



Malawi Farmer to Farmer Agroecology project

Introduction

Malawi is a small landlocked country in southern Africa, bordered by Mozambique, Tanzania and Zambia. The majority of Malawians are smallholder farmers, who grow crops for both food and income. More than half of the Malawian population lives in poverty, and the rate of food insecurity is very high. Estimates show that about one-third of the population lack access to adequate, safe, and nutritious food that meets dietary needs and food preferences for an active life. Almost half of Malawian children under age 5 suffer from chronic undernutrition, as reflected in current rates of stunting. Crop and dietary diversity is quite low - maize is the dominant staple crop, accounting for about 70 percent of all calories intake, and 60 percent of area planted. Typical planting patterns are monocropped maize with limited organic matter returned to the soil, and reliance on commercial fertilizer. Women carry out an estimated half of all farming work, alongside the majority of other household tasks and child care, but often have limited control over household resources. Gender inequality combined with high levels of rural poverty and growing inequality has negative repercussions for maternal and child nutrition.

The Malawi Farmer-to-Farmer Agroecology project (or MAFFA) works in two different areas of Malawi: Lobi region of Dedza District, central Malawi and Ekwendeni region in Mzimba District, northern Malawi. Currently over 6600 farming households work with MAFFA, in 308 villages. Both these areas are mid-altitude, sub-tropical ecosystems, with unimodal rainfall during the months of December to April (700-1300 mm/yr). The typical cropping pattern of smallholders in both sites has been maize (*Zea mays*) as the dominant staple crop, and other crops grown at low density including tobacco (*Nicotiana tabacum*), sweet potatoes (*Ipomoea batatas*) and groundnut (*Arachis hypogaea*). Lobi District is at a higher elevation, approximately 1300 metres above sea level, and with relatively flat land, flooding is a more frequent problem. People grow more 'Irish' potatoes (*Solanum tuberosum* L.) along with common beans (*Phaseolus vulgaris*) for the busy Dedza markets. The majority of people in the region are Chewa, practising matrilineal and matrilineal systems of inheritance – women own the land and stay in their home villages when they marry. In contrast, in Ekwendeni region the majority of people are Tumbuka and Ngoni, and practice patrilineal and patrilineal systems, in which land is passed through men and women move to their husband's village when they marry. Ekwendeni region is at a slightly lower elevation (1200 above sea level), and precipitation rates vary, with drought a more frequent problem than the Lobi area. There are fewer marketing opportunities in the northern region, and greater levels of forested regions still remaining.

Description of the Agroecology system

Farmers who participate in the MAFFA project get training on agroecological principles along with nutrition and social equity issues. They then can choose what they want to experiment with, including growing edible legume intercrops, diversifying their cropping system with additional crops such as sorghum, finger millet, sweet potatoes or cowpea, adding compost manure or legume residue to their soils, mulching and growing local orange landrace varieties of maize. The farming systems that farmers are experimenting with are mixed systems. While many of the crops are ones that they or their neighbours might have grown in the

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past, some crops would be ones that they have never been exposed to, because there has been a significant decline in crop diversity across the country. Some of the crops are indigenous, such as finger millet and sorghum, but were widely discouraged by previous governments. Sorghum and finger millet are indigenous grains that can be substituted for maize, the main staple in Malawian diets. These two crops are drought tolerant and can be used to make a range of food types, including breads, sweet beer and popcorn. Landrace varieties of orange maize, known as *Mtinkinya*, provide a source of vitamin A, an essential nutrient for human nutrition. They are harvested earlier than other maize varieties, and are relatively drought tolerant, thereby reducing risk of crop failure. Other crops, such as sweet potatoes, are not indigenous, but have multiple benefits, such as soil cover, a source of both leafy greens and tubers, and early harvest, thereby spreading out the harvest period and increasing food security for households.



Figure 1. Bettina working on the recently made compost manure so that it spreads well. March 2016. Photo credit: B. Nyirenda.

Some farmers are making compost, using a combination of animal manures, grasses, and legume residue. They make the compost during the dry season and incorporate it into their fields before planting. There are several different types of compost, some of which decompose very quickly, others of which take a longer period. Some people dig pits or build compost heaps in their fields, while others construct compost bins or build compost heaps at their homesteads.

Another way that farmers are improving their soil fertility is through growing legumes, either as sole or intercrops. These legumes include pigeonpea, a semi-perennial shrub that produces an edible pea, along with firewood, and has deep roots that draw nutrients from deeper in the soil. Other legumes include groundnut (or peanut), common beans, cowpea and soya bean, all annual edible grain legumes. These legumes help to diversify the diet, providing an important source of protein and in the case of peanuts, and soyabean, oil for families. After harvest, the legume residue can be incorporated into the soil,

increasing soil organic matter, which builds both soil fertility and soil structure. This system has been tested extensively by the Soils, Food and Healthy Communities organization, one of the partner organizations involved in MAFFA. Farmers have found that it is effective at increasing maize yields the following growing season, reducing the need for fertilizer application. They also appreciate the edible legumes as delicious foods for their families.

Another type of agroecological practice that farmers are experimenting with is agroforestry, meaning growing different tree species in their cropping fields. These trees, such as *Acacia albida*, *Gliricidia sepium* and *Tephrosia voglii*, provide shade cover to reduce erosion, often attract beneficial insects and improve soil fertility. *Tephrosia* has the added benefit of providing a natural pesticide that does not kill beneficial insects but is effective with one of the major insect pests of pigeonpea.

These practices are not widely known by local communities, so MAFFA has provided training and support through a farmer-to-farmer educational approach. In each village, participating households are asked to select one man and one woman to be part of the Farmer Research Team, who get additional training and act as mentors and support the experimentation of the broader group. Local



farmer research teams teach farmers organic methods of improving food security, drawing on principles of participation, equity, democracy and social justice. They meet monthly with participating farmers in their villages, and then meet monthly as a team to share ideas and problem-solve. Young people are encouraged to be involved, as are poor households, HIV-affected households and other groups known to be marginalized in communities. Farmer exchanges, field trips and training provide opportunities for farmers to deepen their knowledge of ecological principles, farmer associations and marketing. As this project is aimed at improving food security, nutrition, and more equitable communities, we use a range of educational approaches, including drama, recipe days, and farmer apprenticeships. MAFFA involves a partnership with Soils, Food and Healthy Communities organization, Ekwendeni Hospital, Chancellor College, the University of Malawi, Western University, Cornell University and the University of Manitoba, funded by Global Affairs Canada and the Canadian Food Grains Bank.

Although no one specific reason triggered the start of MAFFA, it built on the Soils, Food and Healthy Communities organization, whose research began due to the rising costs of commercial fertilizer, low crop and dietary diversity, high gender inequality and high levels of child malnutrition, and involved both Cornell University and Western University (see SFHC Agroecology case study here: <http://www.oaklandinstitute.org/legume-diversification-improve-soil> and their website: www.soilandfood.org). In addition, earlier work by Chancellor College and the University of Manitoba identified local orange landrace varieties of maize as having potential to contribute vitamin A in diets, and low vitamin A is a major nutritional issue in Malawi. It was discovered that some farmers had maintained local orange varieties of maize and were willing to share their expertise.



Figure 2. Tinkani Gondwe and Agnes Shonga standing in their intercropped field of sorghum, maize and pigeonpea. May 2010. Photo: R. Bezner Kerr

Political space

Initially there was limited political support for promoting this kind of system, particularly when the agricultural input subsidy program was first re-introduced. But in recent years there has been increasing support and interest from the Ministry of Agriculture in this approach, at least in terms of improving soil fertility. The Ministry of Agriculture extension staff often participate in MAFFA training and field days, and have invited project staff and farmers to different field days and events that they organize. In addition, we have involved an entomologist from the Department of Agricultural Research Services in training and supporting farmers to do research on ecological pest management strategies. In January 2016, the government endorsed the intercrop combination of pigeonpea and groundnut as an official agricultural technology, which means that government extension officers will be promoting this method. There is also an official policy to promote crop diversification, but this policy receives limited financial support, compared to the input subsidy program, which takes up the majority of the Ministry of Agriculture's budget. Our participatory approach, emphasis on farmer-to-farmer teaching, agroecological principles, the importance of local and indigenous knowledge and efforts to address gender and other social inequalities are not at the time of writing supported by any public policies or programs. The focus of agricultural research and extension has largely been on fertilizer use and



improved seeds. The government has indicated that they intend to align their laws to be in line with the Common Market for East and Southern Africa (COMESA) Seed Harmonization Implementation Plan (COMSHIP), and under the New Alliance for Food Security and Nutrition, have committed to adopting plant variety protection laws which better support the private sector. The Malawi Plant Breeders' Right Bill has been concluded, and is awaiting enactment, along with a new Seed Act and Pesticide Act. These bills are anticipated to promote conventional use of fertilizers and pesticides, alongside uniform, distinct and stable varieties of certified seed. These pieces of legislation do not support indigenous, farmer-bred varieties of seed, nor do they promote agroecological methods of farming. Only approved varieties of seed will be permitted to be traded across borders, thereby further marginalizing farmers' local seed varieties.

Outcomes of the practices

Farmers using these approaches have seen significant impacts in improved maize yields, greater crop and dietary diversity, improved soil fertility, seed sovereignty, food security, household gender relations, and greater resiliency to climatic variability. Using farmer-led experiments, we have shown that maize yields can be increased significantly without the use of fertilizer, but rather using nitrogen-fixing legumes like pigeonpea and groundnut. This approach also reduces costs and provides a source of income through legume sales. Farmers who use legume residue to manage soil fertility are significantly more likely to be food secure than those who do not. Many farmers have also shifted from maize mono-cropping to cereal-legume intercropping, with positive nutritional outcomes. Dietary diversity, which is the number of different food groups in a diet and is considered a good measure of nutrition, is also significantly higher for farming households using these methods. Farmers are very positive about growing local orange maize as one source of vitamin A and as a climate change adaptation strategy.

Our key focus on gender has also led to positive changes, including greater involvement in decision-making for married women, and men taking on more household tasks including child care, cooking, fetching water and collecting firewood. Beyond the farm household level, we have also seen improved cohesion and social relations at the community level. In participating communities, farmers have started their own seed sharing networks that are independent from the MAFFA seed banks. By freely exchanging local seed varieties that are hardy and well-adapted to the local environment, these farmers now circumvent the difficulties in purchasing costly hybrid seeds every farming season. Reduced dependence on external inputs and greater seed saving and sharing help to build food sovereignty.

Message from farmer to farmers

"My advice to my fellow farmers; let us adopt and use this type of farming as the results are numerous. Besides improving our soils, legumes are good sources of food which also helps to improve our diets. Manure helps to feed the soil and retain moisture making it a better option especially when faced with droughts and erratic rainfall"

— Betina Kathako, small scale farmer from Kaunyolo village

"My advice to fellow farmers: applying Agro-ecological practices in the fields is very good, in the sense that you don't require a lot of money, it only requires your energy and effort. For example to make manure, you only require energy, and most of these Agro-ecological practices help keep the soil moist."

- Tinkani Gondwe, small scale farmer from Chisangano village.