Diversified Farming Systems - Learning from past to move into future

Diversity is being lost rapidly both in nature and culture, including agriculture. But, all is not lost yet. Realising the benefits and also as a reliable option in fragile ecosystems, communities are still nurturing diversity. This article highlights issues, available and potential options as well as barriers.

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During the last 50 years we have been losing diversity at an alarming rate, both in nature and in culture, including agriculture. If it was for clearing greenery for roads and railways in the beginning, in mid 60's it was by promoting monocultures of rice and wheat, large doses of synthetic fertilisers and biocides. As a result, soils which were repositiories of wide range of micro flora and macro fauna, got impoverished and destroyed. As water too got polluted, hundreds of fish, frog, shrimp, crab, snail species etc, living in rice fields and surrounding water bodies, got destroyed. They were rich sources of protein for the rural poor. With advent of mechanization, trees and shrubs in between crop fields were cleared to enable free movement of tractors and power tillers. Gradually, the need for and possibilities of raising strong bullocks and buffaloes affected; local breeds of diverse livestock disappeared, often through active collaboration and sometimes coercion with the state authorities. Imported plants and animal genetic materials, for instance vegetables and fruits, advertised as 'miracles' were expanded through loans and subsidies. With reference to livestock, farmers could not buy indigenous breeds. Exotic short cycle pulpwood species were promoted by forest departments initially for planting on degraded land – gradually were extended to farmland, wetlands and forests, sometimes even replacing multi-utility natural forests. Diversity, at the level of genes, species and ecosystem has therefore threatened by mainstream development; whatever exists today is not because of but inspite of development planners. A national biodiversity action plan is formulated but remains stillborn.

Diversifying cropping system is a goal of the agricultural department but the real message is: 'stop growing less profitable food crops, grow flowers, fruits, spices instead for sale to retail chains or supermarkets in city or even better to export houses'. This diversification has nothing to do with achieving self sufficiency, reducing pollution or erosion of soil and of livelihoods.

Where then, can we find diversity?

Much of the diversity is lost (or has been handed over to multinational corporations, who use it to breed new hybrids and claim patent rights), whatever remains is in the hand of small and marginal farmers, especially those who live in too dry, too wet or too remote areas and who mainly grow food for themselves.

Indigenous tribes living in forested regions in hilly areas of India (mainly north east India, eastern or Western Ghats and in Himalayan midhills) still practice jhum / podu /slash and burn farming. In these farming systems 15-20 or more cereals, legumes, cucurbits, oilseeds and tubers are planted together in patches that are cleared among forested area. Farmers also harvest wild herbs, tubers, mushroom etc. In 3-4 years, trees start to grow back and the plot is abandoned, and a new plot is cleared and planted. These farms are now becoming less productive, because land is scarce and farmers often have to return to the same plot after only 5-6 years (or even less) rather than the 12-15 year rotations observed in the past. Forest authorities have tried to outlaw these people, or replace their farms with monocultures of pineapple, banana, citrus fruits etc. Farmers in India, Nepal, Thailand, Cambodia and Vietnam nurture and grow major and minor millets, rice beans, pigeon pea and cowpeas, dolichos beans, horsegram and kidney bean varieties as well as many varieties of gourds. *Diascorea* yams, jack beans etc from forest are nurtured rather than cultivated. Traditional varieties of upland rice, maize, grain amaranth and buckwheat are often the main food grains cultivated. Many tree leaves are used as food or fodder. These communities hardly use any spices or vegetable oil, food is usually eaten raw, or boiled or roasted.

Diversity is still alive in the Home Gardens, both in the hills and in plains. Home gardens are usually small and are primarily for self consumption. Often, they are managed by women and children based and the choices are based on food preferences rather than market prices. In a home garden, vegetables, decorative plants, culinary and medicinal herbs, fruit and other trees, domestic animals, birds and sometimes bees, frogs and fish etc are raised.

A typical backyard garden in West Bengal would have small fruit trees like guava, lemon, banana, pomello, coconut, arecanut etc. In the drier regions custard apple, jujube, pomegranate are more common. Mango, hog apple, elephant apple, wood apple etc are also found in larger plots. For the fences, thorny or non browsable species are preferred. Flowering plants such as *hibiscus, nycanthes, nerium*; bitter leaf plants such as *vasak, vitex negundo*; thorny cactus etc are commonly planted on fences. Stumps of *erythrina, lannea, coromandelica*, drumstick or moringa are often used as fence post in the moist areas. *Sesbania grandiflora*, arecanut tree etc are planted along fence. Yams or sword beans use them as climbing support. Cultivated or wild variety of ivy gourd, yam beans, hyacinth bean, bitter gourd etc are also used as part of fence. Leafy vegetables commonly planted are, amaranthus (many varieties) basella, sweet or bitter leaf jutes, sour leaf roselle or kenag, curry leaf, drum stick, tavo leaf etc. Many kind of gourd leaves, bean leaves are also eaten but this varies according to region – the highest number of varieties consumed are in Kerala, West Bengal, Assam, North East Indian states. Pumpkins, Melons, Gourds, Brinjals, Tomatoes, Okra / ladies finger, pole and bush beans are preferred vegetables. Taro and sweet potato, elephant foot yam, cocoyam, cassava, *diasco vea* / climbing yams, arrow roots are the preferred tubers in home gardens as most of them are vegetatively propagated. Many indigenous varieties have survived in these courtyard / backyard / home gardens. Chillies, ginger, turmeric, bunching onions, many varieties of basil, mint, lemon grass and other aromatic plants are often grown under the shade of larger trees / shrubs. Many households have a small fish pond, few goats, pigs, chickens, ducks etc (mostly indigenous ones) which are raised mainly on crop residues and household wastes. Larger scale households have cows, buffaloes as well. In peri-urban areas, home gardens have increasingly become monoculture orchards of banana, papaya, limes and lemon, guava, coconut etc or have been overtaken by short cycle plantations of pulp woods such as