

RECOGNIZING THE PROPERTY RIGHT REGIME FOR INDIGENOUS KNOWLEDGE OF BIODIVERSITY IN FACE OF TRIPs AGREEMENT

*Anupam Goyal**

I. INTRODUCTION

Genetic and biological resources, as they exist today in the hands of farmers, pastoralists, hunters, and gatherers, are not only valuable as raw materials for the manufacturer of new commercial commodities but also essential as the means of production and reproduction in local economies that are relatively well integrated into local ecosystem.¹ Local people in these economies depend on a wide range of ecological and economic values of genetic and biological resources. Their gardens, farms, and surrounding areas include many different species and many varieties of species, which provide long-term stability in the face of climatic variation, crop diseases and other changes, while also producing a range of valuable products. Often they manage these local biological resources under traditional rules and institutions that take into account ecological constraints. Conservation of traditional knowledge and resources can produce widespread long-term benefits. It can help to ensure the survival of local communities and enhance biodiversity and environmental protection where these groups are located. It may also lead to the discovery of valuable new natural products.² To these ends, local communities should be able to control access to and use of their traditional resources and knowledge, and receive just and equitable compensation when outsiders use them. For local economies, diversity is “the basis and foundation of production and economic activity, not merely an input.”³ Diverse biological resources produce not only for substance and local markets but also for equally important non-marketable ecological services (such as protection of water quality and flood control) as well as aesthetic, cultural, and spiritual values.

Local communities’ knowledge and resources are rapidly disappearing, transforming rural communities. Many indigenous population face pressures that threaten their lands and cultures and can lead to their disappearance as

* Lecturer, Law Centre - I, Faculty of Law, University of Delhi, Delhi.

¹ David R. Downs, “Global Trade, Local Economics, and the Biodiversity Convention” in William J. Snape, ed., *BIODIVERSITY AND THE LAW* (Washington D.C., 1996) at 207.

² Dinah Shelton, “Fair Play, Fair Pay : Preserving Traditional Knowledge and Biological Resources”, *5 Year book of International Environmental Law*, 1994 at 79.

³ Downs, *supra* note 1 at 208.

distinct groups.⁴ Biological diversity is also decreasing. Of approximately 1.4 million organisms that have scientific names, an estimated one plant or animal species becomes extinct every day, with the number likely to reach one species every hour by the start of 21st century.⁵ Western scientists have studied only about 1,100 of the earth's plant species, yet as many as 40,000 may have undiscovered medicinal or nutritional value for humans.⁶

Indigenous and local communities are often the custodians of biological resources. The profundity of this fact is apparent through the various references to indigenous and local communities which abound in the Convention on Biological Diversity (CBD). Of particular importance is Article 10(c), which calls on Parties, as far as possible and as appropriate, to:

Protect and encourage customary use of biological resources in accordance with traditional culture practices that are compatible with conservation or sustainable use requirements.

A key issue is the extent to which such practices are encouraged by the intellectual property rights (IPRs) regime. In other words, do they allow for the holder of such knowledge to exercise control over it so as to receive compensation for its use by others? So far this question must be answered in the negative.⁷ One reason is that indigenous and local communities have difficulty in proving the 'novelty' requirement for patenting innovation, since this knowledge has often been in their communities for generations. This extended time factor also works against the granting of IPRs, which grant exclusive property rights over knowledge for a much more limited time period. The only form of IPRs which is not time bound—namely 'trade secrets', is argued not to be applicable because it like all IPRs is based on individual claims, whereas traditional knowledge is usually seen as collectively held.⁸

In this paper an effort is made to extend the property rights for the traditional and indigenous knowledge. The paper begins with analysing the relationship between human rights and environment. It is observed that the protection of indigenous knowledge and environment form the part of international human rights. The importance of local knowledge for the preservation of eco-system is addressee by certain basic international environmental instruments like Convention on Biological Diversity; Agenda

⁴ Shelton, *supra* note 2 at 78.

⁵ *Ibid.*

⁶ *Ibid.*

⁷ Richard G. Tarasofsky, "The Relationship Between the TRIPs Agreement and the Convention on Biological Diversity : Towards a Pragmatic Approach", 6 *Review of European Community & International Environmental Law*, 1972 (2) at p. 150.

⁸ *Id.*, at 151. However, Shelton argues that the 'failure to allow intellectual property rights for traditional knowledge of local communities can be said to confuse the collective knowledge of a small group with the public domain'. *Supra* note 2 at 108.

21; and Rio Declaration. The paper points out as to how the conservation of biodiversity is linked with indigenous knowledge which is followed by the discussion eliciting the fact that traditional knowledge of biodiversity is to a great extent acts as the feeding source for bio-tech industries.

Next is the discussion targeted at possibility of granting property rights for traditional knowledge. What is the criticism relating to hurdles in extending property rights for indigenous knowledge and an evaluation is done as to whether the criticism is appropriate. The paper explores the possibility for the grant of 'trade secrets' based rights for the traditional knowledge of biodiversity. In this regard 'collectivity' and 'secrecy' issues are analysed. In last part, the study attempts to overcome the difficulties in recognizing 'trade secrets' based rights for traditional knowledge of genetic diversity.

II. RELATIONSHIP BETWEEN HUMAN RIGHTS AND THE ENVIRONMENT

International human rights law offers an alternative basis to international environmental law for ensuring equitable treatment of local communities and preserving their biological resources. International human rights law is based on recognition of the inherent dignity and equal and inalienable rights of all members of the human family. It reflects global concern for the treatment of individuals and groups, demanding that this treatment meet internationally agreed minimum standards. Human rights obligations exist in the United Nations Charter,⁹ customary international law,¹⁰ and the provisions of nearly global and regional human rights treaties.

The loss of traditional resources may implicate numerous internationally guaranteed human rights, including life, health, culture, religion, standard of living, development, well-being, property, information, participation, democracy, remedies, rights of future generations, self-determination, privacy and the right to the product of one's labor and intellectual achievement. In addition, international human rights law involves the link between human rights and the environment, which has produced growing recognition of a human right to a safe, healthy, and sustainable environment.

⁹ Among the purposes of the United Nations is 'to cooperate...in promoting respect of human rights and fundamental freedoms for all'. UN Charter, Article 1. Articles 55 and 56 contain obligations for the organization and member states to promote 'universal respect for, and observance of, human rights and fundamental freedom for all without distinction as to race, sex, language or religion'. Downs, *supra* note 1 at 209.

¹⁰ Some provisions of the Universal Declaration of Human Rights contains customary international law. Universal Declaration of Human Rights, GA Res. 217 (III), UNGA, at 71, UN doc. A/810 (Dec. 1948).

The 1972 Stockholm Declaration on the Human Environment (Stockholm Declaration) affirmed a connection between human right and environmental protection, stating that man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being.¹¹ It implies that all persons have the right to a secure, healthy, and ecologically sound environment. This includes the right to be free from discrimination, pollution, environmental degradation and activities that adversely affect the environment or threaten life, health, livelihood, well-being, or sustainable development. In particular, the Stockholm Declaration recognizes a right to land tenure and safe food and water. Principle 14 states that indigenous peoples have the right to control their lands and natural resources and to maintain their traditional ways of life. This includes 'the right to security in the enjoyment of their means of subsistence' and the right to protection against any action or course of conduct that may result in the destruction or degradation of their territories.¹²

The United Nations (UN) Sub-Commission on the Prevention of Discrimination and Protection of Minorities (Sub-Commission) began a study of the relationship between human rights and the environment in 1990, and has issued annual reports since then. The reports note that human rights violations often lead to environmental degradation and, conversely, that environmental deterioration can result in or itself be a human rights violation.¹³ The 1994 Sub-Commission report includes a Declaration of Principles that affirms the interdependence and indivisibility of human rights, an ecologically sound environment, sustainable development and peace.¹⁴

The UN Food and Agricultural Organization (FAO) resolution (farmers rights) emphasizes the importance and rights of plant breeders,¹⁵ although it recognizes that plant genetic resources are 'common heritage of mankind' that should be available without restriction. The Farmers' Rights resolution asks States to 'allow farmers, their communities, and countries in all regions, to participate fully in the benefits derived ... from the improved use of plant genetic resources, through plant breeding and other scientific methods.'¹⁶

The United Nations Technical Conference on Indigenous Peoples and the Environment took place in 1992. It adopted Conclusions and Recommendations on Indigenous Peoples and the Environment that recognize

¹¹ Stockholm Declaration on the Human Environment, June 16, 1972, UN Doc. A/Conf. 48/14 principle 1, reprinted in 11 ILM, 1972 at 1416.

¹² *Id.*, Principle 14.

¹³ Shelton, *supra* note 2 at 89.

¹⁴ *Ibid.*

¹⁵ UN Food and Agricultural Organization (FAO) Res. 5/89 (Farmer's Rights), FAO Report of the Commission of Plant Genetic Resources, 1989 at 13.

¹⁶ FAO Report, *supra* note 15.

that the survival and well-being of indigenous peoples and the sustainability of the ecological system on which they depend cannot be achieved without rights to land and other resources and the right to use and develop those resources. The Conference recommended prior environmental and socio-economic impact studies of national development projects that affect indigenous peoples, with the participation of indigenous peoples. It also recommended that the United Nations system takes measures to protect indigenous property rights, including intellectual property, with regard to their cultural property, genetic resources, biotechnology and biodiversity. The Conference emphasized participation and prior- consent.¹⁷

III. INTERNATIONAL HUMAN RIGHTS AND PROTECTION OF INDIGENOUS PEOPLES AND THEIR ENVIRONMENT

Local communities may claim protection for their traditional knowledge and resources on the basis of human rights law.¹⁸ Human rights protections include the right to information, consultation and participation in decision-making on proposals that affect local communities.¹⁹ Local communities can also seek to develop community economies and mechanisms to establish fair prices for forest products and spread of local knowledge about them.²⁰ In these ways, human rights law can be useful in establishing local control over resources and knowledge.

The right to property is one of the strongest human rights claims for protection of indigenous peoples and their environment. State-sanctioned taking of resources or knowledge without compensation could violate property rights. The success of such a claim would depend on a showing that the resources or knowledge constitute property under national or local community law. Property has no inherent attributes that would preclude such a showing. 'Property' is a legal label attached to those tangible and intangible interests deemed capable of individual or collective ownership. Today, property includes not only land and objects, but goodwill, animals and air space. Nearly

¹⁷ UN Sub-Commission on Prevention of Discrimination and Protection of Minorities, *ECONOMIC AND SOCIAL RELATIONS BETWEEN INDIGENOUS PEOPLE*, Res. 199/132, E/CN.4/Sub. 2/1991/56, at 69, Aug. 29, 1991

¹⁸ For example, the rights to privacy — UDHR, *supra* note 10, Article 12 — may be implicated when the State licenses of permits exploitation or improper activities by researchers. Some individuals intrude into the privacy and seclusion of local communities. Those who study traditional cultures through working in a position of trust with indigenous herbalists or medical specialists may obtain confidential information.

¹⁹ Charter of the Indigenous Tribal People of the Tropical Forests, 1992, Article 23

²⁰ *Ibid.*

all legal systems treat some human discoveries or creations as property and grant monopoly rights over them.²¹

Under this framework, local resources and even traditional knowledge may constitute property under national or local law. Plants and animals, as tangible resources capable of exclusive appropriation and use, are frequently designated as property. When they have been developed within the community or are located on private or tribal lands, they could constitute part of the land rights of the community or be individually owned. Resources on public lands, however, even if traditionally used, are often viewed as state property.²²

In addition to plant and animal specimens, plant varieties, life forms, and plant-based pharmaceutical products may be subject to state-approved monopoly ownership.²³ Western scientific discoveries in this field are generally protected as intellectual property, which grants a limited monopoly to the inventor or originator. Protecting scientific discoveries as property is deemed to serve the public interest by stimulating research,²⁴ even though the attributes of property are difficult to apply to ideas or intellectual creations. Because of consumer demand and diminishing biodiversity, products that have been developed through genetic research and engineering for agriculture and pharmacology, with vast research and development costs, are increasingly designated as property.²⁵

Local communities could similarly claim property rights for resources they develop or cultivate.²⁶ Communities use traditional knowledge to conserve biodiversity and identify useful compounds and apply technology to the use and evolution of living things. Their knowledge holds the key to active ingredients of commercial value and the proper processing and use of plant resources.²⁷ Existing studies show that selective breeding in local communities over the centuries has developed many important strains of plants. It is in the public interest to protect this knowledge like Western laboratory products.²⁸

²¹ Shelton, *supra* note 2 at 96.

²² National laws increasingly treat plants and animals as they treat mineral resources and archeological sites. Costa Rica's Law for the Conservation of Nature (1990) identifies genetic resources as a national patrimony, in the public domain, it reserves to the State the exclusive right to commercialize them.

²³ Louis pasture received a United States patent in 1873 for 'yeast', free from organic germs of disease, as an article of manufacture. I. Cooper, *BIOTECHNOLOGY AND THE LAW*, Vol. I, 1982 at 2-5. In 1930, the United States adopted a Plant Variety Protection Act to stimulate research and assist in the development of new breeds: 7 USC, 2321-2582 (1988), — Shelton, *supra* note 2 at 102.

²⁴ S.B. Brush, "Indigenous Knowledge of Biological Resources and Intellectual Property Rights: The role of Anthropology", 95 *AM. ANTH.* at 5.

²⁵ Shelton, *supra* note 2 at 97.

²⁶ *Ibid.*

²⁷ *Id.* at 98.

²⁸ *Ibid.*

IV. RECOGNITION OF IMPORTANCE OF INDIGENOUS KNOWLEDGE IN INTERNATIONAL INSTRUMENTS AND INSTITUTIONS

There are several international agreements and conventions, which substantially acknowledges the importance of indigenous knowledge for the environment protection and their traditional rights. The main international conventions are as follows:

(i) *Biodiversity Convention*

Environmental instruments reflect a consensus that preserving indigenous peoples' environments, including conserving and sustainably using biological resources, is in humanity's interest. Indigenous peoples' and local communities' knowledge is vital to attaining this goal, as well as to achieving more sustainable agriculture and conserving and sustainably using forests.²⁹ The Biodiversity Convention can lead the way to legal recognition of this fact—which can be a major sustainable step forward in the context of international trade law.

Local communities' knowledge is essential to protecting local ecosystems, conserving biodiversity,³⁰ and sustainably using biological resources,³¹ including genetic resources.³² International instruments thus stress access to and sharing of local information, technology and resources. The Biodiversity Convention refers to biodiversity's importance for evolution and for maintaining the biosphere's life-sustaining systems.³³ It maintains that access to and sharing of both genetic resources and technologies are essential for these purposes.³⁴ The CBD calls on its parties to encourage customary use of biological resources, exchange traditional and indigenous knowledge, and develop methods of cooperation for the development and use of indigenous and

²⁹ *Id.*, at 80.

³⁰ Biodiversity Convention defines biological diversity as 'the variability among living organisms from all sources including *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems with actual or potential use of value for humanity'. *Ibid.*

³¹ 'Biological resources' 'includes genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use of value for humanity'. *Ibid.*

³² Shelton, *supra* note 2 at 80; 'Genetic resources' is defined as 'genetic material of actual or potential value'. *Ibid.*

³³ Biodiversity Convention, *supra* note 30. Preamble's second recital.

³⁴ *Id.*, 20th recital. Agenda 21 expresses the same idea, noting that 'essential goods and services depend on the variety and variability of genes, species, populations and ecosystems. Biological resources feed and cloth us and provide housing, medicines and spiritual nourishment.' Agenda 21, the program of action adopted at UNCED, Rio de Janeiro, June 1992, Ch. 15.

traditional technologies. It makes no reference, however, to the consent or participation of local and indigenous groups in this process.³⁵ The emphasis on state efforts to collect and disseminate traditional knowledge highlights the need to determine issues of local control and compensation. The CBD contains the most direct reference to compensation for knowledge and resources use. It recognizes, although only in its Preamble, 'the close and traditional dependence of many indigenous and local communities embodying traditional lifestyles on biological resources, and the desirability of sharing equitably benefits arising from the use of traditional knowledge, innovations and practices relevant to the conservation of biological diversity and the sustainable use of its components.'³⁶

In the CBD, Article 8 on *in situ* conservation³⁷ requires each state to preserve indigenous and local communities' practice and to promote wider application of traditional knowledge 'with the approval and involvement of the holders of such knowledge, innovations, and practices'. Access to the resources themselves is subject to the prior informed consent of the state providing such resources, unless the state itself determines otherwise.³⁸

(ii) *Agenda 21*

Other texts concerning public participation echo the CBD's reference to local consent and involvement. Agenda 21 provides that the local community should be involved in developing and transferring indigenous ecological knowledge and farm practices³⁹ with a view to promoting environmentally sound and sustainable development. Agenda 21 also states that international organizations should provide technical and financial assistance for capacity-building programs and strengthen research and education programs to incorporate indigenous peoples' and local communities' 'values' view and knowledge including the unique contribution of indigenous women, in resource management and other policies and programs that may affect them.⁴⁰ Agenda 21 provides that, 'essential goods and services depend on the variety and

³⁵ Biodiversity Convention, *supra* note 30, Articles 10, 17, 18.

³⁶ *Id.*, Preamble's 12th recital.

³⁷ *Id.*, Article 8; The Biodiversity Convention emphasizes that: 'the fundamental requirement for the conservation of biological diversity is the *in-situ* conservation of ecosystems and natural habitats and the maintenance and recovery of viable population of species and their natural surroundings.' *Id.*, Preamble's 10th recital. *Ex-situ* conservation of biological diversity adds to the value of the knowledge and traditional practices of indigenous peoples. *Id.*, Article 9.

³⁸ *Id.*, Article 15(5).

³⁹ Agenda 21, *supra* note 34, paras. 14.22(a), 26.3 (iii).

⁴⁰ *Id.*, para 26.5.

variability of genes, species, population and ecosystem. Biological resources feed and clothe us and provide housing, medicine and spiritual nourishment.⁴¹

According to chapter 16 of Agenda 21, biological resources are also essential to biotechnology research which promises to make significant contribution to providing health care, food security, water, efficient industrial development processes for transforming raw materials, sustainable forestry, and detoxification of hazardous waste.⁴²

Agenda 21 also emphasizes the importance of traditional knowledge and practices. With regard to forest and vegetation protection, it requires governments to research indigenous people's traditional uses of forest resources,⁴³ to collect and record indigenous farming knowledge, and facilitate the transfer of environmentally sound technologies.⁴⁴ Chapter 15 of Agenda 21 provides an overview, calling on governments to '[r]ecognize and foster the traditional methods and the knowledge of indigenous people and their communities, emphasizing the role of women, relevant to the conservation of biological diversity and the sustainable use of biological resources.'⁴⁵ It also calls on governments, to provide incentives for conserving biodiversity through traditional methods of agriculture, agro forestry, forestry, and range and wildlife management.⁴⁶

(iii) Rio Declaration

Rio declaration on Environment and Development⁴⁷ also recognizes indigenous peoples' special role in developing traditional practices that are essential for conserving and sustainably using the environment in general and biodiversity and biological resources in particular.⁴⁸ Article 22 of Rio Declaration specifies:

Indigenous people and their communities and other local communities have a vital role in environment management and development because of their knowledge and traditional practices. States should recognize and duly support their identity, culture and interests and enable their effective participation in the achievement of sustainable development.⁴⁹

⁴¹ Agenda 21, *supra* note 34.

⁴² *Id.*, para 16.1

⁴³ *Id.*, paras. *Id.*, para 11.4 (g)

⁴⁴ *Id.*, para 14.26(b), 14.28(b)

⁴⁵ *Id.*, para. 15.4(g)

⁴⁶ *Id.*, para 15.5(d).

⁴⁷ Rio Declaration on Environment and Development, June 14, 1992, UN Doc., A/Conf. 151/26 (vol. 1), reprinted in 31 ILM, 1992 at 874.*Id.*, Principle 22.

⁴⁸ *Id.*, Principle 22.

⁴⁹ *Ibid.*

V. IMPORTANCE OF INDIGENOUS KNOWLEDGE OF BIODIVERSITY

Rural Communities especially indigenous⁵⁰ peoples and forest dwellers, have sustainably used and developed their surrounding biological resources for many centuries. These groups have developed important technologies and arts, mastering crop varieties and irrigation methods, maintaining delicate ecosystems, and using flora and fauna. Through trial and error, they have applied their ecosystems' plants and animals to human health and well being. Today, 80 percent of the world's population depends on traditional health care based on medicinal plants.⁵¹

The loss of biological and cultural diversity has considerable economic implications. Local communities' knowledge and resources are increasing in global importance and economic value. Biological products and processes account for 40 percent of the world's market economy.⁵² According to a 1990 experts meeting, pharmacologists draw 7,000 medical compounds—from plants.⁵³ The estimated annual world market value for these medicines is between \$35 and \$47 billion.⁵⁴ Biodiversity is clearly a 'common concern of mankind', a global resource of intrinsic value.⁵⁵

Many local economies are accustomed to operating within the constraints of local ecosystems and have evolved methods for dealing with them. Producers and consumers are more likely to live close to the means of production and thus are less able to "externalize" costs onto others.⁵⁶ Sometimes they are the same individuals, or have bonds of kinship or marriage, and in any case they tend to live close together in the same community, all of which tend to increase accountability.⁵⁷ While some of these communities may have engaged in long-distance trade for centuries, they often have developed traditions that minimize its impact on their environment.⁵⁸ The emphasis on indigenous knowledge is not intended to romanticize non-western or non-industrial cultures. These cultures, too, cause biodiversity loss, especially as their populations grow. And they too, often seek some of the benefits of the industrial economy. But their traditional economies and styles of life are in many cases far more consistent with conservation than those of industrial society.

⁵⁰ Shelton, *supra* note 2 at 77.

⁵¹ *Ibid.*

⁵² *Id.*, at 78.

⁵³ *Ibid.*

⁵⁴ *Ibid.*

⁵⁵ Biodiversity Convention, *supra* note 30, Preamble's 3rd recital.

⁵⁶ Downs, *supra* note 1 at 208.

⁵⁷ *Ibid.*

⁵⁸ *Id.*, at 209.

VI. INFORMATIONAL AND SOURCE VALUE OF GENETIC BIODIVERSITY TO BIO-TECH INDUSTRIES

Over 95% of the world's resources originate and are concentrated in Third World countries.⁵⁹ Modern agricultural systems in Northern countries need a continual supply of diverse genetic resources in order to maintain healthy crops and, as a result, there is a net flow of genetic resources from the South to the North.⁶⁰ The germplasm siphoned off from biodiversity or the unmodified genetic material is taken by industries in the developed world and converted into a value-added product which is sold back to the developing nations.

The mere existence of greater diversity (irrespective of the specific components of that diversity) also has value. One of the most important services rendered by diversity is information.⁶¹ The genetic and chemical structures found in diverse species, and varieties of species, are an extremely valuable source of products such as pharmaceuticals, biotechnology products and processes, and new varieties of crops.⁶²

Fewer than 1% of flowering plants have been thoroughly investigated by modern science for their chemical composition. Traditional knowledge of the biology and utility of plants is vast by comparison.⁶³ Thousands of years of direct dependence on plants has required the revision and perpetuation of a significant body of information regarding the value of individual species and their habitats.⁶⁴

Potential use of plant fibers such as hardwood, bamboo or jute can be readily surmised and tested, but useful chemical activity or nutritional benefits

⁵⁹ C.L. McDougall, *INTELLECTUAL PROPERTY RIGHTS AND THE BIODIVERSITY CONVENTION : THE IMPACT OF GATT (1995)* at 4.

⁶⁰ *Ibid.*

⁶¹ Timothy Swanson, *Global Action for Biodiversity : An International Framework for Implementing the Convention on Biological Diversity* (London: IUCN, 1997) at 63.

⁶² Hermann Daly and John B. Cobb, Jr., *FOR THE COMMON GOOD* (Boston : Boston Press, 1991) at 205. (Ultimately all of our food, as well as most of our other daily needs, derive from the diversity of technologies that plants and other photosynthetic organisms use to tap the energy of the sun. The blueprint for these technologies are stored as genetic information. "If our ultimate natural resource is the solar flow of low entropy, then our ultimate capital is the gene pool in which evolution has evolved and stored technologies for tapping this basic flow for life generation").— Downs, *supra* note 1, at 213.

⁶³ Jennie W. Sheldon and Michael J. Balick, "Ethnobotany and the Search for Balance Use and Conservation" in Timothy Swanson, ed., *INTELLECTUAL PROPERTY RIGHTS AND BIODIVERSITY CONSERVATION : AN INTERDISCIPLINARY ANALYSIS OF THE VALUES OF MEDICINAL PLANT* (London: 1995) at 46.

⁶⁴ *Id.*, at 47.

are more difficult to determine. Numerous strategies have been developed to steer the selection and matching of plant species and applications. Like a farmer who tests soil composition by taste, a sample taste can provide evidence of a plant's chemical properties; sweetness may indicate a plant is edible whereas a bitter flavor often signals toxicity or potential medicinal activity.⁶⁵ Other indications of potential chemical activity are based on the observation of a species' characteristics *in vivo*.⁶⁶ When it has been noticed that mosses appear to never grow on the trunks of certain trees, or that bark heals most quickly when stripped from the side of a tree which receives the most sun, these observations are incorporated into traditional knowledge about plants and their potentially therapeutic applications.⁶⁷

The morphology of individual plant species has also been correlated with their medicinal efficacy. The 'Doctrine of Signatures' is based on the belief that shape, color or other characteristics serve as clues alluding to specific diseases or a particular part of the body for which a plant would be an effective remedy.⁶⁸ There are many historic examples which include administering the snake-like root of *Ruwolfia serpentina* as an antivenom, red latex or leaves for blood disorders, milky saps (*Ficus and Prunus dulcis*) to encourage milk in nursing mothers and liver-shaped leaves (*Hepatica nobilis*) to treat liver.⁶⁹ The hybrid varieties that yield bumper corn crops in the United States depend on traditional varieties or wild relatives of corn found in Mexico for resistance to disease or drought.⁷⁰

Lead compounds from nature that are of interest to the pharmaceutical industry are drawn from the secondary metabolites produced by living organisms. Primary metabolites are the principal chemical constituents, such as amino acids, that are common to all living organisms. Secondary metabolites are more complex compounds that are generally common only to a particular family, genus or even species.⁷¹ As secondary metabolites of different types are present in all organisms, the full range of biodiversity has the potential for yielding new compounds of medicinal interest.⁷² A discussion of the use of natural products in the development of new pharmaceuticals is often largely associated with the use of plants, particularly those found in tropical rainforests. This is in part a result of the popular appeal of the

⁶⁵ *Ibid.*

^{66.} *Ibid.*

⁶⁶ *Ibid.*

⁶⁷ *Ibid.*

⁶⁸ *Ibid.*

⁶⁹ *Ibid.*

⁷⁰ Downs, *supra* note 1 at 205.

⁷¹ Bruce Aylward, "The Role of Plant Screening and Plant Supply in Biodiversity Conservation, Drug Development and Health Care", in Swanson, *supra* note 63 at 103.

⁷² *Ibid.*

argument for conservation that is based on preserving potential cures for AIDS, cancer and other life threatening and debilitating diseases.⁷³

Neem a tropical tree is known as an effective germicidal plant. It is believed to have antiviral properties and is used that way by growing in the premises by the people. Its leaves have a curing effect on patients suffering from measles. The water boiled with leaves of *neem* and strained thereafter acts as an effective blood purifier, if consumed. Such germicidal quality of *neem* has eventuated the safe and effective contraceptive.

In sum, biological diversity contains informational value because it maintains a wider choice set. This generates something that economists term a 'quasi-option value', i.e. the value of retaining a wider set of choices in the event that the decision making environment shift to render the retained choices relevant.⁷⁴ The aggregate value of biodiversity as a present and future source of genetic and chemical information is difficult to measure, but clearly immense.⁷⁵

VI. RECOGNIZING PROPERTY RIGHTS FOR INDIGENOUS KNOWLEDGE

The question arises whether the information in *natural capital*⁷⁶ can be considered technological in some regard. It is often seen that in most cases innovations are based on some already known basic knowledge about a particular plant. The screening process can be rendered by means of the use of the information accumulated by the human communities living in contact with diverse resources. These people gather this information simply by interacting with their biological environment. For example, the important drug *Tubocurarine* was developed from the poison known as *curare* used on poison-arrows by Latin American peoples.⁷⁷ Indigenous peoples' information is much more useful than a single example demonstrates. A study by Farnsworth⁷⁸ of 119 commercially useful plant-based drugs identified that 74 per cent of them were in prior use by indigenous communities. Thus it provides the impetus behind industrial investments in ethnobotany, the research into indigenous peoples' traditional medicines.

⁷³ *Ibid.*

⁷⁴ Swanson 1997, *supra* note 61 at 64-65.

⁷⁵ Downes, *supra* note 1 at 205.

⁷⁶ 'Natural capital' is the phrase which is used to describe the diversity that exists within nature as an important and useful source of information (besides raw germplasm) that feeds into our industries and into our lives. Swanson, *supra* note 61 at 152.

⁷⁷ H. Illitis, *Serendipity in the Exploration of Biodiversity*, in E.O. Wilson, *BIODIVERSITY* (Washington D.C.: National Academy of Sciences, 1988).

⁷⁸ N. Farnsworth, *Screening Plants of New Medicines*, in Wilson, *id.*

The information emanating from diverse resources is used by industries other than the pharmaceutical. For example, many communities raising traditional non-specialized crops have known of useful traits of these species which were not incorporated into the standard commodities. The most closely related varieties—known as ‘landraces’—have periodically been used for improvements to the standard varieties. The crop breeding enterprise is in fact a major international industry, spending US\$ 330 million on the research and development of crop varieties in 1988⁷⁹ Therefore, plant-screening occurs with regard to more than similarly medicinal plants. Several times various qualities and characteristics of particular plant which may be the basis of modern scientific innovations reveal themselves by varied usages of the plant by the host community. These various usages come out to be workable as a result of various unsophisticated experiments or technologies done by the people of host community.

Therefore, establishing of some sort of ‘property right regime’ can be justified for indigenous and traditional knowledge about biodiversity.

*(i) Criticism of Extending Property Rights to
Traditional Knowledge*

Critics raise various objections to extending property rights to the traditional knowledge of local communities. They argue that biological knowledge is too valuable to be commoditized for individual gain, but rather that its benefits should be freely shared as common heritage of mankind, even where the knowledge is not widespread.⁸⁰ Others also note that traditional knowledge, particularly about agricultural practices, is often freely exchanged with no exception of payment or concept of exclusivity. Moreover, communities have acquired this knowledge incrementally over the centuries. Most of those who have contributed are dead, and it could be inequitable to compensate those who remain.⁸¹ Further, establishing a system of intellectual property rights in pre-capitalist societies may hasten the destruction that compensation is intended to prevent.⁸² Subsistence groups could be further marginalised or their territories transformed to produce the most ‘useful’ resources. Finally, local communities may be unaware of important uses for plants they identify. For example, a plant may help combat a disease which is not endemic to the area where the plant grows and is used. When the discoveries are made in laboratories to which researchers take the plants for study, issues of compensation become more complex.⁸³

⁷⁹ Swanson 1997, *supra* note 61 at 64.

⁸⁰ Brush, *supra* note 24 at 653.

⁸¹ Shelton, *supra* note 2 at 98.

⁸² *Ibid.*

⁸³ *Ibid.*

(ii) *Inappropriateness of Criticism*

However, the objections are not sustainable. They are raised to protect the unhindered interests of biotechnological Industries. For the first argument the 'common heritage of mankind' should be understood with its real intent. If someone delves into the meaning of 'common heritage of mankind' as its application to biodiversity, he shall find the reality of its being imbued with endeavor to sustainability. Life of mankind is not of some hundred years. Rather it encompasses whole future of the living world. Therefore, the narrow meaning of the phrase thereby to allow the *user States* to have free access to collection of germplasm can not be sustained, as that would mean unhindered and unregulated use-up of natural genetic diversity and consequent genetic erosion of natural capital. Why only biological knowledge,⁸⁴ why not biotechnological knowledge too should be considered to be freely shared as a common heritage of mankind at least for the conservation of biodiversity itself. At the place of earnest provisions solely for protecting the economic interests resulting from the result of laboratory based technology, a mechanism providing for sufficiently moderate economic interests may be ensured for incentives in the natural capital. The objection is also not good in view of the perception that traditional knowledge should be regarded as property is not motivated by acquisition of private gains, rather to invest back in natural capital. Second, objection that for the contribution made by the persons who are now dead, it is inequitable to compensate those who remain,⁸⁵ will water down the laws relating to the benefits arising, from representative and ancestral status trust. Furthering, guarding, repositing and conserving the traditional knowledge is the contribution of those who remain. Third, as to the fear that intellectual property rights in pre-capitalist societies may hasten the destruction of that compensations is intended to prevent⁸⁶ is baseless. If the mechanism for compensation is effective enough as watchdog of ensuring the compensation to be duly invested for the conservation of biodiversity. Finally, the issue of compensation⁸⁷ is not complex if the researchers take the plants for study in the laboratory, because compensation should not be pre-based, i.e. viewed for the plants taken as raw material. Rather, it should be post-success based, i.e. if the study succeeds, the compensation should be paid by way of royalty on the line of John Moore's case.⁸⁸ This way no complexity shall remain. In fact what is

⁸⁴ *Supra* note 83 and accompanying text.

⁸⁵ *Supra* note 84 and accompanying text.

⁸⁶ *Supra* note 85 and accompanying text.

⁸⁷ *Supra* note 86 and accompanying text.

⁸⁸ In *John Moore v. Regents of University of California*, a dispute arose between the university hospital and a patient over the use of some of his 'cells' that had been removed during an operation and subsequently used in the production of a patented medical product. The patient took legal action to recover some of the money that had been received from sales of the product. The use of human tissue,

needed is the will and tendency to transcend narrow national economic gains in face of conserving 'common heritage of mankind'.

Most of these objections concern the fairness of restricting access and use of local resources and traditional knowledge in particular cases. But if property rights are generally appropriate to protect people and resources and are also in the public interest, then the definition of property can exclude those cases in which protection is unwarranted.

Thus the numerous interests must be balanced in order to meet the twin goals of protecting biological resources and preserving local communities fairly and equitably. These interests include those of the local communities, the states in which the knowledge and resources are located, researchers and collectors, companies that use the knowledge and consumers of the products thereby developed.

VIII. TRADE SECRET'S BASED RIGHTS FOR TRADITIONAL KNOWLEDGE

The biotechnology industry relies upon trade secret protection in a number of circumstances:

- (a) to protect information prior to all application for its patent;
- (b) to protect peripheral, undisclosed know-how related to the patent, and
- (c) to protect information that is unpatentable, or for which patent law provides ineffective commercial security.⁸⁹

Indeed, it has been noted that trade secret protection is increasingly being used by the biotechnological industry as an effective method of protection.⁹⁰

In absence of 'novelty' requirement under Article 27 of the TRIPs Agreement,⁹¹ so as to be entitled for patent protection of traditional knowledge

as the basis on which a biotechnology patent was awarded, gave rise to conflicting 'property' rights between the patent owner and the individual tissue donor. The court eventually concluded that the common law tort of unlawfully converting personal property had taken place, and therefore the patient was entitled to compensation. — 271 *CAL. RPTR.*, 1990 at 146.

⁸⁹ Ian Walden, "Intellectual Property Rights and Biodiversity" in Michael Bowman and Catherin Redgwell, eds., *INTERNATIONAL LAW AND THE CONSERVATION OF BIOLOGICAL DIVERSITY* (London: Kluwer Law International, 1996) at 177.

⁹⁰ *Ibid.*

⁹¹ "... 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."—TRIPs Agreement, Article 27(1). Prior to the Final Act, the original GATT was applied through the Protocol of Provisional Application, Protocol of Provisional Application of the General Agreement on Tariff and Trade, opened for signature Oct. 30, 1947, 61 Stat. A2051, 55, U.N.T.S.

the key advantage of trade secret protection is that the length of protection is not limited to a certain number of years; it simply depends on the information remaining a "secret".⁹² However, the disadvantage of trade secret protection for genetic material and indigenous knowledge about it is the fact that the commercial exploitation of the material will usually involve its introduction into the public domain, thereby losing its nature as a secret.⁹³

Article 39(2) of the TRIPs Agreement provides. that natural and legal persons shall have the possibility of preventing information lawfully within their control from being disclosed to, acquired by or used by others ...,⁹⁴ so long as this information is secret...;⁹⁵ has commercial value because it is secret,⁹⁶ and has been subject to reasonable steps ... to keep it secret.⁹⁷

(i) *Collectivity Issue*

Before examining secrecy issue for the possibility to grant trade secrets' rights for indigenous knowledge about the species of biodiversity, it is necessary to discuss collectivity issue first, as absence of collectivity of knowledge is a pre-condition of secrecy.

It is argued that IPRs in form of 'trade secrets' may not be applicable because they like all IPRs are based on individual claimants, whereas traditional knowledge is usually seen as collectively held.⁹⁸ Attributes of general collectivity to traditional knowledge preclude the protection of intellectual property laws. Yet these laws protect the discoveries of modern research laboratories, although they often involve the work of large teams of people, each of whom contributes to the achievements of the laboratory.⁹⁹ When such protected discoveries of modern research laboratories involve the work of large team, it is arguable that there also the knowledge of discovery

308, the rules of GATT now constitute the principal rules of a larger agreement and formal international institution, the World Trade Organization (WTO). General Agreement on Tariff and Trade: Final Act Embodying the Results of the Uruguay Round of Multilateral Trade Negotiations, Apr. 15, 1994, subsequently reprinted in 33 ILM, 1994 at 1; Annex 1C - Agreements on Trade-Related Aspects of Intellectual Property Rights, Annex 1C, 33 ILM at 1197. For the purpose of this Article, the term "inventive step" and "capable of industrial application" may be deemed by a Member to be synonymous with the terms "non-obvious" and "useful" respectively.

⁹² Walden 1996, *supra* note 89.

⁹³ *Ibid.*

⁹⁴ TRIPs Agreement, Article 39.

⁹⁵ *Ibid.*

⁹⁶ *Ibid.*

⁹⁷ *Ibid.*

⁹⁸ Tarasofsky, *supra* note 7 at 151.

⁹⁹ Shelton, *supra* note 2 at 107.

should be labelled as *collective*. Gone are the days when signal inventions were made by single individuals. Nowadays, inventions especially in the field of biotechnology have assumed industrial character. Today's inventions are the result of efforts of large number of people involved in the work, often employed by companies or multinational corporations. Such multinational corporations are broad based and comprise number of people as members, share holders, experts, directors, scientists, analyses etc. and collectively they are viewed as single entity. Today, most intellectual property protection is afforded to companies, not to the individual creator or discoverer.¹⁰⁰ When such collectivity of a corporation does not come in the way of applicability of IPRs through 'trade secrets', why the collectivity be attributed to traditional and indigenous knowledge of the peoples. Thus the local communities and indigenous groups' claim as a group for intellectual property protection seems likely to succeed to protect the community and intergenerational knowledge and technologies of local communities. So, either the intellectual property laws should be extended to traditional, collective knowledge, or the utility and benefits of the entire system of intellectual property could be questioned.¹⁰¹

The difference between the 'corporation collectivity' and traditional collectivity' is that later lacks the organizational character. Thus the non-applicability of IPRs to indigenous knowledge collectively held may be imputed to lack of organizational character, which is unjustified. IPRs non-applicability on indigenous knowledge is doubtful also on the ground that there are no expressly laid down prohibitive provisions against the 'collective knowledge'.

Rather in contrast Article 39 para. 2 of the TRIPs Agreement provides— "Natural and legal *persons* shall have the possibility of preventing information lawfully within their control from being disclosed to, acquired by or used by others".¹⁰² Here the persons used in plural way indicate collective knowledge, not to be a bar to IPRs in form of trade secret.

(ii) Secrecy Issue

In an action for breach of trade secrets it is to be seen, if the information involved could be categorized as a trade secret or confidential information.¹⁰³ An action will only succeed if the plaintiff can show that adequate precautions were taken to protect the secret nature of the information.¹⁰⁴

In case of traditional knowledge about the genetic material, the community aspect of much genetic material makes secrecy problematic, and indeed

¹⁰⁰ *Id.*, at 106.

¹⁰¹ *Id.*, at 107.

¹⁰² TRIPs Agreement, Article 39.

¹⁰³ Walden 1996, *supra* note 89 at 177.

¹⁰⁴ *Ibid.*

secrecy would be contrary to the open exchange considered necessary for maximizing advances with genetic resources.¹⁰⁵ Thus trade secret legislation in respect of indigenous knowledge is not really applicable.¹⁰⁶ Indigenous knowledge of biodiversity generally does not fulfill the requirement of secrecy. So to prove it, adequate precautions to protect the secret nature of the information are required.

The Convention on Biological Diversity (CBD), shows concerns for traditional and technological knowledge. Article 8(j) requires that each 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 embodying traditional life-styles relevant for 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 practice *and encourage the equitable sharing of the benefits arising from the utilization* of such knowledge, innovations and practices.¹⁰⁷

From here, provisions relating to access to genetic resources, and access to and transfer of technology take lead under Article 15 and of the CBD. It provides that access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by the Party.¹⁰⁸ "Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, with the aim that Contracting Parties, in particular those that are Third World countries, which provide genetic resources are provided access to and transfer of technology which makes use to those resources, on mutually agreed terms, including technology protected by patents and other intellectual property rights..."¹⁰⁹ It has already been shown that genetic material invariably carries with it traditional and indigenous technological knowledge.¹¹⁰

In Australia, the courts have shown themselves willing to view plant genetic material as having the appropriate qualities of trade secrets.¹¹¹ In *Franklin v. Giddins*, 1978 the defendant stole cutting from the plaintiff's genetically unique nectarine trees. An action was taken for the improper

¹⁰⁵ William Lesser, Institutional Mechanisms Supporting Trade in Genetic Materials : Issue under the Biodiversity Convention and GATT/TRIPs (UNEP, 1994) at 40.

¹⁰⁶ *Ibid.*

¹⁰⁷ Biodiversity Convention, *supra* note 30, Article 8(j).

¹⁰⁸ *Id.*, Article 15(5).

¹⁰⁹ *Id.*, Article 16(3).

¹¹⁰ Heading — "Informational and Source Value of Genetic Biodiversity to Bio-Tech Industries", *id.*

¹¹¹ Ian Waldn, "Preserving Biodiversity : The Role of Property Rights", in Swanson, *supra* note 63 at 188.

acquisition of confidential information embodied within the genetic code of the trees.¹¹² The judge accepted this position, declaring that:

The parent tree may be likened to a safe within which there are locked up a number of copies of a formula for making a nectarine tree with special characteristics... when a twig of budwood is taken from the tree, it is as though a copy of the formula is taken out of the safe.¹¹³

Such secrecy does not have to be absolute, rather it is a question of objective fact. Although the courts will consider all forms of misappropriation of trade secrets, an action will usually only succeed if the plaintiff can show that adequate precautions were taken to protect the secret nature of the information.¹¹⁴

The genetic diversity in Third World countries has not come about by accident.¹¹⁵ It exists because of an ongoing process of conscious and unconscious selection, by farmers and indigenous communities.¹¹⁶ These “*steward of biodiversity since time immemorial*”¹¹⁷ have developed and maintained diversity to meet their own agricultural needs, in diverse and often difficult environments.¹¹⁸ Furthermore, their efforts have not just ‘conserved’ the gene pool, they have actively enhanced it.¹¹⁹ Using generations of experience and their understanding of agricultural production, farmers have developed thousands of different crop varieties to meet the specific needs of different agro ecosystem.¹²⁰

Indigenous knowledge of biodiversity generally does not fulfill the requirement of secrecy. So to prove it, adequate precautions to protect the secret nature of the information at the part of local community are difficult. However, this difficulty is related with lack of organizational structure. Problem of organizational structure may be solved by establishing a proper mechanism. Thus the existence of legal protection must be made known to local communities who then can withhold their knowledge until they negotiate satisfactory agreements on protection and remuneration. This might be

¹¹² *Id.*, at 188-89.

¹¹³ *Id.*, at 189.

¹¹⁴ TRIPs Agreement, *supra* note 95, Article 39(2)(c).

¹¹⁵ *Supra* note 59 at 4.

¹¹⁶ *Ibid.*

¹¹⁷ *Ibid.*

¹¹⁸ *Ibid.* There is common misconception that this form of diversity is not ‘productive’. This is untrue because although given the right inputs (which are expensive), the yield of a particular monoculture crop of a genetically uniform variety may be high, when the security benefits and the multiple yields (for multiple uses) of a diverse cropping systems are taken into account, then diversity can be understood to be highly productive, *Id.* at 15.

¹¹⁹ *Ibid.*

¹²⁰ *Id.*, at 4.

coupled with imposing a duty on researchers and collectors to obtain informed consent. Thus the invocation of intellectual property rights as ‘trade secrets’ could be a means to provide an incentive for local communities to conserve their knowledge for future generations and to share their knowledge with others.¹²¹

Against the backdrop of “secrecy” requirement, the information of traditional knowledge may be tried to be kept unknown. Traditional knowledge about the ecosystem and their plants may constitute proprietary ‘know-how’ or ‘trade Secrets’.¹²² The processing or use of a plant may not be known outside a local community or an indigenous group and it could thus contractually be protected.¹²³

*(iii) Difficulties and their Removal in Recognizing
‘Trade Secrets’ Rights for Indigenous Knowledge*

The provisions of the CBD relating to the regulating of access to genetic resources,¹²⁴ which carry with it the technological information, has been looked upon with disfavour. The Association of Biotechnology Companies, a U.S. organization that promotes the interests of biotech concerns, believed that the treaty would be substantially detrimental to those in agro-biotech.¹²⁵ The treaty expressly provides that engineers of new agricultural related technologies must provide “access to and transfer of technologies ... that make use of genetic resources... to developing countries”¹²⁶ This broad language is susceptible to an interpretation that a super-farmers’ privileges or privilege to indigenous knowledge of plant genetic material has been created—not only a right to use but a power to compel the relinquishing of agriculturally related biotechnology patents.¹²⁷

Now the resulting situation is paradoxical. The supply of ‘raw germplasm’ coupled with its informational asset has been considered to be ownerless (hence the terms ‘open access’ or the common heritage of mankind).¹²⁸ Southern contributors of raw genetic resources rarely receive either payment or recognition, even though these resources contribute to massive profits in the plant breeding and biotechnology industries and are deemed sufficiently

¹²¹ Shelton, *supra* note 2 at 109.

¹²² *Id.*, at 108.

¹²³ *Id.*, at 108-109

¹²⁴ Biodiversity Convention, *supra* note 30, Articles 15 and 16.

¹²⁵ David G. Scalis and D. Nugent, “International Intellectual Property Protections for Living Matter : Biotechnology, Multinational Conventions and the Exception for Agriculture”, 27 *CASE WESTERN RESERVE JOURNAL OF INTERNATIONAL LAW*, 1995 at 111.

¹²⁶ *Id.*, referring, Biodiversity Convention, *supra* note 30, Articles 16(1) and (2).

¹²⁷ *Ibid.*

¹²⁸ *Supra* note 59 at 8.

important to be preserved in international seed banks.¹²⁹ Originally countries were happy to provide these 'unimproved' resources in exchange for easy access to the improved results.¹³⁰ However, following the introduction of intellectual property protection for plant genetic resources, the cost of those improved materials rose substantially. At the same time, however, farmers and indigenous people found that they had no legal means of gaining either recognition or financial recompense for their own 'unimproved' resources including the basic indigenous knowledge upon which the edifice of biotechnology depended.¹³¹

The paradox exists as the free access to 'raw germplasm' including its informational asset of developing countries should have been a matter of credit. Yet with the IPR regime as provided by the TRIPS agreement for the requirement rights to be available as 'trade secrets', rendered the free access to genetic resources of the developing nations to the discredit by laying down the condition of "secrecy". So that the developing nations could be fleeced of their natural capital without any return, by the developed nations to spin billion of dollars, and at the same time keeping them completely dependent for any benefit of biotechnology.

The rescue against such imbalance is visible in the CBD provisions relating to restrictions on access to genetic resources with the sole object of conservation of the biodiversity. Here the profit orientations being least. By legislative or private measures restricting access to habitats, such as rainforests or reefs, might thus strengthen a claim of trade secrecy with respect to information about the habitats. Such measures are dubbed to have chilling effect on experimental research.¹³² It is argued that an industry's willingness to invest millions of dollars in research and development of innovative technology¹³³ is based, at least in part, on the protection intellectual property laws afford,¹³⁴ therefore developing countries should consider such rights a prerequisite.

¹²⁹ *Ibid.*

¹³⁰ *Ibid.*

¹³¹ *Ibid.*

¹³² M.A. Gollin, "An Intellectual Property Rights Framework for Biodiversity Prospecting", in W.V. Reid, et. al., ed., *BIODIVERSITY PROSPECTING : USING GENETIC RESOURCES FOR SUSTAINABLE DEVELOPMENT* (WRI, Washington D.C., 1993) at 164.

¹³³ In 1986, U.S. pharmaceutical firms spend \$4.6 billion on research and development. On average, it takes about 10 years and \$125 million to discover, test and market a new drug in the United States.—Gerald J. Mossinghoff, "Research — Based Pharmaceutical Companies: The Need for Improved Patent Protection Worldwide", 2 *JOURNAL OF LAW TECHNOLOGY*, 1987 at 307, 308.

¹³⁴ David E. Bell, "The 1992 Convention on Biological Diversity : The Continuing Significance of U.S. Objections at the Earth Summit", 26 *GEORGE*

So much earnestness is shown for the IPRs in relation to biotech-industries. However, any degree of earnestness in respect of conservation of natural capital and any return for germplasm and for its informational contribution to its place of origin is conspicuously absent. Such state of affairs testifies the duplicity and self-oriented attitude of the North at the expense of the South. Reciprocity is unheeded, and from the 'give and take' principle only 'take' has been secured by the developed nations.

However the motivation or 'will' to conserve diversity at the part of indigenous community is not the only necessary factor. Farmers have to have the ability to conserve diversity as well. In this particular context, 'ability' is taken as meaning continued access to 'good seed' of high physiological quality.¹³⁵ Farmers depend upon biological diversity for their livelihoods, and contribute to it in return.¹³⁶ If they cannot have access to 'good', diverse seed resources, their contribution to the preservation and promotion of diversity cannot be sustained, nor their livelihood supported.¹³⁷

As to the issue that does any conflict exist between Article 39(2), of the TRIPs Agreement, relating to the conditions of "secrecy"¹³⁸, and, CBD's provisions relating to "access to genetic resources" subject to prior informed consent and, on mutually agreed terms as provided in Article 15 and 16 respectively,¹³⁹ the answer might be negative. Article 39(2) (2) of the TRIPs Agreement impels specifically to endeavor that knowledge be kept confidential and only then it could be claimed as 'trade secrets'. The 'access to genetic resources' provisions essentially may have in its fold useful information upon which biotechnological improvements may be done. Therefore, restrictions on free access as provided by CBD can be said to be mandated by the TRIPs Agreement for the indigenous information to be entitled for having 'trade secret' rights.

IX. CONCLUSION

Indigenous knowledge of biodiversity generally does not fulfill the requirement of secrecy. So to prove it, adequate precautions to protect the secret nature of the information at the part of local community are needed.

WASHINGTON JOURNAL OF INTERNATIONAL LAW & ECONOMY, 1996 at 524.

¹³⁵ The term 'good seed' is used to denote appropriate varieties of seed of good physiological quality. Good seed is essential to the production of diversity, the rest can be considered essential to agricultural production generally. Friends, *supra* note 59 at 20-21.

¹³⁶ *Ibid.*

¹³⁷ *Ibid.*

¹³⁸ *Supra* note 106.

¹³⁹ Biodiversity Convention, *supra* note 30; *Supra* note 112, 113 and accompanying text.

However, this difficulty is also related with lack of organizational structure. In the United States, trade secrets protect confidential information and know-how that gives the owner a competitive advantage. Particular measures to maintain secrecy may be necessary to establish define and provide notice of a trade secret.¹⁴⁰ For example, marking documents as confidential, preserving access to certain equipment or plantations, and obtaining confidentiality agreements can distinguish secret from non-secret material.¹⁴¹ Legislative or private measures restricting access to habitats, such as rain-forests or reefs, might thus strengthen a claim of trade secrecy with respect to information about the habitats.¹⁴² Governments should review intellectual property laws to determine the scope of protection to be afforded for discoveries concerning living organisms.¹⁴³ They should explore how such protection might provide for recognition of traditional knowledge and ensure adequate compensation for indigenous populations that choose to share their traditional knowledge.¹⁴⁴

A trade secret can endure forever, provided that the formula, information or device remains secret. In plant breeding, for example, the lines used to produce a hybrid may be protected as secrets indefinitely.¹⁴⁵ The owner of a trade secret may license, disclose or assign the right to use the trade secret, subject to an agreement to hold the information in confidence. One who without permission uses a farmer's or a traditional healer's secret knowledge to produce a new drug or crop may be liable for resulting profits.¹⁴⁶ However it is argued that concept of confidentiality may be elusive in a traditional culture that emphasizes common over private property.¹⁴⁷ If an extractive technique is handed down from generation to generation of traditional healers. The information could be considered a trade secret by developed-country standards if it is kept from others both within and outside the traditional society.¹⁴⁸ But once traditional knowledge (e.g., the identity and use of species of fungus) is published by a researcher, government entity, or anyone in the world, the trade secret rights are extinguished.¹⁴⁹ But the existence of legal protection must be known to local communities who then can withhold their knowledge until they negotiate satisfactory agreements on protection and remuneration. This might be coupled with imposing a duty on researchers and collectors to obtain informed consent.¹⁵⁰ In the United States, publication of such knowledge

¹⁴⁰ Gollin, *supra* note 138 at 163.

¹⁴¹ *Id.* at 163-164.

¹⁴² *Ibid.*

¹⁴³ Shelton, *supra* note 2.

¹⁴⁴ *Ibid.*

¹⁴⁵ Gollin, *supra* note 138 at 164.

¹⁴⁶ *Ibid.*

¹⁴⁷ *Ibid.*

¹⁴⁸ *Ibid.*

¹⁴⁹ *Id.*, at 164-165.

¹⁵⁰ *Ibid.*

without knowing agreement arguably could be considered a misappropriation, theft or taking of trade secrets as long as the information was not innocently learned from a third party or reverse engineered from a product.

Therefore, the trade secrets may comprise important components of packages of technology transferred as part of biodiversity prospecting agreements, they can also provide at least some form of protection for information in countries where patents are unavailable. Thus, the law of trade secrets is one suitable tool for promoting the sustainable development of biological resources in wild habitats.