]

⁷⁴*Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, 610 U.N.T.S. 205.

⁷⁵*Antarctic Treaty*, concluded at Washinton, I December 1959; entered into force, 23 June 1961, reprinted in 40 U.N.T.S. 71.

synonymous with the status of “generally accepted principle of international law.”⁷⁶ Strict “constructionists” of international law will readily argue that CHM is not yet a generally accepted principle of international law. On the face of it, there are some arguments which may be made for this point of view. Generally speaking, for a concept be considered as a generally accepted principle and a part of international law, it would seem that “the content of the principle must be distinct enough so as to enable it to be part of the general corpus of international law.”⁷⁷ Given the problematic meanings of the constitutive words “common”, “heritage” and “mankind”, it may therefore be doubted whether any coherent or logical clarification of the concept exists at international law. As subsequent paragraphs would demonstrate, this argument is not tenable.

However, the word “common” refers to something which belongs to all. Expressly and impliedly, management of such entities or resource requires the consent and representative mandate of all who have property in the thing held in common. Second, the term “heritage” refers to property which has been inherited. It is impossible to conceive of the relevance of this term to plants which may well be unknown to humanity let alone being capable of being passed on as a heritage. As already, indicated, the term “mankind” has not yet acquired any juridical meaning in international law. Accordingly, Wolfrun, Gorove and Joyner are ostensibly on solid ground in their argument that the concept of CHM is afflicted with internal inconsistency if not anarchy.

⁷⁶See for example, Joyner, *supra* note 50 at 198.

⁷⁷Wolfrun, *supra* note 51 at 333. For an authoritative and fresh insight into the vexed question of precision of custom at international law, see the seminal work of, Anthony D’Amato, *The Concept of Custom in International Law* (Ithaca: Cornell University Press, 1971) [hereinafter, D’Amato]; Larschan & Brennan, *supra* note 62.

On the other hand, it is also a matter of common knowledge and experience among international lawyers that there are principles of international law which are not known for their clarity but are nonetheless accepted as generally accepted principles of international law. In other words, conceptual clarity is not a condition precedent to the emergence of legal concepts as a generally accepted principle of international law. Ready examples of legal concepts which are not the epitomes of conceptual clarity but which have recently assumed the character of generally accepted principles of international law include the principles of sustainable development and precaution.⁷⁸ The point here is that although conceptual clarity is a virtue and a desirable value in legal norms, absence thereof is not necessarily fatal to the status and characterization of a concept or principle as a generally accepted principle of international law. After all, in the development of international law, vague terms and phrases often ripen into coherent and clearer concepts and principles of law.

It would seem that the crucial factor in determining general acceptance of principles of international law is that the resultant state practice from allegiance to and compliance with that concept (regardless of the clarity of the concept itself), in this case, CHM, must be demonstrably evident and accompanied with the requisite *opinio juris*.⁷⁹ A corollary to this requirement is that the custom of acceptance of that concept or principle, in this case, the CHM concept, must be widespread. Here, the CHM stands on a shaky ground.

It is remarkable that those treaties which recognize CHM have witnessed the lowest numbers of ratifications, especially, in view of the global implications of the CHM concept.

⁷⁸Chapter 2:7, *supra*; Chapter Five, *infra*.

⁷⁹Joyner, *supra* note 50 at 198. Professor Joyner thus concludes that CHM is at best a philosophical notion with the potential of emerging and crystallizing as a legal norm.

For example, the Moon treaty has only the barest number of ratifications for its effectivity-five. Apart from this miserably poor number of ratifications, none of the five State-parties to the Moon treaty-Austria, Chile, Netherlands, Philippines and Uruguay- is a space-faring state. When this fact is juxtaposed with the universal significance of the moon and the ubiquitous nature of the usefulness of celestial bodies and space in daily life (satellite television, telephony, weather forecasting, etc) the low number of ratifications leaves the CHM in a weak position as a generally accepted principle of international law in respect to the norm.

The inescapable conclusion is that the concept of CHM is a principle of international law. Whether it is “a generally accepted principle” of international may well amount to an idle debate of a semantic nature. Assuming but not conceding that the concept of CHM is a generally accepted principle of international law, the second limb of the question, to wit; whether the “principle” of CHM is applicable to plant resources, deserves further examination. In resolving this issue, it is equally useful that due regard must be had to the sources and evidences of international law, the principles of state sovereignty and how these principles apply to plant life forms. As already noted, Article 38 of the Statute of the International Court of Justice details the general sources and evidences of international law.⁸⁰

First, assuming that the concept of CHM is an accepted principle of international law, there is no international treaty or convention which characterizes or designates plants as part of the CHM. Indeed, it is striking that unlike other “emergent” or “fledgling” concepts and principles in international law, particularly on the environment, there is not even a single

⁸⁰Note 65, *supra*.

declaration or resolution by the United Nations General Assembly which declares that plants constitute part of CHM.⁸¹ More significantly, all references to CHM in treaties and declarations of the the organs of the United Nations have consistently been in the context of the last frontiers on earth, and celestial space and objects. None of the treaties which mention CHM pertains to spaces traditionally under state sovereignty and jurisdiction.

The absence of a treaty law basis for the purported applicability of CHM to plant life forms is not a remarkable omission or a coincidence. International law is state-centric and is founded on the control of each state over its own territories, subject to principles of international law.⁸² Article 8 of the Montevideo Convention is clear on the point as it provides that no state has the right to intervene in the internal or external affairs of another. Indeed, all aspects of international law, treaty law and otherwise on State sovereignty implicitly and expressly recognize the undoubted powers of states to regulate access to plant life forms within their respective jurisdictions.⁸³

In the absence of treaty law support for CHM on plants, attention may be shifted to customary international law. Here again, the notion of a CHM regime on plants holds no

⁸¹*South West Africa Cases* (1960) I.C.J. Rep. 6 at 323. Even the recently adopted FAO *International Treaty On Plant Genetic Resources for Food and Agriculture* reiterates that plants are part of national sovereignty of states. Article 10 thereof provides that:

[I]n their relationships with other States, the Contracting Parties recognize the sovereign rights of States over their own plant genetic resources for foof and agriculture, including that the authority to determine access to those resources rests with national governments and is subject to national legislation

See *FAO Treaty on Plants*, available online > fao.org/ag/cgrfa.IU.htm accessed on 24/11/01. [hereinafter, FAO treaty on plants]

⁸²The 1933 *Montevideo Convention on Rights and Duties of States*, Dec. 26, 1933. 165 L.N.T.S 19.

⁸³Jennings & Watts, *supra* note 61 at 563-580. See for example, *International Convention for the Protection of Plants*, April 16, 1929, reprinted in 126 L.N.T.S.305 (1931-32)

water. In the first instance, the concept of CHM entered global discourse in the late 1960's. In other words, the concept of CHM is of recent vintage. In contrast, the activities in question, that is, the transfer or appropriation of plant life forms through colonial and post-colonial national and international "research" institutions largely occurred during the colonial and immediate post-colonial era spanning from 1492 till the late 1960's. In effect, assuming but not conceding that the CHM concept is a principle of customary international law, the CHM concept could not have governed activities which had occurred decades before it [the notion of CHM] came into existence. It would be absurd to suggest that an idea which was first proposed in the late 1960's formed the legal basis of transactions in 1940, for example. Customary international law does not operate retroactively.

Furthermore, an examination of state practice shows that indeed, the concept of CHM has no roots in customary international law. That is to say, state practice or custom⁸⁴ accompanied by evidence of *opinio juris* clearly show that the notion of CHM on plant life forms is not part of customary international law. States have always sought to protect and sustain their monopoly of and hegemony over economically useful plants. Thus, even though states, particularly the gene-rich states of the South, were made to yield their plant life forms to their colonial masters as part of contributions to the international agricultural "research" centres, such practice lacked the character of customary international law.

This is so because the element of *opinio juris sive necessitates*, (which Anthony D'Amato in his classical disquisition has beautifully reformulated as the articulation of

⁸⁴Michael Akehurst, "Custom as a Source of International Law" (1974-5) 47 *British Yearbook of International Law* 12 at 36; D'Amato, *supra* note 77 at 75.

reciprocal international behavior with legal consequences)⁸⁵ is conspicuously missing. Here, the psychological element involved is the articulated expectation in state relations that a particular act or omission will have legal implications. It is the voluntary and volitional choice to be bound in law by a free act. In the absence of the psychological element of articulated expectation of reciprocal juridically significant behavior, otherwise known as *opinio juris sive necessitatis*, the transfer of plant germplasm from the South to the North through the instrumentalism of international “research centres” or colonialist institutions lacks the legal sense of obligatoriness which is the essential characteristic of customary international law. As such, those transfers of plant life forms do not amount to a customary international law of CHM on plant life forms. Repetition of the practice, no matter how frequent, would not yield a legally binding obligation unless it could be shown that the practice was articulated and carried out in the belief that there was a legally binding obligation to do so in international law.⁸⁶

This distinction is crucial as it constitutes the divide between a mere social usage and a legally binding principle of customary international law.⁸⁷ Indeed, a close study and analysis of relevant state practice shows clearly that states have always sought to keep economically useful plants out of the reach of other states. This practice is particularly evident in the case of states with the requisite enforcement mechanisms for such an

⁸⁵D’Amato *supra* at 74-75. McDougall makes the same point when he referred to it as “world constitutive prescription.” See, Myers McDougall, Lasswell, & Reisman, “The World Constitutive Process of Authoritative Decision” (1967) 19 *Journal of Legal Education* 403.

⁸⁶See, for example, Justice Gray, in the *Paquette Habana*, 175 U.S. 677 (1900)

⁸⁷See, Gregori Tunkin, “Remarks on the Juridical Nature of Customary Norms of International Law” (1961) 49 *California Law Review* 419; Lazare Kopelmanas, “Custom as a Means of the Creation of International Law” (1937) 28 *British Yearbook of International Law* 127.

exclusionary policy or the ability to police their territorial borders. Of course, the reproducibility of many plants by seeds made such policies difficult to implement effectively.

States conducted themselves in a manner clearly supportive of the position that they had sovereignty over plants within their jurisdiction and were under no legal obligation to grant free access thereto. For example, economic and military powers like France, the Netherlands, United Kingdom adopted elaborate and often stringent measures to “keep useful [plant] materials out of competitors’ hands.”⁸⁸ Examples of state control over plants are legion. For example the French were so determined to sustain their monopoly on the indigo dye trade that the export of indigo seeds from French Antigua (a French colony) was made a capital offence.⁸⁹ Prior to the CBD era, the government of Ethiopia systematically embargoed the transfer of coffee germ plasm from Ethiopia. Furthermore, it has always been difficult to obtain black pepper from India and Ecuador does not freely supply cocoa germ plasm to other cocoa-producing states. Peru and Bolivia once made trade in quinine (an extract from the bark of the Cinchona tree native to those countries) a government monopoly.

Of course, no state could have seriously argued that such actions were violative of international law. Sometimes, desperate measures were taken by states to maintain control over plants in their territories. For example, the Dutch, in order to maintain their global monopoly on the supply of nutmegs, destroyed all nutmeg and clove trees in the Moluccas except those on three islands where they located their plantations.⁹⁰ In like manner,

⁸⁸Kloppenburger, *supra* note 2 at 154. See also, Cyrille de Klemm, *Biological Diversity Conservation and the Law--Legal Mechanisms for Conserving Species and Ecosystems* (Gland: IUNC, 1993) at 56.

⁸⁹Kloppenburger, *supra* at 154.

⁹⁰Kloppenburger, *supra* note 2 at 154.

audacious attempts were also sponsored by states to break the monopoly of other states on some plants of key economic importance. For example, the British, in order to break the Brazilian iron-grid monopoly on the global supply of rubber (Brazil controlled 95% of global trade in rubber), in 1876 encouraged and aided Henry Wickham to successfully smuggle out 70,000 rubber seeds in a boat which eventually reached British colonies in Asia. Wickham's intriguing escape with the rubber seeds literally sowed the seeds of the collapse of the Brazilian monopoly on rubber production.⁹¹

It is thus evident from the above instances and analyses that the undoubted powers of states to regulate access to and the use of plant life forms within their domains has always remained an inherent and intrinsic aspect of statehood. Such laws span the entire gamut of forests, wildlife, parks, and trade in endangered species. Such laws are indeed so well-known and trite as to obviate the need for citation here. However, a few examples will suffice. The *Zimbabwe Parks and Wildlife Act of 1975* requires a permit to enable any individual to collect a protected indigenous plant from any of the national parks. The Act also authorizes the relevant Minister to prohibit persons from collecting any indigenous plants from any of the national parks.⁹²

Indeed, prior to the emergence of the notion of CHM on plants, most countries of the world, if not all, had national quarantine laws regulating the importation of diseased or

⁹¹Klaus Bosselman, "Plants and Politics: The International Legal Regime Concerning Biotechnology and Biodiversity" (1995) 7 *Colorado Journal of International Environmental Law and Policy* 111. Brazil now manages with a miserable 5% share of the world rubber trade. The multi-billion dollar rubber industry is today dominated by British and American conglomerates, Dunlop and Firestone with massive plantations in Liberia and Malaysia.[hereinafter, Bosellman]

⁹²Similar provisions are also included in the Indian Wildlife (Protection) Act of 1972, the Papua New Guinea Fauna (Protection and Control) Act of 1976, the Ugandan Forest Act and the Kenya Forest Act of 1942. See, Mugabe, supra note 49.

potentially-diseased plants. Yet, it has not been suggested that such legislative powers on plants are dependent or contingent upon an external permission or the pleasure of an external transnational authority, or even the so-called concept of CHM on plants. Coextensive with the power to regulate access to plant resources, the International Covenant for the Protection of Plants, signed at Rome on April 16, 1929⁹³ mandated the contracting states to establish relevant machineries for the regulation of the import and export of plants.”⁹⁴

Clearly, states have always had as an inherent part of their status as such, the legal power and jurisdiction to regulate and determine the inflow and outflow of plant life forms within their respective domestic jurisdictions.⁹⁵ In effect, the concept of state sovereignty over plants falls within the more extensive concept and principle of Permanent Sovereignty Over Natural Resources, hereinafter, PNSR.⁹⁶ In the governance of the same subject-matter,

⁹³*International Convention for the Protection of Plants*, April 16, 1929, *supra* note 83. Article 4 of the Plant Convention provided thus:

The Contracting States undertake to enact all necessary measures both to prevent and combat plant diseases and pests and to supervise the importation of plants and parts of plants, in particular those consigned from countries not as yet possessing any official organisation for the protection of plants. When Contracting States require that plants or parts of plants to be imported shall be accompanied by a health certificate issued by a competent official agent duly authorized by the exporting state, the Contracting States must conform to the provisions of the present Convention.

Article 6 proceeds further by providing that “each state retains the right to inspect and place in quarantine plants or parts of plants, or temporarily and exceptionally to prohibit their importation, even when the consignments are accompanied by a health certificate.

⁹⁴Article 4, Plant Convention, *supra*.

⁹⁵Mugabe, *supra* note 49.

⁹⁶PSNR emerged and developed after the end of the World War II to affirm and assert the sovereignty of developing countries over their own natural resources. It seems to have matured from a “fundamental principle of the New International Economic Order (NIEO) to the same status of *jus cogens* similar to the right of self-determination in the present international order.” Baslar, *supra* note 67 at 137.

the concept of PNSR⁹⁷ and CHM are thus mutually exclusive.⁹⁸

The internal conflict between CHM and PSNR is best dramatized in the Amazon issue. The North has long argued that Brazil *should not* (this is clearly distinct from “does not”) have absolute sovereignty over the Amazon region.⁹⁹ Brazil controls approximately three-fifths of the Amazon. The Amazon itself comprises of some 42% of Brazilian territory. It produces 50 percent of the world’s oxygen¹⁰⁰ and a substantial part of the world’s fresh water and biodiversity.¹⁰¹ Given its universal importance, it is very tempting to misconstrue the Amazon as a CHM.

However, the North’s concern over Brazilian (ab)use of the Amazonia has never really impressed the Brazilians who insist that “we [they] are masters of our [their] destiny and will not permit any interference in our [their] territory.”¹⁰² Needless to add, concerns over

⁹⁷See, *Permanent Sovereignty over Natural Resources*, UN General Assembly Resolution 1803 (XVII); Principle 21 of the 1972 *Stockholm Declaration*, Article 30 of the *Charter of Economic Rights and Duties of States* of 1974 (UNGAOR 3281, XXIV); Principle 2 of the 1992 *Rio Declaration*. For an excellent and exhaustive treatment of the subject, see Nico Schrijver, *Permanent Sovereignty Over Natural Resources: Balancing Rights and Duties* (Cambridge: Cambridge University Press, 1997) [hereinafter, Schrijver] Some scholars have thus opined that the common heritage of mankind regime can only start where it is agreed that the PSNR ends. See, Baslar, *supra* note 67 at 137.

⁹⁸Nico Schrijver, “Permanent Sovereignty over Natural Resources versus the Common Heritage of Mankind: Complementary or Contradictory Principles of International Economic Law?” in Denters, Peters Waart eds, *International Law and Development* (Dordrecht: Martinus Nijhoff Publishers, 1988). See also, Stephen Schwebel, *Justice in International Law* (Cambridge: Cambridge University Press, 1994) at 401.

⁹⁹R.M. McClearly, “The International Communities Claim to Right in Brazilian Amazonia” (1991) 39 *Political Studies* 691; J. Goldenberg & E.R. Durham, “Amazonia and National Sovereignty” (1992) 2 *International Environmental Affairs* 22.

¹⁰⁰Hence, Cocca’s argument that “the oxygen produced by the Amazonian forest ...should be declared common heritage of mankind”. See, A.A. Cocca, “The Common Heritage of Mankind: Doctrine and Principle of Space Law: An Overview (1986) 29th *Coll. On the Law of Outer Space* 17, at 22.

¹⁰¹K. Zimmerman, “The Deforestation of the Brazilian Amazon: Law, Politics, and International Cooperation” (1990) 21 *Inter-American Law Review* 513.

¹⁰²McCclearly, *supra* note 99 at 692.

Brazilian (mis)management¹⁰³ of the Amazon does not entitle any state or a group of states to assert a right of individual or collective extra-territorial jurisdiction over Brazilian Amazonia.¹⁰⁴ Accordingly, states have always had the right, albeit largely unexplored and sometimes fallow, to determine, regulate, and control access to plant life forms within their respective jurisdictions. Perhaps, what may have confused some modern scholars on this issue is the subtle but real distinction between access free of charge with free access *simpliciter*. The former was largely the case until the phenomenon of proprietary rights over the South's germ plasm by corporate and industrial seed merchants.

If there were any juridical doubts on this issue, it is fair to say that the CBD has laid such doubts to rest. Accordingly, it would be an overstatement, indeed, an error, to argue or posit, as most scholars and commentators¹⁰⁵ have done, that the CBD created a "new" regime of state sovereignty over plant life forms. The CBD merely reaffirmed an inherent, pre-existing right of state jurisdiction over plant life forms. It would seem that what has changed in recent times is the stridency and vociferousness with which States, particularly from the gene-rich South are reasserting their perceived right of sovereignty over plants within their respective jurisdictions. Having disposed of the issue of CHM as it applies to plants, it is now apposite to examine the processes by which the North, by the use of international institutions appropriates plants and TKUP from the South.

¹⁰³Internally, the "development" of Amazon by the Brazilian has literally destroyed the Indians. As the Governor of Roraima declared in 1975, "an area as rich as this cannot afford the luxury of conserving half a dozen Indian tribes who are holding back the development of Brazil." Baslar, *supra* note 67 at 185.

¹⁰⁴Baslar, *supra* note 67 at 154.

¹⁰⁵Lesser, *supra* note 12 at 99.

3.4: International Agricultural Research Centers (IARCs) and the Institutionalization of Appropriation of Plants: The North-South Context

Following a meeting in 1941 between Vice-President Wallace¹⁰⁶ of the United States and the President of the Rockefeller Foundation, Raymond Fosdick, “it was thought that a program of agricultural development aimed at Latin America in general and Mexico in particular would have both political and economic benefits”¹⁰⁷ for the United States. By 1943, the Rockefeller Foundation started its Mexican Agricultural Program with the ostensible primary focus on the improvement of wheat and corn.¹⁰⁸ However, the idea was not just to “improve” wheat and corn. Rather, “from the very first, the collection of indigenous germplasm was an important component of the Rockefeller Foundation’s Mexican Agricultural Program and of the other Latin American Initiatives.”¹⁰⁹

What is equally significant here is the perspicacity in the timing of this paradigmatic shift in the appropriation of plants. That is to say, the Rockefeller-Ford initiative displayed profound business acumen and foresight in that it realized the imminence of the demise of colonialism and the consequential loss of the colonial apparatus for funneling plant germ plasm from the South to the North. Hence, a new mechanism for appropriating plant life forms was imperative if the crucially important transfer of plant germ plasm was to continue

¹⁰⁶It is significant that Vice President Wallace was also the founder of one of the largest seed firms in the world-Pioneer Hi-Bred. He was also an ardent advocate of patents on plants.

¹⁰⁷Kloppenborg, *supra* note 2 at 158.

¹⁰⁸Similar projects were started in Guatemala, El Salvador, Venezuela, Brazil, Uruguay, Argentina, Costa Rica, Cuba, Colombia, Peru and Chile under the auspices of the United States Department of Agriculture. See, Kloppenburg, *supra* note 2 at 158.

¹⁰⁹Kloppenborg, *ibid.*

unhindered. As William Lesser has argued, with the “decline of the empire system...governments lacked the military presence and legal authority to compel sovereign nations to yield valuable germ plasm.”¹¹⁰ Thus, the Rockefeller-Ford initiative probably marked the beginnings of a post-colonial institutionalization of the global network for the appropriation of the South’s germplasm on the ostensible grounds of fostering research in agricultural crops. The Rockefeller Foundation in conjunction with the United States government spawned the series of International Agricultural Research Centers, hereinafter, IARCs, in the South. The location of the IARCs in the various countries of the South was not a product of fortuitous occurrences or a series of coincidences. The IARCs are established in each region known for its phenomenal stock of indigenous germ plasm, that is to say, the so-called Vavilov centres. For example, the International Rice Research Institute (IRRI) is located in the Philippines;¹¹¹ the International Center for Agricultural Research in Dry Areas (ICARDA) is located in Syria;¹¹² the West African Rice Development Association (WARDA) is located in Liberia;¹¹³ the International Potato Center (CIP) in Peru;¹¹⁴ *et cetera*.¹¹⁵

¹¹⁰Lesser, *supra* note 12 at 14.

¹¹¹The indigenous and diverse stock of rice species and cultivars in the Philippines is very significant.

¹¹²This country and the region is the center of origin of such economically important cereals such as wheat.

¹¹³Liberia contains a majority of African indigenous rice species.

¹¹⁴Potatoes originated in Andes.

¹¹⁵Other IARCs include the International Institute of Tropical Agriculture(IITA) in Nigeria, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India, and the International Maize and Wheat Improvement Center (CIMMYT) in Mexico. See, Kloppenburg, *supra* note 2 at 161.

In justifying the choice of Guatemala, it was argued by the Rockefeller Foundation that “...the Tropical Research Center has been located in Guatemala to search for genes or characters that will improve our corns.”¹¹⁶ By this process of institutionalized appropriation of plant germ plasm, the United States amassed a large collection of corn and other plant germ plasm which was subsequently released into the farm fields of the United States and Europe without any economic benefits for the South or recognition of the intellectual property rights of the local farmers, particularly women, who had spent millennia (and still continue to do so) in improving the plant germ plasm in question. Thus, for each crop of global significance, such as corn, wheat, rice, and other cereals, the IARCs were established at the respective centre of diversity and origin and then funneled to the North.¹¹⁷

In little time, an enormous quantity, quality, and diversity of plant germ plasm had been collected and it is no coincidence that it was also at this period that the idea of expanding and reconfiguring the patent system to allow for patents on plants took roots. It is significant that the United States itself simultaneously began a process of aggressively patenting plants and plant products by deliberately lowering the threshold on patentability. These issues are however dealt with in the next section. Having amassed a huge quantity and diversity of plant germ plasm, the next phase and problem was how to store the collected plant germ.

By 1956, this problem had largely been solved by the construction of the National

¹¹⁶Kloppenburg, *ibid.*

¹¹⁷Kloppenburg, *supra* at 161.

Seed Storage Laboratory (NSSL) at Fort Collins, Colorado, United States.¹¹⁸ It should be noted that the plant germ plasm could easily have been stored in their countries of origin but this never happened. Thus, while over 80 percent of all economically useful plant germ plasm and varieties indigenous to the South were collected by the IARCs, most of the actual storage or gene banks of the collections (called accessions) are located in the North.¹¹⁹ The Food and Agriculture Organization (FAO) has identified over 1200 plant genetic resource collections worldwide, held in more than 160 countries and territories.¹²⁰

Overall, governments hold 83% of the accessions, the International Agricultural Research Centres (IARCs) 11% and the private sector held 1.27%. The IARC collections contain about 35% of the unique samples, making them probably “the world’s most significant collection”¹²¹ of Southern plant germ plasm. As Naomi Roht-Ariazza notes, “most genetic materials collected in Southern countries-68% of all crop seed, 85% of all livestock, and 86% of microbial culture collections are held at the IARCs or in Northern countries.”¹²²

In effect:

[T]he advanced capitalist nations, though poor in naturally occurring plant genetic diversity, are as rich in “banked” germ plasm as the developing nations of the Third World. Indeed in a number of crops (wheat, barley, food legumes, potato) the

¹¹⁸Kloppenburg, *ibid.*

¹¹⁹“Institutes Conserving Crop Germplasm: The IBPGR Global Network of Genebanks.” International Board for Plant Genetic Resources (Rome: 1984). Fifty of the ninety IBPGR designated gene banks are located in the North.

¹²⁰See. UNEP/CBD/IC/2/13, 1994 par. 16.

¹²¹Lesser, *supra* note 12 at 99.

¹²²Naomi Roht-Arriaza, “Of Seeds and Shamans: The Appropriation of the Scientific and Technical Knowledge of Indigenous and Local Communities” (1996) 17 *Michigan Journal of International Law* 940 at 945. [hereinafter, Arriazza] See also, Lesser, *ibid.*

advanced capitalist nations possess more stored germ plasm accessions than do those nations that are the regions of natural diversity for the crop.¹²³

Thus, removed from their area of original jurisdiction, the collected plant germ plasm was released to the public in the North without economic payment to the traditional farmers who developed them nor recognition of the intellectual contributions of local farmers and breeders of South.

Until recent times, the IARC's were co-ordinated by the Consultative Group on International Agricultural Research, hereinafter, CGIAR, with the mandate to "co-ordinate the disparate and haphazard network of germ plasm collection around the World."¹²⁴ The CGIAR was established in 1971. According to Kloppenburg, the CGIAR "spearheaded and sustained what has come to be known as the Green Revolution."¹²⁵ But that is hardly the end of the Rockefeller-Ford inroad into plant life forms. As Kloppenburg further notes:

[T]he IARCs perform a dual role in the processing of plant germ plasm. They necessarily collect and evaluate indigenous land races and primitive cultivars that are the raw materials from HYVs (high yield varieties) are bred. And because their "imported" agricultures are based on the very species that the IARCs are mandated to improve (i.e., corn, wheat, potato), such collection and evaluation are of direct value to the developed nations. The IARCs are...vehicles for the efficient extraction of plant genetic resources from the Third World and their transfer to the gene banks

¹²³Kloppenburg, *supra* note 2 at 166.

¹²⁴Stenson & Gray, *supra* note 6 at 13.

¹²⁵Kloppenburg, at 160. It deserves mentioning that the doomed Green Revolution of the 1960's was not devoid of North-South intrigues, particularly, during the Cold War. In effect, the "Green Revolution" was not completely altruistic as it constituted a major pawn in both the economic and ideological conflict between the East and the West in the struggle for the soul of the South. The appropriated plant germ plasm from the South was thus modified and subjected to heavy doses of agricultural inputs such as fertilizers and herbicides for "bumper" harvests which were then used to dramatize the wonders of capitalist science and technology. The objective was to de-legitimize the competing ideology of communism which was then become appealing to many countries of the South, particularly, in Asia. For further analysis of the politics of plant life forms, see, Stenson & Gray, *supra* note 6.

of Europe, North America, and Japan...The CGIAR system is, in one sense, the modern successor to the eighteenth- and nineteenth-century botanical gardens that served as conduits for the transmission of plant genetic information from the colonies to the imperial powers.¹²⁶

In effect, the CGIAR was an institutional channel for funneling plant germ plasm from the South to the North free of charge and without an acknowledgment of the intellectual contributions of traditional and local farmers of the South, particularly women, who form a decisive majority of the active farming population in the South. In effect,

[S]eed banks and gene banks collect Southern germplasm and distribute it to gene-poor Northern countries; thus a large proportion of commercially used genetic material moves to the Northern countries via the IARCs. Studies estimate, for example that 21% of the U.S. wheat crop was derived from material stored at the International Maize and Wheat Improvement Center, the IARC for wheat.¹²⁷

It is equally noteworthy that storage of the germ plasm *ex situ* in the North practically renders such germ plasm inaccessible to the original providers from the South. Commenting on this phenomenon, Garrison Wilkes notes that “the centers of diversity are moving from natural systems...to gene banks and breeders’ working collections with the liabilities that a concentration of resource implies.”¹²⁸

The next phase in the process of “concentration of resource” was the deliberate expansion, relaxation and re-configuration of the patent system to accommodate patents on plants and TKUP. This issue is dealt with in the next section but suffice it to note that the

¹²⁶Kloppenburg, *supra* note 2 at 161. [emphasis added]

¹²⁷Ariazza, *supra* note 122 at 944.

¹²⁸See, Garrison Wilkes, “The World’s Crop Germplasm- An Endangered Resource” (1977) 33 *Bulletin of the Atomic Scientists* 8-16.

regime of patents on plants was a phenomenon which started after the institutionalization of large scale appropriation of plant germ plasm from the South to the North through the IARCs mechanism.

However, it was the success of the CGIAR in providing the germ plasm for the development of the so-called high yield varieties (HYVs) which ultimately brought into focus the dangerous consequences of excessive and mercantilist reliance on HYVs.¹²⁹ In other words, driven by the forces of profit, most crops in the agribusiness world, particularly in the North, are based on very narrow genetic diversity; thus raising real fears and potentials of disastrous vulnerability to pests and diseases. The irony here is that the gospel of “Green Revolution” and HYVs enthusiastically promoted by corporate and political interests of the North across the globe was a potent poison pill for plant genetic diversity. That is to say, the limitations of using the shallow criteria of “market forces” as the defining parameter of which plant species should perish or thrive was becoming obvious.¹³⁰

The problem of genetic uniformity in plants thus brought to the fore, especially in the 1960s and 1970s, the economic importance of Southern germplasm as “insurance” against the ravages of any pest or disease attack on industrial crops or farming as an industry. In turn, this realization fueled another round of aggressive collection of plant germplasm by the Northern-controlled IARCs. The FAO thus organized two conferences where a decision was

¹²⁹The erosion of plant genetic diversity was partly fueled by the successes of the HYVs. In effect, since the elite commercial varieties on which agri-business is based show a high degree of genetic uniformity, they are highly susceptible to disease and pest attack in a way that more heterogenous land races are not. Needless to add, the effects of narrow plant genetic bases can be quite disastrous. The Irish potato blight of the 18th century is a notorious case. Similarly, the American corn blight of 1970 wiped out fifteen percent of American corn harvest for that year.

¹³⁰Robert Prescott-Allen, *Genes From The Wild* (Earthscan: 1988) at 17. [hereinafter, Prescott-Allen] See generally, Chapter 2 (5) (d), *supra*.

reached to the effect that “a coordinated global program of collection and conservation was necessary to ensure that the essential raw materials of plant improvement was not lost.”¹³¹

Similarly, in 1972 the UN Conference on the Human Environment in Stockholm issued a resolution calling for an international program to preserve the germplasm of tropical crops. In consequence, the Beltsville Conference in Maryland in 1972 recommended the establishment of the International Board for Plant Genetic Resources (IBGR). The significant fact here is that instead of locating such an international programme under the FAO which is an agency of the United Nations, the Northern-controlled CGIAR argued that it [the CGIAR] be designated the research arm of world agricultural development.

The anomalous compromise in this situation was the creation by the CGIAR in 1974 of the International Board for Plant Genetic Resources, hereinafter, IBPGR.¹³² Although it was physically placed in the FAO offices in Rome,¹³³ to all intents and purposes, it was constituted as a CGIAR institution and thus under the political and financial control of the industrialized states of the North.¹³⁴ For example, the budget of the IBPGR is not provided for by the FAO but by twenty of the most industrialized states who have little or negligible

¹³¹Kloppenburg, *supra* note 2 at 163.

¹³²The IBPGR and Its Policy on *In Situ* Conservation. FAO Doc/AGPG:IBFGRI/83/143 at 1. Note that for many plants there is no alternative to *in situ* conservation. These include cocoa, breadfruit and rubber. Their seeds are not storable.

¹³³The IBGR is housed in the FAO headquarters in Rome. The IBGR secretariat is in the FAO hedaquarter and its financial resources are provided by the CGIAR. The IBPGR has the goal of encouraging and coordinating efforts to conserve, document, evaluate, and use plant germplasm. This organization is the primary international coordinator of worldwide genetic resource activities. The IBGR has since 1993 been reorganized and renamed the International Plant Genetic Resources Institute (IPGRI).

¹³⁴See, “Report of the Quinquennial Review of the International Board for Plant Genetic Resources”, Consultative Group on International Agricultural Research (Rome: 1980)

indigenous plant germplasm of commercial significance but are the greatest commercial users of plant germplasm. In fact, sixty-nine percent of the IBPGR's 1984 budget was underwritten by just six of these donors; namely, Canada, Japan, Netherlands, United Kingdom, the World Bank and the United States Agency for International Development.¹³⁵

Further, the policies of the IBPGR are not set by debate among the global community constituted in the wider FAO but "through decision-making processes internal to the CGIAR."¹³⁶ In Kloppenburg's scathing, albeit irrefutable insight, "the IBPGR may cloak itself in the "internationalist" legitimacy provided by its association with the FAO, but the board is not subject to the control of the United Nations. The financial heart and soul of the IBPGR lies elsewhere."¹³⁷

The loyalty of the IARCs to the North is also reflected in the ideological and political stance of the IARCs in the non-release of plant germ plasm to states perceived by it to be ideological enemies, especially during the Cold War era. In addition, until recent times, legal claims to ownership have been made by some powerful states of the North to the plant accessions originally from the South but stored in its (the North's) gene banks.

As already hinted, in some cases, those gene banks, for political or economic reasons, refused to release or grant free access to the stored germ plasm to some states even when those states were the original donors of the plant accession in question. For example, the gene banks located in the United States have been known several times to refuse free access

¹³⁵See, "International Board for Plant Genetic Resources Annual Report 1983." (Rome: 1983)

¹³⁶Kloppenborg, *supra* note 2 at 164.

¹³⁷Kloppenborg, *ibid.*

to requests from original donors such as Afghanistan, Albania, Cuba, Libya, Nicaragua, and the defunct Soviet Union. According to the Administrator of one of the gene banks,

[W]e are willing to accept selected collections for long-term maintenance at Fort-Collins. They would become the property of the U.S Government, would be incorporated with our regular collections, and made available upon request on the same basis as the rest of the collection ...As you know, it has been our policy for many years to freely exchange germ plasm with most countries of the world, political considerations have at times dictated exclusion of a few countries.¹³⁸

Naturally, as the overt politicization and appropriation of the stored germplasm became exacerbated by patents and plant breeder's rights on plant germ plasm taken from the South and "improved" in the North for re-sale to the South, the South began a dissent to the dispensation.¹³⁹ The North dismissed the arguments of the South and observed that there were no legal barriers stopping the South from "improving" the plant germplasm itself and re-selling it in the global market as it wished.¹⁴⁰ The discontent of the South was soon to find expression in the framework of the FAO and ultimately lead to an aggressive re-assertion of national and state sovereignty over plants. Ultimately, the juridical solution was the emergence of an international legal order which recognizes the peculiar character of plant genetic resources as both a national and global asset. This is apparent from the texts of both the CBD and the newly adopted FAO International Treaty on Plant. At this stage, an analysis of the events leading to the latter would be very beneficial.

¹³⁸As quoted in Kloppenburg, *supra* at 172. [emphasis mine]

¹³⁹A. Putter, ed, *Safeguarding the Genetic Basis of Africa's Traditional Crops* (The Netherlands: CTA, 1994)

¹⁴⁰The implication here is that all plant germ plasm from the South are wild raw materials. See, Abdulqawi Yussuf, "International Law and Sustainable Development: The Convention on Biological Diversity" (1995) 1 *African Yearbook of International Law* 109.

3:5 The FAO and the Politics of Appropriation of Plants

At the FAO's 21st biennial conference in 1981, a resolution was passed instructing the Director-General of the FAO to prepare a draft of an international agreement that would provide a legal framework for controlling the flow of plant genetic resources across the globe.¹⁴¹ The draft agreement which was prepared was designed to be a legally binding convention, but in a classic display of diplomatic maneuvering by both sides, the document was reduced to a hortatory and ineffectual undertaking.¹⁴² The 1983 FAO undertaking is a non-binding instrument with platitudes and ill-defined, turgid exhortations on the notion of common heritage of mankind on plant germ plasm. In hindsight, it seems that both the South and the North over-reached each other in the struggle for juridical and political control over plant life forms.

In sum, the 1983 undertaking seems to be a mis-conceived attempted *coup d'etat* by the South against the perceived inequity of prevailing regimes. In its short-sightedness, the South, probably influenced by the politically-charged book by Canadian activist Pat Mooney,¹⁴³ wanted to have a regime of CHM on plants, including the so-called elite varieties

¹⁴¹See, "Plant Genetic Resources: Report of the Director-General." Document C 83/25, August, (Rome: FAO) The debate on the 1983 undertaking was acrimonious. The fact that a numerical vote was forced on the question was by itself no feat. At the end of the day, the numerical advantage of the South and their common outrage at the appropriation of plant germplasm withstood the formidable attempts of the North to thwart a change of the status quo.

¹⁴²*International Undertaking on Plant Genetic Resources*, Resolution 8/83 of the Twenty-second Session of the FAO Conference, 23 November 1983 [hereinafter, 1983 undertaking]; *Agreed Interpretation of the International Undertaking* Resolution 4/89 and Farmers Right, Resolution 5/89, of Twenty-fifth session, 1989. 102 countries have adhered to the Undertaking which is a non-binding instrument.

¹⁴³Pat Mooney, *The Seeds of the Earth: A Private or Public Resource?* (Ottawa, Inter Pares, 1979). Mooney's brilliant but incendiary work detailed and analysed the mechanisms of appropriation and privatization of the South's germ plasm by the multinational seed merchants of the North.

produced in the laboratories of the North from germplasm originally collected from the South through the IARCs. The short-sightedness here is the erroneous notion that the so-called “elite” versions of plant germ plasm were desirable when in fact the elite varieties require enormous agricultural inputs and are antithetical to sustainable agriculture as known to hundreds of millions of local farmers in the South.

Thus, the aim of this mis-perception of the utility of “elite” plants was to establish a regime of global free access to those varieties modified and marketed by the North under patent regimes. Thus, article 2 of the 1983 undertaking defines “plant genetic resources” to include the reproductive or vegetative propagating materials of:

- (i) cultivated varieties (cultivars) in current use and newly developed varieties;
- (ii) obsolete cultivars;
- (iii) primitive cultivars (land races);
- (iv) wild and weed species, near relatives of cultivated varieties;
- (v) special genetic stocks (including elite and current breeder’s lines and mutants).¹⁴⁴

As Tilford has observed, “by the terms of the 1983 Undertaking, the common heritage blanket spreads over not only the Vavilov centres and Third World farmer’s fields, but over Northern agricultural laboratories as well.”¹⁴⁵ Needless to add, the North considered this challenge to the status quo unacceptable.

The response by the North, particularly the United States’ seed industry was immediate and intense. The American Seed Trade Association fulminated that the 1983 International Undertaking struck “at the heart of free enterprise and intellectual property

¹⁴⁴1983 Undertaking, *supra* note 142.

¹⁴⁵David Tillford, “Saving the Blue Prints: The International Regime for Plant Resources” (1998) 30 *Case Western Reserve Journal of International Law* 373. [hereinafter, Tillford]

rights.”¹⁴⁶ The United States government refused to sign the Undertaking or to join the Commission on Plant Genetic Resources, and promised no financial support. Other countries of the North followed suit.¹⁴⁷ What is quite remarkable, indeed ironic here is that while the North enthusiastically supported the erroneous characterization of plants from the South as CHM, it “steadfastly maintained that inclusion of elite or commercial varieties [under the CHM rubric] was flatly unacceptable”¹⁴⁸ to it. In the North’s view, it could not freely give away the right of commercial plant breeders.¹⁴⁹ Yet, by necessary implication, the rights of local and traditional farmers and breeders, particularly women, were expected to be sacrificed at the altar of an unfounded notion of CHM.

If the 1983 undertaking contains any progressive or redeeming element, perhaps, attention should be focused on its Article 7. The provisions of Article 7 in the 1983 Undertaking practically sought to re-write the well orchestrated Northern institutionalization of appropriation of the South’s plant diversity. The said article mandates the development of:

[A]n internationally coordinated network of national, regional, and international centres, including an international network of base collections in gene banks, under the auspices or jurisdiction of the FAO, that have assumed the responsibility to hold, for the benefit of the international community, and on the principle of unrestricted exchange, base or active collections of the plant genetic resources of particular species.¹⁵⁰

¹⁴⁶Tilford, *ibid.*

¹⁴⁷Tilford, *supra* at 412.

¹⁴⁸Kloppenburg, *supra* note 2 at 173.

¹⁴⁹Denmark, Finland, France, Norway, Sweden, United Kingdom and New Zealand officially opposed the 1983 undertaking.

¹⁵⁰1983 Undertaking, *supra* note 142. [emphasis added]

Article 7 of the 1983 undertaking thus mandated a transfer of the IARCs to the FAO. As already pointed out, the IARCs had practically functioned as the pipeline for funneling the South's plant germ plasm to the North without economic rewards or recognition of local farmers and breeders' intellectual contributions towards improving the plants in question.

The North initially opposed the incorporation of the IBPGR into the FAO structure. Following severe North-South disagreements on the letter and spirit of the 1983 undertaking, subsequent attempts were made to "interpret" the undertaking in a manner suitable to all sides. Such interpretations include Resolution 4/89 which recognized a symmetry between Plant Breeder's Rights (PBRs), as provided for by the International Union for the Protection of New Varieties of Plants (UPOV) and the Undertaking. Similarly, the concept of Farmers' Rights was defined by Resolution 5/89 and the sovereign rights of nations over their genetic resources was re-affirmed in Resolution 3/91. Finally, in 1993, the FAO Conference adopted Resolution 7/93 for the revision of the International Undertaking and its harmonization with the CBD.¹⁵¹

3.5.1: The Concept of Farmers' Rights

In 1988, the Colorado-based Keystone Center mediated in the matter under the aegis of the Keystone International Dialogue on Plant Genetic Resources.¹⁵² Consequently, the 1989 interpretation of the 1983 undertaking was adopted accepting the restrictions of free

¹⁵¹This subsequently led to the FAO International Treaty on Plants. See note 81, *supra*.

¹⁵²The Keystone Center is a non-profit organization which serves to mediate on environmental issues.

flow of modified germplasms based on the concept of Plant Breeders Rights (PBRs). In return, the South got a recognition of the new concept of “Farmers’ Rights (FR).”¹⁵³ In this respect, it is well to note the definition of farmers right as articulated in the FAO Undertaking of 1989 as per Resolution 5/89. Farmers’ rights are defined as:

[R]ights arising from the past, present and future contributions of farmers in conserving, improving and making available plant genetic resources, particularly those in centres of origin/diversity. These rights are vested in the international community as trustee for present and future generations of farmers for the purpose of ensuring full benefits to farmers and supporting the continuation of their contributions, as well as of the overall purposes of the International Undertaking.¹⁵⁴

It is instructive that under the concept of Farmers’ Rights, even the “future” intellectual exertions and input of farmers from the South, particularly women, in improving plant germ plasm are supposedly mortgaged and vested in the “international community.”

In sharp contrast, intellectual exertions by scientists in the laboratories of the multinational seed companies of the North are construed as private property and secured with patents and plant breeders’ rights. While these international instruments are non-binding, they provide a useful sub-text to the politics and economics of the struggle for control of plants through the mechanism of patents.

Further, the reality is that, although non-binding, the interpretation of the 1983 undertaking and the so-called concept of Farmer’s Right constitute distracting platitudes which legitimize the widening juridical gap between germ plasm modified in the laboratories

¹⁵³Note that the concept of “farmer’s right” was originally introduced by Mexico, supported by Libya and vehemently opposed by the Netherlands. See, Michael Halewood, “Indigenous and Local Knowledge in International Law: A Preface to Sui Generis Intellectual Property Protection” (1999) 44 *McGill Law Journal* 953 at 970. [hereinafter, Halewood]

¹⁵⁴Underlining supplied.

of the North and those modified in the farms of the South, especially, by local women farmers and breeders. The former has patent protection while the latter languishes in the commons as mere raw material and folk-knowledge. Thus, the prevailing structure is aided by the express denial of the value and merit of the intellectual and capital resources expended by farmers and growers in the South over the millennia and in modern times in the improvement of plants.

While the 1983 Undertaking has been “interpreted” and completed by three FAO Conference Resolutions namely, Resolutions 4/89; 5/89; 3/91, a total of 112 countries have notified their adherence to the Undertaking. In theory however, the 1983 Undertaking seeks to achieve the following:

- ensure that the need for conservation is globally recognized and that sufficient funds are made available;
- assist farmers, particularly, in the gene-rich South to protect and conserve plant resources and the natural biosphere;
- allow farmers to derive the economic benefits of their contributions to genetic conservation and improvement.

In the face of the institutional appropriation of plants, doubts were expressed whether these grand objectives were achievable. Consequently, the South mounted a campaign to re-configure the juridical status and basis of the IARCs, particularly the legal ownership of the IARC gene banks and economic remuneration from commercialization of the plant accessions held in them.

3.5.2: International Law and the Status of Plant Germ plasm in Ex-Situ Gene Banks

With particular reference to the legal status of the genebanks which harbour plant germ plasm originally collected from the South under the ostensible cause of research but

which became widely distributed after being relocated to the North, it was once seriously argued, indeed, believed that legal ownership of those plant genetic resources vested in those states, mainly in the North, where those gene banks are located. It was under this view that local authorities where those gene banks are located pretended they had the legal right to determine which state could benefit from the gene banks. Thus, in some cases, the local guardians of the gene banks refused to share some of the stored germ plasm with other states, including the original donors.

Although the movement and transfer of plant germplasm from their *in situ* sites in the South to *ex situ* facilities in the North such as botanic gardens, arboreta, seed-banks, tissue and cell culture collections, *et cetera*, was promoted as an aid to scientific research for the benefit of humanity,¹⁵⁵ later developments, particularly, relaxed patent regimes for plants clearly revealed the appropriative functions of those institutions. It was therefore inevitable that the facile function of the excuse of “scientific research” to mask the process of appropriation would wear thin and lose efficacy.

As already evident, the South seemed to have operated under the unfounded assumption that there was no hidden agenda behind the IARCs but as the plant germ plasm from the South entered the North and re-appeared in the global market as patented commodities of trade, the naive notions of altruism in the exchange of plant germ plasm were soon dispelled. In effect, the South began to complain loudly that its plant germ plasm which had been transferred to the North by the IARCs for research purposes more often than not, became modified, patented and resold at the global market at enormous profits and with little

¹⁵⁵Tilford, *supra* note 145.

regard to the sensibilities to the culture and integrity of local farmers and breeders.

These concerns agitated the South and one of the questions that fell to be determined was the legal status of the gene banks and control of the IARCs. Given that these gene-banks hold at least one-third of the unduplicated samples of the world's plant germ plasm, it is not surprising that an acrimonious legal debate ensued between the North and the South as to the exact legal status of the IARCs and the plant accessions held in those gene banks. However, not all the IARCs were mired in confusion on this issue. For example, the CIMMYT-International Maize and Wheat Improvement Center, and IRRI-International Rice Research Institute- seemed to have had clearer policies on ownership of germ plasm in storage. Both institutions clearly stated that genetic materials in their custody deposited before the CBD were "held in trust for the world community" and that plant genetic resources obtained by them after the CBD came into effect were governed by the terms of deposit and that of the CBD.¹⁵⁶

With respect to the other IARCs, the position was far from clear. A legal opinion by the FAO in 1986, apparently vague in conception and filled with prevarications concluded nebulously that the CGIAR gene banks:

[E]xisted in a unique world between national and international law. They are not created by a formal treaty concluded among States or other international legal persons, and their activities are not directed by States or such other international legal persons. The genebanks maintained by the IARCS are neither under the control of any given State or national authority, nor in the private sector. Their status is, in fact, *sui generis*.¹⁵⁷

¹⁵⁶Lesser, *supra* note 12 at 105.

¹⁵⁷Tilford, *supra* note 145 at 424

Another legal opinion of the FAO in 1987 hardly added clarity to the question. It equivocated that:

[O]wnership of genetic material held in government genebanks or those of public institutions was in most cases, for practical purposes considered to be vested in the State in which these genebanks are located. However, for material held in the International Agricultural Research Centres, the legal position was unclear.¹⁵⁸

This rather obfuscatory quibble was not to stand for a long time. Following agitations by the South and threats of restricted access to plant germplasm in the South, a clearer legal answer to the question came forth in 1995. Thus, by virtue of an agreement between the CGIAR gene banks and the FAO, control of those IARCs was vested on the FAO.¹⁵⁹ The new FAO treaty on plant genetic resources (it has not come into effect yet) provides a legal framework for access to the IARC germplasm collection but hardly stems the flow of appropriation of plant germplasm.

However, a regime of compensation seems probable in the future and in the cases where the origin of the IARC accession is unknown, the FAO has suggested that “compensation might be provided to developing countries collectively.”¹⁶⁰ The FAO/IPGR agreement thus brings the global network of the Rockefeller-founded IARCs within the framework of the FAO which in turn would be incorporated into the framework of the newly adopted FAO treaty on plant genetic resources . In a bid to exorcize the ghost of CHM from plant life forms, the FAO treaty on plant genetic resources recognizes the “sovereign rights

¹⁵⁸UNEP/CBD/IC/2/13, 1994, Par.22, *supra* note 120.

¹⁵⁹Tilford, *supra* note 145 at 422 and the citations therein. See, *Revision of the International Undertaking on Plant Genetic Resources, Analysis of Some Technical, Economic and Legal Aspects for Consideration in Stage II: Access to Plant Genetic Resources and Farmer's Rights, Commission on Plant Genetic Resources*, 6th Sess., FAO Doc. CPGR-6/95/8 Supp. (June 19-30, 1995). The new FAO treaty settles the question of legal ownership of .

¹⁶⁰Tilford, *ibid.*

of States” over those plant resources within their territorial jurisdiction.¹⁶¹

It seems that the definition of the legal status of the IARCs has hardly resolved the North-South differences on access to plants. Indeed, following the inability of the South and the North to arrive at a compromise on the question of Farmers’ Rights, the International Undertaking fell for review at the Leipzig conference in Germany where a global plan of action was adopted.¹⁶² This Global Plan of Action (although non-binding) recognizes the intellectual input of local farmers in the improvement and conservation of plant germ plasm.¹⁶³

However, its platitudinous and patronizing praises offer little comfort to local farmers whose contributions to plant development continue to be appropriated through the juridical framework of the patent system, of which, later. Suffice it however to note that in an ostensible attempt to stem the tide of appropriation of plant germ plasm, the FAO concluded a draft international code of conduct for the collection and transfer of plant germplasm.¹⁶⁴

In addition, in 1993, the FAO passed Resolution 7/93 which requested the Commission on Genetic Resources to provide a forum for negotiations among governments to harmonize the 1983 Undertaking with the relevant provisions of the CBD. According to

¹⁶¹Note 81. *supra*. See also, *Report of the Conference of FAO, Genetic Resources and Biological Diversity*, Annex 3, at 1, U.N. Doc. C/91/ REP (1991).

¹⁶²FAO, *Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture and the Leipzig Declaration, Adopted by the International Technical Conference on Plant Genetic Resources* (Rome: FAO, 1996). [hereinafter, Global Plan of Action]

¹⁶³Global Plan of Action, *supra* at para.57. It states that many food crops have “been consciously selected and improved by farmers since the origins of agriculture” and have “continued to be developed and improved by farmers without interruption since ancient times.”

¹⁶⁴FAO *Draft International Code of Conduct for the Collection and Transfer of Plant Germplasm*, Doc. CPGR/91/10 of March 1991.

the Commission on Genetic Resources, the revised undertaking was designed to become a legally-binding instrument when finalized. As earlier noted, these initiatives from the FAO culminated in the adoption on November 3, 2001 of the international treaty on plant genetic resources and the draft article on traditional knowledge and equitable sharing of the benefits therefrom.¹⁶⁵

Having examined how the IARCs and the FAO have sought to deal with the politics and law on plant life forms, it is now necessary to shift the focus of this analysis to the problematic and, indeed, incendiary question of the appropriation of plants and TKUP from the South through the mechanism of a Eurocentric and instrumentalist patent system.

¹⁶⁵For a detailed account of the evolution of the FAO *International Treaty on Plant Genetic Resources for Food and Agriculture*, see, Commission on Genetic Resources for Food and Agriculture, *supra* note 81. See also, *Composite Draft Text of the International Undertaking on Plant Genetic Resources*, Commission on Genetic Resources for Food and Agriculture, Third Inter-sessional Meeting of the Contact Group, 2000, Doc. CGRFA/CG-3/00/2.

CHAPTER FOUR

Appropriation of Plants and Traditional Knowledge of the Uses of Plants (TKUP) Through Patent Systems

4:0 Introduction

As the preceding chapters have argued, the process of appropriation of plants and TKUP is a multiple one involving international institutions and juridical mechanisms. This chapter examines the appropriative function of the interplay between national patent systems. In addition, it proposes a regime of communal patents for the benefit of traditional knowledge holders. The proposals for a communal patent regime is a pragmatic response to the inescapability from the global hold of the patent systems on all national legal systems. To a limited extent, it also comments on the concept of Plant Breeders' Rights (PBRs).

As dealt with in this thesis, the concept of appropriation refers to the commercial use of plants and TKUP without compensation and/or acknowledgment of the intellectual property of the owner(s) of the knowledge in question.¹ In a more analytical sense, appropriation of plants also deals with the interplay of various national patent laws, particularly the United States patent system in fostering and legitimizing the unauthorized use and commercialization of the plant-derived knowledge and innovation of local farmers, indigenous and traditional peoples, particularly women without their consent or adequate

¹Valentina Tejera, "Tripping Over Property Rights: Is it Possible to Reconcile the Convention on Biological Diversity with Article 27 of the TRIPs Agreement?" (1999) 33 *New England Law Review* 967. [hereinafter, Tejera]

compensation.² This practice has recently gained the rather inflammatory description of “bio-piracy,”³ especially by outraged and indignant activists and traditional peoples.

The consensus of these activists and traditional knowledge practitioners is that the patent system has not been favourable to or respectful of the dignity and rights of indigenous and traditional peoples and other cultures outside the prevailing Western cultural regime. Most of the critics argue that the patent system is incompatible with the values and culture of traditional and indigenous peoples. In addition, it has been argued that a root cause of this problem is that there exists an epistemological and cultural prejudice against non-Western knowledge frameworks. The bias in question construes germplasm of the South as “natural products often derived from the wild,”⁴ and hence, subjects of appropriation.

It is a process which, as critics of the patent system argue, denies and de-legitimizes the profound intellectual input of local farmers, particularly women, in the improvement of plant species. Within the paradigm in question, centuries-old efforts of indigenous and traditional farmers are diminished as “informal” or “unorthodox” or lacking scientific basis. The consequence is that seeds and plant germplasm improved over the centuries by local and

²*RAFI Communique*, December 1996 at 1; Vandana Shiva, “Biopiracy: Need to Change Western IPR Systems” *The Hindu*, Wednesday, July 28, 1999, at 3; Luiza Villaema, “Indians Want Patent: Chiefs Prepare International Law Suit Against Scientist Who Registered Indigenous Knowledge” *ISTOE Magazine*, No. 1581, Sao Paulo, 19 January, 2000.

³Lakshmi Sarma, “Biopiracy: Twentieth Century Imperialism in the Form of International Agreements” (1999) 13 *Temple International and Comparative Law Journal* 107; “Biopiracy Update: A Global Pandemic” *RAFI Communique*, September/October 1995; David Orr, “India Accuses US of Stealing Ancient Cures” *The Times* (London), 31 July 1999, at 2; Mario Osava, “Brazil Biodiversity: Crackdown on Eco-Pirates” *IPS*, August 14, 1999. “RAFI’s List of Bioprospectors and Biopirates” *RAFI Communique*, September/October 1995.

⁴William Lesser & Anatole Krattiger, “Marketing Genetic Technologies in South-North and North-South Exchanges: The Proposed New Facilitating Organization” in, Anatole Krattiger, *et al*, eds, *Widening Perspectives on Biodiversity* (Gland, Switzerland: IUCN, 1994) at 291.

traditional farmers are construed and appropriated as part of global common heritage whereas their counterparts from the North are seen as “improved varieties” which are subjects of patent rights and to some extent, PBRs.

In analyzing the process of appropriation of plants through the patent system, it is useful to pay reasonable attention to both direct and circumstantial evidence and the subtleties of facts, history, culture and law which support and/or clarify the processes which sustain the juridical phenomenon of appropriation. This approach is particularly indispensable because the modern process of appropriation of plants and TKUP is sophisticated and subtle; completely different from the physically daring bravado of the likes of Henry Wickham who brazenly smuggled rubber seeds out of Brazil.

By and large, appropriation of plants and TKUP is no longer a crude and rough act or process. Appropriation of plants and TKUP through the patent system is more or less an art form; a respectable business. As one recent commentator observed, perhaps, with an admixture of historical and contemporary imagery:

[T]oday’s pirates don’t come with eye patches and daggers clenched in their teeth, but with sharp suits and claiming intellectual property rights. So those rich countries which take seeds away from their poorer neighbors and then try to patent them are guilty of theft—plain and simple: biopirates by another name.⁵

Thus, in order to identify and appreciate the role of the patent system in the appropriation of plants and TKUP, a close and contextualized regard must be had to several factors. These include the history of the patent system, the original scope of the concept of patentability, the Euro-centricity of the patent concept itself, the circumstances in which the patenting of plants

⁵NewsScientist. Online > <http://www.newscientist.com/ns/980214/editorial.html> accessed on 8/27/99. [hereinafter, NewsScientist]

arose and gained global strength, the global imbalance in the distribution of plants and of course, and the deliberate relaxation and lowering of the threshold for patentability of plant inventions and TKUP products.

In addition, it will not be enough to merely analyze what the legal norms of the patent system seek to protect but also, what they omit to protect is relevant. After all, in most cases, what the law makes elaborate processes to protect is as significant as what it refuses or omits to protect. In short, the patent system must be thoroughly interrogated and its intellectual integrity should not be presumed. In this endeavour, particular emphasis ought to be paid to some pertinent United States statutes and case law. In addition, the influence of United States-based multinational seed and pharmaceutical corporations in shaping patent and Plant Breeders' laws deserves scrutiny. The reasons for this relative emphasis on United States patent system are not far-fetched.

First, it is common knowledge that the TRIPs agreement on patents which is the global minimum threshold for patentability is an approximation of the United States law on the subject. Second, it is also known by patent law scholars and students of contemporary globalization that by and large, the TRIPs agreement is a product of the immense clout of the American pharmaceutical and biotechnology industry. Third, the United States' patent system accounts for almost half of all patents issued in the world. Fourth, most of the controversial patents which raise the question of appropriation of plants and TKUP have been issued by the American Patent Office. Fifth, the United States has the most relaxed and instrumentalist requirements for patentability of TKUP and plants.

In examining these issues, this chapter is divided into eight sections. Section 1 deals

with the concept of patentability and the processes by which this concept has evolved over the years. The ideas dealt with in this section encompass plants and TKUP. Given the intricacy and complexity of the task, the juridical regime created by the Convention on Biological Diversity, the Agreement on the Trade-Related Aspects of Intellectual Property Rights (TRIPs) and the case law on the subject are critically examined. Given that the TRIPs agreement is practically an elevation of the United States patent law into a set of global legal norms, closer attention is focused on United States' statutes and case law in the elucidation of the issues involved. It concludes that the changes in the concept of patentability owe much more to judicial assertiveness and rise of corporate control of the seed industry than legislative boldness.

Section 2 examines in greater detail the expansion and relaxation of the various criteria for patentability as they relate specifically to plants. Towards this end, section 2 is sub-divided into four parts. The first sub-division deals with the criterion of novelty and how it has been changed to suit the peculiar needs of inventions relating to plants. Sub-section 2 examines the criterion of specification and the various methods in which some patent law jurisdictions have sought to scale the hurdle of the inherent indescribability of certain qualities or characteristics of plants. One of the controversial options is the deposit of the purported plant invention with the Patent Office. Sub-section 3 deals with the criteria of inventive step and utility of invention. Lastly, sub-section 4 examines the criterion of uniform reproducibility. Given the vagaries and complexities of genetics, the courts have tried to grapple with this issue.

Section 3 focuses on TKUP and analyses the concept of patentability as applied to

this important aspect of patents. The central theory here is that the fundamental elements of the patent system have been re-written, relaxed and watered down in order to accommodate the special interests of the seed and pharmaceutical industries. The end result is a set of double-standard rules and permissive patent system which facilitates, condones and legitimizes the phenomenon of appropriation of TKUP. Section 3 is sub-divided into three. The first part deals with debate on “products-of-nature” exception to patentability. The second part examines the relaxation of the criterion of novelty as applied to TKUP. The third part deals with the issue of utility of inventions and determination of what constitutes inventive step in relation to TKUP.

Section 4 examines the various ways in which international law has attempted to meet the challenges of appropriation of plants and TKUP. Regrettably, international law on state responsibility for the appropriation of alien property seems preoccupied with real property and thus, leaves traditionally-generated intellectual property rights unprotected. In the light of this lacuna, it seems that states from the South, or rather, their non-governmental organization (NGO) sympathizers and academics have shifted their attention towards the option of churning out an incredible quantity of “soft law” instruments which are a little more than moral pontification on the inequity inherent in appropriation of plants and TKUP.

Section 4 examines the impotence of such measures and argues that the better approach may be in re-thinking of the domestic laws on patents and a regionalization of juridical responses to the challenge of appropriation. In this regard, the options of registration of TKUP and modification of the domestic laws and institutions on patents are explored. The section is divided into three parts. The first part critiques the concept of state responsibility

as it relates to appropriation of plants and TKUP. The second part examines the law on access to plants and TKUP. The third part exposes the weaknesses of soft law approaches to the problems of appropriation.

Section 5 revisits the option of registration of traditional knowledge as a means towards the avoidance of appropriation of plants and TKUP. Section 6 makes a case for a modification of domestic patent regimes to deal with the problem of appropriation. This section answers some of the objections by scholars about the potentials of positive changes for patent systems. It further outlines the features of a communal patent concept. Recent applications of this concept in Brazil and the Philippines are also discussed. Section 7 treats the issue of PBRs and concludes that this genre of private property rights over plants is as problematic as patent grants. In sum, Chapter 4 examines the processes by which the patent system and the PBRs concepts have been used by commercial seed growers and pharmaceutical corporations to dominate the field of plant germplasm and monopolize the benefits of TKUP. In response, Chapter 4 also recommends a combined measure of communal patent systems and other juridical initiatives at both the domestic and international levels in dealing with the problem of appropriation of plants and TKUP.

4.2: Expansion of the Concept of Patentability

Although the definition of patentable inventions has always extended beyond machines to include new “art”, “manufacture”, “compositions of matter”, “processes” and “designs”, the concept of patentability was for a long time wedded to mechanical⁶ products and processes. With the rise of the chemical and pharmaceutical industries, the scope of patentability gradually encompassed products and processes of those industries. Life forms, including plants, were practically excluded. Today, the scope of patentable subjects include artificially-modified life forms. Some critics of this evolution of the patent system argue that life forms are however ill-fitted for the patent system. Whatever the merits of the debate, the interesting question here is the trajectory of the expansion of the concept of patentability.

The practice of granting patents on plants started on a rather benign note. A close study of the process by which the patent system was reinvented to accommodate the interests of the seed merchants and commercial plant breeders reveals that the appropriation and privatization of plants through the patent law system was a carefully planned and methodically executed expansion of the concept of patentability. In addition, a system of Plant Breeders’ Rights⁷ was designed to complement the expanding regime of patentability

⁶A machine is any instrument used to transmit force or modify its application. For an excellent treatment of this crucial issue, see, Benoit Joly & Marie-Angele de Looze, “An Analysis of Innovation Strategies and Industrial Differentiation Through Patent Applications: The Case of Plant Biotechnology” (1996) 25 *Research Policy* 1028. As Rachel Carson reminds hubristic scientists, notwithstanding the amazing strides of modern science, no scientist can make a blade of grass. See, Tamsen de Valour, “The Obviousness of Cloning” (1995) 9 *Intellectual Property Journal* 349. However, in 1873, Louis Pasteur was awarded U.S Patent No. 141, 072 for a yeast organism free from organic germs of contagion as an article of manufacture. This was a rather anomalous case as the courts consistently rejected patents on life forms. See, Herbert Jervis, “Impact of Recent Legal Developments on the Scope and Enforceability of Biotechnology Patent Claims” (1994) 4 *Dickinson Journal of Environmental Law and Policy* 79.

⁷This is dealt with in Section 4.7.

of plants. The process of expanding the concept of patentability has been pursued at three distinct levels; namely, the state, regional and lately, global level. At all three levels, the imprint of the seed industry is unmistakable.

It is significant that at the state level, soon after Vavilov's ground-breaking studies, efforts were made by the American seed industry to extend property rights on plants through patents and to a lesser extent, Plant Breeders' Rights. Although the initial plan was to have patents on seeds and plants of agricultural importance, it was sensed by the American seed industry that such a bold proposition would be drowned in public outrage. Therefore, what was preferred was a gradual process which would begin with establishing the principle that plants were capable of being patented. To outflank public outrage, the first legislative proposal for patents on plants was made by a seemingly harmless organization in America: rose breeders and horticulturists.

Similarly, since most important agricultural crops are sexually reproducing, the threshold on patents on plants was sought to be achieved through asexually-reproducing plants. Sexually reproducing crops which also constituted staple diets for millions of people (for example, wheat, rice, barley, oats, maize, *et cetera*) and formed the basis of several sensitive industries such as brewing were deliberately excluded from the initial grasp of patentability. Commenting on this shrewd and astute manoeuvre, Kloppenburg notes that:

[I]n 1930, Paul Stark advised the American Seed Trade Association's Plant Patent Committee to drop their efforts to have sexually reproducing species included in the proposed Plant Patent Act. He suggested that it was best to let the establishment of patent rights to asexually reproducing species set a principle that new plant forms

could be considered patentable.⁸

With the exception of potatoes, most asexually reproducing crops were plants of limited economic significance such as roses.

It must however be noted that gaining this initial threshold was no mean feat and ultimately required a fundamental re-configuration and re-writing of both substantive and procedural patent law.⁹ When it is realized that the United States and other champions of patents on plants are dependent on the South for plant germ plasm,¹⁰ the political and economic motives behind this template shift and the overall implications become more apparent.¹¹ The United States *Plant Patent Act*,¹² the United States *Plant Variety Protection Act*,¹³ and the courts in the United States have often weighed in to expand the boundaries of the patent system in favour of the industries which rely mainly on plants and TKUP.¹⁴ The practice of extending patents to plants and TKUP originally faced strong opposition,

⁸Jack Kloppenburg Jr, *First the Seed-- The Political Economy of Plant Biotechnology, 1492-2000* (Cambridge: Cambridge University Press, 1988) at xii & 49. [hereinafter, Kloppenburg] at 261.

⁹Geertrui Van Overwalle, "Patent Protection for Plants: A Comparison of American and European Approaches" (1998-9) 39 *IDEA* 143. [hereinafter, Overwalle]

¹⁰Chapter 2, *supra*.

¹¹According to Frank Press, President of the American National Academy of Sciences, "a nation with a weak base in plant biology hostages its future. It risks a serious disadvantage in world markets..."quoted in, Kloppenburg, *supra* note 8 at 236.

¹²Plant Patent Act, 35 U.S.C. 161 (1988 & Supp. 1996). The essence of this legislation was to dilute the strict requirements previously provided for patentability.

¹³Plant Variety Protection Act 7 U.S.C. 2402 (1988 & 1996). This legislation created the regime of Plant Breeders' Rights (PBRs) which is discussed in Section 4.7, *infra*.

¹⁴According to John Golden, "indeed, whether as a result of a pro-patent judiciary or as a consequence of the natural extension of prior legal doctrine, by the early 1990s patent law had resolved many fundamental issues in favour of biotechnology's patentability." See, John Golden, "Biotechnology, Technology Policy, and Patentability: Natural Products and Invention in the American System" (2001) 50 *Emory Law Journal* 101 at 126. [hereinafter, John Golden]

especially in Europe. For example, in Germany patents on plants started only in 1934. Prior to that, the German patent office held the view that plants could not be patented as they were not inventions having industrial applicability. It would seem that in wearing down the walls of opposition to plant patentability, the courts of powerful states with huge investments in the seed industry, particularly in the North, have often seized the initiative.

Perhaps, the most celebrated judicial pronouncement in the United States on the rationale for including life forms as patentable subjects is the majority decision of the United States' Supreme Court in *Diamond v. Chakrabarty*.¹⁵ Here, the court held that since the new bacteria in question was an artificially created "composition of matter" hitherto unknown to man, it was patentable. In addition to the pre-existing concept of Plant Breeders' Rights created by the United States' *Plant Variety Protection Act* (PVPA), the notion of granting intellectual property rights such as patents on plants was further amplified in *Ex Parte Hibbard*¹⁶ where it was held that plants, seeds, and tissue cultures can be covered by patents.¹⁷ The initiatives in the United States also found support in other similar laws in many states of the North where legislative responses designed to cater to the interests of commercial seed-breeders have been made.¹⁸

Given the importance of judicial influence in expanding the frontiers of

¹⁵447 U.S. 303 (1980).

¹⁶227 U.S.P.Q. 443 (1985)

¹⁷1077 Official Gazette Patent Office 24 (1987), announcement dated April 7, 1987.

¹⁸Michael Greenfield, "Recombinant DNA Technology: A Science Struggling with the Patent Law" (1993) 25 *Intellectual Property Law Review* 135; David Scalise & Daniel Nugent, "International Intellectual Property Protections for Living Matter: Biotechnology, Multinational Conventions and the Exception for Agriculture" (1995) 27 *Case Western Reserve Journal of International Law* 83. [hereinafter, Scalise & Nugent]

patentability,¹⁹ the rationale in another case of importance deserves closer examination. In the Canadian case of *Pioneer Hi-Bred Ltd. v. Commissioner of Patents*,²⁰ a patent application was filed by Clark Jennings in respect of a new soybean variety known as “Soybean Variety 0877.” The claims related to the soybean plant, pod and the seed. According to the specification filed alongside the patent application for this new soybean variety, the novelty in the variety rested on the fact that the new variety had a high oil content, early maturity, stable high yields, resistance to seed shattering and resistance to certain diseases. Moreover, as the claimant argued, these characteristics could not be achieved by natural breeding of soybeans. Only “artificial intervention” will make it possible to hybridize two different lines of soybeans to produce the “soybean variety 0877” in question. In determining whether this new variety of soybean was patentable, the Canadian Federal Court of Appeal considered the controversial issue of patentability of plants.

In the opinion of the Appeal Court, plant “inventions” do not qualify as “manufacture” within the purview of the *Patent Act* of Canada.²¹ As Marceau J., noted, the legislature did not contemplate plants as patentable subject-matter. If they did, such words as “strain,” “variety,” or “hybrid,” would have appeared²² in the legislation. In a concurring opinion, Pratte J. further argued that since a complete and accurate disclosure of the soybean

¹⁹Edmund Sease, “From Microbes, to Corn Seeds, To Oysters, To Mice: Patentability of New Life Forms” (1989) 38 *Drake Law Review* 551; Thomas Keane, “The Patentability of Biotechnological Inventions” (1992) *Irish Law Times* 139.

²⁰(1989) 25 CPR (3d) 257.

²¹Patent Act, RSC 1970, c. P-4.

²²*Pioneer-Hi-Bred, supra.*

variety was not possible, plants were not capable of being patented. On further appeal to the Supreme Court of Canada, the court had to deal with the question whether a new variety of soybean resulting from artificial cross-breeding represent an invention within the meaning of the Canadian Patent Act. In grappling with this question, the Court opined that the level of “human intervention” required in the invention of plants for patent purposes must be such that alters or defies the natural laws of reproduction.

In other words, artificial changes in plants which merely reflect natural laws of heredity or Mendelian principles do not rise to the level of patentability. Accordingly, while plants were not necessarily debarred from patentability, the standard of patentability must ensure that plant inventions cross the boundaries of or defy the laws of nature. On the question of specification of plant inventions, the opinion of the Canadian Supreme Court will be examined later but suffice to note at this stage that both Canadian and European courts are not persuaded that plant inventions may be sufficiently disclosed, even by a deposit of the plant invention. As subsequent analysis will demonstrate, the laws of various states are not of the same or similar rigorous scrutiny of the purported plant invention and, consequently, permit the patenting of dubious plant inventions.

Domestic legislative initiatives particularly in the United States laid the groundwork for international conventions for patents on plants, such as the UPOV²³ Convention,²⁴ which

²³Union for the Protection of New Plant Varieties, commonly known by its French acronym “UPOV” (*Union pour la Protection des Obstantions Vegetales*).

²⁴*International Convention for the Protection of New Varieties of Plants*, December 2, 1961, as revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991; 815 U.N.T.S. 89. [hereinafter, UPOV Convention] This convention is administered by the World Intellectual Property Organization (WIPO). At present 44 countries are party to the UPOV and the member states are predominantly from the North.

In order to be eligible for protection under the UPOV, new plant varieties must be (1) distinct from

interestingly started off like the United States *Patent Act* by initially limiting its scope to asexually reproduced plants. At the regional and continental level, treaties such as the *European Patent Convention of 1973*²⁵ were concluded and put into effect. For example, Article 53 (b) of the EPC states that “European patents shall not be granted in respect of plants or animal varieties or essentially biological processes for the production of plants and animals.”²⁶ This treaty provision formed the basis for member states of the European Union to modify their laws accordingly.

In comparison with member states of the European Union, it would seem that the United States have pursued an “aggressive expansion”²⁷ of property rights over plants. For example, although the UPOV Convention recognizes an optional protection of plants by Plant Breeders’ Rights (PBRs) *or* patents, most European Union states opted for PBRs instead of patents. Second, until the European Patent Office made its famous *volte face* in policy in the *Plant Genetic Systems* decisions, it was believed that Article 53 (b) limited the scope of patent protection for plants to plants *simpliciter* instead of plant varieties.²⁸

existing commonly known varieties, (2) sufficiently uniform, (3) stable, and (4) new, in the sense that they must not have been commercialized prior to certain dates. In creating this right, the breeder’s authorization must be obtained with respect to the use of the propagating material of his or her protected variety for any of the following acts: (1) production or reproduction (multiplication), (2) conditioning for the purpose of propagation, (3) offering for sale, (4) selling or other marketing, (5) exporting, (6) importing, and (7) stocking for any of the purposes mentioned from 1-6.

²⁵*Convention on the Grant of the European Patents*, Oct. 5, 1973, 13 I.L.M. 276, or 1160 U.N.T.S. 231. [hereinafter, EPC]

²⁶EPC, *supra*.

²⁷John Golden, *supra* note 14 at 125.

²⁸Prior to that, the decisions in *Ciba-Geigy*, Technical Board of Appeal 3.3.1., July 26, 1983 (T 49/83) and *Lubrizol [hybrid plants]* Technical Board of Appeal 3.3.2., Nov. 10, 1988 (T 320/87) had prohibited the patenting of plant varieties. In other words, the EPC prohibited the patenting of plants or their propagating material in the genetically fixed form of the plant variety but did not prohibit the patenting of plants *per se*.

However, it now seems that the EU law on the matter has reverted to the pre-plant genetic systems regime.²⁹ Third, most cases of “biopiracy” emanate from patents arising from the practices and law of the United States’ patent system.

At the global level, the TRIPs agreement marks the culmination of the unrelenting campaign by powerful seed traders of the North to extend the frontiers of the patent system by expanding the concept of patentability at a global level.³⁰ In other words, in the creation and enforcement of a global regime of patents on life forms, what is clear is the ubiquitous presence and influence of the seed merchants and pharmaceutical giants.³¹ As Valentina Tejera has critically observed:

[S]eeking the enactment of the TRIPs agreement,³² executives from large U.S. pharmaceutical companies exerted strong lobbying to shape United States policy affecting the Uruguay Round GATT negotiations. In fact, many of the transnational companies served as advisors to the GATT Agreement because of their interest in having an “even playing field” in the international market...for the establishment of this uniform playing field the Uruguay Round Agreement compels Third World signatories to adopt the patent policies and laws of the United States.³³

However, the Plant Genetic Systems case, patenting of plant cells are permissible whereas the patenting of plants per se are no longer legal in European Union patent law. See, Overwalle, *supra* note 169 at 170. Indeed, the law on patentability of plants in Europe is *recondite*. It seems that since the TRIPs era, European Union patent law has reverted to the ratio in *Ciba-Geigy* and *Lubrizol*.

²⁹Overwalle, *supra* at 172.

³⁰Carrie Smith, “Patenting Life: The Potential and Pitfalls of Using the WTO to Globalize Intellectual Property Rights” (2000) 26 *North Carolina Journal of Law and Commercial Regulation* 143. Compare with, Keith Maskus, “Intellectual Property Challenges for Developing Countries: An Economic Perspective” (2001) 1 *University of Illinois Law Review* 457.

³¹But see, Margaret Boulware, *et al.*, “An Overview of Intellectual Property Rights Abroad” (1994) 16 *Houston Journal of International Law* 441.

³²For an exhaustive account of the negotiating history of the TRIPs Agreement see, Terence Stewart, ed, *The GATT Uruguay Round-- A Negotiating History* (1986-1992) Vol. 1 (Boston: Kluwer Law and Taxation Publishers, 1993).

³³Valentina Tejera, note 1 *supra*.

While business executives from powerful states of the North, particularly the United States shaped the content and structure of legal norms on the patenting of plants and TKUP, it is interesting that most of those who contribute most to the improvement and sustenance of plant diversity were left to watch the law-making process from the sidelines. With particular reference to the African delegation, the OAU Draft Declaration on Community Rights and Access to Biological Resources laments that, “a smaller part of humanity, represented by 40 States concluded the negotiations for the creation of the World Trade Organization (WTO) in 1994. African countries had negligible or no inputs into the negotiations.”³⁴

As the expansion of the concept of patentability rolls ahead with barely explored consequences,³⁵ one of things which stands out is the globalization of the industrial model of development and incorporation of plants into this gigantic process for purposes of private profit.³⁶ As Mark Ritchie has argued:

[T]he TRIPs Agreement embraces an industrial model whereby the products of scientific research become the private property of its corporate sponsors. The new rules developed during the Uruguay Round are in conflict with many existing

³⁴*Supra*. See also, Michelle Gravelle & John Whalley, “Africa and the Uruguay Round” (1996) *Transnational Law and Contemporary Problems* 123. The implication is that the TRIPs agreement may not command much compliance at the domestic levels of these states. See, Peter Gerhart, “Reflections: Beyond Compliance Theory-TRIPs as a Substantive Issue” (2000) 32 *Case Western Reserve Journal of International Law* 357; Jerome Reichman, “The TRIPs Agreement Comes of Age: Conflict or Cooperation with the Developing Countries” (2000) 32 *Case Western Reserve Journal of International Law* 441. This issue is briefly examined in Chapter Five.

³⁵Marci Hamilton, “The TRIPs Agreement: Imperialistic, Outdated, and Overprotective” (1996) 29 *Vanderbilt Journal of Transnational Law* 747 [hereinafter, Hamilton]; Jerome Reichman, “Intellectual Property in International Trade: Opportunities and Risks of a GATT Connection” (1989) 29 *Vanderbilt Journal of Transnational Law* 747. [hereinafter, Reichman, Opportunities and Risks]

³⁶According to the OAU/STRC Task Force Declaration on Community Rights and Access to Biological Resources, “privatization of life forms through any Intellectual Property Rights (IPR) regime violates the African sense of respect for life.” See, *Declaration and Draft Model Law by the OAU/STRC Task Force on Community Rights and Access to Biological Resources*, March 1999; online <<http://users.ox.ac.uk/~wgtrr/OAU-decl.htm>. Accessed on 9/21/99.

national laws and the traditions of many agricultural and indigenous communities where knowledge of the nutritional and medicinal uses of plants and the results of plant breeding are shared as a community resources.³⁷

As the moral, ethical and legal debates on the patentability of plants and TKUP³⁸ rage on, it is equally necessary to re-examine the various ways in which legislative and judicial efforts have been made to expand the concept of patentability. It is arguable that the shift from mechanical inventions and compositions of inanimate matter to life forms has opened the way for the industrialization and privatization of life forms.³⁹ To achieve this end, the elements of patentability have had to be re-adjusted and watered down to fit the demands and requirements of the seed-breeding and pharmaceutical industries of the North.⁴⁰ Given the radical importance of these juridical changes, in their roles as appropriative concepts⁴¹ and as legitimizers of what may otherwise amount to theft of knowledge, it is necessary to closely examine and analyse these changed conditions of patentability and how their fluidity and deliberate re-definition have contributed to and facilitated the appropriation of plants and TKUP.

Strictly speaking, prior to the World Trade Organization (WTO) era, there was no

³⁷Mark Ritchie, *et al.*, "Intellectual Property Rights and Biodiversity: The Industrialization of Natural Resources and Traditional Knowledge" (1996) 11 *St. John's Journal of Legal Commentary* 431 at 432. [hereinafter, Ritchie]

³⁸*Supra* note 167.

³⁹Kenneth Krosin, "Are Plants Patentable Under the Utility Patent Act?" (1985) 67 *Journal of Patents, Trademark Office Society* 220; Nancy Linck, "Patentable Subject Under Section 101—Are Plants Included?" (1985) 67 *Journal of Patents, Trademark Office Society* 489.

⁴⁰Lara Ewens, "Biotechnology and Intellectual Property" (2000) 23 *Boston College International and Comparative Law Review* at 289. [hereinafter, Lara Ewens]

⁴¹Peter Goss, "Guiding the Hand that Feeds: Towards Socially Optimal Appropriability in Agricultural Biotechnological Innovation" (1996) 84 *California Law Review* 1395.

global minimum standard for patentability of inventions. The Agreement on Trade-Related Aspects of Intellectual Property Rights,⁴² hereinafter, TRIPs may thus be said to constitute an approximation of what may be crudely regarded as a global standard on patentability. Article 27 (1) of the TRIPs Agreement offers the modern minimum yardstick for patentability of all inventions. The said provision provides as follows:

Subject to the provisions of paragraphs 2 and 3, patents shall be available for any inventions, whether products or processes,⁴³ in all fields of technology, provided that they are new, involve an inventive step and are capable of industrial application.⁴⁴

The exceptions stated in paragraphs 2 and 3 are that:

2. [M]embers may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect *ordre public* or morality, including to protect human, animal or plant life or health or to avoid serious prejudice to the environment, provided that such exclusion is not made merely because the exploitation is prohibited by their law.
3. Members may also exclude from patentability;
 - a. diagnostic, therapeutic and surgical methods for the treatment of humans or animals;
 - b. plants and animals other than micro-organisms, and essentially biological processes for the production of plants or animals other than non-biological and micro-biological processes. However, Members shall provide for the protection of plant varieties either by patents or by an effective *sui generis* system or by a combination of thereof.⁴⁵

⁴²*Agreement on Trade-Related Aspects of Intellectual Property Rights*, 33 I.L.M. 1197 (1994)

⁴³A process may be defined as method involving the application of materials to produce a result. See, *General Tire & Rubber Co. v. Phillips Petroleum Co.* [1967] SCR 664 at 671.

⁴⁴Article 27 (1), TRIPs, *supra* note 42.

⁴⁵*Ibid.* With respect to the exceptions, particularly, public policy and *ordre public*, it is not yet clear how the courts would interpret and apply them. Exceptions on the grounds of *ordre public* are judicially administered exceptions to the usual commitment of individual nations to recognize and give effect to foreign law in circumstances deemed appropriate by the domestic forum. See, Kent Murphy, "The Traditional View of Public Policy and *Ordre Public* in Private International Law" (1981) 11 *Georgia Journal of International*

The clear regime established by these provisions is that member-states must establish patent systems or an effective *sui generis* system or a combination thereof for plants. The conditions for patentability of plants are four fold; namely, the article must be an invention, the invention must be new, the novelty must involve an inventive step, and finally, the novel invention must be capable of industrial application and must also be useful.

These criteria deserve closer treatment and analysis and in the course of the analyses, it should be noted that plants ought to be treated separately from TKUP. Another point worthy of note is that under the TRIPs agreement, states must have a patent regime for plants or a *sui generis* system or a combined regime of patents and that *sui generis* system. Most scholars have pointed to the Plant Breeders' Rights of the UPOV laws as the obvious *sui generis* option. Given that the latest revision of the UPOV is practically indistinguishable from a patent grant (this issue is dealt with in Section 4.7) there seems to be an overlap of

and Comparative Law 591.

That is to say, no country can afford to open its tribunals to the legislatures of the world without reserving for its judges the power to reject foreign law that is harmful to its domestic forum. These doctrines are mandated by the exigent forces of local morality and social order. However, while the doctrine of public policy has its origins in fifteenth century English common law, *ordre public* is associated with civil law and has a statutory force of its own independent of custom. See, W.S.M. Knight, "Public Policy in English Law" (1922) 38 *Law Quarterly Review* 207.

Under common law jurisdictions, courts reserve a power under the public policy doctrine to deny legal effect to claims or causes of action deemed injurious to the interests of the public or offensive to public morality or decency. See, Gerhart Husserl, "Public Policy and Order Public" (1938) 25 *Virginia Law Review* 37; Nicholas Katzenbach, "Conflicts on an Unruly Horse: Reciprocal Claims and Tolerances in Interstate and International Law" (1956) 65 *Yale Law Journal* 1087; Percy Winfield, "Public Policy in the English Common Law" (1929) 42 *Harvard Law Review* 76; Monrad Paulsen & Michael Sovern, "Public Policy" in the Conflict of Laws" (1956) 56 *Columbia Law Review* 969. Needless to say, the scope of these concepts may be as wide and expansive as the judge determining the actual case may delimit; hence its notorious description as an "unruly horse." See, Judge Burrough's remarks in, *Richardson v. Mellish* 130 English Reports 294 at 303. "I protest arguing too strongly upon public policy. It is a very unruly horse and once you get astride it, you never know where it will carry you." There has thus been several judicial exhortations that the duty of the court is to "expound but not to expand" this area of the law. See, *Fender v. St. John-Mildmay* [1938] A.C. 1, per Lord Atkin. However, there is a marked restraint in the judicial employment of the public policy doctrine in limiting the juridical efficacy of international obligations at the domestic level.

laws or an illusion of choice for states ill-prepared or unwilling to grant patents on plants.

Although this concern is purely academic, the Vienna Convention on the Law of Treaties which essentially codifies customary international law on treaty law may not be very helpful on the question.⁴⁶ The closest aid from the Vienna Convention is Article 30 which provides as follows:

- (a) If a treaty says that it is subject to, or is not to be considered as incompatible with, another treaty, that other treaty will prevail.
- (b) As between parties to a treaty who become parties to a later, inconsistent treaty, the earlier treaty will apply only where its provisions are not incompatible with the later treaty.
- (c) As between a party to both treaties and a party to only one of them, the treaty to which both are parties will govern the mutual rights and obligations of the States concerned.⁴⁷

A careful scrutiny of the Vienna Convention yields the impression that the above-stated rules are essentially, residuary rules, that is to say, rules which are meant to apply in the absence of express treaty provisions regulating priority. A scrutiny of both the UPOV convention and the TRIPs agreement shows that neither of them makes a clear provision on the matter of priority. The closest to a rule on priority in this instance are the provisions of Article of 1 of the TRIPs agreement. The said article provides that:

[M]embers shall give effect to the provisions of this Agreement. Members may, but shall not be obliged to, implement in their law more extensive protection than is required by this Agreement, provided that such protection does not contravene the provisions of this Agreement. Members shall determine the appropriate method of implementing the provisions of this Agreement within their own legal system and

⁴⁶Louis Henkin, *et al*, eds, *International Law—Cases and Materials* (Minnesota: West Publishing, 1987) at 439.

⁴⁷*Vienna Convention on the Law of Treaties*, opened for Signature May 23, 1969. Entered into force, 27 January 1988. 8 I.L.M. 679 (1969) [hereinafter, Vienna Convention]

practice.”⁴⁸

It therefore seems that without expressly or impliedly abrogating the UPOV convention, the TRIPs agreement establishes the minimum threshold for patentability of plants and TKUP. States may decide to impose stricter or more extensive rules provided that such domestic legislative initiatives are not essentially in conflict with the threshold established by the TRIPs agreement. It is therefore arguable that accession to UPOV amounts to a strict implementation of the obligations of the TRIPs agreement.

On this basis, this thesis will examine the question of appropriation of plants and TKUP by the patent system through the criteria established by the TRIPs agreement. In the analysis arguments made in respect of patents should be taken as applying with equal force to the UPOV Convention, especially the 1991 version. Where there is the need to elaborate or clarify issues by reference to any special UPOV conventions or other pertinent juridical provisions peculiarly within the ambit of Plant Breeders’ Rights (PBRs), attention would also be paid to those special provisions. The regime of plants will be dealt with first followed by the regime on TKUP.

4.2.1: The Criterion of Novelty and Implications on Appropriation of Plants

The TRIPs agreement does not offer any definition for inventions. Remarkably, since the early beginnings of the patent system, the definition of what constitutes an invention has been subjected to endless scholarly and judicial analysis. In effect, there is no unanimity as to what an invention means and domestic exertions on this issue, while seemingly anarchic,

⁴⁸TRIPs Agreement, *supra* note note 199.

are indeed purposive towards appropriation of plants, especially by the powerful states of the North. As the United Nations recently noted:

[T]he TRIPs agreement contains no definition of invention and therefore leaves member countries relatively free to draw the line between patentable 'discoveries' and actual inventions in the biological field...the lack of consensus concerning biological patents thus allows countries considerable leeway in fashioning their policy options.⁴⁹

As will soon become evident, the domestic ambit out of which states have to fashion their policy options has been widely exploited, particularly in the North, to create domestic regimes which have international repercussions by appropriating other states' intellectual stock on plants and TKUP.

Early theorists on the patent system proposed that an invention must be a tangible thing; a manifest result of an intellectual exertion. By this threshold, scientific discoveries were theoretically debarred from the patent regime. Second, until the rise of the biotechnology and pharmaceutical industries, it was also believed that the law on patents disallowed patent protection for the so-called products of nature. These distinctions have been difficult to justify in theory and arguments that inventions may be distinguished from the so-called discoveries and products of nature have not been supported by case-law and state policy, particularly from the North.

On the other hand, arguments that inventions, as it were, are worthier of protection than the so-called discoveries have remained inconclusive. The fact is that scientific discoveries contribute immensely to technological development and most inventions are

⁴⁹*The Trips Agreement and Developing Countries* (New York: UNCTAD, 1996) at 34.

based upon theoretical principles established by scientists and philosophers. However, the general perception is that the patent system has long established the theoretical rule or legal doctrine that only tangible inventions are protectable.⁵⁰

In reality however the law on patentability of inventions is not well settled and indeed, some scholars have argued that it is the “arch-problem of patent law.”⁵¹ Apart from the issue of absence of global standards on what constitutes inventions, there is the issue of the blurred distinction between invention of plants, as it were, and discovery of new plants. On this point, certain interesting issues arise, particularly, with respect to the United States’ law which is, perhaps the most extreme on this subject.

The definition of patentable subject matter under the United States *Plant Patent Act* of 1930 is quite curious. Section 161 thereof provides that:

[W]hoever invents or discovers and asexually reproduces any distinct and new variety of plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a propagated plant or a plant found in an uncultivated state, may obtain a patent therefor, subject to the conditions and requirements of this title.⁵²

The practical significance of this legislation, particularly the underlined portions is that “the PPA...extends patent protection not only to inventors but also to “discoverers” of eligible subject matter.”⁵³ The combined consequence of these acts is to permit the appropriation of

⁵⁰But see, T. Jlosvay, “Scientific Property” (1953) 2 *American Journal of Comparative Law* 180. For further analysis of this issue, see, J. Soltysinski, “New Forms of Protection for Intellectual Property in the Soviet Union and Czechoslovakia” (1969) 32 *The Modern Law Review* 408.

⁵¹Harold Potts, “The Definition of Invention in Patent Law” (1944) 7 *Modern Law Review* 113. [hereinafter, Potts]

⁵²35 U.S.C. 161-64 (1982), *supra* note 12 [underlining mine]

⁵³Nicholas Seay, “Protecting the Seeds of Innovation: Patenting Plants” (1988-9) 16 *AIPLA Quarterly Journal* 418 at 420. [hereinafter, Seay]

foreign plants through permissive and geographically-biased legislation. Indeed, when the provisions cited above are read in conjunction with Section 102 of the United States Patent Act, a far more sinister regime of appropriation of plants is inescapable. Section 102 provides that:

[A] person shall be entitled to a patent unless-

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or sale in this country, more than one year to the date of the application for patent in the United States, or

...

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it.⁵⁴

The United States' Supreme Court *dicta* in *Gayler v. Wilder*⁵⁵ brings out the oddity of this law to the full. According to the United States Supreme Court:

[I]f the foreign invention had been printed or patented, it was already given to the world and open to the people of this country, as well as of others, upon reasonable inquiry. ...but if the foreign discovery is not patented, nor described in any printed publication, it might be known and used in remote places for ages, and the people of this country be unable to profit by it. The means of obtaining knowledge would not be within their reach; and as far as their interests is concerned, it would be the same as if the improvement had never been discovered. It is the inventor here that brings it to them, and places it in their possession. And as he does this by the effort of his own genius, the law regards him as the first and original inventor, and protects his patent, although the improvement had in fact been invented before, and used by

⁵⁴35, U.S.C. 102 (1994), *supra*. (Underlining supplied). Ironically, the 1790 and 1793 Patent Acts of the U.S. did not have any geographic distinctions on the matter of invention. Indeed, the case of, *Dawson v. Follen*, 7 F. Cas. 216 (C.C.D. Pa. 1808) held that the patentee must be the original inventor "in relation to every part of the world."

⁵⁵51 U.S. (10 How.) 477 (1850). For a fuller discussion of this geographical dichotomy and its overall implications see, Donald Chisum, "Foreign Activity: Its Effect on Patentability Under United States Law" (1980) 11 *International Review of Industrial Property and Copyright Law* 26.

others.⁵⁶

In effect, under section 102 of the United States *Patent Act*, prior knowledge, use or invention in the United States can be used as evidence to invalidate a U.S. patent for a lack of novelty⁵⁷ but as Shayana Kadidal points out, “almost all similar foreign activity cannot be used against a U.S. patent.”⁵⁸ In effect, what may be construed and upheld as a new plant invention in the United States may in some circumstances refer to plants used in and well-known to other peoples outside of the United States.

This is not to say that all states of the North have parochial and state-centric notions of novelty of inventions. Most states, including Canada apply a global standard of novelty.⁵⁹ In deed, of the major patent-granting countries, only the United States and Japan operate regimes of limited, state-centric, and geographically-specific notions of printed publications in the determination of prior art.⁶⁰ Remarkably, both states issue more than half of all patents operative in the world. The obvious consequence is that for states and peoples, especially of the South, who do not have strong formal structures of patenting plants and or publishing

⁵⁶Underlining supplied. Of the major patent systems, only Japan and the United States have a regime of printed publication for the purposes of determining prior art.

⁵⁷Shayana Kadidal, “Subject-Matter Imperialism? Biodiversity, Foreign Prior Art and the Neem Patent Controversy” (1996-7) 37 *IDEA* 371. [hereinafter, Subject-Matter Imperialism]

⁵⁸Subject Matter Imperialism, *ibid.*

⁵⁹Michel Goulet, “Novelty Under Canada’s Patent Act-- A European Accent” (1998) 13 *Intellectual Property Journal* 83. See also, Patent Act of Canada, R.S.C. 1985, c. P-4, as amended.

⁶⁰See generally, John Sinnott, *World Patent Law and Practice* vols. 2b, 2c, 2d, 2e, 2f, 2g (New York: Matthew Bender, 1977)

their knowledge of plants in journals,⁶¹ plant resources in their domains could be “discovered” by any one so interested and taken to a country like the United States or Japan for the purposes of patent protection. Considering the huge information gap between the North and South, the enormous global ignorance on plants in many hinterlands of the South, and the phenomenal ignorance of even the “experts” in the North of the diversity of plant life forms available to and in common use among local and traditional peoples in the South, it hardly takes more than a visit to a village in the South for anyone to become an “inventor” of a “new” plant.

Further, the concept of “printed publication” has not been given any clear meaning, particularly, in the United States and Japan. The courts in the United States, have for instance, tended to consider the words “printed publication” as halves of a two-tiered standard.⁶² In other words, the prior art must not only be printed, it must also be published. Interestingly, the meaning of the word “printed” could sometimes yield bizarre judicial interpretations. For example, some states of the North like the United States which have deemed it convenient to jettison the central requirement of written descriptions in plant patents, have often turned round to hold that typescripts of prior art are not “printed” matter for the purposes of determining prior art emanating from some countries of the South.⁶³ More

⁶¹Gerald Rose, “Do You Have a “Printed Publication?” If Not, Do You Have Evidence of Prior “Knowledge or Use?” (1979) 61 *Journal of Patents and Trademark Office Society* 643

⁶²Subject-Matter Imperialism” *supra* at 391.

⁶³For example, in *Carter Prods, Inc., v. Colgate-Palmolive Co.*, 130 F. Supp557, 104 U.S.P.Q. (BNA) 314 (D. Md. 1955), it was held that a typewritten patent document from the Patent Office in Argentina was not a “printed matter” and therefore could not invalidate a patent application on the same subject in the United States.

importantly, the emphasis on printed publication places “oral and other evanescent sources clearly outside prior art for the purposes of determining inventions.”⁶⁴

Given that most of the peoples and cultures in the South where plant diversity thrives largely operate a culture of oral transmission of knowledge, the damage which this regime wreaks on them culturally and economically is enormous. For example, local farmers in Nigeria, had developed an insect-resistant cowpea. Needless to add, those local farmers did not “publish” their findings in a “reputable journal” reviewed by their “peers.” However, on a trip to West Africa, Angharad Gatehouse, a scientist at the University of Durban obtained some of these seeds. Using “formal” techniques, he identified in “scientific language” the genetic mechanism which causes the locally-developed cow-peas to be insect-resistant. As Buchanan notes, “he [the scientist] promptly left the university and joined Agricultural Genetic Company of Cambridge and they proceeded to apply for a patent on their “invention.”⁶⁵

The double standard which is inherent in this regime creates a legal order of patents by discovery or importation similar to Medieval European practices. As William Lesser notes, “those who complain of a double standard regarding IPR protection for genetic materials have a legitimate position.”⁶⁶ In effect, non-Western contributions to plant

⁶⁴“Subject-Matter Imperialism”, *supra* note 57 at 392. See also, Meetal Jain, “Global Trade and the New Millennium: Defining the Scope of Intellectual Property Protection of Plant Genetic Resources and Traditional Knowledge in India” (1999) 22 *Hastings International and Comparative Law Review* 777. [hereinafter, Jain]

⁶⁵James Buchanan, “Between Advocacy and Responsibility: The Challenge of Biotechnology for International Law” (1994) 1 *Buffalo Journal of International Law* 221.

⁶⁶William Lesser, *Institutional Mechanisms Supporting Trade in Genetic Materials: Issues Under the Biodiversity Convention and GATT/TRIPs* (Geneva: UNEP, 1994) at 41.

development are systematically relegated to an inferior status fit and ready for appropriation through the patent system.⁶⁷

A few real examples of this permissive regime may suffice to demonstrate the point. In 1999, two Australian government agricultural agencies attempted to patent chickpeas grown by subsistence farmers in India and Iran but which were unknown to farmers and scientists in Australia until storage of the chickpea germ plasm in an international gene bank.⁶⁸ What stopped the patent application was a protest by some activists.

Sometimes, public outrage may come a little too late. For instance, two professors at Colorado State University have been asked to abandon patents on *Quinoa Chenopodium Quinoa*- an important food crop among the Andeans. The professors, Duane Johnson and Sarah Ward applied for and obtained US patent No. 5, 304, 718 on a traditional Bolivian variety of quinoa called "Apelawa" giving them exclusive monopoly of male sterile plants of the traditional Bolivian "Apelawa" quinoa variety and its use in creating other hybrid quinoa varieties. The patent covers both male sterile Apelawa Quinoa and "any" quinoa hybrid that is derived from the Apelawa. The point here is that male sterility in Andean farmer's varieties of Quinoa had been known for decades among the Andean farmers and peasant farmers in Bolivia, Peru, Ecuador and Chile.⁶⁹

Furthermore, in 1997, a Texas-based company acquired U.S patent no 5, 663, 484 on

⁶⁷Steven Rothschild & Thomas White, "Printed Publication: What Is It Now?" (1988) 70 *Journal of Patents and Trademark Office Society* 42.

⁶⁸Newscientist, *supra* note 5.

⁶⁹See, "Bolivian Farmers Demand Researchers Drop Patent on Andean Food Crop" *RAFI Press Release*, 18 June 1997.

basmati⁷⁰ rice lines and grains. It should be noted that for centuries, Basmati rice had been grown and developed in the Greater Punjab region now split between India and Pakistan. Basmati rice is world-famous for its fragrant aroma, long and slender grain and distinctive taste.⁷¹ Over 1 million hectares of rice paddy is cultivated in India with basmati rice per annum and 0.75 million hectares in Pakistan. In 1998/9 alone India exported USD425 million dollars of Basmati rice.⁷² Thus, in this case, the patent of Basmati not only appropriated a globally recognized name but threatens the livelihood of thousands of Punjabi farmers who export Basmati rice.

Sometimes, the nature of appropriation of plants by a process of invention by “discovery” could be stranger than fiction. For example, in May 1986, a chief from the Secoya community of Ecuador “exchanged” some specimens of the rare and useful plant, *Banisteriopsis caapi* (otherwise known as “yage” in the local language) for two packs of Marlboro cigarettes. This exchange, as it were, occurred between the chief and a person he would later simply describe as a “gringo.” The “gringo” was Loren Miller of the International Plant Medicine Corporation who had heard of the known psychoactive properties of “yage” as an hallucinogenic (the variety of *banisteriopsis* Miller took had been domesticated by the Indians for hundreds of year). Shortly after the exchange, Miller returned to America with his “discovery” and applied for and obtained a plant patent no. 5,751 from the United States

⁷⁰The word “basmati” in Sanskrit, means ‘Queen of Fragrance’ or ‘fragrancee earth.’ This species of rice is known for its slender, aromatic long-grain and unusually delicate texture. See, *RAFI Geno-Types*, 1 April 1998.

⁷¹*RAFI Update*, 4 January 2000.

⁷²*Ibid.*

Patent Office.⁷³ In another case, Larry Proctor of POD-NERS in the United States is alleged to have patented (US Patent No. 5,894,079) yellow beans he collected in Mexico. This species of beans has been known to Mexican farmers for centuries.⁷⁴

Indeed, these few examples which have raised a measure of controversy may well be the proverbial tip of the iceberg. Section 102 of the United States *Patent Act* appears to have been mitigated by the United States' Uruguay Round Agreements Act⁷⁵ which purports to limit prior art on inventive activities to member-states of the North American Free Trade Area (NAFTA) and the World Trade Organization (WTO). For the purposes of clarity, the said amendment is hereunder reproduced *in extenso*:

S.104. Invention made abroad.

(a) In proceedings in the Patent and Trademark Office, in the courts, and before any other competent authority, an applicant for a patent or a patentee, may not establish a date of invention by reference to knowledge or use thereof, or any other activity with respect thereto, in a foreign other than a NAFTA or a WTO member country, except as provided in sections 119 and 365 of this title⁷⁶

It is curious why the United States and indeed, the whole of the member-states of the World Trade Organization or even the Paris Convention should not have a simple global standard

⁷³Josef Henry Vogel, "An Economic Analysis of the Convention on Biological Diversity: The Rationale for a Cartel" (on file with the author). [hereinafter, Vogel]. See also, Rosemary Coombe, "Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity" (1998) 6 *Indiana Journal of Global Legal Studies* 59. [hereinafter, Coombe, "Dilemmas"] at 88.

⁷⁴For a detailed discussion of this case see, "Mexican Bean Piracy" *RAFI Geno-Types*, 17 January 2000.

⁷⁵*An Act to Approve and Implement the Trade Agreements Concluded in the Uruguay Round of Multilateral Trade Negotiations, The Uruguay Round Agreements Act* 1994, Dec. 8, 1994, P.L. 103-465, 108 Stat. 4809.

⁷⁶*Ibid.*

of absolute novelty instead of the questionable and exploitative national or regional limitation to what constitutes novelty and prior art.

4.2.2: The Criterion of Specification and Implications on Appropriation of Plants

The second aspect of deliberate relaxation and re-writing of patent laws to facilitate or at least conduce to a regime of appropriation of plants is the lowering of the threshold on specification of inventions. Under the general patent law on inventions, an applicant for a patent is required to submit a detailed description of the invention in question. This requirement virtually epitomises the supposed social *raison d'être* of the patent system; that is to say, the enrichment of the stock of knowledge in the public domain. Indeed, one of the major theories on patents is that the state grants the privilege of patents in exchange for the inventor's full disclosure of the invention in question in a manner in which those skilled in the art as the inventor would be enabled to work and replicate the invention freely after the expiration of the patent term. It is for this reason that patent law experts are agreed that the requirement of specification lies at the heart of the whole patent system.⁷⁷

Thus, absent a strong and strict enforcement of the requirement for a full and frank specification of the purported invention, the entire edifice of the patent system collapses into a disreputable regime of privileges like the much-maligned Royal Monopolies of the Medieval ages in the United Kingdom. In relation to plants, it is obvious that a literal interpretation and application of the rule of complete description and disclosure of the

⁷⁷George Francis Takach, *Patents: A Canadian Compendium of Law and Practice* (Edmonton: Juriliber, 1993)

purported invention by way of a specification is practically impossible. This is because, morphological characteristics and features such as “the taste of a fruit, the smell of a flower, the baking power of a cereal or the brewing power of barley”⁷⁸ cannot be reduced to documentary specification capable of enabling a skilled person in the art replicate the plant invention, as it were. In other words, differentiation of one plant “invention” from the other by way of graphical and literal specification is virtually impossible. It was for this reason that classical patent theorists opined that the patent system was incapable of being applied to plants.

Indeed, attempts to cure this juridical black-hole by requiring the deposit of the plant invention hardly ameliorate the radical defect in and impossibility of specifying the purported plant invention. The major advantage in written description or specification is that it enables the public, with minimum hassle or delay to have access to the information contained in the specification. This need is hardly resolved by the requirement that a plant invention be deposited with the patent office. It is difficult to conceive of how a deposit of a sample of the purported plant invention would be of any scientific value to interested members of the public or enable thousands of other persons skilled in the art in question to have easy access to what is meant to be an unencumbered contribution to information and knowledge in the public domain. In the *Pioneer Hi-Bred* case⁷⁹ the Canadian Supreme Court considered the question and reasoned that since a specification,

⁷⁸Overwalle, *supra* note 9 at 155.

⁷⁹*Supra* note 20.

[L]ies at the heart of the whole patent system⁸⁰...,the test to be applied in determining whether disclosure is complete. The applicant must disclose everything that is essential for the invention to function properly. To be complete, it must meet two conditions: it must describe the invention and define the way it is produced or built...The description must be such that as to enable a person skilled in the art or the field of the invention to produce it using only the instructions contained in the disclosure.⁸¹

In considering the case at hand, the Court found that in the absence of any special legislation on deposit of samples of the purported invention, it could not unilaterally expand the traditional tests for patentability. Accordingly, since “deposit of the seed by itself does not comply with the applicable law”⁸² the patent application on the new variety of soybeans was refused. At the moment, it is not yet clear whether the courts would accept the deposit of biological material other than microorganisms as sufficient disclosure and specification. In the *Tetraploide Kamille* case involving camomille plants, the German Federal Supreme Court, like their Canadian counterparts explicitly left the question unanswered.

The requirement for special legislation to bring plants within the scope of patentability has been met in some jurisdictions such as the United States through the enactment of the *Plant Patent Act*. As subsequent pages will show, this type of law attempts to lower the traditional requirement of complete and accurate specification by written description. Even with such special laws which lower traditional standards of specification and/or elevate the deposit of samples to the status of actual and complete specification, there are still conceptual and practical problems. For example, it is still difficult to comprehend

⁸⁰*Consolboard Inc. v. MacMillan Bloedel (Sask.) Ltd.* (1981) 56 C.P.R. (2d) 145 at 154.

⁸¹*Pioneer Hi-Bred, supra.*

⁸²*Ibid.* Compare with, *Tetraploide Kamille*, (BGH GRUR 1993, 651).

how certain indescribable qualities of plants would be reduced to drawings and writings as the case with non-life form inventions.

As some of the earliest critics of patents on plants have queried or observed, “how will a plant breeder describe his new product? It is almost impossible to describe in words what a violet smells like, or a Jonathan apple tastes like?”⁸³ According to Robert Allyn’s rhetorical query, “pray tell me, what does an onion taste like?”⁸⁴ The sum of this conundrum is that plants are inherently incapable of falling within the scope of what may be specified under traditional patent laws.⁸⁵

However, this great jurisprudential obstacle did not stop the process of forcing plants into the patent regime. As earlier indicated, shortly after the publication of Vavilov’s findings on the nature of global distribution of plant variety, the United States took the lead in expanding the patent system to accommodate plant and seed merchants by deliberately “relaxing the written description requirement in favor of a description as complete as is reasonably possible.”⁸⁶ Thus, in 1930, identical bills were introduced in both houses seeking to remove and or dilute the written description requirement which had for centuries constituted the social *raison d’etre* of the patent system.

For example, section 161 of the the *Plant Patent Act* of the United States provides that “no plant patent shall be declared invalid for non-compliance with section 112 of this

⁸³Joseph Rossman, “Plant Patents” (1931) 13 *Journal of Patent Office Society* 7.

⁸⁴Robert Allyn, “Plant Patent Questions” (1933) 15 *Journal of Patent Office Society* 180.

⁸⁵Robert Cook, “Applying the Plant Patent Law” (1931) 13 *Journal of Patent Office Society* 22.

⁸⁶*Diamond v. Chakrabarty*, *supra* at note 15 at 198.

title if the description is as complete as is reasonably possible.”⁸⁷ The American initiative was followed in the Netherlands in 1942 and Germany in 1953 and other European countries.⁸⁸ In justifying this bold re-writing of a hitherto fundamental pillar of patent law to accommodate the commercial interests of plant breeders and seed merchants, the U.S Congress admitted that the template shift was designed to “afford agriculture, so far as practicable, the same opportunity to participate in the benefits of the patent system as has been given industry.”⁸⁹ By way of contrast, no mechanical invention would be patented if it was not accompanied, *inter alia*, with a full and frank specification. The inescapable inference is that “the requirements for obtaining a plant patent ...are substantially more liberal than those mandated for a standard utility patent”⁹⁰ and this has had an appropriative impact on plants from the South.

4.2.3: The Criteria of Inventive Step and Utility of Invention in Relation to Appropriation of Plants

Two close concepts to invention are the requirements of novelty and utility of the invention. However, as already evident, the concept of novelty is relative and sometimes

⁸⁷35 U.S.C (1988), *supra* at sections 161-164. Note that the section 112 referred to deals with written specifications.

⁸⁸For example, *Plant Varieties and Seeds Act of 1964* (U.K)

⁸⁹Hearings Before the Subcommittee on Departmental Operations of the Committee on Agriculture, 91st Congress, 2nd Sess. 7 (1970) (statement by Allenby White, Chairman, Breeder’s Rights Study Committee, American Seed Trade Association, quoting S. Rep. No. 315, 71st Congress., 2nd Sess, (1930) (as quoted in Scalise & Nugent, *supra* note 18 at 91-2); see also, Martin Adelman & Sonia Badia, “Prospects and Limits of the Patent Provisions in the TRIPS Agreement: The Case of India” (1996) 29 *Vanderbilt Journal of Transnational Law* 507.

⁹⁰Scalise & Nugent, *supra* at 92.

arbitrarily determined. The determination of whether a particular inventive step is worthy of patent protection is subjective. Furthermore, as Reichman has noted, “there is no international agreement or uniform set of guidelines for implementing the now universal eligibility criterion of “nonobviousness.”⁹¹

In its subjectivity, the element of cultural bias and the subtext of gender discrimination, especially for plants which are largely improved by women farmers in the South, cannot be easily discountenanced given that those farming activities are usually relegated as mere drudgery and unintellectual chores. As subsequent pages will demonstrate, the ambiguities surrounding these concepts, facilitates a free ride on plant germ plasm from the South which are generalized as raw materials for the pharmaceutical and biotechnology industries of the North. In order to appreciate how the obfuscation on the meaning of novelty and inventive step facilitates the appropriation of plant life forms, it is pertinent to briefly examine judicial and scholarly debates on the issue.

The doctrine of the patent system is that unlike the copyright regime which protects both “the most impassioned poetry and the sheerest doggerel”⁹² alike, patent protection is only available, at least in theory, for inventions which are deemed to be substantially above extant knowledge, that is, prior art.⁹³ The problem however lies in determining what quantum

⁹¹Jerome Reichman, “From Free Riders to Fair Followers: Global Competition Under the TRIPS Agreement” (1996-7) *International Law and Politics* 11. [hereinafter, Reichman, Free Riders]

⁹²Pott, *supra* note 51 at 113.

⁹³Stephen Gratwick, “Having Regard to What Was Known and Used” (1972) 88 *The Law Quarterly Review* 341.[hereinafter, Gratwick]; Stephen Gratwick, “Having Regard to What Was Known and Used”-Revisited” (1986)102 *The Law Quarterly Review* 403.

of innovation or creativity amounts to an invention.⁹⁴ There is thus a theoretical difference between mere improvements which could be made or would be expected of the hypothetical person “skilled in the art” and changes which rise to the level of invention. Needless to say, there is a measure of discretion between these two poles and the fundamental problem of the patent law system lies in this grey space between inventions and improvements.⁹⁵ As Tomlin J. noted in *Samuel Parkes & Co., v. Cocker Bros., Ltd*,

[N]obody, however, has told me, what is the precise characteristic or quality the presence of which distinguishes invention from a workshop improvement. Day is day and night is night, but who shall tell where day ends or night begins...it is, I think, practically impossible to say there is not that scintilla of invention necessary to support the talent.⁹⁶

It is not only judges who have grappled with this slippery aspect of patent law; scholars have also found the concept of inventive genius or such similar tests elusive. In his analyses and summary of this conundrum, Richard Gardiner despaired that:

[I]n the light of uncertainty as what it is that is protected by patent law (both in cases of what required element of inventiveness is central to patentability and the extent of what the patent actually protects) readers of the Reports of Patent Cases might well reach the conclusion that the state of the law in this field depends on how key concepts strike the judge hearing a cause or fit the line of reasoning ...invention...idea...ingenuity..and discovery are used by the courts in conjunction with novelty and the notion of what is inventive or not obvious in unpredictable ways.⁹⁷

A careful perusal of both case law and scholarly writings on the question of what constitutes

⁹⁴A Commission appointed by the German government in 1886 to examine the possibility of forming a definition of invention failed to come up with a definition. See, Potts, *supra* at 117.

⁹⁵Pott, *supra* at 114.

⁹⁶46 R.P.C. (1929) at 248.

⁹⁷Richard Gardiner, “Language and the Law of Patents” (1994) 47 *Current Legal Problems* 32.

the appropriate quantum of novelty to justify a patent grant shows that there are no *a priori* thresholds, rather, patent examiners and judges have, in spite of protestations to the contrary, essentially relied on their judgment, hunch, value, criticism and gut reaction.

In effect, although all legal authorities are agreed in theory that there is no invention when the alleged improvement is obvious to the hypothetical person skilled in the art, the fact of the matter is that the determination of that “requisite level of inventiveness” is a subjective process which evaluates the gradation of innovations and affixes value on the patent application in question. This is what the German jurists who have examined this phenomenon have termed a *Werturteil*; a judgment of value.⁹⁸

In the exercise of this judgment of value, a close scrutiny of judicial decisions on the matter and quick comparison with judicial attitudes to plant patents vis-a-vis mechanical inventions clearly show that the juridical system of patents leans rather hard on mechanical inventions as compared to plant “inventions” or biotechnological products. In this process of double standards and lenient approach to purported plant inventions, the level of inventiveness required is significantly low.

For example, although the United States *Plant Patent Act* (this legislation creates special provisions for plant inventions) requires that for a plant to be patentable, it must be “be distinct and new”,⁹⁹ the novelty required is not necessarily of the standard provided for under section 102 of the United States *Patent Act* (this act lays the rules for general patents

⁹⁸Potts, *supra* note 51 at 117. That is to say, the judge is called to evaluate the quantum of difference from the prior art, by making a subjective estimate of its effect on the mind of the hypothetical person skilled in the art.

⁹⁹Section 161, 35 U.S.C. (1982), *supra*.

excluding plants). Rather, the courts have interpreted this to mean that the “new” plant did not exist previously in a capacity in which it could reproduce itself.¹⁰⁰ In addition to this lowered threshold, the term “distinct” which was ostensibly intended to substantially distinguish one patented plant from the other has hardly received such a purposed intent from the courts. Rather, subtle and frivolous bio-chemical distinctions instead of the usual morphological and utilitarian distinctions have dominated the jurisprudence on patents on plants.¹⁰¹

It is within this context that the requirement of utility of inventions has been thoroughly abused. The criterion of utility bears on the requirement that an invention must be useful for the purposes it claims to serve. Surprisingly, the emphasis on plant patents is on *difference* and not the superiority of the “new” plant sought to be patented over existing varieties. Interestingly, the United States Senate Report on the subject, for example, makes it quite clear that marketing difference is the critical factor and not whether the “new” plants brings forth an improvement or betterment of pre-existing plant varieties.¹⁰² The obvious consequence of this relaxation of a crucial criteria of patentability is that the common “proliferation of lines that are genetically different in trivial ways but [that] are marketed as different.”¹⁰³

The short point here is that the patent regime has more or less been designed and

¹⁰⁰*Yoder Bros., Inc. v. California-Florida Plant Corp.*, 537 F.2d 1347, 1378, 193 U.S.P.Q. 264, 291 n.34 (5th Cir. 1976).

¹⁰¹S. Rep. No. 315, 71st Cong., 2d Sess. (1930)

¹⁰²*Ibid.*

¹⁰³Kloppenburg, *supra* note 8 at 239.

relaxed to suit merchandising in plants without any serious pretensions to improvement of plant varieties *per se*. The direct consequence of this relaxed regime is that frivolous changes which merely create pseudo-varieties directly intended to separate one commercialized plant from the other have become standard practice in the seed industry to the detriment of larger social interests. More often than not, the trivialization of the criterion of utility for plant patent protection so as to protect pseudo-varieties could be incredible. For example, the novelty and utility of Nothrup King Co.'s soybean variety "S30-31" is that this "new" variety (S30-31)

[I]s most similar to "Pella", "Cumberland", and "Agripro 25"; however, "S30-31" has grey pubescence vs. tawny for "Pella", yellow hila vs. imperfect black for "Cumberland", and white flowers vs. purple for "Agripro 25."¹⁰⁴

In other words, the so-called S30-31 was given patent protection merely because the Soybean in question had a different colour of flower. Commenting on this trend, Kloppenburg notes that "it would appear that private breeding work may involve a substantial amount of unproductive effort to achieve uniqueness, and thus, protectability, through transfer of non-economic traits such as flower colour."¹⁰⁵ It would be almost impossible to conceive of patents being granted to mechanical inventions if all that the applicant for patent could show for his/her invention is that the "new" invention differed from prior art on the same machine on grounds of colour; unless, colour itself was the dispositive aspect of the invention.

A direct result of this regime is the appropriation of plants through a process of slight

¹⁰⁴(1994) *Plant Variety Protection Office Journal* 13.

¹⁰⁵Kloppenburg, *supra* note 8 at 144. Further, under the UPOV conventions, "novelty" refers more to "commercial or market" novelty than technological novelty and requires that a variety must not have been sold or marketed in the country where the application is filed earlier than one year before the filing date.

and trivial alteration of existing and well-known plants, particularly from the South. According to Meetal Jain, "to date, at least two-thirds of plant genetic resources from India have been patented, through slight alteration in the United States."¹⁰⁶ The inescapable conclusion here is that the plant patent system defers to the needs of the seed merchants and traders who may not really have much social or public interest in improving the quality of plants but would devote substantial time and resources to add or remove some immaterial characteristics of plants so as to secure plant patent protection thereon and monopolize the market.

The irony here is that while cosmetic changes in plants are being rewarded with patents in the North, the contributions of traditional farmers, particularly women who have historically and in modern times made greater contributions to genuine plant improvement remain in the withered peripheries of systemic neglect occasioned by deliberate cultural and juridical bias. For example, over the centuries Indian farmers, particularly women, have developed and grown over 30,000 different varieties of rice, none of which received patent protection. Similarly, native Andean farmers have ingeniously developed hundreds of species of tomatoes, potato, maize and beans. Indeed, scientists agree that "the total genetic changes achieved by farmers over the millennia is far greater than that achieved by the last hundred or two years of more systematic science-based efforts."¹⁰⁷ Yet, traditionally-improved plants are generally construed in powerful commercial circles as raw materials devoid of respect,

¹⁰⁶Meetal Jain, *supra* note 64.

¹⁰⁷Vandana Shiva, *The Violence of the Green Revolution* (London: Zed Books Ltd,1991) at 259; Vandana Shiva, *Staying Alive-Women, Ecology and Development* (London: Zed Books Ltd, 1988)

intellectual credit or property rights.

While the contributions of traditional farmers and breeders, particularly women, may not command the same degree of media hype and circus-like buzz reserved for corporate modification of plants in the North, evidence is overwhelmingly positive that local and traditional farmers have indeed achieved a greater degree of substantial and useful improvement of plants than their corporate counterparts in the seed industries whose efforts are increasingly commerce driven.¹⁰⁸

For example, in Sierra Leone, local farmers, particularly women, have been known to develop over 70 different varieties of West African indigenous rice. These varieties are based on several useful criteria such as, length to maturity, ease of husking, proportion of husk to grain size, susceptibility to insect attack, behaviour in different soils and moisture levels, cooking time and other utilitarian and aesthetic qualities.¹⁰⁹ The instances of local improvement of plants are legion and the scientific basis of traditional agricultural practices can no longer be questioned. As a recent report of the Friends of the Earth noted, in order to achieve the phenomenal improvement of plants in the so-called “informal” paradigm, traditional farmers;

[E]mploy taxonomic systems, encourage introgression, use selection, make efforts to see that varieties are adopted, multiply seeds, field test, record data [and in fact]...do what many Northern plant breeders do.¹¹⁰

¹⁰⁸Friends of the Earth, *Intellectual Property Rights and the Biodiversity Convention: The Impact of GATT* (Bedfordshire, 1995) [hereinafter, Friends of the Earth]

¹⁰⁹Gurdial Singh Nijar, “Towards a Legal Framework for Protecting Biological Diversity and Community Intellectual Rights—A Third World Perspective” Third World Network Discussion Paper, Penang, Malaysia, 1997. (On file with the author).

¹¹⁰Friends of the Earth, *supra* note 108 at 4.

In deed, even in modern times, traditional farmers have often shown better insight into the nature and utility of plants than the so-called “expert” commercial seed breeding companies whose anxieties and loyalties may lie in the unpredictable world of stock markets than in offering a public benefit to humanity.

For example, a new variety of rice known as “mashuri” was rejected by official government researchers on research stations in the Indian state of Andhra Pradesh. Local women rice farmers got hold of this rejected variety of rice, experimented with it in their farms with other rice varieties, and finding its performance well-suited to local conditions, facilitated its spread to other local farmers. It has been reported in recent times that “mashuri” is the third most popular rice variety in the whole of India.¹¹¹

It therefore seems that the continued mis-characterization of traditionally-improved plants as raw materials for the corporate seed growers and companies in the North is a cultural construct and regime without objective basis. There is nothing inherently inferior about traditional improvement of plants. As notable activist Pat Mooney has observed, “the argument that intellectual property is only recognizable when performed in laboratories with white lab coats is fundamentally a racist view of scientific development.”¹¹² Arguing on a similar vein, the Crucible Group recently noted that, “farmers fields and forests are laboratories. Farmers and healers are researchers. Every season is an experiment.”¹¹³

It is not only the trivialization of the utility requirement which creates room for the

¹¹¹Friends of the Earth, *supra* at 4.

¹¹²Shiva, *The Violence of the Green Revolution*, *supra* note 107 at 259.

¹¹³The Crucible Group I, *People, Plants, and Patents: The Impact of Intellectual Property on Trade, Plant Biodiversity, and Rural Society* (Ottawa: IDRC, 1994) at xviii.

appropriation of plants, other criteria of patentability such as repeatability and industrial applicability of an invention, have been practically watered down by judicial and legislative initiatives in order to accommodate the special interests of the commercial seed breeders and merchants. While the question of utility of invention has been broached in the preceding pages, the next few paragraphs will examine how the patent law system has responded to the juridical obstacle of repeatability and industrial applicability of plants.

4.2.4: The Criteria of Uniform Reproducibility and Industrial Applicability in Relation to the Appropriation of Plants

It is a well-known requirement of patent law that for an invention to be patentable, it must be capable of being applied industrially. A corollary to the industrial applicability requirement is the requirement that the invention be reproducible in such manner that the copies from the prototype are like clones of the original. All these requirements are clearly tailored towards a mechanized and “conveyor-belt” idea of industrialization and mechanized employment of the means of production. Given the linkage to and use of the patent instruments to attract foreign skilled artisans and industry, it is not surprising that this requirement is a crucial aspect of the system of patents.¹¹⁴

With reference to plants, the requirements of industrial applicability and reproducibility require, at least in theory, that the processes which led to the first specimen of the new variety should be repeatable by a person skilled in the art to produce clones of the

¹¹⁴Overwalle, *supra* note 9 at 145.

purported original invention.¹¹⁵ The problem with the application of this principle to complex life forms such as plants is that it is not always practicable to reproduce in exact details the next generations of the original invention.

In grappling with this difficulty, the Canadian Federal Court of Appeal noted in the *Harvard Oncomouse Case*¹¹⁶ that the better approach is to determine the “essential” aspect of the application in question. In other words, a literal and strict construction of the rule of uniform reproducibility should be avoided in the determination of whether a plant patent application scales the hurdle of uniform reproducibility. This minimalist or essentialist approach to uniform reproducibility is in recognition of the near-impossibility of accurately predicting the idiosyncracies and variations of genes in complex life forms when sought to be reproduced.¹¹⁷ However, even with a minimalist approach, a high element of luck may be required by either a person skilled in the art or the original inventor to reproduce in a uniform manner the products of artificial life forms.¹¹⁸ The short point is that in the absence of special legislation, patents on complex life forms such as plants flout the rule of uniform

¹¹⁵Victor Renier, “Vegetable Novelties and Inventor’s Rights” (1960) [Belgium] *Annals of Law and Political Science* 253.

¹¹⁶*President and Fellows of Harvard College v. Commissioner of Patents*, [1998] 79 C.P.R. (3d) 98.

¹¹⁷*Merck & Co. v. Apotex Inc.* (1994), 59 CPR (3d) 133 (Fed. TD) at 178.

¹¹⁸As Overwalle explains:

[T]he technical problems do not occur at the stage of the introduction of genetic information. The technology for making a DNA segment is manageable, and assuming that a description is available, a person skilled in the art should be able to copy the DNA segment to be inserted, on the basis of the description. The difficulties occur in the stage between the gene construct and the plant genome. The cause of these difficulties is that the DNA rapidly enters the nucleus of the plant cell and begins integrating at a random site resulting in the insertion of the DNA segment at a different site in every cell transformed. The underlying implication of this difficulty is that a person skilled in the art who applies the method as specified, can still arrive at another transgene plant that has different DNA. Overwalle, *supra* note 9 at 157-9.

reproducibility. As the Canadian court noted in the *Harvard Oncomouse case*, “ a complex life form does not fit within the current parameters of the Patent Act without stretching the meanings of the words to the breaking point...However, if parliament so wishes, it clearly can alter the legislation..”¹¹⁹

Notwithstanding this judicial restraint by the Canadian courts, some courts in the North, particularly the United States and European Union have in the face of legislative inertia expanded the concept of uniform reproducibility.¹²⁰ Although the modern patent system on plants has glossed over or drowned out such problems, the consequence of this relaxed regime constitutes a double-standard in relation to non-life form inventions. In addition, it also confers juridical legitimacy on “new” plant “inventions” which fail the test of uniform reproducibility.

Further, the lax plant patent regime often has a tendency of encouraging the breach of international agreements on non-patenting of germplasm held in trust in United Nations agencies such as the International Rice Research Institute, and the Consultative Group on International Agricultural Research (CGIAR).¹²¹To sum up the position on patents on plants

¹¹⁹Note 116, *supra*.

¹²⁰67 GRUR 577 (1962) [as cited in, Overwalle, *supra* note 9 at 185. But see, Red Dove (*Rote Taube*, BGHZ 52, 74, 72 GRUR 772 (1969). See also, Robert Allyn, “More About Plant Patents” (1933) 15 *Journal of Patent Office Society* 963.

¹²¹“Australians Abandon 2 Plant ‘Patent’ Claims” *RAFI News Release*, 21 January 1998. In this case, Australian crop development agencies were forced to abandon their claims on two chickpea varieties obtained from an international public research institute (International Crops Research Institute for the Semi-Arid Tropics-ICRISAT) based in India. See also, “International Research Centre (ICARDA) Breaks Trust-Allows Australians to Patent Plants Supposedly Held in Trust for Farmers” *RAFI News Release*, 2 February 1998.

These types of questionable patents have given rise to recent calls for a restructuring of the Consultative Group on International Agricultural Research (CGIAR) which was the umbrella organization responsible for the 12 international genebanks spread all over the world. “Structure and Goals of the CGIAR Need Redefining” Online < <http://users.ox.ac.uk/wgtrr/grairafi.htm> accessed n 9/13/99. However, as already

and its appropriative function, it is pertinent to note that the United States Supreme Court in the *Diamond v. Chakrabarty*¹²² case articulated the reasons for these radical changes in the law of patents. According to the court, the purpose of the domestic statutes on plant patents was to remove what was considered specific “impediments”¹²³ to the patenting of plants. The court also admitted that the plant patent statutes “relaxed” the enabling requirements for plants.

What stands out from this analysis is that the patent system has been used as a deliberate and malleable instrument of state policy and its legal norms may be no more than the congealed political/economic interests of powerful states. The surprising thing about the re-writing and retrofitting of the patent system to accommodate certain well-established interests is that most states of the South have approached the subject of patents on plants as if the patent system was an unalterable, sacrosanct and apolitical regime. The next pages will examine how the patent system has also been purposively used to permit and legitimize the appropriation and privatization of TKUP.

4.3: The Changing Concept of Patentability in Relation to TKUP

As already argued in Chapter 2,¹²⁴ the stupendous body of knowledge held and practised by local and traditional farmers, especially women, on the uses of plants for food,

noted, by an agreement made in October 1994 between the CGIAR and the FAO, the 12 genebanks have been put under the legal and inter-governmental control of the FAO.

¹²²*Supra* note 15.

¹²³*Diamond v. Chakrabarty, ibid.*

¹²⁴Chapter 2.4, *supra*.

medicinal, and other purposes is increasingly being recognized¹²⁵ in Western scientific circles which hitherto dismissed TKUP as unscientific, “ethnic” or folk knowledge. A considerable portion of plants hitherto characterized as “wild” germ plasm or “cultivars” have, on closer and less prejudiced examination turned out to be products of substantial human intervention even though they may not seem commercially appealing or useful.¹²⁶

However, there are still some vestigial views which contend that the intellectual contributions and inputs of traditional peoples and farmers, especially women, to the improvement and utility of plants are unscientific, unreliable and marginal.¹²⁷ Be that as it may, the weight of informed opinion is that the intellectual contributions of traditional farmers and healers to knowledge on the uses of plants is tremendous. In many cases, the insight and knowledge brought to bear on the varied uses of plants have been nothing short of ingenious. This is the principal reason why modern inquiries into medicinal herbs and plants incorporate and rely on the knowledge of traditional and indigenous peoples.

The statistics on this are overwhelming. For example, 74 percent of the pharmacologically active trees reported by an indigenous group correlated with laboratory

¹²⁵The literature on this is immense; but see for example, Craig Jacoby & Charles Weiss, “Recognizing Property Rights in Traditional Bio-cultural Contribution” (1997) 16 *Stanford Environmental Law Journal* 74 [hereinafter, Jacoby & Weiss]; Curtis Horton, “Protecting Biodiversity and Cultural Diversity under Intellectual Property Law: Toward a New International System” (1995) 10 *Journal of Environmental Law and Litigation* 1 [hereinafter, Horton]; Darrel Posey, *Traditional Resource Rights-International Instruments for Protection and Compensation for Indigenous Peoples and Local Communities* (IUCN, 1996) [hereinafter, Possey]; Elias Carreno Peralta, “A Call for Intellectual Property Rights to Recognize Indigenous People’s Knowledge of Genetic and Cultural Resources” in, Anatole Krattiger, *et al*, eds, *supra* note 4; Dan Perlman & Glen Adelson, *Biological Diversity: Exploring Values and Priorities in Conservation* (Mass: Blackwell Inc., 1997)

¹²⁶Michael Hochberg, ed, *Aspects of the Genesis and Maintenance of Biological Diversity* (Oxford: Oxford University Press, 1996)

¹²⁷Robert Merges, “Intellectual Property in Higher Life Forms: The Patent System and Controversial Technologies” (1988) 47 *Maryland Law Review* 1051 [hereinafter, Merges]

tests. In comparison, only 8 percent of random samplings by “formal” scientists showed similar activity.¹²⁸ It is estimated that “absent the aid of indigenous groups, for every commercially-successful drug, at least five thousand species must be tested.”¹²⁹ Michael Balick of the New York Botanical Gardens found that using traditional knowledge increased the efficiency of screening plants for medicinal properties by more than 400%.¹³⁰

It is therefore not surprising that a decisive number of modern and indeed, historical drugs derived from plants have been developed with the insight and experience provided by traditional farmers, healers and breeders.¹³¹ Scientists have found that 86 per cent of the plants used by Samoan healers displayed significant biological activity when tested in the laboratory. Further, crude extracts of plants used by one healer in Belize, gave rise to four times as many positive results in laboratory tests for anti-HIV activity than did specimens collected randomly. In another case, between 1956 and 1976, the U.S National Cancer Institute screened over 35,000 plants for anti-cancer compounds. The programme was terminated in 1981 for poor results. However, a retrospective study conducted on the project concluded that the success rate could have been doubled if medicinal “folk knowledge” had been the only information used to target plant species.

The “filter” of local knowledge is generally estimated to be 5,000 times more

¹²⁸Horton, *supra* note 125.

¹²⁹Daniel Jenks, “The Convention on Biological Diversity-An Efficient Framework for the Preservation of Life on Earth?” (1995) 15 *Northwestern Journal of International Law and Business* 636.

¹³⁰Michael Balick & Paul Alan Cox, *Plants, People and Culture-The Science of Ethnobotany* (New York: Freeman and Company, 1996)

¹³¹Naomi Roht-Arriaza, “Of Seeds and Shamans: The Appropriateness of the Scientific and Technical Knowledge of Indigenous and Local Communities” (1996) 17 *Michigan Journal of International Law* 940.

effective than random collection.¹³² It is for this reason that a considerable number of the giant pharmaceutical and bio-technology companies utilise the services of intermediaries in searching for useful plants and TKUP in the South. Some of the well-known intermediaries include Pharmacogenetics of Bethesda, Maxus Petroleum of Dallas, The Carnivore Preservation Trust of USA, and Shaman Pharmaceutical Inc.¹³³ Although bio-prospecting may not always involve local knowledge of the bio-chemical properties of plants, it is an undeniable fact that absent such local knowledge, little would be achieved by the Western scientists in search of economically useful plants.

In modern times, this body of knowledge on the uses of plants and plant derivatives serves at least four major functions. First, it is a source of direct therapeutic agents.¹³⁴ For example, the alkaloid D-Tubercuranine which is widely used as a muscle-relaxant in surgery is extracted from a South American jungle plant. Modern chemistry is unable to synthesize it in a form comparable to the natural compound. Hence, the continued reliance on the natural product. Second, TKUP is also a point for the development of more complex semi-synthetic compounds.¹³⁵ For example, "saponin"¹³⁶ extracts are chemically altered to produce sapogenins which are necessary for manufacturing steroidal drugs. Third, TKUP often

¹³²Note 130, *supra*.

¹³³R.S. Crespi, *Patents: A Basic Guide to Patenting Biotechnology* (Cambridge University Press; Cambridge, 1988)

¹³⁴Kathryn Racleff, "Preservation of Biological Diversity: Toward a Global Convention" (1992) 3 *Colorado Journal of International Environmental Law and Policy* 405. [hereinafter, Racleff]

¹³⁵Racleff, *ibid*.

¹³⁶Saponins are various sugar compounds that form colloidal solutions when mixed and agitated with water. They are often used in detergents and foaming agents.

affords a model for new synthetic compounds.¹³⁷ Finally, TKUP serves as taxonomic markers for the discovery of new compounds.¹³⁸

The huge economic, cultural, and juridical implications of patents on TKUP has brought to the fore the appropriative role of the patent system in the privatization of TKUP. What is equally significant is the increasing call for a rethink of the contemporary patent system in its relation to TKUP.¹³⁹ Most of these developments have been geared towards highlighting the deficiencies of and inequities in the global patent system particularly with respect to the absence of any informed participation of local peoples¹⁴⁰ in formulating existing and future policies, legislation and policy initiatives on the subject of access to and conservation and exploitation of TKUP.¹⁴¹ While these ideas are in themselves worthy of consideration, this section focuses on how TKUP is appropriated through a process of deliberate relaxation of and double-standards in the patent systems of powerful states.

¹³⁷Cocaine, derived from the coca plant has served as a model for the synthesis for many local anaesthetics. Ratcleff, *ibid*.

¹³⁸Related species with peculiar chemical qualities are explored to discover whether they also possess similar or identical qualities or characteristics.

¹³⁹Mataatua Declaration on Cultural and Intellectual Property Rights of Indigenous Peoples, Online <<http://users.ox.ac.uk/wgtrr/mataatua.htm> accessed on 9/1/99.

¹⁴⁰As the International Society of Ethnobiology recently noted in its newly formulated Code of Ethics: [I]t is acknowledged that much research has been undertaken in the past without the sanction or prior consent of indigenous and traditional peoples and that such research has resulted in wrongful expropriation of cultural and intellectual heritage rights of the affected peoples causing harm and violation.

See, International Society of Ethnobiology (ISE) Code of Ethics; online <<http://users.ox.ac.uk/wgtrr/isecode.htm> accessed on 9/1/99.

¹⁴¹Declaration and Draft Model Law by the OAU/STRC Task Force on Community Rights and Access to Biological Resources, March 1998. Online <<http://users.ox.ac.uk/wgtrr/OAU-decl.htm> accessed on 9/21/99.

4.3.1: Patentability of TKUP and the “Product of Nature” Debate

In theory, most patent law systems purport to debar the patentability of products of nature.¹⁴² On the basis of this theory, mineral products such as marble, iron, aluminium, *et cetera* are not patentable. Initially, this objection was used as the basis for denying patent protection to plants and derivatives of plants.¹⁴³ However, as the ambit and clout of the pharmaceutical and chemical industries grew, this fundamental postulate of patent law began to witness cracks and ultimate collapse. Hence, over the years, the “product of nature” exclusion has lost respectability in informed circles. This process may be said to have started with the product patent in 1910¹⁴⁴ on acetyl salicylic (aspirin) known medically as aspirin, a quintessential product of TKUP.

In recent times, the distinction between products of nature and artificial inventions is practically non-existent, especially, as patents are routinely granted on purified natural products. This is quite distinct from the undisputable patentability of a new process even if that process relates to the production of natural products.¹⁴⁵ Of course, patent attorneys and jurists are agreed that process patents are valid regardless of whether such processes deal exclusively with life forms but what is becoming increasingly controversial is the patenting of the products itself even when such “inventions” are to all practical purposes discoveries.¹⁴⁶

¹⁴²See generally, Sinnot, *supra*.

¹⁴³*Ex parte Lartimer*, 1889 Dec. Comm’r Pat. 123.

¹⁴⁴*Kuehmsted v. Farbenfabriken of Eberfeld Co.*, 179 F. 701, 704-05 (7th Cir.1910)

¹⁴⁵Harold Wegner, “Purified Protein Patents: A Legal Process Gone Berserk?” (1990) 12 *European Intellectual Property Review* 187.

¹⁴⁶Michael Sanzo, “Patenting Biotherapeutics” (1991) 20 *Hofstra Law Review* 387.

While critics of patents on purified natural bio-chemical substances have pointed out that such patents should be limited to the process(es) by which the purification of natural substances are obtained,¹⁴⁷ patents on purified natural substances are becoming routine. Given the preponderance of natural bio-chemical compounds in the South, the isolation and purification of such compounds have an appropriative effect on the South when the products of such isolation and purification are protected with patents. This revolution has largely been executed by the courts. As Thomas Kiley has observed, “there is nothing in the patent statute that says old substances become “new” when first offered in purified and isolated form. This is law that judges have engrafted on the statute.”¹⁴⁸

However, before delving further into the appropriative nature of this distinction, it should be noted that the law on the matter is indeed inconsistent with particular reference to the aspect of purification of metallic substances found in nature. For example, while patent laws across the North have developed a regime of patents on artificially purified natural substances¹⁴⁹ which ordinarily do not occur in a pure state in nature, metals of similar characteristic have been denied patent protection.¹⁵⁰ In other words, the patent system makes arbitrary allowance for chemical and pharmaceutical inventions as against other purified natural products such as metals. Given that most TKUP is related to the needs of the

¹⁴⁷Donald Holland, “Can Product-by-Process Patents Provide the Protection Needed for Proteins Made by Recombinant DNA Technology?” (1992) 74 *Journal of Patents and Trademark Office Society* 902.

¹⁴⁸Thomas Kiley, “Patents on Random Complementary DNA Fragments?” (1992) 14 *Science* 915.

¹⁴⁹*In re Bergstrom*, 427 F.2d 1394, 166 U.S.P.Q. (BNA) 256 (C.C.P.A. 1970)

¹⁵⁰For a detailed analysis of this, see, Howard Forman, *The Law of Chemical, Metallurgical and Pharmaceutical Patents* (New York: Central Book, 1967) Compare with, K.K Beier, R.S. Crespi, & J. Strauss, *Biotechnology and Patent Protection: An International Review* (Paris: OECD, 1985).

pharmaceutical and food industries, this bias tends to facilitate the appropriation of TKUP.

In order to illustrate the bias and illogicality in the law on patenting of “purified” natural substances a few instances would suffice. In the first example, two researchers at the University of Wisconsin reportedly received U.S patents for a protein isolated from the Gabonese berry *Pentadiplandra brazzeana*. This berry has been known and used by peoples of Gabon in Africa for centuries for its incredibly sweet taste. Indeed, the protein which is a natural substance is 2,000 times sweeter than sugar and does not lose its sweetness when heated.¹⁵¹ In the *Olin Mathieson* case involving product patents for vitamin B12, it was held by a circuit court in the United States that purified vitamin B12 was patentable. The product in question occurs naturally but in an impure and unstable state. Although the crystalline form of vitamin B12 does not occur as such in nature, strictly speaking, vitamin B12 is not an invention.¹⁵² Yet, the court in the *Olin Mathieson* held that given the “long” step between natural and purified vitamin B12, “we think the invention is meritorious...it did not exist in nature in the form in which the patentees produced it and was produced by them after lengthy experiments.”¹⁵³

Furthermore, U.S Patent No. 5,900,240 was recently granted to Cromak Research Inc. based in New Jersey, United States. The patent was on the diabetic properties of an Indian plant “Jamun”; a fact known to Indians for many years.¹⁵⁴ Similarly, in July 1999, an African

¹⁵¹“Biopiracy Update: A Global Pandemic” *RAFI Update* Sep/Oct., 1995.

¹⁵²*Merck & Co., v. Olin Mathieson Chem. Corp.*, 253 F. 2d 156 (4th Cir. 1958)

¹⁵³*Ibid.*

¹⁵⁴Vandana Shiva, “Bio-piracy: Need to Change Western IPR Systems” *supra* note 2.

tree (*Swartzia madagascariensis*) which grows in Zimbabwe and had long been used for treating fungal infection was pointed out to two Swiss scientists who announced the tree's potential for curing drug-resistant fungal infections including Athlete's foot, thrush and some types of eye infections which have no known cure.¹⁵⁵ U.S Patent number 5, 929,124 (product patent) was granted on derivatives of the plant to the two Swiss scientists, Kurt Hostettman and Schalle.

The practice of patenting purified versions of naturally occurring substances is not limited to the United States. It is in fact a common practice in the industrialized countries of the North.¹⁵⁶ In the above mentioned cases which evidence the legal norm in the North, the underlying theory is that in spite of the natural origins of the substances in question, given that they do not occur in a pure state in nature, purified versions thereof require substantial human intervention and therefore are patentable.

The contradiction in this theory is that it has never been applied to purified metallic elements which otherwise do not occur in a pure state in nature. These elements require as much "human intervention" in purification as bio-chemical TKUP. They can also be labeled as "manufacture" in the literal sense of the word and it would be worthy of debate to doubt the reasonableness of process patents granted on them. However, in this case, what is in issue is the practice of granting product patents on purified natural TKUP while denying the same privileges to purified natural metals.

¹⁵⁵Steve Connor, "African Root Could be Cure for Athlete's Foot" *The Independent*, London, 21 February 2000 at 3. It is equally significant that six of the trees had to be destroyed to produce just 50 grams of the anti-fungal agent.

¹⁵⁶See the decision of the German Federal Patent Court in, "Menthonthiole" [1978] G.R.U.R. 702.

The case of the metal tungsten is in point. The element tungsten which is generally used as filament in electric bulbs is notorious for being very impure in nature. Indeed, its capacity to react with other elements in nature is legendary. It is always found in an oxidized state in nature. In theory, therefore, a purification of tungsten would require substantial human ingenuity and whoever achieves this feat may be rewarded with a patent as in above-mentioned cases of aspirin, vitamin B12 and the other cases noted above.

However, in the American case of *General Electric Co. v. DeForest Radio Co.*, the court of first instance validated the patent on purified tungsten. There is no question that the process for purifying tungsten was patentable. However, what was in issue was the patentability of purified tungsten itself. On appeal, the district court agreed that the purification of tungsten was a "tremendous advance" in technology, but ultimately held that the application for a product patent on purified tungsten was not to be countenanced. In a ratio riddled with inconsistencies and illogicalities, the court held that:

[W]hat [the patentee] produced by his process was natural tungsten in substantially pure form. What he discovered were natural qualities of pure tungsten. Manifestly he did not create pure tungsten, nor did he create its characteristics. They were created by nature.¹⁵⁷

If the *ratio decidendi* in the *DeForest* case above was applied to all the applications for patents on purified versions of natural substances created or discovered by TKUP, there is no doubt that the modern business of bio-prospecting for TKUP would suffer a profound chill.¹⁵⁸ As

¹⁵⁷*General Electric Co. v. DeForest Radio Co.*, 28 F. 2d 641 (3d Cir. 1928) cert.denied, 278 U.S. 656 (1929)

¹⁵⁸For further examination of this issue, see, Michael Davis, "The Patenting of Products of Nature" (1995) 21 *Rutgers Computer and Technology Law Journal* 293.

Michael Davis observes, “the doctrine against the patenting of natural products would appear to be well entrenched in American jurisprudence. However, a completely different and seemingly contradictory rationale has been applied in cases involving bio-molecules.”¹⁵⁹

In addition to vitamin B12, other natural products which have received product patents include purified prostoglandins¹⁶⁰ and adrenalin.¹⁶¹ Here Judge Haynsworth sought to rationalize the court’s decision by the unhelpful argument that “all of the tangible things which man deals with and for which patent protection is granted are products of nature in the sense that nature provides the basic source material.”¹⁶² This theory was also echoed by Justice Felix Frankfurter in the *Diamond v. Chakrabarty* case. According to Justice Frankfurter, “everything that happens may be deemed the ‘work of nature’ and any patentable composite exemplifies in its properties ‘the laws of nature.’ Arguments drawn from such terms for ascertaining patentability could fairly be employed to challenge almost every patent.”¹⁶³ The sum of this slippery slope argument is, as stated by Michael Davis, that the “product of nature” exclusion in patents is practically dead.

Consequently, in the United States’ patent law, natural products can become patentable upon purification. The enormity of this juridical regime has not been lost on scholars. Commenting on the general laxity and double-standards of the patent system, John

¹⁵⁹*Ibid.*

¹⁶⁰*In re Bergstrom, supra.*

¹⁶¹*Parke-Davis v. Mulford Co.*, 189 F. 95 (C.C.S.D.N.Y. 1911), *modified*, 196 F.496 (2d Cir. 1912).

¹⁶²*Ibid.*

¹⁶³*Diamond v. Chakrabarty, supra* at 135.

Golden observes that:

[T]he question that remains is how much traction traditional requirements for patentability retain. With regard to the “product of nature,” novelty, and enablement doctrines, the answer is practically speaking, “Not much.” The “product of nature” doctrine, although still extant, is effectively toothless, because biotechnology by nature involves isolating, and replicating biological materials to produce “unnatural” levels of purity.¹⁶⁴

In effect, the double standard on the doctrine of purified natural substances and the relaxation of the traditional rules of patentability facilitates the appropriation of TKUP by copying the secrets of nature. One possible solution to this problem is to restore the exclusion of patents on products of nature irrespective of the degree of purification. Another aspect of this process of appropriation of TKUP through the patent system is the prevalent spate of frivolous tinkering of TKUP to obtain patents thereon.

4.3.2: The Criterion of Novelty in Relation to TKUP Inventions

In addition to the appropriative function of the double-standard in the application of the “purified natural substance” doctrine, the concept of novelty of inventions has witnessed severe distortion and relaxation. In the first place, it has already been shown that there is no requirement under general international law on patents for global and absolute novelty. In other words, the international patent system operates a curious regime of *de facto* and *de jure* novelty. The practical implication is that a case of TKUP which may be common knowledge in India or elsewhere could, with some trivial or cosmetic alteration or re-packaging, wear the toga of novelty and be patented in, for instance, the United States. A few examples which

¹⁶⁴John Golden, *supra* note 14 at 127.

illustrate this incongruous regime may suffice to illustrate the point.

First, the Neem tree (*Azadirachta indica*) is known in several Indian and African communities as a curer of all ailments; a “wonder tree.” The tree yields a prolific chemical storehouse of pesticides, medicines, cosmetics, dental remedies, and contraceptives. These useful properties of the Neem tree have been known to Indian and African communities for centuries. The West was only alerted to the tree’s wonderful properties in 1959. However, an American company, W.R. Grace, applied for an obtained U.S. patent No. 5,124,349 on *Azadirachtin*, the active chemical ingredient in the plant.¹⁶⁵

Similarly, Suman Dias and Hari Har of the University of Mississippi Medical Centre have US patent no. 5,401,504 on the use of Turmeric (*Curcuma longa*) to make open wounds heal faster. The use of Turmeric for this purpose has been known to Indians for centuries.¹⁶⁶ Although the Turmeric patent was successfully opposed by an agency of the government on India, it is one of the rare cases where a dubious patent on TKUP has been reversed. In another case, British chemist, Conrad Gorinsky spent considerable time with the Wapishana Indians of Guyana. During that period, the Indians showed him the uses of two plants called *Cunani* and *Tipir*.¹⁶⁷ As Wapishana Spencer notes, “for many days and nights, I was his

¹⁶⁵Emily Marden, “The Neem Tree Patent: International Conflict over the Commodification of Life” (1999) 22 *Boston College International & Comparative Law Review* 279. [hereinafter, Marden]

¹⁶⁶*RAFI Communique*, Nov/Dec. 1995; R.K. Gupta & Balasubramaium, “The Turmeric Effect” (1998) 20 *World Patent Information* 185. See also, R.V. Anuradha, “IPRs: Implications for Biodiversity and Local and Indigenous Communities” (2001) 10 *Review of European Community & International Environmental* 27.

¹⁶⁷The *Tipir* seed is used by the Indians as a contraceptive, antibiotic and abortifacient. The *cunani* is used for fishing as it kills fish without poisoning the fish nor polluting the rivers. See, “Indians Want Patent: Chief Prepare International Law Suit Against Scientist Who Registered Indigenous Knowledge” *ISTOE Magazine*, No. 1581, Sao Paulo, 19 January 2000. The Wapishana were arbitrarily split by the Brazilian and British governments into Brazil and Guyana during a border dispute in 1904.

[Conrad Gorinsky's] guide in the jungle."¹⁶⁸

After Gorinsky left the Wapishanas, he applied for and obtained patents on the pertinent chemical properties of both *Cunani* and *Tipir* in the United States and Europe. The first patent granted to Gorinsky covers the Greenheart tree (*Ocotea rodiaei*) which produces *Tipir*. According to his description on the application for a patent, the active ingredient in the plant was described as an "efficient antipyretic and useful for treating tumors." The other active ingredient registered by Gorinsky, polyacetylene, was obtained from the *cunani bush* tree (*Clibadium sylvestre*) and it is described as "a powerful stimulant of the central nervous system, as a neuromuscular agent capable of dealing with cases of heart blockage."¹⁶⁹

4.3.3: The Criteria of Utility of Inventions and Inventive Step in Relation to TKUP

Another common method of appropriating TKUP through the lax patent system is by a cosmetic re-arrangement or "tinkering" with the chemical and molecular structure of a natural compound identified by TKUP while retaining the original useful properties of the natural substance. Some researchers are of the view that by lowering the standards on utility, the research and development systems of many pharmaceutical companies are ultimately wasteful as their main motivation is to tinker with the molecular structure of TKUP merely for the purposes of obtaining patents. According to the US Office of Technology Assessment (OTA) American drug companies (in 1990 dollars) spent \$65million bringing a new drug to market in 1969 and \$194 million in the 1980s, and 300-350 million in modern times.

¹⁶⁸*Ibid.*

¹⁶⁹*Ibid.*

Interestingly:

[O]f the 348 drugs introduced by the 25 largest pharmaceutical companies between 1981 and 1988, only 12 (or 3 per cent) were deemed important therapeutic advances by the FDA [US Food and Administration]...the vast majority were seen as having little or no potential for advances in treatment.¹⁷⁰

Whatever methods are used to obtain such patents, the crucial juridical fact is that “supposedly central requirements such as utility and non-obviousness have often merely nibbled at the margins of patentability’s broad realm.”¹⁷¹

In the light of this troubling regime some scholars have called for a tightening of the regime on patentability. For example, John Golden recently called for “stricter enforcement of the basic hurdles to patentability—novelty, non-obviousness and especially, utility.”¹⁷² Similarly, Samuel Oddi has suggested a high standard of patentability which will ensure that only revolutionary inventions and not market-induced detail patents are granted. In Oddi’s view, the test for patentability should be “whether the claimed invention would be non-obvious to a person skilled in that art anywhere in the world.”¹⁷³

What is indeed very significant here in the above-mentioned cases is that in addition to an obvious regime of laxity in the patent system, the description or articulation of the

¹⁷⁰“No Cure for Patents: Biotech Patents Distort and Discourage Innovation and Increase Costs for Dubious Drugs” *RAFI Genotypes*, July 1997. [underlining added] But see, Michael Malinowski, “Globalization of Biotechnology and the Public Health Challenges Accompanying It” (1996) 60 *Albany Law Review* 119. For an indepth analysis of the methods of tinkering with and rearranging the molecular structure of TKUP for patent purposes, see, Shayana Kadidal, “Plants, Poverty, and Pharmaceutical Patents” (1993) 103 *The Yale Law Journal* 223

¹⁷¹John Golden, *supra* note 14 at 131.

¹⁷²John Golden, *supra* at 111.

¹⁷³Samuel Oddi, “TRIPS—Natural Rights And a “Polite Form of Economic Imperialism” (1996) 29 *Vanderbilt Journal of Transnational Law* 415. [emphasis added]

“invention” in the signficatory language or jargon of Western science weaves an implausible fabric of novelty, ingenuity and notions of Lockean labour into knowledge which is already well-known to traditional peoples and culture. Accordingly, the patent system has more or less been constituted into a hybridized form of monologic dialogue; that is, while pretending to be speaking the language of plurality, it is in fact a monologue of sorts.¹⁷⁴ In this strange but familiar world, marginalized epistemological frameworks are in an unreal status of both stunned spectatorship and victimization. The exclusiveness of Western scientific jargon and symbols as an elite cultural signifier and Western formalism itself which has been globally positioned as the only legitimate and acceptable narrative framework of science serve multiple functions of appropriation and marginalization.

First, it delegitimizes the intellectual contributions of traditional cultures and peoples. Second, it functions as an appropriative mechanism in the service of powerful states and interests. Third, it pretends that creativity is an individual effort springing forth from nothingness; without inspiration and utility of validation amongst and within extant tradition.

¹⁷⁴Vandana Shiva, *Monocultures of the Mind-Perspectives on Biodiversity and Biotechnology* (Zed Books Ltd, New Jersey, 1993) As Shiva eloquently argues, Western systems of knowledge have always been portrayed as universal. However, the dominant system is also a local system with its social basis in a particular culture, class and gender. It is not universal in an epistemological sense. It is merely the globalised version of a very local and parochial tradition emerging from a dominating and colonising culture. Modern knowledge systems are themselves colonising. Accordingly, its conceptual framework is set within a particular value system which emerged with the rise of commercial capitalism.

In effect, the global status of the western system of knowledge as Shiva argues, was attained by violence and misrepresentation. The first level of violence unleashed on local systems of knowledge is to not see them as knowledge and assigning it the adjectives “primitive” and “unscientific.” This particular stage was achieved by positing that local knowledge is devoid of empiricism while its western counterpart was supposedly arrived at without social mediation. Although recent studies have argued that local knowledge is no less empirical than its western counterpart, the hangover of the prevailing order still warrants some scholars and the patent system to proceed as if local knowledge systems are inherently inferior to western epistemology. For further analysis of the sociology and cultural life of science, see, Thomas Kuhn, *The Structure of Scientific Revolutions* (University of Chicago Press, Chicago, 1972); R. Horton, African Traditional Thought and Western Science” (1976) 37 *Africa* 2.

The reality however is that creativity is tied to the progenitive, inspirational and validative functions of already existing knowledge or tradition.¹⁷⁵ The authorial conceit inherent in the patent system and facilitated by a hubristic epistemological regime is the hand-maiden of appropriation of TKUP. To the extent that the international patent system is a vehicle which excludes traditional knowledge, it is not only a monologue but also a mimetic discussion among a self-perpetuating band of epistemological and cultural elites.¹⁷⁶

This curious posture and cultural status of the patent system has raised legitimate questions as to what is to be done to protect plants and TKUP from further appropriation by a promiscuous and elitist patent system.¹⁷⁷ While some scholars and states ponder this phenomenon, it must not be forgotten that as the UNCTAD recently noted:

[I]t is evident that the primary and immediate beneficiaries of the implementation of the TRIPs agreement are likely to be technology and information developers in the industrialized countries. Indeed, the more rapidly and comprehensively the TRIPs agreement is put into place, the greater will be these benefits.¹⁷⁸

Be that as it may, various suggestions have been made as to how the intellectual contributions of local and traditional farmers, breeders and healers would be defined,

¹⁷⁵For a sound analysis of this aspect of intellectual property, see, Rosemary Coombe, *The Cultural Life of Intellectual Property: Authorship, Appropriation, and the Law* (Durham: Durham University Press, 1998)

¹⁷⁶Barry Mandelker, "Indigenous People and Cultural Appropriation: Intellectual Property Problems and Solutions" (2000) 16 *Canadian Intellectual Property Review* 367.

¹⁷⁷In the United States for example, the Federal Circuit has consistently stated that it is the policy of the court to "adapt" and expand the patent scope in favour of the pharmaceutical and biotechnology industry. In the philosophy of the court, the more patents issued, the better. See, *Pioneer Hi-Bred Int. v J.E.M. AG Supply* 200 F.3d 1374, 1376 (Fed. Cir. 2000); *In re Lundak*, 773 F.2d 1216, 1220 n.1 (Fed. Cir. 1985). See also, Robert Merges & Glenn Reynolds, "The Proper Scope of the Copyright and Patent Power" (2000) 37 *Harvard Journal on Legislation* 45.

¹⁷⁸*The TRIPs Agreement and Developing Countries*, *supra* note 49 at 4.

recognized, respected and if they so desire, economically rewarded. The next section will briefly examine some of the major ideas been canvassed at various international fora. These include the concept of communal patents and modification of Plant Breeders' Rights (PBRs).

4.4: International Law and the Challenge of Appropriation of Plants and TKUP

There is a common notion that the modern controversy on property rights over plants and TKUP is attributable to "the advent of biotechnology."¹⁷⁹ This view cannot be wholly correct because the importance of plants and TKUP has always been an extant and abiding feature of human existence. The better view would seem to be that the appropriation and privatization of plants and TKUP through a permissive patent system operating in an age of globalization and media scrutiny has catalyzed the debate on the nature and functions of the patent system. What is indeed more striking is the outrage and enlightenment brought about by the publicization of the hypocrisy of the patent system in its appropriative and homogenizing function. According to Lara Ewens,

[T]he hypocrisy of western demand for intellectual property protections is twofold: not only do developing countries pay a high price for the patented products that are reintroduced in their countries (yet made from local resources), but developing countries are unable to use the intellectual property framework to protect against the piracy of their own indigenous and local resources and knowledge.¹⁸⁰

¹⁷⁹Thomas Cottier, "The Protection of Genetic Resources and Traditional Knowledge in International Law: Past, Present and Future" in Susette Biber-Klemm, ed, *Legal Claims to Biogenetic Resources*, (Unpublished Papers presented at the Workshop held at the Institute for European and International Economic Law, University of Berne, June 1997-on file with the author). [hereinafter, Workshop]

¹⁸⁰Lara Ewens, *supra* note 40 at 305; Keith Aoki, "Neocolonialism, Anticommons Property, and Biopiracy in the (Not-so-Brave) New World Order of International Intellectual Property Protection" (1998) 6 *Indiana Journal of Global Legal Studies* 11. Given the essentially economic character of patent law policy, it is not surprising that patent issues are within the vortex of the economic gap between the North and the South.

From the analysis so far, a few inferences may be drawn. The first is that current concerns about the over-extension of modern patent laws, particularly in the North, are justified.¹⁸¹ In addition to creating obstacles to future research and innovation, cluttering of the global intellectual space with liberty-intruding patent rights created by a deliberate process of double standards and relaxation of the patent process, appropriates and privatizes TKUP.

The second point is that the process of globalization which is a little less than the universalization of an otherwise ethnic culture (just like every other culture) has exacerbated the already skewed distributional inequality across the world and promotes a regime of delegitimization of the appropriated culture and intellectual contributions on which the dominant culture derives its sustenance.¹⁸² Although there is a noticeable tendency in modern international law to address and redress this distributional disequilibrium, the sobering conclusion of most pragmatic commentators is that:

[T]he international fora within which these issues have evolved so far are not likely to accommodate what would otherwise be the next most predictable and potentially desirable development in this area of law, i.e. international legal obligations on states to provide specially tailored or *sui generis* intellectual property protections for indigenous knowledge.¹⁸³

However, notwithstanding the criticisms that contemporary international law does not lay serious claims to multiculturalism¹⁸⁴ and the pursuit of distributive justice, particularly, as

¹⁸¹Michael Golden, *supra* note 14 at 110.

¹⁸²Halewood Michael, "Indigenous and Local Knowledge in International Law: A Preface to Sui Generis Intellectual Property Protection" (1999) 44 *McGill Law Journal* 953.

¹⁸³Halewood, *ibid.*

¹⁸⁴Edward McWhinney, "Towards an Empirically-Based New International Economic Order" (1989) XXVII *Canadian Yearbook of International Law* 309. (Arguing that "classical international law is too narrowly Eurocentrist or Western in its historical origins). For a recent study confirming the undoubted Euro-centricity of the international law, whether in substance, practice, or procedure, see, Kurt Taylor Gaubatz & Matthew

the South would like it to,¹⁸⁵ it is still pertinent to examine the various ways in which international law has responded to or attempted to respond to the *problematique* of appropriation of plants and TKUP.¹⁸⁶

4.4.1: State Responsibility and the Challenge of Appropriation of Plants and TKUP

Generally speaking, it seems that modern international law has not fully realized the nature and form of appropriation of plants and TKUP through the patent system. Indeed, the existence of appropriation of plants and TKUP is a matter of debate and controversy which often presents itself in the proverbial North-South divide.¹⁸⁷ It would seem however, at least in theory and by parity of reasoning, that since patents are generally construed as and invoke incidents of property rights, international law on state responsibility for appropriation of tangible property would apply.¹⁸⁸

Surprisingly however, while traditional international law has made well-known legal

MacArthur, "How International Is 'International Law?'" (2001) 22 *Michigan Journal of International Law* 239.

¹⁸⁵Thomas Franck & Steven Hawkins, "Justice in the International System" (1989) 10 *Michigan Journal of International Law* 127.

¹⁸⁶It may be naive to assume that the lax patent system merely appropriates and privatizes TKUP and plants and as such poses a problem for the South only. As a matter of fact, there are legitimate concerns that the lax patent system is restricting access to information which ordinarily should be in the public domain. This concern is of particular interest to scientists and other researchers, especially, in respect of dubious patents on gene fragments. See for example, Mario Biagioli, "The Instability of Authorship: Credit and Responsibility in Contemporary Biomedicine" (1998) 12 *Life Science Forum* 3; Declan Butler & Paul Smaglik, "Celera Genome Licensing Spark Concerns Over 'Monopoly'" (2000) 403 *Nature* 231; Eliot Marshall, "Patent on HIV Receptor Provokes an Outcry" (2000) 287 *Science* 1375; Roberto Mazzoleni & Richard Nelson, "The Benefits and Costs of Strong Patent Protection: A Contribution to the Current Debate" (1998) 27 *Research Policy* 273.

¹⁸⁷The Crucible Group II, *Seeding Solutions-Policy Options for Genetic Resources: People, Plants, and Patents Revisited* (Ottawa: IDRC, 2000) [hereinafter, Crucible II]

¹⁸⁸See generally, the dated but useful work of Clyde Eagleton, *The Responsibility of States in International Law* (New York: New York University Press, 1970)

norms of redress for one state by another of injuries suffered in the course of appropriation of tangible property and capital of aliens such as machinery and equipment, international law has not yet formulated any response in jural relief for victims of appropriation of plants and TKUP. It is very arguable that on the basis of the Lockean theory of a moral cum legal right to products of mental and physical sweat, traditionally-modified plants and TKUP, which constitute net assets for some states, are, in spite of their seeming etherealness, as much a metaphor of property with all its juridical incidents as tangible property.¹⁸⁹ Although Reichman's argument on this issue is North-centric, the logic in it applies with equal force to traditionally modified plants and TKUP. According to Reichman:

[T]he notion that intellectual property depends entirely on the place where protection is sought continues to preclude the formation of private international remedies for entrepreneurs who invest in intellectual goods that are reproduced and commercially exploited on foreign soil. At the same time, gaps in the public international law of state responsibility that protects alien property in general permit states to seize the form of alien property that has become the key to economic growth through technological innovation.¹⁹⁰

In the light of the modern convergence of the patent system with the regimes on plants and TKUP it seems that various state initiatives have been unduly preoccupied with the question of instituting a regime on access to plants and TKUP as if physical access to plants and TKUP is the fundamental mode of effecting appropriation of plants and TKUP.¹⁹¹ The reality

¹⁸⁹R.H.Reichman, "Intellectual Property in International Trade: Opportunities and Risks of a GATT Connection" (1989) 22 *Vanderbilt Journal of Transnational Law* 747.

¹⁹⁰Reichman, Opportunities and Risks, *ibid.*

¹⁹¹Given the focus of this thesis on the juridical and institutional methods of appropriation, particularly patents and the IARCs, the question of access to plants and TKUP will not be substantially dealt with in this thesis. For a recent compendium of ideas and initiatives on the regulation of access to plants and TKUP, see, John Mugabe, *et al.* (eds.), *Access to Genetic Resources—Strategies For Sharing Benefits* (Bonn: IUCN-ELC, 1997). See also, The Crucible Group, Vol. II, *Seeding Solutions: Options for National Laws Governing Access to and Control Over Genetic Resources* (pre-publication version-not for quotation) (Ottawa: IDRC, 2001) (on

is that appropriation is fundamentally a juridical process. It is the exclusive legal right over appropriated plants and TKUP which offers the incentive and legitimacy for appropriation.

4.4.2: Access to Plants and TKUP: The Link to Appropriation

Within the convergent confines of the provisions of Article 27 of the TRIPs agreement and the provisions of the CBD which re-affirm the sovereignty of states over plant life forms within their respective territories, it seems that the prevalent response of the South to the problem of appropriation of plants and TKUP has been to enact domestic laws restricting access to plants and TKUP. Such domestic laws have tended to incorporate rules of ethics in research such as obtaining the Prior Informed Consent (PIC) of the affected local community that owns the plant or TKUP in issue.

For example, the Republic of the Philippines by virtue of its Executive Order No. 247 dated 18 May 1995 has taken some steps towards mitigating the perceived inadequacies in the present regime on access to plant resources. Section 2 of the Order prescribes that:

[P]rospecting of biological and genetic resources shall be allowed within the ancestral lands and domains of indigenous cultural communities only with the prior informed consent of such communities, obtained in accordance with the customary laws of the concerned community.¹⁹²

However, it is instructive that the Convention on Biological Diversity¹⁹³ which

file with the author)

¹⁹²Republic of the Philippines Executive Order No. 247, online < <http://users.ox.ac.uk/wgtrr/rp.htm> accessed on 9/13/99. The complexities of the mechanisms and suggestions on access to plants and TKUP are beyond the scope of the paper. For a recent compendium of suggestions, see, Crucible Group II, *ibid*.

¹⁹³*Convention on Biological Diversity*, opened to signature 6th June 1992 [1993] 35 I.L.M. 813; entered into force Dec. 29, 1993 [hereinafter, CBD]

reaffirms a regime of national sovereignty on plants leaves open the question of national sovereignty or lack thereof over the “intellectual property” which may be attached to traditionally-improved plants and TKUP. In effect, short of the platitudes on the need to ensure a fair sharing of the benefits of plants and TKUP, there is no direct recognition in international law of the right to the intellectual property in traditionally-modified plants and TKUP. This is quite remarkable but not unusual because until recent times, international law ignored the significance of traditional knowledge frameworks and the intellectual nature of farming and breeding activities undertaken therein, especially by women.

At the end of the day, it is for the domestic legislator, acting within the theoretical confines of international law, to determine which inventions are capable of being accorded patent protection. More significantly, the CBD does not take a categorical stand as to whether the patent concept is helpful or not to the ideals of conservation and equitable use of plants and TKUP. In this regard, Articles 11 and 16(5) of the CBD oblige Contracting Parties to “as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity.”¹⁹⁴ It is very arguable that the patent system may be one of those sound economic “measures” which may play a role in the process of conservation and sustainable use of plants and TKUP.

However, the CBD does not state clearly whether the patent system plays a “sound” or positive role in the conservation and sustainable use of plants and TKUP. Even if the patent system is to be construed as a sound economic and social measure for the promotion

¹⁹⁴CBD, *supra*.

of conservation and sustainable use of plants and TKUP, it would seem obvious that such a determination must be made within the ambits of the objectives of the CBD itself and not in detraction thereof. Article 16 of the CBD lends further weight to this interpretation. Article 16 (5) provides as follows:

[T]he Contracting Parties, recognizing that patents and other intellectual property rights may have an influence on the implementation of this Convention, shall cooperate in this regard subject to national legislation and international law in order to ensure that such rights are supportive of and do not run counter to its objectives.¹⁹⁵

It is equally arguable that the placement of the above-mentioned paragraph in Article 16 (which deals mainly with issues of transfer of technology), implies that the role of patents in the regime on plants and TKUP is pertinent only with reference to transfer of technology simpliciter. However, these speculations hardly answer the question of what the response of international law has been to the phenomenon of appropriation of plants and TKUP through the patent system.

The crux of the matter is that states are not agreed on the legitimacy and utility of the patent system's encroachment on the plant and TKUP regime. The distrust which some states, particularly from the South, have for the modern patent system would have remained a purely domestic matter were it not for the globalization of the patent concept as a fundamental component of the global trade machinery designed by the industrial and corporate moguls of the North. Hence, with the WTO arrangement practically swallowing the rather idealistic legal norms established by the CBD, it would appear that the margin of municipal legislative competence on patents on plants and TKUP is limited to what the WTO

¹⁹⁵*Ibid.*

TRIPs agreement permits.

In effect, in the absence of any globally binding instrument identifying and/or outlawing appropriation of plants and TKUP, state response to the phenomenon of appropriation of plants and TKUP must be a limited distillate of jural responses contrived within the narrow ambits of the exceptions in Article 27 of the TRIPs and the relevant provisions of the CBD. By all standards, this is a slippery path and a task suited for the boldest and most innovative of domestic legislators. Be that as it may, it must be acknowledged that in diverse international instruments dealing with economic and cultural rights, international law has sought to re-conceive the question of appropriation as a violation of some human rights, especially economic and cultural rights recognized by international law.

This approach is perhaps a reflection or understanding of the social justice consequences of appropriation of plants and TKUP.¹⁹⁶ For example, Article 15 of the International Covenant on Economic, Social and Cultural Rights speaks of the “right to benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production.”¹⁹⁷ Although such conventions and other United Nations declarations¹⁹⁸ affirming the existence of cultural and economic rights have significant moral,

¹⁹⁶Rosemary Coombe, “Intellectual Property, Human Rights and Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity” *supra* note 73.

¹⁹⁷*International Covenant on Economic, Social and Cultural Rights*, December 16, 1966, 993 U.N.T.S. 3.

¹⁹⁸See for example, *The United Nations Draft Declaration on the Rights of Indigenous Peoples*, U.N. ESCOR, Commission on Human Rights, 11th Sess., Annex 1, U.N. Doc. E/CN.4/Sub.2 (1993); *Draft United Nations Declaration on the Rights of Indigenous Peoples, Sub-Commission on Prevention of Discrimination and Protection of Minorities on its Forty-Sixth Session*, Geneva, 1-26 August 1994, E/CN.4/sUB.2/1994/56,

normative and psychological virtues and benefits, it may be erroneous to apply them as an argument against appropriation of plants and TKUP *per se* and thus, a conception of TKUP as a human right. This is because the patent system is not founded on the concept or institution of human rights. There is no state in this world which operates a human rights theory of the patent system. Even the United States which operates what may be described as the world's most aggressive and liberal patent regime ultimately recognizes that patents are governmental privileges dictated by perceived economic, social and political benefits or interests.¹⁹⁹

No inventor, whether in the traditional or Western epistemology has a "human right" to his/her invention. Within the bounds of international law, the state determines what gets to be patented, the duration of the patent, the procedures for obtaining the patent and where the need arises (as determined by the state), further restrictions or conditions may be imposed on the patent regardless of the culpability or liability of the patent holder, if any. Accordingly, framing the discourse of appropriation within the language and concepts of the human rights regime is a misconception of the modern theory of patents. Of course, appropriation of plants and TKUP has multiple consequences of human rights dimension. These results are the legitimate subjects of the human rights regime but this should not be

28 October 1994; *Draft of the Inter-American Declaration on the Rights of Indigenous Peoples*, 19 September 1995, online < <http://users.ox.ac.uk/wgtrr.oas.htm> accessed on 9/2/99.

¹⁹⁹See, Chapter 1.6.1, *supra*. See also, *The Role of Patents in the Transfer of Technology to Developing Countries Report of the Secretary-General, United Nations* (New York: Martinus Nijhoff, 1964); S. Vedaram, "The New Indian Patents Law" (1972) 3 *International Review of Industrial Property and Copyright Law* 39; M. Bruce Harper, "TRIPs Article 27.2: An Argument for Caution" (1997) 21 *William & Mary Environmental Law and Policy Review* 381; *National Aeronautics and Space Act of 1958*, 42 U.S.C. 2457

conflated with a supposed human rights basis of the patent system.

In the absence of any positive international law on appropriation of plants and TKUP, and innovative ideas from the various states, it seems that a lot of states and stakeholders have taken solace and comfort, perhaps temporarily, in the uncertain and nebulous world of “soft law.”²⁰⁰ Before examining the possible ways in which domestic patent laws, especially in the South, may be adjusted and re-tooled to deal with the question of appropriation of plants and TKUP, it would be pertinent to briefly examine the nature and function of the so-called “soft law” theory on appropriation of plants and TKUP.

4.4.3: Soft Law Theory and Appropriation of Plants and TKUP

Although international law may have survived the tedious and fruitless debate as to whether in the absence of a coercive supranational authority, its juridical efficacy as law qua law remains valid,²⁰¹ there remains an abiding tradition of distinctions between specific and precise legal obligations and exhortatory “soft-law recommendations”²⁰² which elicit little

²⁰⁰Krista Single-Cabbage, “International Legal Sources and Global Environmental Crises: The Inadequacy of Principles, Treaties and Custom” (1995) 2 *ILSA Journal of International & Comparative Law* 171; Paul Brietzke, “Insurgents in the ‘New’ International Law” (1994) 13 *Wisconsin International Law Journal* 1; Oscar Schacter, “Recent Trends in International Law Making” (1992) 12 *Australian Yearbook of International Law* 1.

²⁰¹Thomas Franck, *Fairness in International Law and Institutions* (Oxford: Clarendon Press, 1995)

²⁰²Soft law is an assortment of “legal” instruments including United Nations General Assembly resolutions, declarations of inter-governmental organizations, declarations of governmental meetings, guidelines, resolutions, recommendations and action programmes, indeterminate provisions of treaties, unratified conventions, dissenting opinions of individual judges of the International Court of Justice or the various human rights courts, *et cetera*.

or no compliance from states.²⁰³ The former is considered to be positive international law while the latter may be called soft law.²⁰⁴

Generally speaking however, there is no definition of soft law. Declarations, resolutions and other public statements of states and international bodies which show the expectation of state or institutional conduct, albeit non-binding, and other such documents or avowals which exhort or encourage certain modes of behaviour may be categorized as soft law.²⁰⁵ In other words, notwithstanding the retreat of Austinian positivism in the interrogation of what constitutes the “legal” nature of international law, positivist clarity and obligatoriness is still a defining character of international law and marks out legal norms from those non-binding norms which are, at best, precatory notions of behaviour at the twilight of legal normativity.

This is not to say that soft laws lack normative persuasiveness; rather, international law theorists would like to argue that those “embryonic” and exhortatory rules constitute an adjunct or immanent component of positive international law.²⁰⁶ Indeed, optimists argue that soft laws spawn treaties, expand and invigorate existing legal regimes and generally

²⁰³C.M. Chinkin, “The Challenge of Soft Law: Development and Change in International Law” (1989) 38 *International and Comparative Law Quarterly* 850; R.R. Baxter, “International Law in “Her Infinite Variety” (1980) 29 *International and Comparative Law Quarterly* 549.

²⁰⁴Patricia Birnie, “International Environmental Law: Its Adequacy for Present and Future Needs” in, A. Hurrell & B. Kingsbury eds, *The International Politics of the Environment* (Oxford: Clarendon Press, 1992)

²⁰⁵T. Gruchalla-Wisierski, “A Framework for Understanding ‘Soft Law’” (1984) 30 *Revue de Droit de McGill* 37.

²⁰⁶Pierre-Marie Dupuy, “Soft Law and the International Law of the Environment” (1991) 12 *Michigan Journal of International Law* 420.

normativize general international law.²⁰⁷ In addition, this school of thought argues that some of the soft law may harden into customary international law or become part of treaties. For example, Birnie argues that resolutions of the United Nations General Assembly, although not generally binding *per se*, “may become so on the basis of state acceptance of them as such, either when adopted or in their subsequent practice in relation to them.”²⁰⁸

In other words, declarations, resolutions and the like, while non-binding, may be analogised to signposts which point the way towards future treaties and customary international law. As Saraf has argued:

[I]n the absence of an effective law execution machinery, it is difficult to separate resolutions and declarations of international organisations which create binding norms from those which are merely recommendatory. In any case these resolutions are legal data for the purpose of determining the state of law at a particular time.²⁰⁹

In effect, this school of thought would argue that soft law plays an important role in developing, concretizing and creating norms of international law.²¹⁰ This may be the case where the norm in question has been the subject of repeated reaffirmation, reiteration, and declaration by various states. Although acts of repeated declaration on a certain norm by itself do not amount to a source of or evidence of international law (it is what states do that

²⁰⁷Sumudu Atapattu, “Recent Trends in International Environmental Law” (1998) 10 *Sri Lanka Journal of International Law* 47.

²⁰⁸Birnie, *supra* note 204 at 59. Be that as it may, the legal status of each General Assembly Resolution has to be tested individually. However, any abstention or negative vote has to be examined to ascertain the underlying *opinio juris*. Same tests should also apply to declarations of principles by the United Nations.

²⁰⁹D.N. Saraf, “Resolutions of International Organizations: Binding Norms?” (1990) 14 *Cochin University Law Review* 1 at 9. For an excellent analysis of the varied effects on resolutions of international organisations, see, Jochen Frowein, “The Internal and External Effects of International Organizations” (1987) 49 *Heidelberg Journal of International Law* 778. There is not much disagreement as to the internal bindingness of international resolutions on the officials and subordinate organs of the affected international organizations.

²¹⁰Saraf, *ibid*.

matters), such repeated declarations may give an indication of what states consider to be the law. As the ICJ held in the *Nicaragua Case*,

[T]he effect of consent to the text of such resolutions cannot be understood as merely that of a 'reiteration or elucidation' of the treaty commitment undertaken in the Charter. On the contrary it may be understood as an acceptance of the validity of the rule or set of rules declared by the resolution by themselves.²¹¹

In this optimistic sense, the distinction between positive international law and soft law seems blurred.²¹² However, there is another school of thought which casts considerable doubt on the existence, utility and desirability of soft law.²¹³

A consideration of the arguments of this latter school yields the impression that the rejection of the soft law theory of international law is a direct function of a binary conception of law; to wit, that legal order should not be watered down by norms which have an indeterminate and uncertain quality of bindingness. That is to say, that law is either binding or not and thus to speak of soft law is to celebrate the redundancy²¹⁴ of bindingness arrived at through dubious gradations and categories or shades of normativity.²¹⁵ There is substantial logical force in this argument, especially in environmental law and global social justice issues where states prefer to evade obligations and direct issues and responsibilities of the

²¹¹ICJ Reports (1986) at 100.

²¹²Michael Bothe, "Legal and Non-Legal Norms-A Meaningful Distinction in International Relations?" (1980) 11 *Netherlands Yearbook of International Law* 65.

²¹³Jan Klabbbers, "The Undesirability of Soft Law" (1998) 67 *Nordic Journal of International Law* 381 [hereinafter, Klabbbers]

²¹⁴Jan Klabbbers, "The Redundancy of Soft Law " (1996) *Nordic Journal of International Law* 167.

²¹⁵For a fuller analysis of this issue, see, Jan Klabbbers, *The Concept of Treaty in International Law* (London: Kluwer Law International, 1996)

day by looking for platitudinous and exhortatory declarations which they know lack binding force.²¹⁶

In recognition of the various loopholes in modern international patent law which facilitates and legitimizes the appropriation of plants and TKUP, it may be tempting to conclude that the various declarations on the subject constitute international soft law against appropriation of plants and TKUP. One such initiative is from the International Congress of Ethnobiology which has, *inter alia*, recommended that:

[N]obody should be allowed to present research findings in its future conferences if she or he has not shared the findings in an easily comprehensible manner with the providers of the knowledge in local language; taken their concurrence for sharing their knowledge with others; informed them of the possible commercial interests of their own or other third parties, sourced or cited the providers just as they would cite a fellow researcher.²¹⁷

Of course, such an instrument which is practically representative of most recent declarations by public spirited non-governmental organizations and civil society agents seeks to ethicize the process and method of access to TKUP.

Given their high-minded popularity, it has been suggested that the recommendations and Code of Ethics of the International Society of Ethnobiology and similar declarations should form part of a new protocol to the CBD or at least, part of the *corpus* of domestic law

²¹⁶Nico Schrijver, *Sovereignty Over Natural Resources: Balancing Rights and Duties* (Cambridge: Cambridge University Press, 1997)

²¹⁷“An Appeal from SRISTI (the Society for Research & Initiatives for Sustainable Technologies & Institutions) to Ethnobiologists” Online< <http://users.ox.ac.uk/~wgtrr/ethnape2.htm> accessed on 9/13/99. See also, Anthony Cunningham “Guidelines for Equitable Partnerships in New Natural Products Developments—Recommendations for a Code of Practice”; online <http://users.ox.ac.uk/wgtrr/cunning.htm> accessed on 9/9/99; Final Statement from the UNDP Consultation on Indigenous Peoples’ Knowledge and Intellectual Property Rights, Suva, April 1995. Online> <http://users.ox.ac.uk/wgtrr/suva.htm> accessed on 8/27/99.

on access to and exploitation of plant life forms. These principles may be elaborated as follows; the principle of prior rights which recognizes that local and traditional peoples have a priority of proprietary rights over their plant resources, whether wild or cultivated. The second is the principle of local self-determination for indigenous peoples over their resources.²¹⁸ Others include the principles of full disclosure, active participation, prior informed consent and veto, confidentiality, respect, active protection, precaution, compensation and equitable sharing of the benefits of TKUP, support for indigenous research, and the principle of restitution for appropriated plants and TKUP.

These principles were adopted by the ISE at its Annual General Meeting held at Whakatane, Aotearoa/New Zealand on 28 November 1998 and literally summarize the proposed juridical responses of traditional societies to the phenomenon of appropriation of plants and TKUP.²¹⁹ Similarly, there have been several fora of traditional and indigenous peoples where the appropriative function of the patent system has been denounced. For example, according to the statement of the Coordinating Body of Indigenous Organizations of the Amazon Basin (COICA) issued on 30th September 1994:

[P]revailing intellectual property systems reflect a conception and practice that is: colonialist, in that the instruments of the developed countries are imposed in order to appropriate the resources of indigenous peoples; racist, in that it belittle and minimizes the value of our knowledge systems; usurpatory, in that it is essentially a practice of theft.²²⁰

²¹⁸Nihal Jayawickrama, "The Right of Self-Determination-A Time for Reinvention and Renewal" (1993) 57 *Saskatchewan Law Review* 1.

²¹⁹International Society of Ethnobiology (ISE) Code of Ethics, online < <http://users.ox.ac.uk/wgtrr/isecode.htm> accessed on 9/1/99.

²²⁰The COICA Statement, online < <http://users.ox.ac.uk/wgtrr/coica.htm> accessed on 8/27/99.

While the psychological value of these types of public statements is not in doubt, it would be erroneous to characterize them as being part of the so-called “soft law” category of international law.

The crucial factor here is that virtually all the above-mentioned “declarations” are by persons and entities which international law has not yet recognized as having the capacity to generate and validate soft law. If the category of soft law exists in international law, these declarations by groups of well-meaning liberal academics, marginalized peoples and other entities who are not states may be described as the “softest of soft law”²²¹ without juridical effect whatsoever.

The inference is that such hortatory statements are nowhere near the status of *lex ferenda* accorded their counterparts emanating from state or international institutions. They are a little better than ineffectual hortatory and moral opinions with absolutely no juridical significance. While they may help shape public opinion, it would be rash and unwarranted to categorize them as part of the so-called soft law. The bottom-line therefore is that international law, whether by hard or soft law mechanisms has not yet risen to the challenge of appropriation of plants and TKUP by the permissive patent system.

Indeed, to the extent that appropriation of plants and TKUP keeps some industries in the North afloat, it would be naive to expect a sea-change in the legal regime. According to Lara Ewens, “because of the immense investment western corporations have made in plant genetic resources and plant genetic research, and of the important potential biotechnology

²²¹Peter Drahos, “Indigenous Knowledge and the Duties of Intellectual Property Owners” (1997) 11 *Intellectual Property Journal* 179. [hereinafter, Drahos]

offers...modification of the [patent] system is likely to come from within if [it comes] at all.”²²² If the position between the North and the South were reversed, it would not be out of place to expect a new and effective legal regime to deal with appropriation of plants and TKUP.

For example, when it became obvious that the existing patent system could not be contorted to suit the interests of computer chip makers in the North, the Washington treaty on Intellectual Property in respect of Integrated Circuits of 1989 and the 1984 Semiconductor Chip Protection Act of the United States were quickly concluded and enacted respectively. Meanwhile, with respect to protection of TKUP which is predominantly a resource from weak states of the South, the contrast is clear. As Drahos has observed on the double-standard:

[I]n contrast, the issue of protection for indigenous knowledge has remained just that, an issue. Proposals and models have been put forward but little in the way of concrete, binding law has emerged...Basically international norms for the protection of indigenous knowledge have thus far taken the form of model laws and declarations by NGOs—in other words, the softest of soft law.²²³

It is possible that more prudent and circumpect states would devote greater attention at the domestic forum for ways and means of dealing with the phenomenon of appropriation and privatization of plants and TKUP.

²²²Lara Ewens, *supra* note 197 at 307. This reason underpins the proposals for a communal patent system. See 4.6, *infra*.

²²³Peter Drahos, *supra* note 221.

4.5: Appropriation of Plants and TKUP and the Option of Registration of Traditional Knowledge

Apart from the emerging ferment of legislative activities and initiatives across the South on the issue of regulating access to plants and TKUP, another initiative being considered by state and regional authorities is the registration of TKUP for the purposes of regulating contracts for benefit sharing with the so-called end-users of plants and TKUP. Given its prominence in recent times, it is apposite to examine its potentials in closer detail.

The concept of registration of the occurrence, practices, propagation and varied uses of TKUP has attained considerable mention, in deed, international juridical recognition.²²⁴ The idea is to compile and keep a secret Register of Uses of TKUP which will form the basis of any contract between local communities and “end users” of TKUP.²²⁵ This concept has found juridical support in countries such as India,²²⁶ Uganda, Peru, and South Africa.²²⁷ Two principal reasons have been postulated as the rationale for this concept. The first is that most patent systems of the world do not have any respect or protection for oral knowledge of

²²⁴William Lesser, *Sustainable Use of Genetic Resources Under the Convention on Biological Diversity-Exploring Access and Benefit Sharing Issues* (CAB International, Oxford, 1997) at 129. For example, Article 5 (1) (b) of the FAO International Treaty on Plant Genetic Resources for Food and Agriculture obliges Contracting Parties to “promote the collection of plant genetic resources for food and agriculture and relevant associated information on those plant genetic resources that are under threat or are of potential use.” See note 81 of Chapter 3.

²²⁵R.V. Anuradha, “In Search of Knowledge and Resources: Who Sows? Who Reaps?” (1997) 6 *Review of European Community and International Law* 263.

²²⁶Lyle Glowka, *A Guide to Designing Legal Frameworks to Determine Access to Genetic Resources* (IUCN, 1998)

²²⁷*Draft Report of the World Intellectual Property Organization (WIPO) Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, Geneva, Switzerland [hereinafter, WIPO Report].

TKUP and thus, to avoid or protect against their appropriation on the grounds of non-publication in writing, it is argued that such knowledge should be inscribed in written forms. The other reason is that traditional knowledge frameworks are facing extinction in the face of emergent cultural homogenization, therefore it would seem prudent to record knowledge of TKUP before modernization and “civilization” drives such knowledge into extinction.²²⁸

The Register of Uses or compilation of databases of TKUP is a worthy idea but certain issues need to be addressed. Unless some of the issues in question are dealt with, it is arguable the Register of Uses may be counter-productive. First, unless states appreciate the appropriative function of the patent system and are willing to invalidate those patents on TKUP obtained in a manner inconsistent with the intendment of the CBD,²²⁹ there may be problems with achieving the objectives behind the collection of such databases. In other words, it must be ascertained that such databases maintain the requisite degree of confidentiality necessary to frustrate unscrupulous commercialization or appropriation of the TKUP database in question.

Thus, in the absence of both procedural safeguards and what the Crucible Group I has termed a “convincing Global Morality,”²³⁰ it may be naive to expect that mere documentation would avoid or derail appropriative patents on plants and TKUP. As the cases of patents on

²²⁸IUCN: *Inter-Commission Task Force on Indigenous Peoples and Sustainability-Cases and Actions* (Utrecht: IUCN & International Books, 1997)

²²⁹There has been regional legislative initiatives in this regard. For example, Article 75 of Decision 486 of the Andean Community on a Common Industrial Regime which entered into force on December 1, 2000 nullifies any such patent. See, Manuel Ruiz, “The Andean Community’s New Industrial Regime: Creating Synergies Between the CBD and Intellectual Property Rights” (2000) *Bridges* 12.

²³⁰Crucible Group I, *supra*.

Neem tree derivatives, *Turmeric*, and other such patents demonstrate, mere publication of the uses of TKUP may not suffice to debar the patentability of TKUP by an instrumentalist patent regime. In any event, it has already been shown that the requirement of printing and publication of knowledge, especially in the United States and Japan, may sometimes yield bizarre results.

In addition, it should be noted that the drive towards documentation of TKUP may imply that TKUP is invariably oral and the practitioners thereof, unlettered and primitive people. However, a careful perusal of the history of traditional peoples shows that in addition to the “orality” of their narrative frameworks, some of them have some of the world’s oldest cultures of writing.²³¹ Furthermore, the secrecy regimes which govern medicinal (and spiritual uses) of some TKUP question the assumption that all TKUP are in the so-called public domain.²³²

On a matter of ideology, the concept of Registry of Uses may perpetuate the myth that all TKUP and traditionally-improved plants are “raw materials”; without sufficient intellectual input warranting property rights, unless and until such TKUP is redeemed and “improved” in Western style “laboratory.” It is unsupportable to argue that only multinational corporations and public research institutions in the North are engaged in plant improvement

²³¹For example, since time immemorial, the *Ayurvedic* system has been codified in 54 authoritative texts, the *Siddha* system is also codified in 29 authoritative texts and the Unani Tibb tradition in 13. In India, the First Schedule of the Drugs and Cosmetics Act, No. 23 of 1940, as amended by the Drugs and Cosmetics (Amendment) Act no. 71 of 1986, specifies the authoritative books of the three systems. See, WIPO Report, *supra* at 73.

²³²For example, many traditions of traditional healing methods in Southern Nigeria have been transmitted over the millennia in secret signs and symbols known only to the initiates of the traditional healing cults.

and the generation of knowledge on the uses of plants. This attitude and theory is not only apparently implausible but also inconsistent with modern international law which recognizes the historical and modern contributions of local and traditional farmers, especially women, to the improvement of plant life forms.²³³

More importantly, the characterization of traditionally-improved plants and TKUP as raw materials reduces the claims and struggles of traditional and indigenous peoples to an ululation and grumbling for monetary profits. This position cannot be correct: the claims of traditional and indigenous peoples includes a legitimate recognition of their intellectual contributions to the mosaic called human civilization.²³⁴ As the WIPO report has noted, “they (TKUP practitioners) do not wish to be confined to the role of mere purveyors of resources and know-how for the benefit of commercial interests in which they have no participation.”²³⁵

Regard should also be paid to the immense “bargaining” advantages possessed by influential and powerful commercial bio-prospectors. This is not to say that such databases are not useful. The point is that the concept is in need of more refinement and should also take into consideration the modern methods of appropriation. Unless adequately regulated, the concept of Register of Uses may catalyze predatory commercial bio-prospecting and consequent appropriation of plants and TKUP. Perhaps, part of the solution may lie in modifying the patent system and in re-visiting the concept of Plant Breeders’ Rights (PBRs).

²³³Articles 8, 10, 15, and the preamble of the CBD.

²³⁴COICA Statement, *supra*; Mataatua Declaration, *supra*, Bellagio Declaration, *supra*.

²³⁵WIPO Report, *supra*.

4.6: Modifying the Patent System for the Benefit of Traditional and Local Peoples

Given the powerlessness of traditional communities to substantially effect changes in the global patent system, it is ironic that notwithstanding the theoretical and cultural incompatibility of the classical patent system with traditional peoples, the mitigation or prevention of appropriative patents on plants and TKUP may best be effected by modifying the patent system itself.²³⁶ The favoured option in this regard would be a regime of communal patents. Certain reasons compel this audacious response. The first is that although the patent system has global repercussions, it is fundamentally a state privilege and any domestic legislator with enough skill can apparently conform to global standards on patents while effectively pursuing a nationalistic agenda.

The surprising thing here is that states in the South who complain about appropriation have hardly adopted the same instrumentalist approach to patents as their counterparts in the North. While the latter perceives of the patent system as a malleable tool, the former seems to conceive of the patent system as a foreign sacrosanct institution writ on stone and unamenable to deliberate manipulation at the local level of its transplanted site. As Chapter I argued, the patent system is an instrument of state policy. This fundamental maxim seems to have been lost on states of the South.

Second, in the absence of a property right over traditionally-improved plants and on TKUP, the bargaining power and position of traditional societies is fundamentally eroded

²³⁶As earlier noted, the idea of intellectual property among non-western societies is already well-established in anthropological circles. See, R.H. Lowie, *Primitive Society* (New York, 1920) at 235-243; *Intellectual Property Needs and Expectations of Traditional Knowledge Holders: WIPO Report on Fact-Finding Missions on Intellectual Property and Traditional Knowledge* (1998-1999) (Geneva: WIPO, 2001)

and compromised.²³⁷ As a matter of juridical strategy, property rights fundamentally alter and influence the bargaining process for access to and equitable sharing of the benefits of plants and TKUP. As R.H. Coase sagely observed, “in any negotiations between two parties over property rights the initial distribution of the property rights will determine who has to pay and who does not.”²³⁸ Thus, property rights allow the holder of the right to appropriate the value of the resource to which the right relates and thus sets the tone of the bargain. More importantly, they also determine both the direction of wealth transfer and defines *ab initio*, whose intellectual input is being transferred, to whom, and the terms of that transaction.

If there are no property rights in traditionally-improved plants and in TKUP, certain actors will simply construe and appropriate such intellectual contributions as a “free input of production.”²³⁹ Accordingly, in the absence of reciprocal restraint in how the Western world vests property rights on appropriated plants and TKUP, it is of the utmost importance that a form of “property rights” be placed on traditionally-improved plants and TKUP by the South.

Of course, the arguments of “cultural purists” determined to keep traditional societies away from the so-called “contamination” of the patent system must be anticipated, confronted and resolved. In this regard, certain misconceptions must be dispelled. The general notion is that since patents represent the Western liberal ideology of capitalist profits and commodification, an introduction of the patent concept into the traditional cultural

²³⁷Drahos, *supra* note 221.

²³⁸R.H. Coase, “The Problem of Social Cost” (1960) 3 *Journal of Law and Economics* 1.

²³⁹Drahos, *supra* note 221.

framework will “contaminate” the values of traditional peoples. This notion is nonsensical. As Peter Drahos has already noted, allowing Western free market ideologies of patents on TKUP will not necessarily infiltrate and pollute the cultural practices of traditional peoples. In his words, the argument on cultural purity,

[T]ends to oversimplify a more complex picture. Property rights in indigenous knowledge do not necessarily have to lead to open trade. They can be used to prohibit or regulate such a trade. It is a mistake to think that property only has an appropriation function. It also functions as a means of self defence or survival. ..the crucial issue is not whether trade in culture will corrupt those engaged in it, but rather whether we can devise regulatory forms that will allow indigenous people to pursue their own economic interests in the use of their cultures in ways that are consistent with their aspirations for the preservation and evolution of those cultures. Devising such regulatory forms seems best left to indigenous people and the positive law of individual states.²⁴⁰

Thus, moving from the paternalistic and implicitly condescending treatment of traditional knowledge as an anthropological exoticism which is to be kept in a gilded cage for “study” by curious scholars and researchers, what is basically required is to “extend the existing system rather than to create a new system to provide the same protection.”²⁴¹ This line of response to the patent debacle is also grounded on common-sense pragmatism given that traditional communities and the plant-diverse/culturally-diverse countries of the South simply lack the political and coercive clout necessary to create a radically new regime of intellectual property rights specially designed for them and globally recognizable as binding in international law.

²⁴⁰Drahos, *supra* note 221 at 197.

²⁴¹Lester Yano, “Protection of the Ethnobiological Knowledge of Indigenous Peoples” (1993) 41 *UCLA Law Review* 443 at 486.

In effect, patents can be used defensively as a means of protecting against appropriation of plants and TKUP. Recently, this view has gained ground among scholars of the phenomenon of appropriation. According to Naomi Roht-Arriaza:

[O]ne obvious response to the appropriation of indigenous and traditional knowledge and its fruits is to modify existing national and international intellectual property protection regimes to encompass the informal innovations of indigenous and traditional communities.²⁴²

Thomas Cottier has also articulated this idea in the following words which draw a lesson from the German/Swiss petty patents system:

[T]he very concept of IPRs, however, does not prevent states from introducing feasible systems which are cheap and simple. They are often called petty patents and complement the more sophisticated patent system which is designed for industrial purposes. Switzerland for example, relies upon a national patent system which is cheap and simple mainly by the fact that novelty is not examined at the stage of examination and registration. Such questions are left to courts only in case that patents are being challenged. Interestingly, these patents do not fare worse than patents which had been examined for novelty at registration.²⁴³

Thus, the case for a simple, inexpensive and essentially, defensive communal patent system has gaining attention in modern scholarship. It seems that what is needed is a creative adaptation of the patent system and its jural concepts.²⁴⁴ In this regard, Cottier has noted that new forms of legal personality may need to be formally recognized. In his words:

[I]PR systems could adapt to such needs by way of introducing new forms of ownership. Nothing prevents from introducing novel communitarian titles; the

²⁴² Ariazza, *supra*.

²⁴³ Thomas Cottier, "The Protection of Genetic Resources and Traditional Knowledge in International Law: Past, Present and Future" *supra* note 329 at 11.

²⁴⁴ Ashish Kothari & R.V. Anuradha, "Biodiversity and Intellectual Property Rights: Can the Two Co-exist" (1999) 2 *Journal of International Wildlife Law and Policy* 204; Gurdial Nijar Singh, *In Defence of Local Community and Biodiversity-A Conceptual Framework and the Essential Elements of a Rights Regime* (Penang, Malaysia)

system need not be limited to individual ownership...In sum, modern IPRs, appropriately adjusted can make a considerable contribution to valuation and dissemination of grassroots innovation and building of sustainable technologies.²⁴⁵

It would therefore seem that given the instrumentalist and malleable nature of the patent system, another experimentation would not be unduly out of place, especially where such innovation serves a social and equitable purpose. Defensive patents have also become part of the juridical response by the CGIAR which control the IARCs. For example, as Halewood has noted:

[T]he CGIAR centres have recently endorsed a system-wide scheme whereby individual centres may engage in defensive patenting of their own innovations simply to prevent profit driven companies from appropriating their work and commercializing it. Simultaneously, the centres adopt the policy that they will not seek to commercialize these intellectual property-protected innovations.²⁴⁶

The point is that the patent system is an instrumentalist mechanism and thus communal patents, as an instrument designed to achieve a measure of distributive justice, are an attractive option. In effect, it is very arguable that in spite of the existing problems of integrity and instrumentalism of the global patent system, states of the South have not fully explored nor adequately adapted the system to suit the interests of their traditional communities.

Given that powerful states use and exploit the patent system to advance their perceived national interests and ideology, it would be naive and ignorant of the South to

²⁴⁵Cottier, *supra* note 179 at 12.

²⁴⁶Halewood, *supra* note 182 at 993. See also, Annex No. 6: Guiding Principles for the Consultative Group on International Agricultural Research Centres on Intellectual Property and Genetic Resources, in CGIAR, Centres Position Statement on Genetic Resources, Biotechnology and Intellectual Property Rights (19 May 1998)

proceed as if the patent system was beyond counter-manipulation. However, in proceeding to sketch the outlines of what may be described as a regime of the proposed communal patent system, certain questions which have been posed as constituting obstacles to this proposed option must be resolved. These include:

2. Whether TKUP and traditionally-modified plants rise to the level of patentable subject matter.²⁴⁷
3. Second, the question of the supposed communal and collective manner of traditional inventions as against the much celebrated individuality/originality of Western invention.
4. Third, is the question of the so-called "public" and stale nature of innovations and inventions in the traditional domain.

The first question posed above operates on the assumption that an invention must rise above the level of prior art before it can be protected with a patent.²⁴⁸ While this theoretical assumption is virtually taken as a given, the reality of the matter as previous pages have demonstrated is that the determination of what constitutes a patentable novelty remains a subjective business.²⁴⁹ In any case, it is common knowledge that bio-prospectors place a crucial reliance on the insight of traditional farmers and healers in the search for better crops and medicines. As the preceding pages have amply demonstrated, TKUP and traditionally-modified plants are not inherently unpatentable merely because of the cultural paradigm in which they are developed.

The second question relates to the general argument by some scholars that the

²⁴⁷Jorge Caillaux, "Biological Resources and the Convention on Biological Resources" (1994) 1 *Journal of Environmental Law and Policy in Latin America and the Caribbean* 9. [hereinafter, Caillaux]

²⁴⁸Tamsen de Valoir, "The Obviousness of Cloning" *supra* note 6.

²⁴⁹Charles McManis, "The Interface Between International Intellectual Property and Environmental Protection: Biodiversity and Biotechnology" (1998) 76 *Washington University Law Quarterly* 255.

ostensibly communal nature of life in traditional societies is inconsistent with the purported individualism of the inventive process.²⁵⁰ The contention of this school of thought is that the patent system is predicated on the concept of the inventor as an individual qua individual and the inventive process itself, as an exercise in solitary experimentation and lonesome mental agony.²⁵¹ The image that is created and propagated in the Western world on inventorship is that it is one of individualism and the resultant invention, a product of the inventor's isolated genius. The theory thus is that the patent system is designed to compensate the individual qua the inventor.

None of these assumptions withstands scrutiny. The myth of inventorship as a solitary and heroic harvest of the individual's "sweat of the brow" is what many scholars know it to be: an arrogant and ludicrous myth. Every invention is part of the mosaic of human culture and rests on pre-existing ideas and inventions. Although the culture of individualism in Western liberal democracies is virtually cliched,²⁵² it is a misapprehension of the social structure and process of inventiveness to suppose that inventions today are predominantly carried out by the likes of Benjamin Franklin, James Watt or Filippo Brunelleschi working in conditions of near solitary confinement.

Apart from the fact that inventorship is incremental in nature, the notion of sole

²⁵⁰Ruth Gana, "Has Creativity Died in the Third World? Some Implications of the Internationalization of Intellectual Property" (1995) 24 *Denver Journal of International Law and Policy* 109.

²⁵¹Kirsten Petersen, "Recent Intellectual Property Trends in Developing Countries" (1992) 33 *Harvard International Law Journal* 277; Mark Hannig, "An Examination of the Possibility to Secure Intellectual Property Rights for Plant Genetic Resources Developed by Indigenous People's of the NAFTA States: Domestic Legislation Under the International Convention for New Plant Varieties" (1996) 13 *Arizona Journal of International and Comparative Law* 175.

²⁵²See, David Riesman, *Individualism Reconsidered* (New York: Doubleday & Co., 1955)

inventorship is not only a conceited view of the inventive process but an anachronism. In modern times, inventorship is about a multitude of employed labour working away on specific projects, building upon existing ideas and knowledge, exchanging ideas, and information in the process, generally operating as a community.²⁵³ As Kuhn's path-breaking research observes:

[T]he transformation of technology and of economic society during the last century negates completely the patent law assumption as to the nature of the inventive process...In the modern research laboratories, tens, hundreds of men focus upon single, often minute problems; inventions become increasingly inevitable.²⁵⁴

David Safran concurs with Alfred Kuhn. In his words:

[I]n this age, most inventions result from corporate research efforts...a growing number of these inventions are the result of the work of several research and development teams that are located in different countries.²⁵⁵

In the light of this template shift in the inventive process, it is not a coincidence that patent jurisprudence inevitably created the legal fiction of corporate/employer's rights to inventions made by employees in the course of the latter's employment.²⁵⁶ The inescapable conclusion

²⁵³Stephen Brush, "Is Common Heritage Outmoded?" in Stephen Brush & Doreen Doreen Stabinsky, eds, *Valuing Local Knowledge: Indigenous People and Intellectual Property Rights* (Washington/Covelo: Island Press., 1996)

²⁵⁴T. Kuhn, *The Structure of Scientific Revolution*, (Chicago: University of Chicago Press, 1972). See also, Edith Penrose, *The Economics of the International Patent System* (Connecticut: Greenwood Press, 1974); Fritz Machlup, *An Economic Review of the Patent System*, Study No. 15 of the Sub-Committee on Patents, Trademarks, and Copyrights, of the Committee on the Judiciary, U.S. Senate 85th Session, 2nd Session, Washington, 1958).

²⁵⁵David Safran, "Protection of Inventions in the Multinational Marketplace: Problems and Pitfalls in Obtaining and Using Patents" (1983) 9 *North Carolina Journal of International Law and Commercial Regulation* 117.

²⁵⁶See arguments in sections 5 & 6 of Chapter One. Virtually all patent law jurisdictions all over the world have provisions on employer's right in an employee's invention. See, David Vaver, *Intellectual Property* (Concord, Ontario: Irwin Law, 1997) at 147-149.

is that “collective invention is a common and determinant force in both local economies and the world economy.”²⁵⁷

Interestingly, it has not been suggested that collectivity or communality of inventions in “formal” scientific frameworks is a bar to patentability of such inventions. Yet, traditional knowledge frameworks have been singled out and the inventions therefrom literally maligned on the grounds that such inventions are communal and accretional in origin. It is equally intriguing that in other areas of collective intellectual input towards creativity, the theory of individual authorship does not faithfully follow its own rules. For example, the non-individualistic authorship of films has been largely obviated by nominating a person, usually the producer as the “author” of the work. Needless to say, several hundreds of hands work to produce a movie. It is therefore clear that on basic logic and by parity of reasoning, Western knowledge frameworks and creativity are as mosaical, accretional and communal as traditional and non-western narrative and knowledge frameworks.

Furthermore, it would seem that the alleged hermetic boundary between individualism and collective creativity is a conflation of communalism in cultural lifestyle with the notion of collectivity in inventiveness. It is probable that in some cases involving inventiveness in a communal society, an individual in the community of persons, deriving inspiration from surrounding and pre-existing knowledge, may create new inventions or re-interpret existing knowledge into something “of intricate detail and complexity, reflecting

²⁵⁷Stephen Brush, “Is Common Heritage Outmoded” *supra* at 145. In any event, individual rights can and do in fact co-exist with communal rights. See for example, Ronald Ganet, “Communality and Existence: The Rights of Groups” (1983) 56 *Southern California Law Review* 1001; Leighton McDonald, “Can Collective and Individual Rights Coexist?” (1998) 22 *Melbourne University Law Review* 310.

great skill and originality.”²⁵⁸

The third argument on the patentability of TKUP and traditionally-improved plants is that they are matters of common-knowledge and reside in the so-called public domain. There are several cultural, theoretical and factual biases and flaws in this theory. In the first place, the direct implication of this argument is that TKUP is musty heritage frozen in time. This culturally prejudiced notion that TKUP and knowledge in the traditional paradigm is static and a relic of the past is simply absurd. Neither international law²⁵⁹ nor common-sense supports the notion of a stagnant and ossified concept of traditional knowledge. TKUP is as incremental and dynamic as other knowledge frameworks.

Secondly, there is no principle or rule of international law on patents which prescribes any maximum number of years in which a particular innovation or invention which has been made public must be patented before it would lose its patentability on the grounds of staleness or lack of novelty. Perhaps for sound public policy reasons, the Paris Convention merely sets a lower limit of one year. In other words, an invention may be in common use for any number of years or period prescribed by the local legislator without losing its “novelty” and thus becoming patentable in spite of being in common use. Interestingly, this important aspect of patent law has escaped the attention of most commentators and scholars on patents. The issue here is that the means or ease which information is publicized in various states vary. Accordingly, the local legislature is on solid grounds if it takes this factor in consideration when legislating on the matter.

²⁵⁸See, Justice Von Dossa, in, *Milpurrurru v. Indofurn (Pty) Ltd* (1995) 30 *I.P.R.* 209 at 216.

²⁵⁹Article 8 (j) of the CBD, *supra*.

For example, the Kuwaiti patent law limits “novelty” to twenty years after the first open or public use of the invention in Kuwait.²⁶⁰ The Libyan patent law of 1959 provided for a period of 50 years of open use preceding the date of submission of the application for a patent.²⁶¹ The short point here is that there is no upper limit on public use prior to patenting an invention. Indeed, some international organizations have strongly suggested that special allowance be made on this score when dealing with patents for TKUP by traditional peoples. For example, the recent WIPO Report on the needs of traditional knowledge practitioners notes, that “an extended grace period for traditional knowledge holders ...would give informal innovators additional time to research possibilities of commercialization.”²⁶²

Third, it is an unfounded and untenable generalization to say that all TKUP are in the

²⁶⁰The Kuwaiti Patent Law provides as follows:

[A]n invention shall not be considered new, whether wholly or partially, in the following two cases:
 1- Where during the twenty years preceding the date of submission of the application for patent, the invention had been used openly in Kuwait, or where a description...
 2- Where, during the twenty years preceding the date of submission of the application for patent, a patent had been granted in respect of the invention or part thereof to other than the inventor or his assignee...'

See, Article 3, Law No. 4 (Kuwait) of 1962 Governing Patent Designs and Industrial Models, reproduced in John Sinnott, *Patent Laws of the World* Vol. 2E at 3.

²⁶¹The Libyan Patent Law provides that:

[A] patent is not considered to be new, in whole in part, in the following two cases:
 i) If during the 50 years preceding the date of submission of the application, the invention had already been publicly used in Libya, or its description or design had been advertised in publications in Libya, in such a manner as to render possible the exploitation thereof by experts.
 ii) If within the fifty years preceding the date of submission of the application for patent, a patent of the invention or a part thereof had already been granted to persons other than the inventor or his assigns...

See, Article 1 (b) i, Libya Law No. 8 of 1959 Relating to Patents, Designs, and Industrial Models, reproduced in Sinnott, Vol 2E, *supra*.

²⁶²WIPO Report, *supra* note 377 at 125.

public domain. As John Frow notes, "indigenous cultural systems ...are not built upon a principle of open access but are highly regulated and restricted; they are built upon secrecy as much as upon openness."²⁶³ Native healers are notorious for the secrecy regimes surrounding their knowledge of the uses of herbs. Secrecy of their immense knowledge of the medicinal and pharmacological uses of plants ensures their continued power and influence in traditional societies. The elaborate rituals, magic and spirituality which often surrounds and graces the practice of traditional medical practice is in addition to other myriad societal functions, a crucial aspect of secrecy regimes imposed on TKUP and traditionally-modified plants by traditional herbalists.²⁶⁴ Each product of TKUP should be critically examined on its merit to determine whether it is part of the public domain or not. Moreover, assuming that a particular product of TKUP is in the public domain, it is well to note that unconsented placement of knowledge in the public domain does not *ipso facto* extinguish a right of ownership to intellectual property.

Having dispensed with the preliminary issues on the alleged intrinsic non-patentability of TKUP and traditionally-modified plants, it is now pertinent to briefly sketch out a proposal for a regime of defensive community patents on TKUP and traditionally-modified plants. It is significant that some states such as Brazil are instituting similar proposals.²⁶⁵ As Eugenio de Silva has observed, "the law (the Brazilian law) also adopts a

²⁶³John Frow, "Public Domain and Collective Rights in Culture" (1998) 13 *Intellectual Property Journal* 39 at 51.

²⁶⁴For further discussion of the various secrecy regimes, see, WIPO Report, *supra*.

²⁶⁵Eugenio da Costa e Silva, *Biodiversity-Related Aspects of Intellectual Property Rights (IPRs)* (UNU/IAS Working Paper No. 17, July 1996) [hereinafter, Silva]

new concept for the application and patentability of indigenous industrial property rights, when it establishes a principle for the protectability of indigenous traditional knowledge.”²⁶⁶

4.6.1: Outlines of a Community Patent System²⁶⁷

In formulating any broad proposal for community patents, it seems that the first juridical issue to be addressed is the question of legal persons who may apply for patents on TKUP and traditionally-modified plants. The Eurocentric conception of the patent system appears to limit the category of persons who may apply for patents to natural persons and corporations. However, it is significant that even in the defunct socialist countries which, perhaps, were the crudest European approximation of collective and communal existence, inventions were routinely granted to “socialist organizations” or such other multiplicities of individual human persons. For example, the communist Romanian law on patents²⁶⁸ provided for such groups and “collectives” to apply for patents. Similar provisions were made by in the communist Patent Laws of the defunct Republic of Yugoslavia.²⁶⁹ Even capitalist and individualistic societies like the United States provide for joint inventorship.²⁷⁰

²⁶⁶Silva, *supra*.

²⁶⁷Although there are theoretical differences between utility patents on TKUP and specialized plant patent system, the excessive dilution of the conditions of patentability has blurred the distinction. Therefore, the proposals here should be considered as being applicable to both utility patents and plant patents.

²⁶⁸*Romanian Law No. 62 of the Grand National Assembly of October 30, 1974 on Inventions and Innovations*, reproduced in John Sinnott, *World Patent Law and Practice*, Vol 2F, *supra*.

²⁶⁹Sinnott, *supra*, Volumes 2F and 2G.

²⁷⁰For example, section 116 of the United States Patent Act provides that: “when two or more persons have made inventive contributions to subject matter claimed in an application, they shall apply for a patent jointly ...they shall be named as the inventors.” See also, Rivka Monheit, “The Importance of Correct Inventorship” (1999) 7 *Journal of Intellectual Property Law* 191.

The short point here is that countries and cultures where collective inventorship and innovativeness is prevalent need not constrain themselves within the confines of Eurocentric jurisprudence on legal personality. It is the undoubted prerogative of states to grant or deny legal personality to artificial persons. The creation or recognition of various types of moral or artificial persons is a function of the values, cultures and ideology of each domestic legal system. Accordingly, the suggested solution would lie in a juridical consummation of the already existing forms of legal personhood in traditional and non-Western societies. The relevant persons may include families, villages, clans, kindreds and/or any other legal persons recognized as such by and in the customary law of the cultures or peoples concerned.

The tragedy here is that dominant cultures and jurisprudence have practically insisted on defining for others, especially colonized, marginalized and disempowered peoples and cultures who or what is a legal person in the traditional domain. In this mind-set and practice, legal persons such as “stools”, “families”, “kindreds”, “clans”, “age-grades”, “the spirit of unborn”, “ancestral spirits”, and other forms and categories of legal personality have been reduced to exotic curiosities for Eurocentric anthropologists, sociologists and geographers. It is remarkable that some countries including the Philippines²⁷¹ and Brazil have taken steps towards re-affirming that categories and types of legal persons are not limited to Euro-centric preferences for natural persons and corporations.

In Brazil, for instance, pursuant to bill, PL²⁷² N. 2.057, of 23 October 1991,

²⁷¹*Community Intellectual Rights Protection Act of 1994*, S. 1841, 9th Congress of the Republic of Philippines [as cited in, Jacoby & Weiss, *supra*]

²⁷²PL is the acronym for “projeto de Lei” or legislative bill, in English.

indigenous peoples have legal personality and their recognition as such is not a function of any requirements for registration or by the magnanimity of the government. Under the proposed legislation, “indigenous communities, or any of their members, have the right to apply for a patent of invention, utility model or industrial design which has been developed utilising their traditional collective knowledge.”²⁷³ In the event of any overlap of communities, patents granted in the name of one community at the expense of the other may be administratively rectified or corrected. In the event of disputes relating to priority, it may be suggested that traditional arbitration methods be adopted.

Another area of interest is the fact that many traditional societies are leery of having their sacred plants and TKUP “commodified” through the patent process. In the absence of real alternative capable of binding the global community, this attitude may need to be replaced with a more astute and pragmatic response to the dilemma. The concern over commodification is legitimate. However, an astute reading of the patent law system and the well-meaning but misguided attempts by Eurocentric scholars to present traditional peoples as folks desirous of living in a culturally “uncontaminated” world shows that such concerns have been both exaggerated and misconceived. As Thomas Cottier and Peter Drahos have already noted, the communal patent system is primarily a defensive concept.

In any event, this is a misunderstanding of modern international patent law. Under the TRIPs agreement which constitutes the global minimum threshold for patent law, there is no strict obligation to use an invention. In fact, there are thousands of patented inventions which have never been used and may never be used. Even amongst those that have managed

²⁷³Silva, *supra* note 265 at 42.

to be commercialized, a host of such inventions spent decades on the shelves. Perhaps, the most well-known include the television and the fax machine which spent over 40 and 70 years on the shelves respectively. In short, given the global trend towards the abolition of compulsory use of the patents, the fears of commoditization of sacred TKUP and plants may be exaggerated.

In addition, it is equally worthy of note that patent terms have never really remained constant; rather, they have always reflected an instrumentalist function in the hands of states.²⁷⁴ There is no universally prescribed or binding upper limit to the duration of a patent grant. The TRIPs agreement only sets the minimum number of years for patent grants. Arguably therefore, the local legislature in the affected states may protect the spiritual and religious significance of some TKUP for traditional and indigenous populations by significantly improving and/or renew the duration of such communal patents at the request of the affected traditional community.

As regards the question of costs of setting up such a patent system, it is a well-known fact that a substantial part of the costs of running a patent system is spent on the maintenance of patent examiners. In other words, the cost of maintaining a huge army of patent examiners eats up a large part of the budget of the major patent offices in the world. It is suggested that poor countries should borrow a leaf from some European countries which do not maintain large army of patent examiners, especially in matters pertaining to the so-called "petty patents." Thus, the simple thing would be to dispense with examination of communal patent

²⁷⁴Lise Osterborg, "Patent Term a la Carte?" (1986) 17 *International Review of Industrial Property and Copyright Law* 60.

applications. This is already the practice in some European patent law jurisdictions such as France and Switzerland. In such cases, the burden of proof shifts to the person who asserts that the patent grant is unenforceable. Interestingly, the provisions of Article 34 of the TRIPs agreement shift the burden of proving non-infringement of a patented invention to the defendant.

Furthermore, gene-rich states which have made complaints of having their plants and TKUP appropriated should consider a twin-regime of non-recognition of such patents within their own domestic jurisdiction. They may also use the good offices of their states to launch both diplomatic and juridical protests against such patents. On the first leg of this proposal, patents on TKUP and traditionally-improved plants should not be recognized in the states which have legitimate grievances with such patents, particularly, where those patents were obtained without the prior informed consent of the affected traditional community. It is interesting to note that during the negotiation of the CBD, the government of Ethiopia made a similar suggestion. According to the statement by the Ethiopian government:

[W]e express dissatisfaction with the provisions protecting patents and other intellectual property rights without commensurate regard for informal innovations, especially in Article 16, paragraph 2, which opens the way for use by countries with the technological know-how of genetic resources and innovations from countries without the know-how in patents and other intellectual property rights and for taking them out of the reach of even those countries which created the very genetic resources and innovations.²⁷⁵

The government of Ethiopia thus suggested that at a later date, the following paragraph be added to Article 16 of the CBD:

²⁷⁵*Report of the Intergovernmental Committee for a Convention on Biological Diversity*, U.N. Environmental Programme, 7th Negotiating Sess., 5th Session of the International Negotiating Committee., U.N. Doc. UNEP/Bio.Div/N7-INC.5/4 (1992)

[W]here a technology, organism or genetic material which is patented or legally protected in any other way as an intellectual property has incorporated an organism or organisms, a genetic material or materials, a technology or technologies or any other traditional practice or practices originating in another country or countries, the patent or other intellectual property shall not be valid in the country or countries of origin of any of its component parts; and the benefits accruing from the application of the patent or other intellectual property right in other countries shall be equitably shared between the holder or holders of the protected right and the country or countries of origin.²⁷⁶

Although the Ethiopian suggestion is worthy of serious consideration, it suffers from the erroneous assumption that states may not *suo motu* and unilaterally enact laws in their domestic jurisdictions invalidating or rendering unenforceable those patents which make a mockery of the obligations created by the CBD and accepted by Contracting parties.²⁷⁷

It cannot be denied that some of these issues deal with the unresolved question of liability in international law for contradictory obligations of states on a particular point. At the moment, it would seem that from an anecdotal inference or speculation, states tend to resolve this dilemma by leaning towards the particular obligation which converges with their perceived national interests. In the process, the opposing obligation may wear thin or fall into disuse. Furthermore, such stance drains legitimacy out of the ignored international obligation. It may be surmised here that recent leftist riots and public demonstration against institutions of globalization and the supporting legal framework have undermined the efficacy of such international agreements. Another way of resolving this impasse would be for states to clarify the law on this issue through additional protocols to both the CBD and the TRIPs agreement.

²⁷⁶*Ibid.*

²⁷⁷See, Articles 15 & 16 of the CBD, *supra*. The supremacy of state jurisdiction to regulate such intellectual property rights such as Farmers' Rights is further entrenched in Article 9 of the FAO *International Treaty on Plant Genetic Resources for Food and Agriculture*, *supra* note 81 of Chapter 3.

It seems that the global community cannot escape the imperative of rationalising and clarifying the conflicts embedded in some of those contradictory international instruments such as the CBD and the TRIPs agreement.

There are some binding multilateral and regional arrangements which follow the reasoning of suggestions made above. For example, the Andean Community in its Decision 486 on Biological, Genetic and Traditional Knowledge provides that:

[T]he Member Countries shall ensure that the protection granted to intellectual property elements shall be accorded while safeguarding and respecting their biological and genetic heritage, together with the traditional knowledge of their indigenous, African-American, or local communities. As a result, the granting of patents on inventions that have been developed on the basis of material obtained from that heritage or that knowledge shall be subordinated to the acquisition of that material in accordance with international, Andean Community, and national law.²⁷⁸

In addition, Article 3 of Decision 486 provides that “Member Countries recognise the right and authority of indigenous, African-American and local communities to decide on their collective knowledge.”²⁷⁹ Further, Article 26 of Decision 486 provides that the application for a patent for an invention must contain:

(h) a copy of the contract for access, if the products or processes for which a patent application is being filed were obtained or developed from genetic resources or byproducts originating in one of the member countries.

Paragraph 26 (i) further specifies that the application must include:

[a] copy of the document that certifies the license or authorization to use the

²⁷⁸Decision 486. The Community of Andean Nations consists of Bolivia, Columbia, Ecuador, Peru and Venezuela. It enjoys regulatory authority through Decisions and Resolutions. As a rule, Decisions need no internal approval processes and become national law automatically upon their publication in the Community’s Official Journal. This Decision came into effect on December 1, 2000 but was adopted on 14 September 2000. See, Manuel Ruiz, ‘The Andean Community’s New Industrial Property Regime: Creating Synergies Between the CBD and Intellectual Property Rights’ *supra* note 229.

²⁷⁹Decision 486, *supra*.

traditional knowledge of indigenous, African-American, or local communities in the Member Countries where the products or processes whose protection is being requested were obtained or developed on the basis of the knowledge originating in any one of the Member Countries, pursuant to the provisions of Decision 391 and its effective amendments and regulations.²⁸⁰

Interestingly, under Article 75, the competent authority could decree outright, the absolute nullity of a patent in cases where the relevant copy of the contract evidencing access was not attached to the application for the patent. While these legal instruments and provisions may seem draconian, it seems that they are conceived in the spirit of outrage against the inequity in the appropriative instincts and mechanisms of the lax and permissive patent system.

Another option worth pursuing is the adaptation of the common law rule of *parens patriae*, that is, the state should be obliged to protect and take into custody the rights and privileges of its citizens for discharging its obligations.²⁸¹ Given that multinational corporations have clout and influence far in excess of what aggrieved traditional communities may dream of mustering in protesting cases of appropriation, it would be worthwhile for states to consider enacting laws which would enable them to pursue legal proceedings on behalf of traditional communities in various jurisdictions of the world in matters related to appropriation of plants and TKUP. Since it is one of the theoretical duties of the state to secure for its citizens, their rights, it is arguable that in cases where those citizens are unable or incapacitated to assert and secure those rights and privileges, the state ought to step in and assert them in their place, especially having regard to the fact that patents

²⁸⁰*Ibid.* Article 21 of the Brazilian proposed bill referred to above also makes similar provisions.

²⁸¹See, *Charan Lal Sahu v. Union of India* (2000) Vol.118 International Law Reports 451. [hereinafter, Union Carbide case]

are, ultimately national assets.

In other words, the state itself has an independent interest in the consequences of the appropriation it seeks to protest. Therefore, conceptually and jurisprudentially, there is no known reason why states cannot assume this function, especially in cases of egregious appropriation of TKUP.²⁸² Even if such lawsuits are lost in the courtrooms, they may still have some normative value and make appropriators of TKUP ill at ease.

Certain conclusions and recommendations fall due for consideration. First, the global patent system should be reevaluated from the standpoint of the non-Western countries. Second, international patent law forums should be modified to enhance the exchange of information between the North and the South and also to enlarge analyses and discussion of the ramifications of the patent system. Third, the possibility of an alternative regime to the patent system on ownership of plant resources should be vigorously pursued. These should include new deposit standards for material entering germplasm banks, biological prospecting, defensive publication, and certificates of origin.²⁸³

Another option which has been actively promoted is the issue of elevating the concept of Farmers' Rights (now recognized in international law by virtue of the *FAO Treaty on Plant Genetic Resources*) into a community-based alternative to "the private property framework of traditional IPRs."²⁸⁴ At present there are three bills at the Congress of

²⁸²See for example, *Alfred Snapp & Son, Inc v. Puerto Rico*, (1982) 458 US 592

²⁸³International Workshop on Indigenous Peoples and Development. Ollantaytambo, Qosqo, Peru 21-26 April 1997. Online < <http://users.ox.ac.uk/wgtrr.ollan.htm> accessed on 8/27/99.

²⁸⁴Farhana Yamin, *The Biodiversity Convention and Intellectual Property Rights*, [A WWF International Discussion Paper] October 1995 at 4. The concept of Farmers' Rights is entrenched in the FAO Treaty, as per Article 9. See *FAO Treaty on Plants*, *supra* note 81 of Chapter 3.

Philippines providing for the establishment of such community intellectual rights protection.²⁸⁵ These bills seek the incorporation of the ideas already discussed here in respect of traditional knowledge on the uses of plants.

Apart from such measures detailed above, gene-rich states should also pursue a policy of a tighter regime on patent disclosure. As Professor Oddi has argued, “the statutory requirements for enabling disclosure could be quite specific in requiring specifications, blueprints, dimensions, chemical compositions, exact temperatures, pressures, bill of materials, equipment requirements, etc.”²⁸⁶ In other words, applicants for patents involving products of TKUP should fully and completely disclose the elements highlighted by Oddi. This would afford patent examiners the material to make determinations as to whether a purported invention is real or a pseudo-invention.

With regards to the issue of publication of TKUP, there is need for extra caution as this may catalyze appropriation. Indeed studies by Kate and Laird show that:

80% of all companies that use ethnobotanical knowledge (only half of those interviewed) rely solely on literature and databases as their primary source for information. This fact has significant implications for benefit-sharing and suggests that academic publications and transmission of knowledge into databases-rather than field collections on behalf of companies-are the most common route by which traditional knowledge travels from a community to the commercial laboratory. Companies therefore have access to knowledge in ways that do not trigger benefit-sharing.²⁸⁷

The obvious point is that states should modify their patent laws and laws on physical access

²⁸⁵Tshimanga Kongolo, “Towards a More Balanced Coexistence of Traditional Knowledge and Pharmaceuticals Protection in Africa” (2001) 35 No.2 *Journal of World Trade* 349.

²⁸⁶Oddi, “TRIPs Natural Rights” *supra*.

²⁸⁷Kerry Ten Kate & Sarah Laird, *The Commercial Use of Biodiversity: Access to Genetic Resources and Benefit Sharing* (London: Earthscan Publications Ltd, 1999) at 62.

to TKUP to deal with this reality. Further, gene-rich states should wean themselves of the idea that for a treaty outlawing appropriation of TKUP to be global, it needs the financial support and membership of all other states in the world.

It is also suggested that towards a regime of absolute global novelty, an international bureau in the likeness of the International Patents Bureau²⁸⁸ could be established to provide the various patents offices with “reasoned opinions regarding the novelty of inventions in respect of which applications for patents have been filed with the respective national industrial property services.”²⁸⁹ This bureau would also have the duty of cross-checking with various national offices for novelty. The basis for determining state of the art should recognize the non-literate culture of some societies. An additional measure in this regard would be to pass laws elevating oral knowledge to the same status as written knowledge. In effect, no patent would be recognized if it improperly uses oral knowledge. Indeed, this is one of the latest legislative initiatives adopted by the government of India in December 1999.²⁹⁰ In the event that the North does not want to be part of it, the proposed international bureau on novelty of inventions could be established by states of the South for their own benefit. If this regime is instituted, a major normative benefit therefrom is that patents on

²⁸⁸*Agreement Concerning the Establishment of an International Patents Bureau*, The Hague, 6 June 1947, reproduced in, Treaty Series No. 84 (1965); *Agreement Revising the Agreement Signed at the Hague on June 6, 1947, Concerning the Establishment of an International Patents Bureau, with Protocol and Resolution*, The Hague, 16 February-31 December, 1961, reproduced in J.W. Baxter, ed., *World Patent Law and Practice*, vol. 2A (London: Sweet & Maxwell, 1976) at 310. These agreements establish the *Institut International des Brevets*.

²⁸⁹*Article 1, Agreement Concerning the Establishment of an International Patents Bureau*, The Hague, 6 June 1947, reproduced in, Treaty Series No. 84 (1965), supra.

²⁹⁰Peter Drahos, “Indigenous Knowledge, Intellectual Property and Biopiracy: Is a Global Bio-Collecting Society the Answer? [Opinion] (2000) 6 *European Intellectual Property Review* 245.

TKUP or plants which have no certification of novelty from the bureau would lack legitimacy.

In addition to a documentary search for the state of the art, the bureau should also engage in a search of oral tradition of the state of the art. The patent system should be held up to its own theoretical best standards. This bureau should also serve as a bridge between the WTO TRIPs and the CBD, particularly on the vexed issue of the relationship between IPRs and the CBD. The member states of this proposed bureau would undertake to make the domestic validity of their patents conditional on the compliance with the requirements of the bureau on a global standard of novelty. Finally, given the increasing similarity between the concept of Plant Breeders' Rights (PBRs) and patents on plants, the former deserves further re-consideration.

4.7: Plant Breeders' Rights (PBRs)

The TRIPs agreement provides for the protection of plant varieties "either by patents of by an effective *sui generis* system or by any combination thereof."²⁹¹ One of the more well-known "sui generis" property regimes is the concept of Plant Breeders' Rights, hereinafter, PBRs. The origins of this genre of rights has been traced to the efforts of 6 Western European states.²⁹² In the United States, although the *Plant Patent Act of 1930*²⁹³

²⁹¹*Supra* note 42.

²⁹²Kloppenborg, *supra* note 8 at 130.

²⁹³*Supra* note 12. This legislation limited protectable plants to asexually reproduced species. Furthermore, unlike the standard utility patent, this legislation lowered the standard of patentability by excluding utility. Therefore, once the purported new plant invention was distinct and new, it qualified for patentability.

laid the juridical basis for patents on plants, PBRs were created by the *Plant Variety Protection Act of 1970 (PVPA)*.²⁹⁴ This latter legislation extended legal protection to sexually reproduced (i.e, seed) plants. The significance here is that most important food crops in the world, (for example, wheat, maize, rice, et cetera) are sexually reproduced. Thus, control over them has deeper economic and political consequences. Therefore, until the TRIPs agreement, attempts by American agribusiness industry to introduce PBR legislation in Australia, Canada and Ireland were rebuffed by various interest groups such as labour, farm, church and environmental groups.²⁹⁵

The reasons for this opposition to PBRs even in the North are not far-fetched. Plant Breeders' Rights are patent-like protection to developers of novel, sexually-reproduced plants. This specie of rights was created for the benefit of commercial plant breeding companies. The potential for such corporations to have an iron-grip on global food supply has remained hotly debated. However, by "tying-in" other aspects of economic activities as part of the enlarged rubric of "global trade", opposition to PBRs was defeated.²⁹⁶ Today, PBRs are practically entrenched at the international level courtesy of the UPOV Conventions which have been promoted as an alternative to patents on plants.²⁹⁷

Like the patent system, the utility of PBRs remains controversial. As the UNCTAD report observes, "a notable problem in solving the controversy is that empirical evidence on

²⁹⁴Note 13, *supra*.

²⁹⁵Kloppenburg, *ibid*.

²⁹⁶Philippe Cullet, "Plant Variety Protection in Africa: Towards Compliance With TRIPs Agreement" (2001) 45 *Journal of African Law* 97. [hereinafter, Cullet]

²⁹⁷*Supra* note 24.

the impact of PBR is lacking.”²⁹⁸ There have been case-studies in Argentina, Chile and Uruguay and the results remain inconclusive.²⁹⁹ Further, it has also been questioned whether PBRs have the capacity to reward or recognise community-based innovation in the plant regime. In addition, their appropriative function is also a matter of legitimate concern. Commenting on the United States PBRs legislation, the PVPA, Kloppenburg argues that “the PVPA is but the most recent of a variety of juridical strategies taken by private enterprise to extend the reach of the commodity-form to encompass plant germplasm.”³⁰⁰ The fundamental problem with PBRs is the absence of any regulatory framework to ensure that only superior varieties of plants are accorded legal protection.³⁰¹ In effect, proprietary rights over plants are obtainable under the PBR regimes upon fulfilment of the conditions of novelty, uniformity and stability (consistent phenotypic reproducibility). For example, Article 5 of the *International Convention for the Protection of New Varieties of Plants, of December 2, 1962* which sets the international standard for granting of PBRs is instructive. It provides that “the breeder’s right shall be granted where the variety is new, distinct, uniform and stable.”³⁰² There is no consideration for quality or utility.

In addition, it bears noting that like patents, there is no global or absolute standards of novelty. Accordingly, the arguments made in the preceding pages on this point apply with

²⁹⁸UNCTAD Report, *supra* note 49 at 63.

²⁹⁹*Ibid.*

³⁰⁰Kloppenburg, *supra* at 132.

³⁰¹*Ibid.*

³⁰²*Supra* note 24.

equal force to the criterion of novelty for PBRs. There are both geographical and commercial contingencies for ascertaining novelty in PBR regimes. Similarly, the criterion of distinctness has relevance only in a marketing sense as against utility. As Kloppenburg notes, “the PVPA was pursued by the seed industry primarily as a mechanism for permitting the *differentiation* of its products”³⁰³ rather than as a reward for useful improvement of plants. Similarly, the criteria of uniformity and stability are specially tailored to comport with the vagaries of plant genetics and commercialization.³⁰⁴

The irony here is that in spite of the obvious lowering of the standards for granting proprietary rights under PBRs, the weight and scope of PBR rights are virtually similar to patents. For example, in addition to prescribing a minimum duration of 20 years for PBRs, the UPOV Convention outlines the scope of the Breeder’s Right thus:

- [S]ubject to Articles 15 and 16, the following acts in respect of the propagating material of the protected variety shall require the authorization of the breeder:
- (i) production or reproduction (multiplication),
 - (ii) conditioning for the purposes of propagation,
 - (iii) offering for sale,
 - (iv) selling or marketing,
 - (v) exporting,
 - (vi) importing,
 - (vii) stocking for any of the purposes mentioned in (i) to (vi) above
- (b) The breeder may make his authorization subject to conditions and limitations.³⁰⁵

In addition to these sweeping rights, the 1991 revision of the UPOV Convention (which has not yet gone into effect) dispenses with the age-old *farmer’s privilege*. The farmer’s privilege is the clause in PBR laws under which farmers’ may save seeds purchased from commercial

³⁰³Kloppenburg, at 143.

³⁰⁴See, Articles 8 and 9 of the UPOV Convention. *Supra* note 24.

³⁰⁵*Ibid.*

seed breeders for the purposes of re-planting in the subsequent planting seasons without infringing PBR rights.

Under the old regime, when farmers' used protected varieties, their natural right of seed saving became a legal right, or even less, a privilege. This legal privilege is increasingly being restricted and in many case, removed. For this reason, some commentators have argued that "the scope of the right foreseen by the UPOV Act of 1991 goes far beyond that required by the UPOV 1978 Act. In fact, the 1991 revision has brought the Convention more in line with patent law."³⁰⁶ Philippe Cullet agrees with this view. In his concurrence he notes that "the latest revision of the Convention adopted in 1991 has further strengthened the rights of commercial plant breeders. This includes the obligation for member states to provide protection to all plant genera and species...Overall, in the 1991 version, plant breeders' rights have become akin to weakened patents and the conceptual distinction between the two is now blurred."³⁰⁷

Indeed, the difference between patents and PBRs under the 1991 version of the UPOV Convention is the breeders' exemption. Here, a PBR holder's authorization would not be required for the breeding of another variety from the protected variety. The total impact of the relaxation of the criteria for patentability of plants and TKUP in an age of tighter PBR regimes is that both concepts are virtually the same. As Philippe Cullet further notes, "given that countries can now only join the 1991 version of the Convention, which has

³⁰⁶Dan Leskien & Michael Flitner, "Intellectual Property Rights and Plant Genetic Resources: Options for a Sui Generis System" [Issues in Genetic Resources # 6] (International Plant Genetic Resources Institute, Rome, June 1997) at 62.

³⁰⁷Cullet, *supra* note 296 at 100.

significantly weakened the exceptions to the rights of breeders contained in the 1978 version, there is no significant difference between patents and patents and the regime offered by UPOV.”³⁰⁸ Consequently, the suggestions made above in direct reference to mitigating the injustice and excesses of the patent system apply with same relevance to PBRs. Unless “both” regimes are critically re-examined, plants and TKUP would continue to be appropriated.

4.8: Conclusion

From the analyses above, particularly in Chapters 3 and 4, it seems clear that the creation of the IARCs and the relaxation of the conditions for patentability soon thereafter, was not a matter of mere coincidence but a brilliantly planned and executed mechanism for transferring, appropriating, and, ultimately, privatizing plants and TKUP. These twin processes, that is, the mechanism of the IARCs and the relaxation of the patent system have operated under an unspoken but unmistakable prejudiced and gendered conception of the scientific basis or lack thereof of the intellectual inputs of traditional farmers, breeders and healers from marginalized cultures, particularly women.

In response to the appropriative functions of the pertinent international institutions and the patent systems of the major industrialized states, this chapter has recommended *inter alia*, a modified patent system by way of a regime of communal patents. This proposal is largely defensive. It is also an acknowledgment of the relative weakness of the less-industrialized states vis-a-vis the immense power and influence of the industrialized states

³⁰⁸*Ibid.*

in shaping and sustaining international law and institutions. Within this context, the need for greater co-operation among weaker states, particularly in the area of instituting an international regime of absolute novelty of patentable TKUP has been reiterated.

Further, this chapter has argued for the non-recognition of by states of patents on TKUP where the novelty of such “inventions” is clearly questionable. In addition, it has been argued that the dichotomy between oral knowledge and written knowledge in determining novelty is unhelpful to the integrity of the patent system. In fact, the dichotomy in question is illogical and hypocritical. Given the increasing similarity between patents on plants and Plant Breeders’ Rights, the suggestions made in this chapter with regard to patents on plants should apply with necessary modifications to Plants Breeders’ Rights.

In sum, it would be remiss to conclude this thesis without teasing out some of the implications of the appropriation of plants and TKUP by the major patent systems of the world, international institutions, the notion of common heritage of mankind and the gendered institution of science. In addition to the human rights implications of appropriation of plants and TKUP, the incentive offered by patents also catalyze the spread of genetically modified plants. The latter is increasingly becoming controversial. The reasons for this are not far-fetched: genetic modification of plants is a whole new frontier of potentials and pitfalls with profound implications for humanity and the environment.

Chapter 5 thus concludes this examination of the role of international law in the erosion and appropriation of plants and TKUP by peering into the cloudy juridical space on the implications of the erosive and appropriative instincts of patents on both the environment and human cultures. Accordingly, it teases out the questions of what should be the proper

role of the emerging principle of precaution in tempering the march of genetic manipulation of plants, the implications of the emergent dispensation on global food security and the policy direction of the patent system in the years to come.

CHAPTER FIVE

Patents and Plants: In Search of a Regime Respectful of Plant and Cultural Diversity

5.0: Introduction

This thesis has, in the preceding pages, attempted to examine the origins and development of the patent system. In addition, the emergence of a multilateral framework for cooperation on patents has been discussed, particularly the TRIPs Agreement in the context of the so-called North-South divide. The emphases have been on the controversial implications of applying the patent concept to plants and traditional knowledge of the uses of plants (TKUP).

In addition, the issues raised have been examined within the context of loss of plant and cultural diversity. Attention has been paid to the probable causes of the phenomenal erosion of plant life forms and the mutually supporting human cultures. These include the pervading culture of consumerism, inequitable global economic structure, agri-business, bio-prospecting, biotechnology, climate change and cultural homogenization. Although these several factors amongst others are varied in their nature, it has been argued that the common thread seems to be the prevalent concept and practice of development with emphasis on accumulation of capital profit. In addition, this thesis has examined how the international community has attempted a juridical and institutional solution to the erosion of plant life forms. In this context, the *Convention on Biological Diversity* (CBD) and the *FAO Treaty on Plant Genetic Resources for Food and Agriculture* deserve specific mention.

Further, the thesis has undertaken a discussion of how international agricultural

research centres sometimes operate as agents of appropriation of plant life forms and TKUP. As already noted, this contentious aspect of the analysis has been conducted within the context of North-South relations and the excessive politicization of the so-called concept of Common Heritage of Mankind (CHM). In addition to the institutionalization of the erosion and appropriation of plant life forms and TKUP by the agricultural research centres, the thesis has indicted the patent system as an erosive and appropriative mechanism. In making this case, it has been argued that the modern patent system of powerful states have been significantly manipulated and retro-fitted to suit the interests of seed merchants and pharmaceutical companies. These factors operate within a social culture of prejudice and disrespect for non-Western forms of epistemology. A primary consequence of this erosive and appropriative behaviour of both the international agricultural research centres and the patent system is that traditional farmers and local communities have been exploited and impoverished economically and culturally.

This concluding part of the thesis hints at some of the readily apparent consequences of the erosion and appropriation of plant life forms and TKUP by both international institutions, especially the international agricultural research centres, and the patent system. These consequences also constitute norm-influencing considerations to be factored in when policy-makers design patent laws and, perhaps, what the courts should also weigh when construing the wider implications of patent rights on plants and TKUP.

Perhaps the primary threat posed to the plant life form regime by the modern spate of patents on agricultural crops is the question of global food security, especially in the context of the starvation of hundreds of millions of people amidst the affluence of a few

powerful states. Moreover, the process in question is one which is currently being played out as plant genetic diversity suffers at the hands of multiple forces. Of course, a major factor in this regard is the patent systems of powerful states. The phenomena of commercialization, privatization, and erosion of plant genetic diversity may not be possible without the instrumentality of the patent system. In recent times, it is becoming increasingly clear that a handful of multinational corporations with primary interests in the stock markets control the global supply of seeds and related agricultural inputs. More significantly, agricultural inputs are being “tied in” with the global food supply to create a regime of absolute oligopoly in agriculture and food supply. The implications of this trend for global food supply and agricultural security are matters of extant debate and concern.

Apart from the question of global food supply and security, there are also concerns about of the implications of the emerging dispensation on human health and the safety and integrity of the environment. Since the lowering of the threshold for patentability of TKUP, researchers have found increasing evidence of “novelty without innovation” especially, in the pharmaceutical industry. Old drugs and TKUP with known molecular structures are routinely repackaged, patented and purveyed as new improvements on prior art when what is actually taking place is the rearrangement of the molecular structure of existing drugs without substantial improvement in either their potency, utility, or curative abilities for hitherto incurable ailments.

A related factor is that the patent system has largely encouraged the precipitate and premature release into the environment of genetically-modified plant life forms without certainty of their human safety and compatibility with the various interacting niches of the

ecosystem. The role of the principle of precaution in this dispensation is a matter of contemporary agitation. It seems however that the precautionary principle is emerging as a powerful tool for sober consideration of the wider implications of the role of patents in environmental safety and health. These issues in themselves and by mutual interaction raise varied questions of human rights in the modern age. They also compel a reappraisal of the concept and practice of development.

These are some of the questions and issues which this concluding chapter seeks to explore. The questions are complex and in a state of flux. It is a little difficult to theorize on these deep and multi-dimensional issues and therefore there are no quick-fix solutions. What this thesis attempts to do is to stir the questions and provoke further debate. It is hoped that on the anvil of debate and analysis, old solutions may have to yield new ones, not, perhaps, by leaps and bounds but by the traditionally gradual manner, in which law, like all other forms of human knowledge, has always developed.

5.1: Patents, Plants and TKUP: The Question of Global Food Security

A major argument put forward by proponents of patents on plants and TKUP is that the patent system offers an economic incentive for promoting the sustenance of plant genetic diversity and encouraging scientific improvements of plants. Although there may be some element of validity to this free market argument for patents on plants, there is compelling evidence showing that industrialization of agriculture itself is one of the greatest causes of

erosion and extinction of plant genetic diversity.¹

The reasons for this conclusion may not be far-fetched. First, commercially successful or industrialization of agriculture thrives on uniformity of crops. Uniformity means ease of cultivation and harvest which translates into greater profit. Given that the patent system plays a significant role in the commercialization of inventions, the process in question undermines the essence of plant diversity by focusing undue attention on the so-called economically useful plants.² In this market determined judgment of which crops perish or thrive, plants which do not have any appeal for the industrialist machinery are construed as weeds and extirpated or driven into extinction.

For example, in the United States a survey of seed banks showed that chufas, martynia, and rampion have been lost entirely.³ It is estimated that 8,000 to 10,000 different varieties of apples have been named and recorded throughout the history of the world. Today, only about 12-15 varieties account for 95 per cent of all commercially grown apples. In other words, plant species, varieties or even entire crops which hold little commercial appeal, at least as determined by "market forces" in the interim, are jettisoned for commercially exploitable varieties or crops.

However, it is a fact that plant genetic material offers security to both the local and

¹V.H. Heywood, ed, *Global Biodiversity Assessment* (Cambridge University Press, UNEP, 1996). See also, Norman Myers, "The Hamburger Connection: How Central America's Forests Become North America's Hamburgers" (1981) 10 *Ambio* 3-8.

²Since the industrialization of agriculture, plant genetic erosion has intensified. See, Holly Saigo, "Agricultural Biotechnology and the Negotiation of the Biosafety Protocol" (2000) 12 *The Georgetown International Environmental Law Review* 779. [hereinafter, Holly Saigo]

³Mark Ritchie, *et al*, "Intellectual Property Rights and Biodiversity: The Industrialization of Natural Resources and Traditional Knowledge" (1996) 11 *St. John's Journal of Legal Comment* 431. [hereinafter, Ritchie]

the industrial farmer.⁴ Plant breeding activities are dependent upon close relatives of cultivated species known as landraces. This is not to say that industrial or mechanized agriculture has not significantly boosted supply of food and agricultural produce but the unnecessary tragedy is that patents on plants may constitute a perverse incentive and thus would undermine the basis of sustainable agriculture. Indeed, agronomists are agreed that the world today produces more per inhabitant than ever before. This remarkable revolution may be partly attributed to the mechanization of agriculture and the large-scale addition of agricultural inputs.⁵

One consequence of the erosion of plant genetic diversity is that the capacity of the economically preferred plants to resist pests and diseases is compromised. It bears noting that marketability or industrialization of plant produce or agriculture is not necessarily coterminous with the inherent superior quality of the plant produce sought to be marketed or the crops put under industrial mono-cropping. Given the potential utility of plants or cultural prejudice against some plants which “market forces” of the day may erroneously dismiss as economically useless, the short-sighted depletion or extinction of the plant genetic pool can be costly and dramatic.⁶

⁴Annie Patricia Kameri-Mbote & Phillipe Cullet, “Agro-Biodiversity and International Law-A Conceptual Framework” (1995) 11 *Journal of Environmental Law* 257. [hereinafter, Mbote]

⁵As earlier noted, this statement needs to be qualified. For example, the so-called Green revolution with emphasis on seeds which need high doses of chemical fertilizers and pesticides, may produce high yields but as in the Philippines, it also led to a 358% increase in farm expenses due to chemical inputs. Farmers there suffered a 52% drop in farm income. See, Mbote, *supra* at 263. See also, Rebecca Margulies, “Protecting Biodiversity: Recognizing International Intellectual Property Rights in Plant Resources” (1993) 14 *Michigan Journal of International Law* 322. [hereinafter, Margulies]

⁶For instance, the Irish potato famine reduced the population of Ireland by a third. In the 1970s, United States farmers suffered a twenty percent loss of their corn crop to the corn blight Holly Saigo, *supra* note 2 at 796.

In addition to the danger in the erosion of plant genetic base, patents on plants seem to create a regime whereby the emergent biotechnology⁷ industry is integrating the corporate food chain with agri-business and the products of chemical multinational corporations. This may be inferred from the increasing trend by which crops are being bred or genetically-engineered to suit the needs of the corporations which manufacture pesticides and agricultural additives. In other words, the same corporations which are acknowledged as the “seed giants” by virtue of their strength and clout in the seed business, also own the chemical, fertilizer and pesticide subsidiaries.

Usually, the seed companies are subsidiaries of giant multinational chemical firms.⁸ For example, multinational corporations such as Hoescht, ICI, Sandoz, and Shell are all involved in genetic modification⁹ of plants. Thus, there seems to be a link between this

⁷The CBD defines biotechnology as “any technological application that uses biological systems, living organisms or derivatives thereof, to make, modify products or processes for specific use.” See, Article 1, *Convention on Biological Diversity*, (1992) I.L.M. 813. (Entered into force Dec. 29, 1993) [hereinafter, CBD]. Biotechnological procedures “allow scientists to move specific genes within an organism or from one organism to another, whether the gene is from an organism of the same or a different species.” See, Saigo, *supra* note 2 at 783; Michael Doane, “TRIPs and International Intellectual Property Protection in an age of Advancing Technology” (1994) 9 *American University Journal of International Law and Policy* 465.

The actual and potential commercial usefulness of this industry is quite remarkable. For instance, total sales for the year 1991 resulting from biotechnology in the United States alone was approximately \$4billion and estimated at \$20-50billion for the year 2000. Similarly, between 1985 and 1990, the number of biotechnology patents filed in the United States grew by fifteen percent annually. M. Kenney, *Biotechnology: The University-Industrial Complex* (New Haven: Yale University Press, 1986). See also, Rebecca Eisenberg, “Proprietary Rights and the Norms of Science in Biotechnology Research” (1989) 21 *Intellectual Property Law Review* 29.

There are claims by some scientists that the rise of the biotechnology industry and the pursuit of patent rights by academics retards communications among scientists. See, *Commercialization of Academic Biomedical research: Hearings before the Subcommittee on Investigations and Oversight and the subcommittee on Science, Research and Technology of the House Committee on Science and Technology*, 97th Congress., 1st Session (1981).

⁸RAFI *Communique*, February/March 2000.

⁹The term “genetic modification” is used to indicate the introduction of DNA segments into an organism through recombinant DNA technology. All living organisms contain the molecule deoxyribonucleic acid-DNA- which itself looks a like a woven strand and comprised of thousands of genes. Each of these genes

relationship and the fact that “crops now require large amounts of pesticides, herbicides, and fertilizers.”¹⁰ It is therefore not coincidental that research and development by biotechnology conglomerates are now aimed at “fostering, rather than reducing, dependence on company products. In addition to engineering plants to resist natural hazards, corporations engineer

control the existence or expression of a particular trait or characteristic. The combination of these genes distinguish one organism from the other or even make similar organisms in their respective ways. See, Robert Merges, “Intellectual Property in Higher Life Forms: The Patent System and Controversial Technologies” (1988) 47 *Maryland Law Review* 1051; Cheryl Bardales, “A Primer of Genetic Engineering I: Basic Structural Components of the Cell” (1994) 4 *Dickinson Journal of Environmental Law and Policy* 7. The potential risks involved and the need for informed risks and consent in dealing with modified life forms has engendered calls for labelling of such organisms. See, Karen Goldman, “Labelling of Genetically Modified Foods: Legal and Scientific Issues” (2000) 12 *The Georgetown International Environmental Law Review* 717. [hereinafter, Karen]

The scope and implications of genetic modification of life forms, genetic testing of human beings and patents on the products of genetically modified organisms including human cell lines is complex, expanding and virtually borderless. Most of the issues fall outside the purview of this thesis. However, for a brief overview of the varied dimensions of genetic engineering, especially its proneness to politicization, genetic discrimination, eugenics and racism, see, Lori Andrews, “Past as Prologue: Sobering Thoughts on Genetic Enthusiasm” (1997) 27 *Seton Hall Law Review* 893. (Arguing with impressive date that the claims for a genetic cure-all for human ailments is largely oversold and exaggerated. See the notations cited therein); Anita LaFrance Allen, “Genetic Testing, Nature, and Trust” (1997) 27 *Seton Hall Law Review* 887; Lisa Ikemoto, “The Racialization of Genomic Knowledge” (1997) 27 *Seton Hall Law Review* 937; James Bowman, “Genetics and African Americans” (1997) 27 *Seton Hall Law Review* 919; Sheila McLean, “Science’s ‘Holy Grail’ - Some Legal and Ethical Implications of the Human Genome Project” (1995) 48 *Current Legal Problems* 233; Dorothy Roberts, “The Nature of Black’s Skepticism About Genetic Testing” (1997) 27 *Seton Hall Law Review* 971; Maha Munayyer, “Genetic Testing and Germ-line Manipulation: Constructing a New Language for International Human Rights” (1997) 12 *American University Journal of International Law and Policy* 687; Dean Bell, “Human Cloning and International Human Rights Law” (1999) 21 *Sydney Law Review* 202; *UNESCO Universal Declaration on the Human Genome and Human Rights* 1997, 11 November 1997. UNGA Res. 53/152, reprinted in *IHRR* Vol. 6 No. 3 (1999).

Similar concerns have also been raised with respect to the problematic question of patent and proprietary rights to human parts and body tissue. See, Jane Churchill, “Patenting Humanity: The Development of Property Rights in the Human Body and the Subsequent Evolution of Patentability of Living Things” (1994) 8 *Intellectual Property Journal* 249; Roger Magnusson, “The Recognition of Proprietary Rights in Human Tissue in Common Law Jurisdictions” (1992) 18 *Melbourne University Law Review* 601; Paul Jacobs, “Errors Found in Patent for AIDS Gene” *Los Angeles Times*, 21/3/00. For a judicial construction of some of these complex issues, particularly, patents on body parts and the possibility of the emergence of a future human “spare-parts” industry, see, Paul Matthews, “Whose Body? People as Property” (1983) 36 *Current Legal Problems* 193; *The Human Tissue Trade*, RAFI Communiqué, Jan/Feb, 1997 (noting that trade in human tissue may be worth over USD1 billion by 2002); Milagros Beltran, “Legal Aspects of the Protection of the Genome” (1994) 28 *Copyright Bulletin* 13.

¹⁰Holly Saigo, *supra* note 2 at 797.

plants to resist certain chemicals as well.”¹¹

It is probably for the above-stated reasons that patents on plants have been largely construed by opponents of the emergent regime as reflective of the struggle for economic and political control of the global food system by influential multinationals.¹² The role of the patent system in catalyzing the commercialization of agriculture probably conduces to the domination of global food and agricultural market by the seed corporations. For example, at the end of 1995, the Hoescht group held 86,000 patents and patent applications. In 1997, Novartis held more than 40,000 patents worldwide. At the end of 1995, approximately 3.84 million patents were in force worldwide. Indeed, “the world’s food supply is primarily controlled by three dominant food chains-Cargill/Pharmacia, ConAgra, and Novartis/ADM-which all hold shares of the “gene to dinner table.”¹³

Monsanto, DuPont, Aventis, Novartis and AstraZeneca control nearly all of the world trade in genetically modified crops. The top ten global seed companies control an estimated one-quarter to one-third of the \$30 billion annual commercial seed trade and the world’s top ten agrochemical corporations account for 91% of the \$31 billion agrochemical market worldwide. In addition, the top five vegetable seed companies control 75% of the global

¹¹Holly Saigo, *ibid*; “Terminator: So Bad, Even Monsanto Can’t Put a Spin On It” *Geno-Types*, 8 October 1998.

¹²“Biopatenting and the Threat to Food Security: A Christian and Development Perspective”CIDSE Press Release, 10 February 2000. Online<<http://www.cidse.be/pubs/tglppcon.htm> accessed on 2/26/00. (Arguing that patents on genetically modified crops enables major life science corporations to exploit crops at the expense of poor farmers and their families)

¹³Holly Saigo, *supra* note 2 at 797. See also, *Agribusiness Consolidation: Hearings Before the Subcommittee on International Trade of the House Committee on Agriculture.*, 106th Congress 65-70(1999) (statement of Leland Swenson, President of National Farmers Union). On April 3, 2000, Monsanto, Pharmacia & Upjohn merged to become the Pharmacia Corporation.

vegetable seed market and four companies control 69% of the North American maize seed market. By the end of 1998, a single company controlled 71% of the US cotton seed market.¹⁴

Another aspect of this emerging trend is the granting of “sweeping patents” to corporations. For example, “Agracetus, a subsidiary of W.R. Grace has sought exclusive rights to all genetically engineered varieties of cotton and soybeans.”¹⁵ Patents on these were granted in both the United States and Europe but following challenges by an anonymous party, the American patent office has tentatively reversed the sweeping patents.¹⁶ The consequences of this emerging trend for global food security and access of the global citizenry to food are matters of increasing concern,¹⁷ especially, given that the contemporary state of global access to food is already bleak. The Brandt report written in the 1980's states that one-fifth or more of all the people in the Southern half of the world suffer from hunger and malnutrition. The World Food Council's report of 1977 stated that 500 million people in the South suffer extreme deprivations of food and current estimates show that over 800 million people in the world today are chronically undernourished.¹⁸

¹⁴A few companies control thirty per cent of the global seed trade. For a detailed listing of corporate controllers of the global seed industry, see, “The Seed Giants—Who Owns Whom?” *RAFI Update*, September 1999. See also, The Crucible Group Vol. 1., *Seeding Solutions: People, Plants, and Patents Revisited* (Ottawa: IDRC, 2000) at 16-17 [hereinafter, *Seeding Solutions*]

¹⁵Neil Hamilton, “Why Own the Farm if You Can Own the Farmer (And The Crop)? Contract Production and Intellectual Property Protection of Grain Crops” (1994) 73 *Nebraska Law Review* 91.

¹⁶Mark Ritchie, *supra* note 3.

¹⁷Holly Saigo, *supra* note 2 at 797.

¹⁸Seymour Rubin, “Economic and Social Rights and the New International Economic Order” (1986) 1 *American University Journal of International Law and Policy* 67; *Seeding Solutions supra* note 14 at 7.

Another aspect of the implications of patents on plants and TKUP is that given the requirements of the TRIPs agreement, most countries are already putting in place laws on access to plant genetic resources which aim to protect plant “genetic resources of each country, which will definitely affect the way research is conducted and germplasm is exchanged.”¹⁹ This will inevitably affect how food is grown, processed and sold. As the seed giants use their patents to acquire monopoly rights over plant genetic resources there seems to be a juridical backlash from the South on access to plant genetic resources and TKUP. The direct implication is that the era of free access to plant genetic diversity is not only over; there are acrimonious debates on the legal ownership of plant germ plasm stored in the IARC gene banks.

In addition to the backlash from the South on restriction of access to plant germ plasm, it seems that the patenting and commercialization of the so-called “terminator technology”²⁰ poses a significant threat to the security and sustenance of plant genetic diversity. This technology disables farmers from growing second generation crops from the same seed; they must always come back every farming season for new seeds. The seed business in the North has long complained that although plant genes from the South have been tremendous in improving crop yields and resisting plant diseases, the reproducibility of seeds meant that farmers would not return yearly for fresh seeds. This would of course damage the profits of the seed giants. The terminator technology is a technological way of

¹⁹“Plant Variety Rights Sparks Debate in Asia” , online< <http://www.cgiar.org/irri/> accessed on 2/26/00.

²⁰See, Jeremy Oczek, “In the Aftermath of the “Terminator” Technology Controversy: Intellectual Property Protections for Genetically Engineered Seeds and the Right to Save and Replant Seed” (2000) 41 *Boston College Law Review* 627.

having domination and retaining economic control over plant genetic resources. This technology, otherwise known as “Genetic Use Restriction Technology” (GURTs) refers to the use of an external chemical inducer to turn on or off a plant’s genetic traits, in this case, to induce seed sterility in plants. The prototype is US Patent No. 5,723,765 granted to the USDA and the Delta Pine Land Co. It is a technology that blocks genetically altered seeds from germinating after one season.²¹

Considering that at least 1.4 billion people rely on farm-saved seed for their annual crop and farming activities, the implications of the terminator technology may be quite devastating and irreversible. For example, unsuspecting farmers who have their farms near farms planted with “terminator technology” plants may have their crops contaminated and ruined by escaping genes from the patented terminator technology seeds. The impact may not be limited to farmers who purchase artificially sterilized seeds but may extend to others. As in the *Schmeiser* case²² in Saskatoon, Canada, the probability that genetically-engineered seed may escape into the environment cannot be foreclosed.²³

²¹“US Patent on New Genetic Technology will Prevent Farmers from Saving Seed” <online <http://www.rafi.org/genotypes/980311seed.html> accessed on 9/27/99.

²²In a decision handed down in Saskatoon, Saskatchewan, in March 2001, Judge Andrew Mackay of the Canadian Federal Court ordered a farmer to pay \$15,000 in “damages” for “patent infringement” to Monsanto for genetically modified canola which found its way into his farm. According to the court:

[A] farmer whose field contains seed or plants originating from seed spilled into them, or blown as seed, in swaths from a neighbor’s land or even growing from germination by pollen carried into his field from elsewhere by insects, birds, or by the wind, may own the seeds or plants on his land even if he did not set about to plant them. He does not, however, own the right to the use of the patented gene, or of the seed or plant containing the patented gene or cell.

See, *Monsanto Canada Inc. v. Schmeiser* [2001] F.C.J No. 436 at para 92.

²³For some insight into this question, see, Stephen Lewis, “Attack of the Killer Tomatoes?” Corporate Liability for the International Propagation of Genetically Altered Agricultural Products” (1997) 10 *Transnational Law* 178-88; Judy Kim, “Out of the Lab and into the Field: Harmonization of Deliberate Release

5.2: Patents, Plants and TKUP: Human Health and Environmental Integrity

Thus, patents on plants may encourage premature commercialization of genetically-modified food crops without sufficient tests regarding their safety and appreciation of their juridical implications and environmental hazards. In the debate on the social utility of patents on genetically modified plant life forms, it bears noting that genetic engineering is not a natural extension of traditional cross-breeding methods.

It is common knowledge that in traditional cross-breeding or hybridization, nature will only allow the mixing of genes from the same or closely related species.²⁴ In contrast, genetic engineering allows scientists to completely ignore the natural reproductive boundaries established over billions of years. Instead, “through invasive virus or instruments like gene guns, DNA from completely unrelated organisms-like fish and strawberries, bacteria and soybeans, or humans and pigs, for example-can be intermingled.”²⁵ This process is a template shift with huge potentials and dangers. Proponents of genetic engineering of plants have made impressive arguments that notwithstanding the troubling concerns about the environmental and human safety of the products, their benefits are profound and outweigh any dangers or risks. Such benefits may include bio-engineering a delayed ripening of farm produce to allow time to move it through distribution channels. Others include prolonging the retail shelf-life of farm produce, adding colour to natural fibers before harvesting, conferring resistance to pests and fungi, and facilitating the use of herbicides on

Regulations for Genetically Modified Organisms” (1993) 16 *Fordham International Law Journal* 1170..

²⁴Safe Food News [2000 edition]: Scientists Explain Health and Environmental Risks, at 5. [available online at www.safe-food.org] hereinafter, Safe Food News.

²⁵Safe Food News, *ibid.*

harmful weeds.²⁶

Another notable argument for the massive introduction of genetically-engineered plants²⁷ is the notion that “absent biotechnology developments, one might doubt that traditional plant-breeding techniques could increase the world’s food supply enough to feed the estimated global population of 9.4 billion in the year 2050.”²⁸ Impressive as these arguments may seem, there is still need to tread carefully. The promises must not becloud the imperatives of caution.

On the question of food supply, it has long been conclusively shown by Nobel laureate Amartya Sen²⁹ and others that without biotechnology the world today produces more food per inhabitant than ever before. Experts agree that there is enough food to provide 4.3 pounds for every person everyday: 2.5 pounds of grain, beans, and nuts; about a pound of meat, milk, and eggs; and another of fruits and vegetables.³⁰ Accordingly, the problem of global hunger is one of poverty not lack of food.³¹ Therefore the argument that genetic modification of food is necessary to feed the starving billions is hollow.

²⁶Judson Berkey, “The Regulation of Genetically Modified Foods” (1999) *ASIL Insights* (October) 1.

²⁷For example, within four years of placing genetically altered seeds in the market, about 45 million acres of U.S farmland have been planted with biotech crops. About one half of U.S cotton fields, 40% of soybean fields, and 20% of corn fields had been genetically altered in the US by 1998.

²⁸For a recent and concise analysis of the status of biotechnology in international law, see, Sean Murphy, “Biotechnology and International Law” (2001) 42 *Harvard International Law Journal* 47.

²⁹Amartya Sen, *The Political Economy of Hunger* (Oxford, England: 1990); Amartya Sen, *The Standard of Living* (Cambridge, England: 1987). It is remarkable that Amartya Sen’s path-breaking work in this field which shattered the myth of lack of food in the world earned him a Nobel prize.

³⁰Safe Food News, *supra* note 24 at 17.

³¹Amartya Sen, *Poverty and Famine: An Essay on Entitlement and Deprivation* (Oxford, Clarendon: 1981)

As for the other afore-mentioned reasons for the release of genetically-engineered plants without convincing proof of their safety in human and environmental terms, it is doubtful whether there are any compelling social needs justifying the risks involved in premature commercialization of genetically-engineered plant life forms. In addition, the risks, profits and dangers are not evenly spread or shared. While the seed and industrial corporate giants reap the economic benefits, it seems that a larger proportion of the environmental risks and dangers are borne by the South. According to Graziano:

[A]griculture world wide is at risk (and) Third World countries are the most threatened, because they have more diverse varieties of crops, they have to feed more people, and they house much of the world's biodiversity. They are also more susceptible to change, because most biogenetically engineered agriculture is produced in Third World countries. Biotech companies commonly disregard the vulnerability of Third World ecosystems and expose them to possible catastrophic environmental damage.³²

Although the agri-biotechnology industry has been quite consistent in arguing that fears of the potential negative effects of genetic modification of plant life forms are exaggerated, if not unfounded, legitimate and insistent fears remain as to the human and environmental safety of genetically-modified plants.

The demonstrable negative impacts of genetically-modified plants stretch from the soil to the human food chain and to the human immune system. For example, although a genetically modified food is chemically similar to its natural counterpart, this is not adequate evidence that it is safe for human consumption. Other factors which should be considered but which have been ignored include the biological, toxicological and immunological

³²Karen Graziano, "Biosafety Protocol: Recommendations to Ensure the Safety of the Environment"(1995) 7 *Colorado Journal of International Environmental Law and Policy* 179. [hereinafter, Graziano]

consequences of genetically engineered plant life forms.

Interestingly, tests conducted by British scientist, Arzad Pusztai showed that when rats were fed with genetically modified potatoes, there was damage to their immune system and internal organs.³³ In addition, there are reported cases of transgenic super-weeds and pesticide resistant plants arising from genetically engineered plants.³⁴ The instances of actual harm from genetically-modified plant life forms are increasing by the day. For example, in 1994, a genetically-engineered bacterium developed to aid in the production of ethanol, produced residues that rendered the land infertile. New crops “planted on this soil grew three inches and fell over dead.”³⁵ Similarly, in 1996, scientists discovered that ladybugs that had eaten aphids which had eaten genetically-engineered potatoes died.

The reasons for these incidents and trends derive from the complex interactions which genes undergo in the organism itself and with the larger framework of the environment.³⁶ As Professor Richard Strohlman, emeritus professor at the department of

³³See for example, Heather Scoffield, “British Scientists Slam Approvals for Genetically Modified Foods” *The Globe and Mail*, Thursday, October 7, 1999, at A5. See also, Kevin Bastian, “Biotechnology and the United States Department of Agriculture: Problems of Regulation in a Promotional Agency” (1990) 17 *Ecology Law Quarterly* 413.

³⁴Holly Saigo, *supra* note 2 at 790 and the authorities cited therein. As Holly Saigo notes, “today’s super pest could enjoy several doses of yesterday’s pesticide for dessert, ask for more and live to tell about it.”

³⁵Safe Food News, *supra* note 24 at 4.

³⁶For example, wild rice in Taiwan was destroyed when a massive gene flow from cultivated rice swamped out traits such as the perennial life cycle from dormant seeds. See, Graziano, *supra* note 32 at 187. Other dangers include groundwater and surface water pollution, health risks related to mutation of organisms, toxicity and allergies. For example, the outbreak of *Eosinophilia-myalgia syndrome* (EMS) in 1992 was caused by exposure to a particular batch of a synthetic amino acid. The outbreak affected more than 1,500 people and resulted in 38 deaths in the United States. Graziano, *ibid*. Hence the modern legislation regulating release of genetically modified organisms into the environment. Denmark was the first European country to impose a law specifically dealing with the deliberate release of transgenic organisms.

There are similar laws in Germany imposing restrictions on deliberate release of harmful genetically modified organisms into the environment. See, Claus-Joerg Ruetsch & Terry R. Broderick, “New

Molecular and Cell Biology, University of California at Berkeley emphasized recently:

[G]enes exist in networks, interactive networks which have a logic of their own. The technology point of view does not deal with these networks. It simply addresses genes in isolation. But genes do not exist in isolation. And the fact that the industry folks don't deal with these networks is what makes their science incomplete and dangerous. If you send these new genetic structures out into the world, into hundred of thousands of acres, you're going into the world with a premature application of a scientific principle. We're in a crisis position where we know the weaknesses of the genetic concept, but we don't know how to incorporate it into a new, more complete understanding. Monsanto knows this. DuPont knows this. Novartis knows this. They all know what I know. But they don't want to look at it because it's too complicated and it's going to cost too much to figure out.³⁷

Professor Liebe Cavalieri, DNA researcher for over 30 years warns that:

[E]nthusiastic genetic engineers and corporations like to create the impression that the precision of recombinant DNA technology in the living organism is the same realized in the test tube. This is a severe misrepresentation. The interactions within living cells are infinitely more complex than those occurring in today's largest computers. This implies that an infinite number of tests have been carried out. The fact is, the tests haven't been done. We don't even know what type of ill effects to look for or which questions to ask. This oversimplification completely denies the reality of the situation. Caution must be the guiding principle.³⁸

Biotechnology Legislation in the European Community and Federal Republic of Germany" (1990) 18 *International Business Law* 408.

On the other hand, some countries such as Taiwan, China, India, Mexico, Brazil, the Philippines and South Korea do not regulate biotechnology. See, Peter Huber, "Biotechnology and the Regulation Hydra" (1987) 90 *Technology Review* 8. In March 1990, the Council of the European Communities approved two directives on Genetically Modified Organisms—Directive 90/219, Council Directive of 23 April 1990 on the contained use of genetically modified micro-organisms, O. J. L117/1 (1990) otherwise known as Directive 90/219; Directive 90/220, Council Directive of 23 April 1990 on the deliberate release into the environment of genetically modified organisms, O.J. L117/15 (1990) otherwise known as Directive 90/220.

³⁷*Safe Food*, *supra* note 24.

³⁸*Safe Food*, *supra* note 24 at 4. Lending further weight to this view, Dr. Gary Kaplan, Director of Clinical Neurophysiology, North Shore University Hospital, adds:

[A]nd what's worse, the technology itself is imprecise, uncontrolled, and random—it's like performing surgery with a shovel. When we insert genes that would not naturally be a part of a living organism, we should be prepared for a host of unexpected consequences—consequences for the organism being modified, the ecosystem of which that organism is a part, and for the people consuming some or all of that organism as food."

5.3: The Role of Precaution in the Use of Genetically-Modified Plants

For the foregoing reasons, it stands to reason that in designing policies regulating the granting of patents on genetically-engineered plants, states should consider questions relating to the environmental and human safety of those products as part of conditions for patentability.³⁹ As argued in section 1.1.6, patents are instruments of national policy and must reflect an informed balance of the general interests of the society.⁴⁰ Therefore, in the issuance of patents or in designing policies for the patent systems of the world, it would be prudent for national patent systems and the emerging global order on patents to take into consideration the environmental implications of patented genetically-modified plants. Although the patent system has always shown a pro-business orientation or bias, given the contested safety of genetically-engineered plants, there is no compelling reason why a test of environmental safety should not be required of patent applications for genetically-modified plants.

Regrettably, having regard to the fact that the laws of patents have been retrofitted in recent times to spur the biotechnology industry, there is considerable doubt whether states would embrace this suggestion. Moreover, as James Buchanan has convincingly argued, the history of biotechnology in the global law-making process is a tale of the elimination or

Part of the concern deals with the issue of transgenic pollution. Recent studies tend to confirm this fear as genes from transgenic plants might be up to twenty times more likely to "outcross" into relative species than the plant's natural genetic material, See, J. Bergelson, *et al*, "Promiscuity in Transgenic Plants" (1998) 25 *Nature* 25; H.J. Rogers & H.C. Parkes, "Transgenic Plants and the Environment" (1995) 46 *Journal of Experimental Botany* 467; Reid Adler, "Controlling the Applications of Biotechnology: A Critical Analysis of the Proposed Moratorium on Animal Patenting" (1988) 1 *Harvard Journal of Law and Technology* 1.

³⁹As section 1.1.6, *supra* has demonstrated, states do not grant patents on inventions deemed to be harmful to the society or products which endanger national security.

⁴⁰See generally, Chapter 1.

diminution of real caution in norm-making.⁴¹ For example, since 1992 when biotechnology was slated to be the subject of one of the conventions to be concluded under the United Nations auspices, following pressures from the United States, Japan and Germany, it became downgraded from the status of a convention to that of “an issue” connected with biodiversity.⁴²

In other words, expectations of a strong legal regime of precaution must be tempered with the reality of strong business preference for a liberal approach to the potentials and risks of genetically-engineered plant life forms. Hence, although the question of regulation of genetic modification of plants is remarkably complex and controversial,⁴³ a major stumbling block towards a rational appreciation and resolution of the ramifications is the huge amount of capital outlay and investment involved in the biotechnology and agri-business industry. For example, proposals for labelling of genetically modified crops have been construed in economic terms and not as an aspect of necessary precaution or a part of the legal right of the public to be informed of what they buy for consumption.⁴⁴

⁴¹James Buchanan, “Between Advocacy and Responsibility: The Challenge of Biotechnology for International Law” (1994) 1 *Buffalo Journal of International Law* 221. [hereinafter, Buchanan]

⁴²Buchanan, *supra* at 223.

⁴³See, James Chalfant, *et al.*, “Recombinant DNA: A Case Study in Regulation of Scientific Research” (1979) 8 *Ecology Law Quarterly* 55.

⁴⁴Most countries in Europe have a policy of labelling genetically modified plants. The Cartagena Protocol however only provides for the labelling of international food shipments. See, *Cartagena Protocol on Biosafety*, Feb. 23 2000, *Report of Panel IV: Consideration of the Need for Modalities of Protocol Setting out Appropriate Procedures Including in Particular, Advance Informed Agreements in the Field of the Safe Transfer, Handling and use of any Living Modified Organism Resulting from Biotechnology Diversity*, UNEP Arguments For a Protocol Pursuant to Article 19.3 of The Convention, U.N. Doc. UNEP/Bio.Div/Panels/Int.4 (1993). For a negotiating history of the protocol, see, Jonathan Adler, “Cartagena Protocol: Biosafe or Bio-sorry?” (2000) 12 *The Georgetown International Environmental Law Review* 772. [hereinafter, Adler]

At the juridical level, international law seems to have grasped the peculiar risks of genetically-modified plant life forms; hence, the Cartagena Protocol and other juridical initiatives. The Cartagena Protocol is a follow-up to Article 19.3 of the CBD which obliges parties to the convention to consider the need for and modalities of a protocol on the safe transfer, handling and use of living modified organisms (LMOs) that may have an adverse effect on biodiversity. In other words, the Cartagena Protocol constitutes a juridical recognition of both the potentials and perils of genetic modification of plants. More significantly, it entrenches the principle of precaution in relation to genetically modified plants.

At the analytical level, the Protocol adopts a three-pronged principled approach namely, advanced prior informed consent,⁴⁵ the precautionary approach,⁴⁶ and the establishment or maintenance of national measures.⁴⁷ The essence of this instrument is to institute a regime for the safe handling and use of genetically modified plants and other life forms. Given its potentially wide ambit, its normative import may extend to other areas where the law on biological diversity converges with emergent human “rights” such as the

⁴⁵This procedure is the backbone of the Protocol. It however applies to a small percentage of traded Living Modified Organisms (LMOs). Some of the excluded LMOs include most pharmaceuticals for humans, LMOs in transit to a Third Party, LMOs destined for contained use, and LMOs that have been declared safe by a meeting of the Parties. See, Aaron Crosbey & Stas Burgiel, “The Cartagena Protocol on Biosafety: An Analysis of Results” [An IISD Briefing Note] online <<http://iisd.ca/pdf/biosafety>, visited on 1st March 2000. [hereinafter, Cosbey & Burgiel]

⁴⁶For an exhaustive analysis of the status of the precautionary principle in international law, see, Harald Hohmann, *Precautionary Legal Duties and Principles of Modern International Environmental Law* (Dordrecht: Martinus Nijhoff; 1994)

⁴⁷Paul Hagen & John Barlow Weiner, “The Cartagena Protocol on Biosafety: New Rules for International Trade in Living Modified Organisms” (2000) 12 *The Georgetown International Environmental Law Review* 697; Ved Nanda, “Genetically Modified Food and International Law—The Biosafety Protocol and Regulations in Europe” (2000) 28 *Denver Journal of International Law and Policy* 235.

“right to safe food” and a safe environment.⁴⁸

There is still need for sober and modest expectations on the normative implications and potentialities of the Cartagena Protocol, especially since the Protocol contains a “savings” clause emphasizing that it does not preempt rights and obligations provided for in other international agreements and organizations, particularly those dealing with international trade. One of such international agreements is the *Agreement on the Application of Sanitary and Phytosanitary Measures*,⁴⁹ hereinafter, SPS.

For example, preambular recitals 9 to 11 of the Protocol emphasize that the obligations created by other international agreements have not been diminished or compromised by the commitments made by states to the Protocol. In other words, given that the normative link between the Cartagena Protocol and other international agreements on trade and the environment has not been clarified and defined, one cannot be sanguine about the prospects of the Protocol creating the emergence of a progressive and stringent regime of liability for dangerous genetically-modified plants life forms and their handling, particularly those with patent protection.⁵⁰

The Protocol encompasses the so-called LMOs-FFPs, that is, modified organisms that

⁴⁸See, James Nickel, “The Human Right to a Safe Environment: Philosophical Perspectives on its Scope and Justification” (1993) 18 *Yale Journal of International Law* 281. Many countries have recognised a right to a safe environment in their constitutions. For further analysis of this trend, see, Melissa Thorne, “Establishing Environment as a Human Right” (1991) 19 *Denver Journal of International Law and Policy* 301; Luis Rodriguez-Rivera, “Is the Human Right to Environment Recognized Under International Law? It Depends on the Source” (2001) 12 *Colorado Journal of International Law and Policy* 1. But some scholars like Adler argue that “there is no basis for presuming that GMOs pose a distinct threat of ecosystem invasion.” See, Adler, *supra* note 44 at 774.

⁴⁹Reproduced in, 33 I.L.M. 1226 (1994)

⁵⁰Peter-Tobias Stoll, “Controlling the Risks of Genetically Modified Organisms: The Cartagena Protocol on Biosafety and the SPS Agreement” (1999) 10 *Yearbook of International Environmental Law* 82.

are intended for direct use as food or feed, or for processing. This class covers such widely modified plants such as corn, soy, wheat, canola and tomatoes, seeds and other plant life forms which may or may not be introduced into the environment. In effect, genetically-modified plants which may have an impact on human health as well as on the environment as a whole are included under the juridical ambit of the Cartagena Protocol.

As noted earlier, there are questions on some implications of the Protocol. For example, preambular recital 8 of the Protocol contradicts Article 10 (6) of the substantive text. The former purports to take into account, the limited capabilities of many countries, particularly the developing countries to cope with the nature and scale of known and potential risks associated with living modified organisms. It is a common fact that many states of the South suffer acute shortage of Western-trained scientists and infrastructure to make the necessary determination of the safety of modified life forms. Moreover, the science of biotechnology is still in its infancy and shrouded in some uncertainty. Yet, Article 10 (6) of the Protocol provides that:

[L]ack of scientific certainty due to insufficient relevant scientific information and knowledge regarding the extent of the potential adverse effects of a living modified organism on the conservation and sustainable use of biological diversity in the Party of import, taking also into account risks to human health, *shall not prevent that party from taking a decision*, as appropriate, with regard to the import of the living modified organism in question.⁵¹

Moreover, as Tobial Stoll has rightly argued:

[T]he duty to conduct a risk assessment places a considerable burden on potential importing states, which must take decisions in the absence of internationally agreed

⁵¹Cartagena Protocol, *supra*. Italics and emphasis supplied.

determinations and in an area that is likely to be much disputed internationally.⁵²

Considering that genetic modification of life forms is still an incomplete science, Article 10 (6) seems overly restrictive and too precise for a phenomenon which experts lack unanimous views on their human and environmental safety.

To further underscore some of the perplexing implications of the Protocol, Article 7 (3) limits the scope of advanced informed agreement to the first intentional trans-boundary movement of LMOs. Subsequent shipments of the LMOs are not required to undergo compliance of Advanced Informed Agreement (AIA). Considering that the potential impacts of such LMOs largely remain unknown and may only be detected or confirmed in future, the limits placed by Article 7 (2) hardly comports with the dictates of caution which ostensibly girds the Protocol. It may well be that the Protocol sought to compromise the wildly divergent views of member states with vested interests in both the seed industry and the burgeoning biotechnology industry. Whatever the case may be, the Protocol exemplifies certain conceptual inconsistencies and juridical overlap, especially with the SPS Agreement.

Notwithstanding these criticisms, the Protocol marks a significant milestone in the evolution and maturation process of the principle of precaution in international environmental law. It can therefore be strongly argued that the norm of precaution⁵³ in international environmental law has, for good reasons, become one of the most powerful

⁵²Tobias Stoll, *supra* at 96. Although Article 15 (2) provides that the exporter may conduct such scientific tests, this provision only affects AIAs. It does not affect the more important modified life forms meant for use as feed, food or for processing. Moreover, asking the exporter to undertake the tests constitutes the exporter into a judge, witness, jury and claimant all at once.

⁵³For an overview and analysis of the nature of the concept of precaution at international environmental law, see, David VanderZwaag, "The Precautionary Principle in Environmental Law and Policy: Elusive Rhetoric and First Embraces" (1999) 8 *Journal of Environmental Law and Practice* 355.

legal norms in recent times for the regulation of not only genetically-modified plants but other human activities which pose potential but unproven dangers to human health and to the environment. In simple terms, the norm of precaution prescribes that in some cases where the costs of action are low and the risks of inaction are high, “preventive action should be taken, even without scientific certainty about the problem being addressed.”⁵⁴

It is an evolving norm with manifold applications and, in practice, it gives governments and environmental regulatory agencies a useful amount of discretion and creativity in setting environmental policy, even if there are no definitive scientific basis for the measures taken in precaution.⁵⁵ Thus, governments and environmental regulatory agencies must decide in the face of empirical uncertainty and paucity of scientific data, how high the risks are likely to be (beyond monetary terms), how the risks compare to inaction and what types of actions, if any, may be called for. Of course, whether states can resist counter-pressures from vested interests in genetically-modified plants is another question.

However, in a commonsensical way, the precautionary principle ensures that an activity which poses a threat to the environment is prevented regardless of the absence of scientific evidence that such activity is in fact not dangerous to the environment. It emphasizes avoidance and is preventative in approach. Notwithstanding problems of

⁵⁴Cosbey & Burgiel, *supra* note 45. It seems there is a semantic debate as to whether it is a principle or an approach. See, Ellen Hey, “The Precautionary Concept in Environmental Policy and Law: Institutionalizing Caution” (1992) *Georgetown International Environmental Law Review* 303. Both terms are however used interchangeably and it seems there is no juridical difference arising from any perceived differences in the terms used. See, D. Freestone & E. Hey, eds., *The Precautionary Principle and International Law: The Challenge of Implementation* (The Hague: Kluwer Law International, 1996); Ludwig Kramer, *E.C. Treaty and Environmental Law* (London, Sweet & Maxwell, 1995)

⁵⁵James Cameron & Juli Abouchar, “The Precautionary Principle: A Fundamental Principle of Law and Policy for the Protection of the Global Environment” (1991) 14 *Boston College International & Comparative Law Review* 1.

definition⁵⁶ and conceptual ambiguities, it may be argued that the precautionary principle has emerged as a full-blown principle of international environmental law.⁵⁷ Operationally, key elements of the principle of precaution may include an evidentiary threshold, a burden of proof, a duty owed to the international society as a whole, and a policy for action in the face of scientific uncertainty or ignorance.

Historically, it seems that the precautionary principle is an improvement upon the erstwhile “assimilation approach”⁵⁸ of regulations on the environment. The assimilationist policy operated under the assumption that the environment can assimilate a certain amount of pollution without a collapse of the ecosystem. However, the complexity of the ecosystem makes it impossible to predict with certainty, the maximum capacity of the environment to absorb pollution.

The problem with the precautionary approach is that although it would be ideal to have every ecosystem conserved, the realities of life, the immense global pressure which champions a particular model of economic development, and the imperative needs of peoples-whether political, economic or cultural-compel otherwise. Inevitably, hard choices have to be made and the “safety-first” slogan does not really help in such situations.⁵⁹ Even

⁵⁶James Hickey & Vern Walker, “Refining the Precautionary Principle in International Environmental Law” (1995) 14 *Virginia Environmental Law Journal* 423.

⁵⁷Lothar Gundling, “The Status in International Law of the Principle of Precautionary Action” (1990) 5 *Journal of Estuarine and Coastal Law* 23.

⁵⁸For a brief but effective analysis of the arguments for and against legislative regulation of biotechnology, see, David Rosenblatt, “The Regulation of Recombinant DNA Research: The Alternative of Local Control” (1982) 10 *Boston College Environmental Affairs Law Review* 37.

⁵⁹Clifford Russell, “Two Propositions About Biodiversity” (1995) 28 *Vanderbilt Journal of Transnational Law* 689; Chris Backes, “The Precautionary Principle in International, European, and Dutch Wildlife Law” (1998) 9 *Colorado Journal of International Environmental Law and Policy* 43.

without the complexities of genetically-engineered plants, no one really knows how the various species in their natural state interact in the ecosystem and thus the precautionary principle safety may arguably not shed much light on the complicated workings of nature. However, the case for precaution cannot be denied.

5.4: The Human Rights Dimension of Appropriation of Plants and TKUP

Generally speaking, the inability, or rather, unwillingness of contemporary international patent law framework to address the needs of and injustices suffered by marginalized peoples and cultures has led to a shift towards the adoption of the human rights paradigm as a normative platform for addressing the perceived inadequacies of traditional international patent law.⁶⁰ Although intellectual property rights have thus been recognized as an aspect of human rights,⁶¹ there is near-conclusive juridical and scholarly consensus that patents are not founded on a theory of human rights.⁶² However, it would be equally erroneous to argue that erosion and appropriation of plant life forms and TKUP do not raise serious issues with repercussions in the human rights paradigm.

Article 15 of the Covenant on Economic, Social and Cultural Rights institutes a juridical threshold for some of the human rights implications of erosion and appropriation

⁶⁰William Andrew Shutkin, "International Human Rights Law and the Earth: The Protection of Indigenous Peoples and the Environment" (1991) 31 *Virginia Journal of International Law* 479.

⁶¹See for example, Rosemary Coombe, "Intellectual Property, Human Rights & Sovereignty: New Dilemmas in International Law Posed by the Recognition of Indigenous Knowledge and the Conservation of Biodiversity" (1998) 6 *Indiana Journal of Global Legal Studies* 59. [hereinafter, Coombe]

⁶²See generally, Section 5 of Chapter One, *supra*.

of plants and TKUP.⁶³ It provides thus:

[T]he State Parties to the present Covenant recognize the right of everyone:

(a) To take part in cultural life;

(b) To enjoy the benefits of scientific progress and its applications;

(c) To benefit from the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author⁶⁴

In cases where traditional use of plants pertains to the culture of a people, it seems beyond doubt that the appropriation and erosion of such plants constitutes both an individual and collective violation of an internationally recognized and protected right to culture. Even though economic, social, and cultural rights have traditionally been marginalized, there is no doubt amongst scholars that they are human rights in the full sense of the term with all the legal obligations attendant thereto.⁶⁵

In effect, the inability or unwillingness of states to address and redress the human rights implications of appropriation and erosion of plants and TKUP is a political weakness and not a function of a purported absence of juridical basis for the protection of economic, social and cultural rights. Indeed, international human rights law provides techniques such as the duty to report on the progress made in the domestic terrain for the protection of such rights.⁶⁶ While this technique and related methods may have some normative virtues, it is arguable that if states are really desirous of redressing the human rights implications of

⁶³*International Covenant on Economic, Social and Cultural Rights*, Dec. 16, 1966, 993 U.N.T.S. 3 [hereinafter, ESCR]

⁶⁴*Ibid.* See also, Article 25, *supra*.

⁶⁵Coombe, *supra* at 60-62; Scott Leckie, "Another Step Towards Indivisibility: Identifying the Key Features of Violations of Economic, Social and Cultural Rights" (1998) 20 *Human Rights Quarterly* 81.

⁶⁶Articles 16 & 17 of the CESCR require states to submit reports of the legislative steps taken to implement its objectives and obligations. *Supra* note 63.

appropriation and erosion of plants and TKUP they must re-configure and re-think at the domestic level the social justifications for patents on plants and TKUP.

In other words, a truly social-utilitarian instrumentality must pervade the normative framework of the patent regime. Perhaps, the reporting technique of the CESCR should be used to encourage the creation of domestic legal regimes which protect and reward indigenous and traditional contributions to biodiversity innovation.⁶⁷ This approach will of course raise questions of empowering marginalized cultures and peoples in multi-cultural and multi-ethnic states. This question may not be justly determined without reference to the claims for cultural and political self-determination of peoples.⁶⁸

The short point is that states remain central in both the human rights arena and in the implementation of international patent law norms and when both regimes converge, it is the responsibility of states to chart a socially balanced course. Although some scholars argue that the scope of domestic manoeuvrability has been foreclosed by the TRIPs agreement, states still have a remarkable discretion in domestic authority.

However, while it is patently easy to identify global forces of appropriation and erosion of plants and TKUP, it would be erroneous to proceed as if domestic political and economic factors and forces are blameless in the continuing appropriation and erosion of

⁶⁷Anja Meyer, "International Environmental Law and Human Rights: Towards the Explicit Recognition of Traditional Knowledge" (2001) 10 *Review of European Community & International Environmental Law* 37.

⁶⁸Benjamin Richardson, "Indigenous Peoples, International Law and Sustainability" (2001) 10 *Review of European Community & International Environmental Law* 1; Russell Barsh, "Is the Expropriation of Indigenous Peoples' Land GATT-able?" (2001) 10 *Review of European Community & International Environmental Law* 13.

plants and TKUP.⁶⁹ Many local communities in gene-rich states operate under conditions of medieval serfdom with local potentates literally living off the fat of the land while the larger majority of the populace wallow in abject penury. A major consequence of this domestic oppression is that the protection of plants and TKUP suffers.

As domestic elites align their interests with commercial appropriators of plants and TKUP, there is little hope that domestic legislative initiatives designed to promote the interests of poor peasant farmers would come into fruition in the South.⁷⁰ A suggestion towards ameliorating this problem would be in the order of rethinking land ownership policies and laws in such states. For example, the Brazilian government in conjunction with the Brazilian Landless Workers Movement, a civil society, has within 12 years redistributed over 21 million hectares of previously unused private land to more than 300,000 landless peasants. This measure removes some of the immense pressure on overpopulated spaces. However, this conflict and concern, as the following pages will show, often recur in the debate on development of marginalized states and peoples.

5.5: The Concept and Crisis of Development Revisited

The concept of a right to development surfaced at the international level at Strasbourg in 1972 when Senegalese jurist Keba Mbaye, in his capacity as the President of the International Commission of Jurists delivered a lecture entitled "The Right to Development

⁶⁹R. V. Anuradha, "IPRs: Implications for Biodiversity and Local and Indigenous Communities" (2001) 10 *Review of European Community & International Environmental* 27.

⁷⁰But see, Brendan Tobin, "Redefining Perspectives in the Search for Protection of Traditional Knowledge: A Case Study from Peru" (2001) 10 *Review of European Community & International Environmental* 27.

as a Human Right.”⁷¹ Since then, a fierce and largely polemical debate amongst scholars has been conducted on whether there exists a right to development, at least, in the normative sense.⁷² In a positivist sense, the crux of the juridical ferment is that since “rights” as a term correlate to juridical obligations, to whom is the right to development owed and who is obliged to ensure development?

It seems however that the debate, framed in the Hohfeldian paradigm, as it were, is arid, excessively positivist, and ignores the normative dimension and potentialities of the conception of development as a human right. As Zalaquette has argued:

[D]evelopment and human rights differ in many respects, but both relate to those questions of survival and justice which have shown the most potential for conceptual expansion. It is no surprise that attempts to endow development proposals with normative strength tend to converge with efforts to enlarge human rights.⁷³

It is probably in recognition of the normative utility of the concept of a right to development that it has been eloquently postulated that the essence of normative legality is not so much “the form of the norm-bearing instrument as to whether or not it is a reflection of mutual expectations that establish a self-sustaining reciprocal equilibrium in the behavior of states.”⁷⁴ The concept of a right to development thus would encompass and go beyond economic growth, self-reliance, satisfaction of all basic needs, and the fulfillment of all

⁷¹K. Mbaye, “Le droit au developement comme un droit de l’homme” (1975) 5 (2-3) *Human Rights Journal* 53. See, Jose Zalaquett, “An Interdisciplinary Approach to Development and Human Rights” (1983-85) 4-5 *Boston College Third World Law Journal* 1.

⁷²Ignaz Seidl-Hohenveldern, *International Economic Law* (Dordrecht: Martinus Nijhoff, 1989) at 4. [hereinafter, Seidl-Hohenveldern]

⁷³Zalaquett, *supra* note 71 at 6.

⁷⁴Obiora Chinedu Okafor, “The Status and Effect of the Right to Development in Contemporary International Law: Towards a South-North “Entente” (1995) 7 *African Journal of International and Comparative Journal* 865. [hereinafter, Okafor]

human rights in the pursuit of social justice within and amongst states.

Although it may be argued that no precise formulation of the right to development exists, it seems that the approximation of the above-mentioned sentiments have been encapsulated by the Commission on Human Rights and the General Assembly which articulates the concept of development as the “equality of opportunity for development.”⁷⁵ In other words, the notion of a right to development encompasses material and non-material needs of all human beings, respect for human rights for all, opportunity for full participation, principles of equality and a degree of individual and collective self-reliance.⁷⁶

Largely propelled by the South and some sympathetic countries of the North, the concept has achieved a measure of internal energy and critical elements.⁷⁷ As Okafor has noted, “the right to development is in essence (but not exclusively) a claim to the means of development: financial capital, human capital and technology.”⁷⁸ Waart adds that “the right to development...embodies the entitlement of individuals and peoples to an international

⁷⁵Philip Alston, “Development and the Rule of Law: Prevention Versus Cure as a Human Rights Strategy” in *Development, Human Rights and the Rule of Law-Report of a Conference held in The Hague on 27 April -1 May 1981, Convened by the International Commission of Jurists* (Oxford: Pergamon Press, 1981) at 101. [hereinafter, Alston]

⁷⁶See, *Declaration on the Right to Development*, U.N. GAOR, 41st Sess., Resolutions and Decisions, Agenda Item 101, at 3-6, 9th plenary meeting, 4 Dec. 1986 U.N. Doc. A/Res/41/128. Resolution adopted by the General Assembly [on the report of the 3d Committee (A/41/925 and Corr. 1)] For a detailed discussion and multi-dimensional analysis of the right to development, see, Asbjorn Eide, *et al*, eds, *Economic, Social and Cultural Rights: A Textbook* (Dordrecht: Martinus Nijhoff, 1995) [hereinafter, Eide]

⁷⁷*Question of the Realization of the Right to Development, Global Consultation on the Right to Development as a Human Right; Report Prepared by the Secretary-General Pursuant to Commission on Human Rights Resolution 1989/45; E/CN.4/1990/9/rev.1* (Sept. 26, 1990). See also, Phillip Alston, “Making Space for New Human Rights: The Case of the Right to Development” (1988) 1 *Harvard Human Rights Yearbook* 3. The right to development was an integral part of the now defunct clamour for a New International Economic Order (NIEO). The North-South divide on the issue is by no means a function of the nationality of the various scholars on the concept of a right to development. See, Okafor, *supra* note 73 and the notes cited in pages 871-875.

⁷⁸Okafor, *supra* note 73 at 868.

order which provides for a just and adequate realization of the universally recognized human rights.”⁷⁹ Whether the “right to development” is a human right in the narrow legalistic sense is of little moment.⁸⁰ What is more important is that it is at least a potentially useful concept,⁸¹ especially, in institutionalizing a normative global regime of the need for international co-responsibility in addressing fundamental needs for decent existence.⁸²

As such, in a holistic sense, the right to development is arguably a human right because humanity cannot exist without development, especially since Karel Vasek’s purported divorce or gradation of the political and civil rights from economic and social rights is virtually dead in learned circles:⁸³ all human rights are inter-related and indivisible.⁸⁴

⁷⁹P.J.I.M. Waart, “Implementing the Right to Development: The Perfection of Democracy” in, Subrata Chowdhury, *et al.*, eds, *The Right to Development in International Law* (Martinus Nijhoff, Dordrecht, 1992).

⁸⁰Okafor, *supra* note 73; Jacques Chonchol, “The Declaration on Human Rights and the Right to Development: The Gap Between Proposals and Reality” in *Development, Human Rights and the Rule of Law-Report of a Conference held in The Hague on 27 April -1 May 1981, Convened by the International Commission of Jurists* (Oxford: Pergamon Press, 1981) at 109.

⁸¹However, note that some scholars argue that there is no right to development. Rather, what exists is the need for such a right. See, Karel de Vey Mestdagh, “The Right to Development: From Evolving Principle to Legal Right: In Search of its Substance” in *Development, Human Rights and the Rule of Law-Report of a Conference held in The Hague on 27 April -1 May 1981, Convened by the International Commission of Jurists* (Oxford: Pergamon Press, 1981) at 156.

⁸²Oscar Schachter, “The Evolving International Law of Development” (1976) 15 *Columbia Journal of Transnational Law* 9.

⁸³Phillip Alston, “The United Nations’ Specialized Agencies and Implementation of the International Covenant on Economic, Social and Cultural Rights” (1979) 18 *Columbia Journal of Transnational Law* 79; Phillip Alston, “Revitalizing United Nations Work on Human Rights and Development” (1991) 18 *Melbourne University Law Review* 216. For an excellent analysis of the nature and concept of human right to development, see, James Paul, “The Human Right to Development: It’s Meaning and Importance” (1992) 25 *The John Marshall Law Review* 235; J.S. Warrioba, “The Reform of the United Nations in the Context of the Law of the Sea and the United Nations Conference on the Environment and Development” (1995) 7 *RADIC* 426; Seymour Rubin, “Economic and Social Human Rights and the New International Economic Order” (1986) 1 *American University Journal of International Law and Policy* 67.

⁸⁴Tom Allen, “Commonwealth Constitutions and Implied Social and Economic Rights” (1994) 6 *RADIC* 555. [hereinafter, Allen] For an excellent analysis of the interdependent nature of human rights, see, Craig Scott, “Reaching Beyond (Without Abandoning) the Category of “Economic, Social and Cultural Right”

This means that given the comprehensive economic, social, cultural and political aspects and dimensions of the concept of human development,⁸⁵ the right to development is an expansive and organic concept affirming the interdependence of rights.

Prior to the 1986 UN Declaration on the right to development, the African Charter on Human and Peoples' Rights had in Article 22 provided that:

[A]ll peoples shall have the right to their economic, social, cultural development with due regard to their freedom and identity and in the equal enjoyment of the common heritage of mankind...States shall have the duty, individually or collectively, to ensure the exercise of the right to development.⁸⁶

The purport of this norm is also to reiterate the individual and collective nature of the right to development. The right to development has also acquired judicial recognition.⁸⁷ Perhaps, because the "right" in question has been anchored on the basis of entitlement of states in need (the South) to help and a reflection of the prevailing need to reduce the gap, as it were, between the haves and have-nots,⁸⁸ international law as an Eurocentric institution⁸⁹

(1999) 21 *Human Rights Quarterly* 633. Gregorio Peces-Barba, "Reflections on Economic, Social and Cultural Rights" (1981) 2 *Human Rights Law Journal* 281; Antonio Trindade, "Environment and Development: Formulation and Implementation of the Right to Development as a Human Right" (1993) 3 *Asian Yearbook of International Law* 15.

⁸⁵UN Declaration on the Right to Development, UN GA Resolution 41/128 of December 4, 1986.

⁸⁶ See also, R.N. Kiwanuka, "Developing Rights: The UN Declaration on the Right to Development" (1988) 35 *Netherlands International Law Review* 265.

⁸⁷*Guinea/Guinea Bissau Maritime Delimitation Case*. (Cited in Ian Brownlie, *The Human Right to Development*, London, Commonwealth Secretariat (Occasional Paper Series) 1989, at 16-7.

⁸⁸Oscar Schachter, *supra* note 78. However, as the International Court of Justice has held, the giving of aid "is more of a unilateral and voluntary nature" and the cessation of aid cannot be regarded as a breach of the customary law principle of non-intervention. See, *Nicaragua v. United States, Merits* (1986) ICJ Reports 138, para. 276.

⁸⁹Inamul Haq, "The Problem of Global Economic Inequity: Legal Structures and Some Thoughts on the Next Years" (1979) 9 *Georgia Journal of International and Comparative Law* 507.

has been traditionally insensitive to the cause of development.⁹⁰

Hence, the North has persistently opposed the existence of a right to development. It is of course a valid contention that a rule of customary international law cannot bind a persistent objector.⁹¹ It would seem however that the North in principle agrees to support the quest for development in the South but this is subject to access to the “coveted raw materials” of the South. In contemporary times, this means free access to plant life forms and TKUP and probably, the continued existence of the institutions and juridical mechanisms for the appropriation of plants and TKUP.⁹² It is in this sense that Professor Ignaz Seidl-Hohenveldern has posited that “there appears to be some merit in complaints that economic colonialism by the former metropolitan power has not yet come to an end, but has been replaced by neo-colonialism.”⁹³

The pertinent question here is the extent to which patents on plants and TKUP impact on the normative function of the concept of the right to development.⁹⁴ It can hardly be gainsaid that the economic losses and infractions of internationally protected cultural rights arising from appropriation of plants and TKUP constitutes a severe violation of the right to

⁹⁰Ivan Head, “The Contribution of International Law to Development” (1987) *Canadian Yearbook of International Law* 29. But see, Louis Henkin, “Economic-Social Rights as “Rights”: A United States Perspective” (1981) 2 *Human Rights Law Journal* 223; Mitchell Ginsberg & Leonard Lesser, “Current Developments in Economic and Social Rights: A United States Perspective” (1981) 2 *Human Rights Law Journal* 237.

⁹¹*Anglo-Norwegian Fisheries Case*, (1951) ICJ Reports 131, ILR 18 at 73.

⁹²Hohenveldern, *supra* note 68 at 7.

⁹³*Ibid.*

⁹⁴Vandana Date, “Global “Development” and its Environmental Implications—The Interlinking of Ecologically Sustainable Development and Intellectual Property Rights” (1997) 27 *Golden Gate University Law Review* 630.

development, especially, of marginalized peoples. As noted in the *Guinea/Guinea Bissau Maritime Delimitation case*, the “legitimate claims of the parties as developing countries and the right of the peoples involved to a level of economic and social development which fully preserves their dignity”⁹⁵ is a right protected by international law.

5.6: Conclusion: Global Thoughts, Local Actions

This thesis has examined the emerging relationship between patents, plants and TKUP. Some concluding remarks are apposite. Given the complexity of the issues dealt with, it would be better to categorize in sum the gist of the analysis and suggestions. Two interrelated categories of analysis and levels of response are proposed. The first category and level of response is international and regional in scope and dimension. The second category of suggestions operates at the domestic level. Notwithstanding this categorization, the suggestions made in both levels of discourse traverse the gamut of patent law and the environment. The reason for the multi-layered approach is obvious. Although patents and environmental law are global issues, it is ultimately at the local level that they find expression and implementation. Simply put, patents and issues of the environment defy national boundaries.

5.6.1: Patents and Plants: The Global Responses to Appropriation of TKUP

This thesis has revisited the concept of traditional knowledge of the uses of plants as it affects the patentability of such knowledge. In defining this aspect of the analysis, it has

⁹⁵Guinea-Bissau, *supra* note 86.

been argued that the traditionality of such knowledge merely refers to the method of narration and the epistemological framework. In other words, the concept of traditionality has no relationship with the pervading notion of antiquity and stagnation erroneously attributed to it. To the extent that traditional knowledge of the uses of plants is both substance and in practice as dynamic, evolving, and organic as other living frameworks of knowledge and epistemology, it follows that inventions and innovations are conducted and will continue to be conducted by those who live and operate under this framework of knowledge. Towards this end, there is a need to re-think global attitudes on the patentability of TKUP.

The necessary corollary to the above is that mechanisms for rewarding and protecting such innovations and inventions must have a fair amount of open-mindedness about those innovations and inventions. Since the patent system represents the most ubiquitous and established institutional and juridical mechanism for the protection and reward of innovations and inventions, it follows that it must also eschew unfounded prejudices and biases against inventions and innovations emanating from knowledge frameworks. Within this context, the instrumental nature of the patent system comes into play. As this thesis has sought to demonstrate, the patent system is a mechanism, a pliable tool, and a flexible purposive juridical institution designed to achieve certain ends which may in the course of human development change or gain new directions. In other words, the patent system is an instrument but the normative question remains as to what purpose it should be made to serve.

What this quality entails is that it lies in the hands of both states and international

organizations, particularly regional organizations, to articulate the ends which they may want to achieve using the patent system as a tool. Of course, this cannot be done adequately without reference to the history of the patent system, its present character and hints of the vision of what the patent system is expected to be in future. In contemporary times, it seems that the processes of globalizing the patent system and stipulating minimum standards for its operations have limited the scope of domestic initiative in defining and articulating local visions for the patent system.⁹⁶

In other words, the instrumentalist nature of the patent seems to have pandered largely to the interests of a mono-culturalizing phase primarily interested in creating larger economic profits for a few powerful industrial interests/states. The consequence of this troubling instrumentality of the patent system has been an increasing erosion and appropriation of plant life forms⁹⁷ and traditional knowledge of the uses of plants. These may be called some of the presumed “losers” in the age of globalization.⁹⁸ Whether there should be any “losers” in this emerging regime is a question of both morality, ethics, social justice, and human survival itself.⁹⁹ Perhaps, the problem with the trend in question is not that the

⁹⁶Sarah Dillon, “Fuji-Kodak, The WTO, and the Death of Domestic Political Constituencies” (1999) 8 *Minnesota Journal of Global Trade* 197; Paul Stephan, “The New International Law-Legitimacy, Accountability, Authority and Freedom in the New Global Order” (1999) 70 *University of Colorado Law Review* 1555.

⁹⁷Robert Blomquist, “Protecting Nature “Down Under”: An American Law Professor’s View of Australia’s Implementation of the CBD-Laws, Policies, Progress, Institutions, and Plans, 1992-2000” (2000) 9 *Dickinson Journal of Environmental Law and Policy* 237.

⁹⁸Jim Chen, “Globalization and its Losers” (2000) 9 *Minnesota Journal of Global Trade* 157.

⁹⁹For a critique of Jim Chen’s treatise on the “losers” in the age of globalization, see, Elizabeth Larsch-Quinn, “Commentary: Democracy Should Not Have Losers” (2000) 9 *Minnesota Journal of Global Trade* 589; John Miller, “Globalization and Its Metaphors” (2000) 9 *Minnesota Journal of Global Trade* 594; Paul Thompson, “Globalization, Losers, and Property Rights” (2000) 9 *Minnesota Journal of Global Trade* 602.

entirety of all human cultures in the world are “globalizing”); rather, one culture,¹⁰⁰ backed with tremendous economic and political might and juridical machinery is bulldozing¹⁰¹ its way across the cultural and juridical mosaic of the globe with a primary aim of maximizing profit for a very narrow elite. In this onward march, the patent concept has been a very useful tool.

Given that the patent system is fundamentally a socio-economic instrument, the crux of the question is how it can be put to the best service of the larger society, particularly, in respect of plants and TKUP? In the first place, drawing from the analysis above, particularly, in chapter 4, it seems that the first line of response would require a clear and rigorous overhaul of the patent systems of the world. Contrary to the notions of the WIPO Report that the cases of appropriation of plants are mere instances of “bad patents” and not an indictment on the patent system as a whole,¹⁰² the reality is that the problem of erosion and appropriation of plants and TKUP is systemic in both juridical and institutional dimensions. Accordingly,

¹⁰⁰For a brilliant analysis of this phenomenon, see, Alex Geisinger, “Sustainable Development and the Domination of Nature: Spreading the Seed of the Western Ideology of Nature” (1999) 27 *Environmental Affairs* 43.

¹⁰¹Although it may be argued that membership of globalizing institutions such as the WTO are discretionary, given the structure and process of global trade and politics, the reality is that weak states are practically coerced into membership. Whether the element of coercion in this regard would conduce to or frustrate the compliance quotient of such members with the legal norms established by the WTO and similar organizations is a matter of interest, especially, to compliance theorists in international law. A preliminary view would support the conclusion that such legal norms may not command much compliance. Indeed, the well-known cases of public revolt against such institutions and the legal norms they establish lends the view that sooner than later, those institutions and legal norms would have to wear a “human face” or at least make some concessions towards social distributive justice. For a recent examination of these and related issues, see, Peter Gerhart, “Reflections: Beyond Compliance Theory-TRIPS as a Substantive Issue” (2000) 32 *Case Western Reserve Journal of International Law* 357; Kal Raustiala, “Compliance & Effectiveness in International Regulatory Cooperation” (2000) 32 *Case Western Reserve Journal of International Law* 387; J.H. Reichman, “The TRIPs Agreement Comes of Age: Conflict or Cooperation with the Developing Countries?” (2000) 32 *Case Western Reserve Journal of International Law* 441.

¹⁰²*Draft Report of the World Intellectual Property Organization (WIPO) Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999)*, Geneva, Switzerland. [For Comments]

the patent system is in dire need of a critical re-evaluation, re-ordering, and re-direction.

Towards this end a few suggestions may be made. First, the appropriateness of patents on plants and TKUP should be re-considered. Preferably, it would be better that a special incentive regime be created for innovations in plants and products of TKUP. In devising this mechanism, particular attention should be paid to the peculiarities of traditional farmers, particularly women. It is the innovations of local farmers and traditional communities which play the most important roles in understanding, utilizing and conserving plant life forms and TKUP.

Although these local and traditional farmers and communities have been able to achieve these without the aid of the patent system, it would be unrealistic for the world to continue pretending that these marginalized groups do not need legal protection from predatory practices of appropriators. Presently, the application of the patent concept to plants and TKUP serves interests which are at variance with the real and substantial innovators of plant life forms and TKUP. In various fora and frameworks, they have expressed their disavowal of the patent system.

Secondly, it is of the utmost importance that the basic concepts of the system be critically re-evaluated and re-defined. As the building blocks of a system, the elements and criteria for patentability deserve a clarification and consistency in approach which is presently lacking. One of the major consequences of this regime of permissiveness and inconsistency is that the patent system is not only tarnished but its integrity seems to be under scrutiny, particularly from poor states of the South. For example, it is curious, if not absurd that the patent system which asserts that it was established to reward inventors for their

socially beneficial inventions does not contain or have any definition for “inventions.” As Dan Leskien and Michael Flitner have re-confirmed, “neither the TRIPs Agreement, nor the Paris Convention gives any definitions of what an invention should be. The EPC does not define the term “invention” while US patent law only gives a definition of what may be patented.”¹⁰³

Similarly, as already shown, the criteria for patentability of inventions have been lowered down and in consequence, a flurry of patents which constrict the global intellectual space and extort fees and rent from the general public, particularly, in the field of pharmacy and biotechnology, is now the troubling order of the day. The distinction, if any, between inventions and discoveries has become blurred. This has severe erosive and appropriative repercussions on the regime of plant genetic diversity. As Leskien and Flitner once again have observed:

[I]n the field of biotechnology, defining the precise line between unpatentable discoveries and patentable inventions may lead to specific problems that have yet to be resolved. This is because most products of biotechnology are or are based on genes or cells that have been taken from nature or isolated from pre-existing living micro-organisms, plants, animals or humans...it is in fact a very thin line that separates invention from discovery under both US law and EPC.¹⁰⁴

This thesis has argued that indeed, no line of demarcation, thin or otherwise, exists between inventions and discoveries in relation to plant patents.¹⁰⁵ Neither the TRIPs agreement nor

¹⁰³Dan Leskien & Michael Flitner, *Intellectual Property Rights and Plant Genetic Resources: Options for a Sui Generis System*, [Issues in Genetic Resources No. 6] Jan Engels, Vol. editor, (International Plant Genetic Resources Institute, June 1997) (on file with author and available on request) [hereinafter, Leskien & Flitner]

¹⁰⁴Leskien & Flitner, *supra*.

¹⁰⁵Carlos Correa, *Sovereign and Property Rights Over Plant Genetic Resources*, [FAO Background Study Paper No. 2 Commission on Plant Genetic Resources-First Extraordinary Session, Rome, 7-11 November 1994]

any other juridical instrument contains any specific and clear boundary between the alleged divide between discoveries and inventions in relation to plant forms.

Further, the criteria of reproducibility, utility, specification and non-obviousness have been significantly lowered and watered down for the purposes of the pharmaceutical and biotechnology industries. Whether these measures promote social justice are quite debatable. What seems reasonable is the need for an improvement of the patent system. At the very least, “inventions” and “innovations” in plants and TKUP which do not rise to the stricter levels and criteria of patentability for mechanical inventions should not be patented. This would require a global and absolute standard of novelty, a strict enforcement of the classical requirement of specification, a substantial enhancement of the tests of industrial applicability and utility.

Unless this happens, the patent system, especially, in its application on plants and TKUP will remain an engine of mischief and deception and the society will continue to pay rent for undeserving “inventions.” For example, according to the Food and Drug Administration of the United States,

[O]f the 348 drugs introduced by the 25 largest pharmaceutical companies between 1981 and 1988, only 12 (or 3 per cent) were deemed important therapeutic advances by the FDA [US Food and Administration]...the vast majority were seen as having little or no potential for advances in treatment.¹⁰⁶

Yet, all those 348 drugs received “patent protection.” A regime in which nearly all of its so-

¹⁰⁶“No Cure for Patents: Biotech Patents Distort and Discourage Innovation and Increase Costs for Dubious Drugs” *RAFI Genotypes*, July 1997. [underlining added] But see, Michael Malinowski, “Globalization of Biotechnology and the Public Health Challenges Accompanying It” (1996) 60 *Albany Law Review* 119. For an in-depth analysis of the methods of tinkering with and rearranging the molecular structure of TKUP for patent purposes, see, Shayana Kadidal, “Plants, Poverty, and Pharmaceutical Patents” (1993) 103 *The Yale Law Journal* 223.

called inventions (as in the above-mentioned instance with the pharmaceutical industry), are little more than cosmetic changes of prior art, trivial and insubstantial changes is a disgrace to the concept of patents and a fraud¹⁰⁷ on the public who invariably pay the cost of the patent exclusiveness for at least twenty years per patented drug.¹⁰⁸

If the patent system must have credibility, the least it can do is to ensure that inventions which it seeks to reward are indeed new inventions in the full sense of the world. In the absence of a global standard of absolute novelty and dichotomy between *de jure* and *de facto* novelty, there seems to be reasonable scepticism about the quality of conventional claims of discovery and innovation.¹⁰⁹ If a patent grant should be upheld beyond the borders of the state where it was issued, it stands to reason that the beneficiary of that privilege must be deserving of it by showing that the invention in question is truly novel and meets the standard of patentability in those other jurisdictions. The invention must be new in every part of the world. Geographical limitations on novelty is simply a mockery of the essence of novelty. In an age of rapid dissemination of information and internet, there is no compelling reason why geographical limits or biases should figure in the determination or ascertainment of novelty.

¹⁰⁷Critical studies find that the high costs of drugs is attributed to the costs of developing a market monopoly achieved by mergers and acquisitions at the global drug market. It is estimated that by the end of the decade, the top ten drug companies will control 75-90 per cent of global sales. Another significant factor is the cost of advertisement of drugs which constitutes over a quarter of the market costs of drugs. This has largely occurred because pharmaceutical companies, instead of addressing their new products to pharmacists and physicians, now engage in expensive advertisements focused on lay-people who are advised to "ask" their doctors about those drugs. On the patent issue, a 1997 study by Statistics Canada shows that many companies find patent litigation too expensive and are opting for speed and trade secrecy laws. See, "No Cure For Patents," *supra* note 106.

¹⁰⁸*Agreement Related to Trade-Related Aspects of Intellectual Property Rights*, 33 I.L.M. 1197 (1994)

¹⁰⁹Seeding Solutions, *supra* note 14 at 74.

In addition, the institutionalization of a test of utility of inventions is imperative. Those who intend to reap the benefits of a patent on plants and TKUP must at least show the usefulness of their inventions and “improvements” of plants. With particular emphasis on PBRs on plants, it is counter-productive to grant awesome powers of control of plants to entities whose “innovations” serve no useful societal means or ends. Given that PBRs have practically become another name for patents, the element of utility should form part of the requirements for grant of PBRs. Moreover, in age of newer and tougher restrictions on the allowances made in respect of PBRs such as farmers’ privilege, the leeway granted to PBRs must be re-considered.

The same rigorous approach should be applied to the requirements of specification and industrial applicability. Where applicants for plant patents are unable to fully and completely disclose the nature of their inventions as required by the relevant patent legislation, the courts should in strict compliance with patent legislation, reject such applications. The corollary point here is that the spate of judicial hyper-activity in the field of patents on patents and other life forms is becoming worrisome. As the *Diamond v. Chakrabarty* case has shown, the courts, particularly in the United States have often overshadowed the legislature in creating the law on patentability.

The enormity of the public consequences of private control of life forms makes an irrefutable case for legislative pre-eminence in this regard. Courts cannot and should not intervene in this regard. Legislative inactivity is no excuse for judicial usurpation of the task of legislation, especially in areas of high social and economic sensitivity such as ownership

of plants life forms and TKUP. The restraint shown by both Canadian and German¹¹⁰ Supreme Courts on the question of deposit of plants as substitute for specification should be commended. Where there are no special laws dealing with such highly sensitive issues, courts of law should not write new legislation while pretending to be interpreting “existing” law. In short, the patent system must be held to its best standards and its intellectual integrity must be under constant scrutiny and interrogation. Without a doubt, the suggestions made here would best be effective within a multilateral framework and remarkable good faith amongst states.

5.6.2: Regional Responses to Appropriation of Plants and TKUP

However, in appreciation of the political and economic realities of the times, it would be better for gene-rich but politically/economically weak states to pursue the suggestions made above within the ambits of regional frameworks. The fact of the matter is that it would be practically impossible for weak states to create a global and whole new legal mechanism for the protection of plants and TKUP. They lack both the political clout and economic muscle to create a global and special regime capable of respecting, protecting and rewarding innovations in plants and TKUP regime.

The best option therefore is to modify, at regional levels, the existing structure to reflect their concerns, priorities and values. The importance of regional patent systems which reflect the peculiar attributes and concerns of a group of states with similar economic and cultural background cannot be over-emphasized. One of the most effective and viable patent

¹¹⁰*Tetraploide Kamille*, (BGH GRUR 1993, 651).

regimes is the European Union(EU) patent framework. Given its similar historical and cultural background, the relative coherence and efficiency of the EU patent framework suggests that international patent regimes work better when the parties share values and priorities. Applying this approach to countries and patent systems of Africa, Asia and South America would be a first step in the process.

Therefore, groups of states may consider, at a regional level, defensive measures designed to curb the phenomenon of erosion and appropriation of plants and TKUP. In this regard, it may be suggested that gene-rich states should explore, at the regional level, the option of restricting access to plant genetic material to those states with notoriously prejudicial and appropriating patent systems. This approach may best work when such states act like cartels under a continental or regional framework. For example, when the U.S refused to sign the CBD in 1992, “Venezuela stopped signing new agreements for scientific collaboration with United States companies that wished to study genetic resources.”¹¹¹ This singular act helped to galvanize support for the CBD within the biotechnology industry in the United States and consequent ratification of the CBD by the United States government.¹¹²

To make these proposals a reality, it is suggested that states should wean themselves of the notion that any effective international or multilateral treaty must have the ratification of all the powerful and economically strong states. As a matter of fact, gene-rich states need

¹¹¹Edgar Asebey & Jill Kempenaar, “Biodiversity Prospecting: Fulfilling the Mandate of the Biodiversity Convention” (1995) 28 *Vanderbilt Journal of Transnational Law* 703. India also threatened to do the same. Same for Brazil, Indonesia, and Malaysia.

¹¹²*United States' Declaration Made at the United Nations Environment Programme for the Adoption of the Agreed Text of the Convention on Biological Diversity*, issued May 22, 1992, 31 I.L.M. 848. (1992) Compare with the interpretative statement attached to the CBD. See, Melinda Chandler, “The Biodiversity Convention: Selected Issues of Interest to the International Lawyer” (1993) 4 *Colorado Journal of International Environmental Law and Policy* 141.

not wait upon the powerful states before they can assert themselves in this regard. Their sheer number already offers a leverage and a potential for the creation of customary international law on the question of appropriation of plants and TKUP. Strategically, any such treaty or convention should be effective with 20 or 30 ratifications. For example, the UPOV Convention which today constitutes the baseline for PBRs went into effect with only six ratifications.¹¹³ At present there are 44 ratifications of the UPOV Convention and most of the state-parties are from the North. Therefore, treaties which embody the suggestions made above can be concluded beyond the often over-bearing influence of powerful multinational corporations.

Countries in the regions of Asia, Africa and South America have more than enough states to bring such treaties into effect. Thereafter, additional number of states may join if they so wish. This in itself is not unusual. The South should learn to play the game as the North does and use its sheer numbers to generate codes of conduct and normative rules which promote the sustenance of plant genetic diversity and TKUP. A notable initiative in this regard is the *Andean Common Code on Intellectual Property*.¹¹⁴

This agreement incorporates some of the suggestions made in this thesis, particularly in chapter 4. For example, on the question of oral knowledge constituting part of prior art in the determination of novelty, Article 2 thereof provides that “prior art is all that has been

¹¹³*International Convention for the Protection of New Varieties of Plants*, December 2, 1961, as revised at Geneva on November 10, 1972, on October 23, 1978, and on March 19, 1991; 815 U.N.T.S. 89.[hereinafter, UPOV Convention] This convention is administered by the World Intellectual Property Organization (WIPO). At present 44 countries are party to the UPOV and the member states are predominantly from the North.

¹¹⁴Andean Group: Commission Decision 313, February 6, 1992, reproduced in, 32 I.L.M. 180 (1993)

accessible to the public by written or oral description."¹¹⁵ It is arguable that this novel step would not have been possible at a global level because of the enormous impact it would have on many patent applications which would fail the test of novelty if oral knowledge is made part of prior art. The problem however seems to be that most states of the South construe the problem of patents and plant genetic diversity from the lens of financial help from the powerful states of the North. Without discounting the relevance of money, it seems that the emphasis on fiscal support from the North is exaggerated.

5.6.3: Plants, Patents and International Organizations

With respect to the environment, it is clear from the preceding analysis that no single state is wholly independent and self-sufficient in plant life forms. This reality compels international cooperation, good faith and more importantly, a reconciliation of the parallel and discordant legal regimes on plant life forms and TKUP instituted by the CBD, the FAO, and the WTO. For example, the areas of tension between the WTO and the CBD relate to the role and function of patents in the conservation and equitable use of plant life forms. While the WTO is primarily devoted to enhancing trade and making economic profits therefrom, the CBD is premised upon the concept of conservation. Both concepts are not often coterminous or compatible. It would however be irresponsible to maintain a gladiatorial state of affairs between both. The problem seems to be that in most cases, the international law-making process, particularly in an age of increasing corporate has tended to place trade and profit above conservation and sustainability.

¹¹⁵*Ibid.*

This attitude is both wrong and short-sighted. Trade is essential but it must also be understood that it does not exist for itself nor does it operate outside of the contexts of the environment. Only the living can pursue trade and they can only do so if there is something to buy, sell or barter within a sustainable environment. The collapse of the cod fishery in Newfoundland, Canada, and anchovy in Chile are grim testaments to the limitations of the environment to recover from rapacious exploitation. Of course, the environment is magnificent in its elasticity but it is equally truly that mankind knows little about the dynamics of environmental stability and regenerative capacity.

Furthermore, access to and sustainable use of plant life forms need not assume the nationalistic chauvinism which has somewhat become the South's response to the acquisitive practices of multinational agri-business concerns. Co-operation between states on plant germplasm is unavoidable, indeed, an imperative. Presently, there is a duplication of efforts by the CBD and FAO, particularly, on legal ownership of plant life forms stored in *ex situ* gene banks. It is expected that the newly adopted FAO *International Treaty on Plant Genetic Resources* would bridge the gap and harmonize both regimes.

Although previous FAO instruments are non-binding, the need for normative clarity and consistency may have been achieved with the new FAO treaty. In addition to the compensation mechanisms currently created by the new treaty in respect of germplasm stored in IARC gene banks, greater emphasis should be laid on free access to those germplasm and a strict regime of non-patentability of the products of germplasm stored in IARC gene banks.

Another matter for consideration is the need for international researchers and commentators to de-ethnicize the language relating to TKUP as such language validates the

social context in which appropriation of plants and TKUP take place. It must be realized that international scholars wield influence in shaping ideas, validating or delegitimizing attitudes and perceptions. It is not the village carpenter nor shoe-repairer who shapes or influences international law on plants and patents: the elitist scholar or “researcher” does. This is thus a responsibility which scholars and researchers would do well to exercise with all sense of even-handedness, erudition and integrity. It would be disastrous if scholars, as molders and moderators of opinion, which often congeals into law or government policy, interpose their prejudices in the discourse leading towards norm-creation.

Accordingly, in respect of the issue of patents and plants, references to “ethnobiological” knowledge¹¹⁶ or such other terms which imply that non-Western biological knowledge have no “scientific” basis and are only valid in “an ethnic” or informal setting should be eschewed. Apart from the fact that these so-called “culture bound” innovations supply more than a quarter of global medicines and over 90 percent of global food supply, there is no valid basis for the aspersion which such terms of “ethnicity” and folklority denote and connote. Scholars should therefore desist from propagating their cultural prejudices as if it were irrefutable truth.

Traditional knowledge is as empirical as its Western counterpart. Many examples have been given in the course of the analyses in the preceding pages.¹¹⁷ Plants from the so-called ethnic background with international and global food, medicinal and industrial value include banana, cocoa, coffee, oil palm, pineapple, sisal, rubber, maize, beans, potatoes,

¹¹⁶Martine de Koning, “Biodiversity Prospecting and the Equitable Remuneration of Ethnobiological Knowledge: Reconciling Industry and Indigenous Interests” (1998) 12 *Intellectual Property Journal* 261.

¹¹⁷See, *Seeding Solutions*, *supra* note 14 at 74.

cassava and peanuts. Certainly, there is nothing “ethnic” or “culture-bound” about the uses and knowledge of such plants. Scholars and commentators who deal with the problematic issue of appropriation of plants and TKUP would do well to use language which validates, legitimizes and empowers the creditable aspirations of marginalized cultures and peoples.¹¹⁸

This is not a call for condescending patronage but a recognition of the intellectual worth and global value of knowledge regardless of the cultural context where such knowledge emerged from. As the Crucible Group observed:

[A]s conventional science has adapted its language and approach to appreciate the experimental research of farming communities, it has also had to reconsider its understanding of what is ‘known’ and ‘unknown’, ‘wild’ and ‘undomesticated. The discovery that a ‘jungle’ in West Africa was, in fact, an intentionally-developed agro-forestry system spurred the reappraisal of long-held assumptions. Many indigenous and farming communities eschew the term ‘wild’, for example, arguing that the term testifies to the limitations in the information available to conventional science. A so-called wild plant may be protected and nurtured if not actively bred. It is very often used and planted.¹¹⁹

5.6.4: Patents and Plants: Domestic Responses to Appropriation of TKUP

It is impossible to conserve the world’s plant diversity without respecting and conserving cultural diversity. The loss of traditional farm communities, languages and indigenous cultures have direct impacts on plant diversity. It is not a coincidence that the highest levels of plant diversity occurs at the sites of the world’s richest linguistic life. Studies show that “ten out of 12 “mega-diversity” countries identified by the International

¹¹⁸For a succinct history of the legitimation process of the claims of non-Western paradigms of knowledge, see, Johanna Sutherland, “Representations of Indigenous People’s Knowledge and Practice in Modern International Law and Politics” (1995) 2 (1) *Australian Journal of Human Rights* 4.

¹¹⁹Seeding Solutions, *supra* note 14 at 74.

Union for Conservation of Nature and Natural Resources rank among the top ten countries in endemic languages.”¹²⁰ As languages are increasingly lost, the global community loses the knowledge associated with the uses of those plants nurtured by the affected communities. It is nothing less than a phenomenal loss of human intellectual capital. This is an area where current domestic state policies on cultural diversity deserves a serious reappraisal.

Another vital point in this regard is the question of domestic environmental self-determination. While it may be fashionable to highlight the inequities of the global legal and economic order, particularly, in the context of the North- South divide, it is equally true that domestic factors have practically wreaked as much havoc, if not more, on marginalized peoples and cultures. The oppression and domination of indigenous peoples and other marginalized cultures seems far more acute in their domestic jurisdictions, in both North and South, than any conceivable hardships they may experience within the contexts of the notorious North-South divide.

Local elites and dominant cultures which subjugate local and traditional peoples, expropriate and confiscate their lands would need a re-think of the domestic juridical and institutional factors which conduce to the erosion and appropriation of plants and TKUP. This would have to be conducted within the juridical rubric of various international law instruments¹²¹ and institutions which recognize the entrenched human rights of traditional

¹²⁰Seeding Solutions, *supra* note 14 at 9.

¹²¹*International Covenant on Economic, Social and Cultural Rights*, December 16, 1966, 993 U.N.T.S.3; *International Labour Organization Convention Concerning Indigenous and Tribal Peoples in Independent Countries*; Reprinted in 28 I.L.M. 1382 (1989); *Charter of Economic Rights and Duties of States* of 1974 (UNGAOR 3281, XXIV); *Commission on Human Rights, Preliminary Report on the Study of the Problem of Discrimination Against Indigenous Populations*, UN Doc.E/CN.4/sub.2/L.566[1972]; The United Nations Draft Declaration on the Rights of Indigenous Peoples, U.N. ESCOR, Commission on Human Rights, 11th Sess., Annex 1, U.N. Doc. E/CN.4/Sub.2 (1993); *UN Declaration on the Rights of Indigenous Peoples*,

and indigenous peoples to own property individually or collectively, the right to maintain and enjoy one's culture, minority rights, and the right of equal protection under the law. The potential of the human rights initiative in addressing and redressing these issue seems promising. As a corollary, it is suggested that pressure be brought on states which are egregious abusers of minority rights and deniers of domestic environmental self-determination.

A few progressive changes in this regard may be mentioned. For example, in October of 1997, the Philippine government passed the Indigenous Peoples Rights Act. This law "effectively bestows ownership of resources within ancestral domains...to indigenous peoples."¹²² The law which was passed in the teeth of "opposition from many influential groups whose interests would be diminished by returning ancestral rights to [our] indigenous communities"¹²³empowers the twenty percent of Filipinos that are indigenous in granting them their rights to control over their own lands.¹²⁴

The law creates a mechanism whereby a Certificate of Ancestral Domain Title (CADT) is awarded by the newly created National Commission on Indigenous Peoples (NCIP) to Indigenous Cultural Communities (ICC). Once a CADT has been awarded, a mining company or other extractive industry must secure the ICC's consent before logging permits can be granted. Of course, this gives some leverage to the indigenous community in

UN Docs.E/CN.4/1995/2; reprinted in 34 I.L.M. 541 (1995).

¹²²Patricia Thompson, "Philippines Indigenous Peoples Rights Act" (1998) *Human Rights and the Environment* 12.

¹²³Statement by President Fidel Ramos of the Philippines as cited in Thompson, *supra*.

¹²⁴*Ibid.*

negotiating and dealing with agencies whose activities have the potential to damage the ecosystem or to appropriate plant life forms and TKUP. In the absence of serious and non-rhetorical respect for and protection of traditional and indigenous peoples' cultures, and knowledge at the domestic level, international posturing would merely remain a side-show to the relentless erosion and appropriation of plants and TKUP. The inescapable fact is that the concept of land and legal norms and institutions on its ownership cannot be divorced from both the rhetoric and legalese of erosion and appropriation of plants and TKUP.¹²⁵

Furthermore, it is by a process of environmental and local self-determination that the concept of national sovereignty over plant life forms within the boundaries of states would have real meaning and significance beyond the theatrics of rhetoric. National and regional initiatives on access to plant life forms and equitable sharing of the benefits therefrom would be meaningless unless the local and traditional farmers who are in daily contact and interaction with plants have an effective role in the formulation and execution of policies designed to institute this new legal regime.

It may need to be mentioned that states like Thailand, Ecuador, Peru, Bolivia and Venezuela have adopted various laws which empower local and traditional communities in matters of access to and equitable sharing of the benefits of plant life forms.¹²⁶ States should therefore safeguard the environment and its resources which constitute the base and superstructure of trade. In this regard, the need for caution should not be equated for

¹²⁵Janet McDonnell, *The Dispossession of the American Indian-1887-1934* (Indianapolis: Indiana University Press, 1991); Chris Cunneen & Terry Libesman, *Indigenous People and the Law in Australia* (Sydney: Butterworths, 1995) at 3.

¹²⁶Seeding Solutions, *supra* note 14 at 46.

alarmism. It would of course follow that in the process of protecting the environment, technologies which promote this cause should be rewarded. There is therefore a role for the patent system in the process aforementioned, particularly the need to incorporate environmental security as a criterion for patentability of genetically-modified plants.

It should not be forgotten that the theory of the patent system is that it is a mechanism of incentives for the promotion of progress. The intrinsic value of this theory is that patents are therefore a policy instrument for states. The question thus is, what particular vision of progress should be pursued? How would the patent system be used to promote social welfare? This is a questions which raises issues of policy imperatives, values and priorities of states. Since states would not issue patents on inventions which, for example, make the assassination of people easier and undetectable, it follows that inventions which are threats to the well-being of the society should not be rewarded by the state with patents.

Therefore, given the importance of plants and the environment as a whole to human development, states should be very careful in promoting or rewarding technologies whose impact on the environment are reasonably questionable. In this regard, technologies such as the “terminator” breed of seeds which promote sterility of the affected plants and make farmers appendages of seed industries may not pass the threshold test of public utility and environmental integrity.

Another area of national or domestic initiative is the proposed communal patent system examined in Chapter 4. In this regard, similar initiatives on communal patents being currently pursued in Brazil, the Philippines and Peru¹²⁷ should be examined by other states

¹²⁷Chapter 4, *supra*.

for guidance and inspiration. Similarly, the changes in patent laws of members of the Andean community on the inclusion of oral knowledge as part of prior art in determining novelty¹²⁸ should also be emulated by other states with a strong culture of oral transmission of knowledge.

Finally, as a general thought on the *problematique* of development, it seems clear that the lineal conception of development and emphasis on high rates of consumption of resources as the indicia of development is flawed. The continued use of urbanization, industrialization, social mobility, occupational differentiation, free enterprise, and excessive consumption as the gauges for measuring “development” is anathema to the values of cultural and plant genetic diversity. The argument that plant biodiversity is eroding quickly because there are “no economic incentives” to aid their conservation may be misconceived or at least, exaggerated.

The economic value attached to minerals like gold and silver has in no way diminished the environmental havoc and devastation which gold and silver mining wreaks on the environment. The reason for the loss of biological diversity is not simply because plants are considered useless by local farmers and healers even when they do not derive financial benefits therefrom. It is unrealistic to expect that the loss of genetic resources could be prevented simply if plant breeding became more profitable. The granting of IPR for products of modern plant breeding is certainly not an effective instrument to conserve biological diversity. In strictly “ecological terms, incentives to speed the spread of industrial-style agriculture are rather counter-productive and should be properly balanced with other

¹²⁸Note 114, *supra*.

legal or economic measures limiting their destructive effects.”¹²⁹

Another undesirable consequence of this paradigm is that it perpetuates the imbalance in the global economy which makes the North an importer of produce and agricultural “raw material” and the South as the importer of “finished goods”, in this case, the patented ‘improved varieties’, packaged pharmaceutical products, *et cetera*.¹³⁰ Thus, while “knowledge and resources from the South have been flowing freely to the North, the flow of knowledge and resources on the reverse direction is increasingly protected by strong intellectual property rights.”¹³¹

In sum, as this thesis has argued in the preceding pages, the appropriation of plants and TKUP is a function of institutional and juridical structures operating within a complex milieu of inter-cultural superiority. Therefore, aside from necessary institutional and juridical adjustments, it stands to reason that if the rhetoric on protecting plant genetic diversity and global cultural diversity is to congeal into a vision of and thence action¹³² on environmental and cultural sustenance, the gap of epistemological and cultural divide between the North

¹²⁹Leskien & Flitner, *supra* note 102 at 70. See also, Laura Campbell, “The Role of International Trade and Economics in Developing Multilateral Environmental Agreements” in *The Effectiveness of Multilateral Agreements* (Nord: Helsinki, Workshop Proceedings and Study Reports, 1996) at 10.

¹³⁰But see Robert Thomas, “Proposed Establishment of Phytochemical Extraction Companies in Developing Countries” in Anatole Krattiger, *et al.*, (eds.), *Widening Perspectives on Biodiversity* (Gland, Switzerland: IUCN, 1994) at 309. Proponents of this view may be reminded that the extant regime wherein the South supplies a substantial part of the mineral raw materials to the North and imports finished goods has wrought considerable harm on the environment and there is hardly any reason to believe that the same fate will not befall the so-called economic approach to biological diversity.

¹³¹Satu Suikhari, “The Convention on Biological Diversity - A Step Towards a More Equitable Sharing of Benefits Arising from the Utilization of Genetic Resources” in *The Effectiveness of Multilateral Agreements* (Nord: Helsinki, Workshop Proceedings and Study Reports, 1996) at 143.

¹³²Environmental Protection and Sustainable Development-Experts Group on Environmental Law of the World Commission on Environment and Development (Graham & Trotman/ Martinus Nijhoff Publishers, 1987)

and the South¹³³ must be bridged. This function is not solely a task for the ubiquitous market forces,¹³⁴ but a call for the reconsideration of our social and ethical values. It is both an individual as well as a collective decision for our well being, if not very survival.¹³⁵

¹³³Inis Claude, *Swords into Ploughshares: The Problems and Progress of International Organization* (Toronto: Random House, 1971) at 3.

¹³⁴Geir Lundestad, *East, West, North and South: Major Developments in International Politics 1945-1986* (Norwegian University Press, 1988) at 264.

¹³⁵For a recent analysis of some of the issues dealt with in this thesis, see, Erica-Irene Daes, "Intellectual Property and Indigenous Peoples" (2001) 95 *A.S.I.L. Proceedings* 143.

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