Indigenous farming system of Adi tribes: Source of food, nutrition and medicine

Hill farming system involves diverse crops and their varieties, medicinal plants, forest species, practiced by the Adi tribes of Arunachal Pradesh. These tribal farmers are conserving biodiversity and meeting the food, balanced nutrition and health benefits from this farming system. Recognizing and rewarding the custodians of biodiversity and conserving the plant species in different ecologies is essential for the utilization of the potential of these species in the future.

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The Adi tribes are the largest tribe of Arunachal Pradesh (9% of total population of the state) inhabiting in the districts of West Siang, East Siang, Upper Siang, Upper Subansiri and Dibang Valley. However, the majority of this tribe is concentrated in three districts viz. West Siang, East Siang and Upper Siang. The climate of the region is temperate to humid sub-tropical with abundant rainfall of more than 2000 mm per annum spreading over eight months in a year (March to October). The tribe consists of number of sub tribes. They are believed to be the descendants of the Abo-Tani (Abo- Father; Tani- Man). They live in over 50 hill villages, under a selected village chief called Gaon Burrah who moderates the village council (Kebang), which acts as traditional court.

Adi tribes largely depend on shifting cultivation, popularly called *jhumming* (the land in which this is practiced is called jhum land), settled agriculture (kitchen garden and valleys) and adjacent forest for livelihood. The land ownership is of two types: community and individual family. Each village has a certain portion of land for community use and other land is owned by individual family (Table 1).

Almost every household owns a piece of land. However, farmers with marginal and small holding compensate their subsistent needs from animals, forest, fishing etc. The jhum land is utilized after cutting and burning the vegetation generally for the first two years and kept fallow for regeneration of fertility for subsequent 3 -10 years.

Adi farmers are very conservative in maintaining the soil fertility and have strong belief that application of chemical fertilizers will make the soil hard and unsuitable for crop growth. The fertility of jhum land is maintained through in-situ incorporation of burnt vegetation and in kitchen garden and orchard by applying manure of domestic animal. Soil erosion in the sloppy jhum land is controlled by keeping half burnt long wooden logs across the slope of the land, which after the cultivation period decompose and add nutrients to soil. The input for all forms of agriculture is from the system itself. However, there is exchange of seed and planting material within the community.

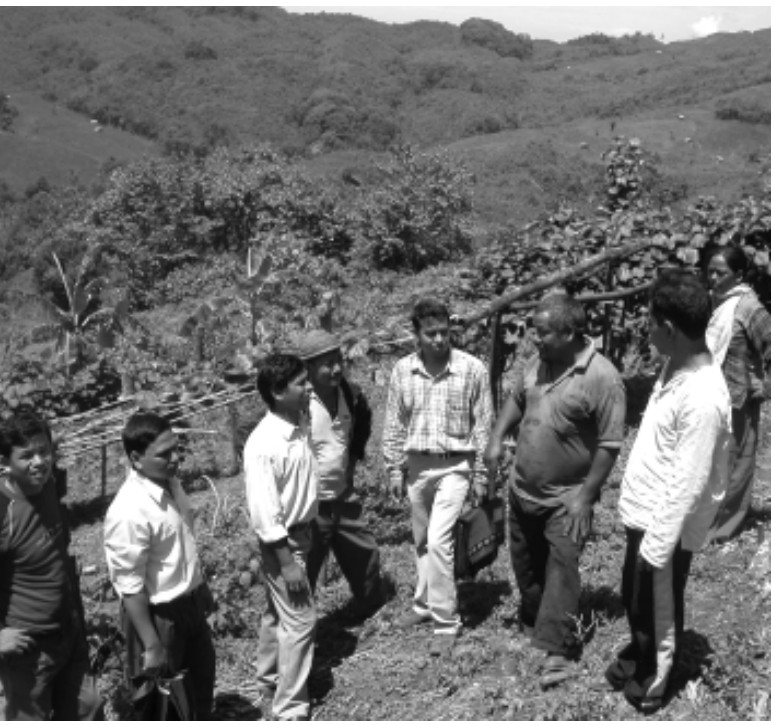
Maintaining diversity

Women play a vital role in seed preservation and maintenance of genetic diversity. The *jhum* system maintains a high crop diversity comprising of cereals (rice, maize and millets), pulses like rice bean (Vigna umbellata), oilseed (sesame) and vegetables (brinjal, cucumber, bhindi etc) with rice as the major crop. Maize crop is sown sparsely in the entire area with rice. Millets and other crops are grown in the boundary of the jhum land. Root crops like local yam and colocassia are sown after harvest of rice and maize. The yield from jhum land in the first year is generally higher than the second year. However, the yield from wetland rice cultivation (WRC) in the valleys is always higher than jhum cultivation. The comparative output: input ratio is 1.25, 1.50 and 1.75 for second year *jhumming*, first year *jhumming* and WRC, respectively.

Farmers with their age old experience in farming developed a comprehensive knowledge on the nutrient content and medicinal properties of various plants. Pseudocereals, small millets, indigenous pulses, oilseeds and many more forest plants form important component of food source for these tribal people of Northeast India. The adjacent forest products are still utilized on day to day basis as dietary supplements and some are also often sold in local markets. These species have been used as life-sustaining food as well as medicines, from time immemorial. Apart from providing diversification of the food base, different indigenous fruit species produced at different times of the year, ensure year round supply of nutrition.

Table 1: Land types and source of livelihood in Adi tribes

Land Type	Ownership	Source of livelihood	Avg. % of holding size
Permanent forest	Community	Timber, fire wood, cane, bamboo, palm leaves, bamboo shoot, medicinal plants, wild edible fruits, vegetables, flowers & mushroom, habitat for semi domestic animal Mithun	-
Jhum forest	Individual family	Rice, maize, millets, rice bean, traditional vegetables during jhum period and act as permanent forest during fallow period	45.0
Orchard	Individual family	Orange, lemon and pineapple	24.0
Kitchen garden	Individual family	Local green vegetables, medicinal herbs etc.	10.0
Valleys (low land)	Individual family	Rice and fish	21.0



The farm is the biodiversity factory fulfilling basic needs

Due to the consumption of a variety of vegetables, fruits, and chemical free food stuffs, the resistance to diseases is very high and deficiency of vitamins is very less. A large number of wild plants or their parts still supply food to large section of human being in this hilly state. Perhaps, this is the only way of having a healthy and balanced diet by consuming as many different foods as possible which are grown in their own farm adjoining the habitation. A large number of indigenous plants are used as medicine for curing the ailments like skin diseases, gastro intestinal disorders, blood pressure, bleeding due to accident etc. Therefore, these people rely very less on the modern system of treatment for their common health problems.

As many as 48 species of grains, vegetables and medicinal plants, 25 species of fruits and 13 species of forest plants are grown in different combinations in their traditional agro-ecosystem. Some of these plants are identified and conserved in the research farm of ICAR Research Complex for NEH Region, Arunachal Pradesh centre, Basar. Besides ecological and economic benefits, risk of crop failure is minimised due to cultivation of a variety of crops in the same piece of land. The traditional farming system of Adi tribes is also organic in nature, ultimately benefitting the health of the community.

Crop diversification minimises risk and provides balanced nutrition

Integrating knowledge sources

The community has strong faith in their traditional agricultural practices. They never replace them with modern practices unless thoroughly convinced of its ecological implications. There have been formal extension agencies like state agriculture and horticulture departments, multiple cropping project (MCP) and irrigation and flood control department (IFCD), but they have been limited to supplying some inputs (seeds/fertilizer) which farmers have seldom used. Until now, the practices followed in the *jhumming* are purely traditional, gained from years of experience and ancestors. However, in the settled agriculture like orchard and WRC, they sometimes add knowledge from extension agencies, for example new knowledge on maintenance and rejuvenation of old declining orchards and use of improved seed/planting material.

Conclusion

The Adi tribes of West Siang district of Arunachal Pradesh practice their own way of traditional farming system with wide variety of crops, which provide food, fodder, fuel, fibre, nutrition and medicine to the community. In days of famine and other natural calamities, these under exploited crops and vegetables have an important place as a staple food for human beings. Most of these vegetables and land races, which have specific nutritive values are facing the danger of extinction today. Therefore, cultivation of these endangered and under exploited plants in different ecological situations is essential to conserve biodiversity and utilize their potential for upliftment of economically poor population. Further, the approach to agricultural development should be built on locally available asset base, rather than modifying it.

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