

Adapting to climate change in Malawi by improving soils and nutrition

Ongoing research in Malawi shows that agro-ecological farming strategies—especially intercropping with legumes—bring many benefits in the context of climate change: healthier soils, improved nutrition, and more resilient farming systems.

Results of better soils and nutrition

Some **7,000** small-hold farm families are intercropping with legumes and using other agro-ecological approaches.

On average, in participating villages:

- One-year-old children are **1 kg heavier**
- Three-year-old children are **1.5 kgs heavier**

According to the UN Food and Agriculture Organization, one in eight people worldwide suffer from chronic hunger, with the highest rates of undernourishment found in sub-Saharan Africa. As of March 2014, some 1.9 million people in Malawi lacked food security.

Malawi is a low-income country. Most of its 13 million people are rural small-hold farmers, who rely on domestic food production to meet their needs. Maize is a staple. But an over-reliance on this starchy cereal magnifies food insecurity: the crop is highly vulnerable to both climate change and sharp price fluctuations. And while corn is rich in calories, a maize-based diet lacks the protein and micronutrients to meet the body's needs. As a result, 46% of children in Malawi under the age of five are stunted and 20.5% are underweight for their age.

Climate change, meanwhile, is an added stressor. According to the latest report by the Intergovernmental Panel on Climate Change, maize-based crop systems are among the most vulnerable to climate change—particularly in southern Africa.

The research: testing crop diversification and soil fertility approaches

Since 2001, IDRC's Ecosystems and Human Health program has funded research in Malawi focusing on the links between soil fertility, food security, nutrition, and human health. Through successive projects in Ekwendeni, in northern Malawi, a number of participatory Farmer Research Teams were established. These teams actively involve resource-poor farmers in testing a variety of agro-ecological options—such



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By intercropping with nitrogen-fixing legumes, farmers improved maize yields in the next season.

as diversifying, interplanting, and rotating crops, burying crop residues, and using other available organic matter—to enhance soil fertility, boost yields, and improve child nutrition. By 2004, some 3,000 households were experimenting with organic soil fertility technologies.

Over several years and successive projects, farmer-led experiments generated interesting results. Intercropping with legumes—nutritious, nitrogen-fixing plants such as pigeon peas and soybeans—improved maize yields in the next season. The legumes improve soil quality and reduce yield variability, while fortifying family diets with protein and micronutrients.

Since 2009, a research partnership between Ekwendeni Hospital, the University of Malawi, and Canada's University of Western Ontario has built on this earlier work with Farmer Research Teams. They have broadened the focus to address the added challenge of climate change and extended

research to Kasungu, in central Malawi. The team is looking at how participatory research can inform climate change adaptation strategies in a context where local farmers struggle and where nearly one in 10 adults are HIV positive.

They set out to inform gender-sensitive policies to increase resilience by documenting how male and female farmers are experiencing climate change and involving them in testing adaptation strategies. To compare how mixed cropping systems perform against maize cropping alone in meeting the nutritional needs of households, researchers have applied crop modelling, using historic rainfall data. They are also exploring how farmer-to-farmer learning and community support can foster resilience, while benefiting those with HIV/AIDS.

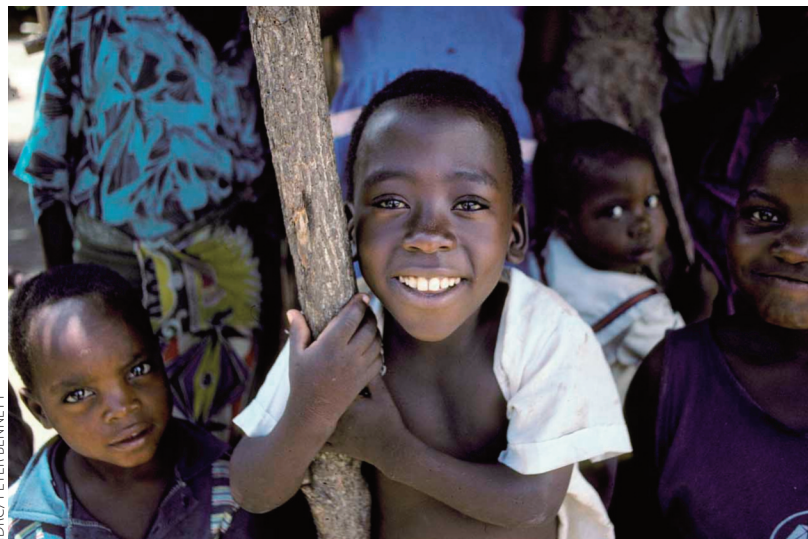
The results: better soils, health, and resilience through intercropping

Both modelling and farmer-led experiments suggest that diversifying and interplanting crops with legumes may be an important food security strategy in the context of climate change. It helps families meet more of their protein and nutrient needs, while protecting against crop losses due to drought, changes in rainfall patterns, and other effects of climate variability.

Adoption of these techniques rose to more than 70% of farmers in study areas by 2011. At the same time, community-led education strategies, such as recipe days, discussion groups, and social dramas, helped promote better nutrition and healthy childcare practices. Farmer exchanges and community-led activities, meanwhile, have helped meet the needs of those with HIV/AIDS and other marginalized groups.

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Working together, farmers and researchers have gained knowledge and become more adept in agro-ecological farming methods. Some 7,000 families have benefited to date. Nutrition and health has improved significantly for some 4,000 children. On average, those in participating villages are 1 kg heavier by their first birthday, and 1.5 kgs heavier at three years of age, than those in non-participating villages.



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Some 4,000 children are healthier as a result of better soils and nutrition.

In 2013, the project was cited by the UN Special Rapporteur on the Right to Food as a model approach to meeting Malawi's food security needs. He urged Malawi to invest in a "Brown Revolution" to reduce dependency on imported fertilizers and enhance drought resilience. As the latest phase of research concludes, the Government of Canada is providing new funding to scale up these successful approaches so they can benefit more farmers in Malawi.

The project "Building Food Security and Social Resilience to Climate Change" was funded by Canada's International Development Research Centre through the Ecosystems and Human Health program. Since 1996, IDRC has supported multidisciplinary research that looks at the interactions between ecosystems, social dynamics, and human health.

Ecosystems and Human Health

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