Do Patents Matter: WTO and Agriculture

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Gujarat is one of the most industrially advanced states but the performance of the innovators and entrepreneurs in Gujarat in the field of protection of intellectual property rights has been quite poor. A study of all the patents filed by Indians in the United States and Trademark Office during last twenty six years provides some revealing evidences about how different states in the country have performed in the domain of intellectual property protection in US. In this paper, I describe some of the key findings of this study in part one followed by some evidences of grassroots innovations collected from more than 6000 villages of the country in part two. I also discuss how National Innovation Foundation (NIF) set up in March 2000 by Department of Science and Technology is trying to give fillip to the cause of intellectual property protection for grassroots innovators. In part three, I discuss the role of incentives for conservation, sustainable utilization and augmentation of biodiversity. Intellectual property rights can provide as one of the many incentives for recognizing, respecting and rewarding innovators as well as traditional knowledge holders in the field of agricultural and other wild biodiversity. Finally, I respond to various issues that have emerged in the discussion on this paper so that future dialogue on this subject can be more illuminating.

Part One

How has India performed in intellectual property rights protection?

The study of all the patents by Indians initially at USPTO and later at European Patent Office (EPO) was triggered by a request by former Chief Secretary, Gujarat Government to present an orientation seminar for all the secretaries on the subject of intellectual property rights in March 1999. It is then that it occurred to me that it would be useful to share the empirical evidence of how Gujarat had performed in the field of intellectual property rights protection abroad. In this section, I would restrict the discussion to the Indian filings in USPTO only. The subsequent analysis has covered not only the patent filing in EPO but also patents filed by others on technologies or products or uses of the commodities exported by Gujarat such as species, castor oil, psyllium, etc. Out of total patents numbering 1246 (as on 21st August, 2001 at USPTO) by Indians, 912 are by resident Indians, remaining being by non-resident Indians (Figure one). Further, out of the so many patents, the share of Gujarat is less than two per cent (Table one). From amongst the 30 patents in Gujarat, there are hardly two patents by individuals, the rest being by corporations and CSIR labs. It is obvious that despite very high level of industrial growth in Gujarat the protection of intellectual property rights internationally has not played an important role in this regard. An interesting finding of the institution wise analysis of total patents is that one third of the total patents filed in last twenty six

years by Indians were from CSIR labs. What is even more remarkable that one fifth of total patents filed in the last twenty six years were filed in the last two to three years. This shows the impact Dr.R.A.Mashelkar, Director General, Council of Scientific and Industrial Research (CSIR) has had on the creative minds of the country. The share of universities in general and the agricultural universities in particular is negligible (Figure one). Obviously, this is not a very creditable position. In the era of globalization market shares are difficult to secure and protect without appropriate protection for the intellectual property of various kinds in those markets. For instance, even in the seed industry, which is one of the most productive sectors of Indian agriculture and where the role of public sector has been outstanding, has not protected its brand names in public sector. For example, Pusa, Pant Nagar or GAU brands have not been protected and therefore private seed companies can use these brand names without having to pay any royalty to the parent organization.

I did another study in 1997-98 on the total world patents on herbal products with the help of Derwent Pharmaceutical Index. This is one of the largest patent databases on pharmaceuticals. It was found that 45 per cent of the total patents were held by Chinese, 20 per cent by Japanese and 16 per cent by Russians followed by the rest of the European countries. India figured nowhere. In the USPTO in the last five years, Indians have filed about 18 patents which is comparable to the Chinese numbering 23. However, what this comparison does not reveal is the share that Chinese have in US and European markets. One in five Americans has used Chinese medicine. Through the brand and trademark protections, Chinese medicine has created a niche, which Indian traditional medicines have failed to create in the world markets.

Part Two

Honey Bee Database on Grassroots Innovations

During the last twelve years the Honey Bee database has been in existence, about 12000 innovations as well as outstanding examples of traditional knowledge have been documented from all over the country, out of these about 7500 are from 5500 villages of Gujarat. These include contemporary innovations as well as outstanding examples of traditional knowledge. The innovations are in the field of herbal pesticide, farm machinery, plant varieties, veterinary medicine, soil and water conservation, and a whole range of other survival technologies. At this moment, there is a dilemma that we face. If we publish all these information and bring them to public domain, then we cannot provide them any protection. While industrial designs can be protected by the existing intellectual property laws, the plant varieties cannot be protected because the Plant Variety and Farmers Rights Bill has not been approved by the parliament. Similarly, while the process of making herbal pesticides, veterinary medicines, and several other biodiversity based products can be protected, in real terms this protection is not of much consequence because the processes can be easily modified. Unless the product patents become applicable, we will not be able to provide protection to these formulations within the country. While there are many other inadequacies in the Indian patent system such as

long delay and uniform cost for small and the bigger inventors, the fact remains that because of the pressure from Indian Drug Manufacturing Association (IDMA) and several such bodies, India seems to have preferred to wait still 2005 before implementing product patent regime. The problem that Honey Bee database and Society for Research and Initiatives for Sustainable Technologies and Institutions (SRISTI) face is that in the absence of any product protection the strategic knowledge of grassroots innovators cannot be brought into public domain. Otherwise, the users will benefit but producers will remain poor because of their generosity. It is also possible that many people will lose incentives to disclose their innovations and also the traditional knowledge if they are not going to get any reward or compensation for the same. We are fully conscious of the fact that monetary rewards are not necessarily the most important incentive for creating innovations and disseminating them. However, it makes very little sense when the same knowledge which is produced by the unsung heroes of our society is used by the corporations both at national and international levels without any reciprocal contribution towards either the producer of the knowledge and/or conservators of biodiversity on which this knowledge is based. The asymmetry in incentives and opportunities for economic growth in this value chain of local knowledge is neither sustainable nor very fair. The NIF was set up Department of Science and Technology in March 2000 with the corpus of Rs.20 crores based in Ahmedabad, under the chairpersonship of Dr.R.A.Mashelkar, Director General, CSIR. It organized a national contest for scouting grassroots technological innovations and within first year more than 998 entries with about 1660 innovations and examples of traditional knowledge were received. Assam had fourth rank (155) in this regard. Once we begin to focus our energy on the knowledge strength of India economy, the centre-periphery relationship would start changing.

There are two issues that need to be made clear here to fully understand and appreciate the role of intellectual property in boosting the creative and entrepreneurial spirit in a globalising economy.

1. The concept of intellectual property is not new. The workers who made the Taj Mahal were rewarded by getting their thumbs cut so that they could not make another Taj Mahal. Cruel as it might seem, the issue is that Shahjahan the King was trying to ensure protection of his design, through such mechanism. There are a large number of healers and herbalists who do not share their knowledge till they die and therefore that part of the knowledge dies with them.

2. There is a very healthy development in the software industry of what is called an open source software, such as Linux. There is a concept of general purpose license. Under this anybody can use the software without any restriction for one's own use but must share improvement of the same also with the society. However, if there is a commercial use of this software, then they should take commercial license and pay part of the income to the developer. This is precisely the spirit that we have tried to follow to some extent at Honey Bee Network. Anybody can use farmers' innovations for one's own personal non-

commercial use. However, if they want to use it for commercial purpose, they should take a license and pay appropriate share of gains with the innovator. At the same time, the patents can indeed be filed in the name of the innovator restricting the right of commercial users. We have decided to provide general purpose license to every user for their own purposes.

One has to develop several such mechanisms to ensure that the goals of intellectual property rights protection are met in such a manner that goals of growth of knowledge, lateral learning among people to people and overall promotion of creativity and innovation in the society are met adequately.

Part Three

Incentives for biodiversity conservation, utilization and augmentation

The issue thus is: how do we go about compensating or rewarding indigenous or local communities for their valuable knowledge and conservation contribution. For the first time, the communities and individuals who conserved biodiversity despite remaining poor have a chance of overcoming their poverty by being compensated/rewarded for their traditional as well as contemporary creativity. Even more promising possibility is that this can happen without any need for patronizing protection from the state (which kept them poor and illiterate for so long). That is not the only promise. We could even hope that the polity of this country for once could get out of the hands of self seeking rent extracting class of non-competitive, non-creative and non-inventive industrial, trading, professional and farming elite. The game thus is very clear. Those who have faith in the inventive capabilities of the economically poor but intellectually rich communities and individuals would like to exploit the opportunity offered by GATT and Rio agreement. On the other hand, there are those who still live under the illusion that a patronizing and protective regime is what poor are looking forward to.

Those who are opposing the protection of intellectual property rights are doing so perhaps because they have no confidence left whatsoever in the native genius. Their argument seems to be very simple, "since we have never won in past in any global struggle, what is the guarantee that we will in future when odds are against us". A mentality of failure, cynicism and defeatism is unlikely to generate any hope even with best of the circumstances and all odds favouring us.

Congressional Research Service of US Congress went into the question of people's knowledge and its protection few years ago (Axt, Corn, Lee and Ackerman, 1993[1], henceforth, The Report). The report noted an increasing awareness that plant and animal species in the tropical rain forests and elsewhere were disappearing at an accelerating rate due to human activities destroying or affecting their habitat. The Report further noted

[1] Axt. Josephine R., M.Lynne Corn, Margaret Lee and David M Ackerman, 1993, Biotechnology, Indigenous Peoples and Intellectual Property Rights, CRS Report for Congress, Washington: Congressional Research Service, Library of Congress

the resurgence of interest among pharmaceutical companies and government research agencies in screening plant and animal species for medicinal properties useful in treating various diseases (biodiversity screening). The Report stressed that the destruction of habitat had "proven fatal not only to the numerous plant and animal species but also to many indigenous peoples dependent upon that habitat, and continues to threaten many that still exist".

The search for local germplasm or new plant sources for deriving herbal pesticides, veterinary drugs, or other products is done globally by multi-national corporations as well as national and inter-organizational associations. Among the issues that must be addressed in bio-prospecting are:

a) Whether those who want to access this kind of biodiversity have the capability of doing so on their own (INBio felt otherwise and thus entered into a deal with Merck)?

b) Whether the external organization can access the same material or knowledge about it from other sources? In many cases the knowledge may be available from other sources though not the entire material. In such a case, the bargaining position of the provider is weakened compared to the one holding a monopoly.

c) Even in the cases of monopoly, whether the external organization could have accessed the material through alternative legal or illegal routes? Any material obtained without due process of law, transparency, and prior informed consent of the communities and the national institutions designated for the purpose, should not be granted patents. Where a local community supplies local knowledge or natural resources from their region, they should be entitled to a share in the value addition. The reason for this is that the people dependent on this resource could suffer losses in several ways, for example, their access to plants, sites, or habitats could be reduced when outsiders find some new uses for the same. It seems ironic that because the people shared their knowledge, they could lose access to the habitats which helped them generate the knowledge in the first place. They could also suffer losses because the plants which they conserved have been selectively harvested (through so called 'scientific forestry'), thus, disturbing the ecological balance and endangering their life support system.

d) Even if the scientific knowledge does exist in some developing countries, it may not be always possible for that nation to commercialize the products based on biodiversity prospecting. The skill and capital trade-offs thus have to be made recognizing the respective strengths of the different partners.

e) Should patents be granted on plant products traditionally used by third-world people if specific improvements have been brought about. The case of Neem is interesting. Neem's use as a source of pesticide could not and has not been patented. Among the three of the important patents (for derivative uses) for the use of Neem are, one for extracting a purer form of azhadirdchtin, a second for a

more storage stable form, and a third for the use of this compound for cancer treatment. None of these forms of the compound were reported to be similar to the ones found in nature. Also, the use was different from the ones known hitherto. Since these patents do not inhibit use of this compound by anyone extracted through any other method of more or less purity or stability, one may argue that compensation to the local communities is not due for such inventions. The fact that this lead was given by people who had used this plant and compound for pesticidal purposes is beyond doubt. Thus, the case for compensation can be made. But compensation to whom? In all such cases of patents on a specific improvement in well known recipes or botanicals, a cess or tax should be levied for a global, regional or national funds for research and development grants to people dependent upon the source plant. Global fund because this plant, for instance Neem, is found in many countries and the knowledge about its use may have been discovered in each of this country.

The Rio treaty suggests that free access to germplasm should continue despite whatever mechanisms are created for compensating communities responsible for the protection of such plasm. In fact some have argued that the national sovereignty granted under the Rio treaty does not grant property rights to nations over the germplasm that they have. It is difficult, however, to see how this resource can be considered different from a coal or a petrol reserve in so far as sovereignty is considered. Unlawfully acquired germplasm for developing varieties or drugs would not confer property rights superior to those of the original providers. FAO undertaking on the subject has however, required mandatory benefit sharing. But the issue of rights over derivative value addition, i.e., genes from national germplasm is not resolved. This implies need for regulations in developed countries requiring full disclosure by any corporation seeking patent protection on a plant based drug or any other natural product. The disclosure should provide that the source material has been rightfully and lawfully acquired. 'Rightful' acquisition would involve moral as well as ethical issues in access to biodiversity. For instance even if a local community has not asked for any price for sharing the material or the knowledge about it, is the corporation bound by an ethical conduct to set up trust funds and other forms of reciprocity for local communities? Is it incumbent upon it to ensure that the superior ethics of local communities remaining poor despite conserving biological diversity and the knowledge around it does not become a reason for perpetuating their poverty, and thus endangering the survival of diversity itself? The 'lawful' acquisition will imply that prior informed consent and approval and involvement of local communities and creative individuals has been ensured provided that the biodiversity donor country has laws requiring such a consent and approval. If a country does not have any such laws, as for instance India, then acquiring any material will be lawful or legal but may not be rightful.

The Rio treaty thus provides for compensation in the form of providing countries (i.e. which provide genetic resources) an access to and transfer of technology which makes use of those resources, including technology protected by patents and other intellectual property rights at mutually agreed term. This should happen through involvement and approval of these communities ensuring an equitable sharing of the benefits. Article 15.5 requires Prior Informed Consent (PIC) to be obtained from the contracting parties for

obtaining access to genetic material or associated knowledge in countries which have enacted legislation requiring PIC.

The knowledge, innovations and practices documented by Honey bee and SRISTI network should be considered eligible for registration in the joint name of SRISTI and the concerned farmers or communities where we can convince ourselves about the genuinity of innovation. The registration system should not discriminate on the basis of obviousness to a small group of farmers in a village or a taluka. The point to be noted is that the practice could not have been discovered or invented by a lay person with average knowledge in the field.

To summarize, we present a scheme in which four kinds of incentives for rewarding creativity and conservation of biodiversity can be generated.

A. a. Material- Specific
b. Material -Non Specific
c. Non Material- Specific
d. Non Material- Non specific

a. Material- Specific: In cases in which specific individuals have contributed to conservation of land races or wild plants with specific economic and inventive uses, their rights to receive licensing fee or royalty must be recognized.

In case of (b) i.e. material -non specific i.e. community or a larger group, the compensation would flow to a group through trust funds, risk fund or insurance funds to encourage inventive communities to take up more experimentation and perhaps progress on the path of entrepreneurship. Insurance funds to ensure that communities or farmers growing land races do not bear risks too much and price advantages compared to the productivity and price grain in high yielding varieties.

There are several ways in which revenue can be generated for providing various incentives to individuals or collectives :

(i) A cess or tax on the sale of seeds or crop varieties using the given germplasm conserved or contributed by the specific individual or community.

(ii) Share in the turnover from commercializable plant derived product such as herbal pesticides, veterinary medicines, vegetative dyes, anti-oxidant compounds, nutritional supplements etc.

(iii) A tax on the market arrivals in grain markets in green revolution regions or high yielding varieties of different crops (including various other cash crops) to be used for conserving diversity and providing incentives to communities and individuals conserving diversity.

(iv) License fee to be collected from public as well as private sector companies for using germplasm still conserved by communities in backward regions even if available in national or international gene banks.

(v) The license fee could be supplemented by larger investments in infrastructural development in these regions particularly in education and other minimum needs.

There are several other ways in which the revenue can be generated. The important point to be understood is that people would not conserve biodiversity while remaining poor for too long.

One can innovate in many ways to identify the precise areas and communities that are conserving rare germplasm . The primary school children and teachers can be involved in country wide documentation of the bio-diverse regions, races, wild plants of economic importance etc., in the form of a campaign led by some committed NGOs and professionals apart from community leaders. State department of agriculture and revenue staff can also be involved in the urgent inventorisation of knowledge, materials and claims communities and individuals.

Farmers growing local varieties particularly under threat will need to be compensated for not shifting to high yielding varieties in selected areas. Mechanisms can be worked out for *in situ* conservation through the involvement of state agricultural universities and other conservation bodies.

(c) The non material-specific rewards deal with honor and recognition of individuals and specific groups of people who have contributed most in conserving biodiversity.

(d) The non material and non specific instruments deal with changes in policies, curriculum at different levels, institutional norms for providing credit and other support systems. Banks would not consider financing a herd of local well bred Gir cows, or bio-diverse farm at the same scale at which they would finance input intensive farm. Students are not taught any thing inspiring about the contribution of communities which conserve biodiversity. On the other hand they are told that these communities are backward.

B. A scheme needs to be developed for supporting all those panchayats which will undertake systematic cultivation of local land races in every season in large enough areas for enabling some seed exchange. Villages which have conserved local varieties like Jackrana variety of pearl millet or Khirchia variety of salt tolerant wheat need to be provided some funds for local development linked to the contribution these land races are making in breeding on an ongoing basis. This will give a signal to other communities as well. Funds under this scheme also may be allocated by an autonomous body rather than bureaucracy.

C: The Patent act must provide for recognition of indigenous innovations. Data base like that of SRISTI can provide a valuable beginning point. Scope can exist for defensive

patents in which certain innovations valid for larger social use can be patented not to prevent their diffusion but to prevent their being patented by some third party.

Creativity at grassroots can indeed spur a new paradigm for development, which builds upon what people know, excel in and have pride in.

Part Four

Agenda for Change in Policies and Institutions

Three different bills are pending before the parliament having bearing on biodiversity and plant varieties in one or the other way. These are biodiversity bill, patent bill and the plant varieties and farmers rights bill. Some of the key changes are summarized here though details are given elsewhere (Gupta, 1999[2])

a. The Patent Bill

There are several changes required in the Patent Amendment Bill most of which are not under consideration of the government. Every patent applicant should be required that the knowledge and/or material used in the claimed invention has been obtained lawfully i.e., in compliance with the national laws and rightfully i.e., through prior informed consent, honouring ethical, moral and other rights of the knowledge/resource provider. Further, the Patent Office must be obliged to access various traditional knowledge databases as well as innovation databases such as Honey Bee database so that patents are not issued on the knowledge already in public domain. A low transaction cost system such as INSTAR (International Network for Sustainable Technology, Applications and Registration) must be put in place so that everybody who registers one's innovations with the national register of grassroots technological knowledge and outstanding traditional knowledge with the NIF gets an automatic protection for ten years with maximum of five claims per innovation. These claims could be in the name of individuals or communities and village panchayats or councils or healers' associations, which could act as representative of the communities for the purposes of grant of these intellectual property rights. A national fund must be created, may be, managed by NIF to provide this protection for the millions of knowledge producers in our society with the understanding that individuals are free to use this knowledge for their own research and /or personal livelihood. However, commercial use of this knowledge beyond household level should require a license depending upon the conditions imposed by the individual or

[2] Gupta, Anil K. "Technologies, Institutions and Incentives for Conservation of Biodiversity in Non-OECD Countries: Assessing Needs for Technical Co-operation," presented at OECD Conference on Biodiversity Conservation Incentive Measures in Cairns, Australia, March 25-29, 1996, published in the proceedings, "Investing In Biological Diversity: The Cairns Conference", Paris: OECD,1997, pp.305-329

Gupta, Anil. K. "Securing Traditional Knowledge and contemporary innovations: can global trade links help grassroots innovations? Honey Bee perspective," invited paper for World Trade Forum, Bern, Switzerland, August 27-29, 1999

communities. For instance, many people while giving written consent to the NIF have suggested that they would not mind free dissemination of their knowledge. In such a case, no restriction need be put. However, many people have also instructed NIF that their knowledge and/or innovation can be shared only through a commercial license and further value addition research. We have no authority or intention to impose our values or norms on the wishes of the people. We gave open-ended options to every innovator and they were free to tick mark whichever condition they wanted to choose. This evidence should put at rest the assertion of those critics who argue that the concept of IPRs is a western construction, being imposed on India and doesn't articulate the wishes of grassroots communities and individuals.

b. Biodiversity bill

There has been a widespread social concern with the problem of biopiracy implying unauthorized and improper protection and exploitation of intellectual property by westerners of knowledge and resources produced by third world communities traditionally. The turmeric patent case was the watershed in this regard because a patent obtained by two non resident Indians on use of turmeric powder for wound healing was overturned on presentation of prior art evidence by CSIR, India at USPTO. Subsequently the USPTO wrote to Dr. Mashelkar, Director General, CSIR suggesting that if they could be given a digital database of traditional knowledge, they would ensure that no patent was issued on the same. In other words, they were admitting their inability to refer to the existing prior art not accessible through digitized databases while examining novelty of an invention. Subsequently Government of India has initiated a major initiative in the form of Traditional Knowledge Digital Library (TKDL) to achieve this precise goal.

Another issue linked to the problem of biopiracy is about the conceptual basis of traditional knowledge and its contemporary improvement by individuals or communities. If we assume that all the knowledge produced by people in villages based on biodiversity is community knowledge, developed long time ago and transferred by one generation to another and the present generation is a mere user of that knowledge, then we have a very limited notion of human ingenuinity. Every generation contributes its improvement to the stock of knowledge some of which is kept as trade secret by a few healers while the rest is known to larger community. However, it does not imply that everybody who is aware of a particular herbal use is equally equipped in the state of art, skill or cultural and traditional knowledge associated with its effective use. There is asymmetry in knowledge, skills, proficiency and creative spirit within the family, community and societies. Obviously incentives if necessary for conservation of biodiversity and its sustainable utilization and augmentation cannot be symmetrically distributed when knowledge and expertise are distributed asymmetrically.

There are four issues here that need to be taken into account: (a) whether the codified traditional knowledge cannot be treated at par with folkloric, oral and partly traditional and partly contemporary knowledge systems, (b) whether incentives are required for individuals as well as communities to conserve as well as create diversity and associated knowledge and innovations, (c) whether the existing intellectual property right systems

can provide some of these incentives as a part of a portfolio of monetary and non monetary incentives targeted at individuals and communities and (d) to what extent the biodiversity bill pending before the parliament addresses these concerns and whether we need significantly new instruments and mechanisms for ensuring the response to above concerns.

There are about forty seven thousand species of plants in India out of which only about 1600 are mentioned in the classical texts of Indian System of Medicine. Obviously the codified traditional knowledge is an extremely small subset of the total knowledge of biodiversity available with the people at grassroots. Much of the uncatalogued knowledge has a potential to solve many contemporary problems and in the process generate opportunities for (a) domestication of these species, (b) enhancing income for local communities and individuals, (c) providing incentives for conservation and (d) experimenting a knowledge based model for poverty alleviation and biodiversity conservation through partnership with market forces in an organized manner.

The Biodiversity bill provides Indian industry to pursue its activities with greater responsibility but does not require it to seek prior permission before accessing biodiversity. At the same time it requires compliance with stricter access and benefit sharing regulations on the part of international companies or Indian companies with international partnership. This is a clause which has caused tremendous discomfort to a lot of biotechnology and biodiversity based companies. In their view, this clause will constrain their choices and affect their growth adversely. At the same time it would be very difficult to have unequal treatment under TRIPS with domestic and international users of biodiversity and seekers of intellectual property. It is important to note that Indian industry whether ayurvedic or otherwise has spent not even one per cent of their profits in the conservation of biological diversity in the country. They have also not developed in most cases methods of sustainable extraction of biodiversity based raw material from the wild. Under the circumstances it is futile to assume that long term growth can be anticipated without sustaining the resource base of this growth.

The Indian industry will also have to recognize that they do not get an unfettered right of exploiting biodiversity and associated knowledge system of the people just because they are Indian. Large number of communities are crucially dependent for their survival, health needs and consumption on the same resources. We are aware that the level of living of people in Dangs district which provides about 75 per cent of the raw material requirement of Gujarat Ayurvedic Industry, has not improved much. This is not sustainable.

The provision in the bill requiring prior intimation to the biodiversity authority before filing patents may need modification. Therefore, one may be allowed to inform the authority after filing the patent along with the benefit sharing agreement that may have been entered into with the Indian partner. It does not give any satisfaction to poor people as to whether their exploiters are Indian or multinational. It is necessary that every commercial user of biodiversity should be obliged to enter into a benefit sharing contract with the providing communities/individuals. These contracts devoid of strategic

commercial information should be subject to the scrutiny on demand or if there is a complaint by a community of unfair deal. This is a sensitive matter and will have to be handled in such a way that the interest of the industry and the communities are properly balanced. If industry decides to import the raw material from other countries in the region where access regime is less strict, the opportunities for Indian communities would go down in the case of regionally available biodiversity.

It should also be imperative for the industry to develop sustainable methods of extraction. The scientific community also has to play a role in this regard.

The examples where industry has shared benefits with the local communities are rare. TBGRI at Thiruvananthapuram had filed patents on the basis of knowledge provided by the Kani tribals based on 'arogya pacha' plant. Later Arya Vaidyashala at Coimbatore entered into an agreement with TBGRI to provide 10 lakh rupees as license fee in addition to the royalty every year for five years. However, TBGRI did not retain this amount with itself. It shared fifty per cent of the fees with a trust of Kani tribals for their own self development and management. A small sum was given separately to the three informants. The scientists concerned particularly Dr. Pushpangadan and his colleagues did not take any share from this amount for their personal use. Forest department unfortunately did not provide permission for cultivation or sustainable harvesting of the leaves of this plant thereby coming in the way of future royalty income for the tribals. The author made personal effort to persuade the Chief Conservator of Forests of Kerala to convince him that this plant was easily cultivable on sloppy lands under shade and therefore its harvest posed no serious problem to this endemic plant. But I failed in persuading them to let an extraordinary experiment in benefit sharing succeed.

The importance of this drug called as Jeevani can be gauged from the fact that its picture was put on the front page of a popular magazine for athletes in US. It was found to boost the energy of athletes without any steroid content in it.

Similarly, there are other cases where effort was made to share benefits to Genetic Resource Recognition Fund at University of California Davis. The idea was that benefits obtained from licensing of a gene Xa21 from a wild variety of rice from Mali cloned by Dr. Pamela Ronald would be put in this fund from the share of the scientist. However, since the company which licensed the gene did not commercialize it, no money ever came into the fund. When I approached the Vice Chancellor of Research of the Davis campus of University of California about institutionalizing such benefit sharing from all similar cases at the University, he expressed his inability to do so. In his view the scientists were free to share their part of the income with anybody they wanted. But University was not obliged to either share its part with anyone or to require other scientists to do so when the biodiversity used was in public domain.

Both these cases were developed as a part of WIPO sponsored study and these indicate clearly that benefit sharing voluntarily may not always be a sustainable system in the long run.

It is unfortunate that all the scientists particularly ethno botanists who have used peoples knowledge have never acknowledged the knowledge of people or shared any benefits with them. Honeybee network started twelve years ago questioned this practice and insisted that every bit of knowledge gain from local communities should be credited to the providers appropriately. Further, Honeybee philosophy requires that findings of the research on the knowledge or resource provided by the communities or individuals are shared back with them in local language. This will also facilitate people to people learning. Further, if any gain or income is obtained from this knowledge the same should be shared in a proper manner with the local communities.

c. Plant Variety and Farmers Rights (PVFR) Bill

The bill has since been presented to the parliament in August 2001 and is expected to become an Act soon. It has several interesting features which have a bearing on the vibrancy of the seed sector as well as incentives for conservation and augmentation of agro biodiversity. The Bill provides for the right of farmers to save, exchange, sell, and store the seeds but not using the brand name (i.e., not as seed but as grain). The Bill also provides for farmers to seek compensation for their contribution to the development of new varieties by way of providing local land races conserved by them. It also provides for the registration of farmers varieties directly by the farmers or through NGOs. A national gene fund is proposed to be established to collect contributions from seed sectors and share the benefits with the local communities and individuals conserving agro biodiversity and thus making development of new varieties possible.

Several suggestions have been made by the author for the improvement of working of this Bill. It will be difficult for farmer breeders to generate data considered necessary by the Authority to be set up under the Act for registration of their varieties. It should be the function of the Authority to buy the seeds at farm gate level and get the data generated through public sector R&D institutions. In the absence of this provision, the indigenous farmer breeders will feel discriminated against. Honey Bee Network has documented large number of such examples where individual farmers have made selections and have developed improved varieties of various crops. In the awards given by National Innovation Foundation (http://www.nifindia.org) for the first national annual contest, there are prize winning farmers and others who have developed outstanding varieties. Sebastian Joseph and Rejimon Joseph have developed a cardamom variety occupying more than eighty per cent area of Idukki district of Kerala. This variety has improved the national productivity as per the communication from the Spices Board. In the absence of PVFR, there is no way the farmer innovator can indeed be rewarded in the market place. Likewise, another winner is C.Rajendran He has developed Chinnapuni variety of rice which reportedly occupies one third area of Tamil Nadu in the relevant season. Similarly, there are farmers in Gujarat, Rajasthan, West Bengal, etc., who have developed new varieties which could not fetch any return to the farmer breeders.

We have to recognize the potential both formal and informal breeding have not just in India but also globally. In the absence of such an Act, no public sector breeder can expect any remuneration for one's institution from the investments in development of

varieties. The result is that public sector research institutions have to continue to depend upon bureaucratic allocation of resources rather than generating it themselves. No seed company in India pays any royalty to research universities/institutions for using their brand name as well as seed material. This is neither fair nor viable. Further, this will mean continued dominance of the bureaucrats on the S&T institutions.

There are many who fear that this Act might increase the dominance of multi national corporations in the seed sector. They do not realise that many MNC seed companies do not even register their plant varieties to safeguard their parent lines and instead use the category of `truthful seeds' to market their products.

If public sector and farmer breeders cannot be rewarded for their contributions, their ability to compete globally would never increase.

There are many other changes suggested in the Act (Gupta, 1999[3]) which need attention.

Summing up:

The impact of WTO on Gujarat agriculture from the point of view of intellectual property rights can be assessed by looking at our performance on this front. As mentioned earlier, we have not recognised the role of IPRs in creating global presence for our farm sector. In a separate study being done as a part of a committee set up by Gujarat Government to study the impact of WTO on Gujarat agriculture, I have shown that in all the six major agricultural export commodities from Gujarat, the majority of the patents are held by companies abroad. Obviously, Indian cannot expect to be competitive by remaining as a provider of raw commodities. The value addition is essential. But the technologies for value addition are being developed abroad and protected through intellectual property rights.

In this paper, I have argued that a stronger IPR regime will make the creative and the innovative elements of our society assume leadership for future growth. A transition to meritocratic society requires protection of intellectual property rights of the innovators in the formal as well as informal sector. The transaction costs for protecting intellectual property rights globally are quite high. We have to develop a low transaction cost system for providing protection to small innovators all around the world. INSTAR proposed by SRISTI in 1993 provides one framework for such a global registry. Similarly, within the country the National Register developed by National Innovation Foundation can be considered as a valid means for cataloguing and providing protection of IPRs for short duration.

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[3] Making Indian Agriculture more Knowledge Intensive and Competitive: The Case of Intellectual Property Rights, keynote paper prepared for 59th Annual Conference of The Indian Society of Agricultural Economics held in December 1-3,1999, Indian Journal of Agricultural Economics, Vol.54 .No.3, July-Sept., 1999, pp.340-369

The role of IPRs can constrain the growth of agriculture if we assume that the best technologies will be developed only by MNCs who may not have any incentive to provide these technologies to Indian consumers at affordable prices. My contention in this paper is that there is enough evidence accumulated by Honey Bee Network over the last twelve years about the potential of grassroots innovations in generating green technologies. Recently, SRISTI has even licensed one innovation by grassroots innovator in Gujarat to a company in US and the entire money so obtained has been shared with the innovator.

Obviously, the global competitiveness of Indian agriculture cannot be achieved without becoming innovative. And IPRs provide just one of the many means to record such innovativeness. We need a portfolio of incentives to match a variety of technological and institutional conditions for innovations.

DISTRIBUTION OF PATENTS GRANTED TO INDIANS AT USPTO FROM 1976-AUGUST 21,2001`

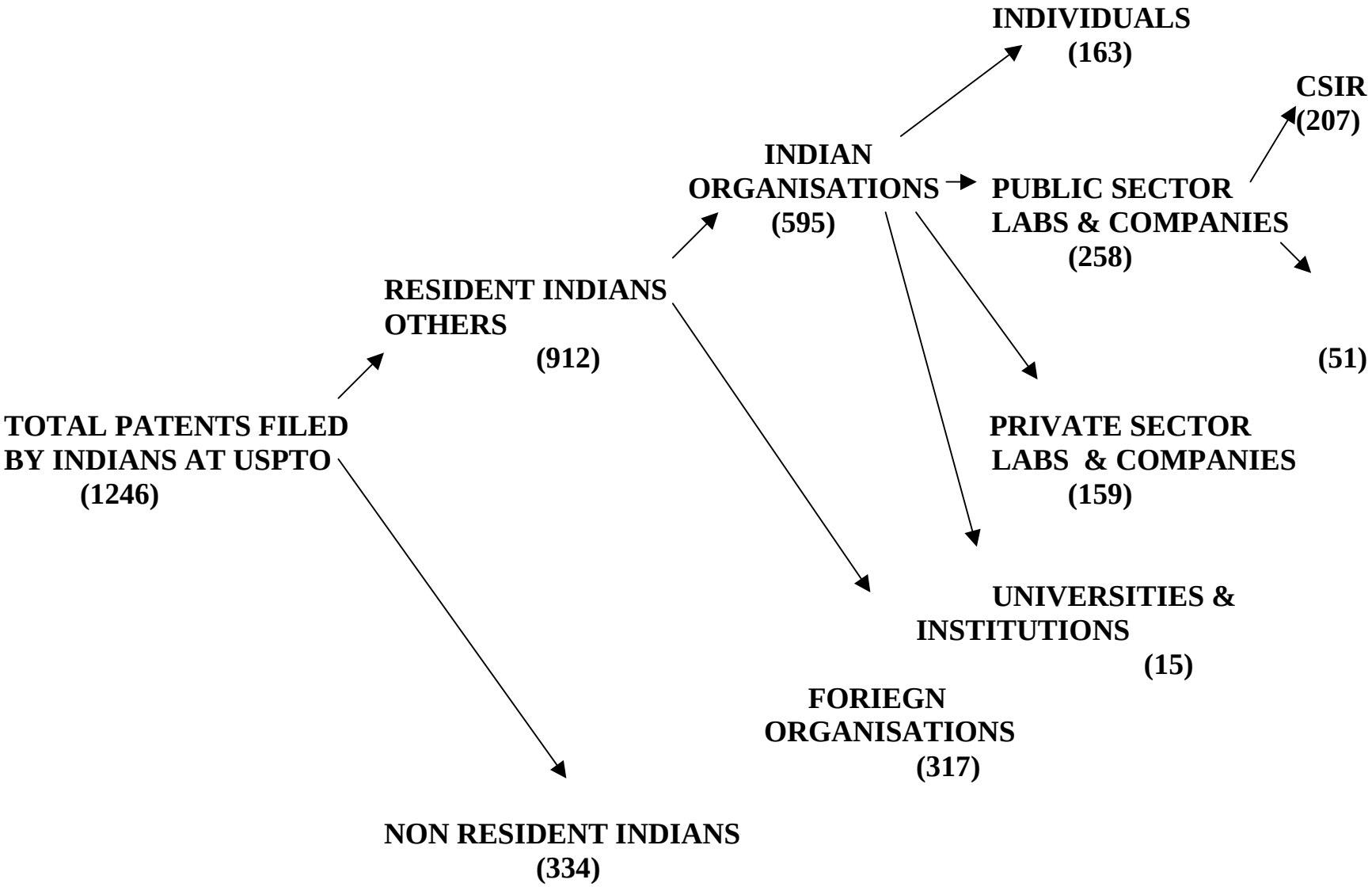

Figure 1

Search Engine : www.uspto.gov **Source :** *Gupta, A. K., Chandak, V. S., Kurup, N. and Vyas, V. H. 2001.*

Table 1

PATENTS GRANETD TO DIFFERENT STATES OF INDIA FROM 1976-AUGUST 21, 2001 AT UNITED STATES PATENT & TRADEMARK OFFICE

Sr. No.	State	No. of patents filed
1.	Maharashtra	359
2.	Delhi	150
3.	Karnataka	103
4.	Andhra Pradesh	56
5.	Uttar Pradesh	40
6.	West Bengal	38
7.	Tamil Nadu	37
8.	Gujarat	30
9.	Kerela	25
10.	Haryana	17
11.	Madhya Pradesh	11
12.	Chandigarh	7
13.	Bihar	5
14.	Assam	5
15.	Jammu & Kashmir	5
16.	Pondicherry	3
17.	Orrisa	3
18.	Goa	2
19.	Others	16

Total patents granted to Indians at USPTO : 912

Search Engine : www.uspto.gov

Source :Gupta, A. K., Chandak, V. S., Kurup, N. and Vyas, V. H.. 2001.