







Proceedings of the Conservation Agriculture National Training of Trainers, 21-25 October, 2013; Linde Motel, Mponela, Malawi

CONSERVATION AGRICULTURE TRAINING OF TRAINERS COURSE IN PICTURES



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Acronyms

ACT.....African Conservation Tillage network

ADD.....

AF.....Agroforestry

AIDS.....Acquired immune-deficiency Syndrome

CA.....Conservation Agriculture

CATF......Conservation Agriculture Task Force

CAWT......Conservation Agriculture with Trees

CRS......Catholic Relief Services

COMESA......Common market for Eastern and Southern Africa

EPA.....Extension Planning Area

FAO.....Food and Agriculture organization

GIS......Geographic Information Systems

GPS.....Geographic Positioning Systems

GoM.....Government of Malawi

HIV.....Human immune-Deficiency Syndrome

NASFAM.....National Smallholder Farmers Association of Malawi

NGO......Non-Governmental Organization

NSA.....National Stakeholder

UNDP......United nations Development Programme

WVI.....world vision International

I. Executive Summary

The Ministry of Agriculture and food Security in Malawi, whose vision and mandate are to ensure food security through the promotion of agricultural productivity and sustainable land management is actively promoting Conservation Agriculture (CA) in the country. The Conservation Agriculture Training of Trainers' course was organized and conducted in partnership with the Malawi CA taskforce. Twenty five participants were initially targeted but twenty one participants ultimately attended the course. The participants were mostly district level managers and supervisors from Government Departments (Animal Health and livestock, Agricultural Extension Services, and Planning Department), NGO partners (WVI, CRS, Christian Aid, Concern Worldwide, Evangelical Lutheran Development Services,) and farmer organizations (NASFAM, Farmers Organization Ltd).

The main objectives of the course as outlined by the Director in the Department of land Resources and Conservation, Mr. John Mussa, were to enhance the capacity of implementing agencies on CA, to provide an information –sharing and to promote the use of GIS tools in monitoring implementation and adoption of CA technologies. The expected outputs were to increase the number of CA trainers and improve monitoring of CA which should ultimately impact positively on the area put to CA in the country

Although many benefits of CA have been observed, the promotion of CA as a standalone technology may reduce these benefits, especially in the face of climate change effects. The course therefore took an inclusive approach that included other climate smart agriculture approaches that could enhance the impact of conservation agriculture (see appended programme). The use of land and water management principles, AF technologies, and GIS tools in CA promotion were some of the many potential approaches presented during the course, which was conducted over a five-day period, and comprised power point presentations, plenary and group discussions, practical sessions and an interaction session with farmers in their CA fields.

The discussions during the course identified issues of high labour demand in hand-hoe based CA systems, residue management and the absence of adequate knowledge and skills among field extension officers and farmers as critical areas that need to be addressed. The exclusive promotion of hand-hoe based CA systems that excludes other more mechanized CA options was also a major challenge.

II. Official Opening Remarks

The Permanent Secretary in the Ministry of Agriculture and Food Security, who was the guest of honour was represented by , Honorable Mr. Nyandule Phiri, the Controller of Agricultural Services and Institutions. In his remarks, the official conveyed his gratitude to the COMESA, ACT and the Department of land Resource Conservation for successfully partnering with the Malawi Conservation Agriculture Task Force, which culminated in the hosting of the course.

The speaker went on to highlight the current status of agriculture in Malawi, where problems of land degradation, high siltation levels and declining soil fertility affect the performance of the sector. The Director, reiterated the direct bearing that the agriculture sector has on the overall economy of the country as it provides employment for almost 90% of the country's population as well as contributing to the country's exports and GDP. The use of CA and other technologies that enhance agricultural productivity, will therefore impact positively on the country's economy. He noted that the Government of Malawi and partner institutions are promoting conservation agriculture as a means for resilience and adaptation to the effects of climate change. The official also stated that, while the Government recognizes the efforts of the many partners involved in promoting CA, some studies by UNDP have revealed the lack of knowledge and skills on CA among field officers and farmers as a major constrain to the adoption of CA.

In conclusion, the guest of honour emphasized the importance of creating synergies and partnerships in order to successfully promote CA, recognizing the presence of several partners in this and previous two Training of Trainers courses organized by the Malawi CATF and partners.



Honourable, Mr. Nyandule Phiri-Controller of Agricultural Services and Institutions, delivering the official opening remarks

III. Presentations and Discussions

i. Land Degradation in Malawi

The presentation dwelled on causes of land degradation, the consequences in terms of economic issues, coping strategies and potential solutions. Major causes of land degradation highlighted in the presentation include the construction industry where the absence of policy regulations and monitoring allows constructors to excavate land without due care. Bush fires were also indicated as another common activity that results in land degradation. An important aspect of improved land management identified was to create awareness on the intrinsic value of land in its natural state.

To address land degradation the Malawian Government is in the process of drafting a land Resources Act, which was at the time was at the Justice department before being presented to Parliament.

ii. CA under Irrigation

The presentation looked at the feasibility of CA under irrigation and concluded that CA could have impact in terms improvement in the efficiency of water use through enhanced water infiltration and reduced soil evaporation. This will in turn lead to a reduction in soil erosion. It was alluded to that this reduction in the demand for water could eventually lead to a reduction in water conflicts in irrigation schemes. The low rate of adoption of CA, however presents a challenge, as there has been no promotion of CA in irrigation systems. The need for more research on CA under irrigation was also emphasized, as well as possible challenges with residues in surface irrigation systems. The major issue arising from the presentation was the absence of CA promotion in irrigation systems.

iii. Conservation agriculture with trees (CAWT)

The presentation highlighted the problems of small holder agriculture and how they can be addressed through the use of agroforestry technologies, especially in CA systems where the benefits can be immense. Use of agroforestry can make agriculture more sustainable through the increase in diversity, thereby also addressing variability in climate. The inherently low soil fertility found in most small holder farming areas can be addressed by planting nitrogen fixing trees, and this can also reduce the amount of fertilizer requirements for the farmer. AF technologies can also address land degradation issues by reducing soil erosion.

Despite the numerous benefits of agroforestry, limited policy support and the fact that benefits from AF may be derived over long periods of time, continue to reduce adoption of AF technologies by smallholder farmers in the region.

iv. Group discussions

To enhance the understanding of the different situations to which the participants have been exposed to, discussion sessions were organized in three groups, with each group responding to the following questions indicated. The group responses are shown in the boxes.

1. a) Is conservation agriculture taking shape in the ADD`S/District/EPA: what are the reasons for the current status

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- Conflicting enterprise interest 9 crops /livestock), bush fires, land pressure affecting adoption
- ➤ Low adoption-farmers not increasing area under CA, knowledge gap at all levels, demonstrations not persuasive, labour −intensive in initial stages, some CA benefits long
- b) Are our messages harmonized as GoM and NSA working with the same farmers? How best do we work together?
 - Messages not harmonized, there CATF has the responsibility to harmonize messages and implementation
- c) Use of incentives in promotion of CA. Some institutions give farmers incentives (usually inputs). Is this the right way to promote CA?
 - Use of incentives should be standardized
 - > Incentives should be given at group level as soft loans to avoid creating dependency
- 2. a) Capacity at ADD/District/NSA level: Do we have the personnel with the right skill and knowledge on CA. What are we doing to impart the much needed knowledge and skills
 - > The number of people that have been trained is not adequate

- b) Use of lead farmers in promoting CA: Are there farmers who have adopted and done farmer level research in perfecting the CA principles within their farm. How many other farmers have learnt them?
- > There are significant numbers of lead farmers that have been trained but the follower farmers are few
- c) Reporting and sharing of data and information amongst different actors on CA
 - There is need for harmonization of reporting channels
 - Issues of ownership of data before analysis and publication affect sharing
 - > There is need for review meetings for information sharing

Emerging Issues-Day 1

- Conflict between CA farmers and livestock. The consensus was to look at the relationship not as a conflict but as complimentary- one part of the residue for livestock feed, the other part for CA
- 2. The knowledge and skills on use of manure in CA is not adequate
- 3. Uncontrolled bush fires are hampering CA implementation, and there is therefore need for policy regulation for their effective control.
- 4. There is need for guidelines to reduce land degradation by the construction industry (brick-making, sand excavation, e.tc.)
- 5. The promotion of conservation agriculture in the country has not included irrigation schemes.
- 6. CA needs to be exposed to youths(primary and secondary schools-these are the farmers of the future
- 7. We should not expect immediate adoption, as mind set change may take time
- 8. There is an absence of new statistics on land degradation
- 9. CA is housed in the Department of land Resources- there is need for improved collaboration with other departments
- 10. Sectorization of CA is hampering adoption (promoted mainly in smallholder farming sector

v. Land use planning and CA

The presenter highlighted the importance of promoting CA within the frame works of land Use and Water Management to enhance its impact. The use of GIS tools in land Use planning could enhance effective data collection in CA. Monitoring of changes in soil quality and water content aspects in CA could be made easier through the use of GIS tools. The presenter shared a portal: www.masdap.mw where data and information on various aspects on GIS use is being shared with the support of development partners

vi. GIS based CA monitoring

The GIS session briefly introduced the basics of GIS and its accessories. The main part of the session comprised of a practical on use of GIS tools to enable different sectors can benefit from the systems.

The practical involved the use of a free GIS software (the quantum GIS software). The participants were exposed to the types and sources of geographic data i.e. vector and raster data as well as map projections and coordinate systems. Some sample maps were produced from available CA data to indicate the location of some CA farmers.

vii. Implements and mechanical traction options for CA

The presenter shared the view that CA is considered both as a tillage system and also as a crop management system by different sectors. As a tillage system, CA should fulfill the objectives of tillage, which include planting, weed, and pest and moisture management among other objectives. As a crop management system CA should encompass crop establishment, protection and harvesting. The presentation showed various CA option which included hand implements, animal and tractor drawn machinery. Key in his presentation was that despite availability of options on machinery which are CA friendly like jab planters, they are not being used extensively in Malawi as a result of an evaluation at Chitedze Research Station, which found the implement to be unsuitable. The following were the findings from the evaluation of the Fitarelli No.5 and No.6 hand operated jab planter:

- The jab planter had a higher planting capacity or rate compared to hand planting even more when planting was combined with fertilizer application.
- > Efficiency of planting for ungraded seed was poor with the jab planter.
- > The efficiency of planting was higher on loamy soils compared to clay soil.
- Fertilizer application was poor in moist conditions

Day 2 – Emerging Issues

- GPS tools given to frontline staff not being used to measure yield because they were not fully trained on use for this purpose.
- Lack of collaboration between Land Resources department and Crops department on use of GPSs because of varying interests
- Generally there is lack of CA implements in Malawi- strict government guidelines have prevented the use of imported fiterrelli jab planters because they were found unsuitable by Chitedze Research Station

viii. Herbicide Formulation and safety; sprayer calibration and application.

The presentation initially focused on the classification of herbicides depending on several criteria including mode of action, selectivity and residual effect among others. The major factors affecting the efficacy of herbicide use were discussed, mainly timing of application, soil particle size, and rate in relation to soil type and soil moisture content. The presenter highlighted the benefits of herbicides in that they enable increase in yield, they are cheaper than manual weeding and require less labour.

The second session of the presentation looked at product knowledge of the common herbicides that are used in Malawi, while the third and final session was a practical on sprayer calibration and spraying.

ix. Conservation Agriculture Concepts

The problems associated with conventional ploughing were highlighted. These included the destruction of soil structure and soil organic matter, soil mining as a result of monocropping and increased rated of soil erosion as a result of the loosened soil. Conservation Agriculture was presented as a complete paradigm shift, with the core principles explained in details. The challenges associated with implementing CA in Malawi were discussed.

x. Women and other social groups in CA

The presenter highlighted the importance of agriculture to the Malawian economy, employing more than 80% of the population and being the major livelihood source for the most of the rural population. The sector has therefore a very direct impact on economic growth. However, the agricultural sector in Malawi is faced with several challenges that include the following:

- > It is heavily dependent on rainfall
- Smallholder farmers produce mainly food crops
- Women make up the majority of the smallholder farmers
- > Lack of diversity in production
- Climate change impacts
- > Changing population dynamics- number of youth and children is increasing

These characteristics of smallholder agriculture in Malawi and the changing population dynamics require a new approach to agriculture. Conservation agriculture with its potential to increase yield and overally reduce labour requirements therefore provides an attractive and more efficient option to address Malawi's small holder agriculture problems.

Emerging issues-Day 3

- CA adoption is still low in Malawi, participants proposed the following strategies to assist in CA adoption:
 - Use of local leadership for CA promotion
 - Political will important and involvement of Members of Parliament in study tours so that they appreciate what is on the ground
 - The government input support programme, FISP could be tied to CA but care should be taken to avoid creating a permanent link between CA and inputs (lessons from Zimbabwe where actual adoption was observed after 8 years). Some farmers have been observed to concentrate on small areas which have input support from donors.
- ➤ Harmonization of messages, with an example from of Kasungu district, where platforms were organized for implementing partners at district level.
- CA is associated with crop rotations/associations and ground cover. How will herbicides like Harness which requires direct contact be used?
- Sprayer calibration very important due variation in pacing coefficient and delivery rate for different sprayers.
- > It is difficult to use herbicides with residual action due to rotation requirements.
- ➤ There is need for guidelines on disposal of herbicide containers. The Chemical Industries could be involved in recycling but the role of government is also key in providing policy guidelines.

x. Field Tour

a) Field Tour briefing

The visit was organized for Dowa district, which has nine Extension Planning areas (EPA). Mponela EPA, with sixteen sections was the nearest district and Kawere B section was selected for the visit. The farmers visited comprised one Lead farmer, who was also a Village Headman, and 3-4 non- lead farmers in the same area. It was also agreed that the farmer group should include a non-adopter to enable the group to understand the reasons for low CA adoption in the country. The first site visited was the lead farmer learning site, while final discussions were held at the individual demonstration plot for the Headman/lead farmer. All farmers visited were using hand hoe basins for their land preparation, with the standard basin size of 35cm length, 15cm width and 20cm depth. The farmer receive inputs such as herbicides, fertilizer and seed from the implementing agency on credit for a total of MK5000 after paying a fee of MK3000 as deposit and the balance being paid at the end of the farming season.

b) Site 1- Farmer: Mr. Vekelani Nthala

The farmer, who is also the Village Headman is responsible for the lead farmer plot, which measured 0.7 ha in area, and demonstrates different components of CA and other climate agriculture technologies. This is the learning site for all the follower farmers in the village and it now in its third year. Mr. Nthala also runs a demonstration site near his homestead. The farmer explained that challenges in availability of maize stalks which are constantly burnt by mice hunters have had an impact on the size of his CA field. Both the lead farmer plot and the individual plot had very high residue levels.



The Sub-Regional Coordinator for Southern and Central Africa, presenting ACT visibility material to lead farmer and village Headman, Mr. Vekelani Nthala

c) Site 2. Farmer- Mr. Praiseman Nkhatha

This was a follower farmer, with a CA field totaling 1 acre and 1 hectare of conventionally ploughed field. There was a complete absence of mulch in the CA field. Despite the absence of mulch in his CA field, Mr. Nkhata revealed that his maize harvest from his 1 Acre CA field was the same as the harvest from the 1 ha conventionally ploughed field.



Mr. Praiseman Nkhatha's field with no mulch cover

d) Site 3. Farmer- Mrs. Cathy Mwase

The farmer is from a female-headed household. She explained that she had challenges in maintaining residues in her field due to fires caused by mice hunters and was also misinformed that she could not use grass as much as this will come with weed seeds. She was advised to cut the grass before seeding to avoid the weed seeds. She had failed to adequately cover her 1 acre CA field with mulch, managing only half of the area. The farmer was in her third year of practicing CA.



Mrs. Cathy Mwase's CA field

e) Site 4

Mrs. Stiphelia Tembo, is a female farmer from a male-headed household Mrs. Tembo also had 1 Acre field under CA. She has previously practiced CA on 1 acre with mulch, yielding up to 2000kg of maize, while using only 1 50kg of compound D and manure for her basal dressing



Mrs. Stiphelia Tembo's 1 Acre CA field with high mulch levels

f) Site 5- Non-adopter- Ms. Chimwemwe Nyirenda

The participants also had the opportunity of meeting Ms. Chimwemwe Nyirenda, who is a non-adopter in order to try and understand the reasons for non-adoption or slow adoption from a farmers' perspective. Although Ms. Chimwemwe acknowledged that CA farmers are getting higher maize yield, and she has to work in other people's fields to supplement her cereal requirements, she finds it difficult to practice CA due to the following reasons.

It is Labor intensive:

- Sourcing of stalks if not available
- Laying down the stalks in the field (takes time)
- Precise placement of seed is slow and time-consuming
- Sourcing and applying manure
- Destruction of the traditional ridges and leveling of the field causes flooding?

g) Emerging Issues-Field visit

A final discussions at the end of the field visit highlighted the challenges of fires as a hindrance to keeping mulch in CA fields, and high labour demand for digging basins, carrying residues and weeding.

The farmers however acknowledged the benefits of CA systems in terms of higher yields, more efficient use of fertilizer (less quantities are used) and also better soil conservation. The size of CA basins was not clear as some farmers were using large planting pits and regarding them as CA. The need for traditional leaders to come together and put in place legislation to prevent fires was emphasized. It was proposed by the participants that there was need to come up with new strategies to make CA demonstrations more attractive to farmers in order to entice them.

xi. Congress announcement

An announcement of the 1st Africa congress for CA was made by ACT. The congress will be held in Lusaka, Zambia, from 18th to 21st March, 2013. Participants were invited to submit abstracts or register to attend. Congress details are available on the website: www.act.africa.org

xii. Climate smart agriculture and CA

The presentation described some of the climate change factors that affect agriculture, namely, increase in rainfall variability and increased frequency of extreme events (droughts and floods). Land use change was identified as one of the major contributing factors to climate change. The presenter went on to explain the role of CA as a mitigation as well as an adaptation measure to climate change. Ca can reduce the vulnerability to climate change through improved water management and increased crop diversity.

xiii. Technology transfer approaches for CA

The presentation focused on addressing issues of low adoption of CA technologies in Malawi. Some of the factors responsible for the low adoption were identified as unclear extension messages, limited capacities among extension workers, lack of sustained support from government and low biomass production which affects the principle of organic cover in CA systems.

The presenter outlined the process of developing extension message by first identifying the knowledge gaps, deciding on the message appeal and positioning the message in relation to the target group. This will also determine the media format chosen to disseminate the message. Two types of demonstrations that can be used to convey CA messages (method and result demonstrations) were also described.

xiv. Development of synergies between CA and other programs

The presentation focused on the need to develop synergies that will benefit the collaborating organizations. This will create complementarity in terms of specialization and may reduce the cost of programmes and bring financial sustainability. Identifying synergies will address the relevance of CA to different target groups that may be the focus of different organizations. The presentation also highlighted factors that determine partnership synergies.

Emerging issues-day 4

- ➤ Different approaches of Conservation Agriculture by different organizations with different messages
- Why are farmers not adopting the CA technology yet it seems they have good information about the technology?

xv. CA Innovation system policy and institutional requirements

The presentation looked at the current policies in Malawi and how they relate and/or promote conservation agriculture. The presenter noted that there is generally a complete silence in the current policies as regards CA and its benefits to farmers in Malawi, giving an example of the National Nutrition and HIV/AIDS policy which could help benefit the affected and infected through the intensification which ultimately reduces the farm size and spreads and reduces labour if correctly implemented.

xvi. Partnership and Networking

The presentation highlighted the different components of CA, which require different specialties and hence the need to partner and network in the promotion of conservation agriculture in Malawi. It also highlighted the role of the National Conservation Agriculture Task Force in facilitating networking and partnerships among institutions implementing CA. This would normally reduce costs, enhance the effectiveness of the promotion efforts and therefore increase adoption.

xvii. Action planning

Participants spent part of the day developing action plans that would be implemented once they go back to their various duty stations. The action planning was based on the following guidelines:

- Identifying the CA technologies that are feasible in area of operation
- Drawing up an action plan for implementation
- Identify potential partners
- Identify resources that are required
- Identify resources in terms of technical backstopping
- > Have clear timelines for all activities.

IV. Appendices

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