CONSERVATION AGRICULTURE NEWSLETTER

MAY, 2015
VOLUME 1
ISSUE 1

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CFGB Conservation Agriculture Technical Officers:

Putso Nyathi:
PutsoNyathi@MCC.org

Neil Rowe Miller:
NeilMIller@MCC.org

Canadian Foodgrains Bank
A Christian Response to Hunger

Welcome to the First CFGB CA Newsletter!

Two years ago, CFGB launched a new initiative designed to learn from ten years of CA programming in Eastern and Southern Africa, and create a network of Partners who work tirelessly to implement this programming. The United Church of Canada provided support for this initiative, and Mennonite Central Committee was asked to implement it.

In January, 2014 Putso Nyathi and Neil Rowe Miller were hired as CA Technical Officers in Southern and Eastern Africa, respecively. This newsletter is designed to help communicate the many lessons we are learning. Pease let us know if there are issues you would like for us to address!

CA Approaches: Including Farming God's Way

CFGB partner, SASOL, has been training Kenyan farmers to implement CA using oxen

Conservation Agriculture (CA) practiced worldwide adheres to 3 central principles:

• Minimizing tillage
• Maintaining at least 30% of soil cover throughout the year
• Crop rotations & associations

While all CA systems hold these characteristics in common, CA can be implemented in many different ways. In Brazil, where CA is practiced on some 30 Million hectares, farmers use tractors and sophisticated zero-till seeders to plant without disturbing the soil and while maintaining cover. In Honduras, on the other hand, farmers practice CA using dense velvetbean (Mucuna) cover crops and simple hand-held planting sticks. In areas of Africa where oxen are trained to work, ox-drawn rippers are used to create minimum-till planting lines while leaving crop residues on the soil surface.

Many of our CFGB partners began implementing CA after receiving training in a methodology referred to as Farming God's Way (FGW)" This CA approach also adheres to the 3 central principles, and promotes the use of hand-dug planting stations. One of the strengths of of FGW is that it also encourages good management beyond the 3 CA principles:.

- On time
- To High Standards
- With Minimal Wastage

Finally, FGW also emphasizes Biblical principles including: Acknowledge God and God alone, consider your ways, understanding God's all sufficiency, what you sow you will reap, bring the tithes and offerings to God, and stake your claim.

While FGW has provided a good starting place for our CA programming, we have found after working with many of our Partners, that its limitations are forcing us to move beyond this approach. Its biggest limitation is a rigid adherence to hand-dug planting stations and mulch brought in from outside, which makes it difficult to scale up for larger-scale basic grain production and to adapt to crops other than maize.

Other limitations include:

No intercropping – FGW prohibits planting 2 crops together in the same field. Research data and farmer practices testify to the fact that multi-cropping generally increases production per unit of land, and lowers the risk of crop failure.

Fixed populations – FGW recommends one maize planting density for every environment. Research data clearly show that populations should be higher in highly productive environments and lower in less productive environments.

FGW fertilizer recommendations (600 kg/ha) are much higher than is agronomically advisable or economically affordable.

In order to move beyond these limitations, we are encouraging our partners to develop new systems such as intercropping of legumes to provide free nitrogen and soil cover. Where oxen are used widely, we are promoting rippers to save labor and to speed up field preparation. For our projects which use fertilizers, we promote micro-dosing at a rate of 20-40 kg/ha.

All of these methods make CA more efficient and should help the farmers we serve to scale up their efforts from small plots to entire farms. We do not claim to have these systems perfected. In fact, we believe they need to be continually adapted to each farming system where CA is being practiced.

We are grateful for the foundation FGW has provided for many of our CA projects. At the same time, we believe firmly that God is pleased whenever we farm using methods that preserve and honor the creation with which we have been entrusted.

Integrated Soil Fertility Management: Improving Soils and Yields Simultaneously

Smallholder farmers in Sub-Saharan Africa face challenges of declining soil fertility, and as a consequence, low production. Reduced fallow periods, acidification of soils, low use of organic and inorganic inputs, and mono-cropping all contribute to this decline.

Although Conservation Agriculture does not list soil fertility management in its central principles, some have suggested that it should be included as the 4th principle of CA. Indeed, CA without adequate soil fertility is often unable to produce satisfactory returns. We feel strongly that all CA projects should address fertility issues along with more traditional CA principles.

Intercropping, such as this field of maize with pigeon pea, increases productivity and lowers risk.

Discussions From the Network

Mary Kamami: Hi folks. Anybody having knowledge on zai pit ? We have been promoting it in our community but now it seems…impractical and labour intensive in the name of minimum soil disturbance and moisture retention.

Neil Miller: Here's a video on Zai that was made in Burkina Faso, where the technique originated: http://www.accessagriculture.org/node/901/en. These pits are much shallower and less labor intensive than the "zai" I've seen promoted in Kenya.

Leonard Muturiki: we are also researching on Zai pits here at the low veld research station and preliminary results indicate that farmers can get something out of it, though labourious

Sibongile Sebata: True, go mechanised CA, it's less laborious!

The CA Technical Officers manage a Facebook Discussion Group from which the above conversations were copied. If you'd like to join the discussion, sign up at **www.facebook/CAinAfrica**

How can farmers best improve their soil fertility and crop yields?

Soil fertility management should be based on locally available resources, soil types and agro-ecological systems. This is the basis of Integrated Soil Fertility Management (ISFM). ISFM is a soil fertility management practice that combines use of organic and synthetic fertility sources, adapting their use to local conditions to maximise their effectiveness and improve crop productivity (Sanginga & Woomer 2009).

Fundamental to this approach is the building of soil health through increases in soil organic matter. However, neither ISFM nor CA adheres strictly to organic methods. As CA Technical Officers, we train partners to use organic sources whenever feasible, but we also recognize that chemical fertilizers are appropriate in some cases.

Contrary to some opinions, synthetic fertilizers will not destroy soil health, as long as they are combined with other good management practices. One study from West Africa showed that in 8 of 11 locations, fertilizer use increased soil organic matter levels by producing crops with more biomass (Vanlauwe & Giller, 2006). Another long-term study of 14 locations throughout Africa found that fertilizer by itself was not able to maintain soil productivity over a 20-30 period. However, when combined with use of manure or crop residues, productivity was maintained or increased in 100% of cases (Bekunda et al., 1997).

Compost is an excellent source of fertility, but because of its high labor and material demand, it is often limited to small plantings of high-value crops.

Organic Fertility Sources:
Manure, compost, green manure cover crops, termite soils, and crop rotation with legumes

Inorganic Fertility Sources:
Chemical fertilizers can be applied at planting or during crop growth

What are the advantages of each?

Organic Fertility Sources
- Slow release of nutrients
- Available for a long period
- Cheap and locally available
- Increase soil organic matter
- Improve soil structure

Inorganic Fertility Sources
- Some nitrogen fertilizers contribute to soil acidity
- Can cause pollution of water if applied inappropriately
- Can be expensive

What are the limitations of each?

Organic Fertility Sources
- Nutrient content is highly variable
- Manure is limited by number of livestock
- Manure quality depends on animal diet (usually declines during the dry season)
- Compost is labour intensive
- Crop rotation with legumes or cover crops is limited by land availability
- Nutrients supplied by legumes vary with growth conditions

Inorganic Fertility Sources
- Immediately available for crop needs
- Consistent quantity and type of nutrients

Partner Profile: SOLDEV, Malawi

The Synod of Livingstonia Development Department (SOLDEV) is completing the second year of CA programming in Mpata, in northen Malawi, with funding from Presbyterian World Service and Development (PWS&D). They have trained 225 farmers using Farming God's Way methods, and aim to eventually reach 360 households organized in clubs of 20 farmers each. Most groups have women in leadership posts, and many young farmers have become interested. Lead farmers work with farmers who are located close to them and assist project officers with monitoring.

Mpata CA farmers started by growing maize alone and intercropped with pigeon pea. Last year they learned that intercropping pigeon pea between maize rows works better than in the same planting station. Farmers have started experimenting with lablab and cowpea which were not promoted by the project. Many farmers like lablab because it provides a lot of soil cover whilst some prefer pigeon pea because it brings cash income.

To control livestock during the dry season, farmers mix cow dung mixed with water and sprinkle this slury on their cover crops. Cattle will not eat when they smell their dung! Most farmers use both manure and chemical fertilizers in their CA fields. They tried making compost, but most stopped due to a lack of water. They also tend to change CA fields back to conventional tillage and shift their CA to another site, which reduces the impact of soil improvement.

In Malawi, the Ministry of Agriculture has actively supported CA including airing promotional radio programmes, and this has made it easier for the project to introduce CA in the community as it is something that they have already heard about.

Community seed banks were constructed using materials supplied by the farmers and the project. Farmers also provide labour. Each farmer is expected to contribute enough seed for themselves and one new farmer. Challenges have included late delivery of seed by some farmers and heterogeneous production, though seed quality has been good.

CATO Schedule: Neil Rowe Miller

8-13 June
Yei, South Sudan
Project visit and staff training for World Renew, South Sudan

15-18 June
Nebbi, Uganda
Project visit and staff training for Kucwiny Food Security Project, Nebbi Diocese (World Renew)

28 June – 3 July
Bukavu, D.R. Congo
CA Training of Trainers. Communaute de Eglises Pentecote en Afrique Central (ERDO), Communaute Baptiste au Centre de L'Afrique (CBM), DMT DRC (WRC), Église du Christ au Congo (MCC)

12-17 July
Brazilia, Brazil
World Congress on Integrated Crops-Livestock-Forestry

30-31 July
Nairobi, Kenya
Africa Ecosystem Based Adaptation for Food Security

CATO Schedule: Putso Nyathi

1-3 June
Choma, Zambia

8-11 July
Winnipeg, Manitoba, Canada
CFGB meetings

12-18 July
Akron, PA USA
MCC Orientation

19-22 July
Toronto, Ontario, Canada
CFGB Member meetings

CA Technical Officer, Putso.Nyathi (2nd from right) with SOLDEV Project Team