

Ecological Knowledge, Biodiversity Conservation and Sustainability

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Background

- ▶ One of the most critical issues on the national and global agenda is the need to preserve biodiversity for future generations while trying to understand and document the indigenous knowledge of resource management practices.
- ▶ Indigenous knowledge and resource use practice has been defined as a cumulative body of knowledge and beliefs handed down through generations by cultural transmission about the relationship of living beings (including human) with one another and with their environment (Gadgil et al 1993).
- ▶ Indigenous knowledge, therefore, is of crucial significance if one wishes to introduce a cost-effective, participatory and sustainable development process (Warren, 1991).

Mountain Biodiversity and Sustainability

- ▶ Mountain systems in India, including the Himalayan region are characterized by highly complex socio-ecological systems, with rich cultural diversity linked with equally rich species of biological diversity.
- ▶ With a large number of ethnic societies having their own social, economic and cultural attributes placed in a highly heterogeneous mountain environment, any conservation-linked developmental initiative has to be based upon a value system that they understand, appreciate and therefore can participate.
- ▶ While textbook-based ‘formal knowledge’ has its value in this effort, the rich traditional ecological knowledge (TEK) derived through an experiential process and available with local communities forms a powerful connecting link between ecological and social systems.
- ▶ ‘Traditional societies’ (those living close to nature and natural resources) are the custodians of this critically important natural resource base.

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- ▶ Over a period of time, there has been rapid degradation of land resources in the mountains arising from deforestation and associated depletion of biodiversity, leading to desertification of the landscape.
- ▶ Developmental initiatives undertaken so far and still being pursued are largely centred around a textbook knowledge-based approach with experimental models being created in the area of mountain agricultural development, or following traditional sylvicultural ways of dealing with forestry.
- ▶ In such efforts community participation in developmental efforts, that is so critical when dealing with these traditional mountain societies, has been ignored, and therefore such efforts have not been able to take-off.

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- ▶ Wherever community participation did occur, it remained highly localized largely as part of environmental activism, which in the absence of a firmly rooted socio-ecological system framework that is based on rigorous research analysis, could not be replicated on a larger region.
- ▶ Even the Joint Forest Management (JFM), what started as a ‘bottom-up’ approach towards conservation linked sustainable livelihood for local communities, has become ‘top-down’ with foresters calling the tune.
- ▶ Traditional ecological knowledge (TEK) has to be properly analysed and meanings put into it, so that generalizations that cut across socio-ecological systems could be arrived at, to enable regional planning efforts.

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- ▶ Understanding of socio-ecological system arrived at through a detailed analysis of ‘knowledge systems’ has opened up possibilities towards finding lasting replicable solutions to the problem of natural resource management in the mountain regions.
- ▶ For instance, redevelopment of *jhum* (shifting agriculture) in Northeast Himalayas through an ‘incremental pathway’ (step-by-step building upon TEK base available with the community) through community participation, was initiated a decade ago in the northeastern hill region; a developmental initiative that could not happen over the last more than 100 years.
- ▶ Now, there is a renewed interest in ‘redeveloped’ *jhum* in the northeastern hill region and elsewhere as part of a cultural landscape. rather than an ‘alternative’ to *jhum* on a sectoral basis and that too based on formal knowledge-based models in the backyard experimental garden divorced from local communities, that got propagated all along during the last more than 30 years by the agricultural scientific community, in one form or another.

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- ▶ Recently, Singh (2006) has alluded to 'fragility and vulnerability of mountain ecosystems due to the uniqueness of mountain specificities'. He further mentioned the significance of socio-cultural system perspectives whilst dealing with sustainable mountain development, without going into specific details of taking them on-board in research analysis, let alone converting research results into developmental initiatives.
- ▶ Indeed, understanding 'knowledge systems' and linking the ecological processes with social processes was seen as the key for linking developmental concerns with a value system that local communities understand and appreciate and therefore participate in the process of development, with possibilities of local initiatives taken to a regional scale, through general principles that could cut across socioecological systems.

What is unique about the mountains?

- ▶ Traditional mountain societies are characterized by the close interconnection that they maintain with nature and the natural resources.
- ▶ They depend upon the natural resources in general, and the biodiversity around for their sustainable livelihood.
- ▶ This relationship extends beyond the biophysical ecology and economic concerns; social, cultural and spiritual dimensions also play a significant role.
- ▶ They have a holistic view of the ecosystem and the social system, which results in agricultural strategies that are adapted to the natural environment and sustainable use of the natural resources.
- ▶ The objective being sustainable use of natural resources to cope with uncertainties in the environment, rather than a short-term strategy to maximize production. [Their ultimate objective has always been geared to sustainable use of natural resources through compromises between environmental risks and productivity concerns.]

Knowledge systems

- ▶ ‘Formal’ knowledge derived through an ‘hypothetico-deductive process, arising from a biophysical understanding of ecosystem dynamicity both in space and time, and their structural and functional attributes have been well studied and elaborated over a period of time.
- ▶ This knowledge base has been widely used to address a whole range of ecosystem management-related issues, and has often worked well in the context of the industrialized world, where a vast majority of the people are now de-linked from nature.
- ▶ However, such an approach is seen to be deficient in addressing resilience and adaptive capacity of socioecological systems under a variety of situations, particularly so in the context of dealing with traditional mountain societies that we have in India.

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- ▶ How ecosystem processes are altered by societal perceptions and decision-making processes. In other words, how does the socio-ecological system function as an integrated whole, both in space and time, and what are the implications for sustainability science?
- ▶ It is only in recent times that ecologists have started looking at the dynamics of these relationships, operating at varied spatial (subspecific, species, ecosystems and landscape) and temporal scales.
- ▶ TEK generated by the community through an experiential process, and which is centred around manipulation of biodiversity, to a large degree still determines land-use dynamics in the mountains. The emphasis is on diversification rather than homogenization of the landscape. Such an approach has ensured sustainability of the fragile mountain landscape in the past.
- ▶ It is now even more significant in the context of global change adaptation strategies, because diversification will render mountain societies less vulnerable to uncertainties arising from global change.

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- ▶ Our understanding of TEK is based on the economic, ecological and socio-cultural benefits, both tangible and intangible that traditional societies may derive from the surrounding landscape:
- ▶ (a) Economic – traditional crop varieties cultivated, lesser-known plants and animals of food value, and medicinal plants harvested from the wild are of direct economic benefit for mountain societies and can buffer periods of food scarcity;
- ▶ (b) Socio-ecological – the way mountain societies conserve and manipulate biodiversity contributes towards ecosystem resilience, and strengthens people's ability to cope with environmental change, to conserve soil water regimes and hydrology, and to manage soil fertility through enhancement of soil biological processes;
- ▶ (c) Socio-cultural – cultural, spiritual and religious belief systems of mountain people are centred around the concept of sacred species, sacred groves and sacred landscapes, which can play an important role in biodiversity conservation.

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- ▶ To manage soil fertility is dependent on the mechanistic understanding of the biological processes regulating nutrient flux, organic matter dynamics and soil physical properties, and the sustainable management of soil fertility must be based on ecosystem/landscape-level understanding of processes, integrating soil-management concerns of the farmer, his objectives and decisions, in relation to all components of the agroecosystem.
- ▶ Earthworm species, as ecosystem engineers, directly or indirectly control the availability of resources to other organisms by causing changes in the physical state of the biotic and/or abiotic materials. At the heart of this concept lies their ability to move through the soil and build organo-mineral structures as macro aggregates.
- ▶ Traditional vermiculture technology that simply uses mostly epigeic (surface-living) earthworms or garbage worms to prepare compost from high-quality organic matter like animal dung or from an amendment of waste biomass, is vermicomposting or 'off-soil' technology, as it is done outside the system under ex situ condition. This technology allows quick transformation of high quality substrate into mineral-rich compost that could readily be used in the field.

Redeveloping shifting agriculture (jhum) system: Building upon TEK incrementally

- ▶ Traditional societies manipulate sub-specific and species-level crop biodiversity in order to optimize production under a given ecological situation, but at the same time cope with predictable and unpredictable environmental uncertainties, as we have under traditional agroecosystems of the northeastern hills.
- ▶ Associated biodiversity (weed biodiversity), rather than resorting to weed control as is done under modern agriculture, so as to conserve moisture and nutrients within the soil ecosystem. We have shown that the socially/culturally valued species that they have in their agroforestry systems right across the Himalayan region and elsewhere in the world where traditional agriculture is practised, are invariably ecological keystone species within the ecosystem.

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- ▶ The knowledge available with local mountain communities, that connects social values with ecological keystone value was seen as the basis for designing strategies for re-developing shifting agriculture (*jhum*) system in Northeast India that is rapidly breaking down. [It may be noted here that the local communities have time and again rejected textbook knowledge-based models of land-use development, in spite of the fact that there is no viable alternative system available to them to replace the *jhum* system that is rapidly breaking down.]
- ▶ TEK combined with appropriate water management could be a major factor for sustainable management of natural and human-managed ecosystems as was initially shown for the northeast, and subsequently demonstrated on a larger scale for the other parts of the Himalayas.

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- ▶ Some of the other important outputs arising from the jhum re-development initiative are:
 - (i) mixed tree plantations in the jhum plots were superior to monocultures;
 - (ii) people were willing to go for some of the suggested non-traditional crops;
 - (iii) home garden systems prevalent in the region were used as a window for cash income crops; and
 - (iv) communities were willing to view biodiversity management and carbon sequestration within the system as incidental outputs.

[Sustainable management of natural ecosystems Textbook-based sylvicultural knowledge has so far been the exclusive basis for forestry practices. However, in recent times, involving communities in forest management is being seen as more and more critical for sustainable forestry.]

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- ▶ From the earlier discussion it follows that socially valued species have to be the basis for community participatory forest management, if sustainability is to be ensured from the point of view of forest-dwellers, who need to be involved to address sustainability concerns, particularly when one realizes that these communities are dependent upon forests for a range of tangible and intangible benefits.
- ▶ To understand the linkages between the biophysical and the social systems but also deals with traditional knowledge not merely as ‘local knowledge’ as often studied by social anthropologists, but have evaluated TEK using appropriate ‘scientific’ tools to arrive at conclusions that could be generalized across socio-ecological systems. [Such an approach towards linking knowledge systems is critical for a regional planning process for conservation-linked sustainable mountain development.]

Subsistence Economy, Diversified Resource Use and Indigenous Knowledge

- ▶ The word subsistence economy itself explains, the impoverished nature of their economy, which is based on consistent income from sources such as agriculture, NTFPs and sale of medicinal herbs.
- ▶ The availability of medicinal plants, as part of the surrounding natural vegetation, and the knowledge of these plants acquired traditionally helped these people to collect, process and trade in them.
- ▶ They obtained a substantial part of their income from sale of medicinal plants and traditional medical treatment.
- ▶ The local knowledge of medicinal herbs in this society has developed over a long period of time, and they were exposed to a wide variety of plants and herbs because of their frequent movement between their summer.

Traditional Institutions, Knowledge and Sustainability

- ▶ The Bhotiya society of Eastern Himalayas did understand the manifestations of their natural resource system in terms of the myriad opportunities and constraints for the community's survival.
- ▶ One of the important features of this community is the functioning of a number of social groups to make certain decisions regarding sharing and utilization of their natural resources.
- ▶ Their community organizations such as the village council (*gram panchayat*), forest council (*van panchayat*) water council (*pani panchayat*), youth forum (*yuva dal*) and women organization (*mahila mangal dal*) have evolved norms and practices to regulate individual and collective behaviour (vis-à-vis nature).
- ▶ These traditional institutions take decisions regarding the regulation of resource sharing and utilization and maintenance of their resources, like the forest, grazing land and water springs.

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- ▶ These traditional institutions, created traditionally by the community are still functional to a great extent, and are respected by the community, their decisions are regarded and obeyed, and has social binding. The evolution of such institutions in this society is an indication of their traditional vision, to respond appropriately to their biophysical circumstances.
- ▶ The traditional institutions of the Bhotiya community have build up their practices based on close proximity and functional knowledge of resource use, and hence, have a strong sense of conservation ingrained in their traditions.

The Himalayan Environment

- ▶ The main man-induced activities which have accelerated ecological degradation and threatened the equilibrium of Himalayan mountain ecosystems are stated as: unplanned land use, cultivation on steep slopes, overgrazing, major engineering activities, over-exploitation of village or community forests, lopping of broad leaved plant species, shifting cultivation (short cycle) in north-east India, tourism and recreation.
- ▶ Monoculture in forests, erosion and landslides have resulted in one-third of the total Himalayan land area becoming environmentally derelict.
- ▶ Man is an important factor for creating change in most of the world's mountain ecosystems. For centuries highlanders have lived in partnership and equilibrium with nature, creating some of the planet's most harmonious landscapes.

Analysis of Himalayan Environmental Problems

- ▶ Man's impact on Himalayan mountain ecosystems is producing critical situations at a faster rate than on most other types of ecosystem.
- ▶ Man-induced activities in the Himalayas, such as unplanned land use, cultivation on steep slopes, overgrazing of natural grassland, major engineering activities (road construction, mining; dams, reservoirs, irrigation canals, quarrying, hydroelectric projects, etc.), over-exploitation of village or community forests, lopping of broad leaved plant species, shifting cultivation (mainly in eastern India) are some of the factors which have accelerated ecological degradation and threatened the equilibrium of the mountain ecosystems.

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Soil impoverishment and losses

- ▶ About one-third of the land in the Himalayas may be considered environmentally 'derelict land' due to poor land maintenance practices, altered agricultural practices, and over-intensive land use. [Besides this 'derelict land', many remaining lands are highly susceptible to erosion and landslides.]
- ▶ The other factors responsible for deterioration of the soil properties are short—cycle shifting cultivation, monoculture in place of mixed forests, ruthless destruction of the native plant species, and overgrazing.
- ▶ The soils in vast areas of the Himalayas are now nutrient deficient and may ultimately result in desertification.

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- ▶ For example, in the Himalayan regions, the herds are privately owned but the pasture land is ‘common property’. Therefore the private livestock holder has little interest in adapting (reducing) the number of his livestock to the pasture capacity because he would be economically inferior to other stock-holders.
- ▶ This tradition of grazing has reduced the quality and quantity of the fodder; it interrupts natural regeneration of plants, decreases the productivity of the fields (carrying capacity, pasture capacity), and finally results in deterioration of the soil.
- ▶ Micro-climatic changes due to the clear felling of native plant species and the construction of dams and reservoirs in the fragile Himalayan region also occur

Sacred Groves and Biodiversity Conservation

- ▶ Sacred groves are tracts of virgin forest harbouring rich biodiversity and are protected by local communities to keep them in a relatively undisturbed state.
- ▶ Sacred groves are conserved on the basis of Religion, faith and belief of the community. “Sacred Groves are small patches of forests/natural vegetation dedicated by local communities to ancestral spirit or deities and have traditional means of biodiversity.” (Singh et al., 2010, Basu,2000)
- ▶ Various indigenous communities dedicate sacred groves to the local deities or ancestral spirits. Such a grove may consist of a multi-species, multi-tier primary forest or a cluster of trees, depending on the history of the vegetation.
- ▶ These groves were protected by local communities, usually through customary taboos and sanctions with cultural and ecological implications – which are the traditional way of in situ conservation of biodiversity.

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Origin of Sacred Groves (Gadgil et al., 1976, Hazra 1980)

- (i) Believed that shifting cultivation could be one of the reasons for creation of sacred groves.
- (ii) Sacred groves might have also originated as result of its utilitarian nature.
- (iii) A social institution or as a part of the taboo that evolved historically over several generations to provide a site for culturally crucial social interactions.

Environment of Sacred Groves (Swain et al., 2008)

- Sacred Groves represent an ancient Indian conservation tradition, protected by lot of Reverence and Respect, Fear and Sentiments.
- Sacred Grove are the Repositories of Rare and Endemic species.
- These provides inextricable link between present Society to the past in terms of biodiversity, culture, religious, and ethnic heritage.

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Ecological significance of Sacred Groves

- ▶ (i) Conservation of Biodiversity, (ii) Soil conservation and fertility, (iii) Climate regions regulation of the local hydrology, (iv) Maintenance of the nutrients cycles, (v) Provide aesthetic scenic beauty to the landscape, and (vi) Avoids deforestation and degradation of forest cover. (M. Thandavamoorthy, 2010)

Biological significance of Sacred Groves

- ▶ (i) They are composed of several floras with medicinal, rare, endemic, threatened, timber and fuel wood yielding plants, (ii) Ethno botanically, these areas remain unexplored and no comprehensive account of local tradition is available, (iii) Their plant wealth and conservation potential were impressive enough to acknowledge as 'mini biosphere reserves. (M. Thandavamoorthy, 2010)

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Threats and sustainability of Sacred Groves (Khumbongmaym, et al.,2004)

- ▶ Sustainable system with limited resource use by indigenous societies
- ▶ Indigenous societies with traditional beliefs and culture, small population, limited demand for plants
- ▶ Well preserved sacred groves perpetuation
- ▶ Unsustainable system due to excessive resource use by modern societies
- ▶ Erosion in traditional beliefs and culture, education, change in religious beliefs, population increase, increased demand for plant

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- Management and conservation
- The faith in sacredness should connect with ecological knowledge.
- Declare sacred groves as Heritage sites and provide Financial support for management
- Re survey of Sacred Groves and recover the encroached areas.
- Conservation of intact groves and restoration of degraded ones.
- Awareness should be organized for the local people.
- A buffer zone between sacred groves and the surrounding to check anthropogenic disturbances (Jayarajan, 2004)

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- ▶ Conservation of Biological Resources
- The endemic and threatened plant species should be Conserve.
- Conserve medicinal plants diversity.
- Add SGs to protected area network to ensure the protection of habitats.
- Convert the traditional belief into an effective conservational strategy.
- The scientific basis and conservational values.
- Reduce anthropogenic pressure on the sacred grove
- Ecological studies of threatened species.

Landscape transformation and landslides

- ▶ Beautiful scenic landscapes have been transformed due to large-scale engineering activities in certain environmentally sensitive areas. Deforestation and continuing use of the mountain slopes have resulted in landslides, very evident in the north-western Himalayas
- ▶ Changes in river course and flash floods, due to the poor vegetation cover and low infiltration rates, modify perennial water resources and change surface and ground water hydrology to create problems throughout the Himalayas.
- ▶ The natural springs are drying up due to drastic disturbances in the aquifer partially affected by indiscriminate lopping of native broad leaved tree species like oak (*Quercus* spp) and *Alnus* spp. These changes in the mountain areas have had effects downstream, especially in the low land plains.
- ▶ Annual floods cause great damage and the rate of sedimentation is increased, in particular, during and immediately after, the monsoon season. There is also an increased chance of the rivers, which are used for irrigation, drying-up in the months without rainfall.

Biological Components

- ▶ The Himalayan ecosystems, with high biological diversity and rich genetic resources, are more fragile, because they have a low intrinsic resilience. Continued human interference has resulted in the partial collapse of the systems. [Clear-felling in the Himalayas has resulted in poor recycling of nutrients.]
- ▶ The settled agriculture, the shifting cultivation (mainly in the north-east Himalayas), expansion of agricultural land due to population pressures, forest exploitation for fuel, fodder and timber, and other major engineering activities like dam and hydroelectric projects, are also responsible for the decline in forest cover.
- ▶ Excessive deforestation and overuse of the mountain slopes has caused massive erosion, landslides, decreasing agricultural-yields and increasing poverty, linked to a deteriorating biological, physical and socio-economic environment.
- ▶ The construction of roads, dams, reservoirs, and mining hydro-electric projects, together with illegal poaching, have also had an impact.

The Central Himalayas

- ▶ Based on a detailed analysis of traditional ecological knowledge that is linked with biodiversity, natural and human-managed, various possibilities for sustainable management of natural resources, with concerns for sustainable livelihood of local communities have been explored for the Garhwal region in the central Himalayas; it is concluded that if the development interests of local people are marginalized for a long period of time, they might adopt actions detrimental to the goal of conservation (Rao et al. 2003).
- ▶ Depletion of forest cover, biodiversity and terrestrial carbon stock, declining farm productivity, increasing hydrological imbalance and soil erosion are interconnected problems and the root-causes of the poor economy of the hill people and threaten global environmental benefits from the Himalayas (Ramakrishnan et al. 1996).

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- ▶ Indigenous knowledge is an integral dimension of all societies but is more intact in areas, such as high-altitude remote Himalayan villages, where inaccessibility and isolation have ~~acted~~ as barriers to outside forces for a long period of time.
- ▶ Some aspects of indigenous ~~knowledge~~ based resource uses of management practices and changes therein, and of the scope for integrating indigenous ~~knowledge~~ and conventional ecological science for resolving biodiversity/environmental conservation-development conflicts, within the context of the Himalayan mountain systems.

Forest/wild biodiversity: impacts of Interventions

- ▶ Traditional socio-cultural mechanisms of fostering systematic and regulated use of wild plant resources seem to have evolved as a necessity to optimize economic outputs from domesticated biodiversity.
- ▶ All across the region, traditional management systems are characterized by practices favouring a balance in utilization and regeneration of the natural resource base, equity and social integrity to achieve the ultimate goal of sustainable livelihood within small-scale subsistence economies in highly isolated and inaccessible mountain settlements.
- ▶ Conventional approaches to conservation, i.e., the establishment of wildlife sanctuaries and national parks, have assumed traditional practices to be detrimental to the conservation of wild biodiversity and the functioning of ecosystems.

Traditional forest/wild biodiversity management

- ▶ In the traditional system, there was no restriction on the collection of wild edibles, deadwood and leaf litter (to be used as a constituent of manure applied to crop fields), partly because these resources were abundant.
- ▶ Lopping, grazing and utilization of forest products such as medicinal plants and bamboos (raw material for handicrafts) used to be undertaken in groups during periods fixed by the consensus of the community so as to reduce the risks of overexploitation by individuals.
- ▶ Traditions such as the social sanction to market forest resource-based handicrafts, medicinal plants and nomadic grazing only by smallholders and landless people fostered equity to a significant extent.

Policy driven changes

- ▶ The utilization of forest resources for national economic/industrial development and environmental conservation was introduced as policy goals distinct from those related to people-forest relationships.
- ▶ Ground actions to achieve these policy goals were coupled with actions that led to drastic changes in traditional uses of forests and wild plant diversity.
- ▶ The majority of village common lands were taken over by the government and notified as forest and wasteland in late nineteenth century with the implementation of the first forest policy.

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As at present, government forest land was stratified into:

- (i) national parks where all consumptive resource uses are strictly prohibited;
- (ii) wildlife sanctuaries where traditional wildlife hunting is an offence but local communities may be allowed some traditional plant resource uses free of any cost;
- (iii) reserve forest where concessions to local communities are more liberal in comparison with those provided in the sanctuaries;
- (iv) community forests whose management is entrusted to local institutions such as the Forest Council or to the traditional village headman; village institutions are authorized to decide only on subsistence needs and government approval to undertake any extraction on a commercial scale and have to share benefits from any commercial extraction with the government.

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Medicinal plants

- Traditionally, medicinal plant collection was a subsidiary activity when people went away from their dwellings to graze livestock. This resource was used for local health care as well as to generate some income.

Traditional agriculture and emerging changes

- Traditional agriculture has undergone prominent changes in the recent past in many segments of the Himalayas. Though there is no perceptible change in cropping intensity, the area under agriculture and crop diversity and husbandry practices have changed.

Summary

- ▶ Several plants and animals that are threatened in the forest are still well conserved in some of the sacred groves.
- ▶ It has been observed that several medicinal plants that are not to be found in the forest are abundant in the sacred groves.
- ▶ Further, rare, endangered, threatened and endemic species are often concentrated in sacred groves.
- ▶ Main causes of anthropogenic pressure the degradation of habitat happening.
- ▶ The sacredness, religious beliefs and taboos play a significant role in promoting sustainable utilization and conservation of flora and fauna of the region.
- ▶ However, with the passage of time, considerable changes have taken place in the extent of the sacred groves, in their vegetation structure, peoples' perception towards them causing the frequent degradation of these "Mini Biosphere Reserves".

Traditional religion and Conservation of Nature in North-East India

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Background

- ▶ Traditional beliefs and practices show the symbiotic relationship of humans and nature and natural resource conservation.
- ▶ Traditional societies maintain a holistic view of the socio-ecological system, which is often protected by cultural and religious values, beliefs, and rituals inter-linked and intimately related to the management of ecosystems.
- ▶ Many scholars acknowledge that culture and religion determine attitudes and behaviour towards the environment (Dwivedi & Tiwari 1987; Gottlieb 1997) and societies have unique ways of viewing, respecting, and valuing nature and the elements of its diversity.

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- ▶ Human communities have many different ways to interpret the world (Geertz 1973; Milton 1998; Posey 1999); these meanings and interpretations are most diverse in their relationships to the natural world, with the most conspicuous links seen in indigenous and non-industrialised communities (Pilgrim et al. 2007; Gadgil 1993).
- ▶ Human cultures attribute meaning to natural systems and processes in various ways, including livelihoods, cosmologies, worldviews, and spiritual beliefs (Berkes 2008).
- ▶ Biodiversity conservation and sustainable development provide the impetus for examining the role of indigenous institutions and traditional ecological knowledge.

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- ▶ This study seeks to establish the symbiotic relationship between the culture and cosmology of the indigenous Kuki people in the Northeast region of India and biodiversity (nature).
- ▶ These communities have ~~conserved~~ and sustainably used the region's natural resources ~~based on~~ on their traditional belief systems (mostly animistic faith) and ecological knowledge.
- ▶ It discusses the symbolism of *Indoi* (house magic or household god) and how *thiempus* (priests) perform rituals that regenerate the human body, the land, the Kukis' ancestral connections, and their indigenous identity.

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- ▶ This study explains the indigenous Kuki worldview and knowledge system possessed and use of natural resource (flora and fauna) in connection with rituals, which had great functional value for biodiversity conservation.
- ▶ The traditional belief and practices of the indigenous Kuki people in the Northeastern region of India—pre-Christian ancestral worship [animism]—serve as a valuable tool in conserving biodiversity.
- ▶ But the spread of Christianity beginning from the late 19th century gradually took away the sacred element and sanctity of nature and changed the faith contour of the indigenous people.

Kuki cosmology – culture and nature linkages

- ▶ Kuki tribal religious beliefs and practices—and land and resource use—are influenced by their natural environment. Their local ecological knowledge (Sillitoe 1998) interconnects with religious restrictions and taboos connected with particular aspects of the environment.
- ▶ The rituals on which this study focuses are interpreted as part of the distinctive means by which the Kuki people relate to their ecosystem.
- ▶ The Kuki believe that mankind co-exists with supernatural spirits and maintain a symbiotic relationship with them through invocations, prayers, offerings, and sacrifices.
- ▶ They believe they have a spiritual connection with—and are linked in a ‘natural’ way to—the land they live in and have special responsibilities (Alfred 1999, p. 9).

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- ▶ Like in many other indigenous communities, the environment greatly influences Kuki symbolism. This is condensed in the institution of *Indoi*. The Kuki ideas about humans and nature and their practices and rituals are rational as well as ‘symbolic’ in their pre-Christian period.
- ▶ The environment influenced Kuki symbol-making activities during their pre-Christian life; for example, flora and fauna formed integral symbol-making ingredients in *Indoi* symbolism.
- ▶ The link between the Kuki tribal community and the influence on their beliefs, social practices, livelihood strategies, and the environment is explicit in *Indoi* symbolism, which exhibits the Kuki cosmology.

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- ▶ The environment shapes the Kuki cosmology—their idea of social space and worldview. The traditional Kuki worldview does not distinguish between the sacred and profane, religious and non-religious, the spiritual and material aspects of life; there is cosmic oneness—all things share the same fundamental nature and same interaction with each other.
- ▶ Before the Kuki were converted to Christianity during the first half of the 20th century, the spiritual domains of their life used to be intimately related with social and natural processes. Traditionally, the Kukis believe that mankind co-exist with invisible spirits.

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- ▶ Cosmological constructs are culturally generated: they provide a framework for culturally specific modes of thought, categories, values, and laws and function as idioms of explanation and ways of creating and maintaining an ordered mental universe (Strang 1997).
- ▶ The Kukis' conceptual universe too has evolved out of their community's experience of living in their physical world with their socio-cultural and religious beliefs.
- ▶ A series of rolling ridges with disproportionate undulations, forest-clad mountains of variable intensities, and the gorges and rivers might have influenced Kuki cosmology (Gangte 1993).

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- ▶ A former Kuki *thiempu* said: ‘While propitiating our incantations, we usually take the names of mountains or hill spirits like *Koubru-te* [spirits which dwells in Koubru hill], *Thangjing-te* [spirits which dwells in Thangjing hill], *Mapithel-te* [spirits which dwells in Mapithel hill], *Langmaiching-te* [spirits which dwells in Langmaiching hill], and so on.’
- ▶ Myths, lore, or incantations express gratitude and offer prayer seeking protection, help, and security against natural forces.
- ▶ Kuki cosmology and the ethical and value systems that evolve from it define and direct an individual’s relation with the environment. The Kuki consider the society and environment they live in sacred and do not objectify it as a resource for use.

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- ▶ In the traditional Kuki belief system, supernatural beings control nature and social life. The Kukis believe in *Chung Pathien*, the creator of the universe and sustainer of nature and all its inhabitants, who manifests himself not outside but as part of nature.
- ▶ They also believe in the existence of semi-divine beings or minor spirits – given greater attention because they underpin the immediate realities of everyday life, such as diseases, crops, rain, and death.
- ▶ The *thiempu* acts as the intermediary between spiritual forces and human beings. These spirits are appeased or placated through performance of elaborate rituals and sacrifices which constitute prayers of *phuisap* (incantation) by the *thiempu*, who officiated in their rituals.

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- ▶ The *thiempu* plays an important role in the traditional religio-cultural life of the Kuki people. He has magical powers and the ability to propitiate the spirits, who are sometimes angry or displeased. The *thiempu* prays and appeases spirits by offering sacrifices.
- ▶ A former *thiempu* explained that ‘ritual confirms and strengthens social identity and people’s sense of social location’.
- ▶ Similarly, *Indoi* ritual gives meaning to the Kuki world in part by linking their past, present, and future. *Indoi* ceremonies show how humans are intrinsically a part of nature and linked to it.

Sacred fauna significant to the kuki

The Cosmic Siel (mithun)

- ▶ The wild bull, *mithun* (*Bos frontalis*), locally called *siel*, plays an important socioeconomic and cultural role in Kuki life and is essential for certain customs. Besides being the symbol of material prosperity in the Kuki community, the *mithun* serves as a manifestation of sacred power.
- ▶ It is used for taking a sacred oath, which is solemnly taken in a ritual called *siel-meilah* (a rite that entails cutting off the *mithun*'s tail). The ritual is performed with two persons—one holding the tail and the other cutting it off with the solemn vow .
- ▶ The *siel-meilah* constitutes the greatest test of one's loyalty and courage in traditional Kuki society.

Cont.

The Sacred *Vohpi* (pig) and Sacred *Ahcha* (fowl)

- ▶ Many social obligations as well as religious performances are incomplete without slaughtering the pig. For instance, *Vohpi-jubel* (a mother pig and a pot of rice beer) is the stipulated penalty for a transgressor in a Kuki society.
- ▶ Various past Kuki rituals used to involve fowl slaughter, the most frequent being related to *divination* and *Iha-kou* (summoning of the soul).
- ▶ The world order is linked to the sacrifice through the myth and the notion that blood is connected to the vital force. The order of the world is maintained and restored when the correct sacrifice and correct ritual chant re-enacting the original ritual are performed so that vital force is raised.

Sacred flora significant to the kuki

The Cosmic Se (oak tree)

- ▶ Se is a tree particularly chosen for a ritual post, or *siel-khom* (a pillar where the mithun is tied for rites and rituals). It also serves as *doi-khom* (a pillar upon which the *Indoi* is suspended). A particular se becomes cosmic if it remains healthy and worm-free.
- ▶ One can see that the symbolisation process starts with the perceived correspondence between the outward beauty (smooth trunk) and the ideal state of the human mind.

Cont.

The Sacred *Thiing* (ginger) and *Khaopi* (fibre)

- ▶ Like the se, the *thiing* (ginger) is considered sacred and capable of protecting a person from harmful external influence.
- ▶ *Khaopi*, ‘the mother of all ropes’, is a wild fibre. Its cortex is intertwined to make ropes of various kinds. One particular rope has up to ten layers. This rope is used to tie all the components of *Indoi*.

Cont.

The Sacred Pat (cotton) and Ai (wild turmeric)

- ▶ The cotton plant too has been employed in certain rituals, especially on a rite pertaining to restraining the soul called *lhalho*. A thread made from cotton is used to bind the components that form *seleng* or *sa-o*, which is worn around one's neck as an amulet.
- ▶ *Ai -saan* is a divination ritual through the sacred power of the wild turmeric. The problems and prospects of the ritual performer are forecast through *ai-saan*.

Cont.

The Sacred Gopi (bamboo) and Um (gourd)

- ▶ Many religious ceremonies require an implement made from gopi.
- ▶ The *chon* ritual (the greatest Kuki feast) cannot be performed without a *chontul*, a hook made from a gopi for the ceremonial or sacrificial killing of the mithun.
- ▶ During *chang-lhakou* (summoning of paddy soul) ritual, this mother seed has to be invoked for a good harvest.
- ▶ The gourd is comparable to the mother's womb as all kinds of seeds are kept inside the gourd jar in the *Indoi* bundle. This action aims to reinvigorate the virile paddy by returning it to its womb.

Summary

- ▶ The Kuki worldview is based on social, ecological, and normative principles, built on experience and expectations culled through generations of interaction with the natural environment.
- ▶ The inroads of Christianity has altered or replaced much of the Kuki worldview, and Western cultural values and practices have supplanted Kuki culture so much that they are competent neither in traditional skills nor in Western knowledge.
- ▶ With the coming of western civilisation, indigenous people and traditions came to be regarded as being less progressive.

Cont.

- ▶ Rituals and ceremonies are central to any understanding of Kuki identity and their well-being. Traditional belief and practices demonstrated ecological wisdom in respecting and protecting their ecosystem.
- ▶ In the primal Kuki religion, nature was conceived primarily as a symbolic system through which God speaks to men. Man shares in great measure God's transcendence of nature.
- ▶ The Kukis' use of the natural resources rests, on the one hand, on a detailed knowledge of the variety of flora and fauna and, on the other hand, on their knowledge of procedures of rituals.
- ▶ They have lived closely with nature for centuries and have created a culture of conservation.

Cont.

- ▶ With the coming of western civilization, indigenous people and traditions were regarded as being less progressive. Thereafter as a result younger generations devalued their own traditional culture and adopted new lifestyles and modern technologies (Rist and Dahdouh-Guebas 2006: 472).
- ▶ Kuki traditional religion was essentially based on the belief in Chung Pathien (Supreme God of above) in spite of the fact that sacrifices were made to various spirits (nonhuman believed to be dwelling in the forest) from time to time in order to appease them for specific reason.
- ▶ This attitude undermined the ecological ethos that recognized the interdependence between Kuki society and nature.

Cont.

- ▶ The spread of western education, development of market economy have undervalued their intimate ecological knowledge and religious practice.
- ▶ The success of evangelization among the Kukis beginning from the twentieth century was gauged in terms of the number of households where the pastor persuaded the Kukis to throw away their *Indoi*.
- ▶ This was mainly because of the mindset prevailing among the Church pastors that the gospel of Christianity was antithetical to *Indoi* rituals.
- ▶ In the West, the worldview has been largely anthropocentric. Here it is worthwhile to recall Lynn White's (1967) explanation wherein he argues that the Judeo-Christian attitude has promoted 'man's mastery over Nature' as the root cause of environment stress and destruction in the west.

Cont.

- ▶ Among the Kuki, it is widely believed that people have developed a profound understanding of nature, which allows them to live in harmony with their environment. According to the Kuki worldview, land is considered Mother Earth that sustains all life.
- ▶ Traditionally, Kukis were self-sufficient, autonomous and did not have any extensive contact with the world beyond their immediate neighbours. A Kuki elder from Gnel village remarked that ‘the traditional practices of Kukis who, over countless generations, evolved a pattern of life, well adapted to their social needs and to the landscape in which they live’.
- ▶ The material simplicity of the Kukis and their close connection with nature were understood to be signs of backwardness and a lack of progress. Although the idea of progress may have been beneficial to western societies, it has been destructive to the Kukis and many other indigenous people.