Diversification of farm and forests to restore livelihoods and landscapes

Sidney Madsen, Perrine Attard, Alexander Wezel

Context

Agriculture is the base of the Nigerian economy, providing the main source of livelihood for most Nigerians as well as employment for about 35% of the population as of 2020 (FAO 2021, World Bank 2020). The sector faces many challenges, with a land tenure system constraining access to land with only about 2 ha per farming household, high cost of farm inputs, poor access to credit, inadequate storage facilities, high postharvest losses and poor access to markets with an overall low agricultural productivity (FAO 2021). In Nigeria, human activities and land use have resulted in dramatic changes in the country's landscape, in terms of deforestation, desertification, and agricultural intensification.

Figure 1. Farmer demonstration of the cultivation, propagation and management of afang; © GEF SGP, UNDP

Disappearing species and livelihoods

Cross River State (CRS) is a coastal state southeast Nigeria, situated within the tropical rainforest zone, with a quickly growing rural population (Ushie et al 2020). In the Obudu municipality, most farmers have access to less than one hectare of land, on which they struggle to produce sufficient food to meet their livelihood needs. Besides the constraint of land access, farmers face irregular and unpredictable rainfall, flooding, and land degradation (Eni et al. 2010). These conditions have undermined agricultural productivity and, to supplement insufficient food and income generated from farming, residents harvest forest products. However, this livelihood practice has intensified, leading to deforestation and the disappearance of indigenous plants. One locally endangered species is afang (Gnetum africanum), a wild vine whose leaves are consumed by over 5 million people in Nigeria, but which is likely to disappear due to over-exploitation. National populations of the plant are so depleted that Nigeria now imports afang from neighbouring Cameroon. The disappearance of this important source of income combined with

the problem of low agricultural productivity, has threatened farmers' ability to make a living in Obudu.

Revitalizing farmer livelihoods through agroecological management of farms and forests

In an effort to create conditions for more sustainable livelihoods in Obudu, a project was implemented with the aim to increase agricultural productivity and profitability, and rehabilitate nearby forests and the income sources they provided. To restore ecosystem services fundamental to agricultural productivity and diversity, the NGO, Rural Infrastructure Services for Under-Served Population (RISEUP), promoted agroecological management of both agricultural and forested areas. Specifically, the programme disseminated practices of crop rotation and sequencing, mulching and composting, the use of simple irrigation technologies, reforestation with fruit trees, and diversification with ten different vegetable species. Farmers were also supported with farming tools and improved vegetable seeds and seedling of indigenous plants, including the threatened afang crop and bush mango species (Figure 1). Farm and forest productivity was enhanced through multiple approaches.

Figure 2. New practices boost crops' health and productivity; © GEF SGP, UNDP

1) Farmer-to-farmer trainings and demonstration farms encouraged over 380 farmers in 19 different communities to implement organic vegetable production and drip irrigation.
2) More than 4,000 afang vine and bush mango seedlings were planted in farmland and forested areas.
3) Farmers diversified production by planting garlic and ginger as medicinal products for improved health and for new income.

OUTCOMES

Reforestation efforts with indigenous species improved the local availability of forest products while agroecological farming approaches, applied in combination with improved seed varieties and drip irrigation technology, successfully increased incomes from vegetable production.

Higher income through productivity and diversity

The implementation of this programme had significant positive contributions to farmers' incomes. When drip-irrigation and improved tomato seeds were combined with agroecological soil

Figure 3. Drying pepper with solar-dryers; © GEF SGP, UNDP

management practices such as composting and mulching, farmers were able to harvest more from the same amount of land (Figure 2). For instance, tomato production increased from 40 to 60-80 t/ha. The adoption of solar dryers to preserve and sell vegetables that would have gone to waste enabled each household to make 10-12 US$ daily, generating about 3,650 US$ additional income per year (Figure 3). Propagation and planting of afang vines and bush mangos have made these species more available as sources of food and income. Consequently, farmer's income significantly increased from 1-2 to 6-12 US$ a day, resulting in about 4,000 US$ of income in a year.

Sustainable land management through reforestation

Forest conservation on over 220 ha was improved through trainings on sustainable management and propagation of bush mango and afang seedlings. Reforestation efforts with these seedlings on degraded farmland further reduced pressure on wild bush mango and afang populations, by making these forest products more locally available. In addition, reforestation with fruit and nut trees helped to restore previous degraded land by reducing topsoil erosion and renewing soil organic matter. The drip irrigation technology reduced consumption, especially during the dry season, of critical water reserves.

Sharing benefits with women and youth

Women were included in marketing of vegetables, giving them more control of agricultural income and how these earnings were used. For example, through the extra income generated by the dried and package vegetables, women chose to pay school fees and send more children to school. At schools, training programmes taught children about sustainable management of forest crops, enabling 479 secondary students to participate in vegetative propagation of afang from vine cuttings and assist their parents in reforestation (UNDP Nigeria 2021).

Conclusion

This project illustrated how agroecological approaches, combined with NGO-supported access to improved seeds and irrigation technologies, can improve farmers' incomes by diversifying and intensifying crop and forest production. The livelihood benefits of increased vegetable productivity, in tandem with reforestation of forest species valued as food and income sources, reduced pressure on wild populations. Agroecological management of wild and cultivated areas thus increased the social and environmental sustainability of farming and food production in Odubu. After observing the positive outcomes of the new practices, six neighbouring communities also implemented the approach, spreading the benefits to more farmers and landscapes in the area (UNDP 2017).

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