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The Role of Cultural Values in Agrobiodiversity Conservation: A Case Study from Uttarakhand, Himalaya

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ABSTRACT The role of socio-cultural values in biodiversity conservation is an integral part of the people living in Uttarakhand, Central Himalaya, India. Still, there exist many rules and regulations set up by earlier generations for the conservation and management of the resources. To a certain extent the present generation is going through the same philosophy following the ideas set up by their ancestors for conservation and management of the resources that would lead to a healthy environment. Due to a variety of reasons the area under traditional crops is declining very fast in the region but undoubtedly many of the crop varieties are still conserved in the region because of their socio-cultural and religious values. The traditional festival called "*Harela*" is one the festivals in Uttarakhand which encourages people to conserve and manage their traditional crop diversity. These kinds of activities of the people need to be emphasized in detail, keeping in view the rapid socio-economic and cultural changes taking place in the societies.

INTRODUCTION

Humanity's collective knowledge of biodiversity and its use and management rests in cultural diversity; conversely, conserving biodiversity often helps in strengthening cultural integrity and values. The study need to be undertaken mainly for the simple reason that culture should not be taken as the ethical imperative for the development; rather it is a condition for its sustainability. There exists a symbiotic relationship between biological diversity and cultural diversity, in between habitat and cultures, and as well in between ecosystems and cultural diversity. These inter-relationships constitute a determining factor in ensuring sustainable human development (Negi et al., 2002). In the Central Himalaya there are various socio-cultural activities of the people which in turn provide a unique identity to each community, and *Harela* is one of them. In Kumaon region of the Central Himalaya *Harela* is an integral part of cultural activity and is celebrated with religious fervor and gaiety; it is considered a symbol of greenery and prosperity all around. The *Harela* celebrated on the 1st day of Sawan (name of the fifth lunar Month of the Hindi Calendar) or in mid July. Hindu deities Lord Shiva and Goddess Parvati are worshipped on this day, as this month is considered the most favorite month of Lord Shiva. Therefore, this festival is also known as HAR-KALI (it means Lord Shiva and Goddess Parvati). Offerings are made for better crop production, conservation, and prosperity. A mixture of five to seven traditional crops/landraces is sown in a small basket 10 days before the *Harela*. Seeds of Maize (*Zea maize*), Sarson (*Brassica* spp.), Gahat (*Macrotyloma uniflorum*) (legume), Jau (*Hordeum vulgare*), Wheat (*Triticum aestivum*), Traditional land race(s) of Paddy (*Oryza sativa*), Mass (*Vigna* sp.), and Bhatt (*Glycine* sp) are used for sowing. The basket is kept in the dark inside the house so that aerial parts of the plants become yellow in color. Traditionally, the yellow color is considered to be a manifestation of good fortune. At the day of *Harela* all plants harvested from the basket are offered to the deities and thereafter are taken as a blessing (Prasad) by all the family members. The overall width and length of each plant is taken as a symbol of prosperity. It is well known, that in India, every festival is related to some social cause and ultimately to the betterment

of humankind. With better growth of *Harela* crops it can be presumed/predicted that all the crops would give better production and fulfill the demand of the local people. However, with changing times, the exact social cause is forgotten and festivals are now becoming a symbol of social custom in many parts. *Harela* of the fifth lunar month of the Hindi calendar has the greatest importance and is celebrated by each and every community of the region because rainy season crops are almost replenish the blank while nourishing the people up to the maximum time in a year.

METHODOLOGY

Regarding Harela the information was asked randomly to the people living in the Hawalbagh Block, Almora, Uttarakhand. The traditional beliefs and reasons behind this festival were noted and thereafter the views of the local people were also questioned in relation to understanding the causes and consequences of traditional beliefs in agrobiodiversity conservation and management. Meanwhile we have surveyed the literature where empirical evidences showed that agrobiodiversity conservation goal would be achieved efficiently with proper documentation and giving values to socio-cultural activities of the local people through which they have been maintaining and conserving the valuable germplasm in the Himalayan agro-ecosystems.

RESULTS AND DISCUSSION

We have noticed that two more *Harela* festivals, one in Ashwin (seventh lunar month of the Hindi calendar-October-November) and the other in Chaitra, the first lunar of the Hindi calendar (mid-March to mid-April) are also celebrated in the region. In the month of Ashwin the harvesting of summer crops is done while the winter crops are being sown, which are harvested in the month of Chaitra (mid March-mid April, time for harvesting of winter crops). It simply means that the people worshiped their Gods and Goddesses for greenery and prosperity while making offerings to deities for safe harvesting and safe storage of their crop produce. It is believed that the people are blessed by the God/ Goddesses for safekeeping their harvest while protecting their food crops from any type of natural calamities (i.e. hail storming, unprecedented rain, drought, etc.). The months of October-November and March-April are likely to have hail storming and unprecedented rain in Central Himalaya. Therefore, the people are always afraid for the safe-harvesting and safekeeping of their agricultural produce, which is main earning of Himalayan people to securing them throughout the year from food/ nourishment. But is has also been observed that presently not all the communities of the Kumaon celebrate *Harela* in the months of October-November or March-April. Why this so? This is not yet clear. However, it is believed at that time, winter and summer season crops are being harvested; therefore, due to high work pressure families without much manpower do not have time to celebrate *Harela*. This is the brief information on *Harela* and subsequently, empirical evidences which support the importance of traditional crop diversity and their conservation in Himalayan agro-ecosystems are presented here.

The '*Harela*' intended here only to give an introduction about the importance of traditional crops of the region. The article emphasized merely that the traditional crops/landraces which have been vanishing from the Himalayan region, need to be conserved with effective support and encouragement through the policy oriented research. *Harela* is one of the socio-cultural activities of the Central Himalayan people which have been contributing in the direction of conservation of traditional germplasm of the region. The value of germplasm of the Himalayan agro-ecosystems is well known to the people living there (Bisht et al., 2006). The seeds of five-seven crops needed for *Harela* festival, should have stored by every household. This is one such socio-cultural activity of the Central Himalayan people through they make efforts to keep conserving the traditional crops/landraces/genetic resources which seems to be in jeopardy due to variety of factors. In this endeavor empirical evidences (Maikhuri et al., 1996, Palni et al., 1998; Maikhuri et al., 2000, Maikhuri et al., 2001; Nautiyal et al., 2003; Nautiyal et al., 2005; Bisht et al., 2006) supports that the diversity of traditional livestock based farming system in fragile Himalayan landscape would be difficult to conserve without conserving the socio-cultural values of the people living in the region along with proper documentation of traditional ecological knowledge pertaining to local available biological resources. The factors responsible for decline in

traditional crop diversity/landraces (such as socio-economic, ecological and policy related issues), the main socio-economic factors responsible for erosion of traditional crop diversity/ landraces/germplasm are presented in Table 1. Among the few main socioeconomic factors, the lack of traditional knowledge and social values are two important points in view of socio-cultural perspective of the local people, which are very essential to be taken into consideration for value addition of traditional crops and protection of Intellectual Property Rights (IPR) (Table 1). Therefore, the information provided with this article is only to highlight the role of cultural values in conservation of traditional crop germplasm.

Studies reported that the people of the Central Himalayas have rich cultural diversity, indigenous knowledge, and traditional beliefs, and that all entities are being transmitted from one generation

Table 1: Main socio-economic factors behind responsible for traditional crops/landraces/germplasm (After Bisht et al., 2006)

S.No.	*Important factors responsiblefor agrobiodiversity loss*	*Process of change and implication*
1	Change in cropping patternsdue to economicconsiderations	The farmers in the region are involved in diverse livelihood options as cultivation of crops, livestock, forestry, etc. Many of the traditional crops are grown under marginal conditions and often provide low yield and extremely low income, forcing the farmers to undertake other activities, for example, replacement of mixed cropping to monocropping, cultivation of improved strains bringing about more uniformity in crop species and switching over to cash crops. Mono-cropping and uniformity results in increased vulnerability to pest epidemics and consequent loss of biodiversity. Besides, a significant proportion of the traditional agricultural land has been brought under cash crops or o .-season vegetables. This has adverse implications on traditional agro-ecosystemsand traditional agro-biodiversity of the region has shrunk over the time.
2	Population growth and landfragmentation	The human population has increased over time. The land fragmentation and insufficient crop yield due to high land: man ratio and low output: input ratio of traditional crops compelled farmers to consider other options for livelihood.
3	Lack of traditional knowledge	Since there is no systematic documentation of ethno-medicinal uses of traditional landraces and the traditional underutilized crops, the younger generation is unaware about the distinctive properties of the landrace diversity. Lack of this knowledge often leads to discontinuation of cultivation of some of these landraces which are of high nutritional value to them. This kind of knowledge is, however, very much essential for value addition to local landrace diversity and also in IPR protection.
4	Out-migration	Migration of people to plain areas for o .-farm jobs and reduced interest in traditional agriculture.
5	Change in food habits	Yield potential of most of the traditional crops has been stable for the last 2 -3 decades. The food shortage problem is because of population growth, change in food habits (increasing preference for wheat and rice as staples), reduction in crop diversity and net sown area.
6	Social values	Local socio-cultural integration has decreased. Social institutions such as community participation in natural resource management for agriculture, and seed and labour exchange systems are disappearing fast leading to weakening of agricultural management.

to another. The livelihood of the Himalayan people is totally dependent on their ecological surroundings and they use very simple technology to sustain their lives, which otherwise seems conservative. But nowadays, the traditional knowledge related to cultural diversity is eroding very fast. The erosion of traditional wisdom, faith, and believing is due to lack of sustainable development policy towards promoting traditional sociological knowledge-based programs which would be centered on the agrobiodiversity and plant biodiversity of the region. There is a rapidly growing recommencement throughout the world of interest in traditional food crops. The traditional crops are rich in all the essential nutrients/proteins and therefore have been used for medicinal purposes in the region, in addition to staple foods (Maikhuri 1996). In this endeavor we have been working on causes and consequence of land use change at temporal dimensions in Central Himalaya India, and meanwhile documenting the indigenous knowledge pertaining to use of traditional crops in variety of ways. Paddy landraces are used for sowing with the mixture of another traditional crops of Harela festival. Therefore, in this endeavor the role of paddy landraces in traditional health care system is documented an area of Uttarakhand Urgam Valley and briefly described in Table 2. However, some of these traditional landraces have been vanished from the area. It means that the traditional knowledge pertaining to extinct crop/landraces is also in the danger of extinction. The traditional knowledge system seems to be declining in younger generation. Farmers of the region possess enough knowledge about various crop resources and wild edibles for their subsistence need and other uses (Bhatt et al., 2000; Bisht et al., 2006). Thus it is important to document and revitalize the indigenous knowledge system and more acutely keeping the present IPR regime in view (Nautiyal et al., 2001a; Kala, 2003). Of the total landraces of paddy (*Oryza sativa)*, 8 were used to cure stomach related disorders such as dysentery, constipation, hiccup, indigestion, shivering etc.; 5 were used as a tonic particularly for expectant and nourishing mothers; 3 were used to cure pimples and small pox; 2 were used in urinary disorders; 1 to cure piles; 1 for healing wounds and cuts; 1 to cure leucorrhoea, and 1 to cure earache. One landrace *viz*., Nagyon is used to retain placenta in newly calved cattle and buffaloes. Here ethnomedicinal description of all the crops in is not possible and therefore we have given the details of traditional land races of paddy in traditional health care system. Inventory of some important crops of the Central Himalayan region, their nutritive value (*moisture content, calories, protein, carbohydrate, fat, fibre and minerals*) and uses (ethnobotany) have been documented by Maikuri et al. (1996).

Table 2: Ethnomedicinal uses of traditional landraces of paddy (*Oryza sativa*) in a part of Central Himalaya

Vernacular name of the landrace	*Ethno-medicinal uses*
Bhabri	Stomachache and shivering
Ghyasu	Loose motion
Jolya	Constipation
Kalon Kala	Leucorrhoea
Kalon Safed	Dysentery
Khagola	Delivery
Khullu Kala	Pimples
Khullu Safed	Wounds and internal injury
Kimoli	As tonic
Lal Sati	Small pox
Lalmati	Earache, urinary infection
Mukhmar	Internal body heat, anti-allergic, auspicious religiously
Nagyon	Retain placenta in ovine and bovine
Nandini	Cold
Rajbhog	Indigestion
Rajmati	Tonic for expectant mother
Ramjawan	Preventing hair loss
Safed kholya	Prevent hair floss
Saron	Hiccup and indigestion
Semolal	Energy food for milching animals, stomachache
Shyudwal	Urinary disorder
Sukhnandi	Tonic for nourishing mother
Thapachini	Piles
Ukhari	Tonic

Study reported that the cultivation area under many of the traditional crops/landraces in the region is shrinking very fast due to replacement of traditional crop varieties by High Yielding Varieties (HYVs), modern varieties, or introduced crops (Maikhuri et al., 1997). The percentage decline in the area ranges between 36% and 100% for many important traditional food crops (Table 3). Many scientific studies are being conducted in the Central Himalayan region for conservation and management of traditional crop diversity (Maikhuri, et.al., 1996, 1997; Semwal and Maikhuri, 1996; Palni et. al., 1998; Nautiyal et. al., 2000; Nautiyal et. al., 2003). Many of them pointed out that the genetic erosion is a very severe phenomenon in the region and the adoption of HYVs or introduced crops are the responsible factors for this. There are also substantial

Table 3: Replacement of area (ha) under cultivation during 1970-74 and 1990-94 of different crops in summer and winter seasons (after Maikhuri, 1997).

Crops/ cropping season *Summer season crop*	*Replacement crop*	*% decline in traditional crops*
Panicum miliaceum (Cheena)	High Yielding rice varieties	65.5
Oryza sativa (Traditional land races)	High Yielding rice varieties	100
Avena sativa (Jai)	Potato	78.5
Fagopyrum tataricum (Phaphar)	Potato and rajma	82.5
F. esculentum (Oggal)	Rajma	92.7
Parilla frutescense (Bhangjeera)	Soyabean	100
Setaria italica (Kauni)	Soyabean	65.2
Eleusince coracana (Koda)	Soyabean and amaranth	36.5
Echinochloa frumentacea (Jhangora)	Pigeon Pea	72
Macrotyloma uniflorum (Gahat)	Soyabean and amaranth	70
Vigna sp. (Mass)	Pigeon pea and amaranth	100
Winter season crops		
Triticum aesativum (traditional landraces of wheat) + *Brassica* (sarson)	High yielding wheat varieties	100
Hordeum himalayens (Owa)	Potato, amaranth and rajma	95
Hordeum vulgare (Jau)	Improved mustard varieties	84.3

evidences that the introduction of modern HYVs in agroecosystems have resulted in the extinction of traditional landraces in the Himalayan region. A study conducted by Nautiyal et al., (2000) in the Central Himalaya showed that a prominent scented paddy landrace "Mukhmar," has become extinct because of the introduction of HYVs by government policy interventions in certain areas where traditional agriculture was once an integral component. During the 1980s a program was launched by the government through a watershed management project in the region, and seeds of HYVs along with fertilizers at subsidized rates were provided to the local farmers. Farmers started cultivating a scented HYV of rice in place of the local scented rice landrace. At the initial stages the HYV showed high output in terms of grain yield under high agronomic management but after some time its production declined when the government agencies decided to remove the subsidy on fertilizers. The traditional landrace Mukhmar has completely disappeared from the area now. The traditional crops are rich in nutrition and are able to fulfill the nutritional demand while making value added product of these crops. In the region, widely grown, an underutilized food crop which is locally known as Mandua or Koda (*Eleusine coracana)* is rich in Calcium, Iron and Fiber (Kazmi, 2003). The grain of *Elesine coracana* has 35 times more calcium content (160mg-487mg/ 100 gm seeds) (Vadivoo et al., 1998) than that of rice (10 mg/100gm seeds) and wheat (41 mg/100gm seeds). Besides, this crop requires little water, which would be a blessing for rainfed agriculture of the Central Himalayan region. But on the other, studies (Maikhuri et al. 1996; 1997) reported that the area under cultivation of this lesser-known crop (*Eleusine coracana*) has decreased to 37%-40% in various localities of the region. How the traditional crops/landraces of the Himalayas would be conserved is a point for policies and planning. The social, cultural, and economic perspective of the local people of the region need to consider together. The plant-based genetic resources cannot be conserved and protected without conserving/managing the socio-cultural organization of the local people (Rao and Saxena, 1996; Palni et al., 1998; Maikhuri et al., 1998; Nautiyal et al., 2001b; Negi et. al., 2002; Kala, 2007).

However, the question is unexplained that why traditional ecological knowledge related to cultural values is eroding in the region? The reasons for such erosion are perhaps socio-economic, ecological and political (Bisht et al., 2006), and crucial factor is lack of incentives for economic upliftment of local people according to their ecological surroundings, and political will. Pressure of modernization, cultural harmonization, and brain-drain are the other factors responsible for such changes. Due to policy failure and lack of incentives, through which these people may be encouraged, the traditional rules and regulations of old Himalayan people are now being questioned by the younger generation. Consequently, the younger generation of the

region is not willing to apprentice to learn from the elderly people. If changes in the region continue then the cultural diversity-based traditional knowledge, which is strongly linked with the Himalayan agrobiodiversity, will vanish from the region.

Therefore, documenting a cultural knowledge base related to conservation of traditional crops/ landraces as described here with the introduction of *Harela* becomes important in view of rapid socio-economic and cultural changes. Emphasizing the social and cultural set up and other socio-cultural activities of the Himalayan people along with other conservative incentives would be helpful for long-term conservation of traditional agrobiodiversity, which is in danger of extinction due to the so-called 'modernization' taking place in society.

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