Chapter 3

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The current system of Intellectual Property Rights is based on the English system, which is founded on the old practices of the kingdom. In medieval times, patents were granted by the English Crown for raising funds and for securing control over the industries that were considered to be of political importance. The basic concept of intellectual property can be traced back as far as the fourth century B.C. to Aristotle. There are two main arguments in favour of Intellectual Property Rights as follows –

- An idea belongs to its creator because the idea is a manifestation of the creator's personality or self.
- The unpleasantness of labour should be rewarded with property.

3.1 History of Intellectual Property Rights and Bio-Diversity

Though IPRs such as copyrights, patents, and trademarks are centuries old, the extension of IPRs to living beings and knowledge/technologies related to them is a relatively recent phenomenon which has raised many controversies. It all started when in 1930, the US Plant Patent Act was passed, which gave IPRs to asexually reproduced plant varieties. Several other

countries subsequently extended such or other forms of protection to plant varieties, until in 1961, an International Convention for the Protection of New Varieties of Plants was signed. Most signatories were industrialized countries, who had also formed a Union for the Protection of New Varieties of Plants (UPOV) in 1968.

Plant Varieties' Rights or Plant Breeders' Rights (PVRs/PBRs), give the right-holder limited regulatory powers over the marketing of 'their' varieties. Till recently, most countries allowed farmers and other breeders to be exempted from the provisions of such rights, as long as they did not indulge in branded commercial transactions of the varieties. These farmers or breeders were allowed to use freely the plant varieties of other breeders, having some rights for the purpose of growing crops or to use it for a new or modified breeding technique. Now, however, after an amendment in 1991, UPOV itself has tightened the monopolistic nature of PVRs/PBRs, and some countries have substantially removed the exemptions to farmers and breeders.

Now the scenario has changed. Boundaries have expanded and horizons have widened. Monopolistic restrictions are no longer limited to technology but have been extended to plant varieties, micro-organisms, and genetically modified animals in many countries. The decision of the US Supreme Court that microbiologist Ananda Chakrabarty's patent claim for a genetically engineered bacterial strain, was permissible[1], opened

[1] *Sydney A Diamond v A M Chakrabarty 447 US 303 (1980)*

the floodgates of patents on life. This legitimised the view that anything made by humans and not found in nature was patentable. The Supreme Court allowed the grant of the patent to stand, US Chief Justice Burger famously remarking that in principle `anything under the sun that is made by man is eligible for patenting'.

Genetically altered animals, such as the infamous **'Onco-mouse'** of Harvard University (bred for cancer research), were also soon given patents. Finally, several patent claims have been made, and some granted, on human genetic material, including on material that has hardly been altered from its natural state. Even Chakrabarty himself for his patent said that he had only shuffled a few genes.

Till very recently, these trends were restricted to some countries, which could not impose them on others. However, with the signing of the TRIPs agreement, this has changed. TRIPs requires that all signatory countries accept:

- Patenting of micro-organisms and "microbiological processes";
- Some "effective" form of IPRs on plant varieties, either patents or some *'sui generis'* version.

TRIPs allows countries to exclude animals and plants *per se* from patentability. However, the provisions above have serious enough implications, for no longer are countries allowed to

exclude patenting of life forms altogether (micro-organisms have to be open for patenting). Nor is there likely to be a great amount of flexibility in evolving *'sui generis'* systems of plant variety protection, for the term "effective" may well be interpreted by industrial countries to mean a UPOV-like model. A series of events hosted by UPOV, World Trade Organization (WTO) or other agencies, have shown that this interpretation is already being imposed on 'developing' countries. The African Intellectual Property Organization (OAPI), representing 15 countries, decided to join UPOV 1991.

The history of IPRs shows that the monopolistic hold of Governments, corporations and some individuals over biological resources and related knowledge is continuously increasing. This monopoly is built upon the resources conserved and knowledge generated by indigenous and local communities, and in many cases, the appropriation of such resources and knowledge.

3.2 Raison D'etre of IPRs

IPRs are to be distinguished from physical property rights. In the context of genetic resources and biotechnology, ownership of the physical resources – plant or animal – is governed by property laws while ownership of the genetic information contained in the plant or animal is governed by intellectual property laws. There are several types of IPRs such as -

Copyrights and related rights
Trademarks
Geographical indications
Industrial designs
Patents and Plant Variety Protection (PVP)
Layout-designs (Topographics) of integrated circuits
Trade secrets & Undisclosed information
Anti-competitive practices in contractual licences.

Patent is a right granted by a Government to inventors to exclude others from imitating, manufacturing, using or selling a specific invention for commercial use for a certain period. In our country this is for 20 years. A patent prevents someone from making commercial use of what is claimed in the patent without authorization of the patent holder. To be patentable, an invention must be –

- ✓ Non-obvious for someone skilled in the art, i.e. not simply be an extension of something that already exists but require some inventive step
- ✓ Novel, i.e. not previously known
- ✓ Industrially applicable in some way and useful, i.e. utility

Patents can be given for products and processes. Patents are limited to a fixed period, after which the invention moves into the public domain and can be used by anyone. They are only applicable in the country in which they are granted[2]. In return

[2] *On July 31, 1790 Samuel Hopkins was issued the first patent in US for a process of making Potash*

for the temporary partial monopoly granted by the patent, the inventor must make a full disclosure of the nature of his invention understandable to anyone else skilled in the necessary arts or sciences. In this way, inventions do not die with the inventor. Moreover, others can try to invent something better, but sufficiently different, so as not to infringe on the claim of the original patent.

The sole objective of IPRs is to reward inventors who contribute significantly to the betterment of mankind through their dedication and sheer hard work and utilize their intellectual capacity for research. This reward is given by providing exclusive benefits resulting from such research work for a particular period of time, thereby encouraging others also to give their best to make the lives of millions more meaningful. At the same time the existing benefits offered to humankind by Mother Nature, which has a rich diversity and is our common heritage and which advocates the concept of 'Live and let live' and 'Nature is for all', should not fall in the hands of only a few individuals in the name of development for solely commercial purposes.

The Indian Patent Act of 1970 states –

"that patents are granted to encourage inventions and to secure that the inventions are worked in India on a commercial scale and to the fullest extent that is reasonably practicable without undue delay and that they are not granted merely to enable the

patentees to enjoy a monopoly for importation of patented articles."[3]

It is clear from the provisions of this Act that India has been in favour of supporting Intellectual Property Rights on the expectations that the inventions are worked in India on a commercial basis. They are certainly not intended to be used purely for imports on the basis of monopolies granted in effect by the patent right. However, the question remains whether it has been successful or not.

A very important aspect of the Indian patent system is that patents are granted on a process and not on a product, a procedure which was widely practiced in all developing countries during the 19th century, and in many developed countries until quite recently.

In today's market based economics, however, the rationale for protecting intellectual property is essentially utilitarian. A piece of knowledge - whether the blueprint of a new machine or a new method of harvesting rice - unlike a physical object, can be used by one person without limiting its use by others. The widest possible dissemination of new knowledge makes for the greatest economics. But if everybody is free to access new knowledge, inventors have little incentive to invest in producing it. IPRs transform knowledge from a public good to private good. Through enhanced market power conferred by IPRs, owners of IPRs can

[3] *Menon, M G K – 'The Dunkel Draft and Intellectual Property Rights'*

recoup their expenditure in creating new knowledge. Creative minds and innovators thus have an incentive to engage in inventive activities.

This utilitarian argument provides the main rationale for the protection given by patents, copyrights, plant breeders' rights and several other types of IPRs. The various forms of intellectual property differ in terms of the subject matter that may be eligible for protection, the scope and duration of protection and possible exemptions to exclusive rights - reflecting society's objective to balance the interests of producers & users of intellectual works.

The arguments made in favour of IPRs include –

- Encouraging and safeguarding intellectual and artistic creation
- Disseminating new ideas and technology quickly and widely
- Promoting investment
- Providing consumers with the results of creation and invention
- Providing increased opportunities for the distribution of these effects across countries in a manner proportionate to national levels of economic and industrial development

3.3 Interface between IPRs and Biodiversity

Historically patents have served to protect the lone inventor from being ripped-off by big business, though whether he can afford to establish his right in law is another matter. Patents or any

Intellectual Property Rights exist to award intellectual endeavour i.e. 'any new and useful process, machine, manufacture or composition of matter, or any new and useful improvement thereof '; they were never meant to award mere discovery. Consider the situation if one of the most important and significant inventions of the developmental stage of humankind, i.e. fire, which revolutionized the life of human beings, had been patented!!

On the basis of the current granting of patents Newton could have patented the laws of gravity, Einstein the Theory of Relativity, the elements could have been patented, new planets could be patented, a royalty charged for anyone who chose to look at them, etc. **Imagine a situation where IPRs are extended to biodiversity and patents are granted on the fragrance of new varieties of roses – a passerby would be asked to pay royalty for inadvertently getting a whiff of their fragrance!**

There are many problems associated with the application of rights to intellectual property in Biotechnology. Many do not want to allow it at all, India for example has fought hard to exclude most living systems and their use therapeutically, from inclusion in any protective system and the patent system was based on protection of process rather than product. On the other hand modern biotechnology costs money – lots of money. Those investing in it will want a return on their investment, and no one wants to invest millions, even billions, of dollars or rupees in a

product, only to find that others are capable of copying the product and exploiting it without having incurred any of the major development costs. It is said that the bringing to market of a new drug costs more than Rs.40 billion but to copy the same drug costs less than Rs4 million. Thus while *Pfizer* introduced in India its anti-hypertensive drug *Enalapril* at a price of more than Rs.20 per tablet, the Indian copycats could sell the same at less than Rs.2 per tablet. Legal recognition of IPRs is the means whereby the developers of biotechnological processes and products and those who funded the development can prevent others from copying, further developing, or in other ways exploiting what they have not themselves developed (or, at least prevent them from doing this without having to recompense those holding the IPRs). Society derives satisfactory compensation for the rights it temporarily confers on certain individuals since the exclusivity generates benefits especially in the long run, that adequately offset any economic disadvantages or risks which 'exclusive rights' might possibly entail.

3.4 Patenting Plants

Under the new rules of GATT, which took effect on January 1, 1995, all member countries must bring their national IPR laws into conformity with certain provisions of the new agreement on TRIPs. This agreement obliges member Governments to provide for "the protection of plant varieties either by patents or by an effective *'sui generis'* system or by any combination thereof." (*'Sui generis'* is a Latin phrase meaning "of its own kind.") Simultaneously, Governments are given the option to exclude

from patentability "plants and animals other than micro-organisms" and the "essentially biological processes for the production of plants or animals other than non-biological and microbiological processes." These provisions were so controversial during the GATT negotiations that the final agreement stated that they "shall be reviewed four years after the date of entry into force" -- in other words, in 1999. Patenting enables the company to monopolize the market for new plant varieties deriving from the original plant for the term of the patent. Agrecetus, for example, a subsidiary of W.R. Grace, had sought exclusive rights to all genetically engineered varieties of cotton and soyabeans in what is known as a "sweeping patent."[4] The cotton patent was granted by the US Patents and Trademarks Office (USPTO) in 1992 and the soyabean patent was granted by the European Patent Convention in 1994. Since then, the sweeping cotton patent was tentatively reversed by the USPTO after a challenge was issued by the US Department of Agriculture and an anonymous party. The European patent has also been challenged on grounds that genetically engineered plants are neither "novel" inventions nor "non-obvious" innovations, according to the criteria of European patent law.

The ability to patent the world's biological diversity brings promise of great new sources of revenue for pharmaceutical, food and seed companies, and biotechnology firms. The income generated by patenting a single plant variety can be mind boggling. A communication released by Monsanto says that it

[4] *www.uspto.gov (official website of United States Patent and Trademark Office)*

expects to earn an additional $150 million annually from a new variety of soyabean. This soyabean is designed to withstand intensive applications of the herbicide which Monsanto itself markets most widely: Round-Up.

3.5 Impacts of IPRs on Biodiversity

Direct impacts of IPRs on biodiversity are hard to perceive, but some of them are as follows-

- Current IPR regimes have allowed industrial and commercial interests to appropriate the resources and knowledge of resource-rich but economically poor countries and communities, further 'impoverishing' them or excluding them from technological improvements;
- IPRs are likely to greatly intensify the trend to homogenize agricultural production and medicinal plant use systems. In agriculture, for instance, any corporation which has spent enormous amounts of money obtaining an IPR, would want to push its varieties in as large an area as possible. The result would be serious displacement of local diversity of crops (though of course IPRs would not be the only factor in this);
- Increasingly species-wide IPRs (such as those on transgenic cotton and soyabean) could stifle even public sector and small-scale private sector crop variety development;
- Having to pay substantial royalties to industrial countries and corporations could greatly increase the debt burdens of many countries. This could further intensify the

environmental and social disruption that is caused when debt repayment measures are taken up, such as the export of natural products;

- Farmers who innovate on seeds through re-use, exchange with other farmers, and other means, would be increasingly discouraged from doing so if the tighter regimes that UPOV 1991 approves are imposed on their countries; these regimes would also increase the economic burden on farmers, further discouraging innovation;
- The ethical aspects of IPRs are serious, and to many communities and people the most important reasons for opposing current IPR regimes: the patenting of life forms (abhorrent to many traditional societies and modern conservationists because of its assumption that Nature exists apart from, and for the interest of, humans);
- The privatization of knowledge (repugnant to many societies which held knowledge largely, though by no means only, in the public domain); and others.

In developing new products, scientists take plant samples from the field to the laboratory, where the simple act of moving a single gene from one spot to another within a cell – whether or not it causes an actual variation in the next generation, creates a "plant variety" deemed sufficiently "new" to qualify as a patentable invention. In most cases, such genetic engineering experiments produce nothing worthwhile. In a few cases, the variations have desirable traits that can be reproduced and marketed.

The emphasis on finding and isolating plants with the most marketable traits leads to the decline of other plant species, as only those required to create the new techno-varieties are cultivated. In the US alone, the focus on commercial varieties has already led to the loss of many varieties of plants in seed bank storage. A survey of US seed banks showed that some varieties of non-commercial and indigenous crops such as chufas, martynia and rampion are lost entirely.

In addition, the privatization of genetic resources that have been engineered and patented accelerates the trend toward mono-cultural cropping. Just as a mere handful of varieties of patented hybrid corn now cover millions of acres of the mid-western US corn belt, where prairies once hosted thousands of varieties of grasses supporting birds and butterflies, bees and other life, so too will the biodiversity of other lands shrink as patented crops take over.

In India, for example, peasant producers now cultivate some 50,000 varieties of rice[5], developed through traditional practices over the millennia. This astonishing variety arose from subtle differences in soil and climatic conditions through mutation, evolution, and the deliberate application of cultural preferences. The GATT-TRIPs Rules would prohibit these farmers from harvesting and reusing the seed of any rice variety that has been patented. (Unlike hybrid species cultivated by plant breeders, genetically engineered plants do produce viable seed.) Lack of

[5] *Navdanya, Cultivating diversity, Research Foundation for Science, Technology & Natural Resource Policy Delhi, India. 1993*

access to seed stocks will cause the abandonment of much of India's biologically diverse agriculture, which in turn sustains healthy diversity in surrounding ecosystems.

Furthermore, an engineered organism may produce unanticipated harmful impacts on other species in its new environment. A group of scientists at Oregon State University, for example, engineered a variety of Klebsiella Planticola, a bacterium known to reside in the soil and contributing to the decomposition of plant material. Their goal was to engineer a product that would efficiently convert agricultural wastes to ethanol fuel. Although the project was successful in meeting this goal, the scientists discovered in late stages of testing that the new product also destroyed much of a beneficial Mycorrhizal fungus essential to the recycling of nitrogen through plant roots – which could lead to desertification throughout the range of the product.

Clear evidence that the patent system has stimulated the development of new products and technology, which otherwise would not have been developed, is only available for a few sectors such as pharmaceuticals. In other sectors, patents are sometimes considered to have mainly anti-competitive effects. They serve to secure and strengthen the position of market leaders and limit the entry of new competitors.[6] In the extreme, they may actually slow the pace of innovation if a dominant firm

[6] *Primo Braga et al, 1999*

In both Argentina and Brazil, their Congresses have also fought against altering their national IPR laws to conform to TRIPs.

Although policymakers have sought to limit the adverse effects of patents through revised IPR legislation, competition policy and other business regulations, the anti-competitive implications of patents remain a cause of concern. Such concerns have regained momentum with the emergence of patents on biotechnology products and processes that cover fundamental research tools, genetically engineered plants, human genes, and living organisms.

In 1993, Kalpvriksh, a Delhi based environmental NGO released information that it had received from the Rural Advancement Foundation International (RAFI), a Canadian group, about the patenting of several microorganisms taken from India by American pharmaceutical companies. Apparently these companies[7], or their agents, took the microbes without any intimation to Indian authorities (not in itself illegal, since there is as yet no law regulating such transfers), tested their possible use in pharmaceuticals and submitted them for patenting. Many of the patents had already been granted when the RAFI, delving into the records of the American Type Culture Collection, unearthed the information. In effect, what should rightfully have been thought of as the property of Nature or of India was being claimed as the property of some private corporations sitting thousands of kilometers away from their place of origin. In the

[7] *US based pharmaceutical companies such as Bristol-Myers, Merck and Pfizer*

US, these corporations now have the monopoly right to use these microbes for industrial applications. Conceivably, if their patents get worldwide recognition under the new trade regimes of GATT, even Indians seeking to use these microorganisms will have to seek the permission of these American firms and probably also have to pay through their noses for the privilege!

Since the news managed to make headlines in one economic newspaper, an alert Member of Parliament raised a question in the Lok Sabha, seeking to know what the Government was planning to do about the "gene theft". The query came to the Union Ministry of Environment and Forests, who did not know how to answer it. The Union Ministry of Environment and Forests passed it on to the Department of Biotechnology, which pretended not to know anything about the matter and sent it back to the Ministry. Finally, some vague answer was drafted and presented in Parliament. Meanwhile, Kalpvriksh, which had demanded action to retrieve the microbes and the profits derived from their use, got a response from the Department of Biotechnology stating that a committee which was considering new legislation to allow patenting in India would consider the matter. Nothing more has been heard from either of the Government agencies till date; the files are probably buried and forgotten. Ironically, the very same companies are being welcomed with open arms today by the Indian Government, to set up pharmaceutical ventures here! This was a small incident, but it illustrated many of the complex policy issues plaguing the world of biodiversity conservation and sustainable use.

3.6 Contribution of the Third World

The bulk of the world's biological diversity, about 70% of all recorded species, is concentrated in the Tropics. The majority of the world's most widely used crops have originated in tropical countries; the genetic material derived from these contributes more than 90% of the global production of food crops. But there has also been a tremendous exchange of genetic resources between tropical countries, through avenues such as international trade, forced transfers during and after colonial times, botanical and zoological expeditions, scientific exchanges, etc. The advanced industrial countries, though extremely poor in naturally occurring or agricultural plant diversity, however, are rich in gene collections. Over half of the world's gene bank holdings are now with the Western countries.

Coffee provides an interesting example of the scale of movement of genetic resources during colonial times. The coffee bean is native to Ethiopia. More than a thousand years ago, it was transported by Arab or Persian traders to Yemen for cultivation. A mere seven seeds were later sent to be grown in India and subsequently in Sri Lanka. When the Dutch took over Sri Lanka from the Portuguese, they took one coffee plant to Indonesia (Java) and a single cutting from that tree was shipped to the Amsterdam Botanical Garden in 1706. Nine years later, cuttings from the Amsterdam tree were packed off to the Dutch colony of Surinam. Other cuttings were shipped across the Atlantic to Martinique in 1723. Thus the entire coffee industry of Latin

America comes from seven plants taken from Yemen a thousand years ago and one plant taken to Java less than 300 years ago.[8]

Coffee is not the only example. There are many more like cinchona and rubber; both 'discovered' in South America (where they were already in use by local indigenous populations). Cinchona revolutionized malaria cure, whereas rubber is such an indispensable part of modern civilization that its absence is unthinkable. How would one value the economic contribution of this genetic material? Another striking example, this time of the future potential of an as yet 'undiscovered' material, is of teosinte (Zea diploperennis). This wild relative of maize, which botanists chanced upon in Mexico, has the unique property of being a perennial (maize is an annual). An economist has estimated that perennial corn bred from teosinte could be worth as much as $6.8 billion per year.[9]

Several tropical countries have, from time to time, tried to block the outflow of genetic material from their territories, but this has been systematically undermined by Northern countries, not only during colonial times, but also subsequently. For instance, Brazil had banned the export of rubber germplasm to protect its infant rubber industry, and Peru and Bolivia made trade in quinine (extracted from the bark of the cinchona tree) a Government monopoly. However, in the 19th century, botanists

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[8] *Kothari, A ' People, Patents and Profits'– Newsletter of Genetic Resources Action Intl, 2000*
[9] *Wiley, J P Jr 1986, 'phenomena, comments and notes', Smithsonian 17(8), in Kloppenburg*

from the famous Kew Gardens in Britain literally stole rubber and cinchona plants from South America.

Germplasm collection and outflow from the Tropics continues even today, with colonial powers having given way to "prospecting" by corporations and scientific bodies. Pharmaceutical, food, agro products and a whole host of other industries have recognized the enormous potential of the largely unexplored genetic wealth of the Tropics and are using all the means at their disposal to obtain this wealth. Their home countries in the North are, of course paving the way for this transfer in various ways, including distorted international trade and aid policies and programmes and various forms of scientific collaborations.

With such a long history of germplasm collection, it is not surprising that the advanced industrial countries, though extremely poor in natural occurring or agricultural plant diversity, are as rich in gene collections as the Tropics. Indeed, in a number of crops some industrial countries today possess more stored germplasm accession than the nations of origin or natural diversity of these crops! Over half of the world's gene bank holding is now with the Western countries and another one-fifth with international organizations controlled by Western countries and corporations.

Like the other tropical countries, a considerable amount of genetic material has gone out of India also in the last few

centuries. There is no comprehensive information on this, but some indicative examples are available. Spices, cotton, soyabean....these were some of the groups which went out in the 19th and early 20th centuries. In more recent times, Indian sorghum has helped American agriculture introduce resistance to a major pest, reportedly resulting in $12 million in early benefits; and extract from sarpagandha (Rauvolfia serpentina), a medicinal plant used for centuries in India, is used as a base in tranquilisers and other drugs used to treat hypertension and schizophrenia, the sales of which in the USA alone exceeded $260 million per year; the Himalayan yew (Taxus Baccata) is being tested for a possible ovarian cancer combating extract, and is now in high demand due to the short supply of its American relative Taxus brevifolia. Neem based bio-pesticides earn foreign companies millions of dollars per annum.[10]

3.7 Ripping off of the Third World

What is important here is that all these contributions of tropical genes to the agricultural and industrial might of the North, have been largely unpaid for. Having taken freely from the Tropics, industrial countries and private corporations have then monopolized the derived products and technological benefits, by the imposition on them of Intellectual Property Rights. The stated purpose of such rights is to stimulate industrial innovation, by offering higher returns than the market would normally offer.

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[10] *The private sector companies W R Grace and P J Margo Co estimate that the global market for their neem based biopesticides could reach $50 million per annum soon*

The ripping-off of the Third World is not a new phenomenon. It started when Columbus discovered the 'New World'. On landing, he found a peaceful, gentle people. In his journal and in a letter to a patron he wrote: "They...brought us parrots and balls of cotton and spears and many other things...They willingly traded everything they owned...They do not bear arms...They would make fine servants...With fifty men we could subjugate them all and make them do whatever we want." The plunder of the Third World did not end with the end of colonialism.

The second wave of exploitation was the Green Revolution. Third World countries were persuaded to buy and plant high yielding varieties. Soon these would take over large areas of the countryside, displacing traditional varieties and the rural poor. The high-yielding varieties had a snag; they only produced their high yields when doused in agro-chemicals purchased as with the seeds, from Western global corporations. Other disadvantages of these seeds were that they were often sterile F1-hybrids, requiring the purchase of fresh seeds each season. The crops were not sustenance crops, but cash crops for the West, for which the West gave a guaranteed low price. Farmers and countries of the developing world found themselves drawn ever deeper into debt.

We are now embarking on a third wave of exploitation; that of bio-piracy, aided and consolidated by IPRs. Global corporations are scouring the world, extracting genetic material, then patenting these finds as 'their discoveries'. Whilst the West is not

immune from this practice, the Third World is targeted as it has the richest genetic diversity.

Besides limiting national economic and social development strategies, the GATT-TRIPs agreement will enable biotechnology companies to compete in the world marketplace with commodity exports that form the backbone of many national economies. Biologically-engineered synthetic substitutes for sugar, cocoa and plant oils are already taking over huge segments of the global markets for these commodities, upon which many impoverished African and Latin American nations depend.

The quest for new plants to create new products has resulted in a new "gold rush" known as bio-prospecting. Ethno botanists go to indigenous communities, sometimes offering compensation in the form of gifts or shares in any royalties that may be earned, once a product is patented and marketed. Like gold diggers everywhere, these explorers inadvertently disrupt the indigenous communities. And once disrupted, it may be difficult or impossible for that human community to restore the traditional balance between itself and the ecosystem that has sustained it while being sustained by it. In 1994, Food and Agriculture Organization (FAO) Assistant Director-General Obaidullah Khan referred to such bio-prospecting as "bio-piracy."

While IPRs are several centuries old, their extension to living beings and related technologies is a recent phenomenon, and one that has evoked considerable controversy. IPRs on biological

resources and related technologies or knowledge are justified much as industrial invention IPRs are: that they stimulate innovation by giving recognition and rewards to inventors, that they encourage investments in research, and that they make possible the eventual disclosure and dissemination of related knowledge. Whether or not these goals are met is hotly disputed.

Historically, the non-patentability of biological matter seemed a topic beyond discussion, or in any case of limited importance. This changed with the grant in 1873 of a patent to Louis Pasteur on certain yeast strains that were free from organic germs. However it has only been in the last twenty years – since the 1980 grant of a patent in the US to Chakrabarty, the inventor of a genetically engineered bacteria to clean oil spills – that the laws on patentability of biotechnological inventions have developed at a rapid rate, which further accelerated in the 21st century which witnessed grant of patents on products used in every house in India like Turmeric[11], Neem[12], Basmati[13] and Cow urine[14].

Even if it is true that in an increasingly monetized world, personal profits are a powerful incentive, IPRs on life forms have serious legal, ethical, social, economic, and ecological implications that must be considered.

Unfortunately, ethical viewpoints no longer have as much acceptance in today's hardheaded world as considerations based

[11] *US patent no 5401504 dt March 28, 1995 to Uni Of Mississippi Medical Centre*
[12] *US patent no 6455070 dt Sep 24, 2002 to East Park Research Inc*
[13] *US patent no 5663484 dt Sep 2, 1997 to Ricetec Inc*
[14] *US patent no 6410059 dt June 25, 2002 to CSIR, India*

return to the market each year to purchase seed, as has to be done for hybrids at present.

Monsanto, a US multinational as part of a package, forces farmers to buy seeds and agrochemicals, they cannot source agrochemicals elsewhere, cannot save seeds. If they do either, they are in breach of contract and Monsanto demands penalty payment (hundred times the value of the seeds). To enforce the contract, farmers have to agree to inspection by Monsanto agents at any time.

The Terminator Technology is the ultimate weapon to ensure that the farmers do not reuse seeds, as they will no longer be able to. The Terminator Technology, to which Monsanto owns the patent rights, is the ultimate biological weapon that introduces a 'suicide gene' into plants, turning off their ability to produce viable genes. Monsanto sees this as a Trojan horse into the Third World; bypassing weak patent laws. The farmer will have no choice other than to purchase fresh seeds each season. Farmers will pay a heavy price, communities will pay a price in loss of biodiversity, but the ultimate price will be when the 'terminator gene' escapes, causing failure of the world's food crops. Monsanto are proposing to wage nothing less than a biological warfare.

Many of the basic food plants grown in the West, potatoes, tomatoes, wheat etc. have their origins in developing countries. The source countries have not patented these food crops, are not

demanding royalty payments (though may be they should). These basic crops are regarded as a common good for all humankind.

The strongest and loudest advocators for the harmonization of IPRs in relation to plants, the Western countries, must bear in mind that they themselves have introduced monopoly rights for plants much later in the day, when their food security was assured and they were actually faced with food surpluses. Although the US introduced its Plant Patent Act in 1930, it granted monopoly rights only for asexually propagated species and specifically excluded tuber propagated species. This excluded potato, an essential food crop. It is very unlikely that they could have allowed monopoly rights on food crops in those days. Similarly when the Netherlands introduced its system of Plant Breeder's Rights in 1941, it allowed its potato farmers and other agriculturists the right to freely multiply the seeds. The developed countries want to impose such a system of total monopoly on all plants on the developing countries which are still plagued by droughts and famines and whose population still does not get two square meals a day. Even the UPOV system had important exceptions to monopoly rights in the form of Plant Breeder's Rights which is a kind of *'sui generis'* system.