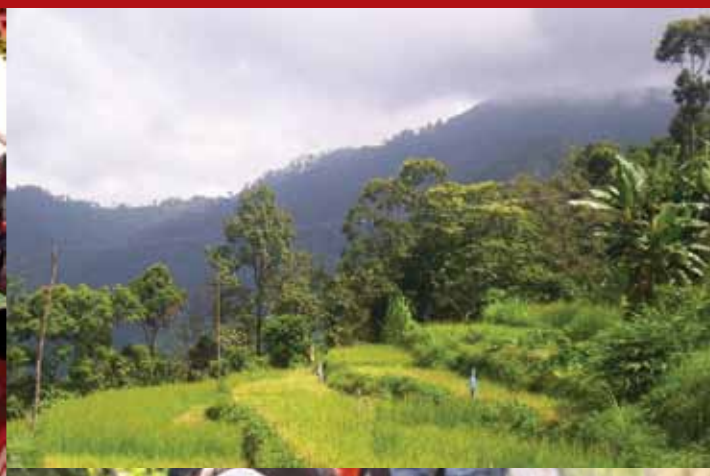
Heritage on the Edge:

Protecting Traditional Knowledge and Genetic Resources in the Eastern Himalayas, India



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September 2012

Ecoserve iied **PROTECTING COMMUNITY RIGHTS OVER TRADITIONAL KNOWLEDGE**

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ACKNOWLEDGEMENTS

This report is the result of work of hundreds of farmers from the Lepcha, Limbu and other local communities in Kalimpong sub-division whose knowledge, innovations, practices and experiences have been explored. It is also the result of understanding developed on this subject through discussions with researchers, experts and policy makers, not only in India but in other countries. I, the writer of the report, would like to thank the financial and technical support received from institutions such as the International Institute for Environment and Development (IIED), International Development Research Centre (IDRC) and SwedBio, not only to conduct the action research but also to give the team the opportunity to participate in several international policy-making platforms which reinforces ones' belief in policy dialogue and influence. This process has seen acceptance of several ideas, concepts and philosophies shared at several such fora. This support and the results achieved in this project underpin the importance of timely funding support from donors to pilot new areas of work which help inform national and international policy-making. I earnestly acknowledge the technical support received on a regular basis from Krystyna Swiderska and Michel Pimbert of IIED during the course of this project. Finally, I would like to thank my mentors and guides, Dr. Rajeev Dhavan, Senior Advocate, Supreme Court of India, and Dr. Amita Singh, Professor, Centre for the Study of Law and Governance, Jawaharlal Nehru University, who encouraged me to develop the results of this research into a framework which helped me obtain a doctoral degree in Law and Governance.

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EXECUTIVE SUMMARY

The Eastern Himalayan belt is the centre of origin for a number of crops, including rice. This study explored the customary laws and farming practices of Lepcha and Limbu communities, and what they mean for the design of mechanisms to protect traditional knowledge at national and community levels. It was conducted in five villages in Kalimpong (District Darjeeling, West Bengal state) and two villages in the neighbouring state of Sikkim. The participatory action research entailed village meetings, focused group discussions, semi-structured interviews and household surveys, and involved a range of stakeholders.

Farmers grow diverse varieties of rice, pulses, millets, oilseeds, cereals and vegetables. This enhances self-reliance in food, forms the basis of health and nutritional security, and meets diverse socio-cultural needs (e.g. special varieties are used for weddings and festivals). In general farmers have not accepted modern varieties, because they do not fulfill the allied needs of providing straw for livestock and roofing material (although some young farmers have started growing commercial crops such as flowers). Despite this there has been a significant decline in the number of rice varieties planted in the region. Only 20 varieties were identified, but there is oral evidence that nearly 100 rice varieties were previously grown. The decline is due to the easy availability of cheap rice through the public distribution system, and availability of cheaper rice products in the market and local *haat* (village market). It is also the result of reduced farm labour (due to changing aspirations of youth); and land fragmentation.

Changes in climate are being felt, and a number of autonomous adaptation practices are evident. Seed exchanges provide access to new varieties needed to cope, for example with water shortages and higher temperatures. Exchanges take place within and between villages including across altitudes and across country borders. Farmers are also adapting their agricultural practices by shifting to horticultural crops such as orange, ginger and cardamom and developing new varieties (e.g. disease resistant cardamom).

Women play a major role in genetic resource conservation, and seed exchange and decision making. They have largely retained their traditional food habits and thus traditional knowledge, for example, preserving vegetables for lean summer months, despite pressure from scientists to adopt high yielding crops to meet global projections, and the promotion of modern lifestyles and foods in the media. However, traditional knowledge is being eroded due to factors such as the withdrawal of many youth from farming. Yields are decreasing as fewer bulls are available for ploughing due to reduced grazing commons, and the aeration of soil is reduced, making farming harder.

At the same time, there is a new trend among the Lepchas and Limbu to revive traditional culture and language in order to establish a space for themselves in the political process underway to demand a new state of "Gorkhaland". In recent negotiations, Lepcha leaders used the concept of biocultural heritage to establish this space, and this has also reinforced the belief of the communities in their own traditions and practices, foods and knowledge. This will ultimately boost biodiversity conservation in the region.

Many conservation practices are followed because of a strong belief in supernatural powers. The Lepchas believe that the mountain gods bless them with seeds and rain for growing crops. For them, protection of knowledge means protection against loss. No customary laws regulating access to knowledge were found. Free sharing of knowledge is an expected social norm, and is believed to enrich knowledge and related resources. Collective farming practices are still popular. Since much farmers' knowledge and crop diversity has been developed collectively based on sharing, decisions about access to these resources are made collectively, and benefits are shared with the collective.

The common principles on which agrarian communities thrive and survive – reciprocity, equilibrium, duality and solidarity – could form the basis for developing an ABS regime for TK protection based on customary laws. Reciprocity is visible in all walks of life and means equal exchange in society and with nature, and barter is still practiced. This means that communities may prefer to receive seeds and knowledge rather than monetary benefits. Equilibrium, means harmony or balance in nature and society, e.g. not using chemicals in farming and promoting social equity in access and benefit-sharing. The principle of Duality means use of complementary systems – e.g. western science and law alongside traditional systems. It also means that individuals have a dual role in society – individual and collective. Brotherhood or Solidarity is well embedded in social organization and goes beyond reciprocity, where families help each other in times of dire need. This means that benefits should be shared also with the most needy, without expecting anything in return.

The Biodiversity Convention (CBD) provisions on access to genetic resources which largely benefit external users of genetic resources are far better elaborated in India's biodiversity law than those on traditional knowledge (TK) protection and benefit-sharing. The Forest Rights Act, 2006, has attempted to recognize community intellectual property. The Protection for Plant Varieties and Farmers Rights Act requires disclosure of use of genetic material in applications for registration. It allows farmers' varieties to be registered, but few if any have been registered so far, and the need to pass Distinctiveness Uniformity and Stability (DUS) criteria could take several years and lead to reduced genetic diversity. India's Geographical Indications Act could help farmers get a premium on TK-based food products, but is still not very effective in achieving this objective.

Customary laws alone are not sufficient to protect TK, because they promote sharing, and have limited jurisdiction and enforcement outside communities. Although the customary principles identified could be used to provide positive protection, a harmonized defensive mechanism in the form of patent legislation disclosure requirements is also needed. In addition, effective protection of TK and biocultural systems requires non-legal tools. The project supported the development of community biodiversity registers for rice and fodder, and explored tools for developing a biocultural community protocol in a transboundary context. Food products can incentivize farmers to grow diverse varieties. Women's self-help groups were trained in packaging and labeling and given opportunities to market their products. A small 'rice park' was established where farmers can access traditional seeds. Exposure visits were organized for farmers and local leaders. Having seen the good yields of traditional varieties, a local Panchayat leader abandoned plans to purchase hybrid seeds for the village. The project also facilitated the creation of the Himalayan Farmers Front, which has enabled farmers to negotiate with others e.g. for better prices of different farm and dairy products. These non-legal activities have made people think differently about their knowledge, creating a sense of pride.

In India, TK is not restricted to indigenous communities. In fact, the Government of India does not recognize the presence of indigenous communities; the closest acknowledgement that a large number of ethnic communities in India find is in the Constitution of India as Scheduled Tribes.

Hence, there is a need to include non-indigenous TK holders in international agreements, and to ensure that farmers including women participate effectively in policy and law making processes. The capacity of communities to negotiate ABS agreements needs to be strengthened, and legal literacy programmes on TK protection are needed for both communities and local government staff. The National Biodiversity Authority should work with progressive lawyers to develop model contracts for ABS based on customary principles. Farmers' access to premium markets for their unique bio-cultural products should be facilitated. Participatory plant breeding requires support to develop climate resilient varieties and promote equitable benefit-sharing with farmers. The National Gene Fund under the Protection of Plant Varieties and Farmers Rights Act should provide funding for in situ conservation of declining genetic resources. Finally, curricula for schools, colleges, technical institutes and universities should include a focus on TK protection and promotion.

1. INTRODUCTION

This report is the culmination of a five year action-research project initiated in 2004 to explore approaches and strategies for developing country- and community- specific *sui generis* mechanisms for protecting genetic resources and associated community knowledge, innovations and practices. The project, "Protecting community rights over traditional knowledge: Implications of customary laws and practices" was supported by the International Development Research Centre (IDRC, Canada) and The Christensen Fund, and coordinated by the International Institute of Environment and Development, UK.

The purpose of the project was to identify mechanisms to assist indigenous and local communities to protect their rights over traditional knowledge relating to biological resources, in accordance with their customary principles and norms.

The specific objectives were to:

- undertake studies in India, Peru, Panama, Kenya and China, to examine the customary laws and practices of indigenous and local communities relevant for controlling external use of Traditional Knowledge (TK); and
- inform and influence policy makers at local, national and international levels, such as the Convention on Biological Diversity (CBD), the World Intellectual Property Organisation (WIPO), the World trade Organisation (WTO) and the United Nations Indigenous Rights fora.

The outcomes anticipated from this project included:

- Improved understanding of alternative systems to existing IPR models based on the livelihoods needs, customary laws and values of indigenous and local communities.
- Enhanced participation of TK holders in policy debate and formulation for TK protection.
- Enhanced capacity of TK holders to protect their rights through the active participation of local communities in the research process and in developing tools for TK protection (e.g. Community protocols and registers)
- Strengthened customary and community institutions and resource management systems, contributing to enhanced community control over resources.

A key criterion for selecting the study sites was the presence of high levels of cultural and biological diversity and rich related TK. The studies with the Maasai and Mijikenda in Kenya, Yanadi Tribes in Andhra Pradesh in India, and Kuna and Embrera in Panama, focused on TK related to medicinal plants; whereas the studies with Quechua communities in Peru, Lepchas and Limbus in the Eastern Himalayas in India and ethnic communities in Guangxi in Southwest China, focused on TK and traditional practices related to potato, paddy and maize respectively. For more information see Swiderska *et al*. (2009) http://pubs.iied.org/pdfs/14591IIED.pdf.

The project focused on traditional knowledge (TK) and its protection as a whole in its broadest sense, including biodiversity, landscapes, spiritual values, customary principles and institutions. The broader focus recognizes the holistic nature of traditional knowledge systems where the tangible and intangible cannot be separated. One of the main findings of the project was that development of any sui generis mechanism for protection of TK and resources should be based on this larger worldview of indigenous and local communities, and include both legal/policy and non-legal approaches. Early on in the project, the research partners developed a conceptual framework for research based on this worldview. It was called Collective Bio-cultural Heritage, and defined as:

> "knowledge, innovations and practices of indigenous and local communities which are often held collectively and are inextricably linked to traditional resources and territories; including the diversity of genes, varieties, species and ecosystems; cultural and spiritual values; and customary laws shaped within the socio-ecological context of communities".

This concept places emphasis on the collective rather than individual rights; addresses biodiversity and culture together, rather than separating them; and recognizes traditional knowledge as 'heritage' rather than 'property' to reflect its custodianship and intergenerational character.

1.1 Why protect communities' rights over TK and biocultural heritage?

Some of the key reasons for protecting communities' rights over their knowledge are as follows:

- The knowledge has been generated through years of experimentation and shared usage by indigenous plant breeders (farmers) in indigenous and local communities.
- The Convention on Biological Diversity (CBD) Article 8(j) recognizes the importance of knowledge, innovations and practices of the indigenous and local communities; and requires Parties to respect, preserve and maintain them, promote their wider application with the approval and involvement of communities, and encourage equitable sharing of benefits from their use. The need to protect communities' rights over their knowledge are implicit in these clauses.
- The CBD requires Parties to adopt incentives for local communities to conserve biodiversity. This is possible only when Parties recognize communities' rights over their knowledge.
- In relation to climate change, it is well established that genetic diversity and communities' knowledge associated with it forms part of adaptive management systems and has addressed new challenges of climate variability (Swiderska *et al.*, 2011).

2. THE EASTERN HIMALAYAS CASE STUDY, INDIA

This case study is located in the villages of Kalimpong sub-division of District Darjeeling in the state of West Bengal. The Darjeeling Gorkha Hills Council area, of which Kalimpong forms part, lies in the western end of the eastern Himalayas, a global hotspot for biodiversity. The Eastern Himalayan belt is the centre of origin for a number of crops, fruits and vegetables, including rice, with an estimated 600 traditional varieties of rice. The study region shares borders with Nepal to the West, Bhutan to the East and China (Tibet) to the North.

The two communities studied as part of this project were: the Lepchas, who are considered the original inhabitants of the region; and the Limbus, who migrated from Nepal a few hundred years ago. Both these communities are listed as Scheduled Tribes under the Constitution of India and thus enjoy a special status. The region is now inhabited by many other ethnic communities of Tibetan and Nepalese origin. Lepchas were mainly hunter-gatherers and engaged in slash and burn dry-paddy cultivation. Gradually, with the influx of Nepali migrants, they picked up the knowledge of settled and wet-rice cultivation. And now, they are mainly subsistence farmers growing paddy, maize, millets and broom grass. Some families are also engaged in cultivation of cash crops such as cardamom, oranges and ginger. The Nepalese migrants brought with them the knowledge of wet-rice cultivation and also the seeds for this kind of cultivation. Nearly a century ago, the Lepchas in district Darjeeling accepted this form of cultivation and with local innovations and practice, gradually moved into settled cultivation. Over the years, with experimentation and usage, they have developed a rich gene pool of rice suitable to different temperatures, soil and moisture conditions.

The participatory action research with the Lepcha and Limbu communities in Kalimpong focused on farming systems and in particular on traditional rice varieties. It explored the potential of customary laws and inherent principles and practices for the protection of community rights over traditional knowledge and genetic resources. It further sought to identify elements for developing a *sui generis* mechanism for the same. The project also aimed to sensitize the communities on emerging trends in policies/ laws, and to promote recognition of customary laws pertaining to biodiversity conservation at national and state levels.

The study was conducted in five villages of Kalimpong sub-division namely Pudung, Khadalay, Lower Ichhey, Dungra and Dalopchand, and two villages in Sikkim, namely Menrongong in North District and Namchebung in East District.

Section 3 of this report provides the methodology for action-research; Section 4 provides the findings on the status and trends relating to traditional knowledge, genetic resources and farming systems; while Section 5 focuses on autonomous adaptation. Section 6 focuses on customary laws for TK protection; and Section 7 explores the trends and drivers of change. Section 8 reviews the existing policy framework for TK protection; and Sections 9 and 10 explore responses based on customary laws and the need to go beyond these. In Section 11, non-legal tools developed for TK protection are presented; while Section 12 identifies the action-research outcomes and lessons learned. Section 13 presents key conclusions and ways forward.

3. METHODOLOGY FOR ACTION RESEARCH

The project in Kalimpong had two main components:

- policy research
- participatory action research

The policy analysis part was the responsibility of the Delhi based organization, Ecoserve, while the Centre for Mountain Dynamics (CMD) anchored the participatory action research facilitated by Ecoserve.

Policy research was initiated by conducting a literature survey, secondary research and an analysis of international, national and state laws and policies related to the conservation of biological diversity, intellectual property rights, farmers' rights and TK protection. Field work was conducted to ascertain the customary laws of the local communities in the region pertaining to conservation of natural and biological resources, traditional knowledge, and access and benefit-sharing.

The participatory action research was initiated with the formation of a Learning Group in Kalimpong. This formed the advisory body of the project in the region to consult on all components of the project. A planning meeting of the key stakeholders was conducted at the start of the project with the local partners, Centre for Mountain Dynamics (CMD), and the newly formed Learning Group. The Learning Group comprised the local NGO partner, several Panchayat leaders, members of women's self-help groups, an ecologist, and a representative from each of two national conservation organizations – WWF and ATREE. The planning meeting was held to introduce the project's components and its objectives to the participants and identify villages for the action-research. A separate round of meetings was held with several government departments and their officers at the district and sub-division level, to ascertain the understanding of these officials on the subject of the action-research.

A cross-section of people was met in two villages of Kalimpong sub-division to understand the socio-economic and ecological status of the villagers. Thereafter, meetings were held in all five villages selected for project implementation. The project was explained to the villagers in detail, including its objectives and work-plan, to seek their prior informed consent before commencing. Two staff members of CMD, who hail from the local communities, accompanied the project coordinator in the interactions and discussions held with the local villagers in the five villages. The research involved different stakeholders: elders, youth, local healers, priests, farmers (men and women), women's self-help groups and members of Panchayati Raj Institutions (institutions of self-governance at the local level).

A questionnaire was developed based on the reconnaissance visit and initial meetings conducted in the project villages. This questionnaire was administered at the household level in an average of 20 households per village in five villages in Kalimpong sub-division (out of a total of about 70-80 households in each village). Baseline data on TK, genetic resources, farming practices, average yields, customary laws and principles were collected through this process. A cross-section of people such interviewed – old and young, women, retired teachers and army men, members of local officer, etc.

Semi-structured interviews were conducted with technical people from the government and non-government sector; focus group discussions were held with institutional groups and women's self-help group (SHG) members, members of the Panchayati Raj Institutes (local self-governments) and informal farmers' groups.

A similar exercise was conducted in the two villages of Sikkim. This was done in collaboration with the state forest department and the staff members of the Indo-Swiss Dairy project (ISDP). The sites in Sikkim were later dropped due to closure of the ISDP activities in Sikkim. However, some basic information and baseline data was collected to develop an understanding about dry-rice cultivation practiced by the Lepcha families in Menrongong village in North Sikkim. These practices are unique and only prevalent in a small area as most Lepchas in Kalimpong sub-division have switched to wet-rice cultivation practices. A number of activities were undertaken to sensitise the farmers and the women self-help group members on issues relating to TK, importance and value of TK, bio-genetic resources, misappropriation of knowledge, need for protection of TK, national and international laws on conservation of biodiversity and intellectual property rights.

Small focused group discussions and classroom trainings were held; exposure visits were organised; staff members of the local NGO (CMD) were sent for trainings to other parts of the country (South-west Bengal, Maharashtra and Andhra Pradesh); and a farmers' exchange with farmers of Chhattisgarh was held. Documentation of the rice varieties was completed with the help of local farmers. Resource persons and experts were invited from other parts of India to help in the sensitization process. People were trained in preparation of village registers focusing mainly on rice and fodder varieties. Seeds of traditional varieties were collected from local farmers to develop a genepool and CMD established a small rice-park with 20 varieties in their campus covering an area of two hectares to keep the genepool alive for local farmers.

Face-to-face meetings of farmers from across the district were organized with the officials of the various relevant departments to make the officials understand the problems farmers face and enable the farmers to learn about the government programmes and schemes. The different departments that participated included representatives from rural development and banking, agriculture, dairy and animal husbandry, water and sanitation, irrigation, health and education.

This mobilization of farmers from across the district led to the formation of a forum for farmers called the Himalayan Farmers' Front, which went on to do several advocacy actions on issues of pricing for milk federations, etc. This Front has established links with farmers across the Himalayan belt and has been engaged in a number of knowledge exchange and information sharing activities and events over the last few years.

A film was made documenting traditional practices relating to different processes in rice cultivation and depicting the importance of traditional practices and knowledge using local examples to sensitise the farmers and the women folk of the project villages. This film was also shown and screened at various international events such as at the International Society for Ethnobiology Congress in Tofino, Canada, in May 2010, and the CBD CoP10 in Nagoya in October 2010, for sharing best practices and learning from the project (see http://biocultural.iied.org/outputs/case-studies-and-partners).

4. STATUS AND TRENDS: TRADITIONAL CROP VARIETIES, FARMING SYSTEMS AND KNOWLEDGE

In addition to traditional rice varieties, farmers in the Kalimpong region grow diverse varieties of crops such as pulses, millets, oilseeds, cereals and vegetables. This not only helps enhance farmers' self-reliance in terms of availability of food but also forms the basis of their health and nutritional security. The choice of variety for a particular season depends on the environmental and soil conditions, availability of labour, family needs and the option of growing an additional crop for inter-cropping on the raised bunds in the narrow terraces. Normally, the farmers here grow a pulse crop, *Kaalo dal*, along with paddy on the raised bunds. Seeds of traditional varieties are not available in the market. Farmers rely on self-saved seeds or local seeds available through the traditional practice of seed exchanges in the village.

The surveys conducted across District Darjeeling revealed that people could recall roughly 50 rice varieties from earlier times[1] but when an effort was made to collect seeds, the team could not find seeds of more than 20 varieties. The reduction in the number of varieties was attributed to the fact that many substitute/ alternative snack products are easily available in the market. The traditional snack products such as *chyura* (flattened/ beaten rice) and *murai* (puffed rice), which were earlier made in these villages using traditional varieties of rice paddy, are now available at reasonable prices. These snacks are made from rice from the plane areas of the state or neighbouring states, using varieties grown in there. Another reason for the reduction in the varieties grown is that fewer hands are available for cultivation in these villages. The younger generation is gradually getting weaned from farming activities or is engaging in floriculture work. Land-fragmentation is also driving the reduction in the number of varieties grown in farmers' fields (see also Section 7.1, on Drivers of change).

The surveys also revealed that the yield of traditional rice varieties is on the decline. Yet, this has not induced local people to shift to high yielding varieties. One of the reasons offered by a few farmers for decline in productivity related to the reduction in the number of times the fields were ploughed before sowing the seed. The farmers observed that this has led to a reduction in aeration of the soil, thus leading to reduced soil fertility. On further examination, it was found that not every family had a bull for ploughing purposes. Over the years, the commons are shrinking and fewer families are rearing bulls. The practice of free-roaming bulls for feed has reduced to stall–feeding, which is a cumbersome activity. With reduced productive hands in a family and limited fodder and thus fewer bulls, one has to hire the services for getting their fields ploughed. Only a few families provided ploughing services in each village.

Although the villages surveyed in this project have a monetised economy, a system of barter prevails in these villages and for several services, money doesn't exchange hands. Families providing ploughing services do not charge money for their services. They continue to follow the age-old practice of exchanging their service in kind. For a fixed area ploughed, they would accept in return a sack-full of paddy for themselves and/or certain number of bundles of straw for their livestock.

Traditional practices such as parma (communal or group- farming) are still popular in the region, and village communities continue to practice collective paddy cultivation. Decisions related to which varieties to grow in the coming season are taken both at the family level and also collectively. Communal/ group farming practices help reduce conflicts during the cultivation season. Collective decisions are also taken on other important matters at the commencement of the cultivation season, such as the sharing of water from the canals. Water is a scarce resource and with climate vagaries is often in short supply. These decisions are influenced by the traditional institutions called the *samaj*, which are still in existence. Collective farming starts from the planning for the varieties to be planted, preparation of the terrace fields, clearing of terrace walls, raising bunds, mulching, transplanting of paddy seedlings, weeding and harvesting, and goes on till winnowing and storage of the grain.

Women play a major role in natural resource management and genetic resource conservation in the region. It is largely women who take decisions on which varieties to grow in a particular season depending on need and climatic conditions. Tasks in an agrarian society are clearly delineated gender-wise. While the preparation for seed sowing – preparation of the field, ploughing, bund raising, contour making, thrashing with the help of a bull, winnowing etc. - are the tasks of men members in the family, the women in the family do most of the remaining work. This includes sowing the seed, transplanting the seedling, weeding, seed selection, seed storage, etc. The responsibility of selecting healthy and quality seeds from the standing crop and saving these till the next sowing season lies with the women farmers.

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1 Though a figure of 100 was mentioned by village elders when meetings were held with them during the reconnaissance visit. or example in commons models or in intellectual property rights.

An interesting example of innovation is visible in women's knowledge relating to preservation and storage of seeds, grains and vegetables, as seeds of many traditional varieties are not available in the market and there are times of seasonal non-availability of vegetables in the region especially in the summers. These women have mastered the art of preserving vegetables. This region is at a reasonably high altitude and not many vegetables are available in the summer season. Even now greenhouse cultivation is not very popular in these parts and farmers adhere to traditional practices of growing crops and vegetables. The women of the family, thus, have traditionally preserved vegetables and soyabean and other items every year for use in the lean summer season. Some of the popular items are given in the box below.

Box 1: Local knowledge for nutrition persists despite external pressures

A good example of local knowledge relating to nutritional and food security vests in particular in the women members of the family and is handed down from one generation to another. In earlier times, summer months saw very little growing in the high altitudes of the Himalayas especially in terms of vegetables. The women of this region have mastered the art of preservation of vegetables in different ways and this art has continued over generations to meet the dietary needs of the family in the scarce summer seasons.

There has been pressure by scientists on farmers to produce high yielding food crops to meet global projections. There has also been pressure from the media through promotion of certain lifestyles, which support the use, and production of exotic foods rather than traditional varieties. Research shows that women in these villages have in spite of the above pressures, retained their knowledge and wisdom to preserve a range of produce for the summer season by continuing these practices. Some of the popular dishes are: *sinkii*, made of squash, *gundruk*, made from radish leaves, *barhi*, made out of black gram pulse, a range of pickles made out of beans, cauliflower, radish, bamboo shoots; *philenge* and *silam*, dried powder made out of stamen of flowers, rich in minerals.

There are many including children who are knowledgeable about wild edible roots, tubers and fruits available in the forests. This knowledge also helps the village rural community secure their food and nutritional needs.

5. ADAPTATION TO CLIMATE CHANGE

The threats of climate change are also being felt by the communities in terms of erratic rainfall, at times excessive rainfall but also drying up of springs and traditional irrigation channels, increased infestation of pest etc. A number of autonomous adaptation practices are visible in the region to address these challenges, involving exchanges of seeds between communities and the breeding of new adapted varieties by farmers (see Box 2).

Engagement with the Lepchas in North Sikkim areas helped the project locate and later access seeds of dry-paddy type, which are no longer found among the Lepchas in Kalimpong. With climate vagaries, the farmers in Kalimpong are now facing water shortage for cultivation and are trying to switch to old cultivation using dry- cultivation techniques that requires different seed varieties.

Box 2: Seed Swap, biyu sattasat: agro-biodiversity and seed-exchange

The farmers in district Darjeeling maintain seed- purity through exchanges within and between villages. Women farmers are adapting to changing conditions by procuring seeds of different varieties through traditional practices of seed saving, exchanges and networks. For example, a villager growing rice at 1000 metres obtained a different variety suited to higher temperatures from a villager at 800 metres. Farmers in the region are also adapting agricultural practices and developing new varieties. One farmer is planting ginger a little later than usual to help tackle pest infestation. Another has used a wild relative of cardamom to breed a new, disease-resistant variety — which is such a success that it has attracted support from the state government for sale to neighbouring regions. Traditional farming systems and farmers' innovations are clearly at the cutting edge in adaptation to climate change. While scientists and policymakers work to find solutions, local farmers have already amassed considerable experience of how to cope, based on their observation and experimentation in the field.

6. CUSTOMARY LAWS, VALUES AND BELIEFS RELEVANT FOR TK PROTECTION

While sensitizing people about the importance of traditional knowledge and protection of bio-resources, it emerged that people found the concept of biopiracy alien to their value system. The agro-biodiversity maintained in the region is a result of the dependence of these communities on the different resources for meeting their varied socio-cultural and ecological needs. These communities have strict norms for protection of natural/ biological resources. The term protection in these peoples' worldview has a different meaning. In the legal or policy sense , the term 'protection' in relation to TK usually means protection against misappropriation or biopiracy, while to traditional and farming communities, 'protection' refers to preservation and promotion of knowledge i.e. protection against loss. One way to protect knowledge from loss is by usage by the present generation and by ensuring transmission to the next generation through practice and other creative means, such as songs and dances.

While conducting primary research in the field, instances and examples of customary laws regulating access to knowledge and plant genetic resources were found to be non-existent. This also reflects the fact that knowledge is considered to be a shared resource and freely available. The view of the local farmers is that knowledge and resources get enriched through sharing. The fact that TK is a shared resource and freely available means that there is a social norm to share it and keep it freely available which is practiced and expected by society.

Hardly any instance of disputes was observed on matters of sharing of seeds and other natural resources. With respect to exchange of seeds and distribution of water, these villages follow an interesting mechanism for dispute prevention. The village people meet prior to the sowing season to exchange seeds and decide in advance who is going to sow which varieties in the following season. Farmers also decide the amount of water required in the season and how it will be distributed during the cultivation season among the users.

People also have a strong belief in supernatural powers and many customary and conservation practices owe their compliance to the fear thereof. The entire Himalayan belt in India is considered sacred. Though the research team identified customary laws on natural resources related to forests and water on collection, extraction and sharing of benefits, however, the management and sharing of genetic resources was found to be governed not by specific customary laws, but by customary values or principles, which are as follows:

- Principle of reciprocity
- Principle of equilibrium/ harmony
- Principle of duality
- Principle of brotherhood/ solidarity

6.1 Customary Principles: Reciprocity, Equilibrium, Duality and Brotherhood/ Solidarity

Principles of Reciprocity

Reciprocity means equal exchange in society and with nature. The Principle of reciprocity is visible in all walks of a community life in the study area. The community members and the different occupational groups are dependent on each other and or the biological and other resources available in the area. In the absence of a monetized economy most of the services and products are exchanged or bartered. In the project area, this system has continued in many aspects of communal farming. This is also reflected in the process of seed-exchanges. Seed exchanges are undertaken to make seeds available to villagers and to maintain purity of the seed, and thus helps conserve the diversity of plant genetic resources. The process of pooling labour to help one in their field is called *khetla*, and when that farmer reciprocates his service in your field it is called *perma khelna*. Free-sharing of knowledge and seeds take place with villages in neighbouring communities and countries too. This was clearly evident in exchange of seeds between people of the same community living across the border in Bhutan and Nepal.

Principle of Equilibrium

Equilibrium means balance in nature and society – respect for nature and social equity in access and benefit-sharing. Local communities in the study area believe that they derive their knowledge and resources from the supernatural powers and the cosmic world. For instance, the Lepchas believe that the mountain gods bless them with seeds and rain for growing crops. The Gods give innumerable cosmic and natural indications related to the timing and volume of rain. Lepchas show their appreciation by way of series of rituals for the mountain gods during different times in the cultivation period such as when sowing paddy seeds, transplanting paddy saplings and post-harvest before storing. The Kanchenjunga Mountain in general and the lakes in this region are accorded a sacred status as this area is considered the abode of the mountain god.

Local people avoid the use of chemicals and pesticides in their fields as this disturbs the equilibrium and harmony of the peoples' survival. People have a close link with and dependence on the various resources and systems in their landscape. For instance, the residual straw of the rice paddy growing in their fields is fed to the livestock and hence, farmers can't use chemicals. In some areas, where farmers engage in wet-rice cultivation and pisci-culture together, again they cannot use pesticides as it affects the health of the fish growing in the same or neighbouring fields.

People's sacred feelings for nature and mountain gods are also reflected in some traditional customs. There was a time when people in this region would not wear slippers or shoes in their fields and work bare feet when engaged in cultivation activities. In another example, it was seen that the *dhatura* plant, a species which indicates high moisture level in the soil, is protected with the help of a taboo or a social sanction – that anyone plucking the flowers of the plant or damaging the plant will fall ill and that the flowers are poisonous.

Principle of Duality

Duality means use of complementary systems – for example. western science and law can be used alongside traditional systems. Similarly, an individual plays a dual role in society – as an individual, and as part of a collective. Individuals make their contribution in communal cultivation. This is also an opportunity for transmission of knowledge related to the resources. The Buddhist Lepchas also contribute one month's time each year to their local temples (*Gompas*) at the time of renovations.

Principle of Brotherhood/Solidarity

Society is organized by cooperation and there is solidarity and reconstruction in societies where social feelings are dominant: cooperation becomes a primary organizer of the major social sectors – work, politics, family, education and culture. There is a character of benevolence and compassion in a cooperative mode of organization. Where exchanges and an equal return for an action form the basis of the principle of reciprocity, the values inherent in the principle of cooperation and brotherhood go beyond reciprocity. Principles of brotherhood and solidarity are well embedded in the social organization in Kalimpong, where families are found to be helping each other in times of dire need. Some poor families may not have enough seeds to sow in their fields or enough rice to fill their stomachs, the traditional institution of samaj has most often ensured that community members contribute for a noble cause.

7. DRIVERS OF CHANGE: CHALLENGES AND OPPORTUNITIES FOR PROTECTION OF COLLECTIVE BIO-CULTURAL HERITAGE

7.1 Negative Drivers: limited land and labour, and changing aspirations

Though there is oral evidence that nearly 100 varieties of rice were grown in this small region covering 3149 sq kms, the project has found that over the past decade, there has been a rapid decline in availability of these traditional rice varieties in the region. This is because farmers have stopped growing a number of the rice varieties. This has affected the availability of seeds of these varieties, which in turn has resulted in the erosion of the traditional knowledge of the indigenous farmers embedded in these seed varieties. This has also affected the availability of the rich gene pool for future food, nutritional and bio-cultural security of the people of the region.

While in other parts of the country, the decline in the number of traditional varieties of crops is caused by the introduction of modern varieties through the extension offices of state government departments and acceptance of these by local farmers, this was not the case in Kalimpong sub-division of West Bengal state of India. Here, the farmers never accepted the new varieties, as these did not fulfil their allied domestic needs of providing straw for their livestock and for making the roof of their houses. The new rice varieties introduced by the state firstly, had a very short stalk and secondly, required a heavy dose of chemicals both as fertilizers and pesticides, which was not affordable and moreover, pesticide-ridden straw could not be fed to the cattle.

The Lepchas and Limbus owe the diversity of rice to the different usage of these rice varieties in their daily lives and on special occasions. Different recipes require use of different rice varieties. For festivals, they cook special aromatic rice and for ailing people, they cook an easily digestible variety. A dish made out of flattened rice (Chhyura), requires yet another variety. However, gradually it is becoming more convenient and cheaper to buy these items in the market rather than going through the tedious process of growing them in their own fields. Also the landholdings are getting fragmented and smaller, hindering farmers from growing diverse varieties in their lands.

The fragmentation of cultivatable land is largely due to the division of property among siblings and then each family has a smaller share. This is not enough to grow diverse varieties and thus each family prefers to then grow the most popular variety, and this reduces the overall number of traditional varieties grown in a village. Also, there is now limited space available for cultivation as land-use is changing gradually. Some people have started constructing modern houses on the paddy fields thus further reducing space for rice cultivation. There is also a craze for moving to larger spaces. People in Kalimpong town have small cramped houses and there is a recent trend to buy land in the nearby villages to construct bigger farm houses. The landscape of the village is slowly changing – where one would only see terrace fields with paddy and vegetable cultivation, one finds the village fields dotted with colourful cemented farm-houses. This is gradually reducing the space available for cultivation in all the five villages studied under the project.

The selection of varieties to be grown in a particular season is also dependent on how much time it takes different varieties to ripen, and on the availability of water around their fields. With the younger generation showing little interest in cultivation and many people moving away for employment, there are fewer hands to help in cultivation. As a result, farming families have to look for varieties that ripen at different times so that they can harvest in rotation. Although the traditional practice of communal agriculture, *parma*, is still popular, with less people available in families for cultivation, people have to find seeds of varieties that can be grown by staggering the planting and harvesting time. But seeds are not easily available for these different varieties. Also, with the growing scarcity of water and drying up of water sources, people have started searching for seeds of varieties that can grow in less water.

The aspiration of younger generation is also changing with the emergence of new markets; of those who are still engaged in cultivation, some want to grow commercial crops such as flowers, but this leads to the introduction of chemicals, which harms the harmony and symbiotic relations in an agrarian society. For example, villagers use paddy not only for food, the straw is used as fodder for their livestock, and for repairing the roofs of their houses. With diversification of agriculture from traditional paddy to other crops, flowers and vegetables, people are not finding enough resources such as chemical-free straw, unpolluted soil and bamboo for maintaining their life-style with cattle and traditional houses.

Kalimpong has had big nurseries now for nearly two decades that are exporting a range of flowers and flower bulbs and this market is growing and taking away the precious paddy lands. Moreover, the reduction in the varieties and erosion in knowledge is also related to the withdrawal of the younger generation from farming altogether. Today, a lot of village youth especially boys and young adults are seen loitering in the market area or in the villages but they do not want to engage in cultivation activities. Farming is becoming a tough occupation, with decreasing yields. After getting basic education, the youth don't want to pursue farming as an occupation, they often prefer to wait for a low-paid cushy government job.

7.2 Positive Drivers: Political struggles and cultural revival

A new trend evident both among the Lepchas and the Limbus in the recent years driven by the search for their own identity especially in the political milieu. The Darjeeling region, of which the Kalimpong sub-division forms roughly one-third of the geographical area, has been under a political turmoil for the last 3 decades. The people of the region collectively have been demanding a geo–political identity/space in the form of a new State 'The Gorkhaland'. The peoples' movement hasn't been truly inclusive and representative of all the ethnic communities in their communications and negotiations with the political negotiators. Voices of both the Lepchas, the original inhabitants, and the Limbus, one of the minorities among the 15 local communities forming Gorkhaland, have been excluded from the process of negotiations. There is clear evidence among the Lepchas and Limbus in the recent years that the older generations have felt the need to strengthen their cultural identity in order to help re-establish their stakes in the negotiations.

While both Lepchas and Limbus have their own languages, the younger generation cannot speak or write their respective languages. In recent years, the older generation in both the communities has adopted creative means of popularizing their languages: by making feature films in their languages, recording both folk songs and pop music, and introducing the language in informal community schools. These communities had stopped adorning their own traditional dresses but gradually one sees more and more people wearing the traditional costumes during festivals and at public events.

In the most recent negotiations with the State government, the Lepchas have won a place in the political landscape and have got a commitment from the State for establishment of a Lepcha Development Council. The recent submissions made by the Lepcha leaders used the concept of Biocultural Heritage. This has reinforced the faith and belief of the communities in their own traditions and practices and has led to the revival of several traditional cultural practices among these communities. This is gradually leading to the realization amongst the local people that they should try and recover some of the lost knowledge related to certain bio-cultural products such as local foods, recipes, grains, seeds, local dyes, traditional attire, etc. This will ultimately lead to a boost in biodiversity conservation efforts in the region.

The indigenous sport of archery was on the decline, as people engaging in it had started using bows made out of fibre-glass instead of bamboo reed, and synthetic threads instead of thread from natural plant fibres. This is now being discouraged. In competitions during fairs and festivals, entrants using non-traditional bows and arrows are being disqualified. People have started using traditional dresses. The demand for local dyes for clothing and bags is gradually on the rise. Special efforts are being made to conserve a local fibre plant, *lokta*, which is used to make a kind of local handmade paper, which is becoming quite popular. People are also promoting clothing made out of nettle plant, which was traditionally very popular but over the years has been replaced by modern clothing. Some people are trying to popularize it now and this is fetching a good price.

8. THE LEGAL AND POLICY FRAMEWORK FOR TK PROTECTION:

This section gives a bird's eye-view of the prevailing international and national legal regime for the protection of Plant Genetic Resources and TK related to it

8.1 The International Level: TRIPs, the CBD and national implementation

At the international level, the legal framework for protection of Plant Genetic Resources, traditional knowledge and Intellectual Property Rights is spread over a range of international conventions: the Convention on Biological Diversity (CBD), the World Intellectual Property Organisation (WIPO), the Agreement on Trade Related Intellectual Property (TRIPs) of the World Trade Organisation (WTO) and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA).

A review of the relevant international laws shows that there isn't sufficient direct protection accorded to people's knowledge in the public domain. However, there are windows of opportunities within these agreements that could be resorted to for protection.

The TRIPs Agreement provides flexibility to member countries to introduce *sui generis* mechanism in protection of plant varieties; but one can interpret it to include protection of TK associated with these Plant Genetic Resources (PGRs) also. The provisions on Geographical Indications can also provide a tool for protection of products derived from PGRs and associated knowledge.

TK related to PGR doesn't usually fulfil the basic criteria of novelty, distinctness, uniformity and stability to qualify for traditional IPRs such as patents. Hence, while searching for an appropriate intellectual property law for protection of TK, the search has to go beyond the conventional norms and provisions offered by existing laws.

International laws such as the ITPGRFA and the ILO convention 169 provide rays of hope as these recognise and safeguard the collective rights of the indigenous and local communities. But, these agreements are not ratified by many countries and often are not enforced, as they do not get incorporated in the national laws of several member countries.

Even within these international treaties, provisions that are in the interest of industry and corporations often have speedy incorporation and compliance in national legislation as opposed to provisions that relate to protection of TK and the knowledge-holder. For instance, the **Convention on Biological Diversity** that recognizes the sovereign rights of the State and also accords positive protection to TK, is very slow in its implementation at the national level in India, especially where it pertains to community matters and protection of TK. The provisions relating to Access to the resources which largely benefit the resource and knowledge–user are far better defined and elaborated in the national biodiversity law than the provisions related to benefit–sharing and protection of TK which support the community and community intellectual property. The same is true when it comes to the implementation of this law. The law provides for creation of Biodiversity Management Committees at the level of local bodies and preparation of Peoples' Biodiversity Registers. Both these provisions have been slow in implementation in the past. However, we see considerable action in the National Biodiversity Authority in the recent times with new leadership and the State Biodiversity Boards have also been activated to establish BMCs in all States and to get Peoples' Biodiversity Registers readied in a time-bound manner.

A peculiar trend observed in the international arena also pertains to the presence of soft non-binding legal regimes vis-à-vis the rights of the local and indigenous communities including farmers. Though there is a growing recognition of the rights and interests of the local and indigenous communities in different fora, the international agreements merely provide a policy direction that is not enforceable. The Bonn Guidelines and the UN Declaration on the Rights of the Indigenous People are a case in point. The recently negotiated Nagoya Protocol on ABS will become legally binding after it receives the requisite ratifications. This protocol requires countries to take legal, administrative or policy measures for equitable benefit sharing and Prior Informed Consent (PIC) for access to TK, but the requirement for countries to take measures for PIC is watered down by the phrases 'in accordance with domestic law' and 'as appropriate'. Furthermore, measures for fair and equitable benefit sharing (BS) and PIC of communities for access to genetic resources are only required where communities have the established right to grant access, which is thus far a gap in India.

Some of the international conventions are very specific as to the target group they address, for instance, the indigenous or tribal communities. However, TK is not limited to such communities only. TK is specific to the bio-genetic resources, irrespective of the status of the communities. Hence, most international conventions that seem to provide protection to knowledge related to biological or plant genetic resources should be extended to all local peoples' informal knowledge and not be restricted in their application to indigenous and ethnic communities only.

8.2 The National Law and Policy on Biodiversity, Farmers' rights, Geographical Indications, and Scheduled Tribes

In order to meet its international obligations, India has aligned itself with the provisions stipulated in the aforementioned international conventions and agreements. Member countries have to either amend existing legislation or enact new domestic laws to harmonise with the provisions of international conventions. India is a pioneer among the bio-rich countries of the South who have developed a legal and policy regime to conform to the international mandate of protection of biological diversity, plant genetic resources and the TK associated with it. The Indian legal framework for protection of plant varieties and knowledge of the Indigenous Plant Breeder communities is laid out in three separate legal instruments. We look at these three and a few additional laws that embody some of the international obligation.

Some of the key laws at the national level relevant for the protection of India's rich biological diversity are: the Wildlife (Protection) Act, 1972, the Forest (Conservation) Act, 1980, the Biological Diversity Act, 2002, Protection of Plant Varieties and Farmers' Rights Act, 2001, Geographical Indications of Goods (Registration and Protection) Act, 1999, and the Patent (Amendment) Act, 2005. In the past, there were no specific laws to protect the knowledge pertaining to biological resources. The recent enactment of the Forest Rights Act, 2006, for the first time has made an attempt to give recognition to Community Intellectual Property.

Biological Diversity Act, 2002

The main objectives of the Act and the Rules made thereunder in 2004 are to ensure the conservation of biological diversity, sustainable use of its components and fair and equitable sharing of benefits arising out of the use of biological resources and related knowledge. The Act through its provision on preparation of Peoples' Biodiversity Register helps document knowledge in one place and thereby helps prevent its loss. The creation of Biodiversity Management Committees (BMCs) is yet another provision in the law that could help protect TK if it can be implemented properly. This provision of the Act requires every local body (Panchayats and Municipalities) to constitute a Biodiversity Management Committee within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of landraces, folk varieties and cultivars, domesticated stocks and breeds of animals and micro-organisms, and for chronicling of knowledge related to biological diversity. The Act mandates the National Biodiversity Authority to consult among others, the BMCs while taking any decisions relating to the use of biological resources and knowledge associated with such resources occurring within the territorial jurisdiction of the BMC. The BMCs have also been authorized to levy charges by way of collection fees from any person for accessing or collecting any biological resource for commercial purposes from areas within their territorial jurisdiction.

The Act also provides for notification of areas of biological importance as biodiversity heritage sites. This provision allows state governments to frame rules for the management and conservation of heritage sites. It gives states the flexibility and opportunity to be innovative in finding a range of options for protection of TK associated with areas of biological significance such as centres of origin of crops. While drafting the rules, state governments could give recognition to the customary norms, principles, practices, protocols and laws of local and indigenous communities.

In 2009, an Expert Committee formulated draft rules for the Protection, Conservation and Effective Management of Traditional Knowledge Relating to Biological Diversity. This draft rule has proposed detailed processes to access TK (registered and non-registered) and obtain the informed consent of the community concerned. The National Biodiversity Authority has not yet officially accepted this draft Bill, it is still under discussion and consideration.

National Policy on Farmers

The National Policy on Farmers is premised on the fact that a majority of the hungry live in rural India and depend on agriculture for their livelihood and also lays emphasis on the economic well-being of the rural women and men feeding the nation. The policy recognizes that 80% of the seeds used in agriculture come from the farmers' seed system. It acknowledges that women are the main knowledge holders for knowledge pertaining to seeds and seed management and that they should be trained to serve as Panchayat level Farm Science Managers in their villages. The policy also reiterates the need for the national IPR policies to make provision for compulsory licensing in cases of research for products and processes of value to resource-poor farming families. Compulsory Licensing is a provision available in the TRIPs Agreement under the WTO which exempts certain knowledge from being patented in view of its value to marginalized farming families. It places emphasis on the role of Information and Communication Technologies by establishing the Gyan Chaupals (Information kiosks) in every village. The policy suggests help to Farmers Associations and Self-Help Groups to help them export on competitive terms by sensitizing them to opportunities available for external agricultural trade. The draft policy on farmers even proposed restructuring of the Ministry/ Department of Agriculture to include Farmers Welfare as well.

The 73rd Constitutional Amendment, 1992, entrusts Panchayats, bodies of local self-government, with responsibility for agriculture including agriculture extension.

Protection for Plant Varieties and Farmers Rights Act, 2001 (PPVFR)

The PPVFR Act has been India's response to the sui generis protection accorded in the TRIPs Agreement (Article 27.3 (b). India has not accepted the patent model. The PPVFR lays equal emphasis on the rights of the plant breeders and the farmers. The Act recognizes the farmer not merely as a cultivator but also as a conserver of the agricultural pool and a breeder who has successfully bred several varieties. The Act acknowledges that all new varieties are based on traditional varieties. It has provided for the establishment of a National Gene Fund. Money from this Fund can be used to reward farmers supporting the conservation and sustainable use of genetic resources including in-situ and ex-situ collections and for strengthening capabilities of the Panchayats in carrying out conservation and sustainable utilization.

The Act provides another form of protection to farmers. At the time of making an application for registration, breeders are required to disclose information regarding the use of genetic material conserved by any tribal or rural families. Concealment of information in the passport data will result in the cancellation of the Breeders' certificate. The Act also recognizes the age-old practice and rights of the farmers to save, use, sow, exchange, share or sell their farm produce including seeds of a variety protected under the Act.

However, it appears that few if any farmers' varieties have been registered in practice. There are also concerns that registration of famers' varieties under the Act may affect the agro-biodiversity of the country. The law requires farmers to follow the DUS (Distinctness, Uniformity and Stability) criteria to be eligible for the purposes of registration. If any farmer wants to succeed in registering his varieties, he/she has to achieve these criteria, which takes several years and results in reducing the diversity of seeds.

Patent (Amendment) Act, 2005

The second amendment to the Patent Act in 2002 introduced product and process patents for plants and seeds which were hitherto exempted from being patented. Although this may seem to go against the rights of farmers, the Act in its recent amendment has included a provision that has a positive implication on TK in the form of a defensive protection against bio-piracy. As per the third amendment which came into effect in January 2005, a patent application not disclosing the source of the geographical origin of the biological material used in the invention, or not having complete specification of claims in the application when anticipated from the knowledge of indigenous and local communities, forms grounds for raising objections to the patent application filed.

The Geographical Indications of Goods (Registration and Protection) Act, 1999, (GI Act)

A geographical indication of a product has to be protected in the country of its origin, or else it doesn't attract any reciprocal protection from other member countries under the TRIPs Agreement. Geographical Indications when defined in relation to goods, are indications which identifygoods such as agricultural, natural or manufactured products as originating in the territory of the country, where a given quality, reputation or other characteristics of such goods is essentially attributable to its geographical origin. A geographical indication usually consists of the name of the place of origin of the goods. For example, Darjeeling tea that originates in Darjeeling district of the state of West Bengal in India, Nagpur oranges originating in Nagpur district from State of Maharashtra, Wayanad rice from Wayanad district in Kerala, Coorg coffee from Coorg district in Karnataka. Agricultural products typically have qualities that derive from their place of production and are influenced by specific local factors such as climate, moisture, soil type, etc. Basmati rice is an exceptional name as it doesn't derive its name from a particular place as its coverage spreads across a large area. Basmati rice is an aromatic rice, *'bas'* means aroma, hence it takes its name from the characteristic.

GIs could be used as a tool for promoting products with certain special characteristics which can improve the incomes of the farmers by getting them a premium on their produce. This opportunity could curtail the migration of marginalized farmers. The GI status reinforces the distinctness of the product and can attract a higher price on the produce if marketed with proper consumer awareness. The GI Act is expected to prevent unauthorized use of the registered geographical indication by others and to promote economic prosperity of producers of goods produced in a particular region.

GI also promotes collective ownership in the form of associations of persons, producers, organizations or authority established under the law. The collective identity recognized and upheld in the GI Act has the potential to help protect TK of the farmers and local communities by according recognition thereto. However, this is not assured, as the protection is more to the name and not necessarily to the TK associated to the produce. This legislation has only been used for registration of names but most farmers of agricultural produce and their knowledge associated with it have hitherto not benefitted from the use of it.

Panchayat Extension to Scheduled Areas Act, 1996

This Act seeks to operationalise the 73rd Amendment to the Constitution of India in the Fifth Schedule areas of the country which are predominantly inhabited by tribal communities. The provisions of the amendment facilitate decentralized governance by giving recognition to the traditional institutions for governance in the tribal communities. This is one of the very few laws that give primacy to customary laws, social and religious practices and traditional management practices of community resources. The Gram Sabha (Village Assembly comprising the adult franchise of the village) is authorized to safeguard and preserve the traditions and customs of the people, their cultural identity, community resources and the customary mode of dispute resolution. By empowering the Gram Sabha, the Act upholds the Gram Sabha's role in management of genetic resources and associated knowledge. However, most of the states have not formulated conformity legislation and as a result these provisions are not enforced in the Fifth Schedule states of the country which are inhabited by quite a large tribal population of the country.

The Scheduled Tribes and Other Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA).

The FRA recognizes the rights, responsibilities and authority of the forest dwelling Scheduled Tribes and other traditional forest dwellers for sustainable use, conservation of biodiversity and maintenance of ecological balance, thereby strengthening the conservation regime of the forests while ensuring livelihood and food security of these communities. The Act recognizes the right of access to biodiversity, and community rights to intellectual property and to traditional knowledge related to biodiversity and cultural diversity, as a forest right. The law being relatively new has not generated much case law. The implementation of the law is slow and as a result not much has emerged in terms of best practices and experiences in protection of community intellectual property rights and TK.

9. POLICY RESPONSES FOR TK PROTECTION BASED ON CUSTOMARY LAWS AND PRACTICES

The Trade related Intellectual Property Rights Agreement under the World Trade Organisation (WTO) has offered a *sui generis* option to member countries under Article 27.3 (b) to develop their own mechanism for protection of plant genetic resources and thus also to the knowledge associated with it. Several international conventions and their subsidiary bodies are making an effort to ascertain if customary laws, principles and protocols could form the basis to develop a *sui generis* mechanism for the protection of TK. This has been encouraged by the Inter-Governmental Committee on Traditional Knowledge, Generic Resources and Folklore of the World Intellectual Property Organisation, and the Ad Hoc Working Group on Article 8(j) of the Convention on Biological Diversity. In this light, it becomes imperative to assess whether customary laws, principles or protocols would be effective in the protection of TK and bio-genetic resources, and whether they could help develop a fair, equitable and effective access and benefit sharing (ABS) regime.

Field research conducted in the villages of Kalimpong sub-division in District Darjeeling revealed that customary laws and protocols include customary principles and values. The common principles on which agrarian communities thrive and survive – reciprocity, equilibrium, duality and solidarity - could form the basis for developing an ABS regime as envisioned under the Convention of Biological Diversity. Equitable benefit sharing should be based on the principle of reciprocity or equal exchange. Farmers share their knowledge freely. People who access the knowledge of the farmers have a duty to reciprocate by sharing the knowledge and profits gained by them or their company, in a fair and equitable manner or according to a pre-decided arrangement. And as observed among traditional communities and enshrined in the Convention of Biological Diversity, the benefits shared need not always be monetary. Sometimes the benefits are in kind, or in the form of other goods and services, or in the form of prestige and rewards that are non-tangible in nature. Similarly, the other principles enunciated during the research - duality, equilibrium and solidarity - could all form the basis for developing an access and benefit-sharing regime under the CBD and have been recognised by the World Intellectual Property Organisation (WIPO).

The Kalimpong area has seen the resurgence of some traditional and cultural practices in recent years, which is also conducive for protection of TK, which is embedded in the bio-cultural product or TK based product.

Since much of the farmers' knowledge has been generated over years of experimentation and sharing of seeds, and fine-tuned in a collective manner, decisions about access to the resource and knowledge should be made collectively by the knowledge–holders. Similarly benefits should be shared in consultation with the collective or the representative. The ABS regime could be based on an equal sharing of benefits among the community, or according to the contribution of community members to biodiversity conservation, and the other principles such as those of solidarity, could be borne in mind, where the needy are also provided with a share.

10. EFFECTIVE TK PROTECTION MEANS GOING BEYOND CUSTOMARY LAWS

However, customary laws alone cannot protect biological resources and associated knowledge. Additional protection beyond customary laws is needed for a number of reasons. Firstly, the practice among the agrarian community thus far is that of free and unconditional sharing of knowledge. Farmers are not so concerned about issues of misappropriation of knowledge. On the contrary, many a times, they have themselves, freely given seeds embedded with knowledge to scientists. Sharing of knowledge through the seeds gives the farmer a sense of pride. Sharing of seed is a traditional practice, which these farmers have practiced for centuries. Farmers do not believe in restricting the use of their seeds to themselves. They are also not aware of the value of their knowledge and resources (in this case, the seed) to the outside world; they are oblivious to the misappropriation happenings beyond their geographic areas.

Another reason why customary laws alone are not sufficient for protection of TK and genetic resources is that they have limited jurisdiction and application and usually do not apply to outsiders. Customary laws do not address matters pertaining to external elements or people living beyond their geographical limits. These laws and protocols vary from community to community and largely govern the functioning of intra-community matters. Furthermore, Customary laws though considered a source of law in the Constitution of India, receive little recognition by the bureaucracy and judiciary in India. There are several national and state laws also that uphold the eminence of customary laws and practices. A review of the case law from the Supreme Court shows that the judiciary is seeking evidence of long-usage to prove a custom and often it is not possible for people or communities to find evidence for this.

Thus, customary principles can be used to provide affirmative or positive legal protection to the knowledge of local and indigenous people as reflected in the principles recorded from the study in Kalimpong. But they are not adequate to provide protection from misappropriation. This also requires the establishment of a harmonized legal defensive mechanism in the form of a patent legislation in all countries that will mandate the insertion of a disclosure of origin provision for any TK or genetic resources used to develop the new invention. Other legal tools that could be resorted to are community protocols, and soft IPRs instruments such as geographical indications and collective trademarks, along with non-legal mechanisms that promote the use of TK through TK based goods and services.

11. NON-LEGAL TOOLS FOR PROTECTING TK AND BIO-CULTURAL HERITAGE

Effective protection of TK and biocultural systems often requires a range of local tools, which goes beyond a legal framework. This includes non-legal tools such as Community or Peoples' Biodiversity Registers/ databases, and value addition to the resources. India has developed a digital library which has codified health knowledge and has made this database available to all patent offices across the globe as proof of existing knowledge or "prior art". This library is called the Traditional Knowledge Digital Library. The Government is contemplating linking up community TK registers with the TKDL.

The concept of Collective Bio-Cultural Heritage was developed in the project as a useful tool to look at the inter-linkages of knowledge with bio-resources, landscapes, and cultural and customary norms. The following tools and mechanisms were tested to protect TK and strengthen biocultural heritage.

11.1 Biodiversity Registers for rice and fodder

The importance and value of Biodiversity Registers in securing knowledge from loss was accepted by the project participants early in the project. In a consultative process, the communities agreed to prepare biodiversity registers to document traditional knowledge and bio-genetic resources. The communities started with a registry of all traditional varieties of rice. After completing this, they prepared a register of fodder species, both naturally growing and planted species. The documentation process reinforced among the villagers the need to conserve the rich gene pool of the traditional varieties that were on the decline and on the verge of extinction.

Fodder plants play an important role in the agro practices of the Lepchas and Limbus of the region. The diversity and number of fodder species in the select villages is declining. It was found that a usual bundle of fodder in this area contains 80% grass and 20% tree leaves. Over-extraction of some of the fodder trees for purposes other than fodder, increase in population, shrinking of village commons, and prevalence of largely marginal and small farm holdings with limited space available for growing fodder, emerged as some of the main reasons for making fodder gradually a scarce resource and thus holding such importance in the lives of the people in the rural areas of District Darjeeling. The documentation carried out by the community members comprised both naturally growing as well as planted fodder species. Collection of fodder although a year-long activity, intensifies during the months of November – December. Straw from paddy is stored for the lean seasons when grass is not available. In order to supplement the straw reserves, certain species of fodder grass are also grown in their fields.

In the next phase of this project, based on the prioritization done by villagers and project staff, one or two local crop varieties will be identified for seeking registration under the Protection for Plant Varieties and Farmers Rights Act and Geographical Indications Act.

Some practices related to the Lepchas and Limbus' conservation and storage of seeds have been documented by the communities in the form of a video and also kept in an e-database for future generations with the local organisation.

11.2 Biocultural community protocols (BCPs)

Biocultural protocols can help to protect community rights over TK and genetic resources and promote respect for traditional authorities and customary laws. Preliminary work was done towards the preparation of BCPs with the Lepchas in two villages. An understanding was developed of the customary principles prevailing in the study area, on which the protocol could be developed. The Bio-cultural protocol is envisioned to serve as a preamble to the Peoples' Biodiversity Register and is expected to provide communities' norms for access to the knowledge and resources and to lay down the principles for drawing up agreements for benefit sharing if the community agrees to give access. Since this site selected for the study in India was unique as the knowledge and some of the biological resources transcend state/ national boundaries, the team started to develop further tools to help develop BCPs in a transboundary context. GIS mapping and genealogical studies were tested to ascertain the extent of knowledge and biological resources within a community even if these are located across borders.

11.3 Marketing Biocultural Food Products

Food products can help communities to derive a fair income from TK and bio-genetic resources by adding value to them and finding markets. The Lepchas and Limbus have succeeded in conserving some of the traditional rice and millet varieties as they have been using these varieties in various socio-cultural contexts. For instance, the *jirasari, Krishna bhog, kalturay* and *masino* rice varieties are grown for their taste and aroma for special occasions; thulo aday gives high yield and maximum straw; *thapachini* is an early ripening variety. *Mongbree*, a kind of millet is used for making the local brew which is offered to the mountain gods and also used for festivals. The special rice varieties are used for special occasions such as wedding feasts, rituals and celebrations such as house warmings and New Year. Certain rice varieties are used only at the time of illnesses to prepare special foods for the old and sick.

Mothers also make a special preparation using five different kinds of flour, which is used as baby food. This is very popular in households and now women Self-help groups are also preparing, and selling it in city outlets by adding value through good packaging and labeling. They were trained on the importance of labels and good packaging to attract the right customers and consumers and to get a premium on their products. The women SHG members are now selling more of such bio-cultural products not only in nearby markets but also in good retail outlets in metropolitan cities. They have developed a range of products made of local produce such as pickles made out of *dalle*, a special small round chilli and *tama*, bamboo shoots. This is also a very popular traditional item and much in demand in the local market.

Farmers need an incentive to grow diverse varieties of crops and vegetables. If farmers get a good price for their bio-cultural products, they will continue to grow these varieties and this will lead to conservation. Opportunities were provided to women SHG members through the project to showcase their bio-cultural products after adequate value addition by facilitating their participation in fairs and festivals in different locations in Darjeeling District and Sikkim. Arrangements were also made to showcase and sell their products in far off markets in Delhi and Calcutta.

11.4 Establishing a Rice Park

The Centre for Mountain Dynamics (CMD) is a Government recognized training institute, which imparts trainings and builds capacities of farmers, members of Self Help Groups (mainly comprising women), panchayat members and functionaries, on a regular basis, supported through various government programmes and schemes. The Centre invited all trainees to bring with them paddy seeds when they came for trainings. In this way, CMD has succeeded in developing a small seed collection centre. Thereafter the Centre set up an ex-situ conservation facility at their campus in the form of a rice park, and using SRI (Sustainable Rice Intensification) and traditional techniques raised a small germplasm centre. This became a small facility from where farmers could have access to traditional seeds, which were gradually on the decline. The Park houses a collection of 20 rice varieties.

11.5 Capacity development for farmers and local government

Capacity building was an important component of the project, including sensitisation of a cross–section of people from the community, panchayat leaders, women self-help group members, students, etc. This included classroom training and exposure visits to a number of sites – e.g. a rice park set up by the Centre for Inter-disciplinary Studies (CIS), in the same state housing 500 varieties of traditional rice. Here, farmers, Panchayat members, members of the Women Self Help Groups, teachers and members from the local NGO got hands-on experience on local manure making techniques, understanding the physiological characterstics of different varieties and a comparison of the yield of some of the traditional and modern varieties in the fields of the institution and other neighbouring farmers. The visit was an eye-opener for a local panchayat officer who did not know that traditional varieties could produce such good yields (see Box 3).

Box 3: Exposure visits show the value of traditional varieties

Mr. Manan Pradhan, elected President of the local body of self- governance, Panchayat from Dungra village, was enamored by the multinational seed companies and the tall claims made by their agents and advertisements. Influenced by these claims, Manan wanted to experiment with these seeds and help farmers in his constituency by enhancing the yields in their fields. He was almost in the process of contacting the agent to get a few sacks-full of seeds under some government scheme for his farmers, when he was taken by CMD to a rice park called *Vrihi* in Bankura district of West Bengal, as part of the exposure. This visit to the fields of the Centre of Interdisciplinary Studies (CIS) turned out to be quite an eye-opener for Manan. When he calculated the yield shown by the scientist in his field of traditional varieties and compared it with the yield of some of the farmers using modern hybrids in the neighbourhood, he was amazed to see the large number of grains in each earhead of the crop for some of the traditional varieties. On his return, in a de-briefing session with the farmers and NGO, he admitted his mistake and gave up the idea of hybrid seeds. He has become a champion for preservation and promotion of traditional varieties and ever since his return from *Vrihi*, has been collecting seeds of different varieties from different parts of the region and contributing to the Rice Park started by CMD. Manan has been promoting the preparation of vermi-composting through Self-Help groups in his village. And they have been selling this vermi-compost not only to local farmers but also to nearby tea-gardens in district Darjeeling that have gone organic and are in the process of conversion.

The Centre for Mountain Dynamics has been responsible for training and creating nearly 300 Self-Help Groups in district Darjeeling. These trainings are largely being supported by the Department of Rural Development. CMD has incorporated a two hour module in their 3-day training programme on the subject of Traditional Knowledge systems and its broader version Collective Biocultural Heritage, its importance, protection, etc. During interactions with the participants, information is also gathered about the status of traditional seeds, rice varieties, traditional practices, etc. The participants hail from the entire hill district of Darjeeling. Nearly 4000 farmers were trained during the project period. Many of these farmers form a part of the Himalayan Farmers' Front.

Farmers have also been trained on ways of adding value to their produce while making it ready for the market. And by better packaging and use of labels and certifications, they have the opportunity to access high segment and premiere markets for sale of their products at higher prices.

11.6 Strengthening local institutions: Women's Self-Help Groups and Himalayan Farmers Front

The module on TK and its protection added to these trainings has sensitized a large number of farmers including women. Earlier the task of seed exchanges was mainly done by the male members in the family. Now, more and more women are coming ahead for seed-exchanges through their own recently created seed-networks which have been facilitated by CMD. These women SHGs are engaged besides in saving, micro-finance and other income generation activities, such as creating and promoting use and sale of bio-cultural products. With the trainings they have received through the project on labeling and packaging, women have improved the prospects of sales at a better price. They are now showcasing their products in exhibitions within the district and outside with help from the CMD and the Department of Rural Development. The department has set up some special retail outlets for sale of these products in different towns in the district and these products are available for sales.

Another achievement of the project has been the creation of a forum for Himalayan farmers, the Himalayan Farmers Front. It began small and with farmers from the district but has gradually added farmer members from neighbouring states. It started as a knowledge sharing network and has taken on more responsibilities such as advocacy for getting farmers' access to knowledge, better prices for their produce in the market, better space for showing and selling their produce, and most of all a forum for interaction with government extension officers and bank officers.

12. OUTCOMES AND LESSONS LEARNED

The project has achieved all the outcomes it had set out to achieve, which are as follows:

Improved understanding of alternative systems to existing IPR models based on the livelihoods needs, customary laws and values of indigenous and local communities.

The project, due to its design which used the conceptual framework of bio-cultural heritage, an approach of working with the community in a participatory action research mode and its proximity to the community, was able to gain a good understanding of the holistic nature of systems of natural resource management which showed that TK cannot be considered for protection in isolation. It is part of an indivisible whole where the knowledge cannot be protected without protecting and conserving the biological resources, the cultural values, the customary principles, social norms and community institutions associated with it.

The action research project being participatory in nature worked closely with the community. The local NGO engaged in this project comprised a team hailing from the villages in the vicinity. This helped gain good understanding of the local environment and helped gain immediate acceptability.

The project through action research was also able to comprehend the worldview of the traditional farming communities on the concept of 'protection'. Protection of TK and bio-resources is mainly from loss due to non-usage; and not because of misappropriation of the resource or associated knowledge.

Since the study area had a transborder component, there was evidence of shared knowledge and resources across borders. The project helped develop tools for future work in this area to track the genealogy of people living across borders using the same resource and sharing similar knowledge associated with these resources.

The field-research also brought to the fore that most systems in a traditional farming society are quite inter-dependent and intrinsically linked to each other and follow the four basic principles of reciprocity, equilibrium (including equity), duality and solidarity. Thus, a clear understanding has emerged that any *sui generis* mechanism to be developed for protection of TK and the rights of the community should follow these principles. Any model of ABS should be designed on the basis of these principles.

Enhanced participation of TK holders in policy debate and formulation for TK protection at local, national and international levels.

One of the key component in the project was the participatory learning and action approach where the project staff did not only learn through engagement with the community but also left behind capacities to understand the need to protect TK from external threats especially international trade policies and laws. The customary principles enunciated from the community focused group discussions formed the basis of recommendations provided and shared at various international policy dialogues such as the 10th Conference of Parties of the Convention on Biological Diversity, the Asia – Pacific Regional Consultation of the Inter-Governmental Committee on Genetic resources, Traditional Knowledge and Folk Lore (WIPO), and the Open Ended Ad hoc Working Group on Article 8(j) of the Convention on Biological Diversity.

Interactive programmes held with the government officials at the district and block level, have helped these village people to come closer to the officials and understand their policies and programmes and similarly the officials have also understood the needs and requirements of the local communities.

The project also succeeded in enhancing the capacities of the local communities, in particular of the indigenous plant breeder communities and women, by organizing them into a Himalayan Farmers Front and training them in various aspects of the project. These farmers have succeeded in advocating collectively at various fora for different things. They succeeded in getting higher prices for the milk obtained from their cattle.

The Farmers' Front was able to successfully get some money sanctioned from the local level Panchayat officials for construction of sheds for the weekly village vegetable market area.

Enhanced capacity of TK holders to protect their rights through the active participation of local communities in the research process and in developing tools for TK protection (e.g. Community protocols and registers)

The project supported the preparation and piloting of tools in protection of TK and resources (Biodiversity Registers, Bio-cultural protocols, bio-cultural TK based products, etc).This has strengthened the capacities of not only the local community members but also the local youth and volunteers who were involved from time to time in various processes and components of the project.

Strengthened customary and community institutions and resource management systems, contributing to enhanced community control over resources.

The trainings and exposure trips organized for the local communities has equipped them with knowledge, which has enhanced their self-esteem and has made them to think differently – they now have a different perception about their resources and their knowledge, their heritage. They take a lot of pride in their knowledge, their culture, etc.

Building capacities of the Lepcha community and especially the Lepcha leaders from their Association has made them imbibe the concept of Bio-Cultural Heritage and this has helped establish their unique identity in the political milieu. The Lepchas have been in the process of finding a political space for themselves in the Gorkha movement for Statehood. The Lepcha political leaders put forth their demand for this space using the concept of bio-cultural heritage in their memorandum to the State and after a prolonged silent struggle, the association has succeeded in getting recognition and have been promised that soon they will have a Lepcha Development Council.

For the past several years, nearly a decade, Lepcha leaders, a few progressive-minded and forward looking Lepchas in the community organized themselves. They were concerned about the absence of Lepcha voice in the demand for a separate state for the people residing in this geographical area. There was awareness among these leaders but they lacked direction and focus in their approach to raise these matters with the Government of India and the State Government of West Bengal. The project through its sensitization activities focusing on the concept of Collective Bio-Cultural heritage, gave these leaders a unique and strong point with which they could approach the State. The project facilitated meetings and discussions for these Lepcha leaders with senior policy analysts, advisers and legal luminaries of national and international repute who guided them and helped strategize their arguments and case.

The institution of Women Self Group has also been a great binding force. It brings the womenfolk to come together on one platform. They have been trained in several things including packaging, cleaning, labeling, etc. This has enhanced their capacities to go out of the state for marketing and selling their products.

13. CONCLUSIONS AND WAYS FORWARD

This participatory action research conducted in Kalimpong sub-division of District Darjeeling shows that the majority of farmers in the region fell under two out of the four categories suggested by Friis–Hansen (1995) on farming communities in developing countries.

a) large-scale commercial farmers: these are located in relatively high potential areas with well-established market infrastructure. Their objective of production is to maximize marketable surplus. These farmers depend on improved high-yielding seeds. Although it is the smallest group in numbers, it exerts a strong influence on policies.

b) Small-scale commercial farmers: these farmers are also oriented towards maximizing marketable surplus. Due to smaller scale of production, they adopt a more labour-intensive mode of production. These farmers are also an attractive market for commercial seed companies.

c) Small-scale semi-commercial farmers: these farmers are in the process of changing from a pattern of production geared primarily to satisfying domestic consumption needs of food. Many are located in areas of limited agricultural potential, remote from market infrastructure and have very little cash resources.

d) subsistence farmers: these farmers largely rely on on-farm inputs and family labour; mostly save their own seeds or rely on traditional practices of seed-exchanges.

The work in Kalimpong revealed that a majority of the farmers fall in category c and d. These farmers are also characterized by poor access to credit. They have adapted seeds to the local and variable water and soil conditions in combination with a variety of characteristics related to labour, food availability and cultural preferences. Local seed production and selection practices demonstrate the presence of capable breeder–selectors in the farming communities (Almekinders et al, 1994). Thus, the study considers the farmers in Kalimpong largely as indigenous plant breeders who have in the past constantly tried to evolve new plant varieties for subsistence and livelihoods.

However, this valuable knowledge of the farmers is under threat for various reasons mentioned earlier. One observes fewer innovations among the farming community especially where alternate means of livelihood are available for local people. Crop diversity has declined significantly in recent years; but cultural values and preferences are still helping to sustain remaining crop diversity. Although there was a phase where cultural practices were on a decline, more recently there is a sudden consciousness and the local communities are making a concerted effort to revive their cultural identity and to transmit cultural values and practices to the younger generation. This will indirectly provide impetus to the conservation of biological diversity. Customary sharing values and exchange practices contribute to the maintenance of crop diversity and related TK and facilitate access to new varieties for adaptation to climate change. This means that mechanisms for TK protection should recognize collective rights to resources and knowledge within and between communities.

This study highlighted some important areas that require further research and action:

Harmonising ABS across borders:

Where the knowledge and biological resource do not observe national political boundaries, in order to develop a sui generis mechanism for protection of the resources, knowledge and culture, it is important to look at the laws, policies, protocols and practices at the regional/ transboundary level. An eco-regional convention for ABS needs to be adopted to ease the complexities involved in the management and regulation of these resources and knowledge. Laws in neighbouring transborder countries should be in harmony with each other to avoid conflicting situations in management of larger ecosystems. It is also important to have uniformity in the ABS regulations to help protect genetic resources and local knowledge. A biocultural community protocol provides a useful tool in this context for protection of communities rights over their knowledge. This tool is developed in a participatory manner by the local community members facilitated by local officials, local NGO and other technical agencies who are familiar with the rights of local communities in the different laws.

Focusing on Biocultural Heritage as a whole:

While this study focused largely on traditional rice varieties and the knowledge and customary laws associated with these varieties, in future, such a study should be more holistic and adopt a landscape approach. While talking of the inter-connectedness of the resource with knowledge through the term 'bio-cultural heritage', it will be useful not to limit the study to varieties of a single crop or medicinal plant, but take a landscape approach which would include other natural/ biological resources, their links in a social, cultural and political context along with their land tenure system also in the research.

Including all local knowledge holders in international agreements:

Conventions and declarations, which address the needs of indigenous communities or peoples alone, should be amended to include other tribal and local communities as well. Otherwise there is reason for several marginalized and vulnerable communities to be left out of the discussion and not get considered for recognition and reward for their knowledge, particularly since many national governments such as Indian Government, do not acknowledge the presence of indigenous communities in their countries. All communities following traditional lifestyles generate considerable amount of locally specific valuable knowledge irrespective of the category of community they belong to (tribal, indigenous, forest-dwelling, etc). Hence the scope of such international agreements and conventions needs to be broadened to encompass all communities and people whose knowledge is valuable and meaningful and requires protection.

Including farmer breeders in policy-making:

The indigenous plant breeder communities especially smallholder farmers and among them women farmers, are mostly excluded from the processes of law and policy making. This situation needs to be rectified and reversed by inclusion of these marginalized sections of society in policy and decision-making processes. These processes should ensure representation and quality participation of the local custodians of genetic resources, including women farmers and self-help groups.

Strengthening community capacity for ABS:

Building capacities among farming communities is extremely important in different areas. For instance, the Trust Funds created at the national and local levels in many countries through a legal mandate for benefit sharing, do not often reflect the interests, needs and desires of the communities. While the corporations setting up Trust Funds may consider monetary returns will benefit the knowledge-holders most, the knowledge holders' most pressing needs may be non-monetary benefits (e.g. access to seeds for adaptation). Capacities of such communities should be strengthened to negotiate their deals themselves. International best practices in this area need to be documented and shared.

Access to premium markets:

Globalisation and liberalization has on the one hand increased access to international markets, and on the other, created non-tariff qualitative trade barriers. State and non-state actors should facilitate access by local agrarian communities to premium markets for enhanced benefits. Value addition and certification will also help these farmers to attract premium and niche markets for their unique bio-cultural products.

Funding in situ conservation:

The Rice Park set up by the Centre for Mountain Dynamics to protect seeds of traditional varieties of rice from the region, needs more support. Such initiatives are often not commercially viable. Funds from the National Gene Fund set up under the Protection of Plant Varieties and Farmer' Rights Act should be available for such ventures.

Strengthening customary social and cultural institutions:

The resurgence in the region to establish their own identity by revival of their language, songs, dresses, sports and other practices, is a positive move to give impetus to protection of TK and the management of biological and genetic resources.

Legal literacy programmes:

Local communities, extension staff and front line staff of various departments should be conducted to sensitise them to their rights and responsibilities under various laws relating to TK protection such as the Biological Diversity Act, Patent Amendment Act, Protection of Plant Varieties and Farmers' Right Act, Geographical Indication Act, Panchayat Raj Extension to Scheduled tribes Act, etc

Participatory Plant Breeding:

In light of the climate variabilities and the likely severe impacts of climate change, it is important to engage in participatory plant breeding and co-management partnerships between the local farming community and the scientific community while protecting the knowledge and rights of the farmer communities and ensuring fair and equitable benefit-sharing from the use of their knowledge and resources in these partnerships. Farmers' knowledge, experience, wisdom and innovations are important to develop climate resilient varieties of crops and vegetables.

Sustainable harvest protocols:

Technically sound organizations, both from the government and autonomous sectors should undertake studies to ascertain sustainability in harvest and extraction of biological material and help develop sustainable harvest protocols, which may also emanate from traditional knowledge and local practices. These studies will help the National Biodiversity Authority, the State Biodiversity Boards and Biodiversity Management Committees at the time of granting approvals to applications received for access to knowledge and resources.

ABS model contracts based on customary law:

The National Biodiversity Authority should work with progressive legal professionals to develop model contracts for ABS based on customary principles, which are fair and equitable to strengthen the community capacity.

Awareness of TK through formal education:

The education curriculum for schools/colleges across the country both in urban and rural areas need to be reviewed and revised to include a focus on the importance of TK, its value and the need for its protection and promotion. This will help develop pride in the rural and tribal children towards their bio-cultural heritage and respect in the urban children for TK systems. Similarly, the curriculam of professional and technical institutes and universities offering basic and specialized courses in law, agriculture, forestry, fisheries, wildlife, water and architecture, should be modified to incorporate TK issues with appropriate reference to local and regional examples.

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