

Traditional farmers' groups supporting sustainable farming

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Traditional farmers' groups can play a pivotal role in achieving and maintaining sustainable production in a specific agro-ecosystem. Arunachal Pradesh, a state in the extreme north-east of India (bordering Bhutan to the west, Tibet to the north and Myanmar to the east), has great ethno-cultural diversity, with 26 major and 110 minor/sub-tribes. The region is well-known for its rich eco-cultural heritage, as well as the wealth of traditional ecological knowledge amongst farmers. As agriculture is the main livelihood activity in the region, it is vital that the production systems are managed efficiently. The traditional farmers' groups of the Apatani people, in the Apatani Valley in the central western part of Arunachal Himalayas, have been successfully managing their natural resources for many years. However, in recent times, with the youth migrating in search of jobs, and other labourers coming in, many of these traditions, practices and knowledge are in danger of being diluted or lost.

When local knowledge and practices developed over centuries are shared in farmers' groups who work on the land together, it clearly supports sustainable agro-ecosystem management in this region. The Apatani are known for their system of rice and fish cultivation in the valley, which produces enough rice to export from the region after meeting local needs. This is a highly evolved indigenous farming system, the energy and economic efficiency of which is very high, partly due to effective recycling of organic wastes and crop residues.

As part of a wider research effort into this little studied region, the G.B. Pant Institute of Himalayan Environment and Development set out to document, validate and revitalise traditional knowledge in relation to sustainable agriculture across the Arunachal Himalayas. The main objectives of the study, carried out between December 2004 and July 2006, were to examine the different farmers' groups in three villages in the Apatani valley, their nature of association, their role in agro-ecosystem management and the changes they are facing. Group discussions among different age classes of the Apatani were held, involving both men and women; special attention was paid to older farmers in order to understand the exact nature and history of traditional farmers' groups.

Farmers' groups for sustainable management

The Apatani have different types of traditional farmers' groups, which have evolved over the years. There are no written records, so it is impossible to trace the exact history and development of the groups. The traditional agro-ecosystems are intricately linked with nature, and are well-fitted to local environmental conditions and cultural needs. The Apatani mainly follow the Donyi-Polo religion, believing that the sun and moon are the supreme gods that bless the community. They are Indo-Mongoloids and speak Tibeto-Burmese languages. They have different taboos and customs to protect their environment: for example, hunting of animals and tapping of forest products are strictly prohibited during major ritual ceremonies. They protect flora and fauna, such as *Castanopsis* and *Ficus* trees, cane, bamboo, one species of monkey and a species of fish



Photo: Author

Maintenance of the traditional irrigation system is most effectively done together.

(*Schizotorax* sp.) which is believed to be sacred and is used in major ritual ceremonies. They maintain reeds (*Phragmites karka*) and *Houttuynia cordata* (the chameleon plant) along the river bank and agricultural bunds, whose roots check soil erosion. *Phragmites* is only harvested for traditional mat making and indigenous salt preparation, while *Houttuynia* is only used either for ethno-medicinal purposes or as a vegetable. These traditional beliefs and practices help to maintain ecological processes and so contribute to the management of the environment and agro-ecosystems.

These agro-ecosystems are sustainable, self-sufficient and efficient due to strong organisations and sharing of such ecological knowledge among farmers, which has traditionally been transmitted orally from generation to generation. Indigenous classification of agricultural land use into seven categories for efficient land management, producing enough to sustain the population, is an example of innovative ecological design by these farmer groups. Traditional wisdom on crop-soil interaction, ethno-pedology, nutrient management, and soil and water conservation are some examples of ecological knowledge which supports the sustainable production system as it has evolved over the decades, and which cannot be managed by individuals.

The Apatani have eight different types of informal farmer organisations (Table 1), and each group has their own task and workload. The groups are valued differently by the community. The *Bogo*, for example, is seen as the most important group as there are limited water sources for irrigation in the Apatani valley, and good water management is essential for efficient production in the rice-fish system.

The farmers know that traditional practices are very important for maintaining sustainable production systems, and that farmers' groups are the foundations of these practices. Most farmers recognise that, without farmers' groups, agro-ecosystem management will easily weaken, and the technical ecological knowledge which supports it will quickly erode: farmers think that the groups are effective in managing the agro-ecosystems. Except for financial support, particularly for erosion control, fencing and drainage maintenance, the farmers do not receive or seek any technological interventions or other help from any outside agencies. Outside experts have highlighted the Apatani rice-fish culture system as one of

the most efficient crop production systems, encouraging the Apatani farmers to continue their traditional practices.

As can be seen in the table, some groups have a distinct manager who holds the position for 1-3 years, while others (group numbers 4, 5, 6 and 7) have managers who hold the position for only one season. In all cases, leaders are selected by the group, from within the group. If a group member does not turn up for group work, the traditional norm is that if the individual is ill he or she will be excused, or else will need to hire a labourer or bear a penalty.

Some groups also have a finance secretary or *Passer Binee* who collects any money and maintains the farmer groups' accounts. The cash maintained by the organisation is normally used for purchasing the materials needed to carry out community tasks which are not available naturally (e.g., nails for fencing), as well as drinks and lunch. Loans are also available within the group or community, with an interest rate of three percent per month. The amount of the loan depends on the security (agricultural field, bamboo garden or homestead) provided by the borrower. This not only helps those in need, but also helps to generate income for community work. Although the traditional village council or *Bulyang* is the supreme authority in Apatani community, it has a limited role in farmers' groups; only occasionally it may assist in case of dispute.

Most of these farmers' groups are permanent, based around communal needs and mutual reliance. In this way they also help to maintain social harmony and cohesiveness. Three examples of the collective management of natural resources follow.

Traditional irrigation system

The Apatani system of irrigation is more than a century old, and the practice has been worked on and perfected through community involvement and equitable sharing of water resources. Water is tapped near the forest on the foothills of the valley, and is channelled through to main canals on either side of the valley to supply the agricultural land. The water is then distributed through numerous small canals in such a way that every plot of land has sufficient water for rice and fish culture. The surplus water is drained back to the main canal without outflow of any organic matter, or soil loss. The agricultural fields have been made along the elevational gradients. At higher elevations in the valley, fields are connected with small diameter bamboo pipes, where the volume of water intake is less. Larger diameter pine pipes are used at the lower ends of the valley where the volume of water is more. These irrigation systems are managed by the traditional farmers' groups led by *Bogo Ahtoh*. The vision of these groups is reflected in the management and sharing of water in the community, which recognises that water is the common concern which binds the group. Since it is the most important factor in rice cultivation, the farmers rely on it completely, and therefore equal distribution has ensured the concept of collective survival and social cohesiveness within the farmers' groups. Each plot owner is bound to provide equal outflow of water to the neighbouring plots and the traditional village council (*Bulyang*) ensures that such regulations are not violated. Each year canal repairs are done through collective participation with one person from each household providing labour.

Field protection

The Apatani have integrated animal husbandry into their farming systems, and they rear cattle and mithun (*Bos frontalis*, a semi-domesticated animal, also known as Indian bison). While this is positive, many fields are at risk from both

domestic and wild animals, as the land is close to the forest. To protect the crops from damage, farmers' groups fence the fields with bamboo, timber and cane. For easier and efficient management of fencing, traditional farmers have organised a group known as *Sulu-sikhii* led by *Sulu Kagenee*. This group is led by a man, as it requires heavy work which includes collecting raw materials from forest. The fencing is repaired every year in late November. During this activity, every household involved contributes a mug of rice/millet (300 g) for lunch, and cane, bamboo and timber for fencing. Fences are made with *Salix sikkimensis* (a type of willow), *Pyrus pashia* (or Indian wild pear) and *Ligustrum* sp. (known as privet, a common species used for hedges), which are all more durable.

Field preparation and crop harvesting

Maintenance of footpaths, preparation of fields and nurseries cannot be done alone, so a group is formed to carry out these activities and combine efforts. Those with fields near a footpath form a group to maintain it. It has been observed that smaller informal groups come together for weeding, field preparation, transplantation and crop harvesting. In these activities, women have the dominant role, although the men have the responsibility for bund construction and crop threshing. The harvesting of the crops is done jointly, where the women cut the spikes and threshing is done by the men.

Transition: challenges and options

Traditional farmers' groups are now in a transitional period, mainly due to outside influences. The Apatani are believed to be a very conservative community, and now some of the traditional agro-ecosystem management practices are on the verge of extinction due to the integration of hired labour forces from outside. Nowadays, it is common for the youth to leave the communities in search of jobs, which creates shortages of traditional labour. In addition, outsider labour forces are increasingly coming to the area for timber sawing, stone mining and the harvesting of non-timber forest products. Due to socio-cultural, climatic and physiographic differences, these people have different management techniques, which often dilute the Apatani traditional practices. The Apatani will still need labour from outside, but they are trying to cope with the emerging situation by being aware that their system is very efficient yet delicate, and realising the need to preserve their time-tested knowledge, by documenting it for future generations.

Outside influences have affected various aspects of farming systems management. For example, barbed wire fencing has been used recently, whereas bio-fencing is preferred as it is more eco-friendly and efficient. In the Apatani valley, live herbs and shrubs have traditionally been used for erosion control on the banks of the stream, but this has disappeared slowly over the years, which is now affecting the permanent flood control technique. Traditional soil and water conservation techniques have been replaced by modern methods using concrete constructions, and the bamboo and wooden pipes used in irrigation water supply have been replaced by lead or plastic materials. Moreover, agrobiodiversity has declined over the years as government agencies have supplied high yielding varieties of seed, which means that fewer crop combinations were possible as there was less choice of crops. In the 1990s, farmers accepted ideas such as high yielding varieties, inorganic fertilizer, or fruit farming. However, more recently farmers have realised that the yield of these "high yielding varieties" is comparatively less than traditional varieties, and they also need a lot of external inputs (fertilizers). Now, farmers have discarded the idea of high yielding varieties and are turning back to traditional varieties, which are more suitable to local conditions.

Table 1. Types and working nature of traditional farmers' groups of the Apatani tribe.

Farmers' groups	Description	Group Manager	Task
<i>Bogo</i>	A farmer group sharing the common water sources. The group manager leads all the activities. Post can be held for 1-3 years and are selected from within the group. Group size is between three and 600 households depending on village size.	<i>Bogo Ahtoh</i> (male)	Construction and maintenance of water supply system and regulation of the efficient sharing of water among the group.
<i>Aji Lenda</i>	A group which has their fields in the same area. The group manager leads all the activities. Tenure is normally for one year only. Group size is 50-350 households.	<i>Lenda Kagenee</i> (male/female)	Construction and maintenance of foot-paths, to allow access to and from fields.
<i>Sulu-sikhii</i>	A group which has their fields in the same area. The group manager leads all the activities. Tenure is normally for one year only. Group size is 50-350 households.	<i>Sulu Kagenee</i> (male)	Construction and maintenance of fencing to protect the agricultural fields from domestic and wild animals.
<i>Tanser Patang</i>	Groups organised during field preparation and weeding. Group size is 5-15 households.	<i>Patang Ahtoh</i> (female)	Field and nursery preparation, seed sowing, and weeding.
<i>Konchi Patang</i>	This groups works in the morning between 5 am to 8 am. Group size is 5-10 households.	<i>Patang Ahtoh</i> (female)	Field preparation, transplantation and weeding.
<i>Halying Patang</i>	This group shares labour during seedling transplantation. Group size is 5-15 households.	<i>Patang Ahtoh</i> (female)	Transplantation of seedlings, particularly rice and millet.
<i>Enthee Patang</i>	This group forms to share labour during crop harvesting. Group size is 8-12 households	<i>Patang Ahtoh</i> (male/female)	Harvesting and carrying of harvests.
<i>Bijee Lenda</i>	A group having bamboo garden at same locality. Here also group manager leads all the activities. Tenure is normally for one year only. Group size is 70-300 households.	<i>Lenda Kagenee</i> (male)	Construction and maintenance of foot-path, for carrying bamboo, timber and fuelwood.

Realising the efficiency and importance of traditional management practices, the Apatani are now discussing how to preserve traditional knowledge and practices. For example in Tajang, one of the villages in the valley, many members of the farmers' groups also take part in the Tajang Village Development Committee, which has taken an active role in controlling the loss of ecological knowledge, and preserving traditional management practices. They have recently adopted a resolution that agricultural land shall not be converted into any other land use; and unsustainable extraction of natural resources will be stopped (such as banning sand and stone mining along the irrigation sources, which they believe are reducing agricultural yields). Penalties will also be imposed where traditional rituals and practices are violated, according to existing local norms (*dapo*). Although the Apatani understand the importance of traditional practices, greater awareness is needed in general as most of the traditional ecological knowledge and management practices are only passed on orally, and are not documented. Field research of traditional knowledge in Arunachal Himalayas, lasting more than six years, has shown that the Apatani tribe is one of the most efficient resource managers, yet sustainability is their major concern.

Towards the future

The traditional groups are considered to be viable, and although they will still need external labour, the groups themselves believe they can cope with the changing circumstances. Traditional agricultural systems may benefit from the use of newer, appropriate technologies based on farmer's innovative agro-ecological knowledge, but it is important to document

and revitalise this knowledge which is quickly disappearing as farmers' groups change, and there is more intervention in indigenous communities. These efforts, however, will only succeed if the contributions of traditional communities are valued, and they are considered as rightful partners in technology development and dissemination. The Apatani people, being conservative in nature and having highly evolved farmers' groups, can be a positive force for the revitalisation of innovative agro-ecological knowledge in the Arunachal Himalayas and can be used as a model for such activities.

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