Conservation Agriculture in Botswana


Samochima, Shakawe.
19-23 June 2012
at the Krokovango Leseding Information Centre
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Krokovango-Leseding
Information Centre
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<tr>
<td>ACADIR</td>
<td>Association of Environmental Conservation and Integrated Rural Development</td>
</tr>
<tr>
<td>ACT</td>
<td>African Conservation Tillage Network</td>
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<tr>
<td>BAMB</td>
<td>Botswana Agricultural Marketing Board</td>
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<td>BCA</td>
<td>Botswana College of Agriculture</td>
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<td>CARWG</td>
<td>Conservation Agriculture Regional Working Group</td>
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<td>CEE</td>
<td>Citizen Economic Empowerment</td>
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<td>CEDP</td>
<td>Community Economic Development Programme</td>
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<tr>
<td>DAP</td>
<td>Department of Animal Production</td>
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<td>DCP</td>
<td>Department of Crop Production</td>
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<td>DEA</td>
<td>Directorate of Environmental Affairs</td>
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<td>DVS</td>
<td>Department of Veterinary Services</td>
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<td>GART</td>
<td>Golden Valley Agricultural Research Trust</td>
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<tr>
<td>HEC</td>
<td>Human-Elephant Conflict</td>
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<tr>
<td>IRDNC</td>
<td>Integrated Rural Development and Nature Conservation</td>
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<tr>
<td>IKS</td>
<td>Indigenous Knowledge Systems</td>
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<tr>
<td>KCS</td>
<td>Kalahari Conservation Society</td>
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<tr>
<td>MEWT</td>
<td>Ministry of Environment, Wildlife and Tourism</td>
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<td>MoA</td>
<td>Ministry of Agriculture</td>
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<tr>
<td>MOPAPA</td>
<td>Ministry of Presidential Affairs and Public Administration</td>
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<tr>
<td>NCATF</td>
<td>National Conservation Agriculture Task Force</td>
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<tr>
<td>NAMPAADD</td>
<td>National Master Plan for Arable Agricultural and Dairy Development</td>
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<td>NNF</td>
<td>Namibian Nature Foundation</td>
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<td>NRC</td>
<td>Namibian Resource Consultants</td>
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<tr>
<td>ORI</td>
<td>Okavango Research Institute</td>
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<tr>
<td>SAREP</td>
<td>Southern African Regional Environmental Programme</td>
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<td>TOT</td>
<td>Training of Trainers</td>
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<td>WWF</td>
<td>World Wildlife Foundation</td>
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1. Introduction

The essence of the consultative meeting between potential actors and stakeholders in Conservation Agriculture (CA) in Botswana, especially along the Okavango Delta, was to explore how CA could be introduced to Botswana in the most sustainable and appropriate way. Specialists and experienced NGOs and other implementers in Namibia and Zambia attended, with thirty two participants who met for 3 days at the Krokovango-Leseding Information Centre near Shakawe. The workshop was hosted by the Pabalelo Trust and the Livelihoods Component of SAREP, Maun. Representatives from Botswana included NGOs from the Panhandle area as well as Ghanzi, researchers, government representatives and representatives from the Botswana College of Agriculture. The resource organizations from Namibia included those who introduced CA in Zambia and Namibia (GART, CEDP) and NRC, with NNF representing those expanding and monitoring the concept.

The first two days of the workshop were presentations by the specialists from other countries, with discussions and questions bringing the information closer to realities of home. Thereafter the Botswana NGOs who had been trying their hand at CA or related agricultural work presented their experiences and plans.

Conclusions and common threads from the presentations were woven together into an assignment sheet for group discussion, on day three. Prior to this a demonstration of the basin method in CA was held in the field of the Pabalelo Trust, as well as a short demonstration of the Magoye ripper method by the resource people from Namibia and Zambia. This was followed by a visit to the Pabalelo Permagardening demonstration site. A film on the work done by Gus Nilsson in the 1970s was shown to indicate that CA principles have long been piloted in Botswana but were not adopted by the Ministry of Agriculture’s research and training programmes as they were not perceived to be based on scientific but experiential methods, and the country’s agricultural focus was not ready for these “alternative” concepts at the time. However, presently the MoA tries to promote CA and permagardening concepts. The Office of the President’s Backyard Gardening Initiatives could also adopt the concepts trying to eradicate poverty in the country by promoting more food security at the subsistence level.

1.1. Summary of discussions and expectations raised at the introductory session

Botswana is already connected internationally regarding CA, as it has a representative (from BCA) on the CARWG (Conservation Agriculture Regional Working Group) This organization connects Botswana with a rich resource of experience and knowledge on CA throughout the SADC region. The facilitator stressed that the interest in CA is a clear sign that more recognition is being given to the value of Indigenous Knowledge Systems, acknowledging the fact that modern tendencies have been to move away from traditional knowledge and skills but that the CA methods is a sign of recognition of IKS to build upon tried and trusted skills and methods.
Participants emphasized the need to link and promote conservation agriculture initiatives not only regionally but also in country to raise awareness not only among farmers but also landboards, agricultural officers, policy makers and other stakeholders. Food security is important but also food sovereignty, putting people in charge of what and how they feed themselves.

1.2. Main conclusions from the workshop

The workshop concluded with group sessions to recommend a suitable strategy to introduce and promote CA in Botswana. Two working groups discussed according to the themes

- Stakeholders: Who are they and what are their interest?
- Development of CA in Botswana: What activities are needed and in what order?

The recommendations included the formation of a National Forum on CA as well as a National Task Force to link the country to regional activities and resources. The promotion of national awareness and capacity building of role players and support networks, as well as the need for proper resource mobilisation were listed to ensure that CA is fully understood and supported.

Other recommendations included CA technology development and the need for lobbying to the inclusion in government policies on agriculture, as well as training, exchange and capacity building.

2. Proceedings of the Workshop

Chief Mbambo from the Kgotla in Shakawe welcomed participants and hailed NGOs for the important role they play in providing links, being flexible and reaching where government cannot.

Workshop Objectives were defined as

- getting an overview of the scope and depth of CA in the region
- defining if the CA way and methods are worth pursuing for the specific challenges of arid and semi-desert Botswana
- which would be the best way to ensure the implementation and promotion of CA in the Okavango area but also the whole of Botswana.

An overview of the SAREP livelihoods programme:

Mr. Innocent Magole from SAREP gave an overview of the organization’s structure and work strategy. He explained SAREP’s role in the Cubango –Okavango River Basin (CORB), how long the programme expects to stay within this area and its mandate. He stressed that government has an important role regarding the sustainability of programmes that other stakeholders initiate. SAREP partners with the larger NGOs for more sustainability as they also tend to extend the network to the smaller ones around them. Examples of their present partners are KCS (Botswana), NNF, IRDNC (Namibia) and ACADIR in Angola. They also ensure that government is involved in all their focus areas, for support and stability. SAREP tries to influence government to provide strategy, and to promote the political will and support needed to keep the Botswana NGOs alive. Therefore SAREP develops a strategy that can be taken forward by others.

The SAREP Livelihoods sector also promotes participatory and integrated land use management planning (PILUMPs) needed to sustain and enhance traditional livelihoods.

In response the Zambian participants then pointed out that in Zambia the government has adopted CA in their national framework, but that it took a long time. However, CA cannot be done without government
support. Mr. Magole used the slogan - Field + Hoe + Political Will = Conservation Agriculture.

The CA specialists from other countries pointed out the need for developing and promoting agro-ecological zones for appropriate agricultural practices for each region. A scheme such as ISPAAD should fund appropriate projects for each region and their field officers on the ground be trained to understand the difference between CA and conventional agriculture.

Botswana College of Agriculture (BCA) representatives pointed out that CA is a complicated and scientific system which should be promoted as that, to counter idea that it is backward and only for small-scale subsistence level.

3. Presentations Namibia:
Full power point presentations’ links can be found on p. 22.
Main points rising from each of the presentations are summarized below.

3.1. CEDP
The effects of local (conventional) farming methods are wasted inputs – (seeds/fertilizer), reduced yield, it destroys soils (lose 1000t/ha) and has crop failure during dry spells. Apart from the financial and physical investment wasted, deforestation increases (a 30 year recovery period needed for a cleared field) which leads to decreased food security.

CA refers to practices which conserve soil, moisture, inputs, energy, time and money, therefore not only a conventional understanding of the word “conservation”. Conservation tillage means opening the soil only where you are going to plant, no further disturbance of the soil. It also takes a lot less land to produce a lot more. A 50x50 meter field has proved to feed a family of 6.

The basin method: 35x15x15 cm (a hand and a foot) basins are dug. Rows should be 90 cm apart, and basins should be 70 cm apart, 3 seeds per basin sowed (maize) and 7 cow pea seeds per basin. Intercropping rows encouraged; maybe millet/cow pea/sunhemp/maize.

Training starts from where the communities’ own practices are, to learn which practices are destructive, and happens through VDCs to pioneer the technology. Easily managed record keeping is important to teach. Contact farmers are chosen from those who join the process. Farmers are encouraged to start small so they can handle their own projects.

CA lessons learnt from Zambia/Namibia work by CEDP:

• The project team must believe in CA and do their work wholeheartedly.
• Start small and adapt to the situation
• Accept reality (and be innovative)
• Inputs must be self-sustaining
• Market linkages important
Long-term collaboration needed
Farmer to farmer extension best method.

CA can integrate gardens and fields (permanent planting stations) for continuous food security. CA as a system also answers one of the biggest needs in rural agriculture, which is lack of labour.

3.2. NRC

Mr. Rod Davis presented on the experiences of the Conservation Tillage Project (CONTILL) in northern Namibia running fully participatory on-farm trials and demonstrations over a 6 year period, consisting of 0.12 ha plots on each farm. CONTILL implements CA adapted to local semi-arid conditions and degraded soils. Rainfall is low and erratic (250 to 400 mm p/a) in the north central region and occasioned by floods. This Semi-arid Conservation Agriculture (SACA) system reverses soil degradation and has shown increased pearl millet yields ranging from 200% to 600%. Maize can now be grown in areas where this was not possible before with yields ranging from 3.3 to 4.4 t/ha. SACA system is as follows:

- 1st. season, ripper furrowing by either tractor or animal power, depending on soil conditions, to simultaneously break the hard pan and create in-field water harvesting (this directs water into the base of the furrow, where the crop is planted, thus increasing penetration by an effective 75% (300mm to 525mm),
- 2nd. season, as above but done early after harvest when soil is still soft and draught animals are still in good condition, along the same lines (controlled traffic) so that a line of concentrated fertility and organic material is built up and compaction avoided when using a tractor.

In Namibia a light application of a fertiliser and manure mix (MAP at 75 kg/ha and 5t/ha manure) has given the best results, but the correct design and use of equipment is most important. Crop rotation with a legume is also important. Contill used indigenous cowpea but groundnuts should also work. Furthermore the bulk of crop residues must be left on the land.

NRC can also report from its experience that:
- the inclusion of farmer beneficiaries, virtually as partners from the start, even in project detail design, is essential,
- that such projects should be non-state actor implemented with govt. extension staff involved to the extent appropriate
- an initial thorough scoping exercise in the focus area is important to understand all the elements (natural, cultural and social).
- land preparation should be completed by the onset of the rains and use first planting rain to give as long a season as possible.

3.3 Namibia Nature Foundation (NNF)

Ms. Tererai Msakwa presented the programme under management of NNF. The 72% of Caprivi population is rural and have agriculture based livelihoods, therefore need support with sustainable agriculture. The Caprivi is a drought prone area with erratic rainfall that rarely exceeds 500mm per annum, with some areas prone to flooding. There is therefore a heavy dependence on government aid since independence.

Highlighted the main activities of the NNF:

Conservation agriculture and the NNF CA Chili Programme started in 2005/2006 under CEDP, CEE (WWF, USAID). The projects were to address the problem of very poor yields farmers were getting. They made use of the TOT farmer to farmer extension method, with area coordinators – Facilitators, Trainer – LCF- CF-Farmers. A system was developed to cater for more farmers and better promote the technology.
CPP was funded from 2009 with NNF doing the implementation. Farmers under this programme include those that have taken up the technology on own adapted farms and in centres (these are community selected areas under Ministry of Agriculture supervision). In 2011 the NNF CA programme had 9.4 Ha under 125 farmers, using the ripper and/or hoe method. The current recruitment is 23 ha and 311 farmers using the ripper and hoe.

The aspects promoted by CA are:

- Early land preparation, semi-permanent planting stations, precise placement of seeds/manure or intercropping, crop residues left on field, frequent weeding and crop rotation.
- NNF plans to expand CA activities in Caprivi, and scale up adoption of CA in own farms (25m by 50m to 50m by 50m). It will also promote intercropping of cover crops (legumes) and try to provide market linkages. Under the market linkages programme NNF also promotes ground nuts.

Other programmes complimenting CA activities are Chili farming and Gardening- (for human wildlife conflict management in the conservancies of Caprivi), low cost fish farming (to reclaim areas that are now having perennial water bodies or ponds). Also low cost poultry farming is introduced for a more integrated approach and for helping communities get more value from their locally available resources. Additional activities within the programme for Sustainable use and Natural product development involves for example the Mangetti and mungongo tree oil extraction from the seeds. Another supportive activity to CA is the Bee-Keeping Programme that is being promoted and directed by the Directorate of Forestry. More than 2500l of honey is being collected each year and marketed in Katima Mulilo.

3.4. GART (Golden Valley Research Trust, Zambia)

Presented by Mr. Douglas Moono he explained how Conservation Agriculture leads to sustainable agriculture practices, which leads to better management of the environment. Important to define agro-ecological zones – rainfall, soil character, physical and chemical differences (for e.g. pH, calcium content etc.) to be successful with CA

Principles of CA followed by GART are:

- minimum disturbance of the soil. Hand hoe farmers can now also be supported by tractor ripping as basin digging is inhibiting for larger fields. Draught animal power is on the increase in CA
- maintenance of adequate ground cover. Dead mulch and crop residue are important elements for this. Live mulch can be used e.g. for cover crops.
- Mix and rotate crops
- Intercropping, e.g. with green manure (e.g. sunhemp - Crotalaria juncea) and Mukuna.

Leguminous crops include cow pea (plant 2 weeks after maize), green gram, dolichos lablab. Green manure can be obtained from velvet beans, mukuna and sunhemp. With ripping up to...
10 ha can be managed, but with hand hoe only 1 ha per farmer possible. Problem of minimum tillage is that there is more space for weeds.

GART recognizes the following kinds of farmers:
- hand/hoe farmers
- livestock ploughing (oxen farmers)
- telephone farmers (absentee)
- commercial farmers

Research is important but should be demand-driven. GART has done various types of research in collaboration with various donors that determined programme focus and shifts over the years from 1996 to today. The Conservation Farming Unit started, when the Zambian government policy supported hand hoe conservation farming. Dutch funding in 2000 introduced the system of ripping, as a hoe pan develops after 3 years. When necessary to dig deep ripping is the better. Deep-rooted crops help as well, e.g. pigeon peas, sunhemp and tephrosia (which also controls ticks).

In lower rainfall areas it is better to reduce maize to 2 plants per basin, and the “fertiliser” tree (Ana boom or Faidherbia albida or winter thorn) can be very beneficial as it drops leaves in summer. Plant seedlings 10m x 10m can be planted for extra nitrogen.

GART promotes local seed production of e.g. orange sweet potatoes, amaranthus, pumpkins (source of selenium and zinc, beneficial for people with HIV/AIDS). Other integrated (holistic) approaches are also piloted to promote better nutrition, e.g. combining chickens, fish farming with CA. Red sorghum (for beer making) has tannic acid and deters birds (bitter) and pearl millet variation called “dolla” is bristled which act as a deterrent to birds. GART is presently involved in the WAHARA project with EU funding, dealing with water harvesting for arable agriculture.

Changing mindsets is the biggest challenge regarding the introduction of CA GART follows the following approaches to CA promotion:
- Training of trainers (TOTs). Target a number to reach over a period and define beneficiaries.
- Training of farmers
- Demonstrations and on-farm trials. Identify and contact lead farmers.
- Work with contact farmers and help the demonstration farmer with inputs
- Dissemination of information: GART yearbook, fact sheets, radio transmissions, FAO publication “A manual for farmers and extension workers – conservation agriculture” important resource.)

4. Presentations Botswana:

4.1. Pabalelo Trust

Mrs. Willemien le Roux presented the objectives and trials done by Pabalelo Trust in the western Okavango Panhandle, to introduce CA as a means of enhancing food security of vulnerable people. Those affected are people who are up against challenges regarding change of land-use, environmental laws and human development, elephant and other animal damage and have limited resources to be able to feed themselves. Pabalelo therefore only piloted the basin method in 2011, with the intention to reach those who are unable to source draught animal power.

The second objective of promoting CA in the Panhandle area is to foster harmony between people and the environment, especially wildlife, as it is easier to deal with human-animal conflict on smaller but more
Conservation Agriculture in Botswana

intensive fields. With CA it is also possible to take better care of the riverine forests. Pabalelo brought experts from the Imusho in Zambia to teach local farmers from Samochima, Xhaoga and Okusi about CA. Crispin Muyanda and Carol Murphy brought contact farmers and field staff in 2010 and 2011. However none of the taught farmers took up or tried CA in their fields. Pabalelo decided to do a trial field themselves, with encouraging results.

Main lessons learnt through their trial were:

- Preparing your field long before the first rains and planting early means being ahead of insects and weeds.
- Leave plant/crop residues and leaves from trees growing in your field to mulch around the basin.
- Wait until the first good rains, but do not plant before the rainy season has fully started. In Botswana it is better to wait till end November or December or even January.
- Rotate crops and grow different plants in rows next to each other, with different advantages, e.g. maize next to beans for nitrogen, sunhemp between rows for mulch. Mahangu rows can be planted alternating between maize rows, and pumpkins between rows for shade from large leaves and for green mulch.
- Keep weeding and keep mulching. Termites eat mulch and carry nutrients deeper into the soil. The more mulch the less weeds.

Pabalelo will repeat its demonstration field incorporating lessons learnt, and also pilot lessons learnt from a Permagarden pilot, e.g. marigold flowers against nematodes, earthworm farms for fertiliser, etc. Before rainy season starts commitments from farmers will be sought for on-farm trials. This will be presided by another workshop where the initial participants will share success and or lessons from the trials.

4.2. Elephant Research Project, Gunitsoga, Botswana

Dr. Anna Songhurst presented the project’s introduction of CA, aimed at counteracting the Human Elephant Conflict which is characterized by problems that impact on agriculture, e.g. crop damage, fence damage, people putting fields in elephant paths, injury and killing of people, killing of elephants and damage to the environment. The project looks at the elephant range expansion in terms of human development expansion and land use change, resulting in HEC.

Actual elephant damage was less than perceived:

- Over 19,000ha of land is cultivated in the eastern panhandle
- The average field size is 3.2ha
- 1040 fields were raided by elephants between 2008-2010 (~5% of total fields)
- Over 25% of fields raided had more than 10% of crops damaged
- Average quantity of cereal crop harvested per field is 499kg (155kg/ha)
- A field can support 1-34 people (average 7)
- Smaller fields are easier to protect using mitigation measures - CA techniques reduce field...
size without reducing harvest yields
• Improved yields will make farmers less vulnerable to the effects of crop raiding - CA can increase yields
• More permanent fields will assist with land use planning, fields can be positioned away from main elephant movement routes - CA can help to maintain soil quality through use of manure, fertilizers, crop rotation, legumes etc

Progress so far:
A total of 25 people were trained in Conservation Agriculture (CA) techniques from 4 villages in the eastern panhandle (Mohembo – East, Sekondomboro, Ngarange, Tobera) and one village in the western panhandle (Samochima) in 2010-2011. The trainings were once more conducted by the Imushu CA team, Zambia. Necessary equipment for CA techniques were distributed to farmers (i.e. Hoe, string, bucket etc.) and a farmer manual designed and distributed to farmers. Community enumerators were trained and deployed to encourage farmers to implement techniques and monitor others, these were also trained in chilli deterrent methods, to encourage a combination of CA and chilli deterrents. Unfortunately, only a small number of farmers (2%) tried to implement the conservation agriculture techniques in 2010-2011.

Reasons for not engaging in CA:
• Not enough time to trial these techniques, while others said the techniques were too hard to implement.
• Some farmers did not want to be “taught how to farm” and preferred traditional techniques.
• Those that did implement found it difficult and time consuming, even though they said training instructions were clear and enough equipment supplied.
• In spite of farmers committing to try CA in 2011-2012 and to start preparations earlier, no farmers practised CA this year. Results demonstration plots within peoples fields are planned to concentrate efforts on a few farmers who could become lead farmers in the area, hoping that through gaining higher yields from smaller areas of land and thus implementing more efficient HEC mitigation on smaller CA fields, more people might take over CA techniques.

4.3. Komku Trust
Mr. Cgara Cgase, coordinator of the Komku Trust, member of the Kuru Family of Organisations in Botswana, presented the programme’s history and efforts with regard to gardening and arable farming in the Ghanzi district. He explained that although the Trust has never heard of CA, a lot of the difficulties people described here are similar to the problems the communities they serve experience. In this semi-desert, Kalahari environment rainfall is less than 350mm per year on average, and although the soils are fertile, the erratic rainfall makes agriculture risky. Another challenge is that the target communities come from a hunter-gatherer background, being San, which makes the transition to the seasonal rhythm and planning of arable farming or any other kind of gardening very difficult. However, they would like to be included in the network of organizations learning about and pursuing CA in future.

Komku Trust works alongside Permaculture Trust who were unable to attend. In the discussion it was pointed out that with the limestone rock base of the Ghanzi district and the fertile soils, it should be possible to grow very good cowpea crops, especially following CA principles to reduce evaporation and for nitrogen fixing.

4.4. ORI Soil Research Programme
Dr Lapo Magole presented on their new project entitled “Soils science and politics of knowledge” that she is working on with her colleague Dr Toyin Kolawole at the Okavango Research Institute. She said they recognise
that soil infertility is a serious problem and threat to both agricultural production/yields and food security in semi-arid areas of Botswana in general and Ngamiland in particular is no exception as it lies on the inherently infertile Kgalagadi sands. There has been several attempts to deal with the issue but today, the integrated soil fertility management (ISFM) approach, which upholds stakeholders’ interests, socio-political, economic and environmental dimensions has become popular. Knowledge production, including that about integrated soil fertility management (ISFM) and its implementation, is influenced by power relations amongst knowledge holders and custodians. Indeed, politics play a crucial role in the process of determining what is considered an acceptable way of knowing and useful knowledge. Thus, the general objective of the proposed project is to ascertain the viewpoints of small farmers and soil scientists about the relevance/role of small farmers, knowledge in ISFM implementation in Northwestern Botswana.

Among others, the study intends to answer the following questions:

• What are the roles and position of small farmers of Ngamiland in the current knowledge discourse?
• What are their views about ISFM?
• How have these small farmers interacted with western innovations?
• How do western trained soil scientists perceive these farmers in relation to soil management?
• What is the pragmatic framework for ISFM that could enhance sustainable soil management and agricultural development in the Ngamiland? CA?

Study sites
A purposive sampling of all the three main geographic areas of the Okavango Delta or Ngamiland District shall be carried out. The geographic area comprise the panhandle, the mid delta area and the delta distal area. Farming communities were chosen from each area tentatively as follow; Mohembo and Kauxwi in the panhandle; Nokaneng and surrounding areas in the delta area; and Chanoga, Xana and Makalamabedi in the distal area. These will provide for comprehensive coverage of the District as well as the cultural diversity in farming systems. The panhandle area is mainly inhabited by BahanbuKushu farmers, while the mid delta is inhabited mainly by Bayei and Batawana farmers dominate the areas chosen at the distal end. ORI will be working with all stakeholders and are happy to have been introduced to the CA practitioners in the region

5. Botswana College of Agriculture
Two representatives of the Botswana College of Agriculture and the government represented work already done on CA in the country, also with networks that exist with other CA programmes.
5.1. Dr. Cecil Patrick

Dr Patrick started by indicating that while global population will increase by 50% by 2050; Sub Saharan Africa’s will increase by 150% (from 0.8 to 2 billion). This will require 50% more food, but Africa’s per capita food production has been declining over the last 50 years. (FAO statistics)

He also listed CA enhancers as general good agronomic practices worthy of promoting, such as timely planting, proper plant spacing, effective weed control (with and without herbicides) and the use of improved external inputs and of improved seeds and of the judicious use of fertilisers and pesticides. Agro-forestry is an important advantage – e.g. including Faidherbia Albida; Baobab; Grevillea; shrubs in CA

Disadvantages of the ox ploughing that most of rural African are up to can be compared to CA on all levels. CA field days are opportunities to teach farmers by demonstration and interaction with emphasis on specific inputs but warned that the real sustainable CA interventions (no till, soil cover and crop rotations) can very easily pass unnoticed.

5.2. Dr. Gilbert Gaboutloeloe

Dr Gaboutloeloe introduced the networks and support systems that already exist in the SADC region to support the practice of CA:

• The Conservation Agriculture Regional Working Group (CARWG) was established by FAO in 2007 with the purpose of coordinating the activities of organizations working to support the introduction and promotion of CA in the SADC region.
• The CARWG works in partnership with a network of National CA Task Forces (NCATF) which coordinate stakeholders within individual countries.
• The ultimate aim is to support and promote the adoption by farmers of packages of CA techniques that are appropriate to their agro-ecological situation and farming practices.

Vision of the network of the CARWG and NCATFs:

• that CA is adopted by farmers throughout the region leading to increased production and farm profitability and sustainable farming systems and so that CA will be widely understood at all levels of the agricultural sector
• that research and training institutions will have adapted their work to include CA
• Policies supportive to the adoption of CA will be developed and implemented.

The Mission of CARWG:

• to provide a platform for the coordination of stakeholders working at a regional level e.g. African Conservation Tillage Network (ACT), FANRPAN to tackle the various constraints on the adoption of CA in order to achieve the Vision.
• The group will provide strategic support to the NCATFs. They will develop programmes to tackle issues that are regional in nature.
• The Mission of each NCATF is to provide a platform for the coordination of stakeholders working within that country to tackle the constraints on the adoption of CA in order to achieve the Vision.
• The group will raise awareness and lobby at all levels within their country and develop programmes to ensure that CA becomes a leading farming practice.
• Members of the NCATF should be individuals and representatives of organizations which are active in the promotion of CA or have a major supporting role to play in carrying out the Mission
• Members of the CARWG should be individuals and representatives of organizations which fulfill the criteria of having a clear regional mandate in relation to CA and/or have active programmes in at least 3 countries related to CA. In addition, the group includes the Chair of each NCATF.
5.3. Regional Agricultural Research Officer Mr Slumber Badubi

…from the Ministry of Agriculture, Mr Badubi, introduced the official perspective on CA in Botswana. He said that most of Botswana population lives in rural areas dependent on subsistence agriculture including livestock and arable agriculture. Production is influenced by erratic and low rainfall and poor livestock performance due to low nutrients in grazing. Therefore most soils in the country also lack phosphorus and especially in Ngami soils do not favour crop production therefore population of livestock (400 000), 100 000 is above the carrying capacity of the area.

**Government approach to arable agriculture.**

He listed Government initiatives such as : ISPAAD which supports both arable and horticultural agriculture with inputs (fertilisers and seeds), but there are also subsidies for land preparations (harrowing), ploughing and row planting, service centres in strategic places for ISPAAD activities, especially for cluster fencing of 150 ha. The Objectives of ISPAAD are to increase grain production and thus promote food security at household and national levels, commercialize agriculture through mechanization and facilitate access to farm inputs and credit. In this way the government's extension outreach is also improved.

**Molapo Farming and Conservation Agriculture**

Molapo farming, ploughing along the flood plains as the water recedes, probably used to be a form of conservation agriculture. It utilizes the most nutritious soils for crop production and studies show increased yields in molapo farming compared to conventional farming. Some now use soil tilling technologies as well. Seeds should then be supplied in August for farmers to start planting as the floods recedes, but are often late and data collection as well as reaching some of the farmers’ fields are not easy. Molapo farming is dependent on the availability of moisture following flooding and is restricted from use of fertilizer due to proximity to water ways.

**Seed supply in arable farming**

The seed multiplication unit contracts farmers to produce certified seeds. Farmers are also encouraged to purchase hybrid seeds from private companies at a subsidy. The challenge is a lower supply of seeds from contracted farmers (prices also not competitive) and that seeds need to be sourced from Zimbabwe

**Agro-ecological zoning**

- This is a restructuring process that aims to take skills and knowledge nearer to our stakeholders (farmers)
- In Okavango District five clusters were identified as potential areas for specific crops and livestock production
- Clustering was based on the breakthrough areas to promote food security and sovereignty (dairy, bee keeping, smallstock, beef, horticulture and field crops).
Major challenges for food security in this area
- Wildlife and human conflicts
- Roaming livestock
- Erratic rainfall and poor soils with low nutrient content
- Fields not destumped hence inability to use mechanised draught power
- Low yields/ha

Government's views on Conservation Agriculture are that the concept is good as it addresses a solution to the types of available soils. Furthermore the production of cereals in the district will be increased and desertification reduced, also a reduction in expenditure for farmers and government expected. Conflicts between humans and wildlife could be reduced as more could be produced in a small area, elephant control technologies could be applicable. Most important is that with erratic rainfall, soil moisture loss could be controlled, therefore increased yields expected, which will lead to increased crop residues which may be used both for mulching and feeding livestock

Recommendations from the District Headquarters
- Technology for CA should be adopted and researched
- Government policies to be influenced to support this initiative, especially ISPAAD
- Capacity building in Conservation Agriculture technology to be promoted
- Public and private partnership should be encouraged (bringing stakeholders aboard).
6. Group discussions

The facilitator divided the participants in two groups according to interest and experience. One group was assigned to discuss and define the existing and potential stakeholders needed for CA in Botswana. Group Two had to look at the elements needed for a strategy to establish and promote CA in Botswana in development terms. The groups worked according to the tables presented here:

### 6.1. Group One: Stakeholders

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>What is their interest in CA</th>
<th>How big is their influence</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MoA Policy Unit</td>
<td>Increase crop productivity Raise contribution of Agricultural sector in national economy</td>
<td>H H</td>
<td>If they don’t support then CA will never take off in Botswana and productivity may not improve.</td>
</tr>
<tr>
<td>2. DCP</td>
<td>Implement policy relevant to their department and source relevant equipment</td>
<td>M M</td>
<td>Influential in getting people to adopt CA and implement policy</td>
</tr>
<tr>
<td>3. DAP</td>
<td>In getting higher yields for fodder for livestock to improve draught power potential</td>
<td>M M</td>
<td>Influential in getting people to adopt CA and implement policy – should be equal partners in promoting CA with crop production</td>
</tr>
<tr>
<td>4. NAMPAADD</td>
<td>To increase crop production and therefore increase dairy promotion in the commercial sector</td>
<td>H L</td>
<td>Already advocating and started demonstrating deep ripping practices in commercial farming. Influence is very high at policy level</td>
</tr>
<tr>
<td>5. Land Management Unit</td>
<td>Better land utilisation and management of soil quality, water harvesting and soil erosion</td>
<td>H M</td>
<td>Influential in getting people to adopt CA and implement policy</td>
</tr>
<tr>
<td>6. Agri. Business</td>
<td>Providing infrastructure and for creating a market for farmers with higher yields</td>
<td>L L</td>
<td>Influential in getting people to adopt CA by creating markets and providing infrastructure and implement policy</td>
</tr>
<tr>
<td>7. DVS</td>
<td>Health of draught power</td>
<td>L M</td>
<td>Secondary interest in CA</td>
</tr>
<tr>
<td>8. MEWT</td>
<td></td>
<td>L H</td>
<td></td>
</tr>
<tr>
<td>9. Dept. Wildlife</td>
<td>HWC, CA has a role in mitigating conflicts</td>
<td>L M</td>
<td></td>
</tr>
<tr>
<td>10. DEA</td>
<td>Environmental management; policy development</td>
<td>M M</td>
<td></td>
</tr>
<tr>
<td>Stakeholder</td>
<td>What is their interest in CA</td>
<td>How big is their interest</td>
<td>Comments</td>
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</tr>
<tr>
<td>11 Dept. Forestry &amp; Range Resources</td>
<td>Rangeland management,; desertification; veld fires; deforestation</td>
<td>L</td>
<td>High interest because CA will have an enormous positive environmental effect on forests and carbon sequestration</td>
</tr>
<tr>
<td>12 NGOs</td>
<td>Food security, improving rural livelihoods, environmental protection and management, capacity building and training</td>
<td>H</td>
<td>Implementers and understand need of communities and target grass root beneficiaries</td>
</tr>
<tr>
<td>13 Farmers</td>
<td>Higher yields; Reduction in HWC; Better land management; Improved livelihoods; Training other farmers</td>
<td>H</td>
<td>Their actions can influence decisions. If they don’t adopt CA it won’t take off in Botswana</td>
</tr>
<tr>
<td>14 Farmers Union</td>
<td>Higher yields; Reduction in HWC; Better land management; Improved livelihoods; Marketing strategies</td>
<td>H</td>
<td>For decision making and influencing policy as a voice of the farmers</td>
</tr>
<tr>
<td>15 Research</td>
<td>Provide data to show whether CA can improve yields etc.; Technology development; social economic factors and indicators of success</td>
<td>M</td>
<td>Different researchers will have varying interests in CA</td>
</tr>
<tr>
<td>16 Training Institutions</td>
<td>Training manuals, training programmes, curriculum to get CA to suit Botswana; TOT</td>
<td>M</td>
<td>Existing and potential</td>
</tr>
<tr>
<td>17 Ministry of Lands &amp; Housing</td>
<td>Smaller fields and improved land use planning</td>
<td>L</td>
<td>Big stakeholder in influencing policy</td>
</tr>
<tr>
<td>18 Private Sector</td>
<td>Interest in promoting CA for business and encouraging high production</td>
<td>M</td>
<td>Includes consultants and equipment suppliers etc. Influence will become greater as CA is promoted and adopted</td>
</tr>
<tr>
<td>19 Ministry of Education</td>
<td>Promote CA in schools and incorporate into the curriculum</td>
<td>L</td>
<td>Could become more influential once people are learning about CA Children can take info back to parents</td>
</tr>
<tr>
<td>20 CBO</td>
<td>Mobilise communities to adopt CA; assist with implementation</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>21 MOPAPA</td>
<td>Poverty eradication, improved livelihoods, food security</td>
<td>L</td>
<td>Highest influence in decision making processes, policy making and community mobilisation. Does not yet know about CA</td>
</tr>
<tr>
<td>22 Media</td>
<td>Create awareness, promote CA, disseminate information</td>
<td>M</td>
<td>Powerful for influencing all stakeholders</td>
</tr>
<tr>
<td>Stakeholder</td>
<td>What is their interest in CA</td>
<td>How big is their interest</td>
<td>Influence</td>
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<tr>
<td>23 RIPCO/BOTEC</td>
<td>Developing and selling equipment for CA</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>24 Ministry of Sports, Youth &amp; Culture</td>
<td>Youth development programmes in CA</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>25 Donors</td>
<td>Improve rural livelihoods, food security, adaptations to Climate change, environmental management</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>26 Advisory &amp; Financial Institutions</td>
<td>Promoting higher productivity and improve rural livelihoods</td>
<td>L</td>
<td>H</td>
</tr>
<tr>
<td>27 Regional CA partners: GART, ACT, NNF, CPD, FANRPAN</td>
<td>Networking and mutual support; and expansion</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>28 National CA task force</td>
<td>CA development, implementation and expansion in Botswana</td>
<td>H</td>
<td>L</td>
</tr>
<tr>
<td>29 CA Regional working group</td>
<td>Expansion of CA in SADC region</td>
<td>H</td>
<td>L</td>
</tr>
</tbody>
</table>
### 6.2. Group Two: Development of CA

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>WHY (objective)</th>
<th>WHAT</th>
<th>WHERE</th>
<th>BY WHO</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Formation of the CA National Forum</strong></td>
<td>1.1 Network</td>
<td>1.1 Identification of all CA Practitioners</td>
<td>Ngamiland/ North West Region</td>
<td>BCA</td>
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<tr>
<td></td>
<td>1.2 Co-ordinate</td>
<td>1.2 Identification of Secretariat</td>
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<td>1.3 Support</td>
<td>1.3 Terms of reference development</td>
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<tr>
<td>2. National Awareness</td>
<td>2.1 Sensitisation</td>
<td>2.1 Press releases to media</td>
<td>National Level</td>
<td>CA National Forum</td>
</tr>
<tr>
<td></td>
<td>2.2 Promote sustainable farming (human-animal conflict mitigation)</td>
<td>2.2 Conduct Workshops (meetings, seminars, participatory process,…)</td>
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<td></td>
<td>2.3 Policy change</td>
<td>2.3 CA information packages</td>
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<td>2.4 Mind set changing</td>
<td>2.4 Creation of CA website</td>
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<tr>
<td>3. CA Capacity Building</td>
<td>3.1 Empowerment of all stakeholders</td>
<td>3.1 Training of farmers</td>
<td>Local, District, National, Regional</td>
<td>Practitioners (internal and external experts)</td>
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<tr>
<td></td>
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<td>3.2 Training of Trainers</td>
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<td>3.3 Training of Planners</td>
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<td>3.4 Undertake exchange visits</td>
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<td>3.5 CA incorporation in BCA curriculum</td>
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<tr>
<td>4. Resource Mobilisation</td>
<td>4.1 CA implementation</td>
<td>4.1 Proposal writing and submission to funding agents</td>
<td>External/Internal</td>
<td>CA Forum and Practitioners</td>
</tr>
<tr>
<td>5. CA Technology Development</td>
<td>5.1 Identify and adapt CA to Botswana conditions</td>
<td>5.1 Conduct assessments on socio-economic and environment design Action Plan with community (future prospects) Pilot Action Plan &amp; Review</td>
<td>North West Region</td>
<td>BCA, Elephant Research, Pabalelo Trust and Agric-Research</td>
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<td></td>
<td></td>
<td>5.2 Design Action Plan with community (future prospects) Pilot Action Plan &amp; Review</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>5.3 Pilot Action Plan &amp; Review</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>5.4 CA Implementation</td>
<td></td>
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<tr>
<td>6. Lobby for CA incorporation into government policy (Policy framework)</td>
<td>6.1 Creating an enabling environment and foster government support</td>
<td>6.1 Input CA into on-going agro-ecological zoning policy Input CA into on-going ISPAAD programme review and Bio-safety and biodiversity programme. Link CA to service providers (e.g dept. of meteorological services, BAM, Land Boards, NAMPAAD,)</td>
<td>National level Forum/Task Force, relevant ministries</td>
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<tr>
<td></td>
<td></td>
<td>6.2 Input CA into on-going ISPAAD programme review and Bio-safety and biodiversity programme. Link CA to service providers (e.g dept. of meteorological services, BAM, Land Boards, NAMPAAD,)</td>
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<td>6.3 Link CA to service providers (e.g dept. of meteorological services, BAM, Land Boards, NAMPAAD,)</td>
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<tr>
<td>7. Task Force Formation</td>
<td>7.1 Represent national aspirations to CARWG</td>
<td>7.1 Identify stakeholders</td>
<td>National level Forum</td>
<td></td>
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</tbody>
</table>
### ACTIVITY

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>WHY (objective)</th>
<th>WHAT</th>
<th>WHERE</th>
<th>BY WHO</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Research</td>
<td>8.1 Baseline and continuous knowledge accumulation on CA</td>
<td>8.1 Environment diagnosis studies</td>
<td>National Level</td>
<td>Researchers, ORI, BCA, Ministry of Agriculture</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.2 Policy environment studies</td>
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<td></td>
<td></td>
<td>8.3 Pilot-monitoring set up</td>
<td></td>
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<tr>
<td>9. Monitoring and Evaluation</td>
<td>9.1 Measure success of the programme</td>
<td>9.1 Develop a monitoring system</td>
<td>National level</td>
<td>Taskforce and other stakeholders</td>
</tr>
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<td></td>
<td></td>
<td>9.2 Come up with success indicators</td>
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</tbody>
</table>

### 7. Way Forward

The following pointers were agreed as a way forward

- There is need to establish a National CA Forum. This high level Forum will seek to create a buy-in of CA at policy level and in learning institutions. Botswana College of Agriculture will lead
- Farmers must be engaged and introduced to CA at the earliest opportunity and those interested must be trained in CA to serve as Champion Farmers. Pabalelo Trust and Elephant Research Project to take the lead
- CA Demonstration sites must be established to support farmers with “on the job training”. Pabalelo Trust and Elephant Research Project to take the lead
- Research and monitoring must be an critical part of CA ORI and BCA to take the lead by engaging researchers and students in CA monitoring
- CA practitioners must develop funding proposals (individually and collectively) and submit to SAREP small grants fund

### Appendices:

Presentations and other resource materials are available on the following website:

[https://sites.google.com/site/pabaleloprojects/](https://sites.google.com/site/pabaleloprojects/)