

Linking Traditional Ecological Knowledge Systems with Modern Approaches

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A combination of modern and traditional methods is often the best approach, to conserve and manage mountain biodiversity for the benefit of both mountain people and others in the plains below. Often development interventions have been alien to the value systems of local people – the traditional forest guardians – and hence have not met with much success. Traditional ecological knowledge is a tool that can link cultural diversity with biological diversity and thus make modern methods acceptable to local populations. In turn modern approaches will help bring about the needed changes by making use of knowledge from global sources.

The intangibles

Because mountain people live close to the natural resources that form the basis of their subsistence, they have a holistic view of 'nature and culture'. Their perspective is one that sees cultural and biological diversity as mutually supportive. The link between the two is traditional ecological knowledge. Intangible dimensions are expressed in music, dance, poetry, and religious rituals, and in artefacts such as sculpture, architecture, and so forth: they vary according to the local culture, each society identifying itself with a specific 'natural cultural landscape.' This is the driving force behind the relationship humans have with nature and the natural resources around them: their 'ecocultural landscape'.

Other dimensions are embedded in the concept of 'natural cultural landscapes' as they relate to biodiversity, for example, 'sacred groves' and 'sacred species'. The following are examples of 'living' ecocultural landscapes in the mountains of the world.

- The ancient rice terraces of the Ifugaos in the Philippines
- The Ziro Valley area of the Apatanis of Arunachal Pradesh, India, where traditional wet-rice cultivation is part of a community forest and includes the surrounding socio-ecological hill systems. A range of religious festivals and rituals link a number of ethnic groups in the area and contribute to their harmonious coexistence.
- The diffuse cultural landscape around the River Ganges, which covers an extensive area of hills and plains in India. Millions of people visit the religious heritage sites along the river and the myths and stories woven around this diffuse cultural landscape are a sacred heritage for millions of Hindus.
- The Himalayan land of Sikkim has many sacred landscapes and groves: Sikkim itself was known in ancient times as Beyul Demojong, the 'Hidden Fruitful Valley.'

Tangible values emerging from the 'intangibles'

Traditional ecological knowledge connects intangible values with the tangible benefits derived from them. But traditional knowledge alone is no longer sufficient; it needs to be integrated with formal knowledge and modern methods to bring about ecological conservation and sustainable development. The importance of formal knowledge cannot be underestimated: when it is linked with traditional knowledge appropriate 'hybrid' technologies and institutional arrangements can evolve.

Some classifications of the tangible dimensions of traditional ecological knowledge derived from the 'intangibles' are listed below.

- Economic: traditional ethnobiology (lesser-known plants and animals harvested from the wild and used for food and medicine)



Jhum landscape in North East India

- Socioecological: the ways in which traditional societies conserve and use biodiversity to manage soil fertility, nutrient cycling, and soil moisture regimes.
- Sociocultural: the cultural, spiritual, and religious belief systems of mountain people which are centred around 'sacred species', 'sacred groves', and 'sacred landscapes'.

Managing agrobiodiversity for food security

Agroforestry systems in forested landscapes can be grouped roughly along a gradient to provide a framework for discussion. At one extreme are the casually-managed systems such as shifting cultivation (northeastern Himalayan region). At the other extreme are the intensely managed cropping or plantation systems (e.g., mountain areas of the Western Ghats). All other systems fall between these two. Managing agroforestry systems at middle levels of intensity seems to be the most beneficial. In terms of agriculture, there are two alternative pathways: (a) improving traditional agriculture through incremental change and (b) a contour pathway where development models are adjusted to the ecological contours of the landscape. These pathways are explained in the following examples.

The incremental pathway

Casually-managed systems, such as shifting cultivation, can be developed using gradual inputs of traditional ecological knowledge with a minimum of formal knowledge. The redevelopment initiative known as the 'Nagaland Environmental Protection and Development' is a good example of this. An attempt at sustainable tree fallow management was made: selection of tree species was based on community perceptions, and socially-valued trees with ecological keystone value. This approach ensured community participation in fallow management and helped prevent land degradation. Over 35 ethnic groups living in Nagaland were involved, so it was essential to integrate traditional institutional arrangements with modern institution building through elective processes. The result was that the community participated to the fullest extent possible.

The contour pathway

The contour pathway emphasises adaptive management of agricultural systems through models suited to the given ecological contours. Some sedentary agroforestry and alley cropping systems fall into this category. More



Traditional transport system used by indigenous people of North-East India

inputs based on formal knowledge are used than in the incremental pathway, and traditional ecological knowledge supplements these as required. Sloping agricultural land technology (SALT), developed for mountain agriculture in the Philippines, is a case in point. Terraces are planted with annual and perennial crops between rows of nitrogen-fixing perennial shrubs. Initially rejected, SALT finally gained acceptance in the Himalayan region when socially-valued tree species were used for nitrogen fixation.

Modern agriculture

Modern agriculture stands apart as an artificial entity of monoculture plantations boosted by chemical fertilisers in a landscape devoid of much tree cover. Since this approach has proven detrimental to soil health, attempts are being made to restore tree cover by introducing organic residue. For example, the steps taken towards sustainable management of soil health through use of organic residue management resulted in a technology package on sustainable soil fertility management. The use of fertiliser consequently decreased by 30-50% in

the tea gardens of the Western Ghats of southern India, resulting in increased productivity and improvement in the quality of tea.

Sustainable forestry in mountain landscapes

Concerns about sustainability have led to a movement towards community approaches to forest management. The integration of traditional ecological knowledge acceptable to the community has helped to reintroduce ecological keystone species that sustain soil fertility and nutrient cycling processes. This approach was further reinforced by designing cheap community-participatory water harvesting systems and/or through the revival of traditional water harvesting technologies where they existed. Traditional knowledge formed the basis for tree-based agroforestry management using early successional fast-growing species valued by the community and/or enabled a 'condensed forest succession' in the landscape. These efforts led to land restoration through a compatible mix of socially-valued, early-successional tree species along with late-successional species.