CASE STUDY 1: Home gardens

Home garden, Indonesia. Credit, Indonesia.org

Home gardens are traditional intercropping systems that provide subsistence, opportunities to commercialise products, and serve multiple environmental and social functions by combining agricultural crops with tree crops and livestock.[1] Home gardens are typically characterised by a great diversity of useful plants and livestock in a small area, cultivated in intricate relationships with one another. On the island of Java, Indonesia, home gardens called *pekarangan* are particularly well developed. The most extensive areas of home gardens in Java and the most intensive cultivation occur below an altitude of 800m where the dry season is short or absent.[2] Usually taking up little more than half a hectare around the farmer's house, home gardens contain a huge variety of plants for food, medicine, condiments and spices, and feed for livestock and fish stock. Much of what is produced is for household consumption, whilst some is sold at local markets.[3]

Although most common across southern and Southeast Asia, successful home garden training programmes have been instituted in Niger, Somalia, Ghana and Kenya under the leadership of the FAO's Nutrition and Consumer Protection Division alongside supportive networks of national extension, research and training institutes and NGOs.[4]

The home garden may be capable of producing a large and varied harvest, contributing to food and nutrition security, but the returns are often small and typically insufficient to bring people out of poverty as a stand-alone method.[5] In this case, however, promotional forums, campaigns, recipe booklets and cooking demonstrations teaching the nutritional value and varied uses for these vegetables changed seasonal planting methods to demand-driven and time-scheduled production to meet increased market demand. Farmers also received business support, reliable access to improved quality seed, and linkages to both formal and informal markets. The demand for AIVs grew by 135% over the 2-year project in Kenya and an estimated 9,000 tonnes of vegetables were sold delivering earnings of Ksh80 million (US$800,000) from informal markets and Ksh150 million (US $1.5 million) in formal markets.[6]

Pekarangan. Credit, BISMACenter

CASE STUDY 2: Intercropping nitrogen-fixing shrubs in Rwandan coffee farms

Coffee, Tephrosia

The shrub *Tephrosia vogelii* can grow very quickly, up to 4 metres high, fixes nitrogen and can be used as green manure.[7] In Maraba, Southwest Rwanda, coffee productivity is constrained by poor soil fertility and lack of organic mulch.

A 2-year study on 8 smallholder coffee farms trialled the effect of intercropping *Tephrosia* and coffee. The mulch produced from *Tephrosia* was also used on the coffee plots. In the first year, *Tephrosia* intercropped with coffee produced 1.4–1.9 tonnes per hectare of biomass and added 42kg–57kg of Nitrogen per hectare. This treatment increased coffee yields by 400kg–500kg per hectare, compared to traditional management methods. In the second year, *Tephrosia* produced between 2.5 tonnes and 3.8 tonnes per hectare of biomass and added 103kg-150kg of Nitrogen per hectare. This increased yields of coffee by 400kgper hectare.

Over the 2-year study, coffee yields increased between 23% and 36%. *Tephrosia* mulch was 87% as efficient as inorganic fertiliser used under similar conditions, and represented a saving of 30 days of labour hours per hectare compared to current farmer management through reduced labour required for weeding. Together the labour savings and the improved yields translated into the farmers producing 5kg of coffee per labour-day, compared to 3.4kg per labour-day under traditional management.[8]

CASE STUDY 3: MBILI intercropping

MBILI. Credit, Sara Costa

Farmers in Western Kenya traditionally row-crop maize with nitrogen-fixing legumes to increase yields and soil fertility. Nitrogen is returned to the soil from the falling leaves and decomposing roots of the bean plants. Researchers at the Sustainable Agriculture Centre for Research, Extension and Development in Africa (SACRED-Africa), noticed that the single rows were not providing enough light for the legumes, and that the second maize crop often failed due to insufficient late rains. To address these constraints, they pioneered a new system known as MBILI (Managing Beneficial

Interactions in Legume Intercrops), meaning “two” in Swahili. MBILI consists of intercropping double rows of maize and legumes, allowing for better light and soil conditions, whilst maintaining the same plant populations. The system yields nearly 3tonnes of maize and more than 500kg of legumes per hectare.

MBILI has been shown to increase production by 26% - 37% in the short rain season and around 7% in the long rain season. The greatest improvement is noted in groundnut which can increase by 101% compared to conventional conditions. Farmers earn an average of 31,689 KSh (US$325) per hectare using MBILI intercropping, compared to 26,333 KSh (US$270) with conventional methods.[9]

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