Presentation

By Dr Joseph Mutua
KENDAT, Kenya

Integrated Natural Resources Management

Enhancing adoption of Conservation Agriculture through local manufacture and repair of implements

"The aim of the project is to teach local artisans to make specialised equipment such as animal drawn rippers and subsoilers, which can break the hardpan without turning the soil."

Implements used for none-inversion tillage and removal of hard pans.

Project Rationale

Most soils in Kalama division of Machakos district in Kenya, and Arumeru in Tanzania, are hard setting and prone to surface crusting. Many years of conventional tillage, where the soil is repeatedly turned over, has caused hard pans to occur which inhibits water infiltration and root development, leading to low yields. Breaking these hard pans requires specialised implements.

The aim of the project is to teach local artisans to make specialised equipment such as animal drawn rippers and subsoilers, which can break the hard pan without turning the soil. The artisans will also be taught how to repair the equipment to improve sustainability of the project.

Some of the common problems caused by intensive soil tillage. From left: hard pans; impaired root development; bare soil resulting in increased runoff and severe soil degradation; and, poor drainage resulting in studded crop growth.

Conservation Agriculture

Conservation Agriculture (CA) aims to reverse the above degradation and restore soil to its original state.

Benefits of the CA system include the following:

- Improved soil fertility and reduced weed infestation;
- Reduced labour requirements;
- Reduced soil and nutrient losses;
- Improved bio-diversity; and,
- Higher yields

Conservation agriculture is adaptable for nearly all farm sizes, soil and crop types and climatic zones. Its principles are as follows:

- Crop rotation;
- Non-inversion tillage;
- Pest management;
- Mulching;
- Cover crops; and,
- Weed management.

Project background

Initial efforts began with five individual farmers who were selected from three districts: Machakos, Laikipia and Rachuonyo. Arusha had also experimented with CA with the support of SIDA and the Regional Land Management Unit (RELMA), eventually settling on best practice. The results were very encouraging as follows:

- In Machakos farmers were able to more than double maize production on account of tillage method alone;
- Laikipia experienced minimal rains but still CA farmers were able to harvest some

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crop when their neighbouring farmers got nothing; and,
- Rachuonyo farmers increased their yields significantly.

There were initial challenges to the adoption of CA systems by farmers due to:
- Lack of adequate knowledge and information on the practice;
- Lack of access to CA inputs such as cover crop seeds, herbicides, pesticides, fertilizers and equipment;
- CA equipment is not readily available locally and is expensive; and
- Lack of credit facilities. Farmers find it difficult to get credit for their farm operations because they lack the collateral asked for by commercial banks.

Project objectives

The project was able to scale-up seven groups in Machakos and four groups in Arusha with group membership ranging from 25 to 100. The main objective was to train local artisans in Machakos and Arusha to make rippers and subsoilers.
Other objectives were:
- To advance CA knowledge and practice by building a critical mass of practitioners through adaptive field trials, information provision and farmer exchange visits; and,
- To enhance community and support actions for sustained CA and business interventions, and initiate long-term collaborative activities between key stakeholders.

Partnership

The following were the partners and the roles they played in the project:
1. KENDAT was the lead organization and facilitated in:
   - Identification and screening of participating groups;
   - Identification of partners;
   - Organisation of training events and materials;
   - Organisation of field days and farmer to farmer exchange visits; and,
   - Overall supervision of project focus.
2. SCAPA assisted in identification of groups and partners in Arusha and co-ordination of group activities;
3. *La Compañia de Deportes e Turismo* (CODET), played the key role of designing and implementing the micro-finance scheme through group-based lending;
4. Ministry of Agriculture assisted in group mobilisation for field days, farmer exchange visits, and strengthening of linkages with local leadership and other stakeholders at the local level;
5. KARI (Kenya) and SARI (Tanzania) provided technical support in cover crops and weed control measures in CA systems; and,
6. University of Nairobi provided support in the training of artisans.

Methodologies used

The following methodologies were used in the project dissemination:
- Popularising CA through group based on-farm learning, modelled on FFS approach;
- Field days and exchange visits were very effective forums for exchange of ideas;
- Establishing a production base for the CA equipment by artisans;
- Empowering farmers with knowledge, skills and improved access to CA inputs;
- A training course in basic workshop procedures and skills to enable participants to make a prototype subsoiler and ripper;
- A second training course to review the production process, in particular the use of jigs and fixtures;
- Provision of a set of jigs and fixtures to participants; and,
- Establishment of a revolving fund: essential in empowering farmers to acquire production inputs to maximise on CA benefits.

Achievements

The following achievements were recorded by the project:
- 286 and 120 farmers in Kenya and Tanzania were directly involved in the project respectively and have replicated CA practice on their own plots.
- 200 rippers and 200 subsoilers have been sold through the trained artisans, which have enabled 800 farmers to practice CA technology (assuming each unit is shared among four farmers).

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- The project has generated great interest in commercial farming through exchange visits and training. A total of 25 farmers, nine from Tanzania, have been trained in tree grafting and are employing their skills to expand fruit tree growing on their plots and their neighbours'. In Kenya alone, the total of grafted seedlings (mangoes, avocados and citrus) is approximately 2,500 to date;
- In Kenya, 208 members (143 women and 65 men) have gained from personal loans amounting to Ksh 1,178,991 with repayment rate standing at 75%; and,
- In Tanzania, a total of TShs 1,286,000 has been loaned to 39 group members (16 women and 23 men). In addition, equipment worth TShs 375,000 was loaned to the groups on a lease agreement.

Changes in productivity

Farmers have reported a significant increase in maize yields, solely attributed to the removal of hard pans. In cases were other inputs such as high breed seeds and fertilisers or manure have been incorporated into CA, a threefold to fourfold increase in productivity has been reported.

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Building local capacity for fabrication and repair of CA equipment.

Impacts on livelihoods

As a result of the project, the following was the impact on household welfare:

- CA has enabled farmers to triple yields to meet family food needs and sell the surplus to raise cash for other family utilities;
- The culture of personal savings has raised prospects for investments in income generating activities; and,
- CA being less labour intensive, farmers have more time to engage in social activities.

Challenges and emerging issues

The main challenge centred on the provision of materials to construct the equipment because some items can only be purchased from Nairobi and Moshi. The high cost of transport to purchase the materials and the inability to buy small quantities has made the equipment uneconomical. This has resulted in artisans using scrap yard metal which is of poor quality. Another challenge is to continue promoting the equipment to farmers and maintaining links.

CA adoption is yet to reach critical mass. Government should take lead in promotion of CA through its well-established structures on the ground and also provide an enabling environment which could include subsidies and credits for acquisition of CA inputs

Administration of the revolving fund

The revolving fund needs constant attention and support to keep it in tune with changing community needs and demands (diversification). This process involves boosting the seed money, strengthening its structures and the gradual disengagement of KENDAT in its operations.

Marketing issues and linkages

Marketing is a major bottleneck in promoting commercial farming. Poor linkages to markets and a lack of market information leads to exploitation by middlemen. Attempts were made to educate farmers on marketing strategies such as group marketing approach, packaging of produce and value addition. Links have been encouraged with markets such as the Horticultural Crops Development Authority (HCDA), Kenya Agricultural Commodities Exchange (KACE) and others.

Production levels of commercial crops are yet to hit critical mass to interest full exploitation of the market chain and value addition. The groups vision is to export some of the high value crops such as improved mangoes by the year 2015. Additional support will be required in terms of quality control during the production process

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to meet export market requirements, for example by obtaining certification from EurepGAP.

Lessons learnt

The following lessons were learnt from the implementation of the project:

- Exhaustive discussions with partners should start early enough, to clearly define roles and agree on budgetary allocations.
- Exchange visits are a powerful tool for farmer learning and inspiration. Growing of horticultural crops was inspired by visiting other successful farmers in Yatta and Katangi in Machakos.
- Collaboration and linkages with other stakeholders and partners is vital in resource maximising and in accelerating technology adoption.

Sustainability and exit strategy

An intensification of CA promotional activities is recommended through existing groups and the creation of new ones through formation of FFS. An equipment hire system needs to be established to make new CA equipment available to farmers.

The current fund requires additional seed money, technical back-up and diversification to be self sustaining in the long run. Activities to support an expanded revolving fund should include additional training on fund administration and record keeping, and M&E to ensure adherence to rules and regulations. KENDAT's presence will eventually give way to a trained loans officer who will run the fund on a full time basis.

Other exit strategies include establishing linkages with similar projects such the ongoing Conservation Agriculture for Sustainable Rural Development (CA-SARD) project, for experience sharing and information exchange.

Discussion and response from participants

AP member Prof Agnes Mwang'ombe commenced the responses with a series of questions on the presentation. She cited the many crop technologies that the project had promoted and she was keen to establish from the presenter what the initial target had been. Was it the equipment or the crop technologies?

Prof Mwang'ombe also questioned the use of herbicides in the project. She was of the opinion that the equipment in conservation agriculture should help reduce the use of such products. The AP member sought more clarification on the cover crops used in the project, "because the type chosen should help lower the use of fertilizers."

Lastly, Prof Mwang'ombe sought more clarification on the issue of EurepGAP with respect to horticulture. She foresaw a clash between the project's horticultural approach and the aspects of herbicides and fertilizers.

The presenter informed the workshop participants that the initial aim of the project was to teach artisans how to make specialised equipment for use in conservation agriculture. The crop technologies were the result of farmers adopting the CA practices for better soil conservation and, eventually, better crop yields.

On the use of herbicides in the project, the presenter clarified that initial excess weed in the farms had to be controlled before the CA practices could be introduced. On the cover crops, he said that various leguminous cover crops such as *Dolichos* and *Mucuna*, were used.

Lastly, the presenter explained that EurepGAP was not part of the project implementation. It only came in on the issue of certification, especially for produce targeting export markets.

SESSION 10

Emerging Marketing And Policy Issues

Closing Session

Marketing issues discussants:
Michael Mbaka
Family Concern, Kenya
Constantine Kandie
Kenya Gatsby Trust
Policy issues discussant:
Charles Marwa
Policy and Research Officer,
FARM-Africa, Kenya

"Farmers and other project participants require access to market information. Market access involves identifying the market channel in which to participate competitively, profitably and sustainably."

Farming as a business: Market access project considerations

The following issues need to be considered in establishing farming as a business:
- Value chain analysis;
- Strategic business plan development;
- Production capacity and product development;
- Market access and development; and,
- Financing of business operations.

Why value chain analysis?

This helps in the identification and analysis of market opportunity. The initial steps involve identifying the target product, target market, value chain players and services offered. The external environment also needs to be identified in the value chain analysis. It's made up of policy, markets, environmental and social issues. In addition, it's important to find out who can offer Business Development Services (BDS) and at what cost.

Strategic business plan development

This is composed of the following:
- Marketing and its four components - product, price, distribution and promotion;
- Operations - guidelines and systems;
- Personnel - capacity of the participants to implement the plan in the target channel and existing governance structure; and,
- Financing - developing capacity in financial management systems.

Production capacity and product development

This takes the form of two stages:
1. Commercialisation - by evolving producers into business support units through group dynamics, record keeping, financial management, business skills, and market exposure through value addition.
2. Developing producer capacity to comply with the following areas:
- Legal business requirements;
- Produce and bulk quantities required by the market;
- Satisfy the target market quality assurance; and,
- Consistent and on time supply.

Market access and development

Farmers and other project participants require access to market information. Market access involves identifying the market channel in which to participate competitively, profitably and sustainably. These could be local markets, Regional markets or international markets. Niche markets can also offer more opportunities through fair trade, high value crops, product development and value addition.

Partnership with the private sector is crucial to the success of these initiatives. This can come through the provision of BDS services, transport, product awareness, packaging, credit and quality assurance. The private sector being the engine of the economy needs to be engaged in the marketing of produce.

Financing of business operations

This would involve the identification of available capital base by the promoter and ability to access additional capital for business growth. Institutionalising financial management systems is important for any business operation. This adds to organisational credibility and makes it easier to access affordable credit.