



# Sustainable agriculture

A pathway out of poverty for East Africa's rural poor

Examples from Kenya and Tanzania

# **SUSTAINABLE AGRICULTURE**

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FOR EAST AFRICA'S RURAL POOR**

***EXAMPLES FROM KENYA AND TANZANIA***



Sustainet aims to systematically evaluate, communicate and disseminate successful approaches and concepts of sustainable agriculture in selected pilot regions. It works at various levels. Discussion between Sustainet's German NGO project partners on the poverty reduction impacts of different models and strategies, coupled with reflection and assessment in the pilot regions in close cooperation with local partners, contribute to harmonizing implementation strategies. Analysis and discussion of successful and promising dissemination strategies aims to influence funding priorities for agricultural and rural development. The exchange of information and networking between public, civil society and private partners on sustainable land use, as well as capacity building of private and public rural service providers, strengthens advocacy and the delivery potential of change agents.

Sustainet's goals are to:

- Highlight the significance of sustainable agriculture for global food security,
- Identify promising key promotion priorities in rural areas,
- Specify fields of action for agricultural policy, and
- Establish networks between local and international partners, thereby promoting the dissemination of successful concepts.

More information: [www.sustainet.org](http://www.sustainet.org)

Publisher: Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Postfach 5180, 65726 Eschborn, Germany, Tel. +49 6196 79-0, fax +49 6196 79-1115, email [info@gtz.de](mailto:info@gtz.de), internet [www.gtz.de](http://www.gtz.de)

Sector project: Sustainet, Sustainable Agriculture Information Network, [www.sustainet.org](http://www.sustainet.org)

Editing and desktop publishing: Paul Mundy, Germany, [paul@mamud.com](mailto:paul@mamud.com), [www.mamud.com](http://www.mamud.com)

Contact in Federal Ministry for Economic Cooperation and Development: Ralf Wyrwinski

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## Foreword

Josef Sayer<sup>1</sup>

WE TEND TO THINK of “sustainability” as having three dimensions: ecological, economic and social. But these three dimensions are not separate: in reality they are intertwined. Plus, sustainability has an international perspective that we must consider.

Acting and behaving according to this concept of sustainability is a global task, and is a key question for humanity. In combating poverty, all three dimensions of sustainability have to be taken into account. In the ecological dimension, conserving a sound environment for future generations is closely related to the fight against poverty. Millennium Development Goal 8 aims at the economic dimension: it calls for a global development partnership which overcomes discrimination between poor and rich countries. Finally, there is a close connection between poverty and the social dimension. If people are starving, their health is at risk – this is especially true for the children of the poor – and combating diseases like HIV/AIDS, malaria or tuberculosis becomes very difficult.

How does Sustainet, as a “lighthouse project” of the German Council for Sustainable Development, meet the task of combating poverty while taking into account the concept of sustainability? A lighthouse project is supposed to have a big political impact. But we know that any project is able to make only a limited contribution to global challenges like combating poverty and assuring food security in rural areas. So, what are the interesting features of Sustainet? It focuses on two crucial aspects:

- On one hand, Sustainet creates awareness of errors in the so-called “Green Revolution”. With the Green Revolution it seemed possible to solve the problem of food insecurity worldwide. But as the principles of sustainability were not taken into account; the Green Revolution failed, and even worse, contributed to the impoverishment of small farmers by trapping them in debt.
- On the other hand, transnational companies pose a similar threat to sustainability through campaigns that promise to abolish hunger through “green gene” technology.

As a reaction to the Green Revolution, development cooperation – above all NGOs and churches – established practices taking into account the criteria of sustainability. Proofs were shown in Africa, Asia and Latin America that it is possible to increase yields by 100% through sustainable agriculture especially for small farmers. Sustainable agriculture actually combats hunger in rural areas and significantly enhances degraded soils.

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<sup>1</sup> Member of the German Council for Sustainable Development and Executive Director of Misereor. This Foreword is based on a speech presented at the Annual Conference of the German Council for Sustainable Development, Berlin, September 2005.

How can these experiences and models of “good agricultural practices” be disseminated? Why are such solutions limited to certain areas? What are the preconditions for a successful scaling up, and what factors hamper dissemination? As there are no systematic analyses to answer these questions, the lighthouse project aims to figure out how successful, sustainable approaches assuring food security could be spread. In this way, the project will present a real alternative to “green gene” technology, and will have a strong political impact.

The local approaches analysed by Sustainet deal with soil conservation, upgrading soil fertility, integrated animal husbandry, diversification of cultivated crops, protection of biodiversity, natural pest management, post-harvest improvements, marketing, and strengthening local institutions. These are diverse approaches; they all minimize the consequences of agricultural production but differ in the level of external resources used and in the type of tillage operations.

In conclusion, the main objectives of the lighthouse project are:

- To implement the three intertwined dimensions of sustainability in the field of agriculture in developing countries.
- To show the effectiveness of networks between local and international partners and contribute to the dissemination of successful approaches of sustainable agriculture.
- To make policymakers increasingly aware of the significance of sustainable agriculture for rural economical growth and for fighting poverty.
- To identify promising strategies that should be promoted to meet the Millennium Development Goals and which can result in recommendations for agricultural development.

## Sustainet partners in Germany and East Africa

<i>German organization</i>	<i>East African organization*</i>
<b>Bread for the World</b> (Brot für die Welt) <a href="http://www.brot-fuer-die-welt.org">www.brot-fuer-die-welt.org</a>	<b>Christian Community Services of Mount Kenya East (CCSMKE)</b> (p. 12) <a href="mailto:ccsmke@yahoo.com">ccsmke@yahoo.com</a> <b>Christian Community Services, Anglican Church of Kenya, Diocese of Eldoret (CCS–Eldoret)</b> (p. 21) <a href="mailto:elreco@africaonline.co.ke">elreco@africaonline.co.ke</a>
<b>Federal Ministry of Food, Agriculture and Consumer Protection (BMELV)</b> <a href="http://www.verbraucherministerium.de">www.verbraucherministerium.de</a>	<b>Conservation Agriculture – Sustainable Agriculture and Rural Development project (CA-SARD)</b> (p. 66) <a href="http://www.fao.org/SARD/en/sard/754/1458/">www.fao.org/SARD/en/sard/754/1458/</a>
<b>German Agro Action</b> (Deutsche Welthungerhilfe) <a href="http://www.welthungerhilfe.de">www.welthungerhilfe.de</a>	<b>Himo Environmental Management Trust Fund (HEM)</b> (p. 58) <a href="mailto:hemtrustfund@kicheko.com">hemtrustfund@kicheko.com</a> <b>Diocese of Embu, Integrated Rural Development Programme</b> (p. 28) <a href="mailto:doe.dssd@alpha.co.ke">doe.dssd@alpha.co.ke</a> <b>Baraka Agricultural College</b> (p. 38) <a href="http://www.sustainableag.org">www.sustainableag.org</a> <b>Catholic Diocese of Homa Bay, Agriculture and Environment Programme (AEP)</b> (p. 48) <a href="mailto:aephoma@africaonline.co.ke">aephoma@africaonline.co.ke</a> <b>Community Habitat Environmental Management (CHEMA)</b> (p. 77) <a href="mailto:chema@africaonline.co.tz">chema@africaonline.co.tz</a> , <a href="http://www.chematanzania.org">www.chematanzania.org</a> <b>PELUM-Tanzania</b> (p. 85) <a href="mailto:pelumtz@maf.or.tz">pelumtz@maf.or.tz</a> , <a href="http://www.pelumtanzania.org">www.pelumtanzania.org</a>

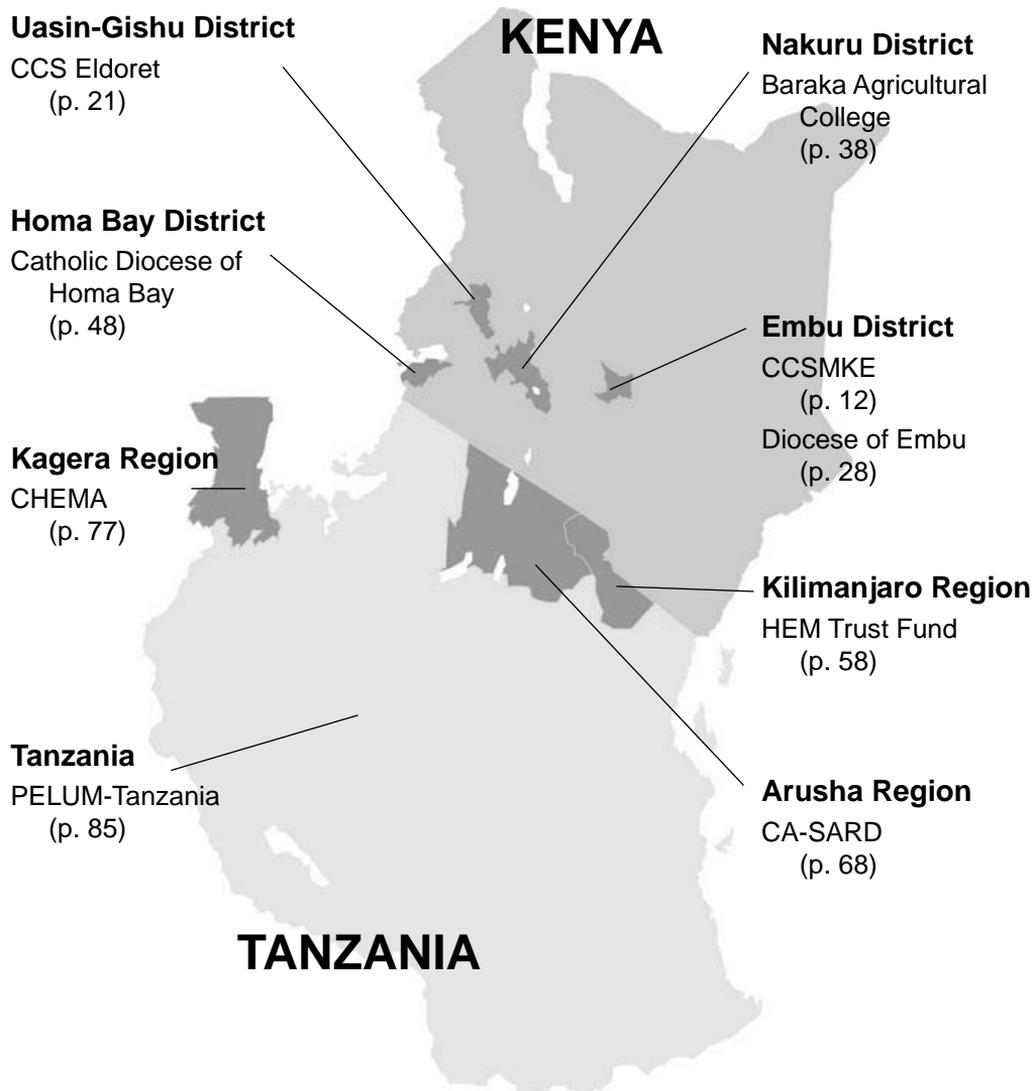
**Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)**  
[www.gtz.de](http://www.gtz.de)

**German Council for Sustainable Development**  
[www.nachhaltigkeitsrat.de](http://www.nachhaltigkeitsrat.de)

**Federal Ministry for Economic Corporation and Development (BMZ)**  
[www.bmz.de](http://www.bmz.de)

\*Recipients of current or past support

## Locations of projects in this book



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- The Leibniz Centre for Agricultural Landscape Research (ZALF), which is undertaking the analysis of the impacts and scaling-up potential of the projects described in this book.

## List of participants

FOR FURTHER INFORMATION AND contact details, see page 135.

### Kenya

*Anglican Church of Kenya, Eldoret Region Christian Community Services (CCS)*

- Rael Jepchumba Korir
- Selina Chepkorir Mayodi

*Agriculture and Environment Programme, Catholic Diocese of Homa Bay (AEP)*

- Richard O Apamo
- Percilla Adhiambo Obunga

*Baraka Agricultural College*

- Ernest Ndungu Githinji
- Maureen Wanjiku K

*Christian Community Services of Mount Kenya East (CCSMKE)*

- Mary Gichobi
- Tabitha W Waweru

*Diocese of Embu*

- John Namu Munene
- Justin Nyaga Wamuru

### Tanzania

*Community Habitat Environmental Management (CHEMA)*

- Sylvery LB Ishuza
- Esther Njeri

*Conservation Agriculture – Sustainable Agriculture and Rural Development project (CA-SARD) / Selian Agriculture Research Institute*

- Marietha Zakayo Omwenya
- Mariam Semlowe

*Himo Environmental Management Trust Fund (HEM)*

- John Roman Karawa

*PELUM-Tanzania*

- Yakobo EK Tibamanya

### Africa-wide

*African Conservation Tillage Network*

- Martin Bwalya

## **Germany**

### ***GTZ Sustainet-Germany***

- Charlotte Haeusler
- Felix zu Knyphausen
- Helga Stamm-Berg (coordinator)

### ***GTZ Sustainet-East Africa***

- Thomas Apina

### ***Leibniz Centre for Agricultural Landscape Research (ZALF)***

- Franziska Bringe
- Wibke Crewett
- Stefan Sieber

## **Workshop staff**

### ***Computer services***

- Bonaventure Nyotumba

### ***Editor***

- Paul Mundy

### ***Facilitation***

- Isaac Bekalo
- Rahab Ngumba Njoroge

### ***Illustrations***

- Bonaventure Nyotumba
- Alfred Ombati

### ***Logistics***

- Thomas Apina



# 1

## Introduction

*Helga Stamm-Berg, Sustainet*

IN SEPTEMBER 2000, THE largest gathering of world leaders in history agreed to a set of eight goals, the Millennium Development Goals. The first of these pledges the world's governments to eradicate extreme hunger and poverty.

This Goal cannot be realized without agricultural and rural development. The challenges are huge. Sub-Saharan Africa faces serious problems of food insecurity and nutrition-related health risks. According to FAO (1996 and 2000) about 33% of all Africa's population is under-nourished, and the depth of hunger is greatest in sub-Saharan Africa, where the undernourished proportion of the population rose from 37% in 1990 to 45% in 2003. About 70–80% of the people in sub-Saharan Africa live on a less than US\$1 per day. Hungry people can work less, think less, and produce less than those who are well nourished. If present trends continue, the region will have to import rising amounts of grain: 27 million tons in 2020. This rapid growth in imports will put a significant burden on the economies in the region. The food security situation of the poor is forecast to deteriorate further.

As is the case for much of sub-Saharan Africa, food insecurity in Kenya and Tanzania has been increasing (FAO, 2001). Poverty in Kenya is increasing, with 52% of the population living under the poverty datum line. The number of food-poor (who consume less than 2,250 calories per day) has nearly doubled from 7.9 million in 1973 to 15 million in 2002. According to Oxfam UK (2000), the number of undernourished people rose from 23% in 1980 to 50% in 2000. It will be difficult to feed another 10 million people from national production in the coming 10–15 years.

Similarly, poverty has become more common in Tanzania during the 1990s. Half of the population – between 15 and 18 million people – live below the poverty line. Nearly 12.5 million live in abject poverty, spending less than \$0.50 on consumption per day. The proportion of the population who are undernourished rose from 32% in early 1990s to 38% towards the early 2000s.

In both Kenya and Tanzania, poverty and hunger remain predominantly rural phenomena (Oxfam UK, 2000). Moreover, in both countries income inequality has increased. That is, gains from economic progress disproportionately favour urban areas and those who are

### **Box 1 Millennium Development Goal 1**

By 2015, all UN member states have pledged to...

- Reduce by half the proportion of people living on less than a dollar a day
- Reduce by half the proportion of people who suffer from hunger.

already relatively better off, while the rural and the poor are disfavoured. Yet the number of unemployed in urban areas is growing fast, inevitably leading to greater poverty.

When natural disaster strikes, some three-quarters of Tanzania's subsistence farmers are vulnerable to malnutrition. They have too little fertile land, live in areas that are poor for farming, lack capital to invest in improved techniques, and have no alternative sources of income. The situation in Kenya is similar: as a result of the 2000 drought, more than half of the population did not have enough to eat. Production of staple crops was well below average in the northern and central parts of the country; maize production was 69% below expected (FEWS 2000).

The statistics make sobering reading. About 22% of Kenyan and 29% of Tanzanian children under the age of five have been affected by malnutrition. Of every 1000 children born in both Kenya and Tanzania, 78 will not see their first birthday, and 120 die before they reach of the age of five. Average life expectancy dropped from 60 in the 1980s to 46 for Kenya and 43 for Tanzania in 2002 (World Bank, 2004) – a drop attributable largely to increased poverty and the ravages of the AIDS epidemic. By comparison, in Germany, a typical developed country, only 4 in every 1000 children die before their first birthday, and life expectancy is 78 years and rising.

## **The potential of agriculture**

How is it possible to meet this challenge? Agriculture has got to be a big part of the answer. It is the most important sector in the economy of both Kenya and Tanzania: it accounts for close to 17% of Kenya's GDP, employs more than 70% of the workforce, and generates about 60% of national export revenue. It is even more important in Tanzania, where farming accounts for about 43% of GDP, produces 56% of export earnings, and employs 70–80% of the workforce (World Bank, 2006).

Because so many people in both countries is rural, the pace of economic development, and success in eradicating poverty, depend largely on growth in the agricultural sector. Farming contributes far less to the national economy than its percentage of the workforce.

But that means agriculture has immense potential (Timmer 1998):

- It can provide adequate and affordable food for a rising population. The process of industrialization and urbanization currently under way in Kenya and Tanzania requires a supply of relatively cheap food for the growing urban labour force.
- Prosperous farmers are a big potential market for domestic industries and services.
- Agriculture provides employment and income to a large percentage of the population. Small improvements in farm productivity and in rural earnings, multiplied by millions of smallholder farmers, can generate huge benefits for the country as a whole.
- Agriculture supplies raw materials to a growing domestic industrial sector.
- It earns valuable foreign exchange that can be used to finance imports of capital and intermediate goods for local development.
- It can be a significant source of domestic savings for investment and capital formation.

## Box 2 Agriculture in Kenya and Tanzania

Kenya and Tanzania are large countries. With over 580,000 km<sup>2</sup>, Kenya is about the same size as France, while at 945,000 km<sup>2</sup>, Tanzania is only a little smaller than France, Germany and the Benelux countries combined. Kenya has a population of 32 million, growing by 2.2% a year, while Tanzania has 36 million, increasing by 1.9% a year (World Bank, 2006). Some 58% of Kenya's population live in rural areas, as do 62% of Tanzania's. However, only about 4 million ha in both countries (8% of Kenya and 4% of Tanzania) can be cropped (FAO 2006).

### Landholdings

Land sizes vary considerably in Kenya, where it is estimated that less than 20% of the population owns more than half the land. While a few own large tracts, much of this land is never used and is not subjected to tax. Most rural families live off only an acre of land (0.4 ha) – not enough to feed themselves – and about 13% have no land at all. In Tanzania too, smallholders dominate farming. Livestock are an important source of food and income in dry areas.

Smallholder farming enterprises with less than 2 ha dominate the agricultural sectors in both countries. They rely heavily on rainfall (rather than irrigation), family labour, hand tools and animal-drawn implements. A small number of large farms produce for export.

### Land quality

Land with the highest potential for crop production also has the highest population densities. In Kenya, the highest potential areas are in the Rift Valley, Central, and Western provinces. Parts of Eastern and Coast provinces of Kenya are economically dynamic, and commercial and export-oriented agro-enterprises operating there have gained valuable experience in producing marketable outputs.

While the irrigation potential in Kenya is about 9% of the total arable land, less than 2% has been used. In Tanzania, the potential is as high as 20% of the total arable area, but only 3.75% is actually irrigated.

Kenya has the most advanced agriculture in East Africa, with a relatively strong research and technology generation and delivery system, and an extensive network of rural infrastructure. Compared with their neighbours, Kenyan farmers use a lot of fertilizers (35 kg/ha on arable land), though this is far below the world average (94 kg/ha). In Tanzania, fertilizer use is very low (7 kg/ha), less than half of the average for Africa (18 kg/ha).

In many parts in both countries, smallholder farmers face steadily declining soil fertility, usually the consequence of population pressure and inappropriate land use. Prolonged dry spells, recurrent drought and erratic weather disrupt farming and livelihoods.

Large parts of both countries suffer from soil degradation, deforestation and desertification. Unsustainable practices such as over-cultivation and overgrazing lead to a decline in land productivity and production. As the population has increased in some areas, farmers have migrated into less favourable regions – to the east of Mount Kenya, for example, and some coastal regions and parts of central Tanzania, where they often use farming methods that work well back home but are unsustainable in their new locations. The result is degradation, falling fertility levels, and wind and water erosion. Livestock herders are deprived of their dry-season and emergency pastures – which have been converted to cropland – so are more vulnerable to the inevitable droughts.

### Commodities

Agricultural products include coffee, sisal, tea, cotton, tobacco, cloves, maize, wheat, cassava, banana, fruits and vegetables. Crops such as maize, rice, wheat and legumes are cultivated for subsistence and to meet domestic demand. Maize is the main staple food crop, despite

*Continued...*

**Box 2 (continued)**

the increasing popularity of wheat and rice in the cities. Subsistence farmers grow sorghum, millet, pulses (beans and peas), roots and tubers (cassava, sweet potatoes, Irish potatoes and yams) mainly for home consumption (Dorsey, 1999; Mukibi et al. 2002).

Traditional exports such as coffee, cotton and tea still account for the bulk of agricultural exports. Nonetheless, Kenya has been making significant efforts to diversify exports in such products as fish, vegetables, fruit and flowers, mostly destined for Europe. In addition, Kenya produces oilseeds and sisal for export; and maize and beans to export to regional markets (Dorsey, 1999). Kenyan small and medium-scale farming enterprises have shown they are capable of serving domestic and export markets. Kenya started these non-traditional exports much earlier than other countries in the region.

Tanzania's tea and cotton exports have revived recently. The increase in cotton production is attributed to a number of factors, including the incentives to farmers resulting from competitive markets, improved supplies of inputs to cotton farmers by traders and ginners, and acreage expansion. Although Tanzania is far behind Kenya, it also grows a variety of other crops for export: cashew, tobacco, sisal and cloves, together with flowers, fruit and vegetables (Ndulu et al. 1998).

Many industries in the two countries process agricultural products. Particularly in Kenya, such industries are promising starting points for higher demand for smallholders' products. Farmers are traditionally prepared to engage in self-help and cooperation in such enterprises.

There is considerable historical evidence that solid agricultural growth has to precede, or at least accompany, general economic growth. This transformation process still applies today; Africa will not be an exception, and it will not be able to jump this vital step. A broadly accepted conceptual framework for agricultural and economic transformation identifies four stages (Mellor, 1986):

- In the first stage, agriculture is nurtured and starts growing, creating new wealth at a rate that allows direct and indirect taxation. This enables investment in other major public assets, including infrastructure.
- In the second stage, agricultural growth becomes a direct contributor to overall economic growth through greater links with industry, improving efficiency of product and factor markets, and continued mobilization of rural resources (labour, raw materials and capital).
- In the third stage, agriculture is fully integrated into the market economy. Prices of food and the share of food in urban budgets continue to decline.
- In the fourth stage, agriculture is part of an industrial economy.

As agriculture passes through these stages, its share of gross national product diminishes, and the population becomes more urbanized.

Unfortunately, some policy makers have misinterpreted this trend. They see a decline in the relative importance of agriculture as meaning that agriculture is economically less important in the development strategy. In reality, agriculture is politically alive, including in industrial economies where farmers and the rural population represent only about 4% of the total population, but still command the attention of governments and of financial and industrial interests. Even where farming's relative importance in the economy has declined, growth in agriculture stimulates growth in other sectors, so has a significant positive impact on national

income. Moreover, increased public and private investment into the rural economy has a strong multiplier effect: it produces jobs, cuts poverty and boosts economic growth, as in fast-growing East and Southeast Asian countries (Timmer 1998).

Africa, it would appear, is still entering the first of the four stages of agricultural transformation. The continent has to get its agriculture moving, and focus squarely on productivity and competitiveness. Over the last three decades, production increases have been largely through expansion of the cultivated area cropped, rather than through improvements in yield. But in many high-potential areas, farms are now very small, and the only way to boost output is to raise productivity.

### Why sustainable agriculture?

The yields on many farms in Kenya and Tanzania have declined. The reasons for this are manifold: the soil fertility is falling because of monocropping with maize and other staples; farmers are no longer able to afford inputs such as fertilizer and seeds after subsidies were withdrawn during the policy reforms of the last decades (see page 95); and a series of droughts has cut production.

Sustainable agriculture offers solutions to these problems.

- **Improved soil fertility** Conventional farming methods rely on artificial fertilizers to maintain fertility. Sustainable agriculture uses a range of techniques to maintain and improve soil fertility: organic fertilizers, mulching, cover crops, agroforestry, crop rotation and multiple cropping.

#### Box 3 Definition of sustainable agriculture

At the 1992 Earth Summit in Rio de Janeiro, the UN Food and Agriculture Organization (FAO) defined “sustainable agriculture and rural development” as follows:

“Sustainable development is the management and conservation of the natural resource base and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations. Such sustainable development (in the agriculture, forestry, and fisheries sectors) conserves land, water, plant and animal genetic resources, is environmentally non-degrading, technically appropriate, economically viable and socially acceptable’ (FAO 1989).

In 1995 FAO went on to define sustainable agriculture and rural development more specifically as a process that meets the following criteria:

- Ensures that the basic nutritional requirements of present and future generations, qualitatively and quantitatively, are met while providing a number of other agricultural products.
- Provides durable employment, sufficient income, and decent living and working conditions for all those engaged in agricultural production.
- Maintains and, where possible, enhances the productive capacity of the natural resource base as a whole, and the regenerative capacity of renewable resources, without disrupting the functioning of basic ecological cycles and natural balances, destroying the socio-cultural attributes of rural communities, or causing contamination of the environment and
- Reduces the vulnerability of the agricultural sector to adverse natural and socio-economic factors and other risks, and strengthens self-reliance” (FAO 2002).

- **Better pest control** Conventional farming uses chemical pesticides to control pests. These are expensive and often result in the emergence of new pests or the resurgence of the very pests they are trying to control. Sustainable agriculture instead uses integrated pest management approaches: a combination of natural enemies, crop rotations and mixtures and biological control methods. These methods cost less than the pesticides, and do not result in pest resurgence.
- **Controlling erosion** Sustainable agriculture includes a palette of techniques to conserve precious topsoil and prevent it from being washed or blown away. These include using contour bunds, contour planting, checkdams, gully plugs, and maintaining cover crops or mulch to protect the soil from heavy rainfall.
- **Water conservation** Water is scarce in much of Kenya and Tanzania, and drought is never far away. Sustainable agriculture conserves water in the soil through a variety of methods. Fortunately, many of these are the same as those used to control soil erosion. Because it conserves water and uses a variety of crops instead of just one, sustainable agriculture is less risky than conventional monocropping: it is more likely to produce food for the farm family even during a drought.
- **Reliance on local inputs** Farmers often do not realize the value of the inputs they have immediately to hand. They include manure from their animals (which very often is wasted in conventional systems), vegetation from roadsides and the field boundaries (used as mulch or to make compost), and local varieties of crops (many of which are ideally adapted to local conditions but which have been half-forgotten in the rush to adopt modern varieties).
- **Indigenous knowledge** An important local input is the people's own knowledge. Local people are experts on the plants, animals, soils and ecosystems they are surrounded by and on which they depend. Instead of pooh-pooing this as superstitious nonsense, sustainable agriculture draws on this wealth of knowledge, and encourages local people to use it, test it, and promote what works.
- **Local organizations and initiative** Equally important are the energy and capacity of local people to organize and cooperate to solve their own problems. Unlike conventional extension agencies, organizations that promote sustainable agriculture spend at least as much time in helping farmers organize as they do in teaching farming technologies.

Ironically, many sustainable agriculture approaches are very similar to the techniques traditionally used by farmers before the advent of “modern” farming. That does not mean, though, that sustainable agriculture turns its back on modern inputs or ideas. Many types of sustainable agriculture use modern high-yielding crop varieties and artificial fertilizers wherever appropriate. (Some, such as organic agriculture (see page 77) avoid such inputs as well.)

## **The Sustainet project**

Combating world hunger through sustainable, adapted agriculture is one of the main goals of the German government's Programme of Action 2015. To help achieve this goal, a supra-regional joint venture among German development cooperation organizations was initiated in December 2003 by the government's Sustainability Council. The core idea behind this project, called “Sustainet”, is to demonstrate the benefits, viability and widespread applicability

of sustainable, locally adapted land use as a strategic way to overcome hunger and poverty in the developing world.

Three major non-governmental development organizations – Bread for the World, German Agro-Action and Misereor – along with the German Agency for Technical Cooperation (GTZ) participate as equal partners in the joint venture. From May 2006, World Vision Germany is also participating in Sustainet. At an international level, Sustainet cooperates closely with FAO, in particular with the Sustainable Agriculture and Rural Development Initiative and the Conservation Agriculture project. The programme secretariat, based at GTZ in Eschborn, near Frankfurt, manages coordination and networking activities. The programme is funded by the German Ministry of Economic Co-operation and is advised by the German Ministry of Consumer Protection, Food and Agriculture.

Sustainet is an acronym for “Sustainable Agriculture Information Network”. As the name suggests, the programme aims to establish networks between institutions involved at local, regional and international levels. Although various good examples of sustainable agriculture were developed with the assistance of German development agencies and their partner organizations, hardly any analyses on the possibilities of scaling up such successful concepts have been published. In response, Sustainet aims to systematically evaluate and communicate “good agricultural practices”: successful local to international approaches and strategies in sustainable agriculture. This will lead to a better understanding of the fostering and hampering factors relevant for the dissemination of sustainable agriculture models, identify locally adapted agriculture, define promising key priorities for promotion, and specify fields of action for agricultural policy.

Sustainet’s objectives go beyond analysis and evaluation: it also aims to promote the process of scaling up itself.

Sustainet concentrates on three pilot areas: Kenya and Tanzania (the focus of this book), India, and Latin America (Peru and Bolivia). In each of these pilot areas, a number of projects were selected that have been especially successful. Among them are projects that apply the techniques of organic farming, integrated pest management, linking small farmers to markets, public-private partnerships, dryland agriculture, watershed management, protection of biodiversity and post-harvest improvement.

Sustainet has various audiences. It aims to help the local cooperating organizations to learn from each other. Through them, it hopes to help the poor rural population in the pilot regions. It also aims to contribute to political discussion on a national and international level. Through promotional activities and meetings, it highlights the significance of sustainable agriculture for the global food security to political institutions in the pilot countries and in Germany.

## **The Sustainet process**

During the initial project phase (December 2003 to November 2006), Sustainet covers three main activities: (1) systematically analysing successful examples of sustainable agriculture, (2) evaluating and documenting the impacts of local projects, and (3) determining possibilities for disseminating best practices.

To document established and tested good practices, Sustainet selected partners in the pilot areas which have been running successful projects for at least 5–10 years. These partners were chosen by the Sustainet steering group from a list drawn up by a team of consultants. Through regional workshops, Sustainet familiarized the local partners with the project idea and discussed future working relationships. Interested partners were then invited to join the Sustainet activities. They agreed to undergo a self-assessment process and prepare a report of a selected “good agricultural practices”. Sustainet promised to promote and publish their experiences (this book is one of these outputs).

Sustainet has established international information networks and communication structures on sustainable agriculture. To document the selected projects in a way that makes it possible to compare and assess them (and so evaluate their potential for scaling up), the Centre for Advanced Training in Rural Development (SLE) at Humboldt University, Berlin, developed self-assessment guidelines in cooperation with the local partners. This self-assessment generated information on the techniques used (both on- and off-farm), the project approach, the outside support provided, external conditions (local and national) and dissemination strategies. Sustainet guided and assisted the local partners during the self-assessment process.

The Leibniz Centre for Agricultural Landscape Research (ZALF) is analysing the data collected through the self-assessment, with funding from the German Federal Ministry of Consumer Protection, Food and Agriculture. The analysis pays particular attention to the degree to which local people have adopted the sustainable agriculture approaches after the end of the project, and how many people not directly linked to the project have copied them spontaneously. This assessment and analysis exercise will also estimate the impact of the improved practices on poverty reduction and on food and nutrition security.

The evaluation will generate information on factors that foster and hamper the dissemination of the approaches. This will enable Sustainet to identify factors relevant for successful scaling up of good practices. The results, case study reports and lessons will be published.

An important aim of Sustainet is to exchange experience and promote strategic dialogue with key actors in partner countries and among German and international development agencies. This dialogue aims to generate recommendations for future agricultural funding strategies.

## **How this book was prepared**

This book was prepared through a 10-day “writeshop” – an intensive, participatory workshop in which participants wrote, presented and revised the manuscripts that form the various chapters of the book. The participants (see page xiv) came from nine Sustainet partners throughout Kenya and Tanzania, Sustainet-Germany, the Leibniz Centre for Agricultural Landscape Research (ZALF), and the African Conservation Tillage Network. They were supported by a facilitator, artists, an editor and logistics staff. Before the writeshop, participants prepared manuscripts describing their project, following a set of guidelines provided.

During the writeshop, each participant presented his or her draft manuscript. The other participants commented, critiqued, asked questions, and suggested revisions. After each presentation, the presenter discussed the manuscript with an editor (the chief editor or one of the Sustainet-Germany staff), and they incorporated the audience’s comments and together restructured the manuscript so it would fit in the book. An artist drew illustrations

to accompany the text. Meanwhile, other participants were also presenting their manuscripts to the group. Each author worked in turn with the team of editors and artists to revise and illustrate the text.

Each participant then presented his or her revised draft to the group a second time. Again, the audience critiqued it and suggested revisions. After the presentation, the editor, artist and desktop-publishing specialist again revised the manuscript and developed a third draft. Towards the end of the writeshop, the third drafts of some manuscripts were made available to participants for final comments and revisions. These manuscripts form Parts 2 and 3 of this book.

At several stages during the writeshop, small groups of participants discussed policy issues relating to sustainable agriculture, and the constraints, potentials and actions needed to ensure that sustainable agriculture could be scaled up successfully in East Africa. Each group then presented its findings to the plenary for further discussion. The results of these discussions form Parts 4 and 5.

Through this process, individual manuscripts were revised substantially, and the information they contained was combined with ideas from other sources and was distributed throughout the toolkit. A single section in the book may contain information provided by many different participants. This means it is not possible to label a particular section as the work of a particular participant. The “authors” of the book are thus the participants listed on page xiv.

The writeshop process was developed by the International Institute of Rural Reconstruction (IIRR, [www.iirr.org](http://www.iirr.org)), which has used it to produce extension and information materials on a wide range of subjects. Senior IIRR staff members facilitated the writeshop for Sustainet.

## Structure of this book

The remainder of this book consists of five Parts.

**Part 2, Cases from Kenya**, provides examples from five sustainable agriculture development initiatives implemented by Sustainet partners in Kenya, covering maize production, agroforestry, goat-raising, integrated agriculture, and groundnut production. Each example describes the initiative, its results and impacts, and draws lessons from it that can be applied to other projects elsewhere.

**Part 3, Cases from Tanzania**, tells the story of four initiatives in Tanzania: soil and water conservation, farmer field schools, organic pineapple growing, and networking.

**Part 4, Agricultural policy in Kenya and Tanzania**, outlines the recent history of agricultural policy reforms in the two countries, identifies problems or issues that remain to be resolved, and suggests how sustainable agriculture can provide solutions to these problems. For each issue, it also suggests policy reforms that could help sustainable agricultural approaches to succeed.

**Part 5, Scaling up**, tackles the problem of scaling up sustainable agricultural approaches. Parts 2 and 3 have shown that these approaches can improve the livelihoods of smallholder farmers and village communities in East Africa, sometimes dramatically so. But how can these approaches be scaled up to reach a much larger number of people? Part 5 draws on the experiences in the previous chapters to show how it might be done. It divides scaling up into

four types; quantitative, functional, political and organizational, and shows how the Sustainet partners have scaled up their activities in each of these ways. This Part should provide a rich vein for other organizations wishing to expand the impact of their work, as well as for government and donors seeking to stimulate large-scale rural development.

Finally, **Part 6, Participants' profiles**, provides contact addresses and profiles of the people who helped compile this book.

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# 2

## Cases from Kenya

Nine-seeded hole in Ena village

*CCSMKE, Kenya*

From agroforestry to improved livelihoods in Chebarus village

*Christian Community Services, Kenya*

Dairy goats: Hope for farmers in Embu and Mbeere districts

*Diocese of Embu, Kenya*

A tale of two villages: Integrated agriculture in Lare Division

*Baraka Agricultural College, Kenya*

Days of hunger are gone: Groundnuts in Kuna village

*Catholic Diocese of Homa Bay, Kenya*

## Nine-seeded hole in Ena village

*Christian Community Services of Mount Kenya East, Kenya*



LYDIA KARIMI USED TO grow maize and beans on her one acre (0.4 ha) of land in the village of Ena, in Runyenje's Division, Embu District. Lydia and her neighbours complained of low yields: like in much of Eastern Kenya, the soil in the village is infertile, and frequent drought meant the farmers sometimes could not harvest anything at all. Lydia had to do all the farm work by herself: her husband worked as a casual labourer in town to earn money to support their two children. The young couple found it very difficult to make ends meet.

Then Lydia heard from the local priest and the village chief that a development organization was going to start work in the area. The organization was the Christian Community Services of Mount Kenya East (CCSMKE), the development arm of the local Anglican Church. CCSMKE conducted a participatory appraisal in Ena and held meetings with the villagers to discuss development issues. Lydia took part in these activities. One thing led to another: she attended training about development issues, and decided to join a new agricultural development group being formed in the village with CCSMKE advice.

Lydia was one of the most active members of the group, so CCSMKE invited her to attend a 3-day training at Macumo Station in August 2004. There she learned many farming techniques: how to make compost, liquid manure and natural pesticides from plants; how to prevent erosion, conserve water and manage soil fertility; how to grow vegetables; and how to select seed of various crops.

One of the subjects in the course was the "nine-seeded hole". This is a way to improve the soil's fertility and its ability to hold water, so increasing yields of crops such as maize, sunflower and sorghum.

Lydia was interested in this method, so she decided to try it out on a small part of her land – about one-eighth of an acre (0.05 ha). She made some compost from the dung and stable litter from her two cows. With some help from a labourer, she dug rows of holes – about 150 of them (see Box 4). She planted the field in the 2005 short rainy season. Instead of using seed she had saved herself, she bought some from a shop in the village and sowed it in the holes. In between the rows of maize, she planted sweet potato vines from CCSMKE, along with beans and bananas.

To her delight, Lydia was able to harvest 90 kg of maize from the plot – over four times more than usual – even though the rains that season were not good. She was able to sell some of the maize and sweet potatoes in the local market. The sweet potatoes, beans and bananas provided some welcome variety to the family's diet.

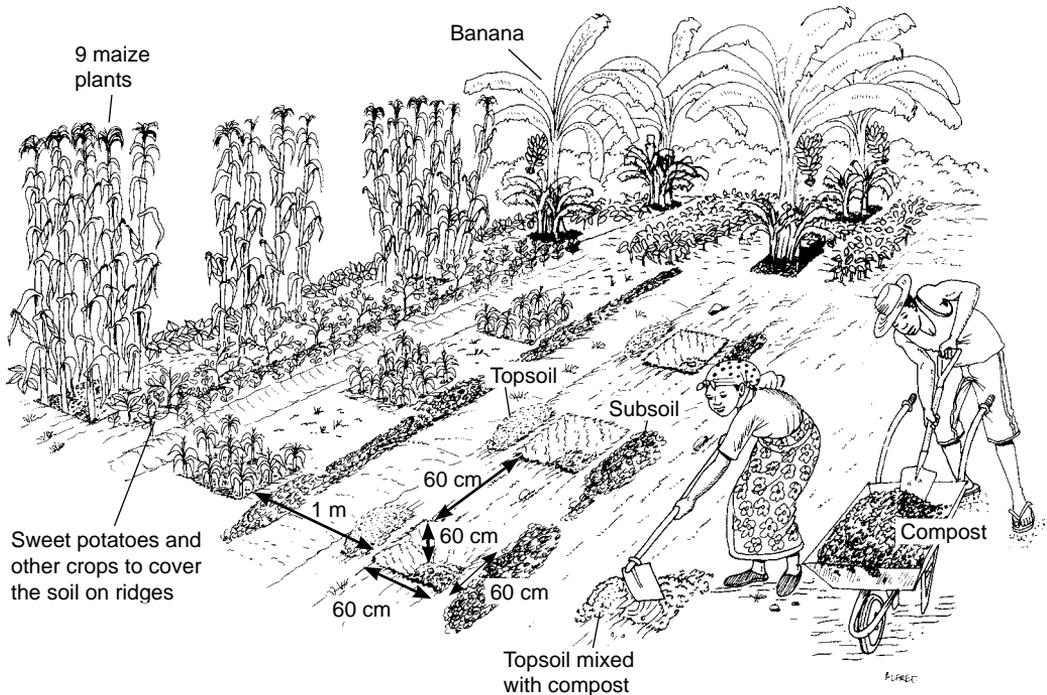


Figure 1 Nine-seeded holes

Lydia was so pleased that in 2006, she decided to use the nine-seeded hole technique on her whole farm. It took 6 days to dig all the holes, and another 3 to carry compost into the field and put it in the holes. It was backbreaking work, but Lydia and her husband decided to invest some of their scanty savings to hire a labourer to help.

Lydia is confident that it will be worth it. She is looking forward to a bumper crop when they harvest their maize in June 2006.

#### Box 4 How to use nine-seeded holes

Use a hoe to dig a row of holes in the field. Make each hole 2 feet square and 2 feet deep (60 x 60 x 60 cm). When you are digging, take the topsoil out and put it to one side. Use the subsoil to make a ridge downslope from the hole (it will help stop erosion).

Space the holes about 2 feet (60 cm) apart within the row. Leave 3 feet (1 m) between rows of holes. Line the rows along the contour to help prevent erosion.

Mix the topsoil from each hole with about 20 kg of compost made from dung, stable litter and green vegetation. Then put it back in the hole, leaving a depression which catches rainwater.

Sows nine seeds of maize (or sunflower or sorghum) in the hole, in a square pattern with 1 foot (30 cm) between the seeds.

Plant crops such as sweet potatoes, amaranths, pulses, pumpkins and *sukuma wiki* (kale) on the ridges. These cover the soil between the rows well, protecting it from the heavy rain, smothering weeds, and helping control erosion.

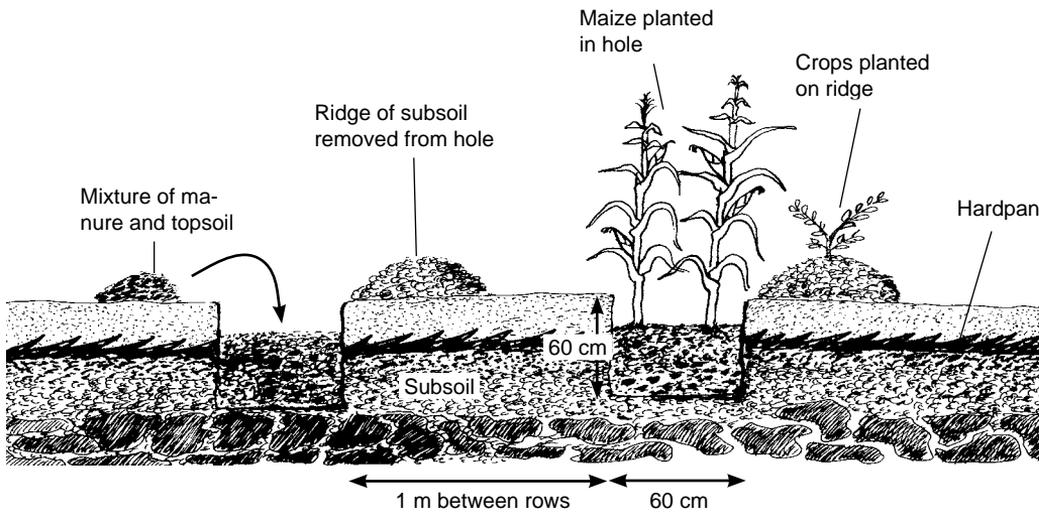


Figure 2 Cross-section of a nine-seeded hole field

### Higher yields from nine-seeded holes

The nine-seeded hole method improves yields in many ways:

- **Improved soil nutrient levels** The compost adds organic matter to the soil, which raises the soil fertility. The nutrients are concentrated where the crops can use it – close to the crop roots.
- **Water harvesting and retention** The holes collect water and give it time to seep into the soil. The spongy compost holds the water in the soil so it can support the crops while they are growing, even during a drought.
- **Improved soil structure** Many soils have a hardpan below the surface, caused either naturally or by repeated ploughing to the same depth. This hardpan prevents water from percolating downwards in the soil (so it runs off instead, causing erosion, and the soil dries out quickly during a dry spell). The hardpan also prevents the crop roots from reaching down to the nutrients deeper in the soil. The holes are deep enough to break through the hardpan, allow both water and roots to penetrate deeper.
- **Improved soil protection** Cover crops such as sweet potatoes and beans protect the soil from the sun and heavy rain, and prevent it from being washed or blown away. The soil surface is moister and temperatures are more even, making it easier for earthworms and other soil life to grow, make food for plants, and aerate the soil. Residue from the cover crops can be used as mulch and add nutrients to the soil, and legumes such as beans fix nitrogen that cereals can use.
- **Better control of pests and diseases** In a monocropped field of maize, it is easy for pests and diseases to multiply and attack the crop. A monocrop also encourages certain types of weeds. Growing a mix of crops in the field, as in the nine-seeded hole technique, controls weeds and pests, encourages spiders and other predators that feed on pests. Crops sown in the fertile holes grow stronger and healthier, so are better able to resist pest and disease attacks.

## Other benefits

- **Improved productivity and crop diversity** More types of crops and greater cropping intensity increases the total output from the field. The farmer can harvest various types of produce, improving his or her family's diet, leaving more to sell, and spreading the risk of one crop failing. A cost-benefit analysis in Nthagaiya village in Embu district found that the nine-seeded with hybrid seeds improved income from one acre of maize from KSh 5,888 (without the technology) to KSh 19,920 a year (an increase from €167 to €567 per hectare).
- **Easy to understand** The nine-seeded hole method is easy to understand and does not require a lot of technical skills.
- **Improves land use efficiency** The technology increases the number and diversity of crops. It is a good way to use small plots efficiently.
- **Saves labour in the long run** Digging the holes is hard work, but the job can be spread out over several months during the dry season. The holes have to be dug only once; they can then be used for at least 3 years without re-digging. The farmer just needs to add a little compost to each hole to replace the nutrients used up by the previous crop. Then he or she sows the seeds in the same holes. Ploughing would be easier than digging holes to begin with, but has to be done at the beginning of every planting season, so needs more work in total. It also normally leads to the formation of a hardpan.
- **Involves men in farm work** Because the nine-seeded hole method produces good yields, men are stimulated to return to farming, rather than trying their luck in the cities. That in turn reduces the burden of farm labour on the women. The surplus is sold by either women or men on the market. Before CCSMKE started work in the area, only men had money. Today, after CCSMKE had given some training to create awareness, women can spend the family income, and men share their incomes with their families.
- **Reduces dependence on agrochemicals** Using compost means that farmers do not have to buy expensive artificial fertilizers to maintain their yields. They can reduce the use of toxic pesticides by using biological pest control methods, such as soil and ash dust to control maize stalkborer. They need less herbicides and artificial fertilizers because the mulch smothers weeds and compost provides nutrients. Many farmers grow organic food using this technology.
- **Other options for extra income** The nine-seeded hole technique can be used for other crops too. For example, Lydia and her neighbours are growing Napier grass instead of maize in some of their holes to feed to their livestock. They also plant bananas and mangoes in larger holes, 4 ft (120 cm) across and 3 ft (1 m) deep that collect more water. They use more manure for the trees.
- **Easily adapted to difficult soils** Nine-seeded holes in their original form are not suitable everywhere. For example, they may result in waterlogging on black cotton soils. On sandy soils where the topsoil has been eroded away, the remaining subsoil may be too hard to dig. Under such conditions farmers can easily modify the technology by making ridges from topsoil mixed with manure, on which they plant the rows of crops. The furrows collect water and prevent the roots from waterlogging.

## Challenges of nine-seeded holes technology

- **High initial labour input** As Lydia found out, it is a lot of work to dig so many deep holes. That discourages many farmers, especially older people who cannot do such hard work. One way around this is to dig a few holes each season, gradually converting a field over several years.
- **Requires enough organic fertilizer** The technique needs enough farmyard manure and other organic matter to make compost. That is difficult in some areas if it is too dry for a lot of vegetation to grow, or if manure is not available.

## Spread of the nine-seeded hole technique

Nearly 1500 farmers in Embu District, and many others in 11 other districts in the area served by CCSMKE, have now adopted the nine-seeded hole method. Where did it come from, and how did it spread?

In Runyenje's Division the technology was first practised by Mr Kagereki, a farmer in Ugweri village. He started by digging holes, putting farmyard manure and nitrogen and phosphate fertilizer in them, and sowing 12 seeds per hole. CCSMKE had already trained him in livestock management, and during a follow-up visit to check his livestock, the extension workers also saw his fields. He showed them his cropping technology, and they thought it was an excellent idea. But Mr Kagereki was putting too many seeds in a hole that was too small.

CCSMKE included the technique in a training seminar on agricultural practices for the first time in 1993. About 20 people participated in that course. One participant, a woman farmer, adopted the method. CCSMKE extension staff later visited her to follow up. Impressed by her success other farmers wanted to know more about the method. Neighbours came by, saw what she did and asked her about the technique. Within a year, 10 other farmers had taken it up.

CCSMKE tested variations of the idea on its own demonstration farm, and found that it was better to reduce the number of seeds to nine to avoid overcrowding the plants. The tests also showed it was not necessary to use expensive fertilizer: well-decomposed compost was better than a combination of manure and fertilizer.

Farmers are also modifying the method. For example, some plant five seeds in each hole rather than nine, or employ the technique to plant banana, papaya and mango trees.

Since the nine-seeded hole method had proved successful, CCSMKE has included it in seminars at its Macumo extension station which take place every three months. It also teaches it during field days. It is not only people who have attended training who employ it. Their neighbours and friends also frequently try it out on part of their land.

## CCSMKE's development programme

Crop yields are low in Runyenje's Division because of low soil fertility and unreliable rainfall. Farmers cannot afford expensive artificial fertilizers, and they often sell their manure to nearby farmers who grow coffee and tea. They do not realize how valuable it is for their own land.

Encouraged by extension programmes in the past, many grow just one crop – maize – leaving them with a boring, unhealthy diet. They feed the maize stalks to their animals or burn them in the field. They control weeds with a hoe or a machete. A few farmers pile weeds, stones and stalks in lines in their fields to clear land for growing crops.

Runyenge's Division is semi-arid; severe droughts have occurred four times in the last 20 years: in 1984, 1998, 2000 and 2005. It was during the first of these that the people of Eastern Province sought relief food from CCSMKE. The organization responded by distributing food for free, but realized that this was not enough. It conducted surveys of the area and discussed problems and potential solutions with the farmers. It then started a "Food Increase Programme" to fight malnutrition and food insecurity. It focused on the most-affected groups: children under five, pregnant mothers and elderly people.

The extension services in the area – government and church – were clearly not adequate since there was only one extension officer in each of the eleven divisions. CCSMKE hired additional staff and began to establish extension stations to serve the four dioceses of Kirnyaga, Embu, Mbeere and Meru in the region. CCSMKE now has seven such stations. They enable CCSMKE to bring services closer to the community and serve farmers more easily.

The Food Increase Programme has evolved gradually over the last 20 years. It started with training programmes on livestock production, crop production, soil and water conservation, crop storage, safe use of pesticides, group formation and leadership, and so on. It has since added programme areas on health, water management for livestock and domestic use, gender issues, lobbying and advocacy, disaster management, and HIV/AIDS.

## **Mobilizing communities**

CCSMKE's Food Increase Programme uses a participatory approach when working with communities. It first contacts the local leaders, church leaders and people in the area who already work with CCSMKE. These arrange a series of meetings to plan how CCSMKE can best help the community. CCSMKE uses participatory rural appraisal exercises during these meetings to help the local people identify problems and potential solutions.

The people typically name a whole range of problems: low food production, poor roads, lack of health facilities, lack of clean drinking water, lack of marketing, and so on. The appraisal exercises help them choose the highest priority problems to solve. They also think of solutions, and come up with a "community action plan". This plan is the basis for the CCSMKE's involvement in the community. It outlines the needs of the community, its goals, the actions required, who is responsible for what, a timeframe, and the budget needed.

## **Interest groups**

As part of the participatory appraisal, the local people form "interest groups" to work on particular aspects of the plan. People join groups on a voluntary basis: examples include groups on crop growing, food preservation, livestock, water, marketing, health, HIV/AIDS, social development and the environment. Most groups have both men and women, but

some have women, men or young people only. Lydia is a member of the agricultural interest group in Ena village. CCSMKE supports the groups on the long run by providing training whenever a need is felt.

People have to contribute a small amount of money when they join a group. The group may decide to levy a regular membership fee, for example, every fortnight or month. The group can use this money to register with the government, open a bank account, and pay for the costs of its activities. The fees also show that the members are committed to the goals of the group. CCSMKE does not provide any funds, except capacitating them through training.

CCSMKE also welcomes groups that already exist. For example, many women already belong to social groups that manage savings or contribute to the cost of members' medical expenses.

The groups may work in many different ways. Some agree to help each other do heavy work such as building soil conservation structures or digging nine-seeded holes on each member's farm in turn. Others manage a joint project (such as a tree nursery or a plot of cropland) and share the proceeds among the group members. Another approach is to operate a merry-go-round savings scheme so each member in turn gets a large enough amount of money to invest in livestock or goods to trade. Other groups pool seed of different crop varieties, or bulk grain and mill it into flour to sell.

CCSMKE provides training for each group on its own topics of interest. The training may include one-day courses in the village, 3–5 day residential courses at the extension station, and educational tours to successful farmers in other areas. CCSMKE also arranges field days and demonstrations at the extension stations or on the farmers' own fields.

In agriculture the organization not only teaches the nine-seeded hole technology. Double digging, the preparation of liquid manure, post-harvest measures, pest and disease control, and agroforestry are all part of the curriculum.

The trainers may be CCSMKE staff, outsiders such as government officials or staff of NGOs or seed companies. The group members themselves may act as trainers: CCSMKE encourages them to show what they have achieved and to share their knowledge with others.

These activities are open to everyone in the community, not just group members. For example, CCSMKE works closely with schools, churches and the local administrations. Contacts with schools are established in various ways. Sometimes CCSMKE is approached by teachers who are engaged in environmental issues or by school heads. In other cases CCSMKE staff themselves offer training in the school's gardens. For educational tours and for residential trainings at the CCSMKE extension station, the organization charges a small amount to attend; other activities are free.

The chair of each group in the village is a member of an umbrella committee that coordinates activities of the groups and mobilizes members for village-wide activities such as building a drinking water supply, constructing a school building, or repairing the road. The village administration works closely with the groups, the umbrella committee and CCSMKE.

As each group becomes better organized and more skilled, it no longer needs close support from CCSMKE. It is able to manage its own affairs. That leaves CCSMKE free to focus on serving newer groups. It typically takes three years for a group to "graduate" in this way.

CCSMKE is currently working with 12 groups in Embu District. Dozens of older groups in the district have already graduated. CCSMKE also works with many other in ten other districts in the Mt Kenya East region.

## Effects of the CCSMKE programme

The CCSMKE programme has had major impacts on the lives of people in the area. Many farmers now practise soil and water conservation on the fields, they grow a greater variety of crops, and they have more to eat and a more varied diet. The increased availability of forage has enabled farmers to expand milk production, and some farmers are able to sell milk to the dairy in Runyenje's town. CCSMKE's mobile health clinics have noted a decline in the numbers of malnourished children below the age of 5.

Fewer men are forced to migrate in search of work because they can feed their families and earn a living off their own farms. Today, both men and women use the nine-seeded hole method.

Some of the farmers who cooperate with CCSMKE sell fresh fruit or dry it for sale in the local market. They also dry and sell vegetables such as cowpeas, amaranth, pumpkins, and sweet potato tubers and leaves. Most of these farmers are organized in producers' and marketing groups.

One of these groups asked CCSMKE for assistance in processing surplus mangoes, sweet bananas and vegetables. In cooperation with government staff from the Ministry of Agriculture, the CCSMKE arranged a course on drying and marketing fruits and vegetables. As a result, one group of about 50 women collected enough money to buy three solar dryers. Seven groups in Embu District have bought similar equipment and use it to dry their produce.

The groups have helped cement relationships within the community. Group members are more ready to help each other, share information, and step in to resolve family disputes. Women are the leaders of many groups, and two of the four office holders in each group (chair, vice-chair, treasurer, secretary) are typically women.

## Lessons

**Build on local knowledge** Farmers have a rich store of information and knowledge. Development organizations should recognize and build on this knowledge, and adapt it (or encourage local people to adapt it) where appropriate. The nine-seeded hole technique, for example, is an adaptation of a local farmer's innovation, and was refined by CCSMKE.

**Farmers are the best extension workers** They have a wealth of experience and other farmers know and trust them. CCSMKE has capitalized on this by providing them with training on farming techniques and on training methods. These farmers are now a source of information and ideas for their own communities.

**Maintain good relations with other organizations** Much of CCSMKE's success has been because it is able to draw on the skills, resources and goodwill of other organizations. For example, CCSMKE collaborates with other NGOs, the government and faith-based organizations in training, village planning, district-level coordination and so on.

**Farmers want to see results** Small-scale farmers cannot bear a large amount of risk. They want to see that something works before they are prepared to adopt it. CCSMKE arranges demonstrations and field days to show them new techniques, and encourages them to try them out on a small scale before adopting them on a larger scale.

**Take advantage of unused resources** Before, farmers could not sell their mangoes because prices during the peak harvest time were so low. By introducing driers, CCSMKE has enabled them to make and store a semi-processed product for sale at a later date when prices are higher.

## Scaling up strategy

CCSMKE has scaled up its activities in various ways.

- It opened additional extension centres and hired extension personnel in order to fill a need: a gap in the official extension services. It has six professional staff and two support staff in Embu district, and a total of 132 staff in the whole region.
- It has adapted its approach from the original programme focusing on food production to an integrated approach covering health, education and various other aspects of development. That is because CCSMKE, as the development arm of the Anglican Church, felt that a more holistic approach was necessary not only to fight poverty in Mt Kenya East Region but also to respect the whole human being.
- CCSMKE collaborates with other NGOs, faith-based organizations and the government.
- It has sought funding from other sources to support its work. CCSMKE receives funding from several donors (Brot für die Welt, Tear Fund, Evangelischer Entwicklungsdienst, and the government of Kenya). This enables it to expand its work to new regions and to new subject areas.
- CCSMKE has mobilized parish priests from different Christian denominations to mobilize the community to identify their goals, develop action plans and form interest groups.
- CCSMKE works with schools to teach sustainable agriculture practices to children, and through them, to educate their parents. Pupils in agricultural clubs meet once a week in the school garden and receive training on environmental conservation, setting up tree nurseries, and the nine-seeded hole technique. They also learn cooking and home economics. The children run demonstrations of farming practices on the school farms, and are proud to show off their achievements during parents' days. Many families decide to adopt techniques which the children bring home from school.

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More information: contact CCSMKE, [ccsmke@yahoo.com](mailto:ccsmke@yahoo.com)

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## From agroforestry to improved livelihoods in Chebarus village

*Christian Community Services, Diocese of Eldoret, Kenya*



**J**ULIUS SAWE IS THE proud owner of a tree nursery in Chebarus, a village in Kiplombe Location of Uasin-Gishu District, in Kenya's Rift Valley Province. The young man and his wife collect seeds of trees and plant them in polybags filled with humus and compost. They water the seedlings, keep the nursery free of weeds, use organic methods to control pests and diseases, and prepare the seedlings for transplanting.

They sell 10,000 seedlings a year. At KSh 5 each, that brings in KSh 50,000 (€576) – a tidy profit.

The couple started the nursery in 1998 when Julius realized that there was a strong demand for tree seedlings in the area. Their nursery provides a vital service in Chebarus: many farmers practise agroforestry in the village.

It has not always been like this. Eight years ago, the land in Chebarus was bare. The soil was eroded and heavily degraded. In the 1970s, most farmers in the area cleared their land of bushes and trees so they could plant more crops. They planted maize because they could sell it best. The soils were good then, and production was high. But after years of planting only maize, productivity became lower and lower. Farmers used a lot of fertilizer and pesticides, and the number of micro-organisms in the soil fell, degrading the soil. The lack of vegetation on the soil surface exposed it to wind and water erosion, and allowed water to run off rather than seeping into the ground. The farmers needed more and more fertilizer, pushing up their production costs further.

Impoverished soils, declining yields: the farmers of Chebarus were getting poorer and poorer each year. Many could no longer meet their basic needs. That was why Julius, unlike his brothers and sisters, was not able to finish school. He was forced to work as a casual labourer on other people's farms.

### **CCS's intervention**

Christian Community Services (CCS) is the development unit of the Anglican Church of Kenya's Dioceses of Eldoret and Kitale. Through Anglican priests, chiefs and other local leaders, it invites local people to approach the CCS–Eldoret office for development assistance. Many communities express interest; CCS–Eldoret chooses those where it sees the biggest need. Chebarus was among the villages selected for assistance in 1998.

CCS–Eldoret staff carried out a participatory appraisal in the village to identify problems and opportunities. Many farmers complained about their farms' low productivity and their



*Figure 3 Tree nurseries need constant care and a reliable supply of water close by*

falling yields. Through the appraisal exercises, they identified the degraded soil as the core of their problems. They said that maize monoculture and the clearing of bushes and trees were the cause of this degradation, and saw agroforestry as a potential solution.

When Julius realized that many farmers were interested in agroforestry, he saw a business opportunity. He and four other young village men asked CCS–Eldoret to train them how to establish a nursery. Each of the five started a nursery, most on their fathers' farms. In his first year Julius' enterprise generated KSh 50,000 – enabling him to buy his own 2-acre (0.8 ha) farm, where he now lives with his wife and two children.

Julius' group has since grown to 25 members. It is formally registered with the government, and has provided seedlings to 80 farmers, as well as to schools and churches.

The trees have totally changed the appearance of the villagers' homesteads. The soil fertility has risen: composting, crop rotation, mulching with leaves and twigs from the trees, terracing, ripping and creating ridges all help boost the soil's fertility and protect it from erosion. The trees provide foliage to use as green manure and as livestock feed; the animals produce manure which goes back onto the soil. The trees act as windbreaks, reduce runoff, and improve the soil structure, so increasing the soil's ability to hold water. These practices encourage micro-organisms and so improve the nutrient content of the soil, and at the same time create a better microclimate.

The farmers have diversified their crops, reducing their reliance on monocropped maize. They now grow indigenous vegetables again, harvesting a crop every three months.

The farmers say their yields have increased substantially. For example, their maize yields have risen from 10 sacks (1 sack = 90 kg) per acre to 25 sacks per acre (from 2.2 to 5.6 t/ha). The water level in shallow wells has risen, and farmers have enough fuelwood for their own use and to sell. The farmers have also been able to improve their livestock production and beekeeping. Food security has improved, and people's diets are more varied and healthier.

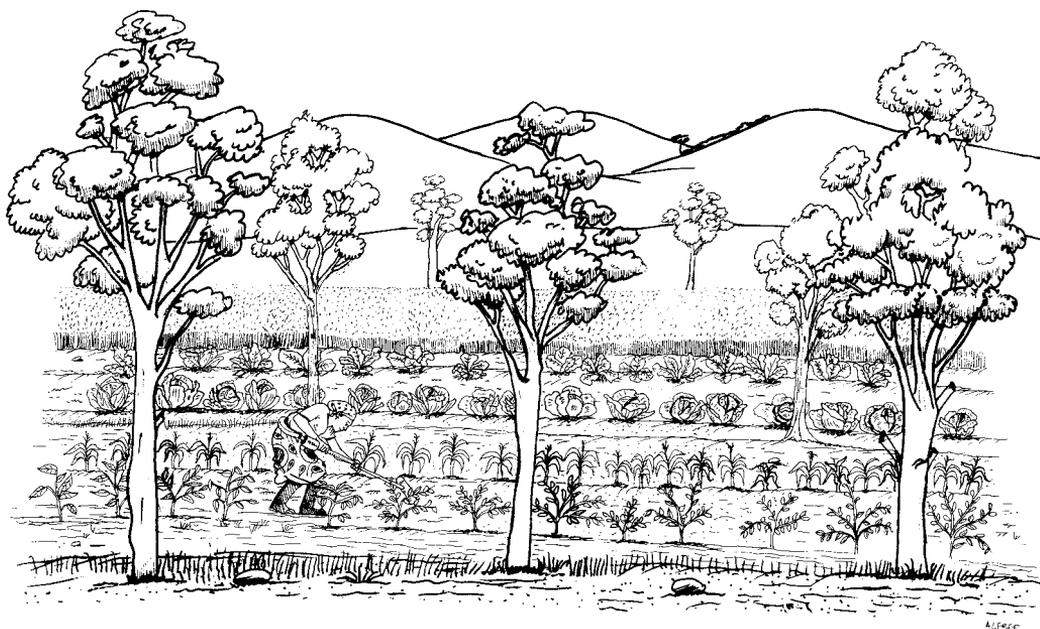


Figure 4 The trees have led to a marked change in the villagers' farms

Agroforestry has also had a positive effect on women's participation in development activities. They are now involved in making decisions in their households and in the village as a whole. Women have taken up leadership positions and responsibilities in the community. For example, they now participate in farm planning and budgeting; they access credit and manage the money, and run businesses such as shops. These changes have come about as men and women realized the importance of participation through CCS–Eldoret's training and awareness building activities. During the resource analysis in particular, the villagers learned that biggest benefits come if everyone is involved.

## Agroforestry

Agroforestry has the potential to increase farm productivity, profitability and diversity. It produces a range of products: food, fuelwood, building materials, medicine and fodder.

Properly conceived and practised, agroforestry can contribute to the sustained productivity of the natural resource base by enhancing soil fertility, controlling erosion, enhancing the microclimate of cropping and grazing lands, and generally improving the environment.

Not every tree species can be used in agroforestry. They must have certain characteristics: they should grow fast in poor soils, fix nitrogen, or have rich foliage to increase the soil fertility. They should be suitable for pruning (to make harvesting possible and to reduce shading) and should not compete with other crops for nutrients. They should provide a yield of fruits, timber, seed, fodder, herbal products or materials useful to control pests. Some trees can also help with disease and pest management in crops, for example by repelling or attracting insects, or hosting predators that prey on pests (Box 5).

**Box 5 Uses of common agroforestry trees**

	Nitrogen-fixing	Fuel-wood	Fodder	Timber	Pest management	Seed
Calliandra	✓	✓	✓			
Casuarina	✓	✓		✓		
Grevillea	✓	✓	✓	✓		
Sesbania	✓	✓	✓		✓	✓

Another desirable characteristic is a tree's contribution to water conservation. Some trees are particularly good at reducing runoff, increasing the amount of water that seeps into the soil, and reducing evaporation by shading and cooling the soil.

The first step to introduce agroforestry on a farm is to establish trees. Some trees can be sown directly from seed; others can be propagated by use of cuttings; still others have to be raised in nurseries. To raise seedlings in a nursery, the seeds must first be collected and stored. Some types of seed should be treated with ash (which acts as a pesticide); some must have their skin cracked, or they must be put briefly into boiling water to break their dormancy.

The seeds are then planted in polybags filled with a mixture of compost and topsoil. The young seedlings must be kept under shade and watered regularly, then "hardened off" by exposing them to sunlight and reducing their water ration before they are transplanted. Of course, the nursery must be kept free of weeds and pests. All this means that managing a nursery requires a fair amount of skill and attention.

Before the seedlings can be transplanted, it is necessary to dig planting holes. The seedlings are planted in the holes in a mixture of soil and manure.

The trees can be planted in different places: intercropped, planted around field boundaries, or as a woodlot. The farmer must look after the trees to make sure they flourish: management practices include weeding, watering in the dry season, pruning, and harvesting.

**Limitations of agroforestry**

Agroforestry is possible everywhere. But it does have some limitations.

- **Agroforestry takes work** Caring for a nursery and maintaining trees in the field increases the farmers' workload, so cuts the amount of time they have to earn money elsewhere. The benefits of agroforestry should outweigh this, but farmers may be put off by the extra work needed.
- **It is best if practised on a wide scale** The benefits of agroforestry, such as reduced soil erosion and improved soil fertility and microclimate, are limited if only a few, scattered farmers practise it. Ideally, many farmers should adopt it to see the full benefits.
- **Raising seedlings requires water** Without enough water, it is difficult to run a profitable nursery.

- **Benefits take time** Some fodder trees can be harvested after 3 months. But other trees need longer before they start to yield. The impacts on soil quality and water availability will increase slowly but gradually.

## CCS–Eldoret organization

CCS–Eldoret serves nine administrative districts in the northern Rift Valley Province. It was established in 1984 under the then-Diocese of Eldoret. Today its services cover the two dioceses – Eldoret and Kitale. Its goal is to enable the community to discover and overcome challenges facing it, so improving their living standards. CCS–Eldoret serves people who cannot meet their basic needs and are willing to use the resources they have available to change their lives. It serves all communities in its region, including non-Anglicans.

CCS–Eldoret works with about 150 groups in the Eldoret region on a whole range of development activities, including integrated rural development, water and sanitation, marketing and family planning. The agroforestry project falls under the first two of these.

CCS–Eldoret believes that people have to develop themselves, rather than being developed. It uses participatory development approaches that are demand-driven and meet people’s actual needs (see Box 6). It believes that self-reliance and independence from initial inputs fosters project sustainability. So training is the core of all CCS–Eldoret’s projects and is, besides awareness building activities, all that the organization provides.

CCS–Eldoret channels its training through village-level organizations and community structures such as schools, churches and ceremonial gatherings. It promotes the idea of forming self-help groups, if these do not already exist. After each training activity, CCS–Eldoret carries out follow-up meetings in the communities to identify further training needs, document successes, and plan further activities such as workshops.

To be close to the communities it serves, CCS–Eldoret has decentralized its services to zonal centres, which are within easy reach of the farmers. Over the years it has created a strong network of government institutions, NGOs, private companies and community organizations. Ties to government institutions prove essential, for example to find trainers on agroforestry, and to get funds for more training (CCS–Eldoret itself has only a limited number of trainers). These ties are also helpful in obtaining information on and understanding new policies.

Links to other NGOs such as LVEMP and VI Agroforestry enables CCS–Eldoret to provide training on nurseries. Together with its partners, CCS–Eldoret is involved in lobbying and advocacy campaigns at all levels. CCS–Eldoret lobbies in communities through meetings and awareness campaigns. At the policy level, it writes policy briefs and urges influential church leaders or church members who sit in parliament to present its issues.

CCS’s contacts with private companies help link farmers with markets. Because the farmers are a part of the network, they do not need CCS’s help to continue once the links have been formed.

### Box 6 The change from PRA to PLA

CCS–Eldoret realized some gaps existed in the participatory rural appraisal (PRA) methodology it was using. PRA aims to empower people to do their own development. But CCS–Eldoret found that some PRA exercises raised expectations among local people that the organization could not meet. For example, one PRA exercise asks villagers to list whatever they feel to be a problem, and then to list the resources at hand to solve these problems. People identify problems like the lack of hospitals, electricity or roads, which cannot be solved using the limited resources available. So they come to expect CCS or other organizations to solve their problems for them.

The Participatory Learning and Action (PLA) approach was developed as a reaction to this difficulty. In this approach people analyse and understand their situation. They ask themselves why the situation is like this. They then have to identify opportunities that are **within their reach** by asking themselves what **they** can do about it. They then draw up their own action plan based on their own resources. For example, if an outside organization's funds are identified as possible resources, the local people would have to know how to mobilize these funds themselves. The community draws up its own programme. CCS then carries out training as part of this programme. CCS does not take any files to the field, and more importantly, takes no papers from the village back to the office. That means the local people do not think their problems will be solved for them, and they will not rely on CCS to find the funds to do so.

### Policy and agroforestry

Various government policies affect agroforestry in a negative or positive way. The Forestry Act of 2005, for example, encourages farmers to have 10% of their farmland planted with trees. However, there are no incentives to farmers to do so, and no penalties for not planting this amount of trees. Concerning the cutting of trees, one law states that a permit is needed to cut a tree, and if someone cuts tree, he or she has to plant two new ones. There is a penalty for breaking this law, but it is hardly enforced, and obtaining the permits is difficult and expensive. CCS–Eldoret believes that there is need to educate farmers about the purpose and benefits of planting trees. Only this will change farmers' view towards this law and resource conservation. In addition, the government should not use a top-down approach when formulating such policies, i.e., not involving the people.

The department of agriculture has a unit to support agroforestry and other conservation practices. It provides training and holds free exhibitions so farmers can learn about these ideas. It also funds field days where farmers can show off their successes and train other farmers. The government should further expand such activities to reach more people.

Compared to other industries, farmers face high taxes for inputs and farm implements, and are taxed on their sales. The government sets aside a large part of its budget to promote industries other than farming. This puts a lot of hardship on small-scale farmers.

CCS–Eldoret would like to see the government promote agroforestry more. The government could enhance extension services such as training. It could also extend its awareness campaigns so that more farmers realize the benefits of agroforestry and implement it willingly rather than being forced to do so by law. The government could encourage the marketing of non-timber forest products such as honey. Farmers now find it easier to sell timber – which encourages deforestation.

## Scaling up

As the benefits of agroforestry became visible, other farmers in Chebarus became interested and approached Julius' group, first to buy seed, and then to get training on nurseries and agroforestry. Julius' group has so far trained 11 other groups and many individual farmers on these practices. In a snowball effect, some of these 11 groups have in turn trained other groups. That means that agroforestry is now spreading without any outside intervention.

CCS–Eldoret got into contact with teachers who were interested in including agroforestry in their school activities. First though, the district education officers had to give permission for the teachers to participate in CCS–Eldoret's training. That meant that CCS–Eldoret had to introduce the education officers to agroforestry practices. It invited them to participate in a training themselves. That convinced them to include environmental issues in the curriculum. CCS–Eldoret then started to train teachers about soil conservation, tree nurseries, tree planting and environmental sanitation. Since then, two schools in the project area have regularly taught these issues to their pupils. They also organize field days to create awareness about the practice among teachers, parents and pupils of other nearby schools. The two host-schools and CCS–Eldoret buy seedlings for planting on these field days.

CCS–Eldoret helps arrange exchanges where groups of farmers visit other farmers who have successfully started using agroforestry. Hundreds have taken part, interacted and learned from each other. These visits are organized so that each group has the opportunity to send at least some of its members on a visit once or twice a year. The days are organized by the farmers themselves; CCS–Eldoret helps with arrangements but does not get involved in the content. Some time later, CCS–Eldoret follows up on the farmers' activities. Most of the time, it finds that the farmers have started replicating what they have learned. This has proven to be a cheap, efficient way of scaling up.

CCS–Eldoret also uses the media to promote agroforestry. It invites journalists from newspapers, TV and radio to visit the organization and talk to staff. The media also sometimes cover field days and campaigns. As a result, the number of farmers and other organizations who have approached CCS–Eldoret has risen notably. Typically, if training courses are announced on the radio, the number of participants doubles.

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More information: contact CCS–Eldoret, [elreco@africaonline.co.ke](mailto:elreco@africaonline.co.ke)

The work of Christian Community Services, Diocese of Eldoret, is supported in part by Bread for the World.

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## Dairy goats: Hope for farmers in Embu and Mbeere districts

*Diocese of Embu, Kenya*



**H**OSEA NJERU WATCHES PROUDLY as his goats eat the fodder he has put into their feeding trough. There are 18 of them: good, healthy, strong goats. He will keep the female kids, and sell the young males: they will fetch a good price in the market. His wife comes to milk the females. The goats are producing a lot of milk at the moment: enough for Hosea's family, and some extra to sell.

The goat shed is made of wood, and has a thatched roof. The floor is made of wooden slats, so the droppings fall through to the ground beneath. Every few weeks, Hosea can raise the floor and scrape out the dung to use as fertilizer on his farm.

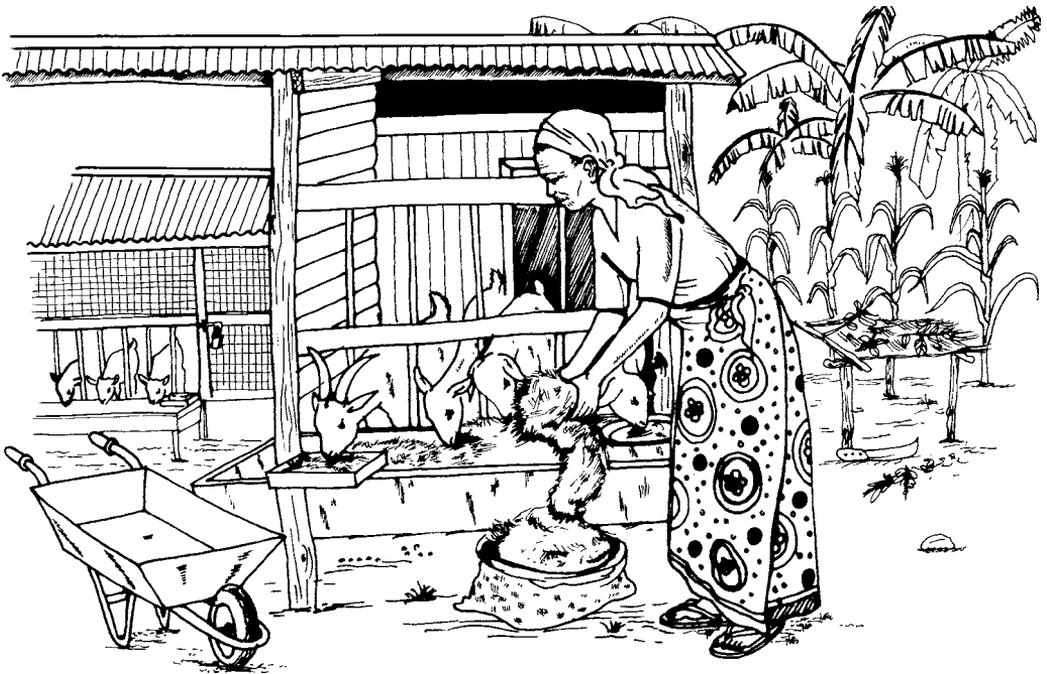
Next to the shed with the does and kids is a separate stall for a buck. Hosea keeps the male goat that belongs to the Gitare Integrated Self Help Group, the group of dairy goat farmers he belongs to. Every few days, one of the other group members brings round a female goat, and takes it to the buck for mating. The male is a Kenya Alpine, an improved breed, so the offspring grow quickly and can be sold after nine months.

Hosea started with just one goat in 2000. He got it from the Integrated Rural Development Programme of the Diocese of Embu, the local branch of the Catholic Church in Kenya. Hosea mated this female with a buck that the Diocese also provided, and after five months it gave birth to a fine female kid. Hosea loved this animal. But he had signed a contract – so when it was six months old, he gave it back to the Diocese's Integrated Rural Development Programme, which passed it on to another farmer to start a new herd.

Seven months later, Hosea's female gave birth to another kid. He hasn't looked back. By 2004, there were 18 in his herd, all descended from the first female. "My goats have a history of kidding twins and sometimes triplets", he says. He is sure this is because of the good feed and care he gives them.

Hosea has been able to earn enough from selling animals and their milk that he has been able to afford to spend KSh 18,000 (€207) on a machine to chop fodder. He has bought another quarter of an acre (0.1 ha) so he can plant fodder – doubling the size of his farm. He and his wife have saved up enough to send their daughter to a private primary school, costing more than KSh18,000 (€207) a year. He no longer has to look for work on building sites; instead, he sells his goats to people who come from all over Kenya.

The Gitare Integrated Self Help Group has 16 members: seven men and nine women. Ten of the members have dairy goats, while 6 keep dairy cattle, but are considering adding goats after realizing the benefits they bring.



**Figure 5** *The goats are kept in sheds and fed with crop residues, household waste and foliage*

### **DOE's community development approach**

The Diocese of Embu covers the two districts of Mbeere and Embu. Mbeere is drier, but Embu has good rainfall: around 1200 mm a year in Hosea's village. But land ownership in Embu is fragmented: many plots are less than half an acre (0.2 ha), and many people do not have any land at all.

The Diocese believes that "self help is the best help". It currently coordinates well over 180 self-help groups, including the one in Gitare. Many farmers in Embu have one or two goats of a local breed. These animals are disease-resistant and can survive under difficult conditions with little fodder and water, but they take a long time to mature and produce little milk – barely enough to feed the goat kids.

As part of its Integrated Rural Development Programme, the Diocese implements a dairy goat upgrading project to fight food insecurity and poverty. The project promotes cross-breeding of the local goats with improved dairy bucks. To qualify for this type of assistance, farmers must meet certain basic criteria. They must belong to a self-help group of at least 15 members. They must have access to some land for housing and to produce fodder. They must contribute both in cash and in kind towards the cost of the project. The Diocese gives such groups several female goats; the farmers who are chosen to take care of the first goats must mate them with an improved male, then pass on the first female kid to another farmer.

### **A programme history**

The story of the Diocese's goat programme is long and has not always been easy. It has had its successes and failures, but over the time it has built on its successes and learned from its

failures. It started in 1993 by assisting needy farmers who were earning less than a dollar a day. It gave out goats for free to these families. The farmers were only required to provide housing, feeding and veterinary care to the goats. The local Church committee acted as the guarantor and monitored progress. The participants did not have to be in a group, and they did not contribute any cash.

One of the first beneficiaries was a woman who was confined to a wheelchair. She was given a good dairy goat producing 2 litres of milk a day. She milked the goat for well over 4 years before finally selling it to a butcher. The goat kidded twice after being served by local unimproved bucks, but both kids died of pneumonia.

The programme also gave goats to two women's groups. The first group's buck died without fathering any kids: a lack of libido sometimes caused by poor management. The second group disintegrated after 2 years, and only one farmer actually achieved any tangible benefits.

An internal evaluation in 2001 showed that the programme suffered from three major flaws:

- The farmer participants did not feel they owned the project. They saw it as a diocesan activity – after all, they did not contribute any money towards the cost of the goat.
- Because the project was dealing with individual farmers, implementation and monitoring were complicated and expensive.
- The diocese did not have a sustainable system of goat breeding, so most of the farmers ended up in-breeding with the same male all the time, or using local males. Both of these defeated the project's purpose.

As a result, the programme made some important changes:

- It now requires the farmers to attend community meetings and participatory appraisals so that they can understand the diocese's policies. The community members discuss the various options and activities (including goat breeding), chooses the ones they see as most important, and make a formal request to the programme for assistance.
- Those interested in goat breeding have to form a group and apply for registration with the Diocese's Integrated Rural Development Programme. If their application is approved, they must register their members and pay a fee of KSh 150 (€1.75) each. The group receives training on group leadership and management. This training enables them to determine their objectives and decide on by-laws. The programme staff helps them assess their needs, identify their problems, and draw up a group action plan.
- The group then requests training about dairy goat rearing. This training normally lasts 3 days and is given by staff from the Diocese programme or from the relevant government ministry. It covers dairy goat management and production, including feeding, housing, breeding, disease and pest control. It also stipulates the key activities, roles and responsibilities of each stakeholder. The group must register with the Dairy Goat Association of Kenya, help choose a buck and contribute towards its purchase cost. Five members who meet specified criteria receive one female goat each for demonstration purposes. The group signs a contract with the Diocese of Embu, stipulating that each member must return the first female kid to the programme so it can be given to someone in a new group.

## Stakeholder roles

**Individual participants** must be registered members of the group. They must either have their own local goats or have received a female goat from the diocesan goat project which they mate with the group's buck. The group members pay KSh 2,600 (€30) for the project goat and return the first female kid to the project for onward lending. They must provide appropriate housing (costing about KSh 5,000, or €58), feed the goat, manage breeding, and take care of veterinary services (which costs an average of KSh 30, or €0.35, per month). They sign a contract with the group promising they will look after the goat properly, and register with the Dairy Goat Association of Kenya (a fee of KSh 300, or €3.50).

**The group** must be registered with the diocese to qualify and participate in the upgrading project. It must raise KSh 3,000 (€35) towards a 3-day onsite group training on dairy goat management and marketing, as well as KSh 5,000 (€58) towards buying an improved buck. It applies on behalf of its members to the Diocese to join the dairy goat project and then monitors its implementation and management. It facilitates the return of the first female kid. It also networks with other stakeholders such as the Dairy Goat Association of Kenya (for breeding) and relevant government ministries (for technical support).

**The programme development committee** comprises representatives from all the groups registered with the programme in a particular area. It screens groups that want to join the programme and recommends them for approval or rejection, then forwards their applications to the programme management team for technical appraisal and approval. It facilitates collaboration and networking among the groups, and is responsible for programme planning, implementation, monitoring and evaluation.

**The programme management team** is composed of programme staff. It provides technical inputs and advice to the project development committee and the groups, and facilitates training of the group members. It monitors the project implementation and links the groups with the Dairy Goat Association of Kenya. It facilitates the choice and purchase of the buck from recognized goat breeders, and places the nannies and bucks with the groups.

### Box 7 More milk from upgraded goats

Upgrading local goats by crossing them with purebred dairy bucks improves the milk production of the offspring. Each new generation of crosses produces more milk.

Breed/crosses	Daily milk production
Local goat	0.5–1 glass (250ml)
1st generation	4 glasses (1 litre)
2nd generation	8 glasses (2 litres)
3rd generation	12 glasses (3 litres)
4th generation	20 glasses (5 litres)

At each stage, the female must be bred with a different purebred male to avoid inbreeding.

## Socio-economic impact

Fifteen groups composed of 127 farmers (66 men and 61 women) in Embu and Mbeere districts are now raising approximately 450 upgraded goats. Some have taken up goat breeding full-time.

**Increased milk production** Farmers used to keep goats mainly to slaughter on important occasions, and sometimes to sell. The dairy goats produce enough milk to sell at the attractive price of KSh 40–60 per litre. Local people know that drinking goat milk helps make children healthy, clever and grow fast, and that the milk is especially good for AIDS patients. Tea with milk is popular in the project area, and people say that adding a small amount of goat milk to the tea is enough because it has a lot of nutrients.

**Improved crop yields** Intensive goat rearing produces a lot of manure. The traditional practice of tethering the goats and allowing them to graze during the day meant that it was not possible to collect this manure. Keeping the goats in a shed all the time and feeding them with cut fodder produces more manure, and makes it easy to collect. Goat manure makes good fertilizer for kitchen gardens, maize, bananas, macadamias, Napier grass and coffee. Many farmers say they get good yields because they use manure on their crops.

**Better use of waste** Goats eat all kinds of crop residues, household waste and foliage from trees, turning them into valuable milk, meat and manure. Goats are ideal for the small plots of land in the wetter areas of Embu District, as well as the larger farms in the drier parts of Mbeere District.

Some goat keepers have virtually no land, so must collect fodder from roadsides or small plots. A cow eats as much fodder as eight goats. So goats are ideal for smallholders, and encourage environmental conservation through fodder grass and tree planting.

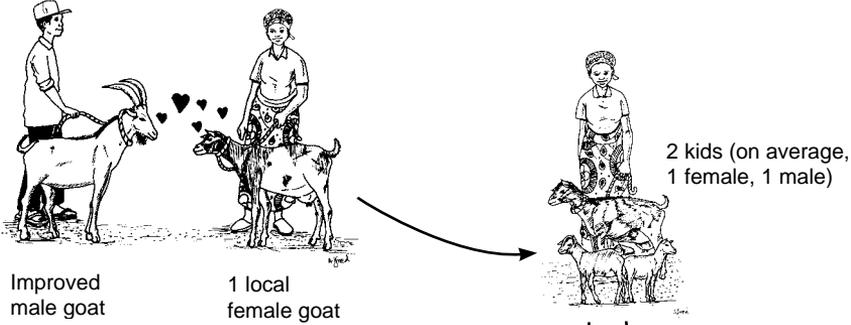
**Increased value of the upgraded stock** Although the local goats are small, they take a long time to reach maturity. They produce very little milk. They are the result of uncontrolled breeding. The dairy goat project introduces a high-quality Kenya Alpine buck to upgrade the local goats. The male offspring grow faster and mature earlier, so earn more income for the farmer. The female offspring produce more milk and earn more money as breeding stock. All goat products and by-products – live animals, meat, milk and manure – fetch prime prices.

### Box 8 Value of 1-year-old animals

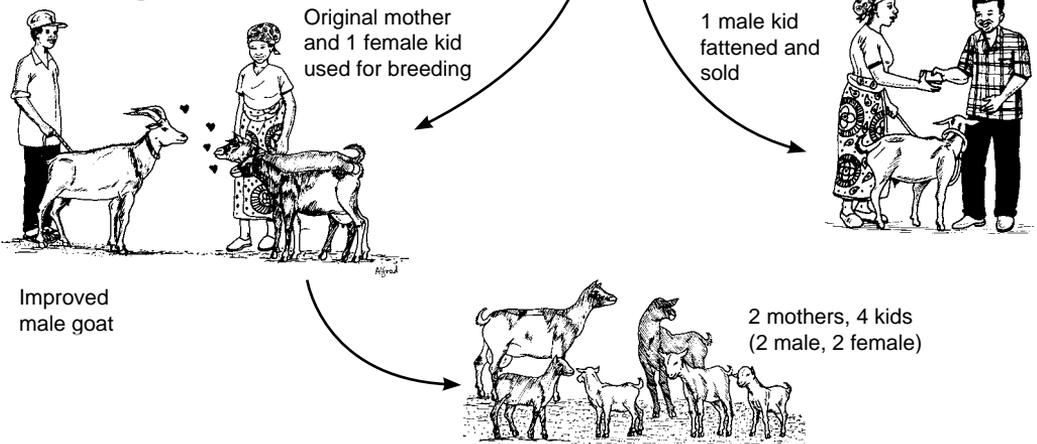
Crossing local females with improved females raises the value of the offspring. Figures are in Kenyan shillings (€1 = about KSh 87)

	Female	Male
Local goat	Less than 1,000	500
1st generation	4,000	1,000
2nd generation	6,000	1,500
3rd generation	8,000	8,000
4th generation	12,000	10,000

### 1st mating



### 2nd mating



### 3rd mating

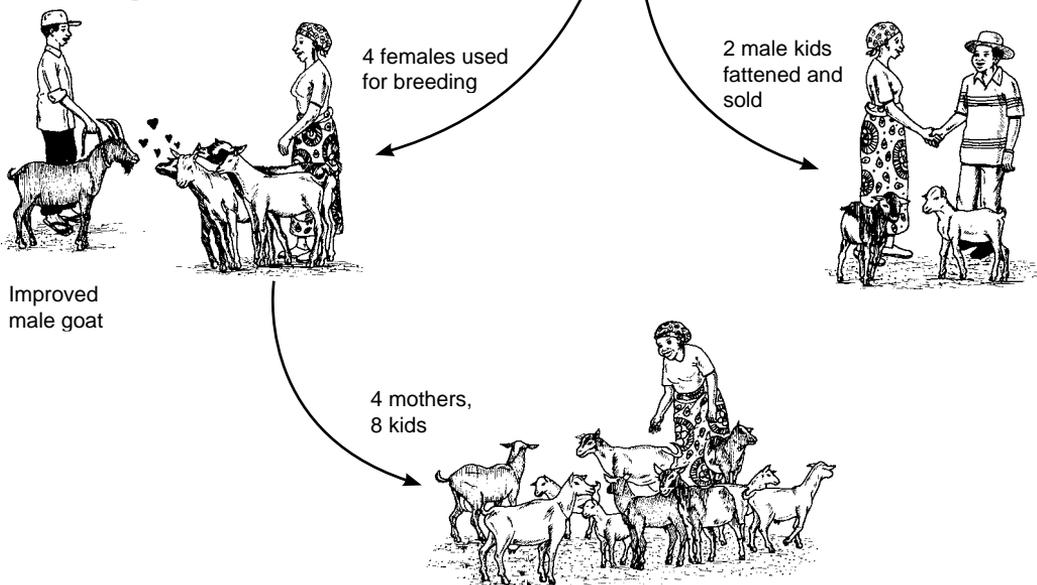


Figure 6 The goat breeding programme enables farmers to build up an improved herd rapidly, as well as providing milk and an income from selling animals

**Improved socio-economic status and cohesion** The project participants are members of groups where they share knowledge, resources, exchange visits and experiences. Even the poorest members can upgrade their animals. Each group keeps a buck and appoints one of the group members to keep it; the other members take their goats to the buck for breeding. The buck keeper maintains breeding records and provides a place where group members can be trained. The members meet regularly to plan, review their activities, and discuss problems. They also get additional training on group dynamics and leadership.

The female goats produce kids 5 months after breeding, so can be bred twice a year. They often bear twins or triplets. That means their owners can build up their stock quickly (Figure 6). From a single female, it is possible to produce two kids (on average, one male and one female) as a result of the first mating, four from the second mating, 8 from the third, and so on. If the females are mated with purebred bucks each time, they will produce progressively more milk, and the kids will be worth more because their genetic makeup is better. Within 4 years, a farmer should be able to build up a herd of (say) 31 animals, worth KSh 190,000. If the animals produce more female kids, the herd will be even larger. The females can be used for breeding, and the males sold for meat. Males of the third or fourth generation crosses can also be used for breeding.

## Scaling up

The dairy goat project has scaled up its activities in various ways. These can be grouped into four categories: quantitative, organizational, functional and political (see also page 117).

### *Quantitative*

**Return of the first kid** The programme started with a stock of 55 upgraded nannies in nine groups. Returning the first female kid to another farmer in the group enables other farmers to benefit and ensures continuity of the project. To date, 127 farmers in 15 groups have benefited from upgraded dairy goats, and they now own over 450 upgraded goats.

**Local contribution** The farmers make a contribution in cash: that ensures that they feel they own the project, and the money covers 30% of the project cost. The members are also expected to contribute labour and construction materials, which accounts for another 20%. The project budget contributes the remaining 50%. These local contributions enable the project to reach more people.

### *Organizational*

**Implementation structure** The programme's policies were adjusted to improve implementation. It used to work with individuals or groups who were loosely affiliated to the programme. This limited the number of people it was possible to work with. As a result of an internal participatory evaluation, changes were made to this approach. Now, participants must be members of a group that is registered with the programme. The Diocese established a project development committee composed of elected representatives from all the registered groups in an area. This committee is responsible for problem identification, planning, implementation, monitoring and evaluation. This allows the programme to reach more people.

**Capacity enhancement.** The project development committee has been trained regularly on group organization and management so it can deal effectively with the individual groups' needs. It interacts with the group members and provides them with feedback. The capacity of the project staff has been enhanced through workshops, seminars, meetings, mentoring, exchange visits and on-the-job training. As a result, the staff can provide technical and administrative support to the committee and to the groups.

### *Functional*

**Breed improvement** To increase their income, the farmers are advised to register their local goats with the Kenya Stud Book and breed them with the group buck. The Kenya Stud Book is responsible for registering and maintaining records of all breeding animals in the country. This adds value to the animals, so brings in more money

**Upgrading local chickens** Seven out of the 15 groups in the goat project have diversified into upgrading local chickens. They do this to bridge the gap before they can start making money from their goats. Starting with a local goat, it takes 21–24 months before they can earn money by selling the offspring, and 5 years to breed a pedigree goat (the highest class), which fetches KSh 12,000 at the age of 1 year. Chickens breed faster, so the farmers can use them to fill this gap. The local chickens are small and lay few eggs because they are inbred, so the programme advised the farmers to upgrade their local stock using a dual-purpose breed, called Kenbro. This gives up to 270 eggs a year, compared to 150 eggs from the local birds.

**Biogas** Farmers from one group have built biogas digesters to use the goat manure and save on wood fuel. They copied this idea from one of their neighbours. They used polythene tubes to make the digester and storage tank. Pipes carry gas to a burner in the farmer's kitchen. The group has so far constructed five biogas units, and plans to make units for all 23 members. Other groups are also interested in adopting this technology.

**Savings and credit** Participatory needs identification revealed the need for the goat keepers to save money and have access to credit. The groups ensure that their members save a small amount regularly with the Mbeere/Embu Savings and Credit Association, a diocesan rural savings programme. This enables them to pay for school fees, medicines and other needs. The savings protect the farmers from the temptation of selling their valuable goats for low prices in an emergency.

### *Political*

**Collaboration and networking** The project recognizes the benefits generated through collaboration and networking with other industry stakeholders. It ensures that all the goat groups and partners are linked with the Dairy Goat Association of Kenya, which keeps breeding records, provides extension services, manages breeding bucks, facilitates registration of upgraded animals with the Kenya Stud Book, provides vaccines for contagious caprine pleuropneumonia (a serious disease in goats), and facilitates the marketing of dairy goats (for which it receives a commission of 10% of the sale price). The Ministry of Agriculture provides extension services and training, while the Kenya Stud Book is responsible for registration of animals. The project also links the farmers with other groups in the district and elsewhere so they can obtain breeding stock and avoid inbreeding.

**Advocacy and lobbying** The project works closely with government departments, has negotiated memoranda of understanding with key partners, and communicates through newsletters and field days. Project staff attend meetings of the district development committee, a forum for discussion on development activities within the district. Many groups not affiliated with the diocese have also adopted the upgrading of dairy goats spontaneously as a result of the Diocese of Embu's work. For example, Njaa Marufuku, a national government poverty eradication programme, supports dairy goat production through groups, using the Diocese's approach.

## Challenges

The project has faced various challenges.

- **Environment** Poor rainfall reduces the amount of fodder available. The farmer groups are expected to plant suitable shrubs and trees as fodder for their animals and to protect the environment. However, frequent droughts devastate newly planted fodder trees and shrubs.
- **Diseases** Contagious caprine pleuropneumonia is endemic in the area and remains the greatest threat to the dairy goat upgrading project. The veterinary department provides vaccination services when there is an outbreak. The Dairy Goat Association of Kenya also provides vaccines to the veterinary department so they can vaccinate its members' animals. The project encourages routine vaccination every 6 months – even though this is expensive.
- **Parasites** Intestinal worms reduce the productivity of the stock. The farmers have to de-worm their animals regularly every 3 months.
- **Breeding** Problems include a failure to detect heat on time, miscarriages and the need to repeat mating if the female does not become pregnant. Project staff, Dairy Goat Association assistants and government extension officers provide training on skills such as heat detection and the control of reproductive diseases. If more males are born than females, farmers may become discouraged because they cannot increase their flock quickly. The project advises farmers to keep more than one goat to increase their chances of getting female kids.
- **Group cohesion** Groups are vital to managing an effective breeding system, but poor leadership means it is not always easy to keep the group together. The project ensures that the groups acquire the leadership, organizational and management skills they need.
- **Handouts culture** Some development organizations still provide free handouts to farmers, creating dependency and killing innovativeness and hard work. Farmers have come to expect such handouts. Overcoming this takes a lot of time and effort. The Diocese requires cash contributions from the beneficiaries of up to 50% for bucks and 30% for females, and KSh 3,000 for training. The farmers must also pass the first female kid back to the programme so it can be allocated to new group members, and requires them to surrender the breeding bucks to the Dairy Goat Association of Kenya, which rotates them to other groups, so avoiding inbreeding.
- **Dwindling donor support** Despite the successes, dwindling support from donors limits the programme's ability to scale up its work. The price of bucks and nannies is

beyond the reach of most potential beneficiaries. Support is still needed to continue the project.

- **Free-range grazing** The free-range grazing system is common in Mbeere. It is difficult to control breeding when goats are allowed to mix out in the field. The Diocese promotes zero grazing, where the buck is kept in a pen, and the females are brought in for breeding when they are on heat. This system is also suitable where farmers have only a little land and they cannot get enough fodder.
- **Castration** To prevent unwanted breeding, all crossbred males that are not suited for breeding should be castrated within the first 6 months. But people are reluctant to do this because they think it will stunt the animals' growth.
- **Consumer attitudes to goat milk** Many people say that goat milk smells and tastes strange. This is because the females are traditionally kept with uncastrated males, and the milk picks the males' characteristic odour. Separating the females from the breeding buck, and castrating unwanted males, solves this problem, but it is still necessary to convince customers that the milk is good.

## Lessons

- Keeping goats produces many benefits for farmers: they can earn money by selling milk, meat and live animals; they produce milk for home consumption; and they can even make cheese to sell. The manure is valuable as fertilizer and can be used to make biogas, a new technology which is spreading quite quickly.
- Dairy goats are easy to manage, produce many kids and a lot of milk, and can be very profitable. Raising goats in confinement is environmentally friendly. It needs little heavy work, so can be done by women and men, young and old, and people who are suffering from HIV/AIDS.
- Local contributions towards the project enhance ownership and sustainability. Development projects should ensure that project participants contribute in cash, even only a small amount – to ensure their commitment to the project.
- Technical knowledge is a key to success. The project previously assumed that people knew how to keep goats. This led to disappointment. It is necessary to train them on both the technical aspects of goat keeping as well as the project's particular management procedures.
- Collaboration enhances success, especially where the partners' strengths complement each other. The farmer groups, Diocese staff, the Dairy Goat Association of Kenya, the ministry and various other partners work together to manage the programme and ensure success.

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More information: contact Justin Wamuru, [doe-irdp@alpha.co.ke](mailto:doe-irdp@alpha.co.ke)

The Diocese of Embu's Integrated Rural Development Programme is supported by Misereor  
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## A tale of two villages: Integrated agriculture in Lare Division

*Baraka Agricultural College, Kenya*



**I**t's 1998... The people who recently arrived in Lare Division, in Nakuru District, are desperate. There have been some terrible ethnic clashes – a fight over land – and many of the men were killed. The remaining people – 26 families – have had no choice but to leave. They have fled their homes, their farms, their cattle. There are only two able-bodied men, 22 women with their children, and a dozen young orphans, along with several elderly people. They have arrived in Lare Division with nothing. The local Catholic Church has tried to help them: it has given them food, blankets and clothes, treated the injured and sick, and given them tents to live in.

To help them get back on their feet, the Catholic Diocese has leased the people some land in Baraka village – 1.5 acres for each family. They have built houses of mud and corrugated sheeting provided by the Church. They have cleared the bush and trees and started farms. They have managed to grow some maize and beans, and a few vegetables, and they have bought a few chickens. But it's not enough: yields are poor, the children are malnourished, and their mothers have no money to buy food, let alone send them to school. Other people nearby view them with some hostility, and look down on them as “refugees”. In desperation, the women leave for days on end to seek work on farms over 40 km away – leaving the children without anyone to care for them.



Figure 7 1998: The people of Baraka were desperate

## Fast-forward to 2006...

The people in Baraka village now have enough to eat. They grow enough to sell: maize, beans, sweet potatoes, cassava, bananas, and even vegetables. They have managed to extend their tiny houses, and the children now all go to school. They can afford to buy new clothes at Christmas. The women have started a savings group, and they want to build tanks to hold rainwater so they don't have to buy expensive water from outside. They welcome visitors with tea, and insist that their guests take some potatoes or maize home with them as a gift.

This is the same village – the same Baraka. The same people. But their lives have changed dramatically – for the better.

What happened?

## Planning change

A training institute in Molo, some 70 km away, by coincidence shares the same name as the village. Staff from this institute, the Baraka Agricultural College, visited Baraka (the village) in 2000. The village is in the area served by an integrated rural development project that College's community development programme was just starting. The project management selected Baraka village as one of three in Lare Division to focus on.

Development workers from the College called the people of Baraka village together for a *baraza*, a community mobilization meeting. The College staff asked the villagers to divide into groups: men, women, and young people. They asked each group to identify the problems

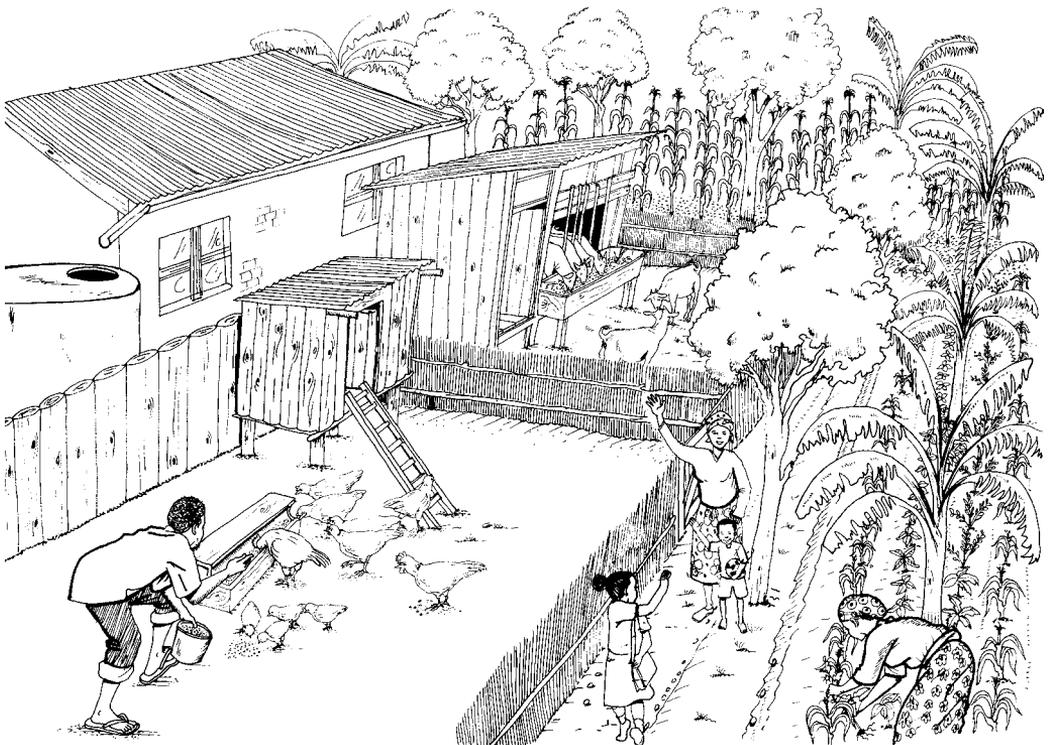


Figure 8 2006: The Baraka villagers are prospering, thanks to integrated farming

### **Box 9 Baraka village – The land and climate**

Baraka village is in the lower highlands of Rift Valley Province in Kenya. The soils are not bad: they include well-drained loams with patches of black cotton soils in some areas. However, they are badly eroded because of deforestation and inappropriate cropping methods.

The rainfall averages 600–800 mm per year, but is erratic: some years have very little or no rain.

The area used to be grassland with scattered trees, but many of the trees have been cleared to make way for farming. That has made the rainfall erratic and temperatures higher, especially during the dry season. Wind and water erosion are a big problem, leading to infertile soils and polluting ponds and streams. Yields are generally poor – around 6–8 bags of maize an acre (1.3–1.8 t/ha), but with appropriate land management, it is possible to get good yields: 12–15 bags an acre (2.7–3.4 t/ha).

they faced, and to select the most important. The people all said that food security was the biggest problem. They suggested that the College help them organize to overcome it.

Each of the groups elected one person to represent them. These community representatives included one elder (a man), one woman, one man, and two teenagers – a boy and a girl. These representatives were to manage activities in their groups, report on their group's activities, and coordinate with the community worker and other College staff.

The development workers agreed to give the villagers two days of training on leadership skills, and on how to organize themselves, plan activities and keep records.

The development workers also discussed alternative farming techniques with the villagers: planting time, choice of crops in case of drought, tree planting, and the need to diversify crops to spread risk and maximize output. The villagers discussed the various possibilities and came up with an initial work plan.

The villagers registered as a group with the Ministry of Culture and Social Services. Registration is necessary for the group to access services such as savings and credit, and to ensure the stability needed to work together in the long run with partners such as the College.

### **Sources of inputs and expertise**

The College contacted various sources of inputs and expertise. They asked the Ministry of Agriculture for assistance with soil conservation. Ministry staff came to do on-farm demonstrations of soil conservation techniques such as marking contours with a line level, constructing contour bunds and terraces, and planting grass strips.

The 26 villagers divided into two subgroups. Each subgroup decided to work on each member's farm in turn, to construct contour bunds and do other heavy work.

The College then asked the Kenya Agricultural Research Institute to advise on what varieties of cassava and sweet potato to plant, and how to grow them. The College bought certified planting materials from the Institute and gave them to the villagers.

The Forestry Department also came to the village to help identify what type of trees to plant for timber, fodder and fuelwood. The department supplied seedlings of each type and told

**Box 10 “Life has never been the same”**

“Life has never been the same again for me. I used to go for a week to look for casual labour in order to look after my family; now that I can grow produce on my farm and sell it. I don’t need to go away any more. My children can go to school and I can do it all even though my husband is dead.”

– *Mama Wangari, Baraka resident*

“We are able to go to school even though we don’t have parents. These people have been like our parents and have even helped us work in our farm.”

– *Njeri, high school student and orphan from Baraka*

the villagers how to plant and take care of them. The subgroups planted the seedlings on each of their members’ farms in turn.

This process took about a year and a half. The College’s development project paid for the costs of all these inputs: the villagers were unable to pay even a share. The villagers met regularly every Friday evening to review their progress, discuss problems, and plan what to do in the following week.

One College community development worker lived and worked in the village. This worker served other nearby villages as well: she served around 800 farmers in all. But because she lived in Baraka, she was able to interact closely with the local people. She attended some of the Friday meetings, but as the group became stronger, it was not necessary for her to be there every week.

The College also linked the farmers with various other service providers, such as a savings and credit agency and dairy goat breeders. The College established a development organization called Mtakatifu Clara Mwangaza in Lare (a larger village nearby). This organization provided various types of support: savings and credit, training, inputs such as polythene to line water pans, linkages with other service providers, and follow-up support.

Progress was slow at first. The farmers were sceptical; they were not used to growing crops like cassava. They planted a small plot first, watched how it grew, and then decided whether to expand the area they planted the next season. Sweet potatoes were more popular, and the villagers took to them very readily. They had fewer problems in accepting the trees, but some of the species were slow growing, so took time to establish. By the fourth year, success was clearly evident: the farmers had adopted many of the technologies they had learned, their incomes were rising, the group was strong and well-organized, and group members were even training people in neighbouring villages how to use the improved techniques and providing them with planting materials.

The College phased out of its direct involvement in Baraka in 2004. As a result of its 4 years’ work in the village, the villagers had improved their incomes and livelihoods to such an extent that they no longer needed the College’s help. The College was able to move to other villages in Nakuru and Baringo districts.

### **Box 11 A pathway out of poverty**

How can small-scale farmers break the vicious cycle of soil erosion, low yields, hunger, poverty and misuse of resources?

Sustainable agriculture offers a pathway out of poverty for these families. By using appropriate farming techniques that conserve the soil and restore its fertility, they can raise their yields, and earn enough to break out of the cycle.

It is hard for them to do this by themselves. They lack the resources and information they need to adopt the improved techniques. Individual farmers do not have the wherewithal to act on their own.

Institutions such as Baraka College can bring together the resources needed, and organize the farmers into groups that can plan, then act on their plans.

The story of Baraka village shows how this can be done.

### **Savings and credit**

As the villagers' production increased, they were able to sell their surplus produce in the market in Lare. They formed a merry-go-round savings club to act as a source of credit for the group members. Members undertook to put KSh 100 into a kitty every week. They divided the kitty into two: each week, half went to one of the families so they could buy a goat, some household utensils, or something else that the group as a whole agreed on. The other half of the kitty was used as group savings. They banked it with Mtakatifu Clara Mwangaza's savings scheme. This organization pays interests on deposits and provides credit to organized groups. Individual villagers could apply for a loan through their group to invest on their farm or to pay school fees. The group acted as guarantor for these loans.

### **Roles of stakeholders**

The programme's success was a result of collaboration among various stakeholders, coordinated by the College's community development programme.

**The villagers** themselves decided what they wanted to do, then put it into practice. They did all the farm work and decided the types of external assistance they needed. This involved risks and innovativeness: they planted crops they were not familiar with, and started raising goats and chickens.

**Representatives of the community** coordinated the villagers, mobilized them to decide on what to do so they could feed themselves, and how to overcome their various other problems. As the group got stronger and better organized, the representatives mobilized the villagers to lobby the local government and other organizations for help.

**Baraka College** networked with donors on behalf of the community. The College identified the problem of food insecurity, helped the villagers think of potential solutions, and facilitated the provision of advice and inputs from various other sources. A College community development worker lived in the village, so was on hand to work with local people on a regular basis and deal with problems as they arose. Other College staff provided support, training, advice and coordination, arranged for inputs, and handled financial aspects of the project.

**Resource institutions** such as Mtakatifu Clara Mwangaza, the Ministry of Agriculture's soil and water conservation team, the Kenya Agriculture Research Institute and the Forestry Department provided advice and training on their areas of expertise, planting materials (cassava stakes, sweet potato vines, tree seedlings), improved livestock breeds (chickens and goats), credit facilities, and so on.

## Integrated agriculture

The Baraka farmers had only a small amount of land, and they had little capital and few skills to begin with. They needed a way to increase their incomes using these limited resources. Sustainable agriculture offered a way to do this. They adopted various practices based on indigenous techniques, modified to suit the particular conditions in Baraka, and enriched by technologies developed through formal research. All the techniques are sustainable: they conserve and enhance the environment (improve soil fertility, prevent erosion, etc.), rely on low levels of external inputs, and produce significant yield gains. This has made it easy for the farmers to adopt them.

Here are the major types of technologies used by the Baraka village farmers.

**Agroforestry** The farmers planted trees to stabilize their terraces, to act as windbreaks, to produce wood for fuel and building, and to yield prunings for use as mulch to smother weeds, protect the soil from erosion, and add organic matter to the soil. The families have each planted more than 30 trees, including *Grevillea*, sesbania and leucaena as part of a living fence around each of their farms. They have also planted woodlots of *Eucalyptus grandis* and cypress as a woodlot for fuel and building poles.

**Improving local chickens** The farmers already had a few chickens, and plans of upgrading them are underway. The project trained the villagers on poultry management. Each family built a poultry coop near its house and keeps a flock of around 15 hens, which they use for eggs and meat. They sell the chicks and eggs in Nakuru town, 40 km away. They use the poultry manure as fertilizer for their vegetables.

**Upgrading of dairy goats** The project trained the farmers how to manage dairy goats, and set up a goat-breeding programme. The farmers built housing for their goats and stopped them from grazing freely. The project hired superior bucks from farmers who specialize in goat-breeding to mate with the female goats. This improved the genetic makeup of the kids, boosted milk output and increased meat production. The project trained the farmers how to keep records of their breeding programme.

**Drought-tolerant crops** Because drought is a problem in some years, it is important that farmers have a fallback in case their main crops fail. The farmers plant drought-tolerant varieties of sweet potatoes and cassava. These crops also provide fodder, and the leaves can be used as vegetables. The sweet potatoes cover the soil with a dense mat of foliage, protecting it against erosion. The project obtained planting materials of improved varieties, organized the farmers to multiply them, and helped them add these crops into their farming practices.

**Bananas** The College and Kenya Agricultural Research Institute introduced a new way of growing bananas in the area. People already planted bananas, but yields were low because of the poor soil fertility. The project introduced the idea of planting bananas in trenches half-filled

with topsoil mixed with farmyard manure. The trenches are dug close to the homestead, and kitchen waste, animal bedding and leftover animal feeds are thrown into the trench, further increasing the soil fertility. (This is a similar idea to the nine-seeded hole method, page 12.)

**Intercropping** The farmers used to grow just maize. The project advised them to intercrop maize with beans, then after harvesting the beans, to plant potatoes between the rows of maize. This range of crops makes maximum use of the soil moisture, maintains the soil fertility (the beans fix nitrogen in the soil), reduces erosion, spreads risk if one of the crops fails, and produces good yields that ensure each family has a varied diet and enough to eat. The farmers now obtain certified seed from suppliers, plant early to ensure they avoid drought later in the season, and keep the fields free of weeds.

**Crop rotation** In addition to intercropping, the farmers also rotate crops in different plots each year – planting maize and beans one season, and then vegetables the next. Like intercropping, rotation improves the soil structure, restores fertility and provides a hedge against the risk of crop failure. It also breaks the life cycle of crop pests and weeds, so producing a healthier crop.

**Water harvesting** The farmers have dug pans to collect water in the rainy season. They have done this work in groups: a group of five or six farmers has dug a pan on each person's farm in turn. The pans are dug in a shady place to reduce evaporation and are lined with polythene to prevent seepage. The water is used for livestock and to irrigate vegetables in the dry season.

## **Benefits of integrated agriculture**

The people of Baraka village have benefited in many ways from adopting integrated farming.

**Food security and income (financial capital)** They have improved their food security and varied their diets. Their sales of farm produce have risen to KSh 5600 (€65) per month, an increase of 50%. The children can now go to school: their mothers have enough money to pay school expenses, and they no longer have to go away to search for work.

The villagers started with few financial resources and survived on relief. They have been able to achieve economic and financial stability. Each family can save KSh 100 (€1.15) a month.

**Improved environment (natural capital)** The improved farming practices conserve the environment: more trees, less erosion, higher soil fertility. The land used to be bare; the slopes were eroded, and low-lying areas were prone to flooding. It is now a pattern of green fields, trees and hedges. Erosion has been minimized, and there is no more flooding.

**Greater social capital** The formation of the group has strengthened the people's ability to work together: they now help each other, and the adults do some of the farm work for the two sets of orphans. The village now has a strongly organized group, registered with the government. The leaders are elected democratically, and decisions are made by a consensus of all the group members. The group is able to demand services from the government and other organizations.

**Greater human capital** People have learned new skills and have realized that they are responsible for their environment – and have the power to improve it using their new knowledge and skills. The villagers have gained in confidence – particularly important since most of the family heads are women. All of the women attend adult education classes run by Mtakatifu Clara Mwangaza. Baraka Agricultural College linked the village to the Department of Adult Education, where they learn to read, write and do sums. The children now go to school, so have hope for their future.

## Promoting and hindering factors

Two main factors have contributed to the success of the Baraka villagers:

- The group is cohesive and well organized. The members are open to new ideas and strongly motivated to improve their lives.
- The College has been able to marshal a range of services to help the villagers. The training has been well implemented, the development worker highly motivated and effective, and the backup support well organized.

Several factors hinder the adoption of sustainable agriculture:

- The intervention has required a lot of resources: money, time, effort and management on the part of the College and the various other organizations involved. Especially in the first two years, the community relied heavily on inputs from the College.
- Unpredictable weather – drought or heavy rain – make it difficult to plan and implement activities. Farmers and staff may be discouraged by a crop failure, so reject a technology that performs well under normal conditions. Sustainable agriculture offers a solution to this problem: the farmers plant drought-resistant crops such as cassava and sweet potato to tide them over in case of drought.
- Integrated agriculture is labour intensive. The various crops and livestock all take work, and the farmers have had to employ casual labourers from other villages to help them (rather than relying on their children, who are now at school, to do the work).
- The process takes a long time before the villagers realize the full benefits.
- Existing agricultural policies on trade and economic integration tend to work to the disadvantage of small-scale farmers.

## Scaling up

All 26 families in Baraka village have adopted sustainable agricultural practices. They can grow enough food for themselves and even have surplus for sale.

The College community workers arranged demonstrations of the various technologies in nearby villages, and a field day at Mtakatifu Clara Mwangaza. They invited people from elsewhere to Baraka village to see how the technologies were working in practice. Most of the people who came to these occasions were women. Back home, many have adopted some of the practices. A total of 120 households in other villages have started using techniques such as drought-resistant crops, intercropping, agroforestry and banana planting. Five nearby schools have planted trees in their compounds, and one has started a tree nursery to sell seedlings.

The College's project has allocated adequate funds to support these scaling-up activities. Even though the project has phased out of Baraka village, the College's outreach programme continues to support and facilitate activities such as demonstrations and field days.

Many people from outside have heard about the Baraka villagers' success story. The District Officer of Lare Division has visited the village and has seen the farmers' success for himself. So have the chiefs of all the Locations within the Division. These officials have informed people in their areas about Baraka village, and urge them to copy its successes. The government has even repaired the roads to Baraka village, making it easy for people to visit – as well as for the villagers to transport their produce.

Numerous visitors from the development agencies which support the College have visited Baraka village. The College uses the village as a site for training for its Kenyan and international students. The farmers of Baraka are proud to show off what they have achieved, and the steady stream of visitors further raises the profile of the village in the surrounding area.

The College has produced pamphlets, brochures and newspaper supplements about its work in Baraka village and its areas of operation. These works feature prominently on the College's website. The College also participates in exhibitions, for example at the Nakuru Agricultural Show, and national and international-level exhibitions. It invites the villagers to participate in workshops to discuss issues related to farming and rural development, and to the College during field days or functions such as graduation ceremonies.

## Lessons

**Importance of facilitation** Intensive, high-quality extension facilitation, backed up by strong support from technical services such as research and development agencies, can make a real difference to people's lives.

**Drawing on other resources** Baraka Agricultural College did not try to do everything itself. It drew on the resources of other organizations, coordinated and managed their inputs in collaboration with the villagers. The combination of resources, with each organization contributing its own area of expertise, was an important factor in the project's success.

**Participation** The participatory approach has been vital. The farmers have had an opportunity to try out activities they are comfortable doing, with minimal external support. The approach has also given the farmers enough confidence to venture into activities they feel are appropriate, given the resources they have.

**Appropriate technology for sustainability** Sustainability can be achieved on a small piece of land by poor households using the integrated approach. This is possible only appropriate technologies are chosen.

**Working together** Social cohesion contributes to the success of a practice and its sustainability. Success breeds success: a group that is able to achieve results becomes a stronger and more coherent in the process.

**Success breeds imitators** If a technology is successful, others will be ready to copy it. But that is often not enough. It may be necessary to promote it through demonstrations, field days, working through the government hierarchy, networking with other organizations,

and so on. It is worth putting a substantial amount of effort into a successful project if it can be used as a model for others to copy. The success of the Baraka villagers is visible far beyond the village boundaries itself, and is influencing development interventions throughout Kenya and beyond.

**From handouts to self-help** Initially, the College provided most of the inputs to the villagers for free. In the later stages of the project, however, cost-sharing became important. The villagers have come to accept the need to bear part of the cost of interventions they benefit from, and because they pay for them, they gain a sense of ownership and responsibility for them.

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More information: The Principal, Baraka Agricultural College, [www.sustainableag.org](http://www.sustainableag.org)

The work of Baraka Agricultural College is supported in part by Misereor.  
[www.misereor.de](http://www.misereor.de)

## Days of hunger are gone: Groundnuts in Kuna village

*Agriculture and Environment Programme,  
Catholic Diocese of Homa Bay, Kenya*



**W**ELCOME TO THE KUNA Seed Fair! It's 10 o'clock in the morning, and the farmers are coming into the field. Some are wheeling bicycles; others are carrying baskets and bags. Twenty men and women are already there. Those who arrived first have already reserved the best places in the shade. They have laid out sisal sacks on the ground and have piled seeds on them. There is more seed in baskets and plastic bags. White maize on the cob. Round grains of red and brown sorghum. Brown millet. Red beans, white beans, brown beans, black beans. Dried tomato seeds. Green sweet potato vines. Tiny black seeds of kale and other leafy vegetables.

And there's the groundnuts. A crowd is already forming around the farmers who have brought brown groundnut seeds – the pride of Kuna.

The farmers are checking the seed – looking at the quality, comparing prices, haggling with the sellers, asking how to grow the crops. People who have brought vegetable seed trade them for millet or sorghum. They visit stalls set up by seed dealers selling certified varieties of maize and beans.

By the time the fair is over in the afternoon, everyone will have gone away with something to plant when the rains begin in the next month.

### **Groundnuts: the star of the show**

People here in Kuna, in Homa Bay District in Kenya, about 60 km from Lake Victoria, have grown groundnuts for many years. The soil is loose and sandy, the climate is right, and people eat the nuts raw, boiled or as relish with the staple diet of maize and sweet potatoes. But yields used to be low. The local varieties grew slowly, taking 5 months to mature. They were susceptible to rosette virus, a disease that attacks the leaves and reduces the number and size of the pods. The farmers grew groundnuts scattered between their maize plants; the maize shaded the groundnut and reduced the yield. It was hard to weed the fields because the crops were not in rows. Sometimes farmers could harvest less than 200 kg per acre (500 kg/ha). If the rain failed, the families would have to eat all their groundnuts, leaving no seeds for the next season.

Things are different now. The farmers of Kuna now plant rows of improved groundnut varieties in rotation with maize. The new varieties mature in only 2.5–3 months, so it is possible to get two crops a season, as well as a crop of maize or sorghum. Weeding between the rows is easier – but is not a big problem anyway because the groundnuts cover the soil



**Figure 9** *The farmers of Kuna used to grow groundnuts scattered throughout their maize fields. The result: low yields*

and smother most of the weeds. The new varieties are resistant against rosette virus. The farmers do not use expensive artificial fertilizer: they apply decomposed farmyard manure or compost to their fields to increase the soil fertility. They plant the crops along the contour and have left grass strips to control erosion.

Yields are good. The farmers can harvest 6–10 bags of shelled nuts an acre (1.3–2.2 t/ha), compared to only half that with the old varieties. Harvesting is easier too: the farmers just go through the rows and pull the plants out. The stems of the old varieties were weaker, so the nuts had to be harvested with a hoe. The new varieties grow well even if the rains are poor.

### **Introducing change to Kuna**

How did the farmers of Kuna come to adopt the new varieties – along with all these other changes?

The Catholic Diocese of Homa Bay knew that the people of Kuna people had difficulty feeding themselves. The Diocese's Agriculture and Environment Programme (AEP) has promoted agroforestry and food production in the village since 1997. During focus group discussions for an evaluation of AEP's work in 2000, local people said that growing groundnuts might be a good way to make money.

AEP held participatory appraisals in Kuna and several other villages in 2001. Ministry of Agriculture extension staff, and researchers from the Kenya Agricultural Research Institute and ICRISAT (an international research institute) were also involved in this exercise. The

### **Box 12 The Catholic Diocese of Homa Bay's Agriculture and Environment Programme**

AEP's goal is to improve food security and income among small-scale farmers in the Diocese of Homa Bay. The programme operates in five administrative districts in Southern Nyanza, serving 10,000 households. The main components of the programme are sustainable agriculture (especially organic farming), livestock, marketing, post-harvest grain storage, and rural financing.

AEP uses existing self-help village groups as an entry point. AEP asks them to divide into smaller "solidarity groups" to make work easier. The solidarity groups consist of 5–10 farmers, and they meet once a week. Once a month, all the solidarity groups from a village hold a joint meeting.

AEP has 12 field extension personnel, who assist resource people within each community. These resource people are farmers chosen by the solidarity groups. AEP trains them in the necessary technical and leadership skills. They provide the link between the solidarity groups and AEP.

villagers discussed problems in groundnut production and possible solutions. The researchers and villagers realized that the drop in groundnut yields was because of diseased seeds and poor varieties. The farmers did not have any improved varieties, and did not know a better way to grow the crop.

Everyone – scientists and villagers alike – agreed that Kuna would be an ideal place to try to improve the production of groundnuts.

### **Testing varieties**

One of the things decided during the participatory appraisal was to test some improved varieties of groundnuts. The researchers provided seeds of five varieties and showed the farmers how to lay out test plots. Two farmers – a man and a woman – allocated some land for the trials. The solidarity groups (Box 12) provided seed of the local variety for comparison, and did the land preparation, planting, weeding and other farm work. They also checked for disease and measured the yield. AEP organized the farmers, monitored the trials and wrote up the results. AEP and Ministry extension staff trained the farmers on improved groundnut production. Two sets of trials were conducted, in the long and the short rainy seasons.

After the second set of trials, the farmers selected the two best varieties based on their yield, drought resistance and disease tolerance. The two top varieties were called ICGV 12991 and ICGV 12988.

### **Seed multiplication**

The trials created a lot of interest. The farmers were keen to get hold of more seed to plant on their own farms. AEP and the solidarity groups decided how to produce more seed.

Two farmers agreed to grow the new varieties and produce seed. AEP gave them each 5 kg of seed. In the first season, the two farmers planted half an acre (0.2 ha) of the new varie-

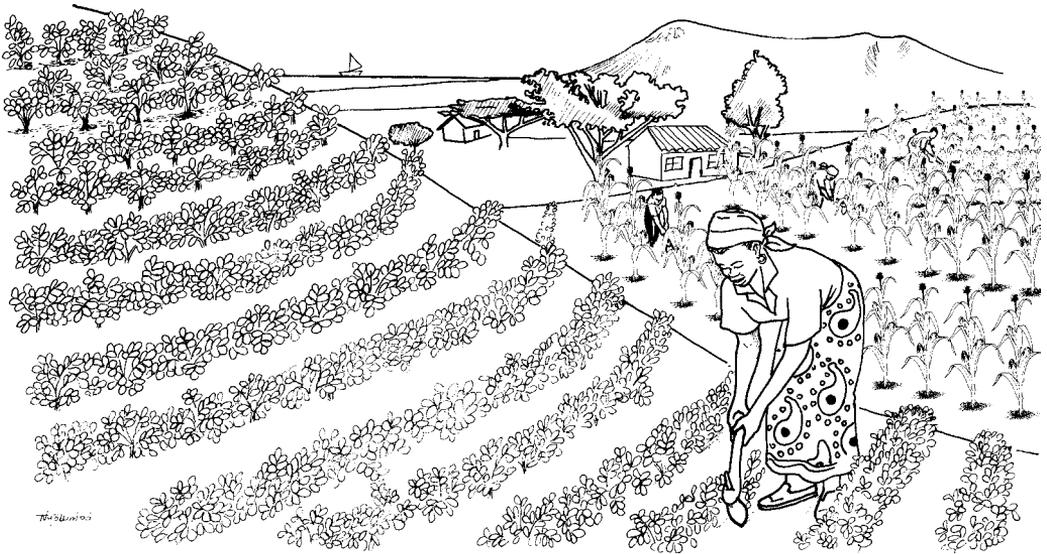


Figure 10 Rotating pure stands of maize and groundnuts produces better yields

ties and harvested 300 kg of seed. They gave 10 kg back to AEP, kept some so they could continue multiplying seed themselves, and sold the rest at seed fairs in Kuna and nearby. AEP organized the seed fairs just before planting time to enable farmers to exchange seed and acquire improved varieties. Some of the farmers who bought seed went on to multiply seed in the same way.

AEP gave 10 kg of seed to two new farmers in Kuna in the next season. It did the same for another two seasons, until all the farmers in Kuna could get the improved varieties.

### Rotating crops

By 2003, 180 farmers in Kuna had started producing improved groundnuts in large volumes. AEP also trained the farmers on how to manage various crops. *Striga*, a parasitic weed that attacks maize, is a problem if maize is grown season after season on the same land. To break the life cycle of the *Striga* and control this weed, it was necessary to rotate maize with another crop. The new groundnut varieties were ideal: they enrich the soil because they fix nitrogen, and the residues could be either fed to livestock (to produce manure) or ploughed back into the soil.

The farmers' plots changed from a mix of randomly planted maize and groundnuts to pure green rows of groundnuts, followed by maize in the next season. Pure stands of both crops yielded more.

After harvest, the farmers leave the groundnuts to dry in the field, then 2 days later they detach the pods from the plants, dry them and put them into sacks. They shell them when they need them to eat or to sell.

**Box 13 “The days of hunger are gone”**

“I can feed my children, pay school fees and buy clothes. I no longer have to bother my in-laws to help make ends meet. I have built a house and bought animals. The days of hunger are gone – thanks to groundnuts.”

–*Mama Esther, a widow in Kuna village*

**Creating the market link**

Marketing was of the problems identified during the participatory appraisal. Before, the farmers – mainly women – took to the market the little surplus they had to sell. The women had to carry the sacks of groundnuts all the way to the market, then wait all day in hope of finding a buyer. They never knew how much they could get for their produce. Sometimes they would have to go back to the market week after week in order to sell all their produce.

AEP and the other partners did a market survey on groundnuts in 2003. This identified some new marketing outlets: exporters and traders from Nairobi and Kisumu, as well as traders in the local markets.

As a result of this survey, AEP helped the farmers form a “producer marketing group” in Kuna, along with several other such groups elsewhere in the district. Each marketing group is composed of the same farmers who are members of several solidarity groups. It is managed by a committee elected every year by the farmer members. The marketing group has its own rules and regulations. The farmers sell their produce to the marketing group, which can use its extra bargaining power to negotiate better prices with buyers. The farmers now have a reliable market, and no longer need to go individually to the market to sell their produce. Farmers get cash immediately, all at one time.

The marketing group’s committee is responsible for buying and selling the groundnuts. They check on market prices, so they know how much they can pay for groundnuts the group buys from its members. They do not receive a salary, but they get their expenses paid out of the sale proceeds. If the marketing group makes a profit, it banks the money with the Bengi Investment Group, a community-managed bank which AEP initiated together with the farmers.

AEP started to train the Kuna marketing group’s committee to develop a production plan – how much to produce, at what time, and how to match the market demand.

By 2004, the farmers of Kuna were mass-producing groundnuts. At the end of that season the marketing group sold 15 tons of groundnuts to an exporter from Nairobi. The demand for seed and grain of the new varieties is very high, and the marketing group has regular orders from NGOs, processors, local markets and other farmers. Catholic Relief Services Kenya, one of AEP’s funding agencies, has created a link with its other operations in Africa, and Kuna farmers now sell groundnuts to buyers in Sudan and Tanzania. The Legume Project, a big project in Western and Eastern Kenya implemented by Technoserve, an American NGO, is interested in buying seed.

There are currently no certified groundnut seeds in the Kenyan market, but the Kuna producers are becoming widely known for producing high-quality seed. One kilogram of seed

fetches KSh 100 (€1.15), while the same amount of grain sells for KSh 70 (€0.80). Many of the Kuna farmers select their best output and sell it as seed. AEP has trained them how to do this.

## **Banking on success**

The farmers now earn enough to save. They can deposit it with the Kuna Bengi Investment Group. All the solidarity groups are members of this bank, and can save their money as groups or as individuals. Every member is supposed to save at least KSh 50 (€0.60) every month.

In times of need, the farmers now have a chance to get a loan. The marketing group also borrows money to buy groundnuts from the farmers that it sells to traders.

The marketing group has used a loan from the bank to buy a manually operated shelling machine from a local blacksmith (who was trained by AEP). The farmers can now shell their groundnuts for a small fee, which is paid into the community bank.

## **Reaping the benefits**

The farmers' income has increased dramatically. They can buy meat or fish, which few could not afford before. They sell groundnuts to buy maize if they need to. Almost everyone in Kuna who grows groundnuts now can eat 3–4 times a day instead of once or twice. There is now no “hungry season” in Kuna.

The farmers can buy farm implements and oxen to pull ploughs, and can build new houses. They can invest in education for their children. They can buy medicine. Some have bought goats, cows, sheep and chickens. Some farmers have started small businesses: kiosks, food stalls and butcheries.

Their increased purchasing power means people can contribute to the community's social amenities and institutions. Parents have contributed towards building a primary school for the village. The growing local economy has spurred the government into action: it is building a road to the village. The local government is short of money, but the villagers managed to convince officials they needed a road so they could sell their groundnuts. The government wins too: it gets more income from its levy on sales in the market.

As a traditional staple food, groundnuts used to be a women's crop. They are now a highly-valued cash crop, and the women's income has increased. The men have got involved in growing groundnuts – and they have come to appreciate the work the women did. The women growers have become role models, and they now play a big part in leading the various groups, from the solidarity groups to the community bank. Women hold treasurer's posts in all the solidarity groups, the marketing group and the bank, and are members of the marketing group's and bank's executive committees. They have a say in things that men used to control exclusively: things like boreholes and handpumps, sheep and goats, credit, the use of compost and manure, and what to do with the harvest. The men still control what to do with the land, managing cattle and heavy implements like ploughs.

## Scaling up

Almost all the farmers in Kuna now grow the improved varieties of groundnuts. AEP started with one solidarity group with 20 members in 2001; by 2006, the number had grown to 32 groups with 300 members. The marketing group now has 150 members, and the bank 220. Farmers from neighbouring areas now buy seeds from Kuna farmers.

AEP has established links between Kuna and Ndhiwa division, about 10 km away. An AEP-supported group in Ndhiwa has bought a flour mill. It buys groundnuts from Kuna to mix with locally produced orange-fleshed sweet potatoes, and make flour. This can be used to make a nutritious porridge that is rich in vitamin A and is especially good for children and HIV/AIDS victims. This has created an additional market for farmers in Kuna and Ndhiwa, and for other farmers producing groundnuts and sweet potatoes elsewhere.

Demand for groundnuts is so high that the Kuna farmers are interested in persuading others to join them in growing the crop. They want the Kuna area to be known throughout Kenya for its groundnuts. They use chiefs' *barazas* (village gatherings), social gatherings, churches and other community meetings to reach more farmers.

The exchange of groundnut seed has been fostered through seed fairs and exhibitions, field days, and farmer-to-farmer visits among the solidarity groups. AEP coordinates and supports these efforts. Farmers from various programme sites of AEP visit Kuna, and as a result have spontaneously taken up growing the new varieties – even in areas not targeted by AEP.

Kuna has no electricity, so it is not possible to do much processing there. AEP is promoting processing in other villages which are into improved groundnut production. Products include peanut butter and roasted nuts. AEP has bought a peanut butter mill for training and demonstration, along with the materials for packaging. A solidarity group operates this machine, produces and sells peanut butter, and train other farmers. A machine costs about KSh 50,000 (€576), so is within the reach of a farmer group that is able to access microcredit. Three solidarity groups have bought machines and have taken up peanut butter production. They can earn almost twice as much from the butter as from the grain. Another group has taken up roasting and packaging groundnuts.

AEP has created a link to the Kenya Bureau of Standards (the body responsible for quality control and certification in Kenya) to test and certify processed groundnuts produced by farmer groups in Homa Bay. The Bureau has approved the quality of the peanut butter, roasted groundnuts and raw groundnuts, and is due to certify the products in the near future. AEP has developed a label for the groundnut products, and intends to register it and acquire



Figure 11 Farmer groups are buying machines to make peanut butter

a barcode so supermarkets will sell it. When all the procedures have been finalized, AEP plans to allow the farmers to use the label and set up a system to maintain the product quality.

## **Networking**

AEP has a very good network in the villages and with community leaders.

The programme collaborates closely with the government. AEP staff link the farmers' groups to special government funds that they can use to pay for training, buy seed, and other needs. The groups decided what to do with the money, under the supervision of the government officials and AEP.

AEP actively participates in government committees. Promoting organic production is a strong part of AEP's agenda. Through its participation in the committees it has established a joint demonstration plot on organic farming. Interest in organic farming is growing in the five districts AEP serves.

The Kenya Agricultural Research Institute and ICRISAT are key partners for AEP. The two research institutes sell "basic seed" to the Kuna marketing group, which sells it to farmers the group has chosen to multiply the seed. This basic seed is necessary to maintain the seed quality and genetic potential of the groundnut varieties.

AEP also cooperates with other NGOs and dioceses throughout Kenya. They buy seed from the Kuna farmers, and organize visits to Kuna by farmers from their localities.

Groundnuts are just one of the development activities that AEP supports in Kuna. Others include microfinance (the bank), and the production of nutritious food such as oranges and porridge (like that produced in Ndhiwa) for HIV/AIDS victims.

The Kuna farmers would make even more money if they could package and label their groundnut seed. But they are not allowed to: the seed has not been approved by the Kenya Plant Health Inspectorate Service (KEPHIS). This service must follow strict rules governing seed production – which the Kuna farmers cannot meet. The rules are biased towards large farms: the groundnuts must be grown a long way from any other groundnut varieties, and KEPHIS charges a hefty fee that even the group cannot afford. The government so far has not developed rules that would make it easier for communities to produce certified seed. AEP is lobbying for a change in these rules.

## **Lessons**

**Participation** It is very important to involve the farmers in choosing technologies, and in managing and evaluating on-farm trials. This is necessary if the farmers are to feel that the project is their own, and that they bear a big part of the responsibility for it.

**Farmer groups** The solidarity groups were AEP's entry point to promote the groundnut technology. The producer marketing groups were vital for marketing, and the bank provided financial support. The solidarity groups were formed from existing self-help groups that the farmers had formed themselves – so were already well organized and coherent. It is important to invest in building the capability of groups in areas such as financial management, savings and credit and marketing.

**Markets** When AEP realized that groundnut production in Kuna was taking off, it did a market survey to find where the farmers could sell their product. It identified buyers who were willing to pay a good price, then did what was necessary to link the farmers to the market. The high demand for groundnuts has stimulated farmers to adopt the technology, building up a critical mass of producers in the area.

**Diversification** The new varieties have small seeds, which can be used for products such as peanut butter and relish. But for peanut snacks, the high-value end of the market, consumers demand the opposite – big seeds. The farmers of Kuna should spread their risk and seek to penetrate new market niches by increasing the range of varieties and other crops they grow.

**Support from other institutions** AEP's linkages with research institutions enabled it to get improved technologies that the farmers could test and adopt. AEP developed linkages with exporters and traders, ensuring that the farmers had a market for their produce.

**Horizontal transfer of information** The technology came originally from the research institutions, but once it had been adopted by a few farmers in Kuna, transfer was mainly horizontal, from farmer to farmer. AEP promoted this exchange by sponsoring farmer-to-farmer visits and group exchange visits. Such approaches are typical of sustainable interventions, and contribute to the successful uptake of innovations.

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More information: Catholic Diocese of Homa Bay, [aephoma@africaonline.co.ke](mailto:aephoma@africaonline.co.ke)

The work of the Catholic Diocese of Homa Bay is supported in part by Misereor.  
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# 3

## Cases from Tanzania

Soil and water conservation on the slopes of Kilimanjaro

*HEM Trust Fund, Tanzania*

The Eotulelo farmer field school: Learning and promoting conservation agriculture

*CA-SARD project, Tanzania*

Organic farming in Karagwe District

*Community Habitat Environmental Management, Tanzania*

Networking for sustainable agriculture

*PELUM-Tanzania*

## Soil and water conservation on the slopes of Kilimanjaro



### *HEM Trust Fund, Tanzania*

AT OVER 5000 METRES high, the rounded, snow-capped peak of Mount Kilimanjaro is a symbol of the whole of Africa. The forested slopes of the National Park rise up to the peak, above the plains of northern Tanzania. Slightly lower down the slope, at altitudes between 1000 and 1500 metres, farmers grow crops on the fertile soil: coffee, bananas, and fodder trees and grasses. Further down still, as the slopes merge into the drier plains at altitudes of 750–1100 metres, they grow maize and beans. They also keep goats and dairy cattle.

The soil is fertile, and the rainfall is relatively good for Tanzania: around 1800 mm a year in the coffee-growing area, and about 800 mm in the maize/beans area. The area has some of the highest population densities in Tanzania: 650 people/km<sup>2</sup> in the coffee-growing area, and 350 people/km<sup>2</sup> in the maize/beans zone.

The main problem farmers face in the maize/beans zone is soil erosion. Farmers here generally own between 0.5 and 2.5 acres (0.2–1 ha) of land. After harvesting their maize and beans, they remove all of the crop residues to feed to their animals. That leaves the soil bare, and gullies form easily when it rains heavily. The water does not seep into the soil, so there is not enough moisture in the soil to support a crop through a dry spell. The water runs off instead, carrying valuable topsoil with it. Farmers cannot afford to apply expensive fertilizer to maintain their crop production. Declining yields are the result, leaving farm families with less to eat and less money in their pockets.

### **HEM Trust Fund**

HEM Trust Fund is an NGO based near the town of Himo, in Moshi District, close to Mt Kilimanjaro. HEM stands for Himo Environmental Management; it focuses on improving the livelihoods of small-scale farmers in the three districts around Mt Kilimanjaro: Moshi, Hai and Rombo. Its work involves managing and protecting the natural resources (land, water and vegetation) in the area, introducing ways to improve small-scale farms, and promoting income-generating activities such as beekeeping, fish farming, poultry, dairy cows, tree nurseries and biogas production. The organization was officially registered in 1998 but has been working in the area since the early 1990s.

HEM manages several types of activities:

- **Tree nurseries** This helps individuals, groups of farmers and institutions such as schools and churches to start tree nurseries. They can grow seedlings of fruit trees and fodder species to plant themselves or to sell to others.

- **Improved stoves** This promotes the use of energy-saving wood stoves among the farmers. The aim is to reduce the number of trees cut for fuel, and to reduce the amount of time women have to spend fetching firewood.
- **Furrow rehabilitation** Farmers have a traditional system that leads water from rivers into their fields to irrigate vegetables and other crops. HEM is helping improve this system by lining the canals with cement, so reducing the amount of water lost and allowing farmers to produce up to three crops a year.
- **Soil and water conservation** It promotes soil and water conservation measures to boost soil fertility and increase productivity and farmers' income (see below).

HEM promotes these activities in various ways, including training and demonstrations on farmers' fields. HEM has a regular training programme offering short courses to farmers on the topics listed above, as well as other new technologies.

## Soil and water conservation

This is HEM's biggest and most important type of activity. The NGO promotes various soil and water conservation technologies:

- **Contour farming** – ploughing and growing crops along the contour rather than up and down the slope.
- **Grass strips** – planting grass strips to break the flow of water down the slope.
- **Mixed cropping** – planting a mix of crops to protect the soil from heavy rain and to maintain soil fertility.
- **Crop rotation** of maize, tomatoes, and nitrogen-fixing legumes such as groundnuts and beans to prevent the build-up of pests, diseases and weeds, to improve the soil structure and to maintain fertility.
- **Mulching** – using crop residues to protect the soil surface, prevent erosion and conserve moisture in the soil.
- **Fanya juu** – a trench dug along the contour, with the soil piled into a ridge upslope to control water flow, prevent erosion, and encourage the natural formation of terraces. The ridges are planted with grass and trees to stabilize them. *Fanya juus* are useful on gentle to moderate slopes of up to 8% gradient.
- **Terracing** – moving large amounts of soil to form a series of flat terraces suited for irrigation. Terraces are appropriate for steeper slopes, up to 13% gradient.
- **Check dams** – barriers across a gully or stream to slow down the flow of water, so preventing further erosion.

All these technologies aim to reduce erosion, conserve and improve the soil fertility, and keep water in the soil where crops can use it.

To use the conservation techniques correctly, farmers have to know how steep the slope is: steeper slopes mean terraces or *fanya juus* have to be closer together. They also have to mark out contour lines so they can plough along the contour, plant grass strips, or construct *fanya juus* or terraces. HEM teaches them how to use a spirit level to measure the slope and mark out contours. It also teaches how to use the various soil and water conservation techniques.

The farmers do all the work themselves. HEM provides training, technical support, advice, and an initial set of planting materials such as fodder tree seedlings and grass seeds, and lends equipment such as spades and spirit levels. It does not provide any form of payment.

## **Introducing innovations**

How has HEM introduced the soil and water conservation techniques to the villagers on the slopes of Kilimanjaro? How has it managed to convince them to invest a lot of time and effort in these new practices?

HEM realized that erosion might be a problem in the area because of the amount of soil being washed down the rivers: they were brown with mud every rainy season. HEM staff made an initial visit to the villages on the mountain slopes to get an idea of the situation. They discussed the problem with government technicians responsible for agriculture, forestry and community development in the area.

The area has 19 villages, each with 350–500 families. HEM selected eight of the villages closest to Himo, and invited two leaders (the chairman and secretary) from each village to attend 2–3 days of training on soil and water conservation at the HEM training centre in Himo. The Ward Secretary and Divisional Secretary (representing the next two higher layers of local government) also attended the training. The training covered various methods of controlling erosion and restoring soil fertility, using a combination of classroom discussions and visits to trial plots on the 2.5-acre HEM experiment farm. This farm has plots for demonstrating banana cultivation, contour farming, fodder production, and various conservation structures.

The leaders were impressed by what they saw. They invited the HEM technicians who covered various specializations (agriculture, natural resources, livestock, water and community development) to visit the villages to advise the local people on how to implement these approaches on their own land. The village leaders called several meetings with all the villagers to discuss the problem facing the village. The leaders described the problem of erosion to the meeting participants, and then invited the technicians to discuss it in more detail.

The local people were interested. HEM conducted a detailed participatory rural appraisal in each village. During these appraisals, local people said that poor yields and low productivity were their most important problem, and identified soil erosion as the cause. HEM agreed to support a soil and water conservation programme in the villages.

People in each village established a soil and water conservation committee, responsible to the village government. These committees have the task of raising awareness about erosion among local people, persuading farmers to adopt soil and water conservation measures, arranging training, planning, monitoring and implementing village-wide conservation works, and so on. The village extension worker (see next paragraph) acts as secretary to the committee. The committee is given tea or soda, but does not receive any payment.

The villagers nominated one farmer from each village as a village-level extension worker to receive extra training. HEM gave the extension workers a month's training at the HEM centre in Himo on tree nurseries, agroforestry, rehabilitation of irrigation furrows, soil and water conservation, zero grazing, improved stoves, and training methodologies. HEM paid these

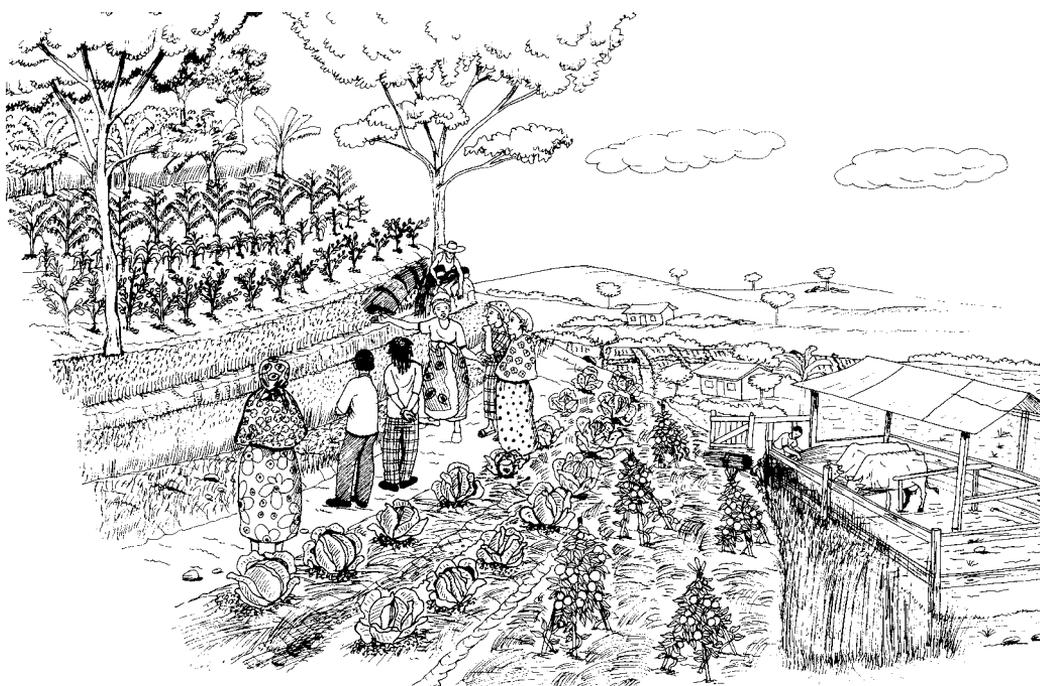


Figure 12 The villagers have adopted a range of soil and water conservation methods

extensionists TSh 10,000 (about US\$10) per month for the first two months and provided them with a bicycle. After this, the extensionists received no cash payment, but were excused from “*kazi jumuiia*” (compulsory community work). (According to local by-laws, all villagers are required to work one day a week on community activities such as road maintenance or school building. The village government in this area is strong, so is able to enforce such rules.)

HEM also organized a study visit for village leaders and extension workers to nearby areas where farmers were already practising soil and water conservation.

HEM technicians and the village’s extension worker then trained farmers in each village how to implement the various technologies. They provided practical training on one of the participants’ farms. Training covered topics such as marking out contours using a spirit level, constructing *fanya juu* contour bunds, types of fodder grasses and trees, planting and maintaining fruit trees, etc. Farmers could choose which courses they wanted to attend. Each training course lasted 1–4 days. In 1996, the first year of the programme, 1140 farmers attended such courses.

HEM and the village extension workers have conducted further courses since then. The village secretary collects names of farmers who are interested in further training. The extension workers train these farmers in small groups or on an individual basis. They can call in HEM technicians if necessary to assist with the training.

HEM is in regular contact with the extension workers. It provides short courses for the extensionists, and the extension workers write a report every month to HEM about their activities. HEM obtains information on improved technologies, new crop varieties, etc. from

local research institutes and other NGOs working in the area, and passes this on to the village extension workers. This information may be in the form of brochures or newsletters, visits by HEM staff to the villages (or by the extension workers to HEM), and quarterly meetings at HEM centre with all eight extension workers. HEM is starting to provide information to the extension workers on market prices for commodities such as banana, tomatoes and other vegetables in the markets in Himo and Moshi towns.

In some villages, farmers have formed groups to build *fanya juu* on each group member's fields in turn. For issues that affect several farmers or the whole village, such as repairing an irrigation canal or building checkdams on a stream, the village leadership organizes a *kaazi jumuiia* to do the work. The village extension worker advises on the work to be done; the work is supervised by the village leaders.

### Benefits of soil and water conservation

Farmers who have implemented the conservation techniques have seen many benefits. Their productivity has risen: maize yields on average have doubled from 6 to 12 bags an acre (from 1.3 to 2.6 t/ha); sunflower yields have gone up from 5 to 9 bags per acre (from 0.6 to 1.1 t/ha); and bean yields have risen from 3 to 5 bags per acre (0.7 to 1.2 t/ha).

The majority of farmers in the area keep cattle – normally one or two cows – that they use for milk, manure and to sell for cash. They also keep goats as a source of meat and for sale. They traditionally keep these animals confined in a shed and feed them with cut grass, banana leaves and other vegetation. Finding enough fodder used to be a problem. There is no free grazing in the area.

Farmers who have adopted soil and water conservation have planted trees such as leucaena, calliandra and croton on the bunds, as well as grasses such as Napier grass, desmodium, setaria and *Pallida*. They can feed cut grass and tree prunings to their animals, so milk yields have risen: before, a goat yielded an average of 0.5 litres of milk a day; now the average is 2.5 litres. An improved cow now produces 7 litres a day, compared to 4 litres previously. The farmers sell the much of their milk to consumers in Himo town. They even have extra fodder to sell to livestock keepers in Himo.

Of the initial 1140 farmers who were trained, 760 (67%) decided to adopt at least some of the technologies. Their success encouraged the others to follow suit. By 2005, some 6500 farmers in the eight villages had applied conservation techniques on over 4200 hectares of land.

Starting in 2000, the village governments passed by-laws requiring all the farmers to implement soil and water conservation practices. The village authorities fine farmers who do not comply – for example, by doubling the amount of *kaazi jumuiia* work they have to do. The sanctions may vary from village to village, and are set by the village's elected representatives, not by the villagers as a whole. Before the by-laws were passed, half of the farmers were implementing conservation measures. Since they were passed, all farmers have begun to do so.

## Scaling up

Many areas in Tanzania are subject to soil erosion, and would benefit from soil and water conservation on a wide scale. HEM is concentrating its efforts on the northern part of the country, on the slopes of Mt Kilimanjaro – in particular on 11 further villages nearby. Farmers in some of these villages have already started copying techniques they have seen in the HEM-supported area. HEM is seeking funding to support the scaling up to these new villages.

HEM's close collaboration with the government has been an important factor in its success in the original eight villages. It aims to continue this collaboration in the new villages. It is also exploring the possibility of government funding for this work.

The success of by-laws in the initial eight villages is an interesting model to pursue. HEM discusses this experience with village governments in the new areas. The governments in several other villages have invited HEM to train them on soil and water conservation during monthly village assemblies. After this training, some farmers have decided to adopt conservation measures. The village governments are waiting to see the results before introducing a new by-law.

The “Uhuru Torch”, a government programme to highlight successful development interventions, has visited HEM several times. This generates publicity in newspapers and on radio and TV. It also attracts the attention of local and regional politicians.

Many other organizations are working in other rural areas in Tanzania: they include NGOs, churches, schools, community organizations and government institutions. HEM tries to increase their awareness of soil and water conservation approaches. Sometimes HEM approaches these organizations, and sometimes they come to HEM. HEM also runs training courses on request for staff of other organizations, and exchanges experiences with other organizations.

HEM produces training manuals and easy-to-understand printed information materials in Swahili and English for distribution to farmers in the eight focus villages and other villages in the three districts, as well as to other NGOs and educational institutions working on similar issues elsewhere in Tanzania. This helps spread the techniques and approaches developed by HEM in the eight villages.

HEM technicians visit primary schools and secondary schools in the area. They teach the schoolchildren about soil and water conservation and other techniques that HEM promotes, and work closely with the agriculture teachers. The children put into practice what they have learned on plots in the school's compound. HEM also arranges training for the teachers to familiarize them with problems and techniques of sustainable agriculture.

The district government is very interested in the approach and the results of HEM's work in the eight villages. District officials responsible for natural resources and agriculture are frequent visitors, and the District Commissioner has paid several visits. National-level officials, including the Minister of the Environment, have also come to the area.

As a result of these visits, as well as contacts with various other NGOs, research organizations and development projects focusing on natural resources conservation, the government established environment committees in 2004–5 in every village throughout the country. These committees are responsible for the conservation of natural resources in their area.

Establishing these committees was part of a policy change on the environment as a result of work by HEM and many other organizations working on environmental and rural issues in Tanzania.

HEM is one of many organizations working on soil and water conservation in Tanzania. By itself, it cannot have a very large impact. But combined with the efforts of all the other organizations, the overall impact on farmers' livelihoods and on government policy can be substantial.

## Networking

HEM cooperates closely with other organizations in the area: NGOs such as TATEDO (an NGO focusing on energy), the United Nations Development Programme, the Selian Agricultural Research Institute and the Tanzanian Irrigation Project. TATEDO and the Selian institute have distributed information about stove-making and improved farming techniques via HEM technicians and the village extension workers. HEM hosts university students for practicals. HEM staff have attended training with other organizations in techniques such as tree grafting, stove-making, biogas production and animal husbandry.

The national and district governments second staff to HEM to assist in the NGO's programme. Arrangements vary: for some, the government continues to pay the staff's salary and HEM pays an additional allowance and covers operational costs; while for others, HEM may contribute all or part of the salary. Government staff are motivated by such arrangements: they earn extra money from their allowances, and their job satisfaction goes up because they are working with a dynamic organization and have a lot to offer farmers. Secondments may be full-time or part-time, and may last from 3 months to several years. While they are with HEM, these staff are already influencing their original working sections, and when they return, they take with them the approaches and ideas they have learned at HEM.

HEM benefits from this collaboration in various ways. It is a source of new ideas and experiences from others working in similar or related fields. HEM staff have learned new skills. HEM works with other organizations on advocacy, for example to promote tree nurseries, beekeeping, fish farming and improved banana varieties. Seconded staff at HEM strengthen ties between the government and the NGO, help HEM understand and work with the government, and facilitate solutions to joint problems.

## Problems

**Marketing** Marketing of vegetables is a problem for the farmers: all harvest their crop of tomatoes or cabbages at the same time, leading to a glut in the market and low prices for these perishable commodities. Possible solutions include identifying new markets, forming a marketing group to sell produce to more distant buyers, processing the crop (for example, drying the tomatoes), switching to other crops with a more reliable price, planting and harvesting at different times to avoid having to sell at low prices during the peak harvest period, signing contracts with buyers for a guaranteed price, and so on.

**Funding for HEM** German Agro Action has generously supported HEM's activities over the last few years. But this support is now phasing out. HEM will have to find other sources of funding to support its work. Possibilities include exploring funding from other donors or from the central government. It may be possible to charge for training courses, and for services such as hosting student practicals. Charging farmers for services is not likely to be possible.

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More information: contact HEM Trust Fund, [hemtrustfund@kicheko.com](mailto:hemtrustfund@kicheko.com)

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[www.welthungerhilfe.de](http://www.welthungerhilfe.de)

## The Eotulelo farmer field school: Learning and promoting conservation agriculture



### CA-SARD project, Tanzania

“GULLIES! GULLIES! GULLIES! IF you look this side it is gullies, the other side you see gullies, far away you still see gullies, there are no trees! Aaah, it is not possible to live here!”<sup>1</sup>

The visiting farmers were shocked by what they saw in Likamba village, on the outskirts of Arusha, in northern Tanzania. The environment was being destroyed: soil erosion was eating into the fields, and herds of cattle roamed the area, eating whatever they could find. There were few trees left: the rest had been cut down for firewood.

The farmers in Likamba were well aware of the problem. But what could they do about it? They were getting poorer and poorer: the impoverished soil grew little of their staple crops – maize and beans – and they had no other source of income apart from their cattle.

In 1997, the villagers came together to discuss what to do. They knew that Regional Land Management Unit (RELMA), a development programme focusing on land management, was helping people in the nearby village to stop the erosion. The Likamba farmers decided to join in. But they found that some of the people in the other village were suspicious of the RELMA programme: they feared that foreigners might take their land. They pulled out the trees at night, destroyed the contour bunds that their fellow-villagers had built, and let their livestock graze there.

Disappointed, the Likamba villagers decided to begin their own self-help group in 2001. They started off with 20 members. They copied some of the RELMA erosion-control technologies – tree planting, building contour bunds, as well as ways to earn money such as beekeeping, vegetable production and chicken raising. They called their group Eotulelo, which means “come and join us” in the local Maasai language.

The Eotulelo group’s leadership is particularly dynamic. They knew that in order to get assistance from outside, they would have to register as a formal organization. They did so in 2002. They asked the Selian Agriculture Research Institute (SARI) in Arusha for help. Shortly afterwards, in 2004, SARI was starting to implement a project called Conservation Agriculture for Sustainable Agriculture and Rural Development Project (CA-SARD). SARI recognized that the Eotulelo group was one of the most active self-help groups in the district, so the institute included it in the CA-SARD project.

The project works through farmer field schools (Box 14), and the Eotulelo group decided to use this approach too.

1 Malimbwi, R.E., et al. 2002. *Sustainable land use system: Lessons from Mount Meru*. Sokoine University of Agriculture, Morogoro, p. 10.

## What is conservation agriculture?

Gullying and severe erosion are not natural: they are caused by the way the land is farmed. Ploughing destroys the soil structure and leaves the soil surface open to the sun, wind and rain. The precious topsoil is easily washed away, lowering fertility and leaving the surface scarred with gullies.

Conservation agriculture is a way of growing crops that conserves the soil and maintains soil fertility. It combines three principles:

- Disturb the soil as little as possible – i.e., not ploughing.
- Keep the soil covered with cover crops, crop residues or mulch.
- Rotate or mix crops (e.g., planting a cereal such as maize and a legume such as pigeonpea or lablab).

These three principles have many advantages: they conserve moisture in the soil, maintain a good soil structure (making it easy for roots to grow), regenerate the soil's fertility, encourage earthworms and other soil life, and protect the soil from erosion hence gullies.

There are many ways of applying these principles. For example, farmers can sow seed using a simple stick, a jab-planter, or a no-till planter drawn by donkeys or oxen. They can protect the soil by planting cover crops or by spreading crop residues over the surface. They can intercrop cereals with legumes and other crops.

Conservation agriculture needs less labour than conventional farming because it avoids ploughing. It produces higher yields because it maintains the soil fertility.

Weed control may be a problem, especially in the first few years after farmers start practising conservation agriculture. They can control weeds by slashing them or using herbicides. Eventually, the cover crops will smother most weeds, making them easier to control.

## The CA-SARD project

The objective of the CA-SARD project is to improve food security and rural livelihoods of small and medium scale farmers in Tanzania by promoting conservation agriculture. It is a collaborative project funded by the German Ministry of Agriculture and Consumer Protection and implemented by FAO and the Tanzanian Ministry of Agriculture, Food Security and Cooperatives, and hosted by SARI. The project started work in June 2004. It is implemented in three districts: Arumeru and Karatu in Northern Tanzania, and Bukoba in the Lake Zone. Each district has at least ten farmer field schools, each with about 30 farmers.

The CA-SARD project coordinates the farmer field school groups. It provided training to extension workers on field school facilitation methods and conservation agriculture practices. It trained farmers on how to use and maintain conservation agriculture equipment. It provided farmer field schools with seeds of maize, cover crops, equipment, herbicides (to control weeds during the transition period from conventional to conservation agriculture), insecticides and stationery.

## The Eotulelo group's experiment

The Eotulelo group had several questions: should they plough as usual, use a ripper before planting, or plant without using a ripper? And would it be better to plant lablab (*Lablab purpureum*, a type of legume) or pigeonpeas in between the rows of maize?

They rented an acre (0.4 ha) of land to use as their field school site. They divided the field into five plots, each with a different combination of techniques:

- Ripped plot, planted with maize intercropped with lablab. At the end of the season, this plot yielded 58 kg of maize, and no lablab because of drought.
- Direct planting without ripping plot, maize intercropped with lablab (yield: 40 kg of maize, no lablab because of drought).

### Box 14 Farmer field schools

A farmer field school is a school without walls. A group of farmers gets together in one of their own fields to learn about their crops and things that affect them. They learn how to farm better by observing, analysing and trying out new ideas on their own fields. The farmers meet every week from planting to harvest, to check on how the crops are growing, look at the amount of moisture in the soil, and count the numbers of pests and beneficial creatures such as earthworms and spiders. They use an approach called “agro-ecosystems analysis” to do this (Figure 13).

They do experiments in the field. For example, they may divide the field into several smaller plots, and try out different types of crops or technologies (such as intercropping, different ways of preparing the land for planting, and so on). They compare the various plots each week and discuss what they see. If they see pests, weeds, nutrient deficiencies or other problems, they discuss the situation, look for solutions and act immediately. They also keep records of the type of work done in the field, the number of people involved, the time taken to do the work, the types of implements used, the inputs used, and so on. At the end of the season, they record the yields of the crops from the different sub-plots.

The facilitator of a farmer field school is normally an extension worker or another farmer who has graduated from another field school. The facilitator guides the group, helps them decide what they want to learn and think of possible solutions, and advises them if they have questions. The farmers draw on their own experience and observations, and make decisions about how to manage the crop.

The group must hold one or two field days (depending on the time they have and their financial capability) to show other farmers what they are doing. In conservation agriculture field schools, the first field day is a demonstration of how to use the implements and manage crop residue. The second field day, held just before harvest, is to demonstrate the effect of different technologies.

The farmers also host exchange visits for members of other field schools, and visit the other field schools themselves. This allows them to share ideas and see how others are dealing with similar problems.

At the end of the crop season, the farmers “graduate”: they receive a certificate from the field school organizer (in this case, the CA-SARD project). The members are then qualified to start a new field school as farmers' facilitators.

The field school includes team building and organization skills, as well as special topics suggested by the field school members themselves. The field schools are a way for farming communities to improve their decision making and stimulate local innovation for sustainable agriculture. The emphasis is on empowering farmers to implement their own decisions in their own fields.

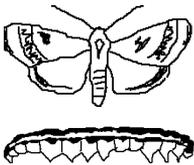
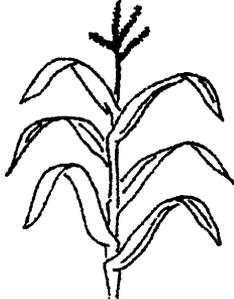
<b>Name of farmer field school:</b> AESA no.: Group no.: Plot no.: Problem addressed:		<b>Date:</b> <b>Week no.:</b>	
<b>General information</b> Variety: Date planted: Age of crop: Spacing: Fertilizer: Weather: Time of observation: Plant population: Germination %:		<b>Measurement</b> Length of leaves: Width of leaves: No. of leaves: No. of diseased leaves: No. of dead leaves: Length of plant: No. of pods:	
<b>Treatment</b> Treatment schedule:  Management practices:			
<b>Insect pests</b> Pests seen: 		<b>Plant drawing</b> 	
<b>Natural enemies</b> Natural enemies seen: 			
<b>Observations</b> Soil moisture: Diseases: Insect pests: Plant health: Deficiency: Weeds: Predators:		<b>Recommendations</b> What management practices should be applied?:	

Figure 13 A typical sheet used by farmer field schools for agro-ecosystem analysis (AESA)

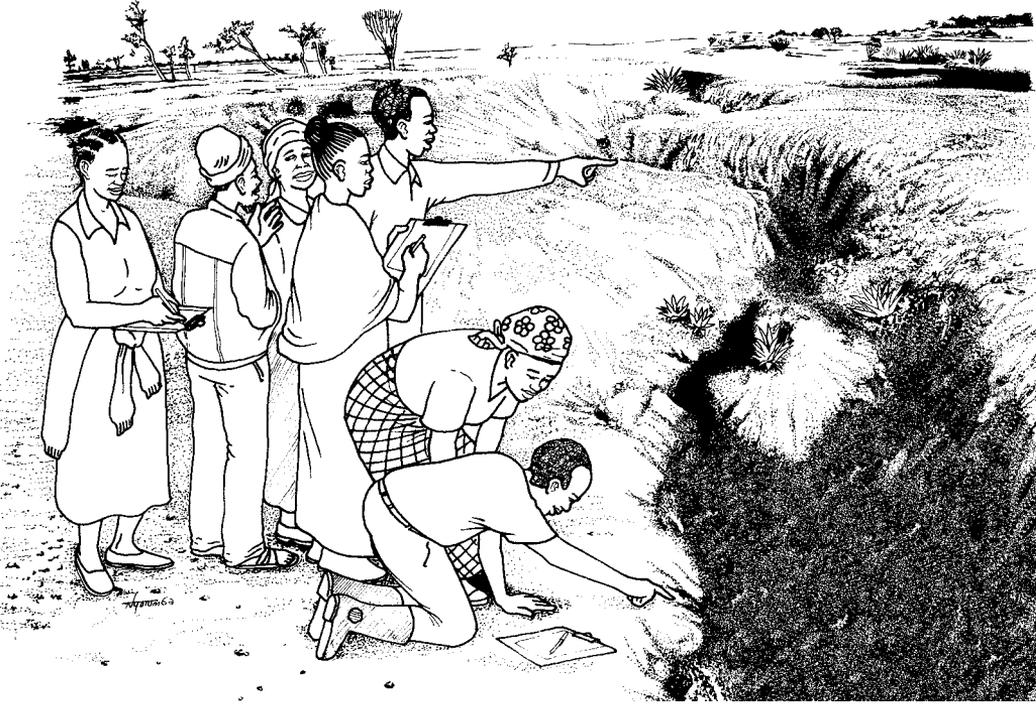


Figure 14 Erosion and gullying were a major problem in Likamba

- Ripped plot, planted with maize intercropped with pigeonpeas (yield: 35 kg; no pigeonpeas because of drought).
- Direct planting without ripping plot, maize intercropped with pigeonpeas (yield: 15 kg maize, pigeonpeas dried and were not harvested).
- Farmer's normal practice: ploughing twice, then planting maize intercropped with beans, pigeonpeas and pumpkins (yield: 12 kg maize, pigeonpeas not harvested).

The farmers chose the techniques to test with help and advice from the facilitator. CA-SARD suggested the farmers use the appropriate conservation agriculture equipment.

The group divided up responsibility for each plot. Each week, a subgroup checked on the crops in their plot, and then reported back to the whole group. The whole group monitored the differences among the plots, discussed each sub-group's findings and solutions, and agreed on what to do.

By the end of the season, the farmers had decided that it was best to rip the soil, then plant maize intercropped lablab. The lablab covered the soil well, protecting it from the sun and rain, and cutting erosion dramatically. Ripping with maize and pigeonpea was also good, though the pigeonpeas took longer than lablab to cover the soil. The ripped furrows allowed rainwater to seep into the soil, producing an excellent crop stand.

The four conservation agriculture plots were all better than the farmers' traditional practice of ploughing twice and planting a mix of crops.

Unfortunately, bad weather prevented the Eotulelo group from completing all the field-school steps in 2005, so they have not yet formally graduated. But some of the group members had

learned enough that they were able to start new farmer field schools with new members. One member helped form a new group called Upendo-nyuki in the same village.

### Outside the field school

The Eotulelo farmers did not confine their conservation agriculture work to their small experimental plots. Each of them also implemented at least one of the three principles of conservation agriculture on their own land. Some tried just one or two technologies, on one part of their farm. Others implemented different technologies on a larger area. The most popular practices were minimum soil disturbance (ripping and using no-till direct planters or jab planters), and keeping the soil covered (not burning crop residues, not allowing animals to graze freely, and planting lablab). In mid-2005, 18 of the 22 group members ripped their fields, four rotated their crops, and all of them planted lablab. During the regular weekly meetings, they were able to share their experiences and compare notes with the other group members. They also compared the performance of experimental plot with their own fields.

The farmers were pleased with the results. They found their conservation agriculture fields produced 50% more than their conventionally ploughed fields. Water sank into the soil through the ripped lines, so the soil stayed moist for longer time. The crops grown with conservation agriculture suffered less from drought than those grown in the conventional fields. The cover crops protected the soil from the heavy rain, reducing erosion.

The farmers also found that conservation agriculture was less work. Ripping was a lot easier than ploughing, needed only two people instead of three, and could be done a lot faster (ripping takes 1–2 hours per acre, while ploughing takes 2 days). That was especially important for physically weak individuals who could not handle heavy work. The women group members said the conservation agriculture implements were light and easy to use.

Because it was not necessary to plough, the farmers could do field operations faster. They could quickly sow their seed after the first heavy rain because there was no need to plough. That meant an earlier harvest, and avoided the risk of drought at the end of the growing season. In case of heavy, continuous rain, those who practised conventional farming had to wait 3–7 days, until the soil had dried out enough to let them plough.

Conservation agriculture cost less than conventional farming. The farmers did not have to buy fertilizers, or hire tractors or oxen for ploughing. They expect to have to buy even fewer inputs such as herbicides and cover crop seeds in the future, so are looking forward to higher



Figure 15 The field school members monitor growth of the crops



Figure 16 A ripper opens a narrow slot for sowing seed, without turning the soil over

profits. Herbicides are just used in the first year to control weeds, and cover crop seeds can be produced by the farmers themselves.

Conservation agriculture often uses lablab as a cover crop, so this crop has risen in importance in the area. The beans – green or dried – make nutritious food, and the young leaves can be eaten as a vegetable or used as fodder. Instead of going in search of fodder, women can now fetch few armfuls of lablab leaves each day from their fields to feed to their animals. That gives them more time to do other things. The farmers can also sell lablab beans, or dry them and sell the seeds.

## Equipment

Conservation agriculture uses certain types of special equipment:

- **Rippers** These cut a narrow furrow without turning the soil over. The seed is sown in the furrow, and rainwater can sink into the soil easily. Rippers are pulled by oxen or donkeys.
- **Subsoilers** These break up a hardpan deep in the soil, often formed by trampling by animals or repeated ploughing to the same depth. Subsoilers are also pulled by animals.
- **Direct planters** These are animal drawn implements with disks to cut the trash on the soil surface, and a chisel to open a narrow furrow. They drop the seeds into the furrow, then cover them over again with soil.
- **Jab planters** These are hand-held implements that plant seeds directly into the soil.



**Figure 17** The field school members discuss what they have seen

These types of equipment are not easily available in Tanzania: they have to be imported, or made specially. CA-SARD started by ordering equipment from Brazil, where conservation agriculture is widespread. It has since purchased equipment from NANDRA Engineering, a firm based in Moshi, about 90 km away from Likamba village. The equipment can be expensive: TSh 145,000 (€95) for a ripper and frame, and TSh 375,000 (€245) for a no-till direct planter. But farmers are used to getting together as a group to pay such prices: an ox plough costs around TSh 75,000 (€49). The project also trains blacksmiths to maintain and repair the equipment.

Because farmers are not familiar with the equipment, CA-SARD has to demonstrate it to them, and provide the first groups with equipment to use. The project advises farmers to organize themselves into small groups to buy equipment. It also links them to credit schemes such as the Ministry of Agriculture's Department of Mechanization, saving and credit cooperatives, microfinance banks and other NGOs so they can buy equipment.

Once a group has some equipment, it can earn money by renting out their conservation agriculture equipment to other farmers. The project encourages groups that do not have their own equipment to rent it from others.

The project hopes that it will be possible to stimulate enough demand for the equipment for local firms to start manufacturing and selling it themselves. The increased demand should also result in lower prices for the equipment. CA-SARD encourages suppliers to invest in equipment and sell it or rent it out to farmers via village shops.

## Other benefits

Since the Eotulelo group began running a farmer field school in July 2004, they have learned a lot. They have become experts in both conservation agriculture and in the farmer field school approach. One member, Thomas Loronyo, was approached by a neighbouring farmer group called Upendo-nyuki, to help them start a new field school. He became the facilitator of this new group.

The Likamba farmers also learned special topics such as management skills, financial issues or HIV/AIDS. In the field school, farmers have the chance to include in the timetable special topics in which they are interested. The facilitator then invites an expert to teach the requested topic. Other development organizations are keen to disseminate information through existing field school groups. They offered to train the Eotulelo group on subjects such as goat raising, credit management and banana production, and building improved latrines.

The women members of the group gained confidence because they got used to speaking in front of larger groups.

## Problems and lessons

**Free grazing** Farmers in the Likamba area normally allow their livestock to graze freely. This is a problem for conservation agriculture fields, because animals compact the soil and remove all the soil cover, leaving it open to erosion and gullyng. It is important to keep animals out of the fields – obviously while the crops are growing, but also after the harvest. Other farmers do not appreciate this need.

To solve this problem, the village leaders told the villagers to confine their animals and reduce their numbers; they backed this up with by-laws to protect the environment. Farmers who violated the by-laws were punished. As a result, many farmers stopped allowing their animals to graze freely, and joined in efforts to conserve the soil.

**Unreliable rainfall** For 3 years in a row, Likamba experienced long dry periods, which affected crop yields. To cope with the situation, the field school trials should include practices that are likely to produce positive results regardless of whether the rainfall is low or high.

**Weeds** During the transition period from conventional to conservation agriculture, weeds may become a serious problem. Farmers may have to use herbicides in the first year. In the following years, cover crops should be well enough established to smother weeds. An option to control weeds in the transition period without herbicides is to plant a high population of mucuna (a leguminous cover crop which covers the soil very densely) for at least two seasons. Mucuna can be used as fodder, but its use as food is still being researched, so market prices are low compared to lablab. Farmers can reduce their income loss by planting only part of their land with mucuna to begin with, and then sowing more later.

**Marketing** Most farmers sell their crops directly after harvest to traders, who offer very low prices. They could overcome this problem by storing or processing their produce, selling as a group to increase their bargaining power, or seeking new markets.

**Further replication** In order to promote conservation agriculture, it is necessary to build up the number of individuals who are skilled in conservation agriculture. This can be done

in part by training more facilitators and farmer leaders in conservation agriculture and farmer field school techniques. CA-SARD works with other organizations involved in conservation agriculture. Here are three examples:

- Research Community and Organizational Development Associates (RECODA) uses the field school groups which CA-SARD has established to disseminate additional technologies.
- CA-SARD provides Catholic Relief Services (CRS) with cover crop seeds and information on how to grow crops using conservation agriculture.
- Canadian Physicians for Aid and Relief (CPAR) recognized the benefits of conservation agriculture practices and copied the approach of disseminating conservation agriculture through field schools from CA-SARD. CPAR learned how to implement the approach from a CA-SARD facilitator who also works with them. The organization has started two new field school groups which are using conservation agriculture practices.

### **Adoption and scaling up**

In Likamba, the CA-SARD project has directly benefited 22 households through the Eotulelo group. Indirectly, another 15 households in the village improved their livelihood. In Arumeru, Karatu and Bukoba districts, it has reached about 900 families directly (as group members) and 300 indirectly.

Technologies such as conservation agriculture spread quickly through farmer field schools. The people of Likamba are in many ways fairly similar: they all come from the same ethnic group, and they all have similar amounts of land. No one is very wealthy. People who knew more about conservation agriculture adopted the approach more quickly. Conservation agriculture is suitable for farmers of all income groups, but poorer people adopt faster because they need to make sure they have enough food, and conservation agriculture enables them to save labour.

Many farmers in Likamba and from other villages learned about conservation agriculture through the farmer field school, and some have started copying the techniques. All the members of the field school and 15 other farmers planted lablab in 2005, and they say they will do so again in the following years, and 26 non-group members hired ripping services from the group. In 2006, 64 non-field school members asked to use the group's ripper and no-till direct planter.

The new Upendo-nyuki field school has had similar success. Other farmers have seen the results of their trials, and have come to the group to learn or asked for help in forming their own field schools. Upendo-nyuki assisted the formation of two more farmer field schools in the village of Likamba, which are also doing conservation agriculture. The farmers see that conservation agriculture is a solution to their low yields, so they want to continue even without support from CA-SARD.

CA-SARD gave a keynote presentation at the World Congress on Conservation Agriculture in Nairobi in 2005. After the congress, senior officials visited several CA-SARD project sites in Arusha. Impressed by what officials saw during the congress and the visit, the Ministry

of Agriculture decided to start 100 pilot farmer field schools in ten districts. CA-SARD advised the ministry on the technologies to be copied, the formation of FFS groups and with implementation of conservation practices.

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More information: [www.fao.org/SARD/en/sard/754/1458/](http://www.fao.org/SARD/en/sard/754/1458/). Contact Richard Shetto, national coordinator CA-SARD Tanzania, PO Box 9192, Dar es Salaam, Tanzania, [rmshetto@yahoo.co.uk](mailto:rmshetto@yahoo.co.uk), or Wilfred Mariki, national facilitator, PO Box 6024, Arusha, Tanzania, [wlmiliki@yahoo.com](mailto:wlmiliki@yahoo.com)

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## Organic farming in Karagwe District

### *Community Habitat Environmental Management, Tanzania*



**F**EW CONSUMERS USED TO spare a thought for how the food they buy was produced. But that's changing: customers are becoming more concerned about the healthiness and taste of their food, and increasing numbers flock to health-food stores and fair-trade shops that guarantee their produce was produced without pesticides or other chemicals that harm the environment or the health of the people who eat it – or who produced it.

Organic agriculture in the developed world is booming. Supermarkets are responding to consumer demand by establishing organic brands and devoting aisles to organic food. A new industry has grown up to certify that labels claiming that food was produced organically was in fact grown using compost and ladybirds rather than phosphates and pesticides.

How can small-scale farmers in East Africa benefit from this growing market? A collaborative project involving farmers in Karagwe District in northwestern Tanzania, the development organization Community Habitat Environmental Management (CHEMA for short, Box 13), and Matunda Mema, an organic produce exporter, shows how it might be done.

Through this project, 300 farmers in Karagwe District have been certified as organic. The farmers are certified by the Institute for Market Ecology, a Swiss-based organization known by its German acronym, IMO. They produce pineapples, papayas and sweet bananas, which Matunda Mema dries and exports to Germany.

### **The Karagwe story**

CHEMA's project began in 1997 in Ihanda and Nkwenda, two wards (groups of villages) in Karagwe District. Ihanda consists of 3 villages with about 250 families, and Nkwenda has 5 villages with about 300 families. The farmers there relied on a combination of traditional cropping and livestock keeping. Most were practising organic agriculture by default, because they could not afford fertilizers and pesticides. But they also used unsustainable practices such as setting bush fires to clear land. Other farmers were dependent on their cattle: they were semi-nomadic, moving around with their herds in search of fodder on communal lands and in forests.

The average farm in the area covers only about 0.5 ha. Four-fifths of the farmers farm less than 1 ha; another 10 to 20% own between 1 and 2 ha, and only 5% have more than 2.5 ha. Almost no one has more than 5 ha of land. The traditional crops are bananas, maize, beans, sorghum, fruit such as pineapples, papayas, mangos and oranges, and spices such as garlic and lemongrass.

### Box 15 CHEMA

CHEMA stands for Community Habitat Environmental Management. It is a development arm of the Catholic Diocese of Rulenge. The Diocese operates in the three districts of Karagwe, Ngara and Biharamulo, in the Kagera region of northwestern Tanzania.

CHEMA promotes the proper use of natural resources and locally available materials through:

- Community participatory planning and action
- Training on watershed management, low external-input sustainable agriculture, afforestation, beekeeping, and seed security for sustainability
- Internal inspections of certified organic farms.

Some farmers had a lot of cattle, which are traditionally considered a sign of wealth. They kept their animals far away from the village. The smaller-scale farmers could not afford cattle, but they kept goats and poultry. Free grazing was common, and overgrazing meant that environmental degradation was severe. Along with regular bush fires, soil erosion, declining soil fertility and pest and disease attacks, it meant that yields of food crops were falling and people often did not have enough to eat, especially after the end of the dry season in September to December, when there was a lot of work to do preparing the land for planting and sowing crops.

Without enough food or money to feed their families, a lot of the men would leave the area in search of work. Many families could not afford to send their children to school or their sick for treatment.

### CHEMA's training

CHEMA initiated the sustainable agriculture project in the area in 1997, with financial support from Misereor. CHEMA already had working relationships with the Mavuno Learning Assistance Centre, a community organization in Ihanda, and World Vision, a non-government organization working in Nkwenda. Together with these organizations, CHEMA trained groups of farmers on low-external-input sustainable agriculture: three groups of 25 farmers in Ihanda, and two groups of 20 farmers in Nkwenda.

Each training course included several 2-day modules, each consisting of a day of theory and a day of practice. The modules were spread out to allow farmers to implement what they had learned before going on to the next one. The modules were:

- **Soil fertility**, including composting and the use of cover crops to fix nitrogen.
- **Integrated pest management** This included biological, cultural, physical and sanitary measures. For example, the biological measures covered the use of neem leaves, hot pepper, garlic and ash to control pests.
- **Soil and water conservation** measures, including contour farming.
- **Agroforestry**, including how to start a tree nursery.
- **Crop management**, including intercropping, using farmyard manure and compost, mulching, and double-row planting



*Figure 18 Through CHEMA's training, the farmers learned alternatives to the practices that were destroying their environment and livelihoods*

After each module, staff visited each farm two or three times to follow up and provide any advice necessary.

As part of the training, the farmers were encouraged to grow organic pineapples to earn money. As a result, 80% of the farmers who had attended the training adopted mulching, 76% adopted mixed cropping, 66% applied manure, and 40% took up composting. Mulching was popular because it reduced the amount of work needed for weeding. Fifty farmers shifted to organic farming completely.

As the farmers' yields increased and income rose, their neighbours started to copy the technologies. They later approached CHEMA and asked to be trained too. In response, the Diocese of Rulenge gradually extended its sustainable agriculture to cover other parts of Karagwe District, as well as Ngara and Biharamulo, the two other districts in the Diocese. Between 1998 and 2002, CHEMA trained about 1,000 farmers in the three districts.

### **Contract farming**

The contract farming arrangement began in 2001 when a retired German Lutheran pastor, Mr Hermann, who once lived and served in Karagwe District, visited CHEMA to learn about its work. He realized that farmers were having problems selling their high-value organically produced fruit in the local market. After retiring, Mr Hermann had gone into the business of importing organic fruits from Uganda to Germany. He decided to establish a similar business in Karagwe.

After consultation with CHEMA, Mr Hermann set up a firm called Matunda Mema Co. Ltd., which buys, processes and export pineapples. The initial board of directors was comprised

of two Karagwe businessmen, the director of a local vocational training institution, and Mr Hermann himself. Each board member had to contribute some starting capital for the new company.

Matunda Mema invited 50 farmers from Ihanda and Nkwenda who were known to practise organic agriculture and to grow pineapples to enter into a business cooperation. The company offered to buy their pineapples at a premium price, on condition that the farmers would agree to produce their pineapples under contract conditions. The farmers would have to undergo a certification process (which the company would organize); they agreed to regular internal field visits and external inspections; and they agreed to sell their pineapples at pre-fixed prices to Matunda Mema. In 2002, an agreement between the 50 farmers and Matunda Mema was signed.

The company decided to concentrate on dried fruits, and to start with pineapples. It bought a piece of land in Nkwenda, which is located about 30 km from Ihanda, constructed a building for the processing unit, and imported two solar driers from Germany. The company employed two field officers, a processing manager, an assistant and some temporary labourers.

After 2–3 years, the farmers were experienced enough to continue on their own. CHEMA withdrew from active involvement in Ihanda and Nkwenda at the end of 2004, leaving coordination of the project with Matunda Mema and the Mavuno organization. CHEMA is now only consulted at times of special need, such as for conducting internal farm inspections.

## **Certification**

Although the conversion to organic farming normally takes 5 years, the initial 50 farmers were able to deliver the first organic pineapples to the company after only two. This short conversion period was because of the farmers' knowledge and practice in organic farming. During the conversion period, the company's field officers advised the farmers on best practices.

The internal inspections were conducted every 6 months by CHEMA staff. Each farmer had to attend follow-up training at least once a year on organic crop management, which CHEMA provided.

The external inspections are conducted by staff from IMO (the certifying body) once a year. During these inspections, the certifying staff ask a series of questions about the field management and crop storage. The inspector also records any advice given to the farmer, and notes it in the farmer's own records so the extension staff can follow it up. Most recommendations refer to pest management, soil fertility measures and crop management.

The certification process covers the whole farm, not just the fields used to grow pineapples. That means farmers cannot use chemicals anywhere on their farms – but it also means that all their produce – not only pineapples – is certified as organic. Farmers are encouraged to leave buffer zones along the border of neighbouring farms so that pesticides drifting across the boundary do not contaminate the organic products.

## Harvesting and processing organic pineapples

To ensure quality, the pineapples are harvested and sorted under the supervision of Matunda Mema's processing manager. The farmers are paid directly for their crop. Farm after farm is visited, and the ripe pineapples are harvested and brought to the processing unit.

At the factory, the top and bottom of the pineapples are cut off, the fruit is washed and weighed, then peeled, sliced and weighed again. The slices are then chopped into smaller pieces and dried. The final stage is packing, weighing and sealing. The dried pineapples are exported to Germany via nearby Uganda.

The first processing unit with two solar driers was set up 2002 in Nkwenda. As the number of farmers delivering to the factory rose, it was necessary to increase the number of driers. As there was no electricity in Nkwenda, the company decided to shift the processing unit to Kihanga, on the main road from Karagwe to Uganda. In Kihanga it was possible to use electric driers which could be used during the rainy season when solar driers were less effective. The company has created jobs for 10 local people.

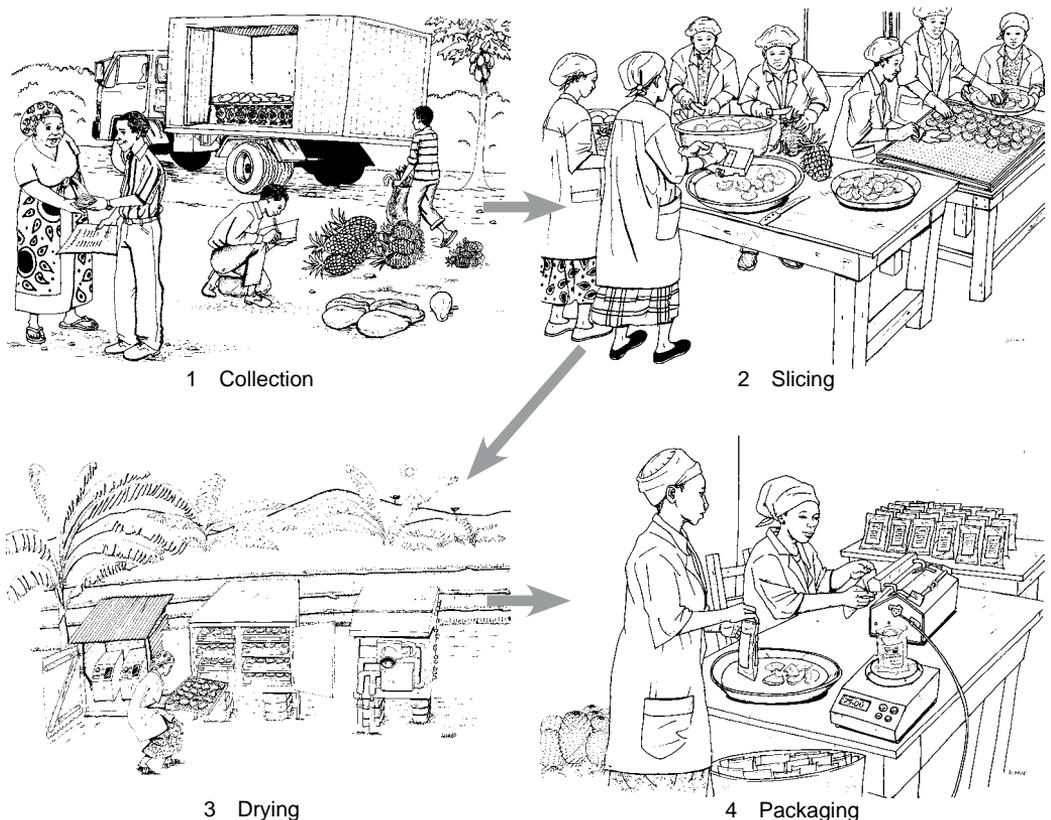


Figure 19 Stages in processing pineapple

## Further expansion planned

In 2004, the first expansion step was completed, and another 150 farmers from Ihanda and Nkwenda were contracted to supply pineapples to Matunda Mema. As the market for dried organic fruits in Germany is doing well, in 2004 the firm decided to extend its business to four other wards in Karagwe (Kihanga, Karaizo, Iteera and Chabalisa), and in 2005, it signed contracts with 100 new farmers, making 300 in all. Another 50 farmers were hoping to sign contracts in the near future.

In 2005, the marketing of other dried fruit – sweet bananas and papayas – was introduced. In 2006, the firm is planning to expand its business further and to diversify into fresh fruits, garlic, lemongrass, jackfruit, coffee and cooking bananas, all produced by the organic farmers.

## Benefits

The farmers of Ihanda and Nkwenda have boosted their yields significantly as a result of their training in sustainable agriculture. Mrs Bitakwate is a typical example. Before the project, she grew bananas and beans. In a normal season she could harvest a sack of beans, worth about TSh 18,000 (€12) from her 0.4 ha of land. By applying grass mulch and compost, she is now able to harvest three bags, worth about TSh 50,000 (€33). A bunch of bananas used to weigh 15 kg; they now weigh 55 kg a bunch. A widow, Mrs Bitakwate has managed to educate her children, who now work as organic farming extension officers in Ihanda.

In 1997, before the project began, the average pineapple grown in the area weighed 0.5 kg and fetched TSh 40 (€0.03) in the local market. Now, one fruit weighs 4 kg and sells there for TSh 200 (€0.13).

Food supplies in the area have improved, especially during the former hungry season. The period of food shortage has fallen from 4 to 2 months.

With proper crop management, it is possible to harvest the pineapples throughout the year. One stem can produce two fruits a year. Contract farmers who sell their fruit directly to Matunda Mema get a fixed price of TSh 250 (€0.16) per piece. They have no transport costs, no risk of not being able to sell the fruit, and lose no time for marketing. That makes contract farming very attractive for the farmers.

The average pineapple farmer grows about 500 pineapple stems on a quarter acre (0.1 ha), bringing in about TSh 200,000 (€130) per year. Larger-scale farmers earn up to TSh 1,000,000 (€650) a year. The biggest farmer grows up to 12,000 stems on 3 acres (1.2 ha).

## Lessons

**Limited markets** Prices for agricultural products on the local market are low, and farmers have to decide whether the extra work needed for sustainable or organic production is worth it. Unlike local markets, foreign markets offer premium prices for organically grown produce. But accessing the export market is very difficult for smallholders without outside support. Improved access to higher-value markets would motivate many more farmers to invest work in sustainable agriculture.

**Quality control** Processed food and high-quality produce need a good quality control. Such a thing does not exist in Africa's traditional farm trading systems. In Karagwe District it is still common for farmers to market their own products individually in the local markets. Each farmer must pay for transport and find time to bring the produce to town and sell it. The longer the distance between the producer and the buyer, the more sophisticated the value chain becomes, and the more important is the establishment of a quality-control system.

The example of Matunda Mema shows that farmers who used to sell their products locally market can become part of a longer value chain – one that is far more complex and demanding than anything they were used to. The new quality controls were established through the external certification and the inspection system. Support systems were also needed to ensure a consistently high-quality product: CHEMA's initial training, and the Matunda Mema field officers' extension services. The processing manager ensures that only pineapples from certified farms which meet the standards are processed.

Recently, however, Matunda Mema has observed a fall in fruit quality. This was attributed to CHEMA's exit from the area. Matunda Mema is now finding ways to re-establish the product quality and training.

This example shows that the transition from traditional farming into a modern value chain requires continuous training and supervision of farmers. This must be provided somehow: by the government, the private sector or NGOs, perhaps with financial contributions from the farmers who benefit.

**Risk of a single buyer** The example of Matunda Mema shows that contract farming in combination with the export of certified organic products opens new opportunities and significant financial benefits for contracted farmers. But it brings the risk of dependence on a single buyer: farmers would be hit severely if anything unexpected happens to this buyer or market connection. Farmers should therefore diversify their market channels if they can.

**Shortage of trainers** Western Tanzania has a shortage of people in government agricultural offices, NGOs and community organizations who can train others as trainers in sustainable and organic agriculture. Such skills are neglected at universities and in the training of extension officers. CHEMA is one of the few organizations that provides training in sustainable and organic agriculture in western Tanzania (this training is financially supported by Misereor).

## Challenges in adopting organic farming

**Labour intensity** Organic farming is more labour-intensive than conventional agriculture. Making compost, digging trenches and contour bunds, and other measures to conserve the soil and maintain its fertility: all this takes a lot of work. If labour is in short supply – as in families affected by HIV/AIDS – it is hard to convince people to put in the extra work needed, even if they stand to benefit greatly from it.

**Conflicts between management types** In Karagwe District, many farmers graze their livestock on communal land. They set bush fires, especially during the dry season, to encourage new grasses and herbs to grow for their animals to eat. Hunters and farmers who want to cultivate a new area also set fires. That means problems for organic farmers who cut the grass to use as mulch.

**Receiving mentality** Karagwe District borders Rwanda and is close to Burundi. Refugees from these two countries flooded into the area in the mid-1990s, and many NGOs and government services provided services for free. Local people got used to getting free food and services such as training. Participants were sometimes even paid allowances to attend training. They came to feel entitled to such services without any contribution from their side. Times have now changed, but this mentality has not. It continues to hamper people's willingness to become active and to use the opportunities open to them.

**Organic pest and disease management** Many farmers find it difficult to imagine managing pests without applying chemicals. That is especially true for tomatoes (against fungus and blight diseases), coffee (berry disease) and sweet bananas (Panama disease). Organic farming avoids artificial chemicals, using instead biological measures, the use of resistant varieties, diversified cropping, intercropping and companion planting. Nevertheless, farmers fear they will lose a major part of their harvest if they stop using pesticides.

## Scaling up

CHEMA has undertaken various measures to scale up its organic farming work in Rulenge diocese:

- It expanded its training from the initial 110 farmers in two wards to over 1000 farmers in the three districts.
- After the export market link was established, CHEMA encouraged farmers to produce more pineapples and diversify to other fruits such as papayas and sweet bananas, which could be processed to fetch a better price.
- CHEMA is in the process of establishing a training centre where farmers and extension staff will be trained in natural resources management and sustainable agriculture.
- It has acquired communication equipment: computers and an internet connection.
- Before starting work in a new village, CHEMA involves the village administration in identifying local needs and priorities.
- CHEMA encourages the enforcement of existing by-laws on the use of natural resources, including discouraging uncontrolled bush fires.

To overcome the various challenges, CHEMA needs to:

- Establish an internal inspection unit for organically produced crops to support and encourage farmers to practise organic farming.
- Support the establishment and strengthening of local institutions that will be able to complement its village-level training efforts.
- Provide training for CHEMA's own staff in marketing so they can help farmers to exploit market opportunities.

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More information: CHEMA, [chema@satconet.net](mailto:chema@satconet.net)

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[www.misereor.org](http://www.misereor.org)

## Networking for sustainable agriculture

### *PELUM-Tanzania*



**I**N THE EARLY 1990s, the Tanzanian government opened the door for the creation of non-governmental organizations to complement its own development efforts. Many NGOs were formed at the community level to work on sustainable agriculture. Most are small and highly localized. They focus closely on their field work with farmers in a particular area, and have a particular set of expertise. They have many needs that they cannot supply by themselves: staff upgrading, technical information materials, new ideas on technologies and extension approaches. But they also have strengths: they have operated in the field for many years, so have much to teach each other. And they have many valuable experiences that government, donors and other development organizations can learn from.

Networking can answer these small organizations' needs, and enable them to take advantage of each others' strengths. PELUM-Tanzania was formed to enable them to come together to facilitate learning, networking and advocacy in sustainable agriculture. The network feeds various experiences into a more strategic process to influence rural development.

PELUM-Tanzania is one of the ten country working groups of the Participatory Ecological Land Use Management (PELUM) Association, which covers East, Central and Southern Africa. The PELUM Association was founded in 1995 with 25 members, and it now has more than 160 member organizations throughout the region.

PELUM-Tanzania was formed in 1995 as the Tanzanian branch of the regional association. It was officially registered as a Trust Fund in 2002. Currently PELUM-Tanzania has 33 member organizations, most of which work in various aspects of sustainable agriculture throughout Tanzania. It facilitates learning, networking and advocacy in promoting sustainable agriculture, the rational use natural resources, household seed and food security, and sustainable rural communities.

PELUM-Tanzania's work includes capacity building, documenting and communicating information, networking of farmers' organizations, advocacy, and gathering and analysing information on markets in Tanzania. The sections below describe each of these activities in turn.

### **Capacity building**

Capacity building of development practitioners is important so they can acquire the skills they need to serve farmers in their area. It also enables organizations to plan and implement activities more effectively.

**Box 16 PELUM-Tanzania’s vision and mission**

**Vision**

Farmers, men and women, especially smallholders, are managing sustainably their environment and have the capacity to identify problems, to experiment and innovate, using locally available resources. At the same time, farmers are organized and have formed strong networks to promote their interests at local and national levels.

**Mission**

To build the capacity of its members in sustainable agricultural knowledge, training and skills for empowering farmer groups, communication skills, fund-raising strategies, action-learning process and gender policy. PELUM-Tanzania is to establish an information centre as a tool for documentation and communication to capitalize experiences and disseminate them in the network. It is also an advocacy tool with and for farmer organizations and development organizations to influence government, donors and NGOs on development issues and policies based on common analysis between farmers and organizations, especially on free market mechanisms. PELUM-Tanzania will collaborate with its members to facilitate networking of farmer organizations.

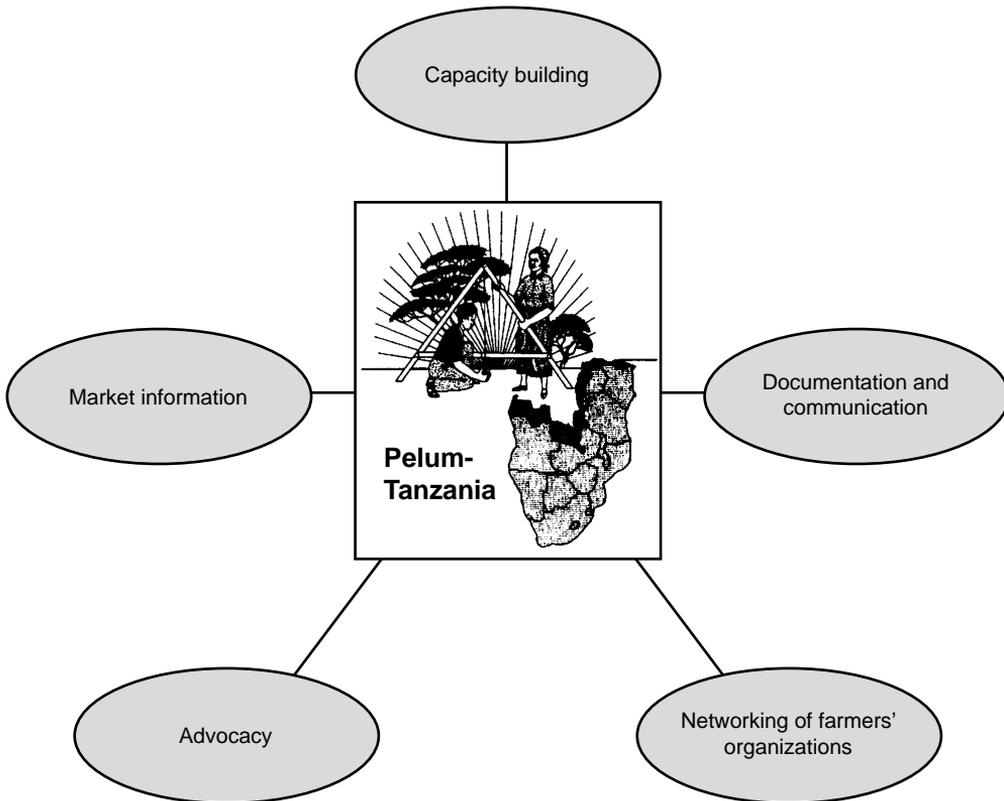


Figure 20 PELUM-Tanzania’s activities

## **Activities**

PELUM-Tanzania builds the capacity of its member organizations and other development partners. It does this by facilitating national and regional training workshops and organizing exchange visits according to members' needs. Since 1996, PELUM-Tanzania has conducted more than 65 training workshops on a whole range of technical, social, management and policy subjects: sustainable agriculture, seed security, genetically modified crops, organic standards and certification, farmer groups and networking, facilitation, planning, monitoring and evaluation, fundraising, communication, policy analysis and advocacy, globalization and trade, and deliberations after the "Small Farmers' Convergence" (a PELUM-initiated gathering of small-scale farmers leaders and representatives at the World Summit on Sustainable Development in Johannesburg in 2002). More than 350 farmers, extensionists and staff from 33 member organizations have attended these courses.

These courses and workshops use participatory learning methods. The trainers and facilitators are drawn from PELUM-Tanzania's member organizations. If no one with the right skills is available, PELUM-Tanzania hires outside experts to act as trainers.

## **Results**

As a result of this capacity building, PELUM-Tanzania's member organizations and small-holder farmers have increased their knowledge on sustainable agriculture and farmers' empowerment. Many of the member organizations have modified and improved their programmes, projects and activities. They are now in a better position to facilitate changes in the villages they serve.

More farmers and member organizations now try to conserve agricultural biodiversity. For example, more farmers use and multiply seeds of local varieties of crops and trees; they make greater use of manure; and the use of locally prepared organic pesticides has gone up. Farmers and extensionists also now participate more actively in activities organized by the community or government.

The training has motivated other organizations to join the PELUM-Tanzania network. It has generated new partnerships and collaborative relationships, further promoting sustainable agriculture, and increasing the scope and reach of PELUM-Tanzania itself.

PELUM-Tanzania's emphasis on participatory approaches has consolidated other organizations' use of these methods. Most member and partner organizations have moved from conventional participation into genuine, active and friendly participatory approaches. Participatory facilitation, in turn, promotes farmer-to-farmer delivery of extension services, improving the effectiveness and efficiency of the development activities. That has led to greater collaboration within farmers' groups, more appropriate farming techniques, and higher yields (sometimes dramatically higher). It is difficult to trace the benefits directly back to PELUM-Tanzania's activities, but the effect is genuine.

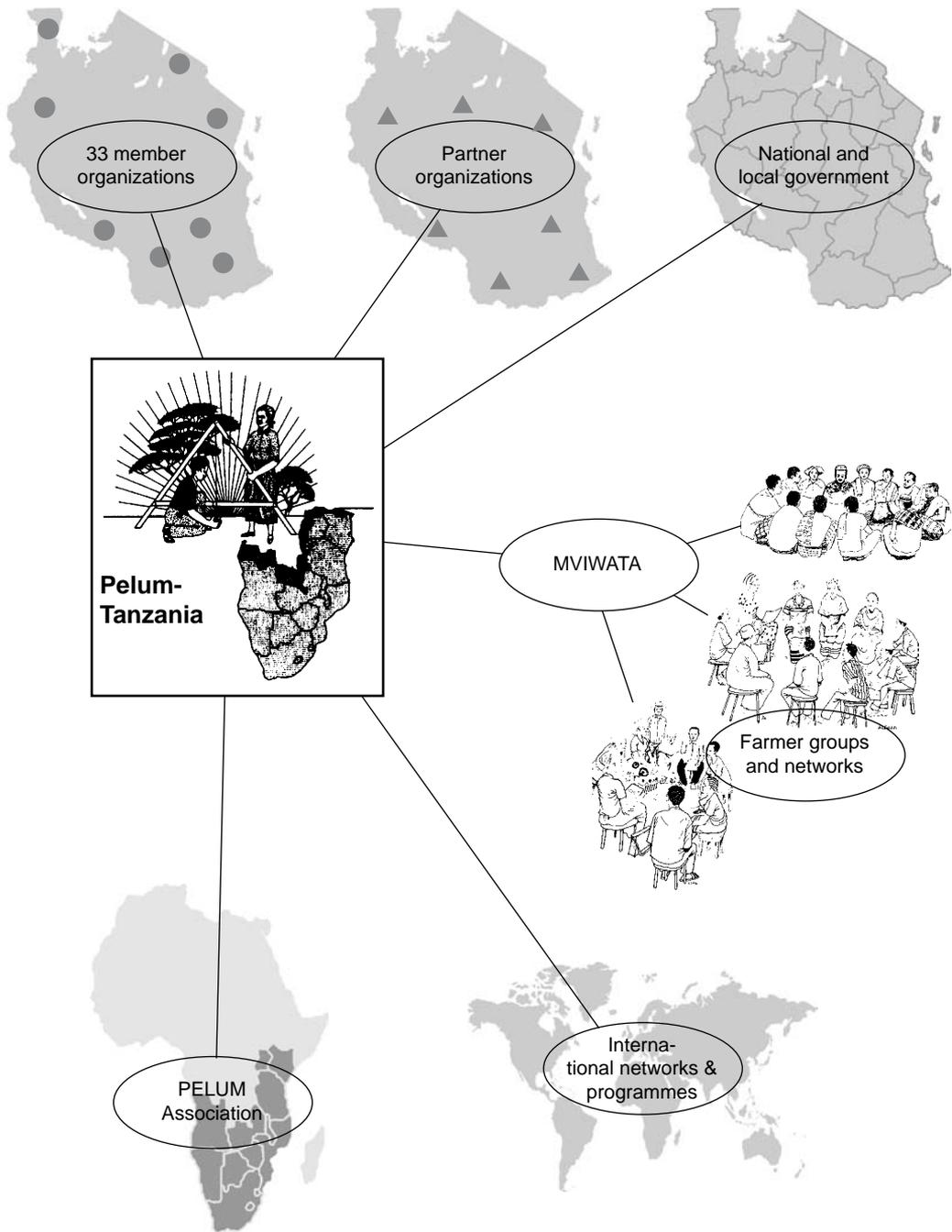


Figure 21 PELUM-Tanzania's key relationships

## Documentation and communication

Documentation enables smallholder farmers and development organizations to share their experiences: successful technologies and approaches, as well as failures. Farmers have many traditional practices and have developed innovations that have not been documented or shared with others. Because development organizations are focused on their day-to-day activities, they often omit to document what they have done and learned, so risk losing this valuable knowledge as key staff move on.

### Activities

PELUM-Tanzania's country desk runs a documentation and resource centre in Dodoma. The centre gathers information on sustainable agriculture initiatives, advocacy and lobbying activities in Tanzania and elsewhere. It makes this information available to member organizations, farmer groups, partner organizations, students, the government and the public. People can come to the resource centre to read and exchange information, or they can get the information through visits, discussion forums arranged by PELUM-Tanzania, emails, leaflets, newsletters, and the PELUM Association's bulletin and its magazine, *Ground Up*.

The resource centre has a large number of publications, reports, CD-ROMs and other documents, many of which are not available anywhere else. The centre is a key resource for member organizations, partners, farmers, and the public.

PELUM-Tanzania's quarterly newsletter, called *Kilimo Endelevu* ("Sustainable Agriculture"), contains articles about good practices in sustainable agriculture, agricultural marketing, policy advocacy issues, seed and food security, experiences in community development, planned events, farmers' local innovations and news. The newsletter is meant to enhance information exchange and distribution, networking and sharing. Most of the articles are by farmers themselves. Two thousand copies of each issue are produced. Member organizations receive 60 copies of each issue at cost.

PELUM-Tanzania publishes various books, booklets, brochures and leaflets about various aspects of sustainable agriculture, lobbying and advocacy techniques, genetically modified crops, and so on. These publications are written for smallholder farmers, public and decision makers. They are published in English and Swahili, so both partners and smallholder farmers can understand them. Some publications are distributed free of charge, while others are sold at a subsidized price so the intended readers can afford them, but part of the production cost can be recouped.

### Results

This documentation and communication work keeps member and partner organizations informed about issues related to sustainable agriculture. PELUM-Tanzania has studied various policy documents, popularized them and translated some into Swahili for dissemination to member and partner organizations and farmers' groups.

New projects in 2003 and 2004 included initiatives to promote food security and local innovations. The *Kilimo Endelevu* newsletter is an important way of disseminating information within

and outside PELUM-Tanzania's constituency. Most member and partner organizations have email and internet facilities, so it is easy and quick to share information and get responses.

Although PELUM-Tanzania has produced various publications, the need is still great. Ironically, the organization has done relatively little to document its own work.

### **Promoting farmers' networks**

Many farmers in Tanzania traditionally work in groups so they can achieve a common goal that they cannot achieve individually. Groups have many purposes: get better prices for their produce, manage irrigation systems, secure access to land, obtain technical support from the government, and many others. Farmers need information, goods and services if they are to improve their farm production and become better off. Groups of farmers have much to learn from each other, and collectively they are strong enough to lobby the government and attract the attention of the private sector.

PELUM-Tanzania and its member organizations facilitate networking among farmers and their organizations so they achieve these goals.

### **Activities**

PELUM-Tanzania facilitates the networking of farmer organizations. It does this by working with its member organizations to promote self-help farmer groups and local farmer networks. It then encourages these networks to join a national network of farmers' groups, known as MVIWATA. This is the only independent national farmer network in Tanzania, and is controlled by small-scale farmers themselves.

MVIWATA has initiated intermediate, regional networks to ensure that farmer representation at the district and national level is transparent and accountable to members. It facilitates partnerships with local authorities, NGOs and other support organizations.

Every year, PELUM-Tanzania organizes and facilitates three 5-day events, known as "networking days". These are held in turn in different parts of the country. They allow farmers to come together to share experiences, show off their best practices, and discuss marketing information and trade challenges.

PELUM-Tanzania invites farmers from throughout East Africa and neighbouring countries to participate in the government's National Farmers' Week and to go on exchange visits to farms in Tanzania.

At the regional level, the Africa-wide PELUM Association and its national members (including PELUM-Tanzania) have facilitated the formation of the East and Southern Africa Farmers' Forum. This is a regional network of small-scale farmers that enables them to discuss issues of common concern and to develop recommendations for national and international policies and practices.

## **Results**

Farmers groups' networks are becoming common all over the country. They have gained confidence by exchanging experience and mutual learning. Extensionists have come to appreciate the farmers' detailed understanding of their crops, livestock and surroundings, and have a new, positive attitude towards this knowledge.

PELUM-Tanzania's member and partner organizations facilitate the organization of farmers' groups and organizations and networks in their own areas. Such networks are becoming increasingly popular, and have achieved a great deal of recognition inside and outside Tanzania since the Small Farmers' Convergence preparations started in 2001. Networks affiliated with PELUM-Tanzania are attractive partners for government agencies and NGOs.

Unlike most projects and donor-driven farmers' organizations, local MVIWATA groups and networks have a high degree of financial autonomy and independence.

## **Advocacy**

There are many powerful stakeholders in agriculture and rural development: large-scale farmers, agro-industries, supermarkets, consumers, research agencies, government departments, foreign governments, multinational firms, and so on. Their interests differ, and the voice of small-scale farmers is often drowned out by the noise.

Small-scale farmers can be very articulate in developing and expressing their opinions. But they need help to gain a voice, a place at the table where policy decisions are made. PELUM-Tanzania's advocacy programme helps them do this.

## **Activities**

Following the Small Farmers' Convergence, PELUM-Tanzania initiated a project to facilitate MVIWATA's work in Tanzania. This aimed to sensitize more small-scale farmers on the range of local to global issues discussed in the Convergence and the agreements made there, and to help farmers advocate for their own interests through farmers' groups and networks.

In collaboration with VECO-Tanzania (a Belgian NGO), PELUM-Tanzania also started advocacy work on food security issues, including sustainable agriculture, produce marketing, access to land, and farmers' income.

PELUM-Tanzania organizes zonal workshops on policy analysis, negotiation skills, decision-making processes and strategic advocacy issues. It has held two workshops for 64 farmers on policy formulation and policy analysis. It lobbies and advocates together with farmer and development organizations on food and seed security, markets and trade, sustainable land use management and sustainable agriculture, biosafety and genetically modified organisms.

Outside the country, the organization collaborates with various global networks on advocacy and lobbying activities. For example, it is part of a joint effort against genetically modified organisms with partners in Africa, Latin America and Asia. It has printed and distributed 2000 advocacy booklets and 5000 leaflets for this campaign.

## Results

As a result of these efforts, some member and partner organizations have developed advocacy strategies, including forming alliances with farmers' organizations to identify issues, lobby and campaign together.

Farmers' delegates raised the visibility of smallholder farmers at the 2002 Johannesburg World Summit on Sustainable Development. Farmers were recognized as a "major group" during the summit; the media gave a large amount of coverage to smallholders' issues, and these figured prominently in the Agriculture Commission – one of the major forums for discussion among NGOs at the Summit. The Tanzanian delegates from the Small Farmers' Convergence formulated plans for action, and disseminated the farmers' view of sustainable development that emerged from it. Advocacy efforts have led to government ministries' recognizing MVIWATA.

Important groups of stakeholders, especially smallholder farmers, were not involved in drafting a biosafety bill. A campaign by PELUM-Tanzania and its members against genetically modified organisms succeeded in preventing the government from submitting this draft to Parliament in 2005.

For one of the *Nane Nane* events (the government-sponsored National Farmers' Day, on 8 August each year) farmer groups chose "Support sustainable agriculture – not genetically modified organisms" as the main theme. Two other advocacy messages for the event were chosen: "Participatory policy formulation: a key to poverty reduction", and "Preserve, improve and use local seeds and practices". *Nane Nane* is a window of opportunity for farmers to campaign and advocate for their agenda.

## Marketing and trade

If villages have access to capital markets, information and technology, globalization gives them opportunities to gain by exploiting their comparative advantages. These opportunities can lead to the more efficient allocation of resources, so enabling growth, development and poverty reduction. But globalization can produce both winners and losers.

## Activities

Together with farmer organizations, PELUM-Tanzania collects and analyses information on the free market in Tanzania. It has studied factors affecting smallholder farmers' market conditions in Tanzania and proposed actions to improve them. It has started a programme to tackle imperfections in the market for smallholder farmers' produce.

It helped organize a workshop on the World Trade Organization and trade for NGOs and members of parliament in collaboration with ActionAid Tanzania. It also organized exchange visits for farmers and member organizations to learn about community cereal banks, and savings and credit organizations.

## Results

A study on agricultural markets and trade in Tanzania looked at ways to provide incentives to producers while keeping consumer prices low. Low prices for producers not only discourage the production of food crops, resulting in food insecurity at the national level and a poorly organized marketing system for traditional food crops. Producers face high losses during times of glut as a consequence of inadequate storage, processing, transport and quality control systems.

For another *Nane Nane* farmers' day, farmers chose "Access to markets as a pillar to improved agriculture" as an advocacy and lobbying issue. In response to farmers' calls, the Ministry of Agriculture, Food Security and Cooperatives has started involving representatives of small-holder farmers through MVIWATA in the formulation of national market policy.

## Developing the PELUM-Tanzania network

PELUM-Tanzania is a small organization with just four staff: a coordinator, a project officer, an advocacy officer, and a secretary. Despite this, it can achieve a great deal because its members are willing to contribute their time, information, expertise and energy to sharing for the common good. They do this because the whole is greater than the sum of the parts: each member organization benefits more than it gives.

## Activities

PELUM-Tanzania holds annual general meetings to discuss the previous year's activities, review progress, plan activities, and develop strategies. In September 1999, the members met to develop a vision and mission statement (Box 16) and to refine the organization's strategies and the roles of its staff.

PELUM-Tanzania has invested in an office in a strategic location in Dodoma, the political capital in the centre of the country. The advocacy officer is located in a partner organization's office in Dar es Salaam, where much of the government is still located.

## Results

PELUM-Tanzania's membership has grown from five in 1995 to 33 in 2005. The organization has built up a strong constituency and has gained a reputation for high-quality, innovative work with and on behalf of smallholder farmers, who are the majority of Tanzania's population. PELUM-Tanzania's member and partner organizations have formed strong local partnerships.

The various forums have sown the seeds of good relationships and strong partnerships among the various organizations and their respective constituencies. Collaborative efforts have covered activities such as needs assessment, planning, implementation, monitoring and evaluation of activities. Collaboration is growing between NGOs, local authorities and central governments. PELUM-Tanzania's members work closely with district and village councils during all phases of development activities. In 2002, the central government enacted the

NGO Act, which creates a national NGO Council to coordinate and oversee NGOs activities and performance. The government has set a budget to assist NGOs in their operations. The government is gradually recognizing the role of NGOs in bringing about development and reducing poverty, particularly in rural areas.

### **Strength, weaknesses, opportunities and threats**

**Strengths** PELUM-Tanzania is composed of many strong member organizations, has a focused and experienced management team, established administrative procedures and a committed board. It has the facilities it needs to deliver services to its members. It has strong ties with other organizations at the national and international levels, including the regional PELUM Association and several funding agencies willing to sustain current operations.

**Weaknesses** Some members do not pay their membership fees on time, and communication can be difficult. There are only a few full-time staff, so inevitably there are gaps in skills, such as, impact assessment, proposal writing and presentation. Although it is a membership organization, PELUM-Tanzania depends on donor support, and finding funds for new activities is a challenge. And in some ways, the organization is fighting an uphill battle in support of smallholder farmers' interests in the face of globalization and increased dominance of larger players.

**Opportunities** Because it is seen as a credible organization, PELUM-Tanzania has high potential to increase its membership and garner more support from donors. It has been recognized by the government and other stakeholders at the national and international level.

**Threats** As with many development organizations, PELUM-Tanzania is at risk if donors withdraw their funds. Another threat is the danger of conflict among member organizations as their number and variety increases.

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More information: contact Yakobo E.K. Tibamanya, PELUM-Tanzania, [info@pelumtanzania.org](mailto:info@pelumtanzania.org)

The work of PELUM-Tanzania is supported in part by Misereor.

[www.misereor.de](http://www.misereor.de)



### **Nine-seeded hole in Ena village**

*Christian Community Services of  
Mount Kenya East, Kenya*

*A farmer in her nine-seeded hole maize field*



*Yields are poor from maize fields planted without  
the nine-seeded hole technique*



*Ready for harvest in a nine-seeded hole field*



*A farmer shows a CCS staff member how she has  
used compost-filled holes to grow bananas*



## **From agroforestry to improved livelihoods in Chebarus village**

*Christian Community Services,  
Diocese of Eldoret, Kenya*

*Julius Sawe's farm*



*Cabbages intercropped with passionfruit in  
Eldoret*



## **Dairy goats: Hope for farmers in Embu and Mbeere districts**

*Diocese of Embu, Kenya*

*Hosea Njeru in his fodder plot. Crops include  
Napier grass, calliandra (in Hosea's left hand),  
mulberry (the small tree) and Lantana camara  
(hedge)*



*Hosea Njeru with his group's Kenya Alpine  
breeding buck*



*Hosea Njeru with a third-generation female that has just kidded with twins.*



*Goats are an important source of milk for farmers in the area*



### **A tale of two villages: Integrated agriculture in Lare Division**

*Baraka Agricultural College, Kenya*

*Each family in Baraka village has built a chicken coop. They sell the eggs and chicks, and collect the droppings to use as fertilizer*



*Intercropping and crop rotations help maintain soil fertility and use soil moisture to the maximum*



*Cassava (the tall crop behind the farmer) was new to the Baraka farmers, so they adopted it cautiously at first*



*The farmers now prevent their dairy goats from grazing freely; instead, they feed them with cut grass and foliage*



## **Days of hunger are gone: Groundnuts in Kuna village**

*Agriculture and Environment  
Programme, Catholic Diocese of  
Homa Bay, Kenya*

*Various types of seed at the Kuna Seed Fair*



*Harvesting groundnuts*



*Groundnut sheller*



*Mama Esther proudly shows the house she built  
with proceeds from her groundnuts to visitors*



## **Soil and water conservation on the slopes of Kilimanjaro**

*HEM Trust Fund, Tanzania*

*Erosion is a severe problem in the Himo area, even on relatively flat land*



*Mary Akaro standing by a grass strip on her farm, after conservation work has been completed*



## **The Eotulelo farmer field school: Learning and promoting conservation agriculture**

*Conservation Agriculture for Sustainable Agriculture and Rural Development project, Tanzania*

*Gullying – the worst thing that can happen to a farmer's fields*



*Instead of using a plough to turn the soil over, conservation agriculture farmers can use a chisel to make a narrow slot in the soil in which to sow the seed*



*Conservation agriculture leaves as much cover on the soil as possible to protect the surface from wind, rain and sun*



### **Organic farming in Karagwe District**

*Community Habitat Environmental Management, Tanzania*

*A field visit is part of the internal inspections needed to maintain organic certification*



*Harvesting pineapples and taking them to the collection point*



*The pineapples are sorted by size before they are loaded onto a lorry*



*It is necessary to keep careful records when loading the pineapples on the lorry*



*Another successful trade: the company pays the farmer for her crop*



## **Networking for sustainable agriculture**

*PELUM-Tanzania*

*PELUM's work involves networking with local organizations and farming communities*



*Public awareness and lobbying are vital to ensure that farmers' voices are heard: this is a celebration at the 2005 annual "Nane Nane" national farmers' day event*

# 4

## Agricultural policy in Kenya and Tanzania



**T**HIS PART DESCRIBES THE impact of policy reforms of the 1980s and 1990s in Kenya and Tanzania on small-scale farmers, rural poverty and rural economic development. It also describes various problems facing agriculture in the two countries, shows how sustainable agriculture can help overcome these problems, and suggests policy changes needed to support a shift to sustainable agriculture.

### Policy reforms

In both Kenya and Tanzania the pre-reform period was characterized by government control, production and marketing for most commodities. In addition to cooperatives, state-run farmer organizations were also set up to support and market major commodities. In Kenya these included (among others) the Kenya Tea Development Authority, Kenya Cooperative Creameries, and the National Cereals and Produce Board. In Tanzania, which was considered as the socialist model for Africa, the principle of government control applied even more strongly. However, most cooperatives and state-owned boards failed to ensure stable prices and food security; instead, product prices fell in surplus areas and rose in deficit areas.

Inspired by the World Bank and the International Monetary Fund, and along with many countries in sub-Saharan Africa, Kenya and Tanzania undertook economic reforms during the late 1980s and the 1990s. Agriculture-relevant reforms included the deregulation of exchange controls, currency devaluation, market and trade liberalization, the reduction of fiscal deficits, the privatization of state marketing boards, and downsizing and streamlining of public institutions. State intervention in agriculture has declined, and production is increasingly based on market principles.

Policy reforms in Tanzania in the 1980s were directed to deal with a lingering economic crisis. They began with removing the government monopoly in the marketing of agricultural commodities, lifting associated price controls on imports and pricing, and distribution of farm inputs. Except for the trading operations of the Strategic Grain Reserve, trade in food crops is now entirely private. All types of public support to the agricultural sector have been eliminated.

Tanzania adopted a National Poverty Eradication Strategy in 1997. The objective of food policy is to maintain food self-sufficiency. This reflects the government's aims of improving social well-being and eliminating abject poverty. The Tanzanian Poverty Reduction Strategy Paper (2000) identified agriculture and small and medium size enterprises as the primary means of cutting poverty.

Since 1993, the Kenyan government has undertaken a series of economic measures with the assistance of the World Bank and the International Monetary Fund. Similar to Tanzania, the government has eliminated price controls and import licensing, removed foreign exchange controls, privatized a range of publicly owned companies, reduced the number of civil servants, and introduced conservative fiscal and monetary policies.

Food security is of paramount importance to Kenyan development policy, as is strongly implied in the country's food policy document (Republic of Kenya, 1994), consecutive five year plans, and the Poverty Reduction Strategy Paper (Government of Kenya, 2002).

## **Agricultural development strategies and poverty reduction**

A conducive policy environment is vital to stimulate agricultural development. The agricultural development strategies in Kenya and Tanzania are fairly similar. With the primary goal of self-sufficiency in basic food needs, the focus of agricultural policy reforms in Kenya and Tanzania has been to produce more food to enhance food security, and then to alleviate poverty. In line with market and price deregulation, top priorities have been to improve transportation and markets so as to increase people's purchasing power and access to food. Promoting private sector involvement in production, processing, storage, input supply and marketing are also integral parts of the strategy. The private sector is supposed to take the leading role in input delivery and purchases of farm produce. The government's role is confined to developing infrastructure, promoting supporting institutions, and monitoring performance. Providing market information is an important area that is neglected by governments; this gap is being filled in part by the private sector and NGOs.

Elements of the strategies include the following.

- **Supporting agricultural research and extension** and improving its effectiveness to generate improved technologies in production, storage and processing. Although research on plant and animal genetic improvement and cultural practices are usually in place, less attention is given to post-harvest technologies. Research is also encouraged to develop on- and off-farm storage and processing technologies to reduce post-harvest losses, boost returns to farmers and traders, and to increase overall food availability.
- **Improving rural infrastructure**, including roads, market centres and storage facilities. The market currently performs very poorly because of poor infrastructure, inadequate organization of local marketing, and lack of storage facilities. Improving rural roads and feeder roads in particular is critically important to improve market access, both nationally and internationally. Rehabilitating or establishing physical marketing and storage facilities for both farmers and traders can enhance exchange and increase competitiveness.
- **Improving the collection and dissemination of market information** so as to reach farmers and traders in a timely way, and strengthening of cooperative societies to enable them to compete in the market.
- **Promotion of cross-border trade** with neighbouring countries and overseas. More focus is given to incentives for non-traditional export crops by liberalizing trade rules.

- **Supporting the private sector** to undertake production, input supply and crop marketing. Measures include removing artificial restrictions on trade such as movement controls and excessive levies at national, regional and district levels, and reviewing the tax regime.
- **Systematic monitoring of the rural food situation** through early warning and crop monitoring systems.
- **Restructuring strategic grain reserves** to improve their efficiency and effectiveness (particularly in Tanzania). Crop boards are being restructured to resume regulatory functions, leaving commercial activities to the cooperative unions and the private sector.

All nations that have transformed their agriculture have embraced these strategies and put appropriate policies in place to make them work. Clearly, these strategies require mechanisms that involve producers in identifying problems, and testing and adopting solutions. The strategies appear to tackle the prevailing problem of food insecurity and to improve living standards. They also provide incentives to non-governmental organizations to participate actively in development work.

## **Constraints to sustainable growth in agriculture**

Despite this series of reforms, agriculture in Kenya and Tanzania has failed to take off. The reforms concentrated on facilitating the process of globalization, but failed to establish a basis for sustainable development. Policy makers perhaps mistakenly assumed that macroeconomic reforms are the sole remedy to poverty alleviation. Allowing currencies to float has the potential to reward exporters (and incidentally of making imports relatively more expensive in local currency terms). A number of producers of export crops such as coffee, tea and sugar have indeed seen their incomes rise. But poor infrastructure and weak institutions mean that most farmers operate in a risky environment. The result has been increased poverty and hunger in rural areas. Per-capita food production and net export earnings have fallen or at best stagnated. The income gap between rich and poor has widened, leaving the rural poor far behind.

Agricultural performance was extremely disappointing during most of the 1970s and 1980s. But despite the policy reforms of the 1990s, production per capita has declined. Agriculture has performed more poorly in eastern and southern Africa than in the continent as a whole (Mbelle, 2001; Mtatifikolo, 1998; Mukibi et al. 2002).

The reforms improved conditions for the market to perform, but there has been insufficient support to allow the huge number of smallholder farmers to use the new opportunities. So food security has not improved. The annual growth rate of Kenyan agriculture has dropped by about 60%, with no compensatory rise in the industrial or service sectors. Though the macro indicators in Tanzania seem good, the performance of the agricultural sector still has not curbed the shortage of food. Both countries are confronted with escalating food insecurity. Their economies have stagnated or declined, income disparity has widened, and poverty among the rural masses has become more intense. Based on their macro-economic indicators, Uganda is the most successful country in East Africa; Tanzania is improving, but Kenya is disappointingly declining.

Kenya's economy performed much better before the reforms than afterwards. Through intensive public investment immediately after independence, the country enjoyed rapid economic growth from 1963 to 1973: the GDP grew at an annual average of 6.6%. But the economy has since stagnated or declined, reaching a nadir in the early 1990s. This is the case not only for agriculture: growth in other sectors has also wilted. Agricultural growth in the 1980s was 3.3%; in the 1990s it was only 1.2%; in the same period industrial growth fell from 3.9% to 1.5% and services dropped from 4.9% to 2.9%.

During the 1990s, the Tanzanian government paid only modest attention to sectoral policies, while concentrating on macro-level policies to provide an impetus towards a free market economy. A study by Ponte (2001) on policy reforms, market failure and input use in Tanzania found that poor infrastructure and dispersed settlements have limited the ability of the private sector to cover the ground left by the state's withdrawal, and private traders have not shown great interest in operating in remote areas.

The poor performance of Kenya's macro-economy and agricultural sector may be due to missing reform in complementary policy areas and in the sequencing of reforms. For example, there is no institutional framework for the efficient operation of markets, and no system of rights and obligations to knit society together and respond to citizen needs. Private entrepreneurs lack the managerial skills, financial capacity and physical infrastructure to take over the activities of cooperatives and boards. The government was relatively slow to undertake reforms in governance (to eliminate corruption or mismanagement) and institutions.

Both structural and policy factors contribute to the generally poor performance of the agricultural sector and the rapid rise in poverty and food insecurity. Development is the outcome of economic, political and social processes that interact and frequently reinforce each other; market liberalization alone cannot be a remedy. Reduced economic activities in Kenya are a result of institutional failure and lack of adequate infrastructure, as well as mismanagement and adverse weather conditions. Additionally, the lack of good governance has helped perpetuate poverty in both countries.

Policy reform is faced with a number of problems: quality assurance, the high price of inputs, inattention to smallholders, underdeveloped supply channels and poorly functioning extension services. Kenyan small-scale farmers find it hard to access credit, the bulk of which goes to large-scale farmers. The smaller-scale farmers, and women farmers, are at a distinct disadvantage, since most have no land certificate or other source of income, which are required to get a loan. Increased food imports have displaced farmers from the domestic market. With no other source of income, rural people cannot buy the imported food, so stay hungry and malnourished.

Why have the reforms not produced the expected improvements? Over-reliance on the market has undermined the role of government interventions in a complex situation where many factors limit agricultural productivity, competitiveness and growth. Institutional weakness and inappropriate policy formulations seem to be the key constraints to getting agriculture moving. In that, Kenya and Tanzania are not so different from most other countries in sub-Saharan Africa.

## Policy options for sustainable agriculture

What can be done? Sustainable agriculture offers solutions to many of the problems facing agriculture in Kenya and Tanzania. For these solutions to be effective, policy changes are needed. The following sections present the major problems facing agriculture in the two countries, along with a summary of the current policies relevant to each problem, the sustainable agriculture solutions, and the policy changes needed to ensure these solutions are effective. The situations in the two countries are similar, but there are sufficient differences that they are treated separately below.

### Resource degradation

#### *Land degradation in Kenya*

*Cases: CCS–Eldoret (p.21), Baraka (p.38), Homa Bay (p. 48)*

**The problem** Traditional and conventional farming methods are often inappropriate. They include burning of fields during land preparation, monocropping, planting up and down slopes, and using the wrong amounts of agrochemicals. These cause decreasing soil fertility, soil erosion, and poor water-retention capacity, leading in turn to lower yields and higher costs for ever-increasing amounts of fertilizer.

**Current policies** The government plans to revitalize public input supply organizations such as the Agricultural Development Corporation (Strategy for revitalizing agriculture in Kenya 2004–2014 [KSRA], p.38).

“Increased agricultural resource base will be achieved through development of diversified, demand driven crop varieties, intensive application of appropriate technologies; and expanded use of irrigation systems in agricultural production.” (Strategic Plan 2005–2009 [KSP], p. 26).

**Sustainable agriculture solutions** Sustainable agriculture offers strong solutions to these problems. Sustainable agricultural practices include agroforestry, organic farming, the application of compost and manure, mulching, diversification, contour farming, mixed cropping, organic or integrated pest management, cover cropping and conservation agriculture. They provide soil cover, improve the soil fertility, reduce erosion, lower the risks of pests, and improve the soil’s ability to retain water. These improvements result in higher yields and lower costs for external inputs.

**Policy changes needed** The Ministry of Agriculture should integrate sustainable agriculture options into national targets, the extension programme and the agricultural curriculum. Policies should promote sustainable and organic agriculture practices instead of concentrating more or less exclusively on conventional farming. University education and the training of extension workers should cover sustainable agriculture. The Kenya Agricultural Research Institute should include sustainable agriculture in its research goals. The government should channel a bigger portion of the funds provided for agriculture into supporting and promoting sustainable practices.

## **Forest encroachment in Kenya**

*Cases: Baraka (p.38), Homa Bay (p. 48)*

**The problem** Communities have little say in managing government-owned forest lands, which cover important water catchments. The Forest Department assigns logging licenses for forest areas. Local people find it difficult to understand why private companies should be allowed to cut and sell trees on a large scale, while the nearby villagers who were the traditional owners of the forest before it was declared government property are not even allowed to cut trees for their own needs. There are no laws for community forests. Local people must get permits from the (unelected) village chief to cut trees. As the people do not participate in decisions on how the forests are used and who benefits from them, they are not committed to protect the forests. Encroachment is common.

**Current policies** “The intention is to check the uncontrolled deforestation and deforestation and excision of land and to protect the area... The policy, legal and institutional framework for forestry will be streamlined, and degraded forest areas will be rehabilitated... Modalities will be developed to facilitate the active participation of local communities in forest resource management.” (KSRA, p. 52)

**Sustainable agriculture solutions** Sustainable agriculture projects encourage local people to plant trees on community land, in school grounds and markets, around ponds and small dams, and along rivers. They normally do this through tree-planting campaigns. The project provides seedlings and mobilizes local people to plant them. They invite the Forestry Department, the Ministry of Agriculture and local leaders to help in the planning. After the work is done, the local people are put in charge of the new plantations. The community decides on a management plan, which includes regular watering, weeding and monitoring growth. After the seedlings are well established, watering is no longer needed. Depending on the type of trees planted, they can be harvested after 5–10 years. Different trees provide different products: wood for building, fencing and fuel, foliage for fodder and green manuring, as well as fruit, shade and honey. The community decides how these benefits are to be distributed. These procedures ensure that local people feel responsible to maintain and protect their plantations.

**Policy changes needed** The examples of Homa Bay and Baraka College show that ownership and usage rights are crucial. If local people are not involved in making decisions about the forest around their villages, they will not feel responsible for the forests. If they do not feel responsible, they will not be willing to obey regulations protecting the forests. That means it is necessary to change the regulations to create formal partnerships between the community and the government, so that joint decisions are made on the management of communal forests. If logging licenses are issued, the logging firms must be required to replant with naturally occurring species.

## **Land fragmentation in Kenya**

*Cases: All in Kenya*

**The problem** The population in Kenya and Tanzania is still growing rapidly (though less quickly than before, in part because of the AIDS epidemic). This population growth

means ever-rising pressure on natural resources and the subdivision of land into smaller and smaller parcels. Farm families commonly have to divide their land among five or six children – nowadays including the daughters, who traditionally did not inherit any of the land. The average arable land size of about an acre (0.4 ha) is already too small to feed a family using conventional approaches.

**Current policies** “The rising population density has contributed to the subdivision of land to uneconomically small units, the reduction of fallow periods and continuous cultivation, leading to rapid depletion of soil nutrients, declining yields and environmental degradation” (KSP, p. 14).

“Land is the key resource in Kenya in agricultural production. Sustainable agricultural growth must address the relationship between population, resources and environment. Land reform policies and measures must strengthen the management of agricultural resources and protect the ecological environment” (KSP, p. 27).

**Sustainable agriculture solutions** Though sustainable agricultural practices have the potential to increase yields on a sustainable and long-term basis, the problem of decreasing land sizes will be tackled only if the increased output can be marketed and can lead to higher incomes. This requires:

- The application of sustainable technologies
- The introduction of high-value crops such as vegetables, fruits, spices, herbs and medicinal plants
- Improved market access, including market information, storage and transport facilities, market links to traders, product quality-management systems, etc.

Without these additional components, the fragmentation of land will lead to further environmental deterioration and poverty.

**Policy changes needed** The Kenyan government has set a minimum farm size, and aims to prevent further subdivision of already small land portions. This is a step in the right direction, and should be made legally binding and enforced.

Sustainable agriculture is especially suitable for small land parcels, and should be supported through government policies and strategies.

### *Cutting of trees in Tanzania*

*Cases: HEM (p. 58), CHEMA (p. 77)*

**The problem** Many Tanzanians use charcoal or wood for cooking because electricity costs a lot, or is unavailable. Demand is high, so villagers cut trees on communal land to make and sell charcoal. Some also cut trees to clear land for farming and settlements. Cutting trees on communal land is prohibited, but the laws are weak and poorly enforced. Villagers cut trees illegally because they lack other sources of income. Erosion and degradation are the result.

**Current policies** “The Government will implement measures, which will minimize encroachment in public lands including forests, woodlands, wetland and pasture. (Tanzania Agricultural and Livestock Policy 1997 [TALP], p. 26)... The ministry will promote agro-forestry and organic farming” (TALP, p. 26).

“Local Government Authorities will initiate, within their respective District Agriculture Development Programmes and District Development Programmes, programmes for promoting alternative sources of energy including solar, wind, biogas, and hydropower (Tanzania agricultural sector development strategy [TASDS], 2001, ch. 8.3).

**Sustainable agriculture solutions** Agroforestry is an important component of sustainable agriculture practices. Trees produce wood for various purposes, protect the soil, act as windbreaks, and produce fruit and honey. The leaves can be pruned and fed to animals, or used as mulch or green manure. Tree nurseries can be an important source of income for some farmers. Trees can be planted in and around farms and homesteads, as well as to restore eroded land.

**Policy changes needed** Village governments need to reinforce existing environmental laws against tree cutting through by-laws. It is necessary to create awareness among local residents for the protection of trees and empower the community to protect their communal forests and trees.

Improved power supply and lower electricity costs would help reduce the demand for charcoal and fuelwood.

## *Free grazing in Tanzania*

*Cases: All in Tanzania*

**The problem** Livestock keepers traditionally allow their animals to graze freely. Fields are not fenced, and after harvest, they are traditionally open for everyone to graze their livestock. But the animals denude the vegetation cover and compact the soil, leave it bare and vulnerable to erosion. Disputes arise between livestock keepers and farmers who use sustainable agriculture practices such as leaving crop residues and cover crops in their fields. Free grazing is an especially crucial problem in densely populated areas. Many farmers keep livestock as an investment and symbol of wealth, as well as a source of milk and meat.

**Current policies** “The ministry will carry out rationalization on grazing systems to mitigate overstocking. The government will develop mechanisms for resolving conflicts among different interests (wildlife protection, forestry, pastoralism and agriculture)” (TALP, p. 27).

“The Government will strengthen livestock breeding, research, extension services and animal disease control so as to enable traditional livestock keepers to improve standards of animal management which will contribute to improved livestock production, productivity and quality for the needs of the export market” (TALP, ch. 6.3.2, p. 51).

“The Government will recognize and respect the rights of pastoral communities to their traditional grazing lands and will promote communal initiatives for better management and integrated exploitation of rangelands resources” (TALP, ch. 6.3.2, p. 48).

“The Ministry of Agriculture and Cooperatives will support destocking of heavily eroded and degraded areas and their rehabilitation through soil conservation measures including encouraging tree planting and promotion of investment in biogas production” (TALP, ch. 6.3.2, p. 49).

**Sustainable agriculture solutions** Sustainable agriculture offers various solutions to the problem of free grazing. It creates awareness among farmers of the negative impacts of this practice, and encourages them to reduce their livestock numbers or to feed them in other ways (tethering, stall-feeding). It provides other strategies to earn money, so reducing reliance on animals. It encourages the participatory planning of land use within the community to resolve conflicts between farmers and livestock keepers.

**Policy changes needed** Policy changes include the following:

- Strengthen and enforce by-laws to stop free grazing.
- Encourage destocking by promoting other ways to make money.
- Design marketing strategies to encourage farmers to sell their livestock at a young age.
- Encourage farmers to keep their savings in the bank rather than in the form of livestock.
- Promote the improvement of indigenous breeds so that fewer livestock are needed for the same output.
- Allocate grazing areas to livestock keepers, and encourage farmers who keep livestock to fence their land to keep their animals away from their crop fields.

## **Infrastructure and services**

Infrastructure has greatly deteriorated since the reforms of the 1990s, and government expenditure on this sector dropped from 63% in 1999 to 54% in 2001. The poor state of transport, communication, storage facilities and irrigation schemes in rural Kenya and Tanzania stands out as one of the principal obstacles to agricultural production and marketing. Adequate investment in infrastructure and its efficient use are crucial if farming is to be productive and competitive. Poor infrastructure hinders access to services such as credit, extension, health and education and market information.

Water is a key limiting factor. Except in the highland areas of western Kenya, most farming depends greatly on unreliable seasonal rainfall. Northern and eastern Kenya, and eastern and central Tanzania, are relatively dry. Farming is increasingly exposed to climatic extremes, with drought alternating with floods. For instance, a severe drought in 1999–2000 compounded Kenya's problems, causing water and energy rationing and reducing agricultural output.

Irrigation can provide significant increases in productivity and allow farmers to diversify into higher value products. While considerable potential exists for expanding irrigation, realizing this potential will be difficult. Large-scale irrigation schemes are expensive and inappropriate for small-scale farmers, particularly if staple food crops are grown. Kenya and Tanzania lack well-developed, locally appropriate means of small-scale irrigation to supplement rainfed agriculture. The irrigation infrastructure is thin and covers only 4–6% of the total arable land.

Roads, transport and communication, storage and processing facilities are among the most important physical infrastructure for public as well as private investment. Governments have long focused on providing such services in and around urban areas, to the neglect of remote rural regions. Few traders reach villages and small towns. Unless the rural road coverage is increased significantly, farmers will remain seriously constrained by transport and information for their inputs and supplies, as well as in their ability to deliver produce to markets.

Similarly, traders are unable to reach out to rural areas without appropriate infrastructure. Promoting storage facilities and processing industries can curb the problem of seasonal fluctuations in prices and food availability, and induce the development of agro-industrial linkages. Improved storage facilities also help reduce post-harvest losses, so increasing farm returns and food security.

Services such as agricultural research, extension and credit are vital if farmers are to be able to learn of, use and profit from improved agricultural techniques. But such services are weak, under-funded, and fail to focus on sustainable agriculture solutions.

### **Roads and storage facilities in Kenya**

*Cases: CCS–Eldoret (p.21), Diocese of Embu (p. 28), Baraka (p.38), Homa Bay (p. 48)*

**The problem** Most roads in rural areas are made of earth and become impassable when it rains. Maintenance is poor. This makes it difficult for farmers to take their products even to local markets. Farmers harvest crops such as maize during the dry season, and would like to store at least part of their output until the rainy season, when prices are higher. But they cannot get them to market at this time.

Poor roads affect the quality and frequency of services. Remote areas are more difficult to reach for agricultural extension officers, credit agents, shopkeepers and traders, medical and veterinary staff, and development workers. Poor storage facilities and bumpy roads result in high post-harvest losses. Perishable crops like vegetables and fruits have a short shelf-life and are easily damaged in transit.

**Current policies** “The main constraints of domestic marketing include high transport costs arising from poor state of roads, poor handling, poor storage and wastage. ... In order to promote domestic marketing, infrastructural development and capacity building will be given priority in the following areas: (e.g.)

- Development of rural market centres and storage facilities by local authorities and or in partnership with private investors for hire
- Provision of all-weather access roads
- Provision of communication facilities and market information systems”

(KSRA, short version, Feb. 2005, p. 12f).

“A key challenge in agriculture is the inadequate and poor state of physical infrastructure in agricultural production areas. The conditions of roads in major farming areas are poor, as are communication and utility infrastructure. The Ministry will work with the relevant ministries to improve the conditions of infrastructure in all agricultural production areas of the country” (KSP, p. 26).

**Sustainable agriculture solutions** One principle of sustainable agriculture is crop diversification. Manure and mulch are used especially for vegetables and fruits grown in kitchen gardens. Those crops attract higher prices at local markets than staple foods such as maize, beans, cassava and potatoes. Thus sustainable agriculture helps diversify income and minimize risk.

Sustainable agriculture projects work through and with organized farmer groups. Such an approach requires not only technical agricultural advice and inputs, but also includes mobilization, awareness building, strengthening of local capacities through training and leadership development, gender and youth development, etc. Farmer unions and cooperative societies are essential for strengthening local leadership capacities, especially among small-scale farmers who are often neglected and poorly represented among decision makers.

Such approaches can bear fruit. For example in Baraka village (page 38), the farmer groups selected a representative to lobby on their behalf with the local member of parliament to improve the village road. There was not enough money for a tarmac road, but a laterite (“*murrum*”) road is passable now throughout the year.

**Policy changes needed** Farmer organizations play a key role in empowering farmers and in negotiating with government on their members’ behalf for services and support. Farmer organizations are key partners with the government in achieving national targets and ensuring that development activities fulfil local needs. The government recognizes this, so it is now time to put its admirable intentions into practice.

Farmers’ representatives should become members of district constituency development committees, and the bodies governing local authority transfer funds and the district roads funds. This would ensure that the government agencies and private providers who act on their behalf deliver services in a way that is decentralized, customer-oriented way, cost-effective and based on transparent decision making.

The demise of institutions such as the Kenya Grain Growers Cooperative Union has left a gap in the supply of inputs to farmers, which the private sector has failed to fill. Ways must be found to fill these gaps.

### *Access to credit and saving in Kenya*

*Cases: All in Kenya*

**The problem** Small-scale farmers have little capital to invest because they are able to save so little. Most grow only a few cash crops and yields are generally low, so they bring in little cash. Farmers have to pay for food they cannot grow themselves, clothes, household items, school fees and so on, so have little money left over. Many are continually in debt. They find it difficult to get credit at reasonable rates for both long-term land improvement and to finance seasonal needs such as seeds and other inputs. Credit for agricultural marketing collapsed after the removal of subsidies in both Tanzania and Kenya. Rural and small-town produce processors, transporters and input-supply businesses also need credit for long-term investment and working capital.

Banks and agricultural credit organizations are weak or non-existent. They do not encourage lending to the small-scale agricultural sector, and rarely go beyond provincial towns. Public sector development banks, established to provide credit for such key sectors as agriculture and industry, have in most instances failed; they served commercial and cash-crop farmers rather than smallholders. As a result, few formal mechanisms mobilize savings or provide credit and other bank services in villages and small towns.

Too many small-scale farmers, the small size of individual loans, and the dispersed rural population push up the costs of banking services. A lack of formal land titles means that individuals cannot offer collateral for loans. Consequently, there are no formal structures to provide credit to rural people, or for mobilizing their savings. Multipurpose savings and loan cooperatives could partly fill this gap. In Asia, village-level savings and loan coops have existed for decades. In Africa, however, micro-credit schemes that could support rural finance have not been widely promoted. Farmers and others are forced to resort to moneylenders and other sources of informal finance, which are generally inadequate and expensive.

**Current policies** “Sectoral ministries will work closely with the rest of the government to make financial services more accessible to rural communities, and in improving marketing services. The two interventions will lead to farmers utilizing technology that will increase productivity because synergies exist between improving services and increasing productivity” (KSRA, p. 24).

**Sustainable agriculture solutions** This is not a problem that can be addressed by sustainable agriculture, but sustainable agriculture also requires access to capital so farmers can invest in their land (land improvements, soil and water conservation measurements) and in business opportunities (storage facilities, marketing options, etc.).

Nonetheless, sustainable agriculture can help reduce the need for costly external inputs by using locally available alternatives. Using indigenous seeds, organic fertilizers and local technologies, farmers need less capital than if they engage in conventional farming.

**Policy changes needed** Even though they need less capital than for conventional farming, farmers who practise sustainable agriculture still need access to credit at reasonable interest rates. Registered farmer groups should be eligible to receive group loans (as in several countries in Asia). The government should create framework conditions to enable farmer groups to form saving and credit groups. The draft Micro-Finance Act, which excludes small-scale farmers from proper services, should be reviewed and revised accordingly.

## ***Extension services***

*Cases: All in Kenya*

**The problem** Current agricultural extension services are demand-driven, and farmers have to cover transport and other costs. Many extension officers are not trained in sustainable agriculture, so have little to offer farmers who practise this approach. There are too few extensionists to meet the rising demand, leaving most farmers without the services they need.

**Current policies** “Efficient and effective agricultural extension is perhaps the most important service for increasing agricultural production, a key objective of the strategy. The provision of extension services will therefore need to be strengthened... The government will divest from the direct provision of inputs, mechanization services and marketing, and instead opt for the indirect and efficient support to the non-government actors. Public extension will play a facilitating and linking role between farmers... and research,... input and service suppliers including marketing and quality control agencies” (KSRA, p. 33).

“The policy will address... the role of the private sector on providing extension services...” (KSP, p. 18).

**Sustainable agriculture solutions** Sustainable agriculture is promoted mainly by NGOs, which are well experienced in helping farmers to form groups and to shift from conventional to sustainable agriculture. Many NGOs have started to move into improving market links and adding value. This integrated, holistic approach is successful and sustainable – as shown in this book. They could provide a model for improving the extension services.

**Policy changes needed** The government should recognize NGOs which successfully deliver agricultural extension services as partners in the planning and implementation of improved extension policies.

### *Market access in Tanzania*

*Case: PELUM (p. 85)*

**The problem** Poor infrastructure (roads, transport, communication, electricity) makes market access for small- and medium-scale farmers a problem. A lack of feeder roads complicates the transport of inputs to villages and of farm produce to markets. Without public transport, it is difficult for farmers to go to the markets. Poor communication infrastructure (radio, television, telephone) results in a lack of market information. Many villages do not have electricity, so they cannot process the output they produce.

**Current policies** “A well-developed and maintained rural infrastructure is essential for agricultural growth and overall rural development. Communication and rural electrification infrastructure is a pre-requisite for the development of agribusiness” (TASDS, ch. 8.2).

“Communication infrastructure has a key role in promoting information flows, whereas electrification is important for agro-processing” (TASDS, ch. 8.3).

“The government will facilitate and support expansion of rural transport network and rehabilitation of existing transport network so as to reduce transport costs. Government will facilitate and support investments in other infrastructure for crops and livestock production, marketing and processing. It will also encourage private sector investments and ownership in processing facilities” (TALP, ch. 3.2 C, p. 26).

“In order to strengthen the collection and monitoring of information the government will place adequate statisticians in every district with necessary basic facilities including radio call system, linked computer system, telephone and faxes” (TALP, ch. 3.3.1, p. 17).

**Sustainable agriculture solutions** Sustainable agriculture uses technologies that require few outside inputs, so farmers need to buy fewer inputs from distant markets.

Farmers’ groups are an important facet of sustainable agriculture. They are involved not just in production and conservation work, but also in purchasing inputs and marketing outputs: a group of farmers can buy and sell jointly, so avoiding the middlemen and enabling them to achieve economies of scale. Farmer groups can also form associations with each other, and alliances with other groups focusing on rural issues, further increasing their bargaining power and their ability to pressure the government to provide services.

**Policy changes needed** Cooperation is needed between NGOs and the government to set up rural marketing centres. Policy promises to improve electricity, roads, transport, communication and storage facilities must be fulfilled.

Networking of farmer organizations should be encouraged.

More rural marketing centres should be established where farmers can sell their produce direct to businesspeople.

## **Research and technology in Kenya and Tanzania**

*Cases: all in Kenya and Tanzania*

**The problem** There is a considerable potential for improved farming practices to increase smallholders' productivity and incomes. But the technologies promoted by the government extension services are not based on sustainable principles, so contribute to resource degradation. Farmers are not involved in the development of most new technologies. They do not feel they own the technologies, so adoption rates are low. Farmer field schools have shown that with the right help, farmers are capable of contributing to and developing improved practices that they are ready to use.

**Current policies** "The full potential of the research capacity is not being utilized due to limited prioritization of activities; lack of a comprehensive approach for disseminating research finding; and weak research-extension-farmer linkages. The agricultural research systems will be reconstructed to address more responsive and efficient technology development and transfer" (KSRA, short version, p. 6).

"Research is the foundation of a strong agricultural base. Research institutions such as KARI, CRF, and TFR will be supported to ensure continuous research and development of relevant agricultural technologies. The participation of the private sector in the development and management of research and extension will be encouraged and supported" (KSP p. 28).

"With regard to the research agenda, higher priority will be given to applied research and problems of small-scale holders, most of whom are women" (KSRA, p. 32).

"The government will continue to promote and encourage mechanization, and modernization in the country through extension services and provision of regulatory services for farm implements including strengthening machinery-testing services" (TALP, ch. 3.3.1 E, p. 19).

"Land has to be managed in such a way that agricultural production is sustainable, even in the long term and that negative environmental externalities are avoided or at least kept to a minimum... To lessen pressure on land, use of fertilizer, animal manure and mulching techniques will be encouraged through extension and training services" (TALP, ch. 3.3.1 E, p. 20).

"Promoting utilization of labour saving technologies (such as appropriate forms of mechanization, minimum tillage techniques, etc. is central to improvement of labour productivity" (TASDS, ch. 6.8).

**Sustainable agriculture solutions** Farmers have a lot of traditional and valuable knowledge about the ecosystem and how it functions in their own area. Old people, especially, have a great deal of such knowledge – which may die with them if they do not pass it on to the younger generation. The application of sustainable agricultural practices often relies on this traditional knowledge. There is great potential to incorporate such knowledge and the farmers' practical experience in research. Many examples show that farmers are capable of

developing improved techniques based on traditional knowledge to respond to new requirements. It is important to take advantage of this potential in research.

**Policy changes needed** Current policies do not adequately take into consideration traditional knowledge and farmers' abilities to contribute to technology development. Policies should be revised to ensure that farmers participate actively in research.

Successful technologies should be disseminated in a much broader way to farmers so they can make use of the opportunities and benefits they offer.

## **International trade**

Agriculture productivity and improved competitiveness in the world market remain crucial for developing countries in general, and for sub-Saharan Africa in particular. Africa has to meet twin targets: getting its agriculture moving, and integrating its rural areas with its industrial economy to accelerate overall economic growth, and to increase income, employment and food security.

To curb rising poverty in a rural-dominated economy requires rational, conducive national development strategies and favourable international market policies. Since the biggest single industry in sub-Saharan Africa is agriculture, this should receive the highest priority in formulating development policies and strategies.

Farm output prices are generally recognized as having three main functions in an economic system: to allocate farm resources, distribute incomes, and influence investment and capital formation in agriculture. Farm prices are directly and indirectly affected by domestic and world market situations. An inefficient domestic market constrains agriculture's contribution to food security for a rising population, limits its ability to cut rural poverty, and contributes to low savings and lack of capital in the rural sector. Farmers must be assured of access to markets for their products, and producer prices must be high enough to cover their costs and leave sufficient profits.

Global trade and access to world markets largely determine economic growth and development prospects of a particular country. Agricultural trade, in particular, is crucial for developing countries, as their exports depend heavily on agricultural primary products. Engagement in the world economy, and the impacts of globalization, are of consequence for farmers in the region. To be competitive, a country's agricultural products must be produced cheaply and efficiently, and must be of good quality. But they also need a strong, efficient marketing chain, and a smoothly functioning system of transport, communication, port handling and shipping. Storage facilities, and regulations on transport, customs and transit, critically affect the competitiveness of farm exports.

But prevailing international trade regimes favour developed countries. Developing countries are constrained by limited access to market information and insufficient trade coordination. Developed countries protect their farmers from outside competition through high import taxes, import quotas, export subsidies and technical barriers which impede market access for outsiders. Poor countries like Kenya and Tanzania often lack the power to ensure their interests are reflected in multi- and bilateral trade negotiations. Developing countries cannot influence prices on their own, and have to organize effectively with other countries if they

are to do so. They find themselves in an unfavourable and largely uninfluential position in the world trading system (Allen and Thompson, 1997; Stiglitz, 2003).

Larger-scale farmers in developing countries can overcome these problems to some extent, and thriving industries have been built up to export products such as cut flowers and fresh vegetables. But small-scale farmers have severe problems getting access to distant and international markets.

Imports of food, particularly wheat and rice, have put considerable burden on the economies of sub-Saharan African countries that heavily depend on these foods. The exporting countries often heavily subsidize production of these crops, so they are cheaper than locally produced foodstuffs in the importing countries. Low commodity prices in the local market mean local producers cannot compete.

Trade liberalization has aimed to increase and diversify exports and ensure quality and value added through processing. However, Kenya and Tanzania (and sub-Saharan Africa in general) have not benefited from such liberalization. Kenya has diversified tremendously towards flowers, vegetables and fruits, but the volume and value of exports have declined drastically since 1999. On the other hand, Tanzania's trade has flourished since the end of the socialism in 1985. However, traditional export markets still constitute over 50% of export revenue, and primary exports comprise 84% of all goods exported, while high technology accounts for only 15% of all manufactured exports.

One of the most serious problems of Kenya and Tanzania is the continuous decline in the terms of trade of their exports. Prices of primary goods such as coffee, sugar, cotton and cacao are declining in the world market due to increasing market supply and substitution (e.g., synthetic fabrics replacing cotton). The expansion of high-quality, premium-price fruit, vegetables and cut flowers for the export market by Kenya is encouraging. Producers in Tanzania have continued to expand their output of traditional exports, but find it difficult to diversify their crops because of inadequate distribution channels. Consequently, many Tanzanian smallholders have suffered losses in recent years due to the collapse in coffee and cotton prices. On the other hand, prices of imported industrial products and fuel are increasing.

The cumulative effect of such price movements is falling terms of trade, a declining trade balance, and rising poverty. In such circumstances, a free market policy favours developed economies.

Because their food production fails to meet domestic demand, Kenya and Tanzania are forced to import food and accept food aid when recurrent natural disasters strike a substantial part of their population. In 2002, Kenya imported three times as much food (cereals and vegetable oils) as in 1985; for Tanzania, food imports doubled over the same period. In the severe drought of 2000, staple crop production was well below average in the northern and central regions of Kenya: maize production, for example, was 69% below expected.

A comprehensive strategy to enable countries such as Kenya and Tanzania to integrate in the international markets is vital to pull their people out of poverty. Improving trade laws and strengthening the capacity of such countries to negotiate would enhance their ability to profit from market liberalization (Ndulu, et al. 1998).

### *International trade in Kenya*

**The problem** Farmers must pay a lot for inputs but get low prices for their products. That leaves little money for consumption or investment. Individual farmers find it hard to meet quality standards required for exports, and their produce must often compete with imports. They have no capital or skills to invest in marketing, storage or processing, so cannot add value to their output. Farmer unions and marketing co-operatives are weak, leaving producers to rely on their own limited resources.

**Current policies** “Trade liberalisation brings opportunities and challenges. However, experience has shown that opening up of trade contributes immensely to higher economic growth while trade barriers retard development... In order to exploit opportunities presented by globalization, the government will implement the following measures:

- (i) Continue to encourage cross-border trade in agricultural commodities
- (ii) Improve the provision and efficiency of quality control services
- (iii) Undertake capacity building for farmers and fisherfolk on sanitary, phytosanitary and zoosanitary measures and international standards
- (iv) Set up effective systems for gathering and utilizing information on external market opportunities
- (v) Establish Disease Free Zones to facilitate access to export markets for livestock
- (vi) Recommend improvement in port and airport services to eliminate delays and costs”

(KSRA, short version, p. 13).

**Sustainable agriculture solutions** Sustainable agriculture – especially organic agriculture – has the potential to address niche markets. In the case of organic agriculture this requires costly certification, which local farmers cannot afford on their own. Nevertheless the examples in this book show that there are opportunities for farmers to produce certified organic products for export.

**Policy changes needed** It is important to develop national standards for the certification of organic products. Kenyan certification bodies should be established to reduce the cost of certification for farmer groups who wish to export their produce.

### *International trade in Tanzania*

*Case: CHEMA (p. 77)*

**The problem** Markets in developed countries are protected and favour their own products (e.g., through subsidies). Agricultural products from developing countries are disadvantaged.

The Tanzanian government favours conventional farming by giving subsidies for fertilizers throughout the country.

**Current policies** “The Ministry [responsible for industry and trade] will promote agro-processing through implementation of the Sustainable Industrial Development Policy (SIDP) and Small and Medium Enterprise Policy (SMEP). It will also establish a conducive legal and

institutional framework to facilitate both local and international food trade which is fair to both producers and consumers” (Tanzania agricultural marketing policy, ch. 4.1.1.2, p. 26).

“Earnings from... traditional export crops seem to have hit a barrier whose removal would require a dramatic technological breakthrough change in production and equally revolutionary improvement of world prices of these crops. These events are unlikely to occur even on the long time horizon. However, the non-traditional export crops face formidable constraints which include poor production organization, lack of appropriate technology (transport, storage, processing and packaging) for handling them after production and disorganized marketing system” (TALP, ch. 6.2.2, p. 35).

“The ministry shall establish a mechanism for quality control” (TALP, ch. 6.2.2, p. 36).

**Sustainable agriculture solutions** Sustainable agriculture produces for alternative markets such as the organic market, where premium prices can be fetched. These markets are often less protected, but may require expensive certification.

NGOs and farmers’ associations can lobby and provide information to the government about sustainable agriculture solutions, and can form alliances with international organizations to gain a strong voice in international meetings.

**Policy changes needed** The government should provide a level playing field for sustainable agriculture. Current policies are advantageous to high-input conventional farming, which makes sustainable agriculture more expensive and pushes it out of the market.

Extension services should promote sustainable agriculture and the systems needed to support it, such as market information and certification processes. The government and private sector should co-operate to promote organic products and seek ways to ensure reliable markets for them. Organic farming for export should be included in training for farmers and extension workers. Organic certification should be developed which is affordable, and development agencies should promote cooperation among farmers so they can get certification as organic producers.

At the international level, the government should lobby for a more conducive environment for Tanzania’s small-scale farmers to export their produce.

## **Governance**

### ***Governance in Kenya and Tanzania***

*Cases: All in Kenya and Tanzania*

**The problem** Poor governance has a direct impact on agriculture. It causes corruption, instability and conflicts, which in turn restrict farm production and aggravate food insecurity. It hinders production and trade. The lack of well-established governance structures creates an unpredictable, costly and sometimes hostile environment for farmers, traders and processors. Complex regulatory systems, licensing and permit-issuing procedures create obstacles for honest actors and opportunities for dishonest ones, result in delays and bureaucratic ineffi-

ciencies, and increase the cost of doing business. An opaque and biased judicial system adds uncertainty. Competitiveness suffers, as do institutions that promote standards and quality control may also suffer. This is particularly serious in Kenya, but prevails in Tanzania too.

The efficiency and effectiveness of the government extension services in Kenya has declined. This is due to falling budgetary allocations, a lack of clear objectives, a failure to identify the role of beneficiaries, and poorly defined organizational and institutional structures. Research organizations are weak in developing and transferring appropriate technologies to farmers.

According to Transparency International (2001), corruption has been a major problem in both countries, especially in Kenya. In Tanzania, the 1996 Presidential Commission on Corruption noted a dramatic increase in bribery and corrupt practices in the public and business sectors at all levels. Petty corruption is widespread and is found in virtually every sector of public service down to the village level. In 2001, Transparency ranked Tanzania as seventh-worst country in terms of perceived corruption (it scored about the same as both Kenya and Uganda). The report suggests that the major payers of bribes are foreign corporations.

Both countries rely heavily on assistance from international donors, which have made their support dependent on the governments' addressing the mismanagement of public resources. The governments have created agencies and laws to tackle corruption, and have undertaken reforms in the judiciary, public procurement, etc. But progress is slow and full of setbacks.

Land grabbing is increasingly common in Kenya. Although formal structures are in place through which to apply for and acquire land, inefficient and corrupt management leads to further inequity in land distribution, and to conflicts over land between different population groups such as farmers and pastoralists.

**Current policies** “The agricultural sector is currently governed by about 130 pieces of legislation many of which are obsolete, unenforceable or inconsistent with current policy. This has increased costs for compliance and discouraged private sector participation and investment. The review of laws and regulations governing the operations of the agricultural sector will be undertaken to remove barriers to production, processing and marketing. This will be achieved by:

- (i) Amalgamation of existing legislation to have fewer broad based acts to suit prevailing circumstances
- (ii) Encourage self-regulation by facilitating capacity building for stakeholder organizations
- (iii) Collaborate with other relevant sectors to that have a bearing on the implementation of the strategy”

(KSRA, short version, p. 5–6).

“Kenya’s agriculture is predominantly small-scale accounting for 75% of the total agricultural output and 70% of marketed agricultural produce. Processing and marketing is organized through farmers’ organizations, cooperatives and statutory bodies. . . . However, in the last two decades, their effectiveness has been impaired by weak governance and mismanagement. There is urgent need to improve management structures and accountability. Action required:

- (i) Establish an ethics commission for cooperatives backed by a code of conduct for cooperatives

- (ii) Strengthen accounting, audit, banking and reporting procedures for use by cooperative societies and where necessary institutionalize public accounting procedures
- (iii) Prescribe the minimum qualifications for management and board members
- (iv) Develop Cooperative Management Information System to help monitor the performance of cooperatives”

(KSRA, short version, p. 10).

**Sustainable agriculture solutions** Sustainable agriculture relies on strong local groups, to which members feel a strong sense of ownership and belonging. Democratic participation in decision making, new skills in organizing and accountancy, and transparency in decision making and financial affairs are vital for this. Sustainable agriculture is thus a valuable school for local-level democracy and good governance.

Strong local groups are also able to put pressure on government agencies to ensure that they provide services, guarantee rights and enforce justice. Sustainable agriculture thus has a trickle-up effect on improving the government hierarchy.

Sustainable agriculture techniques are frequently promoted by faith-based NGOs (e.g., Catholic dioceses, protestant churches, or international NGOs such as World Vision). These organizations usually feel committed to serve the local people and usually obey high humanitarian values. Their approaches not only meet the standards of ecological sustainability; they also are based on social, cultural and ethical values. These organizations strive to integrate local people into decision-making processes. Local NGOs are encouraging farmers to organize themselves. Thereby, they revitalize farmers' organizations and fill the gap left by weak cooperatives.

**Policy changes needed** Local organizations, especially those that are traditional, should be consulted and given an opportunity to feed their knowledge and experience into the formulation of government strategies. Local farmers' organizations should be strengthened and supported, and their capacity to market goods jointly enhanced.

The agricultural legal system should be enhanced, reducing the number of individual laws. The legal/judicial system should also be strengthened to ensure that laws are actually observed.

### ***Village governance in Tanzania***

*Cases: HEM (p. 58), PELUM (p. 85)*

**The problem** To provide good services to local residents, village government leaders need to be knowledgeable and informed, and have the confidence and power to demand services from other agencies and higher levels of government. They must be able to set and enforce local laws. Without these qualities, villagers are likely to violate laws, and they will not be able to draw on government support programs. NGOs will find it difficult to start development projects without the support of the village councillors. Some village governments even demand pay when asked to co-operate in community mobilization. Because the government is unable to provide services, NGOs sometimes have to do so.

**Current policies** “Local government authorities have a critical role in the successful implementation of the Agricultural Sector Development Strategy, because they will undertake or implement all development initiatives intended to improve the rural livelihoods” (TASDS, ch. 4.1.3).

“Government will also legally empower local government authorities to enforce regulations and standards on behalf of the mandated institutions, possibly through the delegation of legal powers” (TASDS, ch. 4.1.3).

**Sustainable agriculture solutions** Almost all sustainable agriculture projects involve the village government. They aim to create ownership within the village government and receive the support of the village leaders. At the same time, the village leaders gain knowledge by attending trainings or seminars.

**Policy changes needed** Decentralization of power to lower levels of government would make government services more responsive to local needs. Local leaders need training so they are able to do their jobs better.

## Conclusion

If Kenya and Tanzania are to maximize their agricultural exports, their farm products must be competitive. Competitiveness is affected by various factors in production, processing and marketing. At production stage, competitiveness is a function of productivity: a higher volume and lower production costs allow for more efficient and effective supply of markets. Maintaining product quality standards is vital, as are information on market trends and traits, and cost-effective processing and packaging. These in turn require effective domestic market infrastructure and institutions, including low taxes and duties to keep transaction costs down.

Despite their negative impacts, the policy reforms have created a more favourable environment for private investment, and are expected to promote sustainable agricultural growth in the long run – if adequate government support is forthcoming.

Market access and price incentives can be improved by improving infrastructure and institutions that directly support small-scale farmers. Reducing tariffs and taxes in agriculture would reduce the cost of production and marketing, so improving competitiveness and smallholders’ incomes.

Successful development requires considerable political will and sacrifice. No single strategy or policy on its own can get agriculture to grow on a sustained basis, reducing or eradicating poverty and insecurity once and for all. There is no magic bullet. Long-term investment in agriculture is necessary, along with investment in other areas such as health and education. Choices must be based on ethical values, including the empowerment of producers, good governance and stewardship of common resources for the common good. A strong public constituency is necessary to ensure decision makers have the will to make policies that fight hunger and promote a more equitable distribution of income.

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# 5

## Scaling up



THE PREVIOUS SECTIONS OF this book described nine cases of how Sustainet partner organizations have worked with communities, other organizations and the government to promote sustainable agriculture in Kenya and Tanzania. They show various ways sustainable agriculture has been scaled up.

We can divide scaling up into four types:

- **Quantitative** Increasing the numbers of people who adopt a technology: directly, spontaneously, or through other organizations. *Example:* Spreading a sustainable agriculture technology to a new village.
- **Functional** Adding new activities or technologies, or adapting them to suit new situations. *Example:* Adapting a farming technique to suit a different soil type.
- **Political** Changing the “rules of the game” by influencing the provision of government services or changing policies. *Example:* lobbying for by-laws to protect the environment.
- **Organizational** Increasing the organization’s capacity and making it more efficient. *Example:* training staff in dissemination techniques.

This chapter summarizes the approaches used by the various organizations and projects described in this book, outlines some other ways that might be used in the future, and summarizes the challenges facing efforts to scale up activities.

### Quantitative scaling up

Quantitative scaling up means enabling a larger number of farmers to adopt sustainable agriculture techniques. These farmers may be in the same village as the original project, in other villages served by the organization, or in areas served by other organizations. This type of scaling up also includes spontaneous adoption or adaptation of the technologies by other farmers, with little or no intervention from development organizations.

Efforts to promote quantitative scaling up include capacity building, extension activities, networking and collaboration, awareness creation and mobilization.

### Capacity building

The Sustainet partners have used the following approaches to build the capacity of farmers and organizations in the areas they serve.

- **Training of groups** The organization trains groups of farmers on general specific

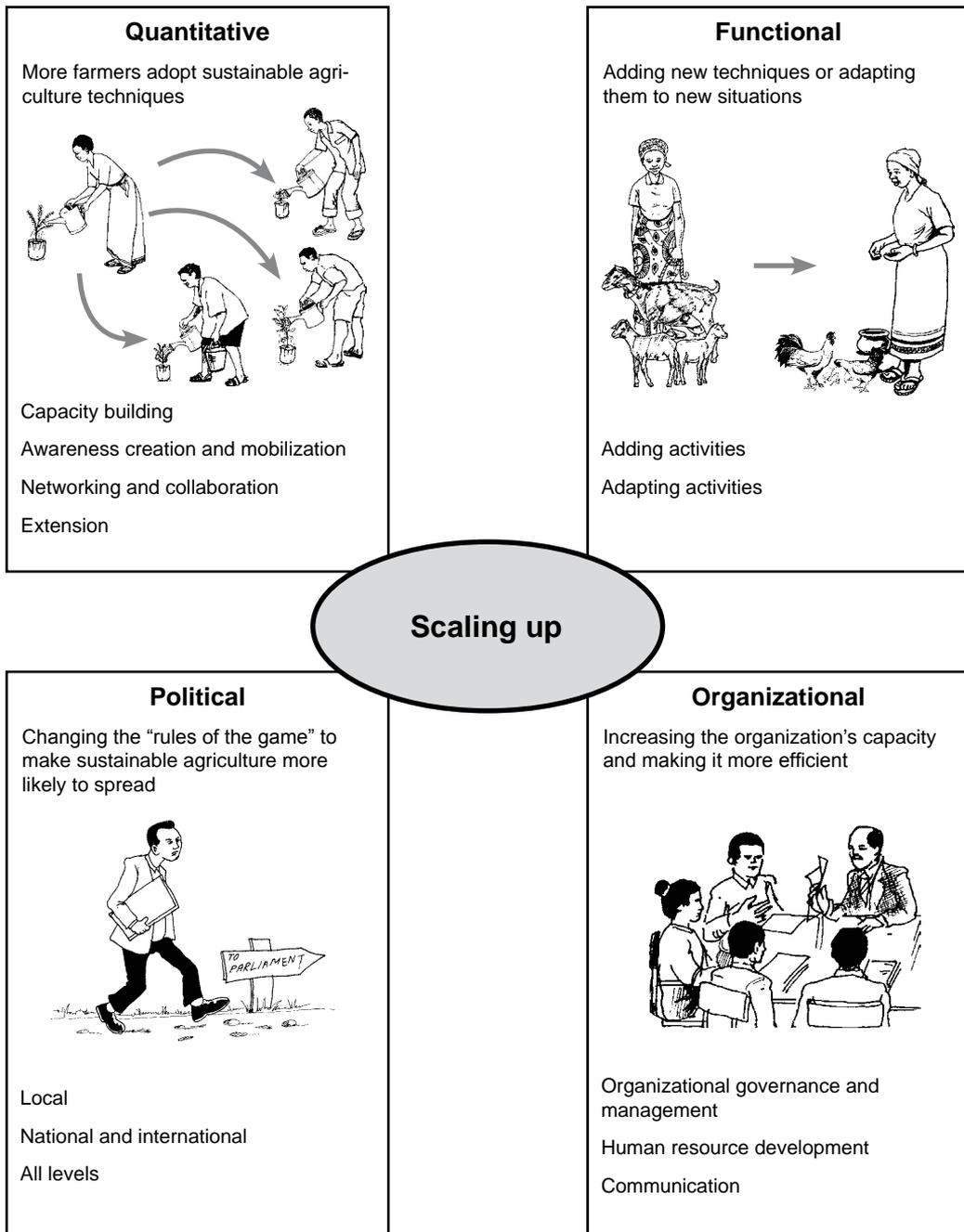


Figure 22 Four types of scaling up

sustainable agriculture approaches, specific techniques (such as composting and water conservation methods), and supporting skills (such as simple book-keeping and group management).

- **Farmer field schools** Groups of farmers get together to learn about their crops, the ecosystem in their fields, and the constraints and opportunities facing them. Guided by a facilitator, they choose subjects to study, do experiments in their own fields, and analyse the results.
- **Field days and on-farm demonstrations** The organization runs demonstrations on its own land, or arranges for cooperating farmers to do so. Other farmers gather to see how to implement the practice and how it performs in the field. Advanced farmers groups may be able to manage their own demonstration plots without any inputs from outside organizations.
- **Training of trainers** The organization trains a group of facilitators, who then train others, who then train still more people.
- **Farmer-to-farmer extension** The organization trains one farmer, who then passes on the information and skills to his or her neighbours and friends, facilitates farmer-instigated tests, and acts a conduit of information from outside.
- **Exchange visits** Groups of farmers visit another village to learn about a new practice, ask questions, and share their own experiences. This is usually carried out with no facilitation by the development organization except arranging transport.
- **Community resource persons** Community members nominate someone for the organization to train. This person then acts as a source of knowledge and skills for the community. With sufficient training (e.g., through a diploma course), the participants should be able to take on some of the responsibilities previously borne by the development organization.
- **Scholarships** This involves enabling men and women from a particular area to attend courses on rural development and sustainable agriculture. They sign a commitment to go back to their community and act as resource persons for several years.

## **Awareness creation and mobilization**

Awareness creation and mobilization means spreading sustainable agriculture ideas to a wider audience than can be reached by the organization alone. Sustainet partners have used the following approaches:

- **Mass media** Newspapers, radio, TV and publications can be a vital way to get a message out to a wider audience.
- **Community mobilization.** This can be done in a variety of ways: through religious institutions, participatory appraisals, role plays, poems, stories and songs, cultural days, etc.



**Figure 23** Quantitative scaling up enables more farmers to adopt a sustainable agriculture technique

## Networking and collaboration

Other organizations have a key role to play in spreading sustainable agriculture techniques. Here are some successful methods.

- **Schools** The organization convinces education officials to incorporate aspects of sustainable agriculture in the school curriculum. It then trains teachers who will teach these topics.
- **Collaboration with other organizations**, such as NGOs, churches, research institutions and ministries, to create awareness about sustainable agriculture and to mobilize these organizations to support it.

## Extension

Regular government extension services provide relatively little information on sustainable agricultural techniques. But Sustanet partners collaborate with the extension service where possible, both with the extension institution as a whole and at the field level with individual extension agents. Other techniques include the following:

- **Resident extensionists** The organization places its own extension staff in villages. They build close relationships with local people, and implement and follow up the programme activities.

- **Experienced extension staff** Sustainable agriculture skills are still relatively rare among extension staff. It is possible to take advantage of the valuable skills of the scarce few by having them train and coordinate the activities of less-experienced staff, provide them with transport so they can cover a wider area, and rotate them from one area to another so that they can work with as many different staff and farmers as possible.
- **Students** Some sustainable agriculture organizations are based at training institutions. They arrange for college students to visit farmers, work with them for a day and give them advice.
- **Exhibitions or fairs** The organization, or a farmer group or association, arranges events where farmers can meet, exchange information, and buy, sell or barter seeds and other inputs.

## Challenges

Quantitative scaling up faces various challenges and constraints.

- **Inadequate funds** Serving more people, distributed over a wider area, inevitably requires more funds. Many activities to promote sustainable agriculture are organized on a project basis: funds are limited, and they are available only for a few years. When the funding runs out, the organization must find more funding to support the expansion of support to new areas, and to continue support for areas already served. Understanding donors are often willing to make funds available to support successes, but they also have limitations on the amount of money they can assign. Sustainet partners respond by seeking low-cost ways of spreading their messages to as many other people as possible – for example through networking and collaboration, awareness creation and community mobilization.
- **Voluntarism of resource persons** Many of the people who promote sustainable agriculture are highly motivated, but get paid little or nothing for their efforts. This works well in the short term, and on the small scale. But it is not sustainable in the longer term or on a broader scale – even the most enthusiastic supporters need to feed themselves and their families, and serving larger areas means that they can spend less time attending to their own farms. Possible solutions include boosting government funding or seeking financial contributions from the villagers who benefit from the services.
- **HIV/AIDS** The disease has devastated rural East Africa, killing or debilitating the most productive people in the society, young adults. Some sustainable agriculture techniques (for example, weeding, applying compost) require more labour than conventional farming. This is especially the case for building soil and water conservation structures. In many families and villages, there are not enough able-bodied young people to do the necessary work. Fortunately, some forms of sustainable agriculture – such as conservation agriculture – reduce the amount of labour required, so are ideally suited for families afflicted by the disease. In addition, sustainable agriculture produces a range of crops, resulting in a rich and varied diet, which helps people with AIDS fight the infection.
- **Socio-cultural barriers** Farmers are rightly sceptical of outsiders who come to tell them how to farm better. After all, they have been able to survive using their current practices, as did their parents and grandparents before them. They are also resistant to major shifts in practices, such as stall-feeding livestock that used to graze freely. They

want to see proof that a new practice works before they are willing to adopt it themselves. That makes demonstrations of technology and the opinions and experiences of other farmers – conveyed through farmer-to-farmer extension, farmer field schools, cross-visits and so on – all the more important as ways of convincing farmers that sustainable agriculture is a good idea.

- **Marketing** Many of the projects described in this book have discovered that the lack of market links and marketing skills is just as important as the need for appropriate technology or the right kind of seed. Markets for niche commodities grown in mixed-cropping sustainable agriculture systems are less well developed than for staples such as maize and bananas. It is necessary to promote crops that have a market locally, so farmers know they can sell their surplus. But as the example of groundnuts in Homa Bay (p. 48) shows, it is possible for farmers to carve out a regional market for a successful product.

It should be noted that these constraints are not unique to sustainable agriculture, or indeed to NGO-supported activities. Government extension services also face most of the same problems. One way of redoubling efforts to promote sustainable agriculture would be for the government to give this approach its full support, thereby reinforcing the efforts of NGOs and farmer organizations.

## Functional scaling up

Functional scaling up involves the development organization adding new activities or technologies, or adapting them to suit new situations.

### Adding activities

An organization that promotes one type of activity can add new activities to the palette it promotes among farmers. Adding activities is almost inevitable for organizations promoting sustainable agriculture, since farming in general and sustainable agriculture in particular are so related to, and dependent on, other aspects of the economy and society. This means it is unrealistic to promote a sustainable agriculture technology by itself: other components, from marketing to organization, finance and processing, are bound to be important.

Here are some examples from the organizations described in this book.

- **Adding value** The organization helps farmers to start processing the crops they have grown. For example, CCSMKE (p. 12) has helped farmers in Embu District in Kenya make sunflower oil. AEP in Homa Bay (p. 48) promoted peanut butter making to add value to and provide a market for the groundnuts that farmers had started to grow successfully.
- **Conservation and storage** Produce prices are lowest just after harvest. By conserving and storing their produce, farmers can sell it several weeks or months later, when the price has recovered.
- **Adding farm enterprises** Organizations promoting one type of crop or livestock can diversify into others. For example, the Diocese of Embu (p. 28) started by promoting

dairy goats, but then diversified into chickens, using many of the same approaches that had been successful with goats.

- **Using by-products** Farming produces a lot of by-products. These are often seen as “waste”, but they can be very valuable if used in the right way. An important feature of sustainable agriculture is that it consciously uses these by-products: it makes compost from weeds and crop residues, and uses manure as fertilizer. But they can be used in other ways too: for example, the Diocese of Embu (p. 28) introduced biogas plants to the dairy goat keepers it supported so they can use manure to make fuel for cooking.
- **Promoting input supply** Inputs can be expensive and hard for farmers to get. Organizations promoting sustainable agriculture can also explore ways for farmers to produce inputs locally. For example, in Homa Bay (p. 48), farmers now share various types of seed as a result of AEP’s promotion of groundnut growing in the area. CCSMKE (p. 12) has promoted the establishment of agro- and veterinary stores so farmers can buy implements and get their animals vaccinated.
- **Farmer organizations** Organizing farmers is key to agricultural development in East Africa. Individually, farmers have few opportunities to improve their livelihoods. Together, they can access credit, buy inputs, process and sell produce, control erosion, conserve soil, and protect forests. Even technically oriented development agencies find that community organizing forms a large part of their task.
- **Microfinance** A shortage of capital often means that farmers cannot invest even the small amounts needed to make money out sustainable agriculture technologies. Most

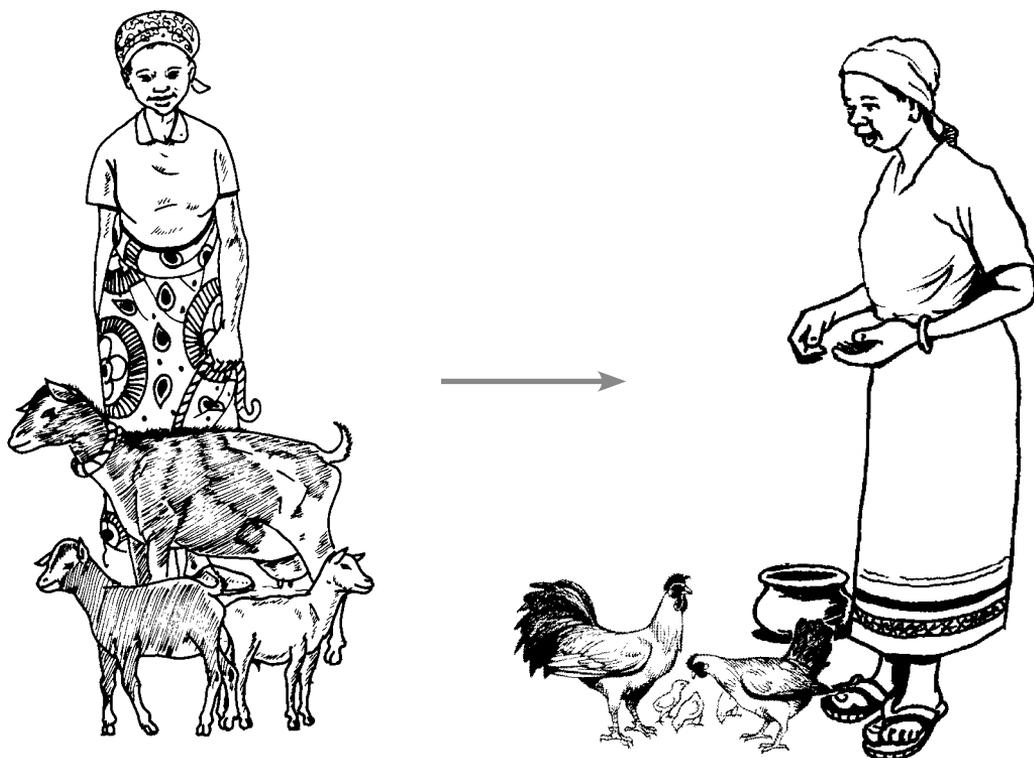


Figure 24 *Functional scaling up involves adapting or adding activities to suit a wider range of conditions*

farmers have little access to formal credit, so merry-go-around savings schemes offer one of the few ways they can bring together enough money at one time to invest. Both AEP in Homa Bay (p. 48) and the Diocese of Embu (p. 28) have introduced microfinance schemes to help farmers to save and to access credit.

- **Marketing** Marketing has been mentioned above as one of the constraints to quantitative scaling up. Organizations promoting sustainable agriculture frequently find they need to support farmers develop market linkages, and train them in marketing skills, in order for them to sell the higher yields and new crops they can grow using sustainable techniques.
- **Related topics** Development organizations that start off working in sustainable agriculture often find themselves called on to deal with other needs identified by local people – such as health or HIV/AIDS. The same is true in reverse: organizations focusing on other areas may identify the need for work on sustainable agriculture.
- **Lobbying and advocacy** Development organizations often also become involved in lobbying and advocacy work, for example to press government agencies to improve specific services in their area, to provide funding or support, or to persuade decision makers to adjust policies (see p. 126).

## Adapting activities

As an organization spreads its sustainable agriculture message to new villages, it is necessary to adapt the technology, and the extension approach, to suit the new conditions. Here are some examples from Sustainet partners' experiences.

- **Adjusting recommended quantities** It may be necessary to adjust things like planting distances, numbers of seeds, amounts of compost, etc. for different situations. These are relatively minor changes, and farmers will inevitably test out variations themselves to see what best suits their needs. Sustainable agriculture organizations can encourage them to do this. They can also manage tests themselves – as CCSMKE (p. 12) did on the nine-seeded-hole technique, which started out using 12 seeds per hole.
- **Adapting varieties, crops and breeds** Different varieties or breeds, or completely different crops or livestock species, may be appropriate in different situations. Organizations can help farmers choose the ones that are best for them, and can facilitate access to seed, breeding stock and other inputs needed (such as vaccines and veterinary medicines).
- **Adapting cropping patterns and management techniques** Sustainable agriculture promotes a wide range of crop and livestock combinations. The most appropriate combination, and the best way to manage it, will depend on many things: the local soil type, rainfall and other agroecological factors, the farmers' economic and social situation as well as their skills and wishes, the potential market, seasonal factors, etc. There is no one right combination: neighbouring farmers are likely to end up with different mixes, managed in slightly different ways. Development organizations can recommend different options for different areas or situations, and help farmers test them.
- **Adapting organizations and procedures** Just as there is no one-size-fits-all combination of crops or management technique, there is no ideal organizational form for farmers' groups and associations. While there are certain general patterns (a group should have

elected leaders, a set of rules, etc.), the particular form of the organization, its membership, focus and functions, and the rules it adopts, will vary from case to case.

## Means

As implied in the list above, sustainable agriculture organizations use a wide range of techniques in functional scaling up. Here are some of them.

- Training (e.g., of community AIDS educators)
- Exposure tours for farmers to other farmer's fields
- Field days
- Participatory evaluations to improve and adapt activities
- Handouts to promote adoption of techniques
- Focus discussions to improve or adapt technologies
- Demonstrations of innovations and to suggest possibilities to adapt them
- Farmer-to-farmer extension to exchange information
- Creating new activities in response to participatory appraisal and evaluation.

## Challenges

Functional scaling up results in various challenges, some of them unique to this approach.

- **Organizational capability** When adding or adapting activities, the development organization may find it lacks expertise in specific areas – a new crop, for example, or marketing or microfinance. It may have to develop its own skills in this area before it can be of use to farmers. Or it can ally with other organizations, as CHEMA (p. 77) did when teaming up with Matunda Mema, an export firm, to promote organic pineapple growing in Ihanda village in Tanzania. If required intervention is too far outside its own scope, it can refer it to other organizations (including the government) that are better equipped to intervene. Or, of course, it can choose to ignore the need.
- **Infrastructure and services** Expanding the range of crops and products may be difficult without improvements in key infrastructure such as roads and electricity, and services such as veterinary services and organic certification. Similarly, the lack of key expertise market information and skills may make it hard to choose which new commodities are most appropriate.
- **Maintaining focus** As an organization expands into unfamiliar new crops and products, it may find its efforts become too diluted. It risks losing its focus on the initial successful initiative, without a similar degree of success in the new ventures. The original farmers groups may still need support – and as their businesses develop, the type of support is likely to change.
- **Adapting approaches** A new commodity may require a radically different approach to the one successfully used in the initial intervention. The organization may lack the vision to recognize this, or capability to adopt new, more appropriate methods. As a result, it may persist in trying to force square pegs into round holes.

- **New partnerships** A new set of commodities may mean the organization has to deal with a new set of partners – in input supplies, processing, marketing, etc. It is vital to help farmers build up a range of such partners to avoid dangerous over-reliance on a single buyer, for example. But building up such partnerships takes time and can be difficult.

## Political scaling up

Political scaling up means “changing the rules of the game” that sustainable agriculture is part of. Most organizations involved in sustainable agriculture are relatively small and have limited funding. They can multiply the effects of their work if they work with and influence the government – a much bigger player in rural development, and one that not only provides a wide range of services, but also sets the rules within which other players operate.

Political lobbying can be done on the local to national and international levels. The local government level is important because it implements the national laws (through by-laws) and implements or oversees all development programmes. Advocacy at the national level aims to influence national government policies. Lobbying can also target international bodies, donors and research agencies such as FAO, IFAD, international agricultural research institutes and ministries in donor countries. Such lobbying can influence funding priorities and ensure that funds are provided in ways that will benefit small-scale farmers.

### Local

Sustainable agriculture organizations can develop close relationships with local administrations – from the village level up to district and province levels.

- **Enforcing national laws** National laws – for example, to protect forests – are often weakly enforced at the local level. Sustainable agriculture organizations can lobby with the local administrations responsible for enforcing them, and can raise awareness among local people and village leaders that such rules exist and why they are important.



Figure 25 Political scaling up means changing government policies to encourage farmers to adopt sustainable agriculture

- **By-laws** A by-law is a rule set by a local authority. Sustainable agriculture organizations can press village and district authorities to design and enforce such laws. For example HEM (p. 58) has promoted the implementation of by-laws on environmental conservation through village governments in Moshi district in Tanzania.
- **Environmental committees** The sustainable use of local resources depends on the ability of local people to manage the resources themselves. In Tanzania, HEM (p. 58) helped to establish environmental committees in the villages it served. These committees are composed of 8–12 villagers nominated by all the residents through the village assembly. They oversee the conservation and protection of soil, water and vegetation in the village. As a result of this pioneering work by HEM and other NGOs, in 2004–5 the government established environment committees in every village throughout the country.

## National and international

- **Policy briefs** Policy briefs are short documents aimed specifically at policy makers. They can be a useful way of informing policy makers of particular issues, and can be used in conjunction with other approaches. CCS–Eldoret (p. 21) prepared a policy brief in support of agroforestry, and mobilized communities to back this brief. Local people also used other channels: they discussed their concerns with parliamentarians who were members of their church.
- **Conferences, seminars and exhibitions** These can be useful ways of reaching a policy audience. For example, the CA-SARD project (p. 66) presented a keynote address at a world conference on conservation agriculture in Nairobi, to which senior ministers were invited. The ministers also saw several CA-SARD sites during the post-conference tour. At the same conference, AEP (p. 48) promoted groundnuts as a major cash crop and pressed for improved markets and access to quality seeds. At one exhibition, one member of parliament bought 300 kg of groundnuts to promote in his constituency. In Tanzania, the annual *Nane Nane* farmers' day is an important event where PELUM (p. 85) and development organizations and farmers can meet and discuss with policy makers.
- **Strategy documents** Government departments use strategy document to indicate the direction they plan to move. Development organizations can develop relationships with government departments, and supply them with information on sustainable agriculture techniques, evidence that the approach works, and suggestions for policy changes. One example of this approach is a forthcoming agro-mechanization strategy of the Department of Mechanization in Tanzania; as a result of the CA-SARD (p. 66) and related projects, this includes a chapter on conservation agriculture.
- **Policy development** Development organizations can be important contributors to policy development. For this, they must be recognized as specialists in a particular area or expertise, and they must have gained the trust of government agencies. For example, in Kenya AEP (p. 48) is concerned about the rules governing the production of seeds, which are biased against community seed producers. AEP is collaborating with Catholic Relief Services (an international NGO) and several government agencies to develop a policy paper on seed production.

- **Media** The mass media are an important way of reaching both policy makers and a wider audience. Coverage in newspapers, radio and television can raise awareness among key audiences about an issue, and keep it in the public view longer and more effectively than would be possible for a single organization working alone. In Tanzania, PELUM (p. 85) uses the mass media to address issues of sustainable agriculture and smallholders.

## All levels

- **Collaboration with the government** Development organizations can work with the government to promote sustainable agriculture. They can participate in district development committees and national agricultural extension programmes. Involving government officials in decision making – and even sharing staff – can help ensure close working relations. For example, as a result of the CA-SARD project's work (p. 66), the Tanzanian Ministry of Agriculture decided to start 100 pilot farmer field schools – far more than CA-SARD could do alone –with technical backstopping from the project. In Kenya, the Diocese of Embu (p. 28) has lobbied for the revival of the extension services – especially for technical backstopping on dairy goat groups, and conducts most training of farmer groups in collaboration with the ministry staff.
- **Documenting activities and results** Documentation is vital to convince policy makers that sustainable agriculture is a promising approach. This does not just mean producing evaluation reports for donors (though these are obviously important). It also means producing information materials that are short, informative and easy to understand, in a variety of formats: print, web-based and audiovisual, and distributing these to the appropriate individuals and organizations. To be convincing, the materials must contain hard numbers: costs, economic benefits, numbers of adopters, yield changes, etc., based on monitoring and evaluation of sustainable agriculture activities.
- **Briefing of decision makers** To make good decisions about sustainable agriculture, local officials must be adequately informed about the various technologies it involves, as well as its benefits and the constraints it faces. Organizations that work on sustainable agriculture in the field typically have gained a wealth of experience and expertise on the problems and prospects of sustainable agriculture in their areas. Such grounded, evidence-based information is extremely valuable for decision makers and staff of other development organizations. Organizations can keep these people informed about sustainable agriculture by inviting them to attend short training courses, demonstrations, field days and excursions. Doing so also helps ensure that they not only know about sustainable agriculture, but also are sympathetic to it. For example, CHEMA (p. 77) invited local officials in the Rulenge area to training courses and meetings on bush fires; the district council later passed by-laws to limit bush fires in the area.
- **Facilitating lobbying by farmers** Lobbying is much more credible if the farmers do it themselves. The organization can help them organize so they can gain their own “voice”. The organization should facilitate and enable, but should not dictate what the farmers say. In Tanzania, PELUM (p. 85) helps farmer organizations and its member NGOs to lobby on sustainable agriculture issues.
- **Resource allocation** Development organizations should persuade government agencies to allocate more resources to sustainable agriculture. Allocating funds to sustainable

agriculture is an investment that can pay dividends: with proper support, sustainable agriculture can generate more revenue for the government in the form of taxes, and reduce the cost of providing for destitute rural people. Development organizations can also organize farmers so they can apply for government funding.

- **Networking** Lobbying carries more weight if several organizations join together to press for the same cause. A network of organizations pulling in the same direction is more likely to be heard than each organization individually. PELUM-Tanzania (p. 85) works with MVIWATA and other farmers' organizations, as well as with other NGOs and community organizations, to press for policy changes.

## Challenges

Political scaling up can promise big rewards – if, for example, the government agrees to sponsor a major expansion in a particular sustainable agriculture approach. But it also is full of challenges. Here are some.

- **Government priorities** Government priorities might not be in line with sustainable agriculture ideas. Agriculture may be low down the government's priority list. Even if the government views farming as important, it may emphasize high-input agriculture rather than the sustainable sort.
- **Commitment of officials** A sustainable agriculture organization is lucky if the national and local governments are understanding and supportive of its efforts. But this is sometimes not the case: unfortunately some officials are not interested, uncooperative, lack the right skills, have different views about what is desirable, are corrupt, or are just too busy.
- **Time and skills** Building awareness and getting support at the policy level takes a lot of time, and requires staff who are adept at lobbying. But with their field focus, organizations promoting sustainable agriculture may not necessarily have the time and staff available.
- **Cost** Lobbying and advocacy is costly, and there is a high risk of failure (or at least of only partial success).
- **Competition** Governments have only a limited amount of resources to allocate, and there is stiff competition for these. Many organizations and interest groups compete for policy makers' time and for the limited pool of resources. Sustainable agriculture must vie with many other deserving causes: education, health and so on. Other stakeholders might try to influence policies in the opposite direction. For example, agrochemicals suppliers are unlikely to sit quietly if they think sustainable agriculture is going to damage their sales of pesticides. These competitors often have deeper pockets, dedicated lobbying staff and good ties to key officials.

One way of overcoming these constraints is to ally with other organizations involved in sustainable agriculture and rural issues to engage in lobbying work. That way, the organizations can pool resources and knowledge. They can employ specialist lobbying staff, and can provide the government with a much larger, more credible set of evidence about sustainable agriculture than any one organization could do alone.

Some organizations specialize exclusively or mainly in lobbying work. Field-based organizations can form alliances with these lobbyists: the field-based organizations provides grounded examples of sustainable agriculture in practice, informs the lobbyists of problems faced in the field, and links the farmers they work with to the lobbying group.

## Organizational scaling up

Organizational scaling up involves increasing the organization's capacity and making it more efficient. We can divide organizational scaling up approaches into governance and management; human resource development; and communication.

### Organizational governance and management

Revising governance of the organization can make it more able to deal with new situations, including the larger scale of operations needed to deal with a bigger number of farmers or a wider area of operation.

- **Strategic planning** At regular intervals every few years, the organization should undergo a strategic planning exercise to review its vision and mission, evaluate its activities, and determine which directions it should move in the next few years.
- **Amending working rules and procedures** Changing the way the organization works can provide efficiencies and enable the organization to do more and be more effective. For example, if the organization provides inputs to farmers for free, this can not only be an unsustainable cost burden for the organization; it also means the farmers do not feel they own the project. Introducing cost-sharing schemes, or even refusing to provide any inputs apart from advice and facilitation, can reduce these costs and increase the sense of ownership. The Diocese of Embu (p. 28) at first provided dairy goats for free; as a result, the farmers did not take enough care of the animals. After assessing the problem, the Diocese introduced a cost-sharing scheme, and modified the project rules to require farmers to register with the Dairy Goat Association of Kenya. The Association trains the farmers in goat management and breeding. As a result, management of the goats has improved.

Another example is rules on whom the organization serves. For example, church-based organizations may focus on serving church members, so excluding people belonging to other faiths from participating in their projects. In the Diocese of Embu at first only Catholics were able to participate in the Diocese's development activities. The Diocese's development committee later revised this rule, allowing non-Catholics to become involved.

- **Adapting the organizational structure** An organization's structure may need revising as its tasks evolve. This may mean creating new departments (and closing existing ones), reassigning staff, changing job descriptions and management procedures, and hiring staff with new skills. CHEMA (p. 77) provides an example of this: it established an inspection and marketing unit to facilitate farmers to grow organic pineapples.
- **Ensuring funding** Many development organizations rely heavily on short-term, project funding. That is a danger to the type of long-term community involvement required if



**Figure 26** *Organizational scaling up means improving the capacity and efficiency of the organization to enable it to accomplish more*

sustainable agriculture interventions are to succeed. Organizations may find they are unable to continue supporting even the best projects because of a gap in funding. If the organization relies too heavily on a single donor, it can be in real trouble if that donor withdraws its support. Organizations can overcome these problems in various ways: establishing fundraising departments, seeking funding from several donors, dividing activities into several small, related projects rather than a single large one, and seeking long-term funding support. In the case of the Diocese of Embu (p. 28), a committee to establish a fundraising department was formed in 2005. This committee will formulate operational guidelines of the unit and will recruit qualified staff.

- **Strengthening monitoring and evaluation** Systematic, regular monitoring and periodic evaluations of activities and outcomes are vital to ensure that the organization is effective and efficient. Some organizations such as CCS–Eldoret (p. 21), Baraka College (p. 38) and the Diocese of Embu (p. 28) have established monitoring and evaluation units and procedures. These units are backed by a set of evaluation guidelines. Regulations in some organizations require a regular review of their work and the development of further organizational strategic plans.
- **Investing in buildings and assets** As the organization grows, it will be necessary to invest in buildings and other assets. For example, CHEMA (p. 77) was able to acquire an additional plot to construct a new training centre. Other organizations have been able to build offices, establish new demonstration plots, or to buy vehicles..

## Human resource development

An organization's effectiveness depends largely on the skills, experience and commitment of its staff. These can be improved in various ways.

- **Adding staff** Adding activities and serving new areas – functional and quantitative scaling up – almost always means adding staff to handle the extra work. If this is not possible, the organization may have to reassign staff from other areas. When Baraka

College (p. 38) extended its training programme of short courses, day-release courses, certificate and diploma courses and field days, it hired new staff to teach and manage the extra load.

- **Staff capacity building** It is important to improve the capacity of staff through training, mentoring, study tours, etc. In CCS–Eldoret (p. 21), it has been felt important to improve the capacity of the staff instead of recruiting more people. An annual assessment identifies staff training needs, and courses to respond to these needs have been offered since 2003. They have included training on participatory development, facilitation skills and agroforestry, in the form of short residential courses and exchange visits to other organizations. CHEMA (p. 77) conducts similar activities. These trainings have reduced costs and diversified staff skills.
- **Staff management** Improved services for staff might help them deliver services more efficiently. This includes clearly defining their roles and responsibilities, providing adequate salaries and benefits, as well as good management and achievable tasks. It may be necessary to create a separate human resources unit within the organization to handle these changes. In the Diocese of Embu (p. 28), staff salary reviews started in 2001. They are to be carried out every three years to assess performance, identify new targets, and ensure employee satisfaction. These improvements has made staff feel their work is better appreciated, and contributes to improvements in their performance.

## Communication

Effective communication is vital to the smooth functioning of an organization. It includes both communication within the organization and with external audiences and partners.

- **Improving internal communication** Communications within the organization can be a problem, especially where field staff are scattered over a wide area with poor infrastructure. They can overcome this by establishing working procedures, such as regular reporting mechanisms, frequent field visits by senior managers, and regular meetings of field and headquarters staff. Investing in technology can also help: purchasing computers, establishing internal communication networks (such as internal email), and using mobile telephones.
- **Accessing information** To be effective, the organization must be able to obtain information readily. This includes information about itself: staff must be able to find and use records and files easily. It also means being able to find information from outside: information about technologies, government rules and policies, funding opportunities, technologies, extension approaches, and so on. To ensure this, the organization must have an effective recording and filing system, and provide staff with opportunities to obtain information from the outside – for example, through travel, refresher training, subscriptions to topic-related magazines, telecommunications services and internet access.
- **Making the organization known** Various aspects of external communication have been discussed above in the sections on quantitative, functional and political scaling up. Important audiences include the farmers and other local people the organization serves, decision makers at various levels, donors, partners, staff of national and local government

agencies, the private sector, the general public, actual and potential students (for training organizations), and the organization's own staff. There are many possible mechanisms to communicate with these audiences: websites, exhibitions, meetings, newsletters, brochures, prospectuses, calendars, etc. A positive public image can be invaluable in helping the organization obtain and maintain funding and goodwill. Church organizations in particular can reach a wider audience since most are well organized, enjoy high credibility, and have access to a wide communication network of church members. Using such networks as information channels can facilitate the spread of innovations. If religious groups take up the idea of “sustainability”, the message of sustainable agriculture can be spread on a daily or weekly basis.

## Challenges

Organizational scaling up faces various challenges. Here are some experiences by Sustainet partners:

- **Cost** It can be expensive to change organizations, both in terms of the monetary cost of investing in new assets, training and publicity materials, and in the terms of the disruption caused by restructuring, staff reassignments and management changes.
- **Funding** Organizations engaged in scaling up to meet field needs may be hit by the withdrawal of donors who have supported its past activities. Donors understandably want to see activities in the field that benefit local people directly, and are often reluctant to pay for other essential costs such as administration and staff development.
- **Leadership and management** Organizational change is hard. The staff and managers may resist change, and change managers' hands may be tied – for example, by laws restricting the hiring and firing of staff. Change is hardest if the organization's own leaders are not fully committed, or if one part of the management system (such as the financial management system) cannot cope. Organizational change must frequently be done in stages – upgrading the financial management before revising the staff management, for example – rather than all at once.
- **Staff continuity** It can be hard to retain good staff. The best, most experienced staff may be tempted to join other organizations that pay more. To guard against this, it may be necessary to review staff salary levels, and ensure that other staff can take over if necessary.



# 6

## Participants' profiles

Richard O Apamo

**Programme coordinator, Agriculture and Environment Programme, Catholic Diocese of Homa Bay**

*Tel. +254-59-22098, 735-467683, fax +254-59-22264, email [aephoma@africaonline.co.ke](mailto:aephoma@africaonline.co.ke)*

Richard earned a national diploma in development studies from the Kimmage Development Studies Centre in Ireland in 2003–4, and a diploma in agriculture and food marketing from Egerton University, Kenya, in 1983–86. From 1986 to 1998 he worked with the Ministry of Agriculture, after which he joined the Diocese's Agriculture and Environment Programme. He has worked with communities for 20 years in extension, project design, implementation, monitoring and evaluation.

Tom Apina

**East Africa coordinator, Sustainet**

*PO Box 41607-00100 GPO, Nairobi, Kenya; GTZ House, Lemana Raod, Kilimani, Nairobi, Kenya. Tel. +254-20-4451394, 445 1391, email [apina99@yahoo.com](mailto:apina99@yahoo.com), internet [www.sustainet.org](http://www.sustainet.org)*

Tom holds a BSc in agricultural engineering from Jomo Kenyatta University of Agriculture and Technology. Before joining Sustainet, he worked for FAO as a research assistant in conservation agriculture for the Sustainable Agriculture and Rural Development project.

Isaac Bekalo

**Regional director for Africa, International Institute of Rural Reconstruction (IIRR)**

*PO Box 66873-00800, Nairobi, Kenya. Tel. +254-20-4442610, 4440991, fax +254-20-4448814, email [admin@iirr-africa.org](mailto:admin@iirr-africa.org), internet [www.iirr.org](http://www.iirr.org)*

Isaac holds a PhD in organizational development and planning. His experience includes teaching, NGO training, curriculum design and organizational development. He provides consultancy services on strategic planning, participatory monitoring and evaluation, project design and proposal writing. He specializes in participatory development approaches and organizational development.

Franziska Bringe

**Researcher, Leibniz Centre for Agricultural Landscape Research (ZALF)**

*Eberswalder Strasse 84, 15374 Müncheberg, Germany. Tel. +49-334-328 2425, +49-163-686 285, email [franziskabringe@hotmail.com](mailto:franziskabringe@hotmail.com), internet [www.zalf.de](http://www.zalf.de)*

Franziska holds a master's degree in international agriculture from Humboldt University in Berlin. After graduating in 2005 she worked for GTZ in Germany and Kenya. She now works for ZALF on scaling-up of good practices in sustainable agriculture.

## **Martin Bwalya**

### **Coordinator, African Conservation Tillage Network**

*9 Balmoral Road, Borrowdale, Harare, Zimbabwe. Tel. +263 4 882107, 885596, email mbwalya@africaonline.co.zw*

Martin holds an MSc in agricultural engineering and mechanization management. He has for many years been involved in on-farm agricultural development programmes, such as the development of animal-powered implements, training of farmers and staff, and the development of agricultural information materials related to sustainable/conservation agriculture. He now focuses on development, synthesis, and dissemination of information on conservation agriculture, facilitation of on-farm experiments, and group learning and training in conservation agriculture.

## **Wibke Crewett**

### **Researcher, Leibniz Centre for Agricultural Landscape Research (ZALF)**

*Eberswalder Strasse 84, 15374 Müncheberg, Germany. Tel. +49-30-4208 7088, +49-33432-82416, email mail@crewett.de, crewett@zalf.de, internet www.zalf.de*

Wibke holds an MSc in international agriculture with a focus on rural development from Humboldt University in Berlin. Her master's thesis focused on land policy research in Ethiopia. She has experience in rural development activities in Indonesia and agricultural policy advice in Azerbaijan. Her major interest is in institutional economics and participatory rural development. Currently she is analysing scaling-up processes in India, Kenya and Tanzania.

## **Mary Gichobi**

### **Station coordinator, Christian Community Services of Mount Kenya East**

*PO Box 290, Kerugoya, Kenya. Tel. +254-60-21478, +254-720-953460, fax +254-60-21699, email ccsmke@yahoo.com*

Mary studied for her diploma in social work and development at Premese Africa Development Institute in 2003–5. She has worked with CCSMKE for the last 15 years. She is one of seven station coordinators in the Mount Kenya East region, and oversees the implementation of the development programme, works with the community on integrated development issues, and participates in monitoring and evaluation work, as well as training farmers in sustainable agriculture, health, water, gender issues, home economics and home industry.

## **Ernest Ndungu Githinji**

### **Teacher, Baraka Agriculture College**

*PO Box 52, Molo 20106, Kenya. Tel. +254-51-721091, mobile +254-722-447916, fax +254-51-721310, email baraka@sustainableag.org, ernestngitb@yahoo.com, internet www.sustainableag.org*

Ernest holds a certificate in agriculture and is pursuing a diploma in community-based development from Premese Africa Development Institute. He has 3 years of experience in extension work and 14 years in teaching agriculture-related subjects.

## Charlotte Häusler

### Development worker, GTZ Sustainet

*GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), Division 45 (Agriculture, Fisheries and Food), Dag-Hammarskjöld Weg 1–5, Postfach 5180, 65726 Eschborn, Germany. Tel. +49-6196-796489, email charlotte.haesler@gtz.de, internet www.sustainet.org*

Charlotte holds a master's degree in geography and has done various internships in development co-operation. She has been working with Sustainet since November 2005, supporting network members and assisting with documentation activities.

## Sylvery L B Ishuza

### Freelance consultant and moderator, Community Habitat Environmental Management (CHEMA)

*PO Box 517, Karagwe District, Kagera Region, Tanzania. Tel. +255-28-2223226, +255-784-785452, fax +255-28-2223226, email ishuzad04@yahoo.co.uk, internet www.chematanzania.org*

Sylvery holds a master's degree in agricultural economics from Reading University in the UK. He was a lecturer at Sokoine University of Agriculture, Morogoro, Tanzania, from 1985 to 1993. Since then he has been a freelance consultant in organizational development, strategic planning, business planning, facilitation assignments and project planning and development. He has worked throughout Tanzania with NGOs, community organizations and government institutions, and has attended training in the UK, Germany and Zimbabwe.

## John Roman Karawa

### Environmental technician, Himo Environmental Management Trust Fund (HEM)

*PO Box 131, Himo-Moshi, Kilimanjaro Region, Tanzania. Tel. +255-127-2756260, +255-744 66318, +255-744-695191, email hemtrustfund@keibeko.com*

John has a diploma in forestry and a certificate in alley cropping from the Forestry Training Institute–Olmotonyi in Arusha. He has 23 years of professional experience. From 1986 to 1994 he worked with GTZ in the Soil and Water Conservation Project in the Lushoto Tanga region. He then worked as a district catchment forest manager in Babati, Hai and Mwanga districts before joining HEM.

## Felix zu Knyphausen

### Development worker, GTZ Sustainet

*GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), Division 45 (Agriculture, Fisheries and Food), Postfach 5180, D-65726 Eschborn, Germany. Tel. +49-6196-791415, fax +49-6196-796103, email felix.knyphausen@gtz.de, internet www.sustainet.org*

Felix studied land management and then agricultural economics, and recently finished his MSc in agricultural economics at Imperial College London at Wye. After a short period working as a freelance consultant in the food industry, he joined the Sustainet project at GTZ.

## **Rael Jepchumba Korir**

### **Community development worker, ACK Eldoret Christian Community Services (CCS)**

*PO Box 6495, Eldoret, Kenya. Tel. +254-54720-862948, email [elreco@africaonline.co.ke](mailto:elreco@africaonline.co.ke), [rajekov@yahoo.com](mailto:rajekov@yahoo.com)*

Rael holds a certificate in agriculture and home economics from the Kilifi Institute of Agriculture. Her experience includes teaching and development work using participatory methodologies with rural communities.

## **Selina Chepkorir Mayodi**

### **Community development worker, ACK Eldoret Christian Community Services (CCS)**

*PO Box 6495, Eldoret, Kenya. Email [elreco@africaonline.co.ke](mailto:elreco@africaonline.co.ke)*

Selina holds a bachelor of science in agriculture from the University of Nairobi. Before joining CCS in 2004, she worked with PECOLIDO, a livestock development organization in Pokot. Her experience is in teaching, facilitating communities to design and implement their own projects, and in the use of participatory methodologies in organic farming and extension.

## **Paul Mundy**

### **Independent consultant in development communication**

*Weizenfeld 4, 51467 Bergisch Gladbach, Germany. Tel. +49-2202-932 921, fax +49-2202-932 922, email [paul@mamud.com](mailto:paul@mamud.com), [www.mamud.com](http://www.mamud.com)*

Paul is a British consultant in development communication. He holds a PhD in journalism and mass communications from the University of Wisconsin-Madison. He specializes in easy-to-understand extension materials, developed through intensive writeshops like the one used to produce this book. He also provides consultancy services in various aspects of development communication. He has worked extensively in Southeast Asia, South Asia and Africa.

## **John Namu Munene**

### **Assistant programme coordinator, Integrated Rural Development Programme, Diocese of Embu**

*Diocese of Embu Development and Social Services Department, PO Box 884, Embu, Kenya. Tel. +254-68-31638, 31415, fax +254-68-30541, email [munenename@yahoo.com](mailto:munenename@yahoo.com)*

John has worked with the Diocese of Embu Development and Social Services for the last 16 years in the field of community development. From 1989 to 1997 he was youth development coordinator, and since 1999 has been the assistant programme coordinator of the Diocese's integrated rural development programme. He studied community development, development studies and rural development at the Uganda Institute of Development Studies. He has taken a lead role in institutionalizing a community-based savings and credit programme, which has over 4000 members and a capital base of KSh 30 million.

## Esther Njeri

### **Programme officer, Community Habitat Environmental Management (CHEMA)**

*PO Box 253, Karagwe District, Kagera Region, Tanzania. Tel. +255-28-2223226, +255-744-656 221, fax +255-28-2223226, email chema@satconnet.net, eisaay@yahoo.com, internet www.chematanzania.org*

Esther holds a certificate in agriculture and rural development. Before joining CHEMA she worked with the Kenya Institute of Organic Farming and the Family Alliance for Development and Co-operation in Tanzania as an organic farming promoter. She has 15 years of experience in community facilitation, monitoring and supervision in low-external-input sustainable agriculture techniques. She is also involved in internal inspection of organic farms.

## Rahab Ngumba Njoroge

### **Strategic capacity building outreach manager, International Institute of Rural Reconstruction (IIRR)**

*PO Box 66873-00800, Nairobi, Kenya. Tel. +254-20-444 2610, 444 0991, fax +254-20-444 8814, email rahab@iirr-africa.org, training@iirr-africa.org, internet www.iirr.org*

Rahab holds a business management degree from Florida International University, Miami, USA; an advance certificate in instructor training from Kenya Technical Teachers College; and a diploma in sales and marketing from the Association of Sales and Marketing Executives, London. She has 19 years of experience in capacity building, having worked in senior positions in international colleges in Kenya, South Africa and the Seychelles. She has worked for 4 years in the development sector with ActionAid Kenya and IIRR. At IIRR, she is responsible for coordinating and facilitating international and customized courses, publications and writeshops, as well as technical assistance missions.

## Bonaventure Nyotumba

### **Art/desktop publishing consultant, International Institute of Rural Reconstruction (IIRR)**

*PO Box 66873-00800, Nairobi, Kenya. Tel. +254-723-667788, +254-20-444 2610, +254-20-444 0991, +254-20-316912, fax +254-20-444 8814, email bonnie@iirr-africa.org, nyotsz@yahoo.com, internet www.iirr.org, www.developmentart.com/artists.htm*

Bonaventure is a freelance designer-cum-artist based in Nairobi. He has a diploma in fine art. He has worked as a designer/painter for Bellerive Foundation, CARE-Kenya, *Rainbow* magazine, Jacaranda Designs, Don Bosco, Jericho Church and the International Institute of Rural Reconstruction. He specializes in fine and graphic art, product design and desktop publishing.

## Percilla Adhiambo Obunga

### **Community development worker, Agriculture and Environmental Programme, Catholic Diocese of Homa Bay**

*PO Box 362-40300, Homa Bay, Kenya. Tel. +254-59-22098, +254-735-467683, fax +254-59-22264, email aephoma@africaonline.co.ke*

Percilla has a bachelor's degree in social studies majoring in sociology from Moi University, Kenya.

She has worked for 3 years in community development programmes, covering participatory rural appraisal, participatory project monitoring and evaluation, research, and general community mobilization and sensitization approaches.

## Alfred Ombati

### Artist

*PO Box 64427-00600, Nairobi, Kenya. Tel. +254-723-350628, 721-420806, email aboliabsart@yahoo.com, internet www.developmentart.com/artists.htm*

Alfred is a freelance artist. He has worked for EPZ (Ancheneyer), and has developed storybooks for Ribena and Panadol. He is currently working with Cover Concept Ltd. as an illustrator, as well as with IIRR. He does fine art, paintings, murals, portraits, book illustrations and comics.

## Marietha Zakayo Owenya

### Assistant national facilitator and principal agriculture field officer, Conservation Agriculture for Sustainable Agriculture and Rural Development Project (CA-SARD)

*Selian Agriculture Research Institute (SARI), PO Box 6024, Arusha, Tanzania. Tel. +255-744-829 544, +255-27-250 3146, fax +255-27-250 5211, email mariethaowenya@yahoo.co.uk*

Marietha holds a diploma in crop production from the Uyole Agricultural Centre, Mbeya. She works with SARI on on-farm socioeconomics and agronomy research and on an FAO-supported conservation agriculture project covering 30 farmer field schools in Tanzania. She has experience in participatory diagnostic surveys, studies of the adoption and impact of technologies, on-farm and on-station experiments on cover crops and food crops, establishing and monitoring farmer field schools, and processing and utilization of legume crops such as lablab, pigeonpeas and chickpeas.

## Mariam Semlowe

### Village facilitator and principal agriculture field officer, Conservation Agriculture for Sustainable Agriculture and Rural Development Project (CA-SARD)

*Selian Agriculture Research Institute (SARI), PO Box 6024, Arusha, Tanzania. Tel. +255-744-598 505, 250 6775, fax +255-27-250 5211, email msemlowe@yahoo.co.uk*

Mariam holds a diploma in crop production. Her experience covers experiments on alternate crops, on-station and farm trials on cover crops, crop rotation and residues, establishing and monitoring farmer field schools, and processing and utilization of legumes.

## Stefan Sieber

### Agriculture economist/project coordinator, Leibniz Centre for Agricultural Landscape Research (ZALF)

*Eberswalder Strasse 84, 15374 Müncheberg, Germany. Tel. +49-334-328 2125, +49-30-61675435, fax +49-33432-82308, email stefan.sieber@zalp.de, stefan\_sieber@gmx.de, internet www.zalp.de*

Stefan holds a doctoral degree in agricultural economics and a diploma in agricultural sciences. His experience includes managing both EU-relevant and development projects. He has worked for 2 years in development collaboration in Latin America. He specializes in project evaluation and impact monitoring, impact assessment of policy instruments, sector analysis and agricultural modelling, environmental and economic support, policy information systems, and capacity and institution building.

## Helga Stamm-Berg

### Project coordinator, Sustainet

*GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), Division 45 (Agriculture, Fisheries and Food), Dag-Hammerskjöld-Weg 1–5, Postfach 5180, 65726 Eschborn, Germany. Tel. +49-6196-791476, +49-6173-320866, fax +49-6196-7966103, email [helga.stamm-berg@gtz.de](mailto:helga.stamm-berg@gtz.de), internet [www.sustainet.org](http://www.sustainet.org)*

Helga holds a master's degree in land use planning. She has worked for more than 20 years in development co-operation. She lived and worked about 8 years in Nepal, Indonesia and Thailand before joining GTZ in Eschborn. There she worked as desk officer for Mozambique and Malawi as well as for the Technical Environmental Department. Her professional experiences include agricultural and rural development, land use and regional planning, watershed management and environmental impact assessment. Helga has also worked for FAO, GTZ and for World Vision Germany.

## Yakobo E K Tibamanya

### Country desk coordinator, PELUM-Tanzania

*PO Box 54, Dodoma, Tanzania. Tel/fax +255-26-235 0744, mobile +255-744-362 749, email [info@pelumtanzania.org](mailto:info@pelumtanzania.org), [y\\_tibamanya@yahoo.com](mailto:y_tibamanya@yahoo.com), internet [www.pelumtanzania.org](http://www.pelumtanzania.org)*

Yakobo holds a diploma in animal production from the Ministry of Agriculture Research and Training Institute, Uyole, Mbeya, and an international diploma in pig Husbandry and animal feed technology from Barneveld College, Netherlands. He has also studied the promotion of self-help organizations in Feldafing, Germany. Before joining PELUM-Tanzania, he worked as a poultry and small stock development officer and in-charge of the regional hatchery unit for 10 years; as dairy farmers' group coordinator with the Southern Highlands Dairy Development Project (from 1993 to 2000), and as a district livestock officer (2000–3). His main interests are in rural development through community organizations and networking.

## Justin Nyaga Wamuru

### Programme coordinator, Integrated Rural Development Programme, Development and Social Services Department, Diocese of Embu

*Diocese of Embu Development and Social Services Department, PO Box 884, Embu, Kenya. Tel. +254-68-31415, 31550, fax +254-68-30541. email [doe.dssd@salpha.co.ke](mailto:doe.dssd@salpha.co.ke), [doe-irdp@salpha.co.ke](mailto:doe-irdp@salpha.co.ke)*

Justin holds a diploma in farm agriculture from Egerton University, and a BSc in agriculture from the University of Manitoba. He has worked for 28 years in agricultural extension and development in both dryland and wetter areas in Eastern Province. He worked with the Ministry of Agriculture from 1979 until 1995, before joining the Diocese of Embu. Has provided leadership and technical advice during the establishment of the Community Based Livestock Services (CBLS) and MBEU Savings and Credit Association.

## **Maureen Wanjiku K**

### **Youth officer, Baraka Agricultural College**

*PO Box 52, Molo 20106, Kenya. Tel. +254-51-721091, fax +254-51-721310, email [community@sustainableag.org](mailto:community@sustainableag.org), [maureen@sustainableag.org](mailto:maureen@sustainableag.org)*

Maureen graduated from Egerton University in 2005 with a BA and specializations in economics and sociology. As a youth officer at Baraka Agricultural College, she coordinates youth activities in Kamara Division in Nakuru District, and Tenges Division in Baringo, as well as in regions where the College's students are recruited. She has also helped formulated a strategic plan for Self Help Development International (a donor agency), has facilitated and trained agricultural heads in Nakuru District in participatory monitoring and evaluation, and has worked with Kenya Breweries and Barclays Bank of Kenya.

## **Tabitha W Waweru**

### **Extension officer, Christian Community Services of Mount Kenya East Region (CCSMKE)**

*PO Box 290, Kerugoya, Kenya. Tel. +254-60-21699, 21478, +254-68-21680, +254-723-866026, fax +254-60-21699, email [ccsmke@yahoo.com](mailto:ccsmke@yahoo.com)*

Tabitha holds certificates in general agriculture from Rwika Institute of Technology, and in leadership skills and rural development from the Asian Rural Institute in Japan. She has 14 years of experience in community training and mobilization using participatory approaches, the formation and management of interest groups, and project monitoring and evaluation.

The list of problems facing East Africa's farmers is long: erratic rainfall and frequent droughts, infertile and eroding soils, conflict over land and resources, a lack of markets for produce, the scourge of AIDS... Infrastructure such as roads and electricity are scant, and structural adjustment programmes have eliminated subsidies, guaranteed prices and extension services.

This book shows how sustainable agriculture can enable East Africa's farmers overcome these problems and pull themselves out of poverty. Nine examples from Kenya and Tanzania cover a wide range of farming techniques (soil and water conservation, agroforestry, integrated agriculture, improved cropping systems, conservation agriculture), livestock raising (dairy goats), extension methods (farmer field schools), marketing (organic farming) and networking approaches. Replicating these approaches on a wide scale would have a major impact on the prosperity of rural areas in the region.

Government policies are key to this. The book discusses changes needed in the policy environment to foster sustainable agriculture. It also discusses ways that development organizations can scale up their efforts so that more people can benefit from successful approaches.

Sustainet is an initiative of the German Council for Sustainable Development in partnership with Bread for the World, German Agro Action, Misereor and GTZ (in Germany) and local organizations in Asia, Africa and Latin America. ([www.sustainet.org](http://www.sustainet.org))

Deutsche Gesellschaft für  
Technische Zusammenarbeit (GTZ) GmbH

Sustainet (Sustainable Agriculture Information Network)

Dag-Hammarskjöld-Weg 1-5  
65760 Eschborn/Germany  
T +49 61 96 79 - 1426  
F +49 61 96 79 - 11 15  
E [info@gtz.de](mailto:info@gtz.de)  
I [www.gtz.de](http://www.gtz.de), [www.sustainet.org](http://www.sustainet.org)

