An agroecological village

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Context

More than 80% of Tanzanian farmers rely on rainfed farming to support their livelihoods, and are increasingly negatively affected by climate change. The Chololo Ecovillage was a three-year project funded as part of The Global Climate Change Alliance (GCCA), in an initiative aiming to test a holistic, integrated, village-scale approach to climate adaptation in vulnerable communities (European Commission 2015). Agroecological approaches were identified with community participation to address key issues affecting residents and practices were spread through multiple avenues including trainings, farmer field days, broadcast of farmers' success stories via local radio stations, and a drama and dance group that encouraged good agricultural practices. The project exemplified a village territory approach based on a large number of principles of agroecology, such as soil health land and natural resource governance; biodiversity; recycling; input reduction; animal health; economic diversification; participation and fairness; which guide the transition towards sustainable food and farming systems (HLPE 2019, Wezel et al. 2020). The application of these different principles and more specifically some agroecological practices are illustrated in the following example.

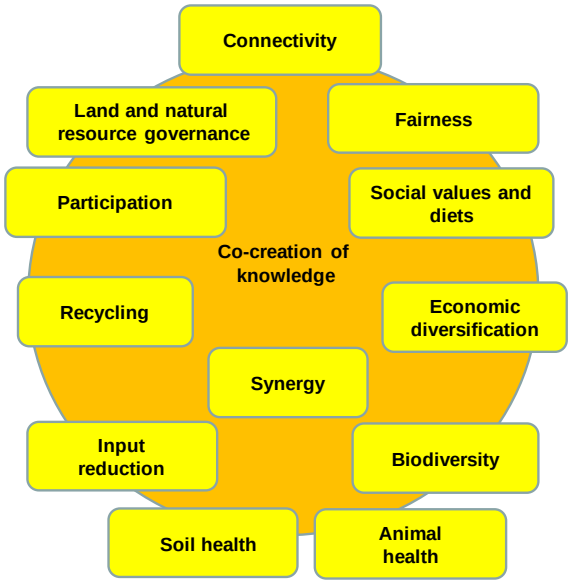

Figure 1. Agroecological principles. Adapted from Wezel et al. (2020).

Soil Health

Organic matter and soil biological activity can be enhanced through agroecological management, building healthy soils to support plant growth. Farmers traditionally practiced shifting cultivation moving from a field to clear forested land once the soil fertility of a plot was depleted. In recent years, no more uncleared land was available, so farmers continued to plant the same crop on the same plot of land, leading to low agricultural productivity. Therefore, the project introduced agroecological soil management practices to replenish nutrients and reduce erosion. This included applying farmyard manure, which provides nutrients necessary for crop growth and further enhancing soil moisture. Farmers learned to create contour ridges, bunds and infiltration ditches, and gully healing. These practices reduce flooding and washouts caused by intense rainfall, instead capturing water on farming fields. Farmers found

Source: JRC Contract CT-EX2019D351242-102 Agroecology for Food Insecure Countries, 2020

that these practices, combined with the use of improved seed varieties, increased their crop yields between about 20-400 % depending on year and species for key crops such as maize, sorghum, pearl millet, sunflowers and groundnuts.

Recycling & input reduction

Figure 2. Row intercropping of maize with legumes; © Chololo Ecovillage Project - Institute of Rural Development Planning

One of the principles of agroecology aims to improve resource efficiency by replacing purchased inputs with locally renewable resources and recycling these resources within farming and food systems. Farmers applied practices that more efficiently used and replenished local resources. Where farmers had previously planted only one crop year after year in a field, they began to intercrop in planting millet or sorghum with leguminous crops like cowpea or groundnut, and to diversify their crop rotations. These practices reduced the need for synthetic fertilizer, replacing nitrogen and decreasing the depletion of other soil nutrients that occurs when only one crop is continuously planted in a field. In addition, through integration of livestock and fish farming, farmers recycled manure and nutrient-rich water from fish ponds by applying them to their field crops. Vice versa, crop residues were increasingly used to feed livestock.

Animal health

Improving animal health and welfare strengthens the resilience of farming systems. Many residents of Chololo raised livestock before the project's introduction, yet farmers explained how livestock disease affected their livelihoods, shortening the lifespan and productivity of their animals. To address these issues, the project crossbred locally adapted breeds of cattle, goats, and chickens with improved breeds (e.g. crossbreeding with pure Mpwapwa cattle bulls). Farmers also learned better livestock management, disease control, and dry season feeding. These new practices kept animals healthier and, when combined with improvements in the genetic potential of local breeds, has increased meat, egg, and milk productivity.

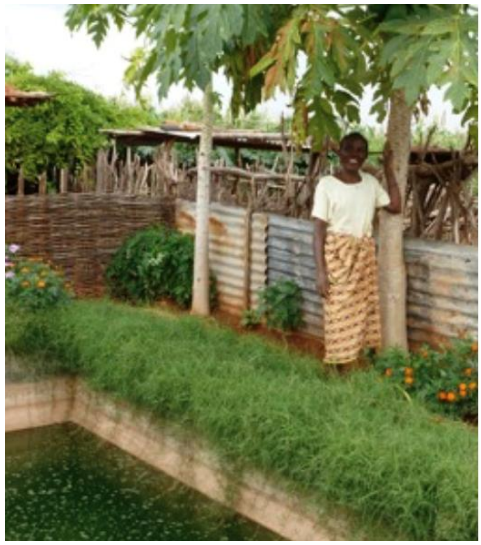

Figure 3. Garden and fish pond production in homesteads; © Chololo Ecovillage Project - Institute of Rural Development Planning

Biodiversity

Agroecological farming systems are characterized by high levels of species and genetic diversity. The project increased diversity on the field, farm, and landscape levels. In addition to introducing new genetic potential to livestock populations, improved varieties of maize, sorghum, millet, cowpeas, and groundnuts were provided to farmers. These varieties were developed in Tanzania to be higher yielding, but also more drought resistant and early maturing- traits farmers found helped them to adapt to later, less reliable rainfall during the growing season. The project also trained farmers in fish production, further increasing farm-level diversity. Beekeeping and tree planting enhanced biodiversity at the landscape level, increasing both pollinating services and habitat for wild flora and fauna.

Figure 4. New fish production in fish ponds; © Chololo Ecovillage Project - Institute of Rural Development Planning

Land & natural resource governance

Agroecological farming depends on ecosystem functioning and natural resources that can be enhanced through careful community planning and management. Before the project, village members reported that deforestation was affecting their community, with little available animal forage, fuel wood and timber. In response to these issues, many community members learned nursery management and afforestation, and grew and planted over 36,000 seedlings of trees valued for their fruit and firewood production and contributions to soil health. Most were planted on farmers' land, although 3,000 trees were planted on a village forest reserve. Community-level vulnerability to drought was reduced with the creation of sub-surface and sand dams, rainwater harvesting equipment, and water storage tanks. A solar powered water pump has replaced an electric pump, halving the cost of water.

Figure 5. Tree planting on the village territory; © Chololo Ecovillage Project - Institute of Rural Development Planning

Economic diversification

The agroecological approach for economic diversification aims to give farmers greater financial

independence. Creating more income sources can make farmers more resilient to fluctuating or low market prices for their produce or crop production failures. Farmer trained in innovative practices of beekeeping harvested three times more than with their traditional hives and were able to sell the surplus. Building and stocking fish ponds provided another source of income, with producers selling fish to community members and fingerlings to other fish farmers. Crop and livestock diversification gave farmers more options for food and income generation. For example, farmers who crossbred local goat breeds with improved varieties, were able to double the price of the offspring and sell them a year earlier than their local breeds. Project participants also learned to process leather and make sandals, adding value to a product they had once sold at a fraction (nearly 1/30th) of the price in the form of raw goatskin.

Figure 6. Chicken and egg production led by women; © Chololo Ecovillage Project - Institute of Rural Development Planning

Fairness & participation

Agroecological approaches seek to remedy social inequities that often characterize food and farming systems, and this project focused on issues of gender inequity. The improvement of local chicken breeds increased productivity of an income source over which women had greater ownership. Women reported that they had earned more money from increased egg and chicken production. Another initiative to alleviate unequal burdens linked to gendered household roles, was the introduction of fuel efficient stoves. The stoves reduced fuel usage by 57%, and the associated work, typically carried out by women, of collecting firewood.

Social values & diets

Food insecurity was a problem for the subsistence-oriented farmers who participated in the project. Agroecological practices of farm- and field-level diversification provided farmers with greater access to a variety of nutrient-rich foods. Fish farming and raising healthier and more productive livestock increased the amount of protein available to farming households, in the form of fish, eggs, milk, and meat. Diversifying a farmstead with fruit trees, and legume crops created the opportunity for a more nutritious diet than when a farm only produced millet or sorghum.

Conclusion

The Chololo village project exemplified agroecological principles and the integration of multiple practices to create positive ecological interactions and synergy between animals, crops, trees, soil and water. This approach was effective for improving and diversifying farmers' incomes and diets. Participation and fairer distribution of income also empowered women and community members to act together for improved land and natural resource management.

References

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