CONSERVATION FARMING

Part III.- Multi-species, Multi-storey Cropping, (Or Homegarden Agro-Forestry)

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Introduction

A 'Homegarden' is a piece of land around a dwelling with clear boundaries and it has a functional relationship with its occupants related to economic, biophysical and social aspects. A homegarden often consists of a mixture of annual and perennial crops, sometimes including small livestock. On account of its vertical structure with different canopy depths of various plant species, the homegarden is more often referred to as a 'multi-species, multi-storied cropping system. The structure and management of a homegarden could vary from place to place depending upon ecological, socio-economic and cultural factors.

The development and maintenance of homegarden is a collective effort of the family members. The cultivation of varied species of plants around the is usually unplanned. One of the main reasons for growing trees around the house is to provide shade and create a favourable microclimate for the household especially during hot weather.

The homegardener selects the location where a crop is to be planted based on the characteristics of the plant and its value. Vegetables are usually planted in open areas or for convenience at the back and sides of the yard close to the house. Kiriala and Kohila with a high water requirement are planted close to the well. Tall trees are often planted along the boundary of the property, while food/fruit crop trees are planted within the boundary. Trees grown in the homegarden could be grouped into several categories based on their functional value. These categories are (1) ornamental, (2) vegetable, (3) medicinal (4) spices, (5) fruits, (6) starch food crops, (7) fodder, (8) timber (9) firewood, and shade.

The most intensive homegarden systems are found in Kandy and Matale districts (Mc Cannel and

Dharmapala, 1973, Kendaragama, 1983). These are small units based on a close association of coconut, kitul and betel palm under planted with cloves, cinnamon, nutmeg, citrus, mango, durian, jakfruit, rambuttan breadfruit, bananas, pepper vines and a peripheral ground storey of maize, cassava and beans.

Dry Zone Homegarden

The traditional homegarden in the dry zone is situated below the water tank. The hgh soil water table makes it possible to grow perennial crops such as coconut, jakfruit, plantains, papaw and breadfruit. Today most homesteads are lease lands, situated along the roads on high ground and, the homegarden is confined to a small area of about 0.05-0.1 ha around the dwelling while rest of the homestead is ground with a range of seasonal arable crops for home consumption and sale.

The dry zone homegarden contains a mixture of food/fruit trees such as coconut, mango, banana (or plantains), sour sop, jak fruit, cashew, woodapple, papaw, guava, lime, orange (mostly Kuda lu) promogranate (deulum), drumsticks and tamarind. There are isolated instances of annual crops such as cassava, sweet potato, Kiriala and winged bean being cultivated . Farmers deliberately retain or sometimes grow some other species of trees or shrubs in their homegardens. Among these are margosa, halmilla, mee, teak and satin-wood. (Weerakoon, 1986).

Arrangement of Components:

The spatial arrangement of plant components in a homegarden are irregular and appears to be very haphazard with the trees/shrubs and food crops being intimately mixed. Vertically, several relatively distinct zones can be distinguished. In terms of canopy depth, the lowest zone (0-1.0 m) consists of food crops such as kiriala, spinach, sweet potato, ginger, kaha and wadakaha. The next zone (1.0-2.0 m) canopies mainly consist of promogranate, lime, sugar cane, castor, cassava etc. Still higher the banana canopy (2.0-5.0 m) and fruit trees such as banana (especially seeni kesel), sour sop, laulu, nelli, papaw, guawa, and some instances drumsticks and katurumurunga. Above this layer, vertical zonation is less distinct

with a diffuse zone (5.0 - 20.0 m) of fruit trees (jak fruit, woodapple, cashew etc) and timber trees. There is a considerable overlap of the storeys with continuous recruitment to the various zones.

Chicken are usually free to roam and scratch the surface soil of the homegarden, while goats are stabled. Bee keeping is an another feature sometimes observed.

Evaluation (merits, weaknesses/constraints):

The advantages attributed to a homegarden are many. The mix of trees with multi-storey canopies effectively protects soil against erosion due to rainfall and wind (Weerakoon et al, 1985) It prevents excessive water evaporation from the soil surface. A large amount of biomass returns to the soil as organic matter in the form of fallen leaves, flowers and branches, aiding enrichment of soil fertility (if allowed to decay in situ) and soil infiltration of water.

The tree roots capture nutrients moving through the soil profile. There is little weed proliferation due to shade offered by the tree canopies. The diversity of plant species in a homegarden can provide nutritional constituents such as vitamins, minerals, carbohydrates, fats and proteins. The harvesting and consequent income generation is dispersed throughout the year and thus provides greater stability than is possible with one or two annual crops. The farmers also obtain a good part of their firewood poles, timber, fodder and medicinal products within the confines of their homegardens.

More often social and biological problems/ constraints could limit the improvement of the homegarden of the dry zone. Seven such constraints have been identified (Weerakoon, 1986), and these in order of their relative importance are as follows: drought soil infertility, non-availability of planting materials, lack of technical know-how, wild animal crop damage, domestic animal crop damage and theft of animals such as chicken, goat and cattle. On average each farmer faces at least three of these problems. They feel they have little or no control over animal damage and thefts.

Potentials:

It is very important to organize an efficient extension service to make homegarden systems more productive and economical. The following measures could be used to overcome the biological problems/ constraints to improve the overall productivity of homegarden systems.

a) Adoption of better soil management techniques, such as mulching and mechanical soil conservation thereby mitigating moisture stress especially during dry periods and minimizing soil erosion.

b) Replacement of less productive tree/shrubs with fast growing nitrogen fixing tree species eg. Leucasne leucocephala, Gliricidia aspium and Sesbania grandiflore to provide green manure for soil enrichment and also obtain firewood and fodder.

c) Formulation of appropriate fertilizer recommendations for the multi-species association and popularisation of composting and compost use.

d) Dissemination of further information regarding the value of integrating botanicals with anti-pest properties such as margoss, karanda and wel habaala, which are already being used by some dry zone farmers. For a small scale farmer chemical pest control is scaresly an alternative.

e) Improved apiculture eg. use of improved bee boxes, improved harvesting etc.

The homegarden system in the dry zone is operating far below its potential efficiency. Since itaás a permanent rather than a temporary form of land use, it clearly takes precedence over chena. In the past there was little competition for land, but as population increases and the land becomes scarcer, the demand for more efficient land utilization is likely to increase.

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Hawaii stocked dairy cows on leucaena/guinea grass pasture (1:1 ratio) at 6 animals per ha, and each year obtained over 9,700 liters (21,400 lb) of milk and 400 kg (800 lb) of live-weight gain per ha.§

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