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The home gardens of Wayanad

Wayanad, which has been in the news for the high number of farmer suicides, is also known for widespread homestead farming. A typical home garden integrates trees with field crops, livestock, poultry and fish. Home gardens form a dominant and promising land use system and maintain high levels of productivity, stability and sustainability, say **A V Santhoshkumar** and **Kaoru Ichikawa**

Wayanad district in Kerala lies on the edge of the Deccan plateau and is unique because of its elevation (700-2,100 metres above mean sea level) compared to the rest of the plains in the state. This district has a purely agriculture-dependent economy and is among the most underdeveloped regions in India. The social fabric of the district is distinctly different from the rest of Kerala, with the highest proportion of aboriginal tribes, a low sex ratio, and an environmentally fragile ecosystem. The district covers an area of 212,560 hectares and is home to 780,619 inhabitants (2001 census). Aboriginal tribes form 17.4% of the total district population.

The gross cropped area of Wayanad covers 97.82% of the geographical area and is dominated by cash crops. The major plantation crops (tea, coffee, pepper and arecanut) together constitute 38% of cropped area. Coffee, which covers a total area of 67,429 hectares, is grown as under-crop in the homesteads of over 80% of small and marginal farmers in Wayanad district. Pepper, the second most important crop in the district, is also grown in home gardens. Of the total estimated 155,855 landholdings in the district of Wayanad, 83% belong to either small or marginal farmers.

Since Wayanad is a largely montane area that receives high annual rainfall within a short span of three to four months, land performs important hydrological and watershed functions. A large number of people living in the adjoining areas receive most of their water supply from rivers originating in the area. Thus, the soils and waters of this region sustain the livelihoods of many people. The geographic setting of Wayanad makes it highly sensitive to environmental stresses.

The area falls entirely within the Western Ghats of India, one of the 18 biodiversity hotspots. It is characterised by high levels of species endemism. The forests here are globally important as they house endemic flora and fauna, including 229 species of

plants, 31 species of mammals, 15 species of birds, 52 species of amphibians. Among these, 55 species are critically endangered, 148 species are endangered, and 129 species are vulnerable, according to IUCN classification. A number of cultivated food plants have their wild relatives in these wet evergreen forests, including the spices black pepper, cardamom, cinnamon and curcuma.

The forests of Wayanad are unique and important because they represent a transition zone from the moist forests of the southwestern ghats to the northern drier forests. However, a large proportion of the Wayanad landscape comprises tea and coffee plantations that have resulted in severe fragmentation of the forests. Conserving these forests from fragmentation and overexploitation is a huge challenge.

In addition to rich biodiversity, Wayanad is home to diverse social, religious, and linguistic groups. The cultural diversity of rituals, customs and lifestyles has led to the establishment of several religious institutions. The six main tribal communities living in Wayanad are the Paniyan, Adiyan, Kattunaickan, Mullu Kuruman, Urali Kuruman and Kurichian. Each of these tribal groups has its own unique social and cultural characteristics.

Sustainable use of biological diversity in socio-ecological production landscapes

The district of Wayanad is characterised by homestead farming at the subsistence level and smallholder plantations. Paddy, the staple food of the region, is cultivated on 11,331 hectares. Paddy-based cropping systems involve paddy, vegetables and banana. The uplands adjoining the wetlands are characterised by homestead farming with coffee and pepper. Coffee-based cropping systems involving coffee, pepper and ginger, along with many trees, are the most prevalent land use patterns. In traditional agro-forestry systems composed mainly of home gardens, the native tree composition of farmlands was largely left intact; only the under-storey plants were replaced by crops. This system lies contiguous with the natural forests and provides an unhindered habitat for wildlife in the area due to plant diversity and shade.

Most farmers in Wayanad are small, marginal, and tend to grow multiple sets of crop on their farmlands. Traditionally, the inhabitants of the area have not depended on forests or community-owned lands for their biomass requirements. One of the reasons was the absence of community-held lands, unlike in many other places in the world. Farmers maintain a spectacular variety of plants in their home gardens to meet their varied needs.

A typical home garden represents an operational farm unit that integrates trees with field crops, livestock, poultry and/or fish, with the basic objective of ensuring sustained availability of multiple products such as food, vegetables, fruits, fodder, fuel, timber,

medicines and/or ornamentals, besides generating employment and cash income. Home gardens constitute a dominant and promising land use system, maintaining high levels of productivity, stability, sustainability and equitability.

Home gardens with a multi-storey canopy structure are deliberately planned to mimic a natural forest and thereby lack a discernible planting pattern. Physiognomically, home gardens exhibit a multi-tiered canopy structure somewhat similar to that of a tropical evergreen forest. The mean density of trees in a home garden is estimated to be as high as 116 trees per hectare.

Home gardens play an important role in the food security of the region as they supply varied products throughout the seasons. Tubers, vegetables, fruits and spices from home gardens make up a significant part of the nutritional requirements of the household. Crop diversity in homesteads results in a range of output from a given area, increasing self-sufficiency and reducing the economic risks associated with adverse climatic, biological and market impacts on particular crops. In densely populated or heavily degraded areas without sufficient staple crop fields, as in Wayanad, home gardens also provide large portions of staple foods.

Another important function of home gardens is the generation of a cash income. Most of the income from a home garden is from marketable surplus derived from perennials such as fruit trees. Income from a home garden could account for more than 50% of the total income of a household.

The high degree of biodiversity present in a home garden is unique and totally distinct from the biodiversity present in a natural forest. The biodiversity of a home garden is the result of generations of conscious selection by farmers, and bears the imprint of their choices. Moreover, these components are, in most cases, the last refuge for species that are useful but not commercially viable for cultivation. Various studies have indicated that home gardens usually contain high volumes of commercial timber and fuelwood which satisfy a substantial proportion of society's demands.

Home gardens also meet a significant portion of the household's energy requirements. Most cooking fuel requirements are met through twigs and other forms of litter collected from the home garden. Oils extracted from varied sources, like coconut and sesame, used to serve as the source of lighting fuel in traditional homesteads before the advent of electricity. The green leaves and cowdung from home gardens used to be a major source of chemical energy in the household, and the fodder from home gardens fed to the cows would serve as the major mechanical energy source used in farming.

In addition to their production value, home gardens have an important social and

cultural function. At times, they serve as a status symbol and the aesthetic value partly outweighs the productive function. The exchange of home garden products and planting material is common in many traditional societies. Some plant species in home gardens are necessary for religious ceremonies; not being commercially viable, they are not cultivated. Most traditional medicinal plants are encountered in home gardens. Home gardens also fulfil ecological functions, particularly in landscapes where large, monotonous and mono-functional agricultural fields dominate.

The multi-layered vegetation structure of home gardens, which resemble natural forests, offers a habitat to a diverse community of wild plants and animals. This structure appears to contribute substantially to the sustainability of home garden systems.

Home gardens save agricultural lands from the degradation resulting from intensive agriculture, and maintain or increase site productivity through nutrient recycling and soil protection. Farmers derive a variety of services and products from home gardens; they increase the value of output per unit of land through spatial or inter-temporal inter-cropping of trees and other species. Home gardens also help farmers by supplying raw materials (such as leaf compost) for agriculture. And they spread the need for labour inputs more evenly seasonally, thus reducing the effects of sharp peaks and troughs characteristic of tropical agriculture. Farmers are able to utilise family labour as a part-time activity without requiring a change in occupation for the landholder.

The technology involved in home gardens is simple, labour-intensive and requires little outside technical or financial support. Tree components of home gardens offer many useful 'assets' to the poor such as low investment cost, rapid appreciation, divisibility, flexible harvesting time and the ability to meet unforeseen contingencies.

Despite these advantages, home gardens rank low in economic calculations as the marketable surplus produced by them is quite low. Lower economic returns force many farmers to shrink their home gardens to make space for more remunerative mono-crops. The process of modernisation includes a decrease in tree/shrub diversity, gradual concentration on a limited number of cash crop species, increase in ornamental plants, gradual homogenisation of the home garden structure, and an increase in the use of external inputs. Traditional home gardens are subject to different conversion processes linked to socio-economic changes, to the point of them becoming irrelevant or even extinct. This change is principally attributed to an increase in the importance of socio-economic factors (such as commercialisation) over time, with a decrease in the importance of agro-ecological characteristics. For example, many agro-ecological characteristics, such as low fertility, can be altered with technologies like the application of fertiliser. Scientists have voiced concerns that socio-

economic changes and the related adoption of modern managerial systems bring about a negative conversion process of home gardens in this region. Studies reinforce the general fear of loss of traditional characteristics of home gardens and their gradual demise into cash crop production systems.

A large proportion of the poor depend on ecosystem services from forests and agricultural lands for their survival. In Wayanad, biodiversity and ecosystems contribute to food security and nutrition, providing the raw materials that underpin health, both formal (ayurveda system) and informal (tribal systems). For many families, agriculture (mostly subsistence) is the main occupation and these families have limited access to alternative sources of income. They inhabit marginal, less agriculturally productive land where harvests are more vulnerable to deterioration of soil and water quality. Though the nature and mode of extractive dependence have changed over time, people's dependence on forests continues. Tribal populations are almost entirely dependent on these natural resources for their survival, and any deterioration of these resources will have a telling impact on their livelihood.

The landscape of Wayanad is a mosaic of forested lands managed by the state as reserve forests or wildlife sanctuaries and agricultural lands adjoining forested areas. The favourable role of these landscapes and production systems has been receiving a lot of attention recently. It is now recognised that traditional farmers have not only conserved biodiversity of great economic, cultural, and social value, they have also enhanced it through selection and value-addition. For example, the potential of traditional land use systems to serve as sinks (soil and biomass) of atmospheric CO2 is being recognised of late.

However, agriculture in Wayanad is facing many problems today. Agricultural production and productivity have decreased drastically over the years due to various reasons. The area was in the news for the high number of suicides by farmers, attributed to losses in farming. Many micro- and macro-level factors have been cited as reasons for failure on the agricultural front in this area, including policy changes, institutional factors, socio-economic factors, geographical peculiarities, climate change effects, poor investment in agriculture, and poor infrastructural facilities.

There is potential to strengthen formal and informal institutions to save farming and traditional land use systems in the area. There exist a large number of informal institutions in the form of tribal clans that strongly influence public opinion and the political decision-making process. However, integrating these institutions with the newly-crafted formal institutions remains a challenge. The People's Biodiversity Register (PBR) is an example of one such attempt under local self-government institutions (panchayats) to document and conserve biodiversity. More efforts like these

are needed to document and understand the dynamics of these landscapes for their conservation and continued maintenance.

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