

A VALUE ADDED MARKETING CHAIN APPROACH FOR AGRO BIODIVERSITY CONSERVATION – A CASE STUDY FROM KOLLI HILLS

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Introduction

Agro biodiversity is a major constituent of Biodiversity and plays a vital role in the food security and nutritional security of the different communities in tribal and rural areas. In the recent decades, such agro biodiversity is under threat due to selective utilization of their genetic base leading to erosion of resources and poor nutritional security among the people. Recent developments in improved mono cropping systems, marketing channels for the cash crops, increasing interest among the people towards commercial crops were the reason for neglecting diverse agricultural crops. Such neglected agro biodiversity resources is possible only by bringing them into use (Swaminathan 2000) and making them economically viable.

In the changing socio-economic condition the social and ecological functions are neglected and greater importance is given for economic sustenance of the crops and system (Gopinath, 2000). Hence an approach has been made to increase the economic potential of traditional cultivars of millet (Annexure 1) as a strategic crop, which enhances agro biodiversity of the region through mixed cropping and mixed farming systems. This paper attempts to explain a value added marketing chain approach adopted by M.S.Swaminathan Research Foundation in conserving the Agro biodiversity in Kolli Hills region in Tamil Nadu.

Settings

Kolli Hills is located in the extreme eastern part of Namakkal district. It falls within the following coordinates, Longitude: 78°17'05"E to 78°27'45"E and Latitude: 11°55'05"N to 11°21'10"N in S.O.I topo sheets 581/8. The total block area is 441.41sq.Kms. The altitude of the hill ranges from 180 m at the foothill to 1415 m at the plateau. The inhabitants of Kolli Hills are known as Malayalars. They migrated from the plains of Kanchipuram and settled in Eastern Ghats hills ranges including the Kolli Hills (Vedavalli et al 2002).

Table 1. Mixed cropping followed in Kolli Hills

Crops	Botanical name	Duration (days)	Sequence of Harvest
Ragi	<i>Eleusine coracana</i>	150-160	IV
Thinai	<i>Setaria italica</i>	100-110	II
Maize	<i>Zea mays</i>	125-130	III
Avarai	<i>Purpureus lab lab</i>	190-240	VI
Cucubits	<i>Cucumber spp.</i>	150	V
Amaranthus	<i>Amaranthus spp.</i>	60-70	I

(Vedavalli et al 1999)

Malayalis have evolved a variety of cropping practices such as mixed cropping and crop rotation according to agro climatological conditions of landscapes in Kolli Hills (Tab1&2) that had supported the food and nutritional security of the people through millet and paddy as their major component. Mixed cropping systems involves combination of crops with the different food value, maturity period, input period and capacity to withstand calamities, which helps in minimizing the risks and stabilizing the household food supply. Besides, crop rotation helps in maintaining the soil health and meeting multiple needs of the rural poor. In these practices, the crop residue from the harvested crop is recycled and enriching the soil.

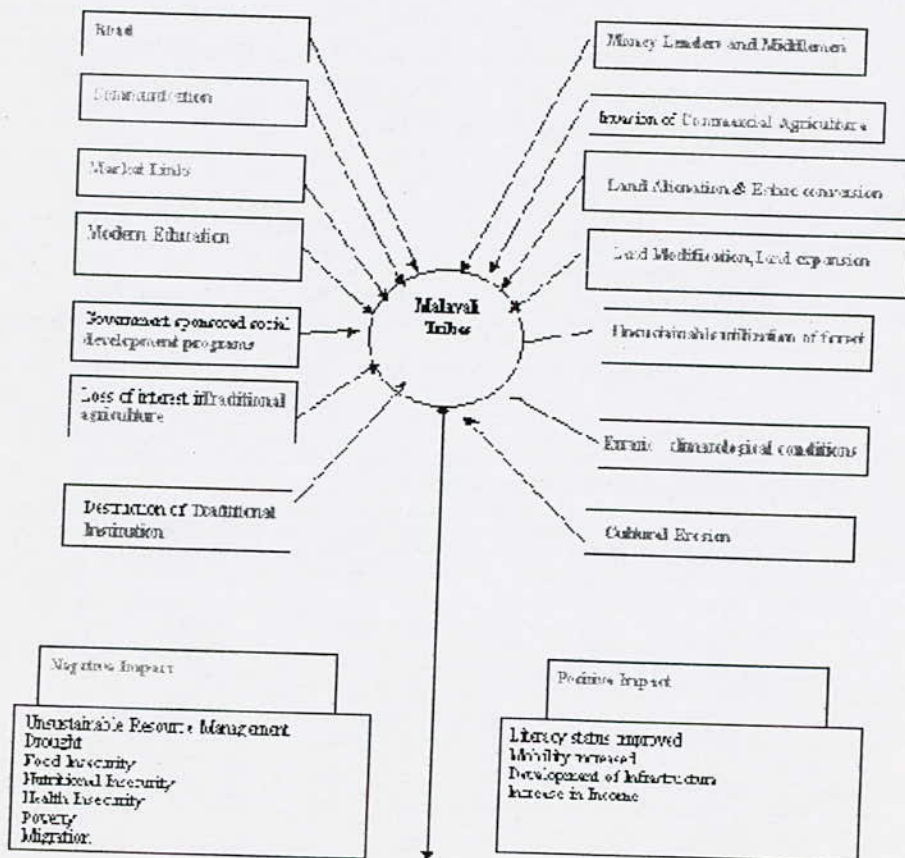
Table 2. Crop rotation followed in Kolli Hills

Type of Land	Crop Rotation
Vayal-Low land	Paddy (One year)-Banana (Two years)
Mettunilam	Paddy-Coriander+ <i>Motchai</i> -fallow
	Paddy-coriander- <i>panivaragu</i>
	Paddy-coriander-sorghum
	Paddy- <i>Motchai</i> - <i>Panivaragu</i>
	Paddy- <i>Motchai</i> -Sorghum
	Tapioca-mixed crops (two year rotation)

(Vedavalli et al 1999)

These traditional agricultural practices ensured the protection of their soil and enough production of food material with the minimal usage of precipitation. This kind of cropping practice is eroding due to the pressure of commercial agriculture like tapioca. When they moved from subsistence agriculture to commercial agriculture they have not only lost their food but also lost the nutritive quality of the soil due to consistent monoculture of tapioca.

Flow Chart 1. Driving forces and Process of Transitions in Kolli Hills



Threat to Agro biodiversity in Kolli Hills

In the recent decades, the agrobiodiversity in Kolli Hills has been declining, especially the area under millets. The process of transition in Kolli Hills is given in the flow chart 1. The introduction of cash crops like tapioca, declining soil fertility, drudgery involved in the processing of millets, lack of market linkages, increasing transport facilities, availability of food grain especially rice at reasonable cost through the PDS, rice consumption as a symbol of social status and mobility may be highlighted as the major factors for decline in the cultivation and consumption of minor millets.

In addition to this, the interest and attitude of the tribal community towards commercial horticulture such as plantation of silver oak, pepper, coffee and cardamom estates have brought more pressure on traditional agriculture. Besides growing trend of fading cultural and value system, dilution of traditional institutions and interest in commercial oriented development are challenging the traditional cultivation methods, resulting in ignorance about importance and nutritive values of millet crops among the younger generation. Moreover, the younger generation in Kolli Hills argues that hand pounding millets induces drudgery and that minor millets do not have any marketing value. These conditions have depressed the interest in cultivation of millets when they have the option of commercial agriculture like tapioca cultivation. Government policies related to crop loan, crop subsidies, tends to favor commercial agriculture but not the traditional cultivation of millets. Besides, the public distribution system supports supplying food items like rice, wheat, maida, rava at reasonable cost, which make the people to prefer these food items over minor millet.

Strategies for Agro biodiversity conservation in Kolli Hills

Over all development of the any region is associated with the sustainable utilization of the natural resources. Decline in agro biodiversity would result in food and Nutritional insecurity, Malnutrition, hidden hunger and Poverty. Hence to resolve these issues an integrated value added marketing chain approach is being implemented in the hills regions of Kolli Hills (Box 1).

A. Seed collection, Multiplication, Seed Distribution, Revival of Seed Storage System and Seed Exchange

Though Kolli Hills tribal community cultivate wide range of millet land races they were widely distributed and at times were not available for the people interested in reviving their millet cultivation. Thus seed collection was the first mission through which all the available land races of millets were collected from different corners of Kolli Hills. These collected seeds are multiplied at controlled plots with the participation of the local people for producing quality planting material (seeds). Traditional seed storage system like *thombai*, *kuthir* is being revived which helps in storage of these seeds and encouraged the seed exchange (Rengalakshmi et al 2003) during season and at community festivals. These activities are institutionalized with organized SHGs and records are maintained for their sustained effort and impact.

B. On farm Millet Cultivation and yield enhancement through participatory research

The availability of seed stock among the local communities encourages their cultivation. But, at the same time it was observed that the yield performance is poor when compared to the commercial crops. Hence, a number of participatory yield enhancement trials through agronomic practices like row planting, intercropping with crops were conducted and demonstrated to the tribal community. This had enhanced their production potential and economic returns from per unit area of land. These efforts promote cultivation of millets in different landscapes and ensures seed availability in villages. Besides these conservation and exchange of millet efforts, value addition and market linkages of millets also accelerates cultivation in response to the increasing market demand. These in turn support conservation of all the landraces spread over Kolli Hills and ensures food security and livelihood security of the region.

C. Milling units and Millet marketing model to address the issues of drudgery Local food security and Nutritional security

One of the issues that identified for reduced interest in cultivation of millets was also due to heavy drudgery involved in processing them for food due their seven layers of seed coat. It was observed that provision of a low cost milling unit for removal of seed coat and removal of stone lead to revival of interest among the community in consumption. Further the same was also had good market value outside Kolli Hills region and reached up to FOOD WORLD, chain of supermarket departmental stores for the sale. Thus processing of millet into rava and also as powder triggered the local consumption and also increased their market potential from rupees five to thirty three with an income of rupees eight thousand per ton of millet.

D. Value addition to Agro biodiversity to enhance the Rural Income

Value-added products like ragi malt and other snack items were also been prepared to make millet consumption more attractive. These efforts encourage the farmers to grow more minor millets with the increase in the area under mixed cropping which indirectly enhances the ecosystem functions such as soil fertility and water management. Village ecosystem function and resource use efficiency has also increased resulting in effective sustainable natural resource management at the village level. Efforts taken to linkup minor millets with markets have resulted in generation of additional income for the tribal families and guarding the food and nutritional security at the household level in Kolli Hills.

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Annexure 1. Landraces in Kolli Hills

Common name	Scientific name	Vernacular name	Local existing varieties
Little millet	<i>Panicum sumatrance</i>	Samai	Sadansamai Thirikulasamai Karumsamai Kettavettisamai Kottapattisamai Malliyasamai Perumsamai Vellaperumsamai Elansamai
ItalianMillet	<i>Setaria italica</i>	Thinai	Senthinai Palanthinai Karanthinai Perunthinai Killanthinai Koranthinai Mosakkannathinai Mokkanathinai
Common Millet	<i>Panicum miliaceum</i>	Panivaragu	
Kodomillet	<i>Paspalum scrobiculatum</i>	Varagu	Peruvaragu Thirivaragu Karunkalivaragu Senkalivaragu

References

- Gopinath L. R. 2002. SHGs Effective Pathway to Biodiversity Conservation, M. S. Swaminathan Research Foundation: Chennai (Memeo)
- Rengalakshmi R. Dhanapal, D., Oliver king, E. D. I. and Boopathy, P. 2003 Institutionalizing traditional seed exchange networks through community seed banks in Kolli Hills, India. CIP UPWARDS. Conservation and sustainable use of Agricultural Biodiversity: A source book. 302 – 308.
- Rengalakshmi R., Oliver king, E. D. I. and Dhanapal, D. 2003. Working with the farmers to enhance productivity of local cultivars in India. CIP UPWARDS. Conservation and sustainable use of Agricultural Biodiversity: A source book. 221-225.
- Shubh kumar-range.2001. Like paddy in rocks Local Institutions and Gender roles in Kolli Hills. MSSRF.
- Swaminathan M.S. 2000. Government- Industry- Civil Society: Partnerships in Integral Gene Management, Ambio Vol.No.2, 115-121.
- Vedavalli L, Rengalakshmi, R., Oliver king, E. D. I. and Balasubramanian, K. 1999. Biodiversity, Underutilized crops and Socio-cultural dimensions in a Historical perspective. MSSRF. Mimeo.
- Vedavalli, L., Oliver king, E. D. I., Balasubramanian, K. and Balusamy, S. 2002. Kolli Malai Makkal Padalgal. Kalaigaan Padhipagam. 416.

CONSERVATION OF SACRED GROVES IN KOLLI HILLS, TAMIL NADU: STRATEGIES FOR SUSTAINABLE MANAGEMENT

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Introduction

People have always lived in close association with nature and continue to depend on natural resources for major needs such as food, shelter and medicine. This association and dependence have led humans to treat plants, animals, rivers and mountains as integral part of their cultural life. Many such components of nature have become objects of reverence and veneration. In this process, human being had evolved various mechanisms for natural resource management and conservation strategies based on their belief and traditional wisdom.

India is ranked as one of the 12-mega diversity rich countries of the world and is a signatory to the Convention on Biological Diversity (1994). In this regard, numerous efforts have been made by the Government of India to sustain and conserve biodiversity. Conservation efforts through public funds can broadly be classified into two groups: *in situ* conservation pursued through National Parks, Protected Areas, Biosphere Reserves and World Heritage Sites and *ex situ* conservation pursued through Botanical and Zoological Gardens and Gene Banks. While the above are widely recognised efforts, conservation in the public domain - Community Conservation or *in situ* conservation by rural and tribal women and men remain largely unrecognized and un-rewarded (Swaminathan 2000). Traditional communities continue to possess the traditional knowledge to use and preserve large number wild relatives of cultivated plants, birds and animals. Tribal and rural farming communities have a long cultural tradition of serving as custodians of genetic wealth. However, it has to be noted that the last remaining such tribal populations in India live in the mountains and hills. The efforts by communities in nature conservation including sacred groves are hardly addressed by mainstream conservation agencies. Sacred groves are one such traditional *insitu* community conservation systems (Prakash Rao 1996).

Sacred groves are part of a landscape, often a forested ecosystem, with well defined geographical features, delimited and protected by traditional societies for cultural and religious reasons (Ramakrishnan et al. 1998). These groves are protected through customary taboos and sanctions, with significant cultural and ecological implications; the protecting institution may be the priest, a temple trust, or the community as a whole (Gokhale 2001). Protection was reinforced by recognizing them as the focal point for varied levels of social interaction (Ramakrishnan et al. 1998) and Sacred Grove conservation is a practice of the ancient way of *insitu* conservation of biological and genetic diversity (Mithra and Pal 1994). Traditional belief and value systems supporting sustainable management of natural resources and their conservation disintegrated in the last few decades thanks to modern developments that has gradually led to control and manipulation of the natural resources in the Sacred groves. This paper examines the role of Sacred Groves in wild plants conservation, associated believe systems of Malayali tribes in Kolli Hills, Tamil Nadu. Current status of the groves and various strategies for the conservation sacred groves are discussed.

Settings

Kolli Hills is located in the extreme eastern part of Namakkal district. It falls within the following coordinates, Longitude: 78°17'05"E to 78°27'45"E and Latitude: 11°55'05"N to 11°21'10"N in S.O.I topo sheets 581/8. The total block area is 441.41sq.Kms. The altitude of the hill ranges from 180 m at the foothill to 1415 m at the plateau. The hill range stretches 29kms from north to south and 19km from east to west. Kolli Hills has an area of 28,293 ha. Human habitation is spread out into 247 hamlets and the area is divided into 14 Nadus which also parallel the jurisdiction of the 14 elected "Revenue Village" Panchayats, in accordance with the laws for local village elected bodies and governance of Tamil Nadu and the Govt. of India.

The inhabitants of Kolli Hills are known as Malayalars. The Malayali community is one of the largest tribal groups in Tamil Nadu inhabiting the hill ranges in the northwestern parts of Tamil Nadu. They constitute more than 98% of the total population (33,888) of Kolli Hills, living in 6840 households as per 1991 census of which the tribal families constitutes about 6,613. The population constitutes 17,207 of males and 16,681 of females. The density of population is 119 persons per sq.km. The people of the hills belong to two major communities, the scheduled tribes and scheduled castes. History of Malayalis shows that they are the principal inhabitants of the Talaghat hills, their chief settlements being Shervaroys, Kalrayans, Chitteris, Kollimalais and the Pachamalais. They originally belonged to the Vellala caste of cultivators and have migrated from Kancheepuram to the hills when the Muhammadan rule was dominant in South India. Prior to Malayalis, vedars or vettuvvars (hunters) were the predominant group in the area (Thurston 1909). The sangam literatures as well as the myths prevailing among Malayalis refer to the succession of the migrants over vedars. The period prior to Malayalis probably could have been characterized by pristine ecosystems in which the vedars were essentially hunter-gatherer group. The invasion and the settlement of Malayalis is a crucial point in the ecological history of kollihills in which the pristine ecosystem must have changed to partially altered ecosystems. Malayalis brought agriculture to kollihills, which led to periodic manipulation with partial domestication of resources. During the process of their settlement these Malayali tribal people have left a patch forest near by their settlement for veneration of their god and goddesses and forefathers. These relicts of the past vegetation are known as Sami Sholai in Kolli Hills.

Sacred Groves in Kolli Hills

These *Sami Sholai* (Sacred Forests) are found in the midst of varying agro ecosystems, forest boundaries on hilltops and slopes distributed across the geographical area of Kolli Hills. Grove sizes ranges from one hectare to five hectare. During the field survey, around two hundred and forty sacred groves have been recorded. Of these, according to the people, eighty percentage of the groves had a lush forest cover earlier and now becoming just merely a sacred place. Due to the changing social conditions size and structure of the groves are being altered. Fore father, Mother goddesses and Peruman workshops are most prevalent in groves of Kolli Hills. Many of the groves are managed by individual family, traditional panchayat in Patta land as well as in Poromboke land as common property. Some of them are found in the territory of reserve forest. Sacred groves of Kolli hills harbors several rare and endangered species of Eastern Ghats. Rare species like *Myrstica dactyloides Gaertner*, *Persea macrantha (Nees) Kostern*, *Philicium decipens*, *Canarium strictum Roxb*, *Alseodaphne semecarpifolia Nees*, *Ammora rohituka (Roxb.) Wight & Arn*, *Agalaya elioignoides var courtalensis*, *Elaeocarpus serratus L*, *Lannea coromandalica*, *Michelia champaca L*, *Toona ciliata M.Roemer* found in the sacred groves. These relict forest patches have conserved by the Malayali Tribal community through community control mechanism by evolving several taboos and restrictions (Box 1).

Box 1: Taboos, Belief Systems Associated with the Sacred Groves in Kolli Hills

1. People should enter in to the grove only after having bath.
2. People should not enter in to the groves with footwear.
3. People should slaughter Goats, Chickens 32 feet away from the main deity.
4. Women should not enter in to the grove for 5 days during their menstrual period.
5. Girls attained puberty should not enter in to the grove for 90 days.
6. Women should enter in to the grove 108 days after delivering the child.
7. Women should not enter in to the groves after 5th month of pregnancy.
8. People who have attended death ceremony should not enter in to the grove for next 21 days.
9. Felling of trees in side the groves are prohibited.

Box 2: Threats to the sacred groves in Kolli Hills

- o Encroachment due to Commercial agricultural crops like Tapioca.
- o Invasion of Alien weeds such as *Lantana camera*, *Parthenium hysterophorus*, replaces the native plants.
- o Removal and clearances of weeds along with wild saplings during festival time.
- o Dilution of beliefs systems in to Superstition due to education and increasing economic status
- o Introducing economically important plants such as *Coffea arabica*, *Elettaria cordanomum*.
- o *Piper nigrum*, *Ananas sativas* in certain groves.
- o Natural falling of old lofty trees vs poor regeneration of wild saplings.
- o Mass workshop and interest towards constructing a temple in place of a deity.
- o Declining interest in protecting plants and erosion of Knowledge among younger generation.

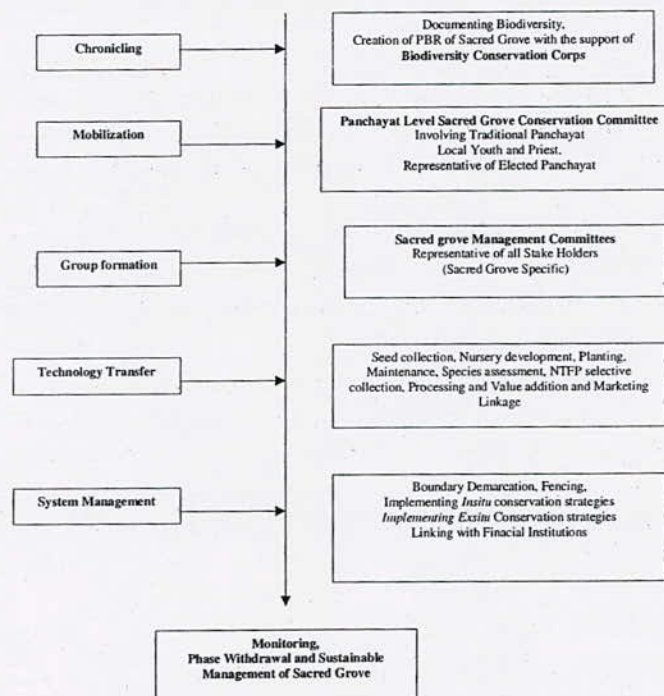
These relict wild patches are the repository of several medicinal plants and source of non-timber forest produce for the community. They serve as source of perennial source water for near by agricultural systems. These groves are the place for community gathering during festivals. Although several taboos and believe system of the people protected these remnant forests, groves are facing threats now. The survival of the existing sacred forest patches has becoming questionable due to various factors (Box2).

There are various stake holder are interacting with the sacred groves directly or indirectly for various reasons (Table 1). These actors are the responsible for the existence and changes in the status of the sacred groves in Kolli Hills. The current trend shows that a Participatory conservation approach is essential for Conservation and Sustainable Management of Sacred Groves.

Table1: Multiple stake holder interaction with the Sacred groves in Kolli Hills

Direct	Indirect
1. Local people (Men and Women)	6. Pilgrim tourists
2. Village Governing Body (Local Panchayat)	7. Revenue Department
3. Priest (Pusari)	8. Occasionally the Forest Department
4. Traditional Healers (Nattu Vaidyars)	9. Elected Panchayat
5. NTFP gatherers	10. Hindu Religious Board
	11. Markets
	12. Non Governmental Organization
	13. Scientific Community

Strategies for Sustainable Management of Sacred groves in Kolli Hills



A Suggested Approach for Conservation

I. Strategies for chronicling biodiversity in sacred groves

Local level grove specific sacred groves Biodiversity conservation corps should be formed and they should be trained to document the biodiversity of the sacred groves in People Biodiversity Register.

II. Strategies for Mobilization and Group formation

With the support of the respective panchayat, Panchayat level Sacred Groves Conservation committee should be formed. Besides, grove specific sacred grove Management committee should be formed involving representatives of all the stakeholders.

III. Strategies and Action for *In situ* Conservation and capacity building to manage wild plant diversity in Sacred Groves

Technical support to local communities is essential for the sustainable management of sacred groves. Local youths should be trained for Wild plants Species assessment, seed collection or propagation, Nursery development, Gap filling/ Planting, Weed Management, Maintenance of Sacred grove, Selective collection and marketing of NTFPs.

IV. Strategies and action for *Ex-situ* conservation

Operational procedures for multiplication of native wild plants of sacred groves and planting through sexual propagation, vegetative propagation and micro-propagation need to be developed.

Local communities should be enabled to raise nurseries of Rare; Endangered and Relict species of sacred groves and the Forest Department could purchase them as a buy back arrangement and shall be used in the restoration of degraded lands.

V. Strategies for sustainable livelihoods and sustainable use

Two of the major material dependence that leads to the degradation of sacred groves are: a) Demand for fuel wood and b) Demand for fodder.

If sacred groves need to be protected, village communities should be provided with alternatives for fulfilling fuel and fodder to asset less households that are currently depending on sacred groves.

Information on NTFP from sacred groves and possibilities of their value addition and marketing linkage might also help. Local communities should be linked for financial backup with the banking sector for enterprises developed around sacred groves.

Identification of people's priorities

Alternative needs of people should be identified in the light of protection and management of sacred groves. This may be basic amenities like roads, drinking water facilities and so on. These developmental programmes should be linked with the conservation programme. The state should respond to such a process.

VI. Strategies and action for data base management on wild plant diversity

Developing people Biodiversity Register for the sacred groves in a panchayat would help in possibly receiving rewards and recognition from the National Biodiversity Fund under Biodiversity Act 2002 and National Gene fund under PPVFR Act 2000 in course of time.

Compilation pooling all available information on sacred groves into a database or a network of databases could help various stakeholders including Panchayats, schools and colleges access information and recognize the stakeholders for their conservation effort.

Important sacred-groves harboring unique species or vegetation type on fairly big in size could possibly be declared as Local Heritage Sites by Panchayats. These could get benefits from the Biodiversity Act 2002

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References

- GOKHALE, Y. 2001. Management of Kans in the Western Ghats of Karnataka. In K. N. Ganeshiah, R. U. Shaanker and K. S. Bawa (Eds.) *Tropical Ecosystems: Structure, Diversity and Human Welfare*. Proceedings of the International Conference Tropical Ecosystems. Oxford-IBH, New Delhi. pp. 570-577.
- MITRA, A. and PAL, S. 1994. The Spirit of the Sanctuary. *Down to Earth*. pp 21-36, Jan. 31.
- PRAKASH RAO. Sacred Groves and Conservation. *WWF India Quarterly*, April-June 1996, pp 4 -10.
- RAMAKRISHNAN, P.S., SAXENA, K.G. and CHANDRASHEKARA, U.M. (eds.) 1998 *Conserving the Sacred For Biodiversity Management*. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
- SWAMINATHAN, M.S. 2000 *Government-Industry-Civil Society: Partnerships in integral gene management*, *Ambio* Vol. No 2, pp 115-121.
- THURSTON, EDGAR 1909. *Castes and Tribes of South India* Vol IV. Madras