

# Fostering Economic Resilience

The Financial Benefits of Ecological Farming  
in Kenya and Malawi



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# Glossary

## Agroecology

Agroecology refers to the scientific discipline of studying agriculture as ecosystems, looking at all interactions and functions (i.e. producing food but also cycling nutrients, building resilience, etc.).

## Agroforestry

Greenpeace follows the definition of Agroforestry included in the IAASTD reports: “A dynamic, ecologically based, natural resources management system that through the integration of trees in farms and in the landscape diversifies and sustains production for increased social, economic and environmental benefits for land users at all levels. Agroforestry focuses on the wide range of work with trees grown on farms and in rural landscapes. Among these are fertiliser trees for land regeneration, soil health and food security; fruit trees for nutrition; fodder trees that improve smallholder livestock production; timber and fuelwood trees for shelter and energy; medicinal trees to combat disease; and trees that produce gums, resins or latex products. Many of these trees are multipurpose, providing a range of social, economic and environmental benefits.”<sup>1</sup>

## Bio-fertilisers

Bio-fertilisers are substances that contain agriculturally beneficial micro-organisms which, when applied to the soil, can form mutually beneficial relationships with plants and can assist nutrient availability. Good quality bio-fertilisers need to be tailored for specific locations and crops, and made available to farmers at minimal or no cost.

## Chemical-Intensive Agriculture

This agricultural model is characterised by low fallow ratios of land, mechanisation of agriculture and the extensive use of chemical fertilisers and/or pesticides. Chemical-intensive agriculture is widely associated with the so-called green revolution and the many negative effects on humans and the environment, from algae blooms (dead zones) to poisoning of farmers and farm workers.

## Conservation Agriculture

Conservation Agriculture is a management system for growing crops that is based on three principles that should be applied together and reinforce each other: minimum physical soil disturbance (no tilling); permanent soil cover with live or dead plant material (mulching or growing cover crops); and crop diversification in space and time (growing complementary crops together, and crop rotation). Herbicides are sometimes promoted as being part of conservation agriculture, however, if conservation agriculture is to be truly sustainable, herbicides cannot form part of the system.

## Donors

We define donors broadly to include: governments providing bilateral overseas development assistance, multilateral financial institutions, philanthropies, and international (UN) development organisations.

## Ecological Farming

Ecological farming encompasses a wide range of modern crop and livestock management systems that seek to increase yields and incomes and maximise the sustainable use of local natural resources whilst minimising the need for external inputs. Ecological farming ensures healthy farming and healthy food for today and tomorrow, by protecting soil, water and climate. It promotes biodiversity, and does not contaminate the environment with chemical inputs or genetically engineered plant varieties.

## Organic Farming

Organic farming is a system of crop production that avoids the use of chemical fertilisers or chemical pest and disease control measures. The International Federation of Organic Agricultural Producers (IFOAM) defines organic agriculture as: “...a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic Agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.”<sup>2</sup>

## Push-Pull Technology

Push-Pull Technology is a form of ecological farming used to control parasitic weeds and pest insects that damage crops. It involves no use of chemical pesticides. Volatile chemicals from Desmodium, a leguminous herb, intercropped with the food crop (maize, sorghum or rice) repel corn borer moths (push), while volatile chemicals from a border of Napier Grass attract the moths, which lay eggs in the grass instead of the crop (pull). Desmodium also improves soil fertility, thereby combating the parasitic Striga weed. Push-pull is an affordable farming technique for small-scale farmers which not only increases yield, it also provides a source of fodder for animals (Napier Grass) which increases milk yields.



# Summary

Faced with widespread hunger and the need to increase farm production to feed a growing population, many governments in Africa and elsewhere are spending vast amounts of money on getting chemical fertilisers and pesticides to farmers. Furthermore donors like the US and Britain, as well as private philanthropies like the Gates Foundation, are also pushing for increased use of chemicals as the solution to raising farm productivity in Africa.

Yet this strategy is grossly misplaced. The evidence in this report suggests that it is more profitable for small-scale farmers in Africa to practise ecological farming that uses no chemical pesticides or fertilisers than it is to use chemicals. Presenting the results of new fieldwork in Malawi and Kenya, this report shows that farmers practising agroforestry (involving the use of natural 'fertiliser trees' instead of chemical fertilisers) and 'Push-Pull' technology (which eliminates the need for chemical pesticides) achieve higher incomes and yields than those practising chemical-intensive agriculture.

Greenpeace is campaigning for ecological farming in East Africa. Governments and donors must re-focus their agriculture spending to support ecological farming since it is economically more beneficial for small-scale farmers. The time is ripe to do this given that 2014 has been designated the African Union Year of Agriculture and the International Year of Family Farming.

## Comparing chemical-intensive and ecological farming

Chemical-intensive agriculture involves a substantial use of chemical fertilisers and pesticides, together with hybrid seeds. It is often associated with the production of cash crops for export and consolidates large areas of land under monocultures (the production of a single crop). Nitrogen fertiliser use has grown by over 900 per cent since the 1960s and projections are for a further rise of 40-50 per cent in the next 40 years.<sup>3</sup> The major beneficiaries of the model will continue to be the multinational corporations manufacturing the chemicals and seeds, not the small-scale farmers being encouraged to buy them.

Chemical-intensive farming is fraught with problems. It can be a massive cost for farmers and governments: Ten countries in sub-Saharan Africa are currently spending US\$1.05 billion a year on fertiliser subsidy programmes, an average of 30 per cent of their agriculture budgets.<sup>4</sup> Chemical-intensive farming also causes farmer and public health problems due to pesticide use: The UN Environment Programme has calculated that the cost of pesticide-related illnesses in sub-Saharan Africa, for governments and those affected, could reach \$90 billion during 2005-20.<sup>5</sup>

The use of chemicals often damages soils, by acidification for example (now a widespread problem in many parts of Asia, after years of chemical fertiliser dependence).<sup>6</sup> Overuse and inefficient use of chemical fertilisers is a major global problem: some 30-80 per cent of nitrogen applied to farmland as fertiliser escapes to contaminate water systems and the environment.<sup>7</sup> Chemical-intensive farming is also a major contributor to climate change: agriculture accounts for as much as 32 per cent of global greenhouse gas emissions (including the impact of deforestation caused by farming)<sup>8</sup> and the manufacturing, transport, distribution and use of chemical fertilisers alone accounts for around 5 per cent of emissions<sup>9</sup>.

By contrast, ecological (often called 'agroecological') farming ensures healthy farming and food by protecting soil, water and climate, promotes biodiversity and does not contaminate the environment with chemical inputs. Ecological farming is both a climate mitigation and adaptation strategy: mitigating climate change by eliminating dependence on fossil fuels, and also enhancing the resilience of poor communities in the face of climate shocks. Ecological farming also makes the best possible use of locally available inputs, thus keeping money in the local economy. Such farming practices include agroforestry, Push-Pull technology, sustainable land management, water harvesting and organic farming. There is substantial evidence that farmers who start using ecological farming methods can increase yields significantly, particularly in Africa.<sup>10</sup>

Critically, and a key focus of this report, ecological farming entails lower production costs and thus often increases incomes for small-scale farmers in resource-poor communities.

## Fieldwork findings in Kenya and Malawi

### Kenya

Push-Pull Technology is a form of ecological farming used to control parasitic weeds and insects that damage crops, and which involves no use of chemical pesticides. Our fieldwork among four groups of small-scale farmers in Kitale and Mbita regions of western Kenya measured the benefits of practising Push-Pull compared to the absence of Push-Pull and to using chemical pesticides.

#### We found that:

- The average profitability per acre of maize per year (meaning the value of production minus costs) in Kitale was \$588 for Push-Pull farmers but only \$193 for chemical farmers – three times greater and a difference of \$395 per acre per year.

- In Mbita, average profitability was \$433 for Push-Pull farmers and \$142 for non- Push-Pull farmers – also three times greater and a difference of \$291 per acre per year.
- If the same results were applied across Kenya, farmers' incomes could more than double and the gains for Kenya's four million farmers would total \$2.7 billion, a huge injection of revenues into poor rural areas.
- This increased income for farmers is due to a combination of better yields and lower production costs. Average yields for maize grown using Push-Pull are roughly double those of farmers not practising Push-Pull. While Push-Pull farmers in Kitale spend nothing on pesticides and a small amount on fertilisers (\$44), chemical farmers spend an average of \$159 per year on pesticides and fertiliser.

## Malawi

Greenpeace interviewed maize farmers in Salima district of central Malawi to assess the relative benefits of farmers using chemicals or agroforestry. Agroforestry is a form of ecological farming that incorporates 'fertiliser trees' into farming systems to build soil health without the use of chemical fertiliser.

### We found that:

- The average profitability per acre of maize (value of production minus costs) was \$259 for agroforestry farmers and \$166 for chemical farmers – a difference of \$93 per acre per year.\* This is a significant sum in rural Malawi, amounting to around one third of average annual incomes (which are around \$270<sup>11</sup>).
- Crucially, agroforestry farmers secure much higher incomes than those farmers buying fertiliser *even at subsidised prices under the government's fertiliser subsidy programme*.
- As in Kenya, farm costs are much lower for agroforestry farmers than for those using chemicals – 9 per cent of the value of production compared to 32 per cent (due mainly to purchases of expensive chemical fertilisers).
- If the 1.5 million Malawian farmers currently using chemical fertilisers were able to switch to agroforestry, they could earn a combined \$209 million extra income per year.<sup>12</sup>
- Maize yields of agroforestry farmers were higher: 1,137 kg per acre compared to only 828 kg per acre for chemical farmers.

It is often believed that ecological farming requires more labour time and costs than chemical-intensive farming. Our research challenges this. In Kitale, a smaller number of Push-Pull farmers incur labour costs than chemical farmers (61 per cent compared to 80 per cent). In Malawi, more farmers buying chemicals (29 per cent of farmers) incurred labour costs on their farm (for all crops including maize) than those practising agroforestry (21 per cent).

Not only do our findings suggest that agroforestry and Push-Pull are more profitable for farmers than using chemical fertilisers and pesticides, but also that many chemical farmers would switch to ecological farming if the government supported the transition. Such support is likely to be more cost-effective for the government, and more profitable for farmers, than subsidising or using chemical fertilisers.

## Government spending on chemicals and ecological farming

Currently, most governments around the world are spending far more on chemicals than ecological farming. Although some governments are promoting forms of ecological farming, only one country – India – has so far adopted a cohesive national policy on agroforestry, for example, and this was approved only in February 2014.<sup>13</sup>

The Kenyan government spent \$34.3 million in 2012/13 on its input (fertilisers and seeds) subsidy programme – the National Accelerated Agricultural Inputs Access Programme (NAAIAP).<sup>14</sup> Kenya imported \$1.3 billion worth of chemical fertilisers and \$578 million worth of pesticides during 2004-11. In addition, the government is planning to build a fertiliser manufacturing plant at a massive cost of \$442 million.<sup>15</sup> Government figures are not disaggregated to show how much is spent on ecological farming, but it is likely to be significantly lower than the level currently or planned to be spent promoting chemical inputs.

Similarly, Malawi has become well-known for its large-scale Farm Input Subsidy Programme (FISP), which offers fertilisers at subsidised prices and which has increased the yields of many farmers who previously suffered deep food insecurity crises. However, the FISP accounted for a huge 51 per cent of the country's agriculture budget in 2012/13 and 43 per cent in 2013/14.<sup>16</sup> This amounts to around 9 per cent of Malawi's entire national budget in both years. As in Kenya, our findings suggest that it would be more profitable for farmers and the government to invest this money in ecological farming. Yet Malawi's budget allocation to the FISP is ten times greater than spending on ecological farming.

## Recommendations

Our findings show that, to enhance small-scale farmers' economic well-being and food security, governments will get better value for their money by supporting ecological farming over chemical inputs. Therefore, governments should reduce their support to chemical-intensive agriculture by phasing out chemical input subsidy programmes, and promote 'enabling' policies that support ecological farming. This can be accomplished by:

\* This is not the same as income. The value of production is the worth of maize produced if sold (which it often is not).

- Establishing time-bound targets to reduce and then eliminate the use of chemical inputs.
- Drastically increasing national budgets devoted to supporting ecological farming.
- Creating and fully funding Ecological Farming Strategies that include plans for phasing out fertiliser subsidies and the use of other chemicals such as pesticides.
- Establishing strategies to increase the use of organic fertilisers, and to provide supportive and enabling policies to achieve this. This policy package should form part of the governments' climate adaptation programmes.
- Establishing subsidy programmes that support ecological farming, such as by promoting bio-fertilisers
- Refocusing extension, agricultural research and rural credit programmes to move away from supporting chemical-intensive agriculture and towards supporting ecological farming.
- Disaggregating and tracking budget spending on ecological farming to assess and increase support for this over time.

#### Donors should:

- Fund larger studies than we have been able to undertake for this report to assess the profitability for small-scale farmers of ecological farming approaches, and identify how these can be scaled up to reach larger numbers of farmers.
- Increase investments in and shift existing agricultural finance to scale up ecological farming. Investments must be predictable, transparent, untied, and channelled through budget support where appropriate.
- Invest in rebuilding extension services to scale up the uptake of ecological farming practices.
- Champion reform of global agricultural research and development to re-focus this on ecological farming.
- Focus climate change adaptation plans and financing on supporting those most vulnerable to risk – small-scale farmers – to increase their uptake of ecological farming practices to increase resilience



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