

Intellectual Property Rights And The Management Of Traditional Knowledge In Indian Agriculture

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ABSTRACT:

India is rich in the diversity of traditional knowledge that has been perpetuated from generation to generation since ancient times. There have been significant changes in farming systems, especially after introduction of the Green revolution, but the intellectual property rights of farmers have been rarely considered by policy makers, researchers and farmers' cooperatives. At present, tribal communities adopt old techniques that need to be gracefully acknowledged and legally recognized. Proper and timely management of traditional knowledge, combined with improved practices, would certainly be helpful in future agricultural strategies. In this paper, the issues related to intellectual property rights (IPR) and management of traditional knowledge are discussed, and guidelines for further studies and development are outlined.

Keywords: *Indian agriculture, Intellectual property rights, traditional knowledge, management practices*

With the introduction of the Green revolution in the country in late sixties, farmers adopted improved techniques of crop cultivation such as hybrid seeds, chemical fertilizers, synthetic pesticides, tractors, threshers and combine-harvesters. The waves of intensive agriculture were associated with a significant increase in grain production to the tune of 400%; however, the gross domestic product contribution to agriculture which was 55.8% in 1951 felled to merely 23% in 2007. The farm output could not cope with ever-increasing prices of various farm inputs nor the disequilibrium in ecological balance reflected in aberration in monsoon rains, frequent floods and droughts, global warming and reduction in biodiversity. Farmers' livelihoods are at stake though extra-ordinary growth in industrial sector is expected. It may however be unethical to harness natural resources in a manner by which existence of all living things is threatened.

One solution is to respect the indigenous /local knowledge as has been recognized by the United Nations Conference on Environment and Development held in 1992. Also the United Nations Environment Programme is working in those countries where agriculture is prone to natural disasters. Agricultural scientists and development workers have started exploring the scientific base behind rural knowledge for establishing location-specific strategies for sustainable agriculture. The current constraint is that Traditional knowledge (TK) is not systematically documented either in rural systems or modern publicity media.

Traditional knowledge refers to unique, traditional, local knowledge, existing within and developed around specific conditions of women and men indigenous to a particular area. The development of TK systems, covering all aspects of life, including management of the natural resources has been a matter of survival to the people who generated these systems. Such knowledge systems are cumulative, representing generations of experience, and trial and error experiments often tested over centuries for agricultural practices, equipments, plant species and animal breeds, and are well adapted to local culture and environment (Arunachalam, 2008). This knowledge facilitates local decision and survival strategies in agriculture since it links human, biological and ecological systems for sustainable use of local resources. It is not confined to tribal groups or original inhabitants and nomadic or migrants.

Current Status Of Traditional Knowledge In Agriculture

TK is mostly practiced and preserved by the small and marginal farmers who represent >65% of the country's population (Gahukar, 2007). Some marginal farmers still follow traditional agriculture which seems to be sustainable, though not always profitable, because it is economically affordable, socially desirable and reasonably reliable with minimum risk. It helps to conserve natural resources and solve problems of local communities through activity designed by them to strengthen community level knowledge systems. Quite often, poor farmers using TK are excluded from the mainstream of development though it is recognized that TK can play an important role in a participatory approaches to sustainable agriculture. This interest is reflected in a myriad of activities generated within local communities, national institutions and rural development agencies.

The conventional agriculture helps families to survive and sustain from generation to generation their livelihood in traditional farming systems (viz. crop rotation, mix and inter-cropping, planting crops of family needs, application of farm yard manure, compost, green manuring crops, *Panchagavya* etc.). Grasses on field bunds are used for mulching, biomass of uprooted weeds is left in the field to restrict evapo-transpiration of soil moisture. Cotton seeds are treated with a mixture of manure and mud or soaked overnight in cow urine. Plant products used against pests and diseases include water extract of neem leaves/kernels; and leaves/seeds/bark/rhizome of indigenous plants such as, *Allium sativa*, *Ocimum sanctum*, *Calotropis procera*, *Vitex negundo*, *Annona squamosa*, *Lantana camara*, *Parthenium* spp., *Melia* spp. etc. Soil incorporation of neem cake has been found effective against nematodes and soil pests. Dried neem leaves are mixed with stored food grains to ward-off insects.

Issue Of Intellectual Property Rights

With the agreement between the Government of India and the World Trade Organization (WTO), the relationship between traditional agriculture and intellectual property rights (IPR) has been strengthened by the World Intellectual Property Organization (WIPO), the Convention on Biological Diversity Conference of the Parties (CBD), and the United Nations Food and Agriculture Organization (FAO), although in fact TK still continues to be a key factor in conserving and developing local genetic resources, and crop cultivars have made contributions to the plant

breeding that resulted in augmentation of crop yields and helped to improve human livelihood and ultimately assured food security in the country. A recent trend to extend IPR to plant genetic resources may limit these uses. In order to prevent the expected crisis, there had been motivation for patentability of biotechnological subject matters from policy makers, research organizations and development/extension agencies (Gahukar, 2003). A similar trend is expected in coming years, and certain institutions including those listed below have accepted responsibility to regulate the access, control and use of genetic biodiversity and protect conventional systems in the country:

- Low External Inputs Sustainable Agriculture, Karnataka
- Society for Research and Initiatives for Sustainable Technologies and Institutions, Gujarat
- Gujarat Grassroots Innovations Augmentation Network, Gujarat
- Maharashtra Organic Farming Federation, Maharashtra.

Under the agreement of the Trade Related Intellectual Property Rights (TRIPS), the WTO grants exclusive rights to global corporations and receive patents on products developed by rural communities (Navdanya, 2005). Therefore, central government enacted legislation to implement following international obligations:

- The Protection of Plant Varieties and Farmers' Rights Act 2001 has been legislated under the obligations of Article 27 3(b) of the TRIPS agreement which mandated for the protection of plant varieties by a patent or an effective "*sui genesis*" (e.g., of its own kind/unique system) or by combination thereof, and was passed in the parliament in August 2001. This act provides protection to commercial plant breeders so that it would lead to increase food production, greater food security and the development of new varieties. However, several traditional cultivars are still popular and need IPR protection such as, sweet *Nagpur* oranges, *HMT* paddy and *Bhivapuri* chillies from eastern Maharashtra, bright red *Byadgi* chillies, sour *Appimidi* mangoes and salt resistant *Kagga* paddy from Karnataka, *Kesar* and *Hapus* mangoes from western Maharashtra, pest resistant *Pattamabi* paddy from Kerala. The geographical situation is now considered for patent since it is an identification of particular product that is specific to a region and unique in its quality and processing. This system of patenting provides legal protection, prevents its unauthorized uses and ensures better market recognition and helps in community rights.
- The Indian Patents Act of 1970 and Patents Rules of 1972 work under the framework of the 1983 Paris Convention which is administered by WIPO. This act was revised by Patents Amendment Bill in January 2005 to extend protection of food, agrochemicals and biotechnology products and to fulfill conditions of the TRIPS agreement. Earlier, methods of agriculture and plants were excluded from patentability in order to ensure that seed was held as a common property resource in the public domain. The farmers' rights to save, exchange and improve seed were not violated but exotic genotypes had been

imported. Thereby, exchange between wild and cultivated plants occurred continuously in nature which helped to maintain biodiversity and to enhance genetic resources in farmers' fields (Gahukar, 2004). It is always the phenomenon that traditional crops have been intermingled through cross-pollination of Genetically Modified (GM) crops planted in the vicinity. Because once exotic genes are introduced in traditional cultivars, it is difficult to trace their origin. On the contrary, the recent version of the act encouraged corporate sector to patent seeds and plants, including GM organisms, which resulted in monopoly of certain companies and therefore distress in farming communities. This fact is evident from the data of farmers' suicides in central India despite the aid offered under package of Prime Minister and Chief Minister Relief Funds.

- The Seed Act of 1966 was performing the function of seed testing and seed certification including compulsory registration of seed. Powers for inspecting farmers' stocks were issued to inspectors. The revised Seed Act of 2004 however, failed to regulate the seed supply and lost control over safety or remedy for untested and hazardous seeds by multinationals. The act also undermines the role of state governments since the number of representatives from states has been reduced (Navdanya, 2005). The revised version of this act came into effect from 2002 through National Seed Board and Central Seed certification Board. With due importance of TK in India, it is obvious that a monopolistic regime cannot be established as long as farmers have the alternative of their own reliable, time tested and high value seeds of the traditional varieties. Further, government failed to stop biopiracy and sale of spurious, hazardous seeds and chemicals (Navdanya, 2005).
- Patents granted for TK-based process and products are limited to neem cake, neem oil, oil extraction and seed planting machinery. There are instances where NGOs together with other groups are fighting against patents on rice, neem, wheat etc. Even now, six leading international companies have claimed patent rights on seeds and knowledge designed to combat the impact of climate change in agriculture. The multinationals have filed 532 applications for such seeds and plant genomes (Mishra, 2008). The price of these seeds would be extremely high and unaffordable to average farmers. Moreover, their utility is rather doubtful since research demonstrated that one DNA has many functions and many DNA have same function. This nature's gift should not be patented (Mishra, 2008).

Current Challenges

1. Private companies develop many crop hybrids every year and over 90% of the area of agricultural crops is under cultivation of hybrid crops. Meanwhile traditional cultivars developed by small farmers have vanished. Therefore, farmers have to depend upon these companies for seed supply. In fact, public organizations could have developed improved varieties and local cultivars. But unfortunately, this did not happen during last 40-50 years.

2. Agriculture related TK existing in rural areas by the way of craftsmen is declining fast and it is difficult to get carpenter, blacksmith etc. in villages. The labour requirement for collecting indigenous raw materials and fabricating farm implements is rather high, readymade goods are therefore on rampant in the market. Farmers too are not willing to purchase the traditional material due to easiness, superior quality and facilities available with new technology.
3. Community efforts for TK preservation and promotion are lacking. For example, India is a home of 45,000 plant species, many of them are being used in agriculture and *Ayurvedic/Unani* medicines. These plants are still unexploited for commercial purpose and patents also. Regeneration of natural resources can easily be done but who will do is a question. Eventually, tribal people can get IPR for medicinal plants and herbs for which Indian systems are well known but communities are not aware of quality products, marketing avenues and IPR registration.
4. If exchange of crop germplasms under commercial terms is granted, the developed countries can reap economic gains. This exploitation and misappropriation of biological and genetic resources and TK would certainly result in biopiracy. Though seed/plant has evolved since ancient times, over years and generations, plant materials are being exported without knowledge of authorities. In fact, major sources of gene diversity are found in developing or less developed countries whereas advantages of international agreements are availed by the developed world. Moreover, present IPR system failed to provide for benefit sharing and guarantee in case of crop failure.
5. Current IPR system allows for rights to be claimed over TK when relatively minor or no changes have been made to such knowledge whilst local communities do not have access to defensive mechanisms to protect their knowledge (Matthews, 2008). Thus, through TRIPS agreement, multinational corporations may pose a threat to the biological and intellectual heritage of India by privatizing TK. Intensive studies are required on these aspects to make agriculture really sustainable and profitable.
6. Lack of documentation hinders knowledge dissemination, preservation, validation and transfer. Since most of the cutting-edge technologies are knowledge based, TK should find its place in advanced world through partnership for which farmers, NGOs, cooperative societies, Self help groups need intensive training on agriculture so that they are encouraged to use it in their endeavours. The publicity particularly through electronic media, should encourage farmers to maintain their autonomy and rights.
7. TK is largely used in organic farming which is an important step towards sustainable agriculture. Farm management including seed treatment, maintenance of soil fertility, management of pests, diseases and weeds was based on indigenous methods. This has great relevance in the current scenario because geographical indication/situation of crop cultivation is considered for

patent. Therefore patents on TK process and products may be obtained urgently otherwise battle would be lost as it happened in case of turmeric and wheat.

8. Enhancement of genetic resources in farmers' fields and establishment of gene banks of local crop cultivars at district level would encourage farmers to continue TK in their fields since seeds of genotypes of their preference/choice would be available at these centres. Concerning raw material and finished/bye products thereof, incentive for technical and industrial development based on TK may be introduced so that "value addition" can be executed in the products originated from village level industries.
9. GM crops have been allowed for general cultivation or are in advanced stage of field testing such as, golden rice, Bt cotton, herbicide-resistant soybean, Bt egg plant etc. (Gahukar, 2003). Though economical and environmental effects have been studied, little is done for social aspects. Even now, there is tremendous depletion in the effects of Bt cotton (resistance build-up in bollworms, susceptibility to plant diseases and sucking pests). As such, how many guidelines of the National Biodiversity Bill of 2002 are being followed in peasant farming? Some of the crop cultivars adapted to local conditions still fetch better price in the market due to taste, appearance and other quality parameters. Considering these facts, the FAO resolved that farmers should be allowed to derive benefits of IPR through protection of farmers' rights.
10. Limited surveys undertaken have shown that after-effects of GR are fading away fast and crop productivity is decreasing due to continuous use of land, mono-cropping, over irrigation and high doses of chemical fertilizers and pesticides. Soils have become infertile due to low content of plant nutrients, organic matter, salinity or alkalinity. Resistance in pests against common pesticides and resurgence of new/secondary pests, diseases and weeds has become apparent. Enhancement of genetic sources from farmers' fields would provide some relief since 5% and 50% gene flow in the self-pollinated and cross-pollinated crops respectively has been reported.
11. Promotion of agricultural projects and short term programmes at village level is necessary to facilitate interface of scientific disciplines and TK. Revision of course curricula at school and college level may be initiated. There is much to learn from the wisdom of farmers because they are rich depository of TK base. Further, the local technology is innovative, eco-friendly, practical, cheaper and replicable (Anandkumar & Ancy, 2008). Biodiversity is maintained due to regeneration and conservation of natural resources. The farm inputs are locally available, compatible and have synergistic action. The foods prepared are without pesticide residue. However, marketing network and awareness in consumers is lacking for organic products.

Future Needs

- In general, the IPR regime through WTO agreement must be capitalized by urgent actions for TK protection as suggested by Posey (1999): Supporting

indigenous demands for self determination

- Assistance in the development of community data and information management
- Supporting indigenous and community controlled research
- Development of contacts to guide research and business negotiations through dialogue with local communities
- Utilization of local criteria and indicators for data collection, environmental impact assessments, biosafety studies and inventories
- Designing taxonomic data-base to interfere with ethno-taxonomic data bases
- Development of biodiversity data that include indigenous ecological knowledge
- Fixing priority for data collection in areas where cultural diversity, linguistic diversity and biological/ecological diversity overlap
- Farmers should be paid through benefit sharing mechanism whenever their varieties are used for breeding by professional plant breeders and public institutions
- Monopoly of the MNCs and private firms in seed business may be discouraged/restricted for the right to free access to protected/traditional varieties
- Seed price of recently marketed hybrids is beyond the capacity of average and small farmers
- Legal provision of compensation to farmers who cultivated registered varieties but could not get the yield promised by companies. In such case, the company should be sued in the court for justice
- The agro-industrial sector should change the model from service to product
- Raw material is exported from India and ready-to-use products are imported. This biased routine may be abolished. Otherwise, the models of SHG will collapse soon and farmers' cooperatives involved in the venture of agro-industries will be no longer active in this sector

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