



FAO EMERGENCY OPERATIONS AND REHABILITATION DIVISION
UN REGIONAL INTER-AGENCY COORDINATION AND SUPPORT OFFICE (RIACSO)

Workshop on Conservation Agriculture in Southern Africa

Harrison's Conference Centre, cnr 12th Avenue
and Wessels Street, Rivonia, Johannesburg

April 2nd and 3rd, 2007.

Monday, April 2nd 2007

08.00-08.30: Registration of Participants

08.30-09.00: Introductions and Expectations of
Participants. Fred Kalibwani, Facilitator.

Participants were drawn from at least 10 countries in southern Africa and various research agencies involved in agricultural research. These included Government agencies such as SA Department of Agriculture, the Mozambican Ministry of Agriculture, research agencies such as the South Africa Agricultural Research Council (ARC). The universities of Lesotho, Zambia and Zimbabwe were also represented. Several NGOs, including CARE, World Vision and the private sector involved in the production and sale of CA equipment were also represented. FAO was represented by participants drawn from regional offices in Zimbabwe, South Africa and from its headquarters in Rome. See Attached Participant's List.

09.00: Official Opening by the FAO Representative to
South Africa, Mr George Mburathi.

The FAO country representative Mr. George Mburathi in his opening remarks noted tremendous food insecurity challenges in the region that could be directly linked to continued use of bad agricultural practices that led to environmental degradation.

This has occurred in the face of increasing population sizes and declining GNP per capita. The latter is partly attributable to low investment in Agriculture on the continent.

- CA holds great potential in contributing to reduction in acute and chronic food insecurity in the sub region stemming from its observed result in higher yields.
- However it needs to be implemented in an integrated way for it to result in sustainable and profitable agriculture and improved livelihoods,

Its three main principles that must be practiced are;

- Minimal soil disturbance;
- Permanent soil cover and
- Crop rotations

CA has been proven to work in diverse agro-ecological zones

- It has been introduced in many southern African countries including South Africa, Zimbabwe, Zambia, Lesotho, Swaziland, Mozambique and Namibia over the past twenty years.
- Its benefits include improved soil conditions, better water holding capacity of soils and more sustainable and economical production environment.
- The methods used in conservation agriculture include the use of jab-planters, specialized hand hoes, ox-drawn rippers, ox-drawn planters and large, tractor drawn planters.

Mr. Mburathi reminded participants of the objectives and the expected outcomes of the workshop.

The overall objective of the workshop was to begin the process of developing an agreed plan of action to expand appropriate systems of CA through all countries in southern Africa, with the intention of improving agricultural production in a sustainable and economical manner.

The specific objectives were to:

1. Review the progress made on implementing the various forms of CA in each country;
2. discuss and recommend improvements in the implementation of CA in each country;
3. identify promising initiatives on CA and success stories for further analysis, taking issues of cost-effectiveness, sustainability, scaling up and replication into account;
4. begin the process of compiling a medium-to long term plan to expand CA throughout southern Africa.

Towards the end of the workshop, the expected output included;

1. an update of the current levels of progress on CA in each country and the success factors required, including the best equipment for hand implementation, ox-drawn and tractor drawn equipment. To this end a CD containing reports on CA from all participating countries is to be provided to all participants.
2. developing of a regional plan of action to expand CA in the most efficient manner, taking into account the best and most appropriate techniques for each country.
3. documenting an emerging catalogue of success stories in the implementation of CA, including how best to obtain official government support for it.
4. take first steps in preparation of a medium to long-term plan to expand CA throughout southern Africa.
5. review training achievements and more pro-active and appropriate and effective training systems will be planned, bearing in mind the capabilities and financial status of farmers in southern Africa.

It is also crucial to recommend ways and means, of ensuring the practitioners on the ground, the farmers, are aware of CA, its benefits and that they take it up.

09.15: What do we mean by Conservation
Agriculture? Definition of Terminology for the
Workshop - John Ashburner, FAO Consultant.

The FAO consultant John Ashburner provided the point of departure for the workshop by providing some definition of terminology in CA. He pointed out the need for presenters to indicate what they meant when they used these terminologies to avoid ambiguities.

The terminology included;

- Sustainable Land Management (SLM),
- Conservation Farming (CF), and
- Conservation Agriculture (CA).

There was also the need to recall that organic agriculture could be used in tandem with CA and vice versa.

In CA any of the three principles could be used as an entry point to its practice.

09.30: Conservation Agriculture from the ACT
Perspective (African Conservation Tillage
Network), its effect on vulnerable households
and on large, medium and small farmers.
Martin Bwalya, ACT, Zimbabwe.

Martin Bwalya of ACT ZIM looked at CA from the ACT perspective, its effect on vulnerable households and on large, medium and small scale farmers.

While noting that farming in the region is largely and characteristically subsistence driven, he highlighted the need to cast the net wider, so to speak, in promoting CA beyond just what termed “sustaining” poverty to a broader objective of a growth agenda

- The farm and farming characteristics that made implementation of CA a compelling necessity include the region’s largely subsistence farming practices, usually on small plots that are often fragmented, wide use of maize monoculture, and low external inputs. These have led to declining yields per hectare
- Hence these issues call for response using CA which can reach large parts of land, households, and address livelihoods.
- The principles of CA lead to sustainable productivity, improved water harvesting and retention, and net accumulation of soil organic matter as well as improved nutrient recycling.

Practices in the region that are being used in the transition phase for the adoption of CA were

1. Burning of crop residue (value of soil cover acknowledged)
 2. Reduce extraction of crop residue
 3. Managed livestock grazing and production system
- CA allowed farmers to do more including, soil cover and OM replenishment, rotations which lead to pest and disease control, diversification, security,
 - Some positive benefits noted include saving of costs and also yields, saving on time, contributed to build up in water content with organic matter, saving in labour or if/when there are no savings in labour then CA leads to higher productivity of available labour,
 - According to Martin, the transition phase is usually over in three years, and farmers begin to consolidate when CA is seen to lead to improved food security through,
 - General increase in yield for farmer,
 - He pointed out the importance of considering ways of dissemination of CA for farmers to adopt.

Some of the scaling up strategies that he proposed included;

- Training and support of farmers and front line extension officers
- Implementation support, empowering farmers to innovate and adopt
- Building social capital and collective responsibility in management of natural resources
- Policy streamlining and institutional support

09.45: Conservation Farming with Planting Basins - where practiced and by how many and which types of farmers – Shatis Vhakakis, Collins Nkantiko, David Howes, CFU, Zambia

David Howes of the Conservation Farming Unit (CFU) in Zambia made a presentation on Conservation Farming with Planting Basins, discussing where it was practiced and by how many and which type of farmers in Zambia.

- At the land preparation stage, there is emphasis on residue retention which leads to reduced erosion.
- Termites which harvest residues also add organic matter to the soil.
- The Chaka hoe is used for land preparation.
- Its design has been improved to sharpen itself as it digs, hence some signs of technological innovation.
- Early land preparation is crucial and should be finished by June or July
- Farmers then apply basal fertilizer and manure or compost.
- Then they backfill the basin and leave a shallow 5 cm hole to plant into. The crops planted under CA include cotton, maize, groundnuts, Soya beans, sunflower, cow peas, and other crops such as sorghum, millet and green gram.
- Legumes provide for families in the hunger period illustrating the benefits of rotation and crop diversification.
- An example of how it works through the seasons in Chibombo district in the 2004/05 season showed that despite the February and March rainfall being 57 and 80 percent below average, comparison of conventional farmer and CF farmer showed higher yields for the CF farmers.
- Yields up for all the crops in year one showed increases ranging from 30% to 70% varying by crop type with maize showing the highest increases.
- There are close to 120,000 farmers doing CF with majority of them being women.
- CA is practiced in Mumbwa, Chibombo, and Monze districts where results show an average of 68% increase in yields for the three districts.
- **Early planting was an important factor to which 45% of the extra yield could be attributed**
- The single most important drawback was that farmers could not obtain tools and seed as needed. Equipment is being made available in collaboration with PROFIT and USAID.
- Hence one aspect of commercialization of CA is making tools available which are essential to CA uptake by farmers, but handouts were not recommended.

10.00: The Use of Rippers in Conservation Agriculture and uptake of this technology by farmers – Piet Stevens, Golden Valley Agricultural Research Trust (GART), Zambia

Piet Stevens from GART Zambia illustrated how farmers in Zambia were using Rippers in CA and the uptake of this technology.

To enhance their productivity, farmers aim to do their work quickly, with as little effort as possible, on time while keeping their costs low and retaining stable yields.

The Magoye Ripper is used in the dry season for breaking up the soil. It is done in parallel planting furrows when the soil is dry allowing for deep penetration while leaving residues on the surface

Also used in inter-cropping where legumes can be planted in between lines of maize crop.

Results of Ripping included

- ❑ better yields in dry years and its use stabilizes yields
- ❑ Is economical
- ❑ Is a good starting point for introducing CF on farms with animal power
- ❑ Adopters tend to rip more and plough less.

Benefits observed by farmers

- ❑ Allows harvesting and conservation of water
- ❑ Well designed
- ❑ Durable and strong
- ❑ Well adopted
- ❑ Not expensive
- ❑ Well accepted
- ❑ Fits well with CA as it leads to reduced tillage, timely planting and copes with soil cover.

One practical drawback is that, with time, the ripper point wears down and hence only scratches the soil surface, unless it is repaired

However the Magoye Ripper is not well adopted at large scale despite having been introduced 12 years ago. Slow adoption because of;

- ❑ Farmers are cautious
- ❑ Farming is risky so relatively few innovators
- ❑ Outstanding technology development issues
- ❑ Need for design improvement to enable it to be used with smaller animals,
- ❑ Requires proper weed control

Since adoption has not been quick, the solution may lie in;

- ❑ Combine introduction with knowledge transfer
- ❑ Strengthen equipment supply through manufactures and importers usually in urban areas
- ❑ Small metal workshops and artisans in urban and rural areas need to be linked up.
- ❑ Small workshops cannot reach all farmers because of remoteness hence high input costs
- ❑ include a weed sweep that can fit on the Magoye ripper frame,

11.00: The Sasakawa Global 2000 Approach to Conservation Agriculture – Inacio Nhancale, Ministry of Agriculture, Mozambique.

Inacio Nhancale from the Ministry of Agric in Mozambique discussed the Sasakawa Global 2000 project's approach to CA.

With extension services introduced in 1987, the project has led to about 500 field extension workers being trained to diploma level with coverage growing from an initial 36 districts to 92 districts

- ❑ The SG 2000 program's approach is to support extension and research activities in partnership with local organizations and to provide technical and financial support at Institutional and field levels.

The main support received from SG200 was;

- ❑ Training of extension agents, farmers and input and output traders-Formal and non-formal training
- ❑ Field demonstration on improved techs through study tours and field days.

Because of perceived low yields in crops which were less than 1 tonne per hectare SG 2000 introduced some interventions including

- ❑ Intensive production technologies for smallholder farmers
- ❑ a technical package with certified improved seed, No till and use of herbicide for land preparation and weed control

Key 'no till' partners ranged from the University of Cape Coast in Ghana to NGOs.

The observed impact of CA technology was;

- ❑ Yield levels rose to 3.5 ton per hectare
- ❑ Assisted farmers had enough food
- ❑ Household income increased
- ❑ Led to more demand for extension service
- ❑ Strengthened linkages between key stakeholders

There were some main constraints (at macro level)

- ❑ poor infrastructure, due to war ravaged bridges and poor feeder roads.
- ❑ poor input supply system
- ❑ late input supply
- ❑ high cost of inputs
- ❑ poor produce market
- ❑ inadequate financial access
- ❑ inputs dependent on imports

At extension level the constraints were;

- ❑ poorly organised farmers' organisations
- ❑ farmers widely dispersed
- ❑ low educational levels
- ❑ poor means of transport for extension workers

- insufficient housing for workers

The Ministry of Agriculture in Mozambique acknowledges the benefits of CA in increasing food production and also its conservation benefits

But given the constraints, (the Ministry) had to try to adjust the CA to use different conservation technologies to accommodate socio-economic conditions of farmers

Farmers appreciated the benefits from yields increase, natural resources conservation and less labour requirements

11.15: The CA approach and the use of Jab Planters in Swaziland – Ndumiso Massimula, Shewula Trust, Swaziland.

Ndumiso Massimula of Shewula Trust an NGO in Swaziland made a presentation on the CA approach and the use of hand jab planters in Swaziland.

CA was introduced in Shewula community by the FAO consultant, John Ashburner.

Its implementation was preceded by a survey carried out by farmers to identify local indigenous crops and indignations farming systems. Subsequently, the training of farmers included the principles of CA and on the use of tools as well as the need to share (tools)with others.

The hand jab planter is a user friendly tool as it is;

- Easy to use because all inputs are put at the same time making it easy for farmers to use when alone compared to animal traction planter.
- It also enables farmers to plant through the residue
- Guarantees minimum soil disturbance as its only the sharp end that goes into the ground

But there are some areas need to be improved. These include;

- **The holes being only suited for big seeds. Need to adjust the holes to smaller size. (Various methods of reducing the size of planting holes in jab planters were described during the discussion, one using used chewing gum!)**
- Availability of the equipment also a big issue. Because of growing demand after awareness was created, there are not enough Jab Planters available from the private sector at present. **(Major issue)**

11.30: Who has access to CA technologies and who is benefiting – applying a socio-economic and gender analysis. Examples from Namibia. Patrick Karanja

Mr. Patrick Karanja of FAO Swaziland looked at access to CA technology and who benefits from it using a socio-economic and gender analysis. He provided some examples from the Caprivi in Namibia.

The Caprivi region has the highest prevalence rate of HIV/AIDS with 43% (Possibly in the world) and this is compounded with food insecurity.

Hence FAO partnered with CLUSA to expand CA with the objective of livelihoods improvement.

- ❑ CLUSA commenced in 2004, with 17 farmers given training in CA by team of Zambian farmers.
- ❑ Conservancies---training and 78 farmers recruited to manage CA on small 10 by 10 meters plots
- ❑ FAO support extended the work to 473 farmers in Caprivi.
- ❑ 66% farmers chose hoe method and 61% of the farmers were women.
- ❑ Of the 474 who signed up for CA the drop out rate was 33%

Drop out attributed to;

- ❑ individuals enrolled for free seeds only and did not want to work on CA
- ❑ Poor selection of contact farmers.
- ❑ Biggest losses among draught animal power (DAP) farmers who lacked oxen
- ❑ Inexperienced facilitators and contact farmers
- ❑ **Tool appropriateness due to difference in soil type made chaka hoe heavy for Namibian conditions**

Next steps will comprise of CF selection to start with a SEAGA with involvement of the Village Development Committees (VDC) to vet CFs—land tenure system

- ❑ CF compensation-rather than monthly payments, CF will be paid per farmer who meets certain benchmarks by set dates
- ❑ Plot selection fencing, avoidance of extremely sandy soils, proximity to villages/ease of accessibility will be set as plot criteria; plots must be ringed with clear area or placed mid-field to discourage mice.
- ❑ Plot sizes-farmers to be encouraged to double their plot sizes.

Mr. Karanja urged the workshop to try to examine why adoption rate is low despite the benefits observed. One reason may be because farmers may perceive it to be a primitive farming method – going back to hand operation rather than tractor powered agriculture.

11. 45: Example of application of CA by communities in Lesotho. Farayi Zimudzi, Pastor August Basson

A presentation by Pastor August Basson was made on behalf of Farayi Zimudzi. It looked at some examples of application of CA by communities in Lesotho.

- ❑ The point previously made by Patrick Karanja about appropriateness of the tools/technologies for each country is due mainly to different soil types.
- ❑ CA in Lesotho was started in 2001 on 2 plots in Tebellow & Butha Buthe and later expanded to 15 hectares.

- ❑ Since then there has been growth in awareness with Ministry of Agriculture, University of Lesotho and University of Tennessee and even has the personal support of the Prime Minister and the former and present Minister of Agriculture.
- ❑ The methods used are the basin method, animal traction, and mechanized farming.

The basin method has certain advantages

- ❑ It is quite available to almost anyone as is illustrated by the case of the blind man in Lesotho, successfully implementing CA and being able, for the first time, to provide food for his family.
- ❑ Provides advantage to orphans. They can implement CA with simple tools and this averts the risk of losing their fields to relatives after the deaths of their parents.,
- ❑ Provides income generation, opportunity for livelihoods and job creation,

It also provides hope for vulnerable sections of communities including women and children who do not have to;

- ❑ wait for oxen to plough the soil
- ❑ withstand cheating on ploughing by tractor owners – they charge for larger areas than they actually plough and hence raise costs beyond the finances of poor people.

It also places more cash on hand and gives pride to farmers when they provide for their families.

Some illustrative examples were provided including the successful CA benefits for Mme Monaheng and a rehabilitated murderer, who is very successful in producing green maize which finds a ready market.

- CA can also be used to plant difficult crops made easy such as potatoes and small seed crops like carrots, tomatoes. Pastor Basson described how potatoes can be planted on the soil surface and covered with mulch up to a metre high.
- It also leads to transformation in community as people learn to feed themselves using CA.

12.00: The use of Ox-drawn and Tractor-drawn Conservation Agriculture Planters in Southern Africa and the Supply of this Equipment to Farmers – Dirk de Koster, Intrac Ltd, South Africa.

Mr. Dirk de Koster of Intrac CC, one of the leading suppliers of CA equipment in the region spoke on the use of Ox-drawn and tractor-drawn CA planters in Southern

Africa and the supply in the region. He demonstrated and described the advantages of some Brazilian equipment, specifically two types of Jab Planter.

The machines supplied by Intrac Ltd in SA, Namibia, Swaziland and Mozambique include:

- ❑ CA planters.
- ❑ Machines for grain handling. Seed cleaning and loading grain
- ❑ Jab planters
- ❑ Animal drawn 1 row planter (Knapik brand) and manual sprayers
- ❑ Cornheads for combine harvesters and seed cleaners
- ❑ Manure spreaders and fodder mixers
- ❑ Tractors
- ❑ Haymaking equipment
- ❑ Seed treatment and cleaning equipment.
- ❑ Seed distributors
- ❑ Fertilizer distributors

He demonstrated that use of the right machines leads to low production costs for farmers, but cautioned that tractors raise costs significantly for small farmers. They need to be used on large areas to be economic. Ox-drawn equipment can be very economic for small farms.

He cautioned that bad planter performance leads to low yields lost and declining profits

In summary,

- ❑ Planting is the most important job for the farmer as it is the most important factor in determining crop quality and yield.
- ❑ Farmers should not try to save money when buying a CA planter, as a bad planter will COST money, not make it.
- ❑ Even an otherwise good farmer using a bad planter achieves bad results

Discussions and outcomes from morning and early afternoon sessions

- The need to start with the *farmers versus technology* in terms of focus/emphasis was pointed out. It was emphasized that it is crucial to change mindsets of farmers first, to introduce CA properly. Pushing the adoption of technology first may meet with resistance and hence is important to first start with what equipment farmers have available and only then move gradually to change of technology to CA. It is also very important to remember that farmers are not a homogeneous group. Hence the question of people first versus technology is not necessarily contradictory, as the 'people factor' was underlined in successive presentations. It is essential to understand farmers' point of view and gradually introduce CA taking these views into account.

- On the question of *adjusting technology to conditions in specific countries* as part of bridging the gap between technology and people it was indicated that the Magoye reaper cannot be modified to become too small for smaller animals as it would require another frame. It is also essential to keep the blade to a certain threshold of surface area to penetrate to required depths. The Magoye ripper costs about US\$25. Prices on jab planter R450-560 including tax. The Brazilian made single row Knapik ox-drawn planter costs R16, 000 and a two- row tractor-drawn planter costs around R45,000.
- On the question of *proper and accurate attribution of rise in yield* to 3.5 tonnes from 1.4 tonnes per hectare in Mozambique to CA, economic analysis showed yield rise recalling that Mozambique has no local inputs so all are imported but so though econ analysis done is not deep it nevertheless showed profit even with the high cost of inputs. Especially when farmers were assisted to clean grain and assisted in getting traders to buy bulk, profits were higher.
- On the question of *comparative cost and time advantage of jab planter* evidence from Kenya was adduced where farmers have attested to reduced time it takes using it in planting. It was also pointed out that in Mozambique when demonstrations were being held, the whole family would take longer to plant but now one day is enough to complete the planting work with a jab planter, hence proven time and labour saving. There are also many entry points in CA since it is a flexible technology. In Swaziland farmers would check soil conditions to decide whether to use the ripper.
- On the question of why CA in Namibia is taking up more labour whereas elsewhere observation is that the amount of work put in with CA is reduced. Participants were reminded that labour constraints imposed by HIV and AIDS have also exacerbated labour shortages, as the most vulnerable families are also affected by HIV and AIDS. However CA can be labour intensive at the beginning, especially using the pot-holing technique.
- On the question of *moving from principles to practice and scaling up*, the involvement and support of policy makers are important. Evidence and data on the effect of CA on conservation and improvement of natural resources and its positive impact and on livelihoods, food security needs to be highlighted. There is a great need to document the improvements achieved by CA to persuade policy makers to give CA their full support. In Zambia, the government is already fully supportive of CA and is already giving subsidized seeds only to farmers who practice some form of CA. Other issues that can help in expanding CA include integration of agro-forestry practices with CA and controlling animals, preventing them from eating crop residues needed for soil improvement under CA. Control of livestock movements on CA farms is essential. CA cannot be introduced successfully where all crop residues are routinely eaten by cattle and goats.
- On the question of how to *support involvement of beneficiaries*, it was stated that *handouts may be counter-productive and unsuitable*. It was pointed out that where poverty makes it difficult for most farmers to access tools,

subsidies to reduce the cost of these tools may be a useful incentive. Subsidies provided in the West are not seen as a threat to sustainability yet in Africa they are bandied together as posing a problem when considering handouts for farmers. It is also good to consider the risks of handouts in terms of discouraging other farmers who do not receive free inputs. For example, free fertilizer may not reach beneficiaries at the correct time for application and so do not benefit the crop.

- On the question of *early planting as a pre-requisite for success*, farmers know what is timely according to their knowledge of seasons. However, many farmers do not plant in time.
- According to some presenters, *women farmers are reportedly more successful* in CA. Finding out and documenting what makes them successful can assist CA upscaling and CA practitioners to do things differently to ensure success and better rates of adoption.

14.00: Organising the Practice of Conservation Agriculture in Southern Africa - Block Farming in South Africa, Lesotho and elsewhere – Richard Fowler, Agricultural Consultant, Pietermaritzburg.

Richard Fowler an agricultural consultant from Pietermaritzburg shared some thoughts on Block farming in South Africa, Lesotho and elsewhere in the region

He pointed out that adoption of CA by small scale farmers is slow due to some reasons which in southern Africa include;

- Promotion of inappropriate technologies
- Extreme climate events
- Erodable soils
- Population pressures from both livestock and people

Block farming can contribute to ameliorate some of the deleterious effects of lack of adoption of CA

He considered;

- Massive Food Production Scheme in the Eastern Cape.
- Land restitution programmes RSA and Zimbabwe
- Block farming in Lesotho
- “Massification” in KwaZulu Natal
- Vuvulane Irrigated Farms In Swaziland Sugar

In such schemes all communities would consists of a minimum of “good” farmers who could

- Increase production
- Reduce devastation
- Benefit local, regional and national economies

- ❑ Improvement of rural economies
- ❑ Stabilize incomes

Farming a block of land by one individual professional manager is proposed as it carries various advantages

- ❑ Shareholding options for groups
- ❑ Would facilitate adoption of CA by small scale farmers

It may pose some problems such as:

- ❑ Increasing unemployment
- ❑ Individuals opting out
- ❑ Subsidies
- ❑ Varying yield potential
- ❑ Crop rotation
- ❑ Management failure
- ❑ Stifling individuals
- ❑ Poor CA adoption
- ❑ Politicians meddling

Solutions could be;

- ❑ Beneficiation – farmers would benefit from better management and economy of scale.
- ❑ Binding agreements to be signed by land holders in the block farming scheme.
- ❑ Revolving seasonal loans
- ❑ Base share on per hectare yield
- ❑ Plant some of each crop each year, thus ensuring good rotations and also hedging against the failure of a monocrop.
- ❑ Professional expert management at cost
- ❑ Beneficiation/gardens
- ❑ Conditional loans/insurance etc
- ❑ Commercial banks could be a source of funds to such schemes.

14.15: Putting the supply of Conservation Agriculture Equipment, Chaka hoes, jab planters, ox-drawn and tractor drawn planters, on to a Commercial Basis –. Dirk Lange, University of Fort Hare.

Dirk Lange from the University of Fort Hare considered the supply of CA equipment on a commercial basis.

He pointed out that the key reason for spread of CA in Brazil and Paraguay is availability of the right machinery at the right time

- ❑ In southern Africa there is insufficient supply of CA equipment
- ❑ Need to put machinery on commercial basis both for introduction and up-scaling
- ❑ Almost no local manufacturers, few retailers and these keep low stocks of equipment

- ❑ Imported machines are expensive and have long order lead times.
- ❑ CA machines from South America are expensive
- ❑ CA is often donor dependent in southern Africa
- ❑ Machines need to be adapted or changed to suit local conditions
- ❑ Inadequate use of the machinery
- ❑ Supply of CA machinery via informal networks
- ❑ Transport an issue

What is necessary to put CA machinery on commercial basis?

- ❑ Creation of market for CA equipment is not that simple. Without sufficient supplies of CA equipment, farmers cannot practice CA, while there is no market for CA equipment at present.
- ❑ Experience from Paraguay and Brazil showed the need to create market for CA equipment and to do so while continuously developing and improving the equipment
- ❑ The advantage for southern Africa is that South America experience can be used in introducing CA equipment

However due to long and complicated delivery, there arises the need to find other solutions such as;

- ❑ Order CA equipment on time and in bulk
- ❑ Produce CA equipment locally under license from South American manufacturers
- ❑ Develop local machines or under license
- ❑ Adapt machines to local conditions always
- ❑ Monitor and evaluate the utilization of machinery
- ❑ Exchange experience on good practices and bad experiences with CA machinery
- ❑ Raise awareness at industry/manufacturers level
- ❑ Always work together with manufacturers-feeding back information on field performance of equipment
- ❑ Train contractors to use CA equipment
- ❑ Agricultural shows and farmer days

However machines are expensive for smallholders Hence need to put practical and efficient financial support system for farmers in place.

14.30: Training experiences – the Mozambique experience – Y.K. Singh, Ministry of Agriculture, Mozambique

Dr. Y.K. Singh, Ministry of Agriculture (MOA) in Mozambique.

The minimum nutritional requirements for households in Mozambique are hard to meet in the face of declining yields per hectare.

The MOA CA Model in Mozambique is based on FAO mandate and is in line with MDG 1- *to eradicate extreme poverty and hunger*.

Some of the benefits include;

- ❑ Can also solve problem of pests, diseases, weeds, water storage
- ❑ Also allow combination of agriculture and livestock
- ❑ Diversified income generation
- ❑ Lowered production cost
- ❑ Low environmental impact
- ❑ Avoid soil degradation
- ❑ Water storage and availability
- ❑ Heat storage and diffusion
- ❑ Improved permeability to air water and roots in soils managed under CA
- ❑ Improvement of pH value in soil
- ❑ Improved nutrient availability
- ❑ Soil structure stimulation
- ❑ Diversification of crop species
- ❑ Biomass quality
- ❑ Root density improved
- ❑ Biological activity increased in soils

Benefits

- ❑ Improved food security and quality of life
- ❑ CA led to 10 times yield increase and profit.
- ❑ CA helped overcome labour shortage due to HIV/AIDS
- ❑ Income generation was improved under CA

14.45: Training experiences – regional training in Southern Africa – Isaiah Nyagumbo, University of Zimbabwe, Harare

Isaiah Nyagumbo of the University of Zimbabwe shared some insights on Training experiences on conservation agriculture in the SADC region

He pointed out that the need for CA is driven by;

- ❑ Regional reliance on rain-fed agriculture
- ❑ Stagnant production
- ❑ Semi arid regions
- ❑ Effects of drought

Adoption still low in region due to

- ❑ Attitudes, low yield incentives
- ❑ Equipment, extension issues, etc
- ❑ Generally no formal training on CA in region
- ❑ Curricula not teaching CA, little practical emphasis on theory, younger generation not keen on farming
- ❑ Graduates of agricultural colleges/Universities are not skilled in dealing effectively with smallholder farmers
- ❑ In-service training of extension workers is weak on CA
- ❑ Training of professionals in CA is not developed in countries

Training being done by NGOs such as

- ❑ SADC/ACT Workshop in 2005
- ❑ 2003 ACT land care frontline extension to 2006 including to government policy makers.
- ❑ Direct farmer training

In Zimbabwe the training approaches used are;

- ❑ Master farmer approaches and group training
- ❑ Training and visit system (world bank) - now abandoned
- ❑ Commodity based and contract approaches e.g. cotton, Soya, tobacco
- ❑ Various participatory approaches e.g. farmer field schools (FAO), Study Circles (Swedish Cooperative Center)
 - Most successful approaches were commodity based
 - Participatory approaches found to be most successful in complex and semi-arid environments

Successful approaches were those in which training is backed by support afterwards

- ❑ Training starts with farmers needs, expressed by farmers in meetings with extension and training staff
- ❑ Discussions with farmers
- ❑ Looking carefully at equipment appropriateness
- ❑ In places with no residues option is for potholes e.g. in transition stage.
- ❑ Training on equipment usage. Various questions on how to make equipment available and used by farmers.

Some perspectives on training of CA

- ❑ Need for critical mass driving CA
- ❑ Yield incentives not immediate. need other drivers
- ❑ Training needs to be followed by support on ground
- ❑ Should address all stages of cropping cycle with critical issues in weed management and residue management.
- ❑ Need for flexibility in addressing principles of CA in training.
- ❑ Need to address effectively the wide range of equipment and its relevance to various circumstances.

Challenges

- ❑ Need to consider internalizing CA training in institutions and extension programmes
- ❑ How to make sure training programmes translate to tangible action on the ground
- ❑ Need better training equipment in training centres as tools to the achievement of CA objectives
- ❑ The diverse nature of farmers in the region also needs to be considered.

15.00: Discussion on the afternoon's presentations, including appropriateness, effectiveness and cost of different training approaches.

Discussions and outcomes

- Concern was expressed on ***emphasis being too much on smallholder farmers and neglecting larger scale farmers*** who have the resources to implement CA immediately.
- A question was raised on average farm size of Brazil and Paraguay being larger than in southern Africa, leading to the question of availability of land become critical success factor to expansion of CA in region
- Concerns expressed over ***disparate results with higher yield advantage in Mozambique not seen in Zimbabwe***. CA did result in increases in some cases but in others it did not. There is evidence that CA tended to improve yields in dry years with commercial farmers. Hence CA had to be seen as a package... in some years farmers using it obtain benefits and in some years they do not. Some report huge benefits from implementing CA. CA has not resulted in low yields but in some instances not significant differences in yields compared to good conventional farming practice.
- A question was raised on ***what's being done to follow up training of extension frontline officers to communicate commitment of their CA content*** and then report to supervisors to monitor actual implementation. A big constraint was lack of resources (transport, overtime) that results in failure to follow up for actual evidence of implementation
- The need ***to institutionalize the practice of CA so as to be accepted in government*** was reiterated as was the need ***tap into farmer's innovations*** and to avoid imposition.
- Emphasis should also be to ***empower trainees with continuous support*** so that training in CA is not a once-off event.
- Need to ***target farmers who were committed*** and not simply people who were living on land as they may be just retirees with no firm commitment to farming. This may account for some failures and drop outs by farmers involved in expanding CA. Also in targeting, emphasis was laid need to ***understand and stratify potential community*** members for CA to apply appropriate technologies and approaches depending on the individual and group farming situation in the country concerned.

15.45: Announcement concerning formation of Working Groups and invitation to join one of the following three groups before proceeding to the Coffee Break – Fred Kalibwani,

Facilitator. Selection of Group Chairpersons and Rapporteurs.

The Workshop was divided into three groups, as follows:

- A) Equipment Supply for the Future - Getting the Private Commercial Sector Involved
- B) Mechanisation of Conservation Agriculture: How best to do it?
- C) Providing Effective Training on Conservation Agriculture: Planning for the Future.

Tuesday, April 3rd 2007

The potential of CA in the Southern African Region Josef Kienzle. FAO Rome

While pointing out the interested, involvement and support for CA in many divisions of FAO headquarters, Josef recapped the many benefits that accrue to livelihoods when applied correctly as illustrated in Lesotho.

Underlining the need for food production to double by 2030 through increased production whilst conserving the environment and natural resources, he noted that CA offered an opportunity to counter the effects of declining precipitation through proper land management.

However there is a need to counter the negative perception of hoeing as low tech on the continent. He emphasized that it held the potential to bring positive benefits to communities through its principles when applied correctly by ensuring in its implementation that it led to;

1. Empowerment and local capacity building in local institutions
2. Strengthening of local ownership
3. Alignment with local government thrust in growth and sustainable management

08.00: Recap on First Day – Fred Kalibwani,
Facilitator and Josef Kienzle.

Key Points that emerged from Day one deliberations

- Need to focus on applications moving from principles to practice
- Sustainable agricultural production and livelihood systems is key
- Focus on people first and technology second
- Need to ensure local ownership of CA
- Ensure integration of farmer experimentation with research and technical assistance
- Livestock integration and agreements on grazing corridors is essential to successful expansion of CA
- Integrated agroforestry in CA and other complementary agricultural techniques.
- Role of private sector in manufacture and up-scaling-mechanized CA systems needs to be recognized and fostered
- Group ownership and government schemes did not work
- Networking and knowledge transfer is more important than technology transfer
- Commitment of individuals at all levels is key to success in implementing CA on a large scale, there is a need to use “champions”, i.e. enthusiasts who are also expert CA practitioners/extension agents.
- Respects for local habits and regulations
- Need for policy maker buy-in to ensure up-scaling and adequate and timely materials supply
- Need to also focus on broad range of farmers including commercial farmers
- Yield analysis to provide real evidence of the beneficial effects of CA and this to provide better attribution of CA
- Capacity building not just training but also increasing awareness including among policy makers
- Include CA in training of extension workers
- Farmer participation including the principles on social mobilization
- Deliberate targeting of female farmers
- Proper targeting where entry points need to be correct and focus on communities
- Impact analysis need to track adoption and M&E
- Ensuring the retention and improvement of networks in CA.

Martin Bwalya of The African Conservation Tillage Network (ACT) gave a brief overview of ACT and its role in promoting CA on the continent. With its presence in Kenya, Zimbabwe, and Burkina Faso, it has become large network with over a thousand members.

It plays a critical role of enhancing access to CA knowledge and information and strengthens collaboration and partnerships in the promotion of CA in Africa.

The networks core functions are:

- Adds value in information and knowledge sharing.
- Acts as a CA Knowledge Bank
- Stimulates national networking
- Promotion/lobbying and advocacy
- Training and support
- CA appraisal and identification of knowledge and skills gaps
- Stimulates and facilitates strategic thinking on CA and natural resources management (NRM)

Hence its core content includes:

- CA link to livelihoods,
- CA link to agricultural productivity (bearing in mind the continent's commitment to achieve 6% growth in agricultural productivity per annum),
- CA role in rain water management and,
- CA in SLM, and
- CA in mitigating impact of climate change

9: 15: Working Groups commence initial discussions

Groups were tasked to develop a plan for practical implementation of outcomes of the workshop.

Working Group 1

Equipment Supply for the Future – Getting the Private Commercial Sector Involved

Overall purpose:

- Participants to help develop a regional plan of action to expand CA in the most efficient manner, taking into account the best and most appropriate techniques for each country
- Participants to generate first steps to the preparation of a medium to long term plan to expand CA in Southern Africa

Background

The ready availability at the right price of the right CA equipment, together with servicing and appropriate spares inventory is vital for the expansion of this technology. Up to now in Southern Africa, projects such as CFU in Zambia, various FAO TCP projects and emergency projects have procured and distributed inputs of CA tools and machinery. This was largely done outside the normal machinery supply system. As many projects are highly temporary, they are not the right way to supply tools and machinery to CA farmers. This has to be taken up by the private sector as a full commercial activity.

Group I will discuss and propose practical ways of getting the commercial private sector involved. Machinery and tools need to be manufactured locally in the longer term, perhaps under licence to established manufacturers in Brazil and elsewhere. Prior to that, traders have to be persuaded that there is a local demand/market for CA equipment and that this is effective demand, not dependent on NGO, UN or government subsidies which could be withdrawn at any time.

Guiding Questions

1. What are some of the practical ways through which increased private sector investment/involved can be achieved? Discuss at least 5 options
2. How and when (if possible) can this be done – for both the short and long term?
3. Propose a 3-5 year work plan depicting activities, timeframes, resources required, and who-by for implementing the proposed options. Present the work plan in form of a table (Please state any assumptions made)

Group Leader
Reynolds Shula

Rapporteur:
Wells Kumwenda

Working Group 2

Mechanisation of Conservation Agriculture: How best to do it?

Overall purpose:

- Participants to help develop a regional plan of action to expand CA in the most efficient manner, taking into account the best and most appropriate techniques for each country
- Participants to generate first steps to the preparation of a medium to long term plan to expand CA in Southern Africa

Background

There are various CA technologies, operated by hand, by ox-draught and by tractor. Hand operation is only suitable for small areas, hence the need for mechanization. Government mechanization schemes still exist in Lesotho and Swaziland and possibly other countries. Should they become involved in tractor mounted CA planting? Or not?

Experience in Brazil and Paraguay and in other parts of Africa, notably South Africa, should be studied.

Group 2 will discuss guidelines for increased mechanization – which machines are best for small, medium and large scale operation in specific countries and soil situations?

Existing machinery suppliers need to be persuaded that CA is the way of the future and their investment in ploughs, harrows, rotavators and other tillage equipment is going to become obsolete over time. They need to be prepared for this and persuaded that it is better for them in the long run, as conventional agriculture will become increasingly difficult with global warming.

Some guiding questions

1. Should government mechanization schemes become involved in tractor mounted CA planting? Or not?
2. Which machines are best for small, medium and large scale operation in specific countries and soil situations?
3. What are some of the practical ways through which increased mechanization of CA be achieved? Discuss at least 5 options
4. How (and when if possible) can this be done – both in the short and long term?
5. Propose a 3-5 year work plan depicting activities, timeframes, resources required, and who-by for implementing the proposed options for increased mechanisation. Present the work plan in form of a table (Please state any assumptions made)

Group Leader: Piet Stevens

Rapporteur: Patrick Karanja

Working Group 3

Providing Effective Training on Conservation Agriculture:
Planning for the Future

Overall purpose:

- Participants to help develop a regional plan of action to expand CA in the most efficient manner, taking into account the best and most appropriate techniques for each country
- Participants to generate first steps to the preparation of a medium to long term plan to expand CA in Southern Africa

Background

There is a lack of agreement still about the right methods of implementing CA by small farmers. This must be ironed out and a training curriculum developed for each country that is clear and practical.

The urgency of implementing CA to avoid environmental destruction of soils and watersheds is clear. The message, though, must be clear and unambiguous and the methodology of training should be effective and have the full backing of the Ministry of Agriculture in each country. It should start in schools agriculture textbooks, which will have to be substantially revised to remove references to the need for ploughing and 'land preparation'.

Group 3 will discuss options for increased CA training and awareness at all levels (farmer, researchers, policy makers etc). Training of extension and research staff need

to be completely revamped to remove the ploughing, rotavation, harrowing, rolling and such clichés as ‘fine seedbed’, ‘good tilth’ from the vocabulary and replace them with ‘ground cover’, ‘good rotations’ and minimum/zero tillage.

The complementary technologies of agro-forestry, use of nitrogen fixing trees such as Acacia albida, use of live fences (to keep out livestock from devouring crop residues and leaving them instead to enrich the soil) need to be taught and taught well, with good demonstrations on farmers’ fields.

Policy makers need to be taught why the change to CA is necessary and this need to be reinforced with good demonstrations and good, well written, reports on the comparative effect of CA farming and conventional farming.

Training systems used to good effect in Paraguay and Brazil and Argentina need to be emulated.

Some guiding questions

1. What are some of the practical ways through which increased CA awareness (at different levels) and adoption can be achieved? Discuss at least 5 options for increased awareness and adoption.
2. How can small-scale adoption be better managed?
3. How can we better monitor and evaluate the social-economic impact of CA?
4. How (and when if possible) can these proposed options be implemented – both in the short and long term?
5. Propose a 3-5 year work plan depicting activities, timeframes, resources required, and who-by for implementing the proposed options. Present the work plan in form of a table (Please state any assumptions made)

Group Leader
Isaiah Nyagumbo

Rapporteur:
August Basson

The Groups presentations are attached as **Appendix 1, 2 and 3**. Group three split into 3 sections each looking at specific aspect of training.

Appendix 4 provides a final summary that resulted from the plenary session at the closing of the workshop and contains specific recommendations and action points.

Appendix 5 folder with all the presentations.

Appendix 6 is the list of participants.

