African Conservation Tillage Network

The Guest of Honour (with jacket) flanked by ACT Directors on Left and Executive Secretary on right (seated), and Course Participants (standing)

Report of Training in CA held in Lusaka, Zambia, October 2011

By

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ACRONYMS

BEO	Block Extension Officer
CA	Conservation Agriculture
CBNRM	Community-Based Natural Resource Management
CEO	Camp Extension Officer
CFU	Conservation Farming Unit
COMACO	Community Markets for Conservation
DSMS	District Subject Matter Specialist
FAO	Food and Agriculture Organisation of the United Nations
FFS	farmer Field School
FISP	Fertilizer Input Support Programme
GART	Golden Valley Agricultural Research Trust
MoAL	Ministry of Agriculture and Livestock
MOLES	Management Organic matter Liming Earthworm Standard
SAO	Senior Agricultural Officer
TSB	Technical Services Branch
UNDP	United Nations Development Programme
UNZA	University of Zambia
ZARI	Zambia Agriculture Research Institute

1.0 INTRODUCTION

A total of 33 (92%) of the 36 expected participants attended the International CA Learning Course scheduled for ACAMM's Lodge- Lusaka from 25th October 2011 to 3rd November 2011 of which 3 were females (9%) and 30 males (91%) (see Appendix 3). The training was facilitated by 4 international (Zimbabwe, Tanzania, Kenya) and 7 local (Zambians) resource persons with commendable support from CFU, GART and 2 commercial CA farmers. Resource persons came from out of Zambia but also key players from the private sector, notably Grownet Investments (manufacturer) from Zimbabwe, Agrifocus (agro-chemical firm in Lusaka), ZARI (Kabwe), GART – Magoye, and MoAL itself.

1.1 Objectives

1. To enhance understanding of the principles of conservation agriculture as the new way to farm sustainably;
2. Impart practical knowledge and skills in the application of CA practices for different socio-economic and agro-ecological environments to enable them respond competently to farmers' needs;
3. Provide the participants with approaches and methodologies for enhanced documentation and wide-scale adoption of profitable CA; and
4. Strengthen the competency of the participants to facilitate learning of CA to CA support staff (e.g. researchers, extension staff).

1.2 Expected Outputs

1. Explain and demonstrate to others the concept and principles of CA and farm level applications of the same;
2. Guide farmers and other stakeholders in analysing and determining solutions to problems in sustainable use of soil and water in farming;
3. Plan and facilitate farmer based trials and demonstrations for development and/or adaptation of CA technologies;
4. Participants guided in development of learning facilitation materials and work plans for implementation of identified field activities; and
5. Participants provided with relevant reference information materials and M&E tools.

2.0 PARTICIPANTS' EXPECTATIONS FROM THE TRAINING

A number of learning expectations were outlined by the participants to regulate participation but also enhance their understanding and skill of CA, as summarised in Table 1 below.

Table 1. Summary of Participant Expectations

Areas of Focus	Expectation
Administrative	
	▪ Speak through the chair. ▪ All topics covered on the programme. ▪ Time should be treated equally. ▪ Topics should be well presented and easy to understand. ▪ Participants awarded with certificates of attendance. ▪ Time management by facilitators and participants. ▪ A lot of energisers. ▪ Expect to see timely implementation of the things talked about and agreed upon.
Cognitive	
	▪ Gain more knowledge on conservation agriculture. ▪ Learn about new technologies in CA. ▪ Identify coping strategies in view of current farming systems. ▪ Facilitators to explain clearly so that all participants would be able to hear. ▪ Cover all the materials prepared for the workshop. ▪ Not to go back blank after the workshop.
Psycho-motor	
	▪ How the CA principles can quietly be adopted by small scale farmers. ▪ How CA principles can be adopted in areas where farmers are still resistant to it e.g. Siavonga. ▪ What the government is doing to train more staff so that the principles of the workshop do not only end in a few people but widened to cater for more farmers. ▪ See a lot of different types of CA tools. ▪ 'hands-on' practicals to enhance understanding of CA. ▪ Practical lessons and provision of demonstration equipment. ▪ The action plan drawn at the end of the workshop.
Attitudinal	
	▪ Experience sharing on what has worked. ▪ Participation from everyone. ▪ Friendliness. ▪ Respect for each other. ▪ Team work. ▪ Common understanding of CA at the end of Workshop. ▪ Collective responsibility of group work presentation. ▪ More interaction and sharing of experiences from the different areas represented.

Participants desired that the knowledge gained through the training will reward adoption/ action motives that will improve performance and positively contribute to the evolvement of new farming mind-sets. With this thrust, they hoped to see significant impact among the target group leading to increased economic and environmental benefit.

3.0 TRAINING AREAS

3.1 Course Content

This training involved key promoters of CA notably Dunavant Zambia, UNDP, FAO, GART, CFU, UNZA, CA commercial and small-scale farmers and of course ACT.

The training/learning workshop covered the following topics:

1) Background

- Situation analysis - Regional experiences with CA by Participants + coping strategies; and
- CA Background, historical perspectives, rationale, benefits, challenges.

2) CA Concepts and Principles

- Soil cover;
- Minimum mechanical soil disturbance - Manual, animal traction and tractor based systems;
- Crop rotations and associations; and
- Practical demonstration of erosion processes and infiltration - Run-off trays, links to livelihoods.

3) Agronomic Practices

- Practical session on weed control;
- Calibration of sprayers;
- Weed, pest & disease management and control in CA systems; and
- Timeliness, manual and chemical options, strategic control.

4) **Soil Health**

- Soil characteristics & properties;
- Erosion and water infiltration;
- Managing Soil fertility in CA systems; and
- Soil fertility recovery options.

5) Crop-livestock integration in conservation agriculture

6) CA and Agro forestry

7) CA and Climate Change

8) Field Practicals:

- **CA in animal traction systems**
    a. harnessing work animals;
    b. ripping/sub soiling /direct seeding; and
    c. showcase of CA equipment - guided exposure to CA equipment, hands-on use and adjustments.
- **CA techniques in manual systems**
    d. dibbling;
    e. jab planting;
    f. laying, digging "basins;" and
    g. manual weed control.
- **CA in Tractor based Systems**
    h. tractor mounted sprayers; and
    i. tractor subsoilers, rippers and direct seeders.

9) Extension Approaches for CA

- Farmer field schools;
- Study circles;
- FFS and On-farm Experimentation;
- On-farm CA trial set-up;
- Data/ Information management; and
- Monitoring and Evaluation of CA programmes.

10) **Social economic aspects of CA**

11) **Field Visits**

- A look at what goes on below the soil surface;
- CA dissemination groups and adopters;
- CA for the environment; and
- CA Service providers.

12) **Guidelines on Preparation of Country Action Plans**

- Feasible CA option;
- Plans for implementation; and
- Way forward.

The training was opened by the Permanent Secretary of the new Ministry of Agriculture and Livestock (MoAL) (Dr. Austin Sichinga, himself conversant with CA practices). There were no international participants except the resource team comprising Saidi Mkomwa (Kenya), Richard Shetto (Tanzania), Edward Chuma and Bridget Mupeti (Zimbabwe). The 'all Zambia' participants came from different spectra – MoALs camp extension officers, agricultural supervisors, district/provincial/national subject matter specialists, under the UNDP supported Climate Change Adaptation Programme operating in Western, Southern, Eastern, North-western provinces. Some MoAL participants were supported by FAO from Lusaka province and from provincial and national headquarters. Dunavant Cotton also sent 4 regional coordinators.

A busy schedule it was for everyone - the learners, the facilitators and the organisers!

Figure 1. Field-based learning exposures at GART Chisamba

The learning process comprised CA lessons, case studies, exposures to large and small scale farmer experiences, research advances, religious touches to CA, academia exposes and down-to-earth hands on with CA equipment from hand-based to tractor-based systems. The CA manual for Extension workers was also part of the training package.

Figure 2. Exposure to Practising Farmers - (1) commercial, (2) medium-scale female-headed, (3) small-scale male-headed

A field visit into the Chisamba area included that to:

1) Pastures bank at GART comprising potential CA material;
2) Faidherbia albida trials of integration of trees and crops;
3) Soil Profiles at and near CFU Agro forestry Site;
4) Visit to a CA Commercial Farmer, Oakley Farm; and
5) CFU –supported CA Medium/Small Scale Farmers in Liteta area.

The whole training was aimed at 'sowing' a well-planted paradigm shift that must sprout, establish and mature!

Figure 3. Practical Demonstrations by CFU Staff, Chisamba

The concepts, practices and exposures were down-to-earth! Details of power point presentations were 'burnt' to a CD that was given to each participant.

Figure 4. Session Group Discussions (1) Eastern province (2) Dunavant Teams

Demonstrations and group discussions formed part of the training. Among them were a set of learning situations as presented below.

3.2 Situational Analysis & Coping Strategies

Table 2. Group Presentations of Situational Analysis

Group 1

Problems	Causes	Coping Strategy
1. Physical a) Geographical e.g. slope, rocks a) Land degradation	Occur naturally	Other non-traditional practices of CA
2. Environmental a) Flood and droughts b) High temperatures	Poor rainfall distribution Emission of greenhouse gases	-water harvesting -planting drought resistant crops -planting more tress -recycling waste
3. Socio-Economic a) Insufficient capital invest b) Inadequate extension service	-Lack of political will -Lack of access to loans -Limited extension staff -Lack of political will to employ more officers	-Farmers are working with cooperatives to access loans - Partnering with private sector e.g. Dunavant

Group 2

Problems	Causes	Coping Strategy
1. Lack of water for crop production	1. Inadequate rainfall	1. - CA methods - water harvesting techniques
2. Lack of farming land	3. Land degradation	2. Land reclamation techniques e.g. stone lining, vetiver grass, cover crops
3. Monocropping	3. Farmer attitude	3. Farmer study circles/field schools
4. Crop damage	4. Animal –human conflict	4. - Avoiding cultivating in animal corridors. - Use of appropriate means of scaring away animals.
5. Low human labour force	5. HIV/AIDS	4. Home based care.

Group 3

Problems	Causes	Coping Strategies
1. Soil Infertility	-Deforestation -Acidity -Môn cropping -Soil erosion -Conventional tillage	-Manuring -Crop rotation -Crop diversification -Agro forestry -Intercropping -Fertilization -Fallowing
2. Drought and Dry Spell	-Climate change	-CA - Irrigation -Drought tolerant crop variety
2. Floods	-Natural	- Early planting -Avoid areas prone to drought -Growing of crops tolerant to floods -Resettle flood refugees
4. Inadequate infrastructure	-poor economic planning -lack of political will	-changing government -Constituency Development Fund

5. Deforestation	-charcoal burning -inadequate energy sources -Inappropriate agricultural practices e.g. shifting cultivation	-Establishment of CBNRM -Promotion of alternative energy sources -Afforestation
6. Pest and Diseases	-Monoculture -Poor weeding -Use of one type of chemical	-Diversification -Good weed control -Chemical rotation

Group 4

Problems	**Causes**	**Coping Strategies**
1. Lack of water 2. Degraded soils 3. Lack of knowledge 4. Animal human conflict	-Less rainfall -Soil erosion -Inadequate training -Farmers encroaching game areas	-Water harvesting -Soil cover -Contours -Train farmers in CA -Good agricultural practices

3.3 Lessons Learnt

Group discussions also came up with issues requiring more consideration:

(i) Calibration of CA implements was important to achieve optimum results. e.g. sprayers, tillage implements, planters, correct dimensions for the basin and rip lines.

Table 3. CA Equipment in Different Systems

OPERATION	**MANUAL**	**ADP**	**TRACTORISED**
Land Preparation and Planting	-Hand hoe -Chaka hoe -Jab Planter -Dibble stick	-Ripper -Subsoiler -Ripper planter -Direct seeder	-Ripper -Chisel plough -Direct seeder
Fertilisation	Manual Banding	-Manual banding -Direct seeder	-M/C Application -Direct seeder
Weeding	-Manual hoe weeding -Chemical weeding -Zamwipe -Hand slashing	-Manual weeding -Boom sprayer -Weed control	-Manual weeding -Boom sprayer -Aerial sprayer
Harvesting	Manual	Manual	Combine

3.1 Hand Powered Equipment Developed in SADC

Equipment	**Use**	**Market Availability**	**Sources**	**Remarks**
Hand hoe	-planting -weeding	Yes	Diverse	Versatile
Jab planter	planting	Yes	Hastt	Not so popular in Zambia

Chaka hoe	Basin preparation	Yes	Zimbabwe	Imported into Zambia
Weed sprayer	-Weed control -chemical	Yes	Diverse	Widely used but costs prohibiting
Hand slasher	Cover management	Yes	Diverse	Labour demand
Zamwipe	Applying glyphosate	Yes	CFU-Zambia	Need care when applying

3.2 Animal Power Drawn Equipment

Equipment	**Use**	**Market Availability**	**Sources**	**Remarks**
Sub soiler	Breaking pan	Yes	Zimbabwe	Commercial Available
Contil knife ripper	Ripping	No	_____	Affordability
Zim ripper	Ripping	Yes	Zimbabwe	Affordable
Magoye ripper	Ripping	Yes	Magoye	Not readily available
No till seeder	Direct seeding	Yes	Brazil; CFU	Not easily available

(ii) CA is not just a science but requires other consideration of social and economic factors.

(iii) Weeds should be controlled throughout the year to reduce/eliminate seed bank.

(iv) Personalized forms of appreciating CA and what has to be done to achieve CA e.g. MOLES concept at Oakley Farm in Chisamba.

(v) Effective training and extension should be backed up by hands on experience. Participants were exposed to farmer field schools, study circles and household-based learning centres extension approaches to CA. These techniques lay emphasis on learning as an evolutionary process characterised by free and open communication and consultation. Details of each type of approach were outlined:

1) FFS as field-based school where scientists/SMS' work with the farmer through facilitation rather than lecturing. These are conducted for easy monitoring and to ensure that results are not compromised due to different soils, amount of rainfall, temperatures, soil pH, and landscape/slope. Therefore, treatments needed to be uniform so that in order to compare and evaluate the effectiveness of the practice (tillage).

2) Complementary Activities to FFS:

a) Study circle depending on location, 30 metres from FFS can be split into 2-3 smaller units for/of empowering knowledge/skills through lead farmer.
b) Household field learning sites –for observing realities.
c) Record keeping of practices inputs and observations in books must be emphasised.

(vi) For high CA adoptions /acceptance farmers should own the CA activities. CEOs and the like are just facilitators in this process.
(vii) CA trainings should not be events but processes. There must be a continuous sharing of lessons and experiences.
(viii) Apart from chemical soil fertility, there is physical and biological soil fertility that have to be considered which relate directly to the 3 principles of CA.

Group work on cover crops gave the following results:

Table 4. Common Cover Crops

	Group 1	Group 2	Group 3	Group 4
Cowpeas	*	*	*	*
Velvet beans	*	*	*	
Sun hemp	*	*	*	
Pigeon peas	*	*		
Tephrosia		*	*	
Groundnuts		*		*
Lablab		*		*
Green gram	*			
Sesame			*	
Pumpkin				*
Bambara nuts				*

Various reasons were given regarding the advantages and limiting factors of using different cover crops from the different groups:

Table 5: Types and Usage of Cover Crops

Group 1

Crop	Advantage	Disadvantage
Velvet bean	-High biomass -Complete soil cover	no other crop to intercrop
Cow peas	Edible	Attracts pests e.g. Aphids
Sun hemp	Releases nutrient quickly	Requires to plough back
Pigeon peas	-Edible -Nitrogen fixation	Pest

Green gram	-Edible -Nitrogen fixation	Pest

Group 2

Crop	Advantage	Limiting factor
Velvet beans	-Nitrogen fixing -Suppressing weed growth -Wide coverage and adds biomass/humus -Retention of moisture due to coverage	-If not properly/timely planted it can choke the main crop
Sun hemp	It grows fast therefore good weed suppression	-It can only be used on tall crops -It has moderate biomass
Cow pea	-It is edible -It is used for medicinal purposes	-Seed no easily available -It is considered to be a woman's crop
Pigeon pea	-It is deep rooted -It is perennial -It is edible -It is tolerant to droughts	-It is a slow grower -It takes up soil space
Tephrosia	-It is an organic pesticide -It adds nutrients to the soil	-It is poisonous

Reasons given for selection of some of these cover crops were that they were deep rooted (Tephrosia), formed good canopy (Sesbania sesban), good coverage (cowpea) or provided good biomass (velvet beans).

Group 3

Crop	Advantages	Limiting factors
Cow peas	-Fix nitrogen -Erosion control -Quick establishment -Used as food	-Susceptible to pests (aphids)
Velvet beans	-Gives good soil cover	Strangles main crop (choke)
Sun hemp	-Used as green manure -Fix nitrogen -Good in crop rotation -Extract nutrients from deep layers	-Competes with main crop -Not edible -Does not give complete soil cover
Sesame	-Human and animal: food/feed -Source of oil	
Tephrosia	-Pesticide -Nitrogen fixation -Deep rooted, capable of extracting nutrients from deep layers	-Poisonous to livestock

Other green materials that can be used include groundnuts, local beans, and Bambara nuts.
Rotation of cover crops not covered though crops concept /knowledge is present e.g. groundnuts, Bambara nuts, and velvet beans, are normally planted as cover crops.

Group 4

Cover crop	Advantages	Limiting Factors
Cow peas	-Source of food -Adds nutrients to soil -Grows fast	-Very prone to pest attack -Limited market
Lablab	-Nitrogen fixation -High biomass -Grows fast -Food for livestock	-May over shade the main crop -Not edible
Velvet beans	-High biomass -Grows faster than most cover crops -Feed for livestock -Nitrogen fixation	-Limited market -Toxic to human -Seeds not readily available
Pumpkin	-Food for humans -High biomass	-Biomass usually reduced through human consumption -Attracts pests especially in cotton
Groundnuts	-Food for humans -Nitrogen fixation -Feed for livestock	-Attracts pests e.g. rodents

Pumpkin was included though not leguminous because of its high biomass and as a food for humans. Groundnuts were also included because they form part of most farming systems and are a nutritious food for humans.

Dead material for soil cover such as saw dust, wood shavings, rice husks and coffee pulp had their own positives and negatives, and some views varied from group to group.

Material	Advantages	Disadvantages
Saw dust	-Good for mulching -Adds organic matter (nutrients)	-Takes too long to decompose -May be source of pests
Wood shavings	-Good for mulching -Gives organic matter (nutrients)	-Takes too long to decompose -Expensive to acquire
Rice husks/coffee pulp	-Good for mulching -adds nutrients when it decomposes	-Takes too long to decompose -Not readily available

(ix) Climate change is a cross cutting issue which should be considered in a holistic manner where issues of CA and agro forestry can be incorporated.

3.4 Challenges

- CA adoption is not increasing despite many options available.
- Documentation on adopters is not readily available.
- Livestock/crop integration in small scale farming communities due to communal grazing, as opposed to commercial farmers who have exclusive control of their land and animals.

Figure 5. Ripping and a Faidherbia albida nursery in Chisamba area

Figure 6. Available CA Implements

(1) Issues to be addressed

- How to treat virgin land (conventional (ploughing), CA (direct seeding, ripping).
- Gradual/stepwise adoption of CA principles is more effective than asking farmers to practice all the three principles at one time.
- How to network amongst ourselves (participants/ACT) from here.

(2) Recommendations

- All organizations dealing with agriculture activities must promote CA. The government FISP programme should not be an exception.
- ACT Zambia Office should be seen to coordinate CA activities in the country. They should state their role and promote a country network of all stakeholders involved in CA and document statistics.
- Legislation on communal grazing must be reinforced.

4.0 WAY FORWARD

4.1 Development of Action Plans

In addition each province and Dunavant came up with action plans given in Appendix 1 below. It is our great hope that these action plans are implemented, monitored and evaluated.

4.2 Course Evaluation

(Vertical scale = Scores; Horizontal Scale Level of Excellence, 1 = lowest, 5 = highest):

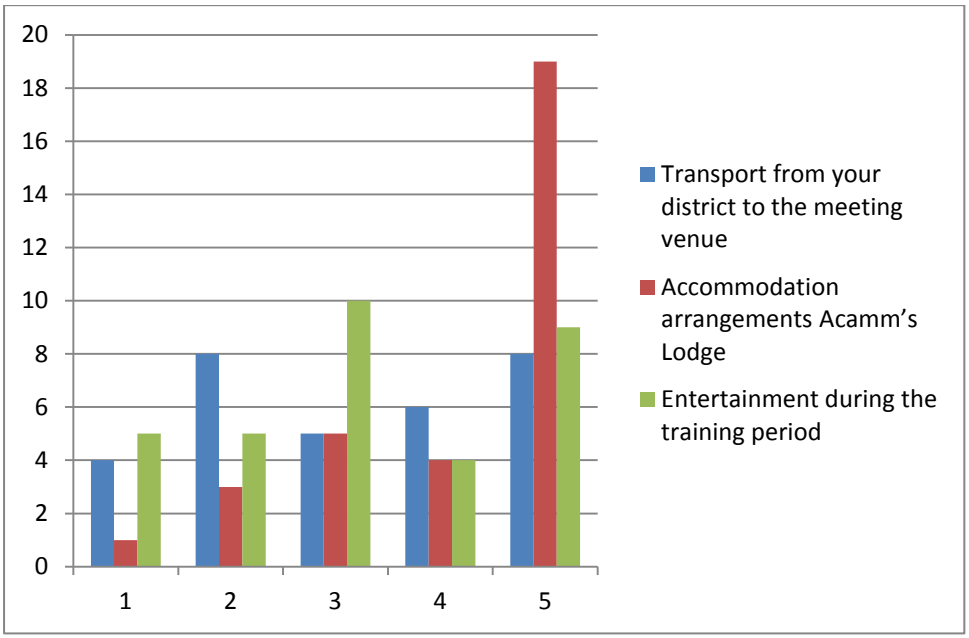

Figure 7. Course logistics

Most participants were happy with accommodation arrangements, giving it an excellent to above average. Entertainment was rated average to above average. Transport, a variable beyond ACT's reach, varied among the participants.

Figure 8. A Cruise on Lake Kariba and Stroll on Kariba Dam wall

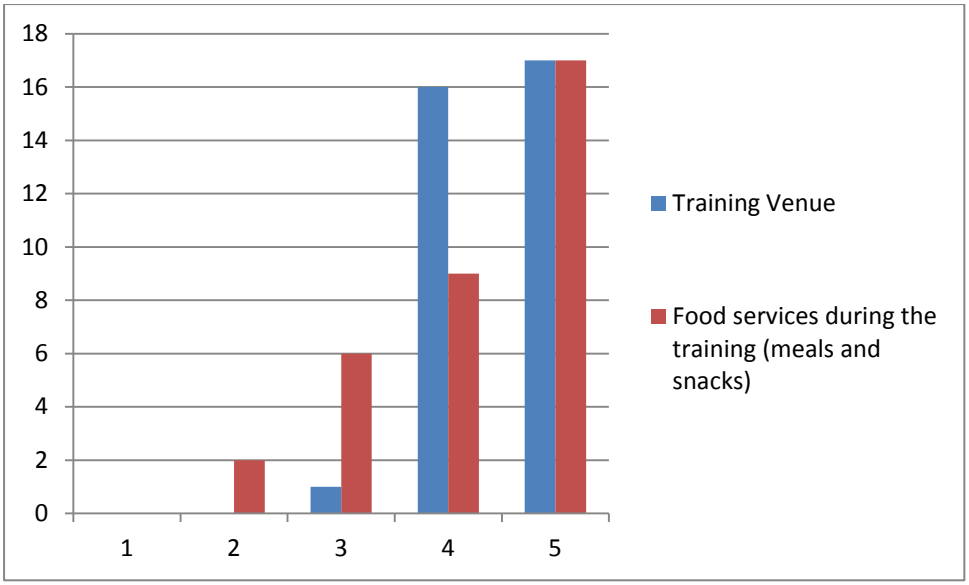

Figure 9. Course Facilities

Regarding course facilities, the venue and food services were highly rated. There were no major concerns.

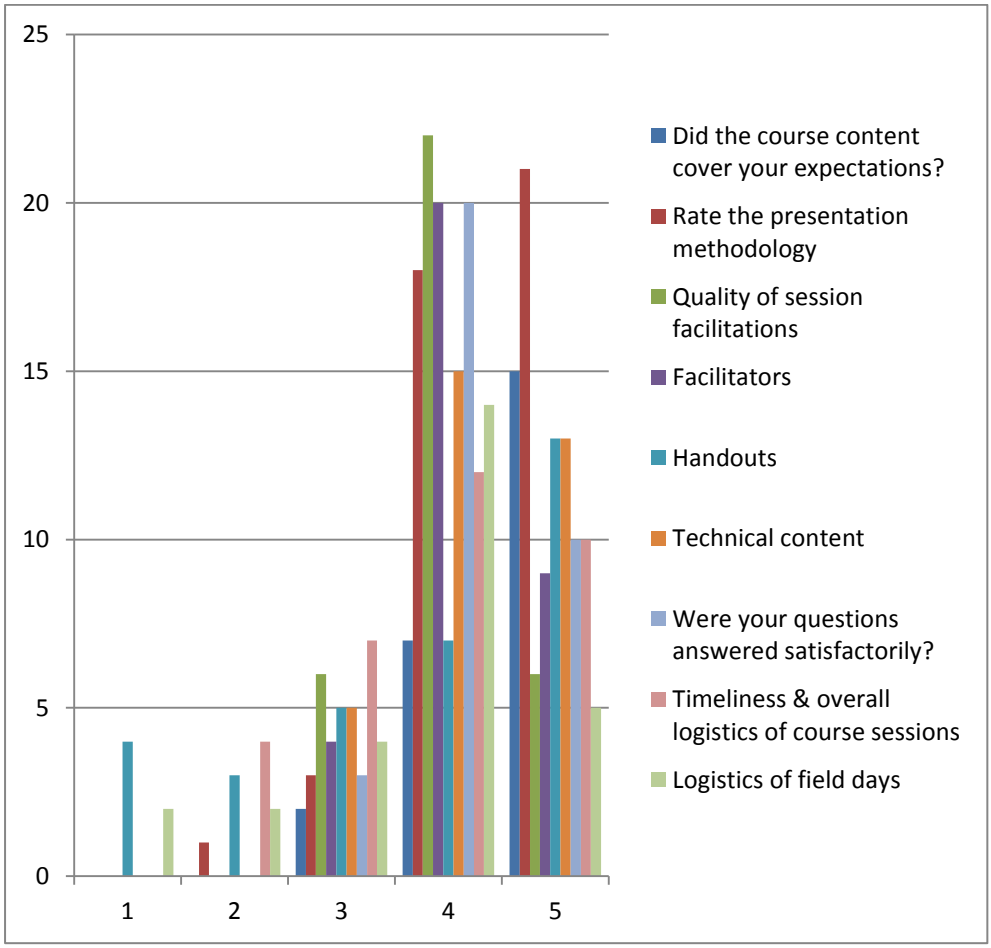

Figure 10. Course Content

Most of the course content was regarded good to excellent in terms of quality of session facilitators and presentation methodologies. Some participants felt they needed handouts though all of the materials covered were in the Conservation manual and the CD given to each one of the participants. There were a few timeliness concerns. Field days logistics were a major concern in terms of the transport hired. Most of the assessments skewed towards the more positive direction.

(3) Course Finances

A total of US$ 46,580.42 was spent to hold this workshop with most of the expenses towards accommodation and meals (90%). The costs of international travel and fees for resource persons are not included here.

Table 5. Local Budgetary Expenses

Budget Line	ZMK	US$ Equivalent	% of total budget
1) Accommodation and Meals	201,940,000	42,070.00	90.3
2) Fuel	2,256,000	470.00	1.0
3) Transport	3,870,000	806.25	1.7
4) Lunches Field trips	3,166,000	659.58	1.4
5) Media	3,100,000	645.83	1.4
6) Entertainment braii/Siavonga trip	4,650,000	968.75	2.1
7) Stationery/printing/photocopying	2,112,000	440.00	0.9
8) Other incidentals	2,496,000	520.00	1.1
Totals	**223,590,000**	**46,580.42**	

5. CONCLUSION

The course in Lusaka was meant to attract participants from other countries in the sub-region. None came for a number of reasons including cost. However, the Zambian participants who attended the training were a good balanced team except in terms of gender imbalance.

Besides a few logistical problems the course was highly rated and commended to others. Availability of a manual and some case studies increased the rating of the course. Involvement of a varied range of resource persons and especially of practising farmers enhanced understanding of CA principles and practices.

A challenge facing all that came is to realise action plans developed. It is hoped that sponsoring organisations will support and build up those trained to meet their action plan proposals. With some logistical support the action plans appear achievable.

APPENDIX 1: ACTION PLANS

(1) Eastern Province Action plan

i) Action Sheet 1: Feasible Options

AREA	FEASIBLE OPTIONS	JUSTIFICATION
Mambwe and Chama Districts	Making permanent basins	For water harvesting
Mambwe and Chama Districts	Permanent Soil Cover	-Improve soil organic mater -To conserve moisture
Mambwe and Chama Districts	Establishment of Agro forest nurseries/woodlots/alleys	-Improve organic matter -For fodder -Improve fertility
Mambwe and Chama Districts	Weeding using herbicides (weed control)	Farmers need training on herbicide use.
Mambwe and Chama Districts	Making CA Basins and Ripping	-To conserve moisture -To increase yield

ii) Action Sheet 2: CA Implementation

WHAT	WHERE	WHEN	WHO	WHY	HOW
Conducting demo on minimum tillage (basin and ripping)	Mambwe Chama	November	Farmer M F 15 15 Officers 1 CEO – 01 BEO - 01	To have farmers hands on and see	By having Farmer filed School Demo Plots
Conducting Farmer Training in weed control using herbicide	Mambwe Chama	November	Farmers M F 15 15	To disseminate technology on herbicides use	By having Farmer Filed School -Demo plots

			CEO; BEO		
Tree Nursery Establishment	Mambwe Chama	November	Farmers M F 15 15 COMACO UNDP	-To raise seedlings and Afro-forest -Soil fertility and fodder	By harvesting FFS -Individual farmers -Demo plots
Training on permanent soil cover (crop residues, cover crops)	Mambwe Chama	November	Farmers M F 15 15 CEO; BEO COMACO, UNDP	To improve soil structure and fertility and conserve moisture	-By having FFS -Demo plots -Individual Farmers
Monitoring and Implementation	Mambwe Chama	December -August	Farmers, CEO, BEO, TSB, SAO,	To ensure the implementation ...	Field visits
Conducting Field Days -herbicide use -cover crops	Mambwe Chama	February, March, April	CEO, BEO, SAO	Farmers to see the effectiveness of CA and Evaluate	Farmer Field School -Demos farmers field
Camp Management Meeting	Mambwe Chama	August	Camp committee CEO, BEO	To evaluate the programme	Meetings with CAC

iii) Eastern Province List of Technologies

a) Action Plan

-Construction planting basins and ripping
-Practicing permanent Soil Cover
-Practising Crop Rotation
-Planting or using Cover crops
-Weed Control using herbicides
-Establishment Agro –Forest

b) Justification

-Minimum soil disturbance
-Improve soil fertility and water holding capacity
-Reduce Labour costs

(2) Lusaka/North-Western Provinces

i) Action Sheet 1: Feasible Options

a) Lusaka Province

AREA	FEASIBLE CA OPTIONS	JUSTIFICATION
LUANGWA DISTRICT – Lunya Camp	Tillage systems ➢ Basins ➢ Ripping	➢ Chaka hoes and Rippers are affordable to Farmers. ➢ Availability of Oxen
"	Fertilizer Application ➢ Hand application	➢ Availability of labour (family & hired)
"	Planting ➢ Hand planting ➢ Direct planter/seeder	➢ Availability of labour (family & hired) ➢ Availability of labour (family & hired)
"	Weeding ➢ Hand weeding ➢ Use of herbicides	➢ Availability of labour (family & hired) ➢ Farmers have knowledge of using Knapsack Sprayer
LUANGWA DISTRICT – Lunya Camp	Cover crops ➢ Dolichos lablab ➢ Velvet beans ➢ Red sunnhemp ➢ Cowpeas	➢ Farmers have experience and knowledge of using Cover crops.

"	Agro – forestry ➢ Sesbania sesban ➢ Pigeon peas ➢ Musangu trees ➢ Musekese tree	➢ For live fencing and folder banks ➢ For the improvement of soil fertility
"	Harvesting ➢ Hand harvesting ➢ Residue management	➢ Non availability of CA implements ➢ Leaving crop residues as soil cover to protect soil and improve soil organic matter.
LUANGWA DISTRICT – Lunya Camp	Crop rotation ➢ Groundnuts ➢ Soya beans ➢ Tephrosia ➢ Cowpeas	➢ Breaking pests and disease life cycle ➢ Legumes-cereal crop for soil fertility maintenance
CHONGWE DISTRICT – Shelleni Camp	Tillage aspects ➢ Basins ➢ Ripping	➢ Affordable Chaka hoes and Rippers. ➢ Availability of Oxen
"	Liming and Basal Fertilizer Application ➢ Hand application	➢ Availability of labour (family & hired)
"	Planting ➢ Hand planting ➢ Direct planter/seeder	➢ Availability of labour (family & hired) ➢ Availability of labour (family & hired)
"	Weeding ➢ Hand hoe weeding ➢ Use of herbicides	➢ Availability of labour (family & hired) ➢ Farmers have knowledge in the use of Knapsack Sprayer
CHONGWE DISTRICT – Shelleni Camp	Fertilizer Application Top dressing ➢ Hand application	➢ Availability of labour (family & hired)

	Green manure crops ➢ Red sunnhemp ➢ Velvet beans ➢ Cowpeas	➢ Farmers have experience and knowledge of using Cover crops.
"	Agro – forestry ➢ Sesbania sesban ➢ Tephrosia ➢ Gliricidia ➢ Musangu	➢ For live fencing and folder banks ➢ For the improvement of soil fertility
"	Harvesting ➢ Hand harvesting	➢ Family labour available and hire if possible
CHONGWE DISTRICT – Shelleni Camp	Crop rotation ➢ Cereal – maize ➢ Legume - groundnuts ➢ Cash crop - cotton	➢ Breaking pests and disease life cycle ➢ Legumes-cereal crop for soil fertility maintenance
	Crop residue management ➢ Min grazing ➢ Avoid burning ➢ Sensitization of ownership	➢ For soil fertility management ➢ Addition of organic matter to the soil

c)

b) North-Western Province

SOLWEZI DISTRICT + Solwezi central Camp	Tillage aspects ➢ Basins ➢ Ripping	➢ Affordable Chaka hoes and Rippers. ➢ Availability of Oxen
+ East and West Camps	Liming and Basal Fertilizer Application ➢ Hand application	➢ Availability of labour (family & hired)

"	Planting ➢ Hand planting ➢ Direct planter/seeder	➢ Availability of labour (family & hired) ➢ Availability of labour (family & hired)
"	Weeding ➢ Hand hoe weeding ➢ Use of herbicides	➢ Availability of labour (family & hired) ➢ Farmers have knowledge in the use of Knapsack Sprayer
SOLWEZI DISTRICT – Solwezi central Camp	Fertilizer Application Top dressing ➢ Hand application	➢ Availability of labour (family & hired)
+ East and West Camps	Green manure crops ➢ Red sunnhemp ➢ Velvet beans ➢ Cowpeas	➢ Farmers have experience and knowledge of using Cover crops.
"	Agro – forestry ➢ Sesbania sesban ➢ Tephrosia ➢ Gliricidia ➢ Musangu	➢ For live fencing and folder banks ➢ For the improvement of soil fertility
"	Harvesting ➢ Hand harvesting	➢ Family labour available and hire if possible
SOLWEZI DISTRICT – Solwezi central Camp	Crop rotation ➢ Cereal – maize ➢ Legume - groundnuts ➢ Cash crop - cotton	➢ Breaking pests and disease life cycle ➢ Legumes-cereal crop for soil fertility maintenance
+ East and West Camps	Crop residue management ➢ Min grazing ➢ Avoid burning ➢ Sensitization of ownership	➢ For soil fertility management ➢ Addition of organic matter to the soil

ii) Action Sheet 2: CA Implementation

a) Lusaka Province

No.	What	Where	Target	When	Who	How
1	Demo on land prep	Zalapango area-Lunya camp	20	April-June	Farmer/MoAL	FFS and trials
2	Basal application & planting	"	20	Nov-Dec	Farmer	FFS and trials
3	1st weeding and spraying	"	20	Dec-Jan	Farmer/MoAL	Conducting trainings
4	2nd weeding	"	20	Feb	"	Conducting trainings
5	Harvesting	"	20	Apr-May	"	Farmer
6	Agro forestry	"	20	Nov-Dec	"	Through demos and FFS
7	Crop rotation	"	20	Nov-Dec	"	"
1	Demo on land prep	Shelleni camp	20	April-June	Farmer/MoAL	FFS and trials
2	Training in liming and basal	"	20	Sept-Oct	CEO/BEO/DSMS	FFS and trials
3	Basal application & planting	"	20	Nov-Dec	CEO/BEO	Training
4	1st weeding and spraying	"	20	Nov	CEO/BEO/DSMS	Training
5	2nd weeding	"	20	Dec	Farmer	Training
6	Fertiliser – top dressing training	"	20	Dec	CEO/BEO/DSMS	Training

7	Demo on planting and cover crops	Shelleni camp	20	Dec	"	Through FFS and trials
8	Harvesting	"	20	Apr-May	Farmer	
9	Agro forestry	"	20	Nov-Dec	"	Through FFS and trials
10	Crop rotation	"	20	Nov-Dec	"	"
11	Supervision Monitoring and backstopping of CA activities	"	20	Throughout implementation process	CEO/BEO/DSMS	Through District and Provincial Staff

b) North-Western Province

1	Demo on land prep	Solwezi, central, east & west	20	April-June	Farmer/MAL	FFS and trials
2	Training in liming and basal	"	20	Sept-Oct	CEO/BEO/DSMS	FFS and trials
3	Basal application & planting	"	20	Nov-Dec	CEO/BEO	Training
4	1st weeding and spraying	"	20	Nov	CEO/BEO/DSMS	Training
5	2nd weeding	"	20	Dec	Farmer	Training
6	Fertiliser – top dressing training	"	20	Dec	CEO/BEO/DSMS	Training
7	Demo on planting and cover crops	Solwezi central, east & west	20	Dec	"	Through FFS and trials
8	Harvesting	"	20	Apr-May	Farmer	

9	Agro forestry	"	20	Nov-Dec	"	Through FFS and trials
10	Crop rotation	"	20	Nov-Dec	"	"
11	Monitoring and backstopping of CA activities	"	20	Throughout	CEO/BEO/DSMS	Through District and Provincial Staff

(3) Southern Province

i) Action Sheet 1: Feasible Options

AREA	FEASIBLE OPTION	JUSTIFICATION
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Basins	❖ Maximise Water Harvesting, ❖ Minimum Soil Disturbance
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Ripping	❖ Maximise Water, Harvesting, ❖ Minimum Soil Disturbance
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Green manure	❖ Enhance Soil Fertility, ❖ Increased Biomass.
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp	Agro forestry	❑ Soil Fertility, ❑ Soil Cover, ❑ Afforestation, ❑ Livestock Feed,

v. Sikaunzwe Camp vi. Mambova Camp		
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp Mambova Camp	Crop Rotation	❑ Pest And Disease Mgt, ❑ Soil Fertility, ❑ Weed Control
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Soil Erosion Control	❑ Maintain Soil Fertility, ❑ Improves Water Infiltration
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Livestock Integration	❑ To Maintain Soil Cover, ❑ Reduce Burning,
i. Kayuni Camp ii. Simaamba Camp iii. Singani Camp iv. Mbabala Camp v. Sikaunzwe Camp vi. Mambova Camp	Use Of Herbicides	❑ Reduce Diseases And Pests, ❑ Reduce Nutrients Competition, ❑ Increase Productivity

ii) Action Sheet 2: CA Implementation

SN	WHAT	WHERE	TARGET	WHEN	WHO	WHY	HOW
1	Basin Making	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Apr 2012 – Aug 2012	Extension Officers, Stakeholders	Maximise Water Harvesting, Minimum Soil Disturbance	Sensitisation Meetings , Trainings With Lead Farmers
2	Ripping	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Apr 2012 – Aug 2012	Extension Officers, Stakeholders	Maximise Water Harvesting, Minimum Soil Disturbance	Sensitisation Meetings, Trainings With Lead Farmers
	Promotion of Green Manure. (Velvet Beans, Sunnhemp, Lab Lab)	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Nov 2011 – Mar 2012	Extension Staff And Stakeholders	Enhance Soil Fertility, Increased Biomass. Weed Control	Trainings , Sensitisation Meetings
4	Promotion Of Agro forestry in Farming Systems (Musangu, Moringa, Neem)	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Nov 2011 – Dec 2012	Extension Staff And Stakeholders	Improving Soil Fertility, Soil Cover, Soil Aeration Fodder, Medicinal source Of Alternative Energy	Lobbying, Sensitization And Training Meetings
5	Crop Rotation (Legumes like Cowpeas, Cereals Like Maize, Sorghum and Cash Crop like Cotton	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Nov 2011 – Nov 2012	Extension Officers, Stakeholders	Enhancing Soil Fertility, Disease, Pest And Weed Control	Sensitization Of Farmers On Rotation Options,
6	Use Of Herbicides	Siavonga, Choma, Kazungula Districts	2 Camps Per District 32 Farmers Per District	Dec 2011 – Mar 2012	Extension Officers, Stakeholders	Timely Control Of Weeds, Improve Yields	Sensitization Meetings, Demonstrations,

d) Western Province

i) Action Sheet 1: Feasible Options

No	AREA		FEASIBLE OPTIONS	JUSTIFICATION
	District	Camps		
1	Shangombo	Sioma, Nangweshi	Intercropping maize with legumes (velvet beans, cow peas and groundnuts) –using ripping and basins	Low fertility, high organic oxidation and weeds undermine crop production. Intercropping maize with legumes will improve soil fertility, minimizes soil disturbance, control weeds and increase organic matter in the soil
	Senanga	Kataba		
	Kaoma	Mayukwayukwa		
	Mongu	Mongu		
2	Shangombo	Sioma, Nangweshi	Agro forestry – Musangu tree seedlings and demonstration	Some farmers resist the use of inorganic fertilizer despite low soil fertility status
	Senanga	Kataba		
	Kaoma	Mayukwayukwa		
	Mongu	Mongu		
3	Shangombo	Sioma, Nangweshi	Tillage practices (Ripping and Basins)	Conventional tillage destroys organic matter and soil erosion both of which undermine soil fertility.
	Senanga	Kataba		
	Kaoma	Mayukwayukwa		
	Mongu	Mongu		
4	Shangombo	Sioma	Crop rotation (maize with groundnuts)	Soil fertility management
5	Shangombo	Sioma & Nangweshi	Demonstration on Herbicides use	Minimize labour constraints in weeding

ii) Action Sheet 2: CA Implementation

	WHAT	WHERE	WHEN	WHO	WHY	HOW
1	Intercropping Cereals with Legumes	Sioma, Nangweshi, Kataba, Mayukwayukwa	2011/2012 season	CEO, SAO, SMS	Improve soil fertility, weed control, Minimise soil disturbance	Soil cover, Nitrogen fixation
2	Agro forestry – Raising Musangu tree seedlings	Sioma, Nangweshi, Kataba, Mayukwayukwa	2011 -2012	CEO, SAO, SMS,	Low use of inorganic fertilizers despite diminishing soil fertility	Soil fertility improvements
3	Agro forestry demonstration with Musangu tree	Nangweshi	2011 – 2013	CEO, SAO, SMS	To promote sustainable soil fertility management practices	On-station demonstration
4	Crop Rotation(Maize & Groundnuts)	Sioma	2011/2012 season	CEO, SMS, SAO	Soil fertility management	On-farm demonstration
5	Conduct On-farm Weed control demonstration with Herbicides	Sioma	2011/2012 season	CEO, SMS, SAO	Minimize labour constraints in weeding	On-farm demonstration
		Kataba	2011/2012 season	CEO, SMS, SAO	Minimize labour constraints in weeding	On-farm demonstration
6	Training of Lead farmers/farmers in Conservation Tillage	Kataba, Sioma, Nangweshi	April 2012	CEO, SMS, SAO	To enhance CA technology transfer	Demonstrations

e) Dunavant (Dikoka Ching'ambu, David Chandalala, Jonathan Zimuto)

i) Action Sheet 1: Feasible Options

	AREA	FEASIBLE OPTIONS	JUSTIFICATION

1	Katete	Ox- Drawn Ripping, Hand Hoe, Tractor Drawn Ripping, soil cover	Dunavant has embarked on a loan scheme of giving out tractors and oxen together with rippers for the purpose of CA. - Tractors 3 - Pairs of Oxen 5 - Ox Drawn Rippers 300
2	Lusaka	Direct seeding, Ox- Drawn Ripping, Hand Hoe, Tractor Drawn Ripping, Cover crops	- Tractors 5 - Pairs of Oxen 8 - Ox Drawn Rippers 200
3	Monze	Ox- Drawn Ripping, Tractor Drawn Ripping, Hand Hoe, Cover crops	- Tractors 3 - Pairs of Oxen 6 - Ox Drawn Rippers 200

ii) Action Sheet 2: CA Implementation

	WHAT	WHERE	WHEN	WHO	WHY	HOW
1	Ox and Tractor Drawn Rippers(Tillage Service Provision) Land preparation, Reduce labour, Breaking Hard pan	- Farmer ➢ Muchenje ➢ Chongwe ➢ Katete ➢ Chadiza ➢ Magoye ➢ Monze	➢ 2011/2012 season (November) ➢ 2012/2013 season (May to November)	▪ Extension Staffs ▪ Tillage Service Providers	✓ Degraded soils ✓ Erratic Rainfall ✓ Soil Erosion ✓ Reduce labour costs ✓ Low productivity. ✓ Break plough pan. ✓ Water Harvesting	❖ Training Extension staff and Service Providers. ❖ Come up with a reporting/ monitoring tools. ❖ Give Areas of operation/ Targets.
2	Soil Cover(Cover crops and crop residue e.g. Cowpeas and Maize stocks, Cotton stocks). Aid in weed control, increase organic matter, maintains soil moisture and improves soil life.	All Dunavant operational areas	➢ 2011/2012 season. (November to April) ➢ 2012/2013 season	▪ Extension staffs (Demo plots). ▪ YCD/YGL	❖ Enhance soil fertility (MOLES) ❖ Prevent erosion	Conduct training with. ➢ 20 Extension Staffs. ➢ 2540 YCD/YGLs on the benefits of maintaining a soil cover Under CA.

APPENDIX 2: OFFICIAL OPENING OF THE INTERNATIONAL CONSERVATION AGRICULTURE TRAINING COURSE

Speech by Dr. Austin Sichinga, Permanent Secretary, Ministry of Agriculture and Livestock,

Lusaka, Zambia, 25th October 2011

Resource persons, Participants from Kenya, Zimbabwe, Tanzania and Zambia,

Ladies and Gentlemen,

It is a great honour for me to be with you on this day and moment to mark the official opening of the International Conservation Agriculture (CA) Training course for Southern Africa participants, which is being conducted by the African Conservation Tillage Network (ACT) in conjunction with FAO.

Low agricultural productivity, food and nutrition insecurity, negative effects of climate change, and a degrading agricultural resource base are major challenges affecting our sub-region and Africa in general. The low productivity of our agricultural resource base is largely a result of degraded soil resources that are caused by application of unsustainable farming and natural resources management practices by the majority of agricultural land users. This is compounded by the negative impacts of climate change resulting in increased atmospheric greenhouse gas emissions, and changes to 'normal' weather patterns. This general decline in land productivity has resulted in reduced production per unit area due to un-replenished and exhausted soil resources.

Ladies and gentlemen, this status of our land cannot be allowed to continue, of allowing more and more of our valuable land to waste away. Our agricultural land users need to change their agricultural practices, this by adopting practices that are more sustainable, increase productivity, more economic, and environmentally friendly.

Conservation Agriculture can be a tool achieving all of this, if done correctly. It has been proven on research stations and farmers' fields that, in combination with other good agronomic practices, CA, through its three basic principles of minimum mechanical soil disturbance, maintenance of soil cover, and crop rotations, increases productivity whilst reducing tillage and input cost, soil degradation, and soil carbon emissions into the atmosphere. Because CA promotes in situ water harvesting and soil moisture conservation, its role in our mostly drought-prone environment as predicted by experts cannot be underestimated.

Dear participants, our major challenge amongst our various agricultural land users is converting their mindset from conventional agricultural practices to CA, as they require new knowledge and skills to effectively implement and manage CA systems. Most importantly, this huge mind shift is required not only by farmers, but all of us. It is almost impossible for one to convince farmers to convert to CA when we ourselves are not convinced.

Research, training and extension support as well as private sector participation are therefore pivotal to successful CA implementation and adoption by farmers. Inadequately or poorly trained extension

agents pose a risk to CA uptake by farmers as these people will fail to clearly articulate the case for CA and to impart the necessary knowledge and skills to the farmers. Similarly, availability of appropriate and affordable CA equipment and machinery are required to increase the hectarage, production and participation under CA.

Because CA is a knowledge intensive technology, training courses/events that combine both theoretical and practical sessions are required over a number of seasons to foster confidence among extension agents and farmers. These events also require presence of business houses to ensure availability of machinery and equipment, inputs and agro-chemicals, and business strategies.

While short term courses like the one you will receive over the coming week are important, the long term solution lies in having CA being taught in all relevant institutions that produce extension agents, and of course combine this with follow up courses while on the job.

The challenge will be to see piloting the integration of CA into the curricula of agricultural training colleges with assistance from cooperating partners, a move that is expected to strengthen CA expertise and adoption.

Despite the human and other resources challenges in most countries, FAO recognizes the current efforts by Governments, Intergovernmental Institutions, NGOs, Donors, International Research Organizations, Academic Institutions and other players to up-scale CA in the region. The organization is proud to be part and actively being involved in these initiatives and encourages all relevant stakeholders to place their efforts on this endeavour and help to bring CA to its rightful position in agricultural productivity and natural resources management in the region.

I sincerely thank you all for taking part in this regional event and wish all partners and trainees here today a lot of success. I am confident that you will greatly benefit from the African Conservation Tillage Network's continent-wide experiences on CA. I urge you to go and play your part in the development or strengthening of CA training programmes to improve their effectiveness in your respective countries.

It is therefore my honour to declare this FAO supported "International Conservation Agriculture Training Course" officially open.

I thank you all.

Appendix 3: LIST OF PARTICIPANTS

CA Learning Course, Lusaka, Zambia, 26 October - 4 November 2011

No	FIRST NAME	MIDDLE NAME	SURNAME	GENDER	DESIGNATION	ORGANISATION	POSTAL ADDRESS	COUNTRY	EMAIL ADDRESS	PHONE
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Appendix 4: Training Programme – Lusaka Course

Ministry of Agriculture & Livestock

AFRICAN CONSERVATION TILLAGE NETWORK

INTERNATIONAL CONSERVATION AGRICULTURE COURSE PROGRAMME
ACAMM's Lodge- Lusaka, Zambia; 25th October -3rd November 2011

Date - Time	**08:00-08:30**	**08:30-10:30**	**10:30-11:00**	**11:00-13:00**	**13:00 - 14:00**	**14:00-15:30**	**15:30 - 15:45**	**15:45-17:30**
24th and 25th October	***Arrival of Participants and RegIstratIon***							
26th October (Wednesday)	Participants Registration	**Setting the scene [RK]** Introductions; logistics; participants' expectations; course objectives and workshop processes Official opening: 10.00 am **[Minister for Agriculture and Livestock]**	**B**	**Situation analysis - Regional Experiences with CA by Participants [RK]** *Country group exercises*		**Situation analysis: + coping strategies [RK]** *Plenary presentations by country groups*	**B**	**What is CA and why CA?** Background, historical perspectives, rationale, benefits, challenges **[SM]** *Plenary presentations & discussions*

Date - Time	08:00-08:30	08:30-10:30	10:30-11:00	11:00-13:00	13:00 - 14:00	14:00-15:30	15:30 - 15:45	15:45-17:30
27th October (Thursday)	Committee reports	**CA Concepts and principles I: Soil cover [SM]** *Plenary presentations and discussions*	**R**	**CA Concepts and principles II:** Minimum Mechanical Soil Disturbance **[SM]** Manual, animal traction and tractor based systems *Plenary presentations, discussions*	**L**	**CA Concepts and principles III: Crop rotations and Associations [RK]** *Plenary presentations, discussions*	**R**	**Practical Demonstration of erosion processes and infiltration [EC]** Run-off trays, links to livelihoods *Field based practical Exercises*
28th October (Friday)	Committee reports	**Weed, pest & disease management and control in CA systems [AM]** timeliness; manual and chemical options; strategic control *Plenary presentations, discussions*	**A**	**Practical session on weed control [AM]** Calibration of sprayers *Practical exercises*	**N**	**Pesticide safety Awareness in CA production systems[SL]** *Plenary presentations, discussions* **Conservation Agriculture Equipment [AC]** CA equipment for hand, oxen and tractor based systems, calibration	**A**	**Free Afternoon**
29th October (Saturday)	Field practicals preparation	**Field Practicals: CA in animal traction systems [AC, SM, Grownet]** • harnessing work animals • ripping/sub soiling /direct seeding • showcase of CA equipment *Guided exposure to CA equipment, hands-on use and adjustments*	**E**	**Field practical: CA techniques in manual systems [AC, Grownet]** • dibbling • jab planting *Field Practical Exercises*	**U**	**Field practical: CA techniques in manual systems [AC, CFU]** • laying, digging "basins" • manual weed control *Field based Practical Exercises*	**E**	**Field practicals: CA in Tractor based Systems [AC]** • tractor mounted sprayers • tractor subsoilers, rippers and direct seeders *Field based Practical Exercises*
30th October (Sunday)	***Free day, organised group excursions (National park, Victoria waterfalls or home visit to CA farmers near Lusaka)***							

Date - Time	08:00-08:30	08:30-10:30	10:30-11:00	11:00-13:00	13:00 - 14:00	14:00-15:30	15:30 - 15:45	15:45-17:30
31st October (Monday)	Committee reports	**Extension Approaches for CA [MS]** Farmer field schools; Study circles **The FFS and On-farm Experimentation [MS]:** Group work and presentations		**On-farm CA trial set-up [RSH]** Data/ Information management **Optional demanded topics [HM]**	**H**	**Monitoring and Evaluation of CA programmes [PH]**		**Social economic aspects of CA [PH]** **Field Visit Preparations [CFU, HM]:** Approaches; Questions; Logistics
1st November (Tuesday)	Committee reports	**FIELD VISIT** A look at what goes on below the soil surface **[EP]**		**FIELD VISIT** CA dissemination groups and adopters **[CN, HM]**		**FIELD VISIT** CA dissemination groups and adopters **[CN, HM]**		**FIELD VISIT** CA for the environment; CA Service providers **[CN, HM]**
2nd November (Wednesday)	Committee reports	**Field Visit Presentations by Groups [MS]** **Soil Health [EP]** • Soil characteristics, properties • Erosion and water infiltration *Plenary presentations and discussions*	**K**	**Managing Soil fertility in CA systems [GS]** Soil fertility recovery options *Plenary, discussions, exercises*	**C**	**Crop-livestock integration in conservation agriculture [HM, SS]** *Plenary, discussions, exercises*	**K**	**CA and Agro forestry [RS]** **CA and Climate Change [RS]** **Guidelines on Preparation of Country Action Plans [HM]** *Plenary, discussions, exercises*
3rd November (Thursday)	Committee reports	**Action planning [SM]** • Feasible CA options • Plans for implementation *Exercises visualized on flip charts*		**Action planning [HM]** Feasible CA options and Way Forward	**H**	**Course evaluation [HM]** ***End of course* [FAO Guest]**		
4th November (Friday)	***D e p a r t u r e o f p a r t i c i p a n t s***							

Resource persons list

No.	Name	Initials	Dates When Resource Persons are Available							
			Wednesday 26th October	Thursday 27th October	Friday 28th October	Saturday 29th October	Monday 31st October	Tuesday 1st November	Wednesday 2nd November	Thursday 3rd November
1.	Edward Chuma	EC		◙	◙					
2.	Arthur Chomba	AC			◙	◙				
3.	Reynolds Shula	RS							◙	◙
4.	Godfrey Sakala	GS							◙	
5	Collins Nkatiko [CFU]	CN				◙				
6.	Herbert Mwanza	HM	◙	◙	◙	◙	◙	◙	◙	◙
7.	Petan Hamazakaza	PH					◙			
8.	Elijah Phiri	EP						◙	◙	
9.	Saidi Mkomwa	SM	◙	◙	◙	◙	◙	◙	◙	◙
10.	Sebastian Scott	SS							◙	
11.	Rasford Kalamatila	RK	◙	◙		◙				
12.	Adolph Musonda	AM			◙					
13.	Grownet (L Mataba)	GI				◙				
14.	Richard Shetto	RSH					◙			
15.	Sina Luchen	SL			◙					
16.	Martin Sishekanu	MS					◙		◙	
DAYS' FACILITATOR			R. Kalamatila	E. Chuma	E. Chuma	S. Mkomwa	R. Shetto	M. Sishekanu	R. Kalamatila	H. Mwanza