

RESILIM-O:
Resilience in the Limpopo Basin
Program- Olifants

MILESTONE 6: Progress Report #5:
Under the
Lower Olifants catchment
Agricultural Support Initiative
(AgriSI)

30/09/2017



Acknowledgements

The USAID: RESILIM-O project is funded by the U.S. Agency for International Development under USAID/Southern Africa RESILIENCE IN THE LIMPOPO BASIN PROGRAM (RESILIM). The RESILIM-O project is implemented by the Association for Water and Rural Development (AWARD), in collaboration with partners. Cooperative Agreement nr AID-674-A-13-00008.

© Association for Water and Rural Development (AWARD)

P O Box 1919

Hoedspruit 1380

Limpopo, South Africa

T 015-793 0503

W award.org.za

Company Reg. No. 98/03011/08

Non-profit org. Reg. No. 006 - 821



ABOUT USAID: RESILIM

USAID's Resilience in the Limpopo River Basin (RESILIM) program addresses ongoing degradation in the Limpopo River Basin in southern Africa, where people face water shortages, increased floods, and declines in crop productivity as climate change further stresses an already water limited region.

There are two components to the program; one operating at a basin-scale (RESILIM-B, which is implemented by USA-based Chemonix and addresses similar issues at the scale of the four SADC member states that share the Limpopo Basin (South Africa, Botswana, Zimbabwe and Mozambique) and a catchment-scale project (RESILIM-O) that It is being implemented by the Association for Water and Rural Development (AWARD). Both projects share the same overall objectives. You can find out more information on the RESILIM projects on www.usaid.gov website and www.award.org.za.

The USAID's RESILIM-O focusses on the Olifants catchment. The program aims to reduce the vulnerability of people and ecosystems in the Olifants Catchment specifically, by improving how transboundary natural resources are managed. By understanding the systemic causes of vulnerability, including climate vulnerability, it is promoting new ways of thinking and acting to promote integrated water and biodiversity management.

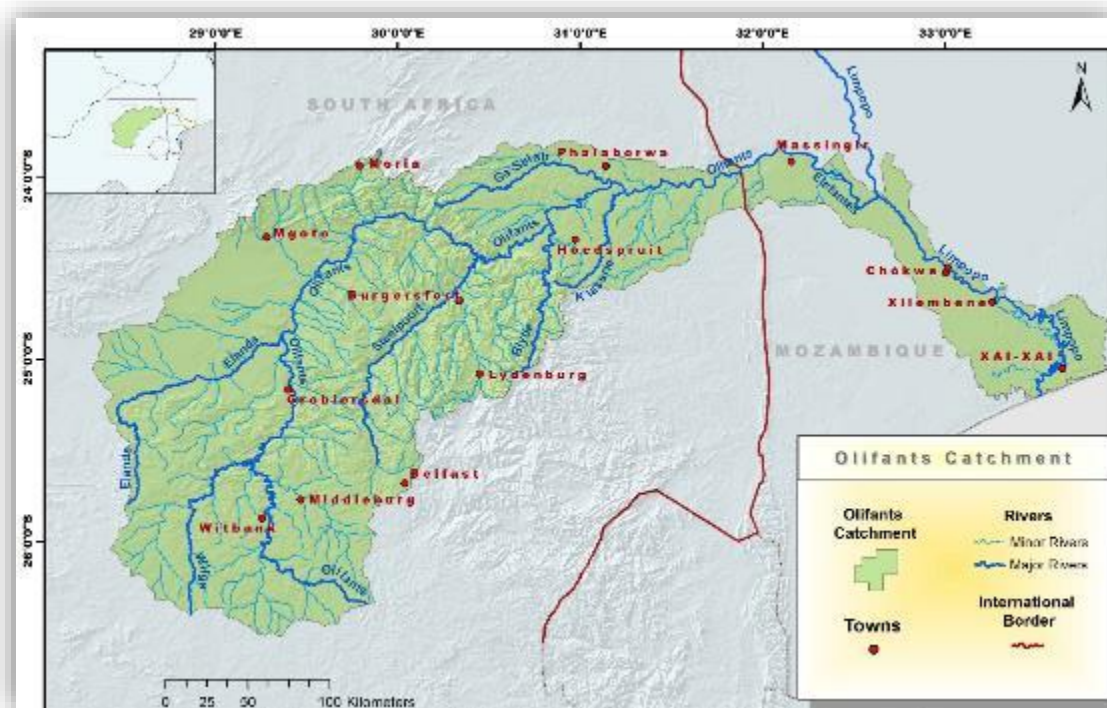
ABOUT AWARD

At AWARD, we recognize that the natural world's resources are limited, and undergoing rapid depletion and transformation. We know current practices of use and management are inadequate to deal with the changes and challenges we are facing. We design practical interventions to address the vulnerability of people and ecosystems, and merge considerations from both environmental and social perspectives. Our approach involves thinking across disciplines, boundaries and systems.

We are working with diverse people and institutions in the water and biodiversity sectors in the Olifants River Catchment to understand the multiple vulnerabilities to change, including climate change. Along with quality scientific contributions, our engagement in the socio-political context of the Olifants River Catchment allows us begin to begin to institutionalize integrated, resilience-based practices, providing a foundation for robust development policy and practice in the in this river catchment, and beyond.

The Olifants Catchment: An overview

The Olifants River Catchment falls within the Limpopo River Basin, which is part of an international drainage basin that stretches across South Africa, Mozambique, Zimbabwe and Botswana. In fact, the Olifants River contributes nearly 40% of the water that flows in the Limpopo River making it an important catchment in the system as a whole.



At the heart of this catchment is the Olifants River, a vital artery that flows for 560 kilometres through South Africa and into Mozambique, where it is known as the Rio dos Elefantes in Mozambique.

This mighty river originates in South Africa's Mpumalanga Highveld, flowing northwards before curving in an easterly direction through the Kruger National Park and into Mozambique, finally finding rest in the salty water of the Indian Ocean near Xai Xai, just north of Maputo.

The main tributaries of the Olifants River are the Wilge, Elands, Ga-Selati, Klein Olifants, Steelpoort, Blyde, Klaserie and Timbavati Rivers.

Along with its tributaries, it is one of the six major Lowveld river systems, occupying an area just short of 55 000 square kilometres. It traverses three provinces in South Africa; Gauteng, Mpumalanga and Limpopo. About 3.5 million people live on the South African side of the catchment. In Mozambique, it flows through Gaza Province, which is home to about 700 000 people.

A system under change

Our catchment is the foundation of our livelihoods and development. Yet the river and associated natural resources in the Olifants Catchment are under threat...

Unchecked pollution, inappropriate land resource use, weak and poorly enforced policies and regulations and poor protection of habitats and biodiversity are degrading the Olifants at an alarming rate. What's more, the area is however under threat from factors such as mining for heavy metals, inappropriate land management, rural sprawl and unsustainable use of natural resources. This affects the level of goods and services provided by the ecosystem.

The diverse population groups living in the Olifants Catchment all have one thing in common; they rely on the river and the catchment's natural biodiversity for their livelihoods. This reliance can be direct or indirect. Rural communities rely on it for things such as traditional medicine, grazing and browse, fuel, food and housing materials. Some people in river-side communities harvest reeds, collect water from the river for washing and drinking and use it for recreational and spiritual practices. Subsistence farmers in



Mozambique rely heavily on the catchment's flood plains. There are also large mines and associated industries, large scale agriculture and the wildlife economy, which all rely on a healthy, functioning river system. Often people forget that what they do upstream affects people downstream, sometimes with dire consequences.

The catchment is our home and it is worth investing in its future. The work reported here is part of the ongoing activities of the RESILIM- O project under the grant from USAID: Southern Africa.



Project partners



Mahlatini Development Foundation (MDF) is a small public benefit non-profit organization consisting of rural development practitioners who specialize in participatory learning and action processes, sustainable natural resource management and low external input farming systems, including a focus on rain water harvesting, conservation agriculture, intensive homestead food production, food security, micro finance and enterprise development.

MDF designs and implements rural development programmes and training processes providing learning processes for adults all the way from semi- literate farmers to post graduate university level. We work in partnership with government and non-government organisations alike. We are sensitive to and mainstream where possible gender, disability and living with HIV/AIDs



Contents

Table of Contents

1 Executive Summary	9
1.1 Progress for the reporting period	9
2 Project Objectives	9
2.1 Overview of RESILIM-O Project objectives.....	9
2.2 Sub-grant Project Objectives	10
3 Milestone Description.....	10
3.1 Definition of milestone and purpose.....	10
4 Approach/ Process/ Activities	12
4.1 Summary of activities	12
4.2 Progress and Results	13
4.2.1 Learning and mentoring	13
4.2.2 Learning workshops.....	18
4.2.3 Garden monitoring.....	20
4.2.4 Collaborative work	25
4.3 Success and Challenges in meeting milestone.	31
4.4 MERL.....	31
4.4.1 Indicators: Assessment September 2017	31
4.4.2 Project Life Change Questions:	32
4.4.3 Work Plan for the coming three months.....	34
4.5 Communication Materials from this milestone.....	35
4.6 Other outputs	35
5 Overall Progress of Project	35
5.1 Integration of milestone status.	35
5.2 Project risk and mitigation summary.	36
5.2.1 Implementation risks and mitigation	36
5.2.2 Financial risks and mitigation.....	37
6 Conclusion and Recommendations	37
7 Appendices	37
1 Appendix 1: Case studies; WRC CCA	38
1.1 Climate Change Adaptation, Limpopo	38
1.1.1 Description of the programme	38



1.1.2	Problem	38
1.1.3	Rationale	39
1.1.4	Implementation of practices	39
1.1.5	Methodology	43
1.1.6	Outcomes and learnings.....	45
	Future planning	49
1.1.7	Suitability of this community as an implementation site for the CSA project	50
2	Appendix 2: DICLAD_Conversations about farming and climate change_ Principles for good farming practices - Sedawa 20170817	51
2.1	Agenda	51
2.2	Introduction	51
2.3	Climate Change Concepts.....	53
2.4	Small group work	53
2.5	Way forward.....	56



1 Executive Summary

1.1 Progress for the reporting period

During this quarter focus was given to:

- The construction of the 10 tunnels (shade cloth structures and associated drip irrigation systems) across three villages - Botshabelo, Swedawa and The Oaks
- The construction of 3 underground RWH storage tanks (24m³) in Botshabelo and Sedawa - Norah Mhlaku, Christina Thobejane and Mariam Malepe.
- Training and mentoring of Local Facilitators (LFs) and garden monitoring for participants

In addition, DICLAD workshops have been held for exploration of Climate Change impacts and adaptation for all 6 villages (3 workshops).

Further learning workshops have been run for all 6 villages, to provide an overview of all the practices introduced thus far, a further focus on natural pest and disease control and to start on the Conservation Agriculture trial process for the coming planting season. The agendas have been designed to accommodate learning needs expressed by the groups. Some areas, for example Sedawa have asked for another process around natural pest and disease control. Willows and The Oaks have requested an emphasis on practices appropriate for field scale implementation.

Attention has been given to support the local facilitators in their processes of providing advice and support to participants and in completion of the garden monitoring forms. A total of 38 forms have been translated and analysed (April- July 2017). This process is ongoing and some adjustments have been made to increase efficiency.

PARTICIPANTS THIS PERIOD

SEEDS OF LIGHT: Trygive Nxumalo

MAHLATHINI: Erna Kruger, Sylvester Selala, Chris Stimie

AWARD: Richard Hatfield, Bigboy Mkhabela,

2 Project Objectives

2.1 Overview of RESILIM-O Project objectives

RESILIM-O is large multi-faceted, multi-stakeholder, cross-boundary programme to reduce vulnerability to climate change through building improved transboundary water and biodiversity governance and management of the Olifants Basin through the adoption of science-based strategies that enhance the resilience of its people and ecosystems through systemic and social learning approaches. The programme has been running for four years and is being implemented by AWARD (The Association for Water and Rural Development) with funding from USAID.

The Agricultural Support Initiative (AgriSI) was initiated as a sub-grant process within the larger programme towards the end of 2016. This initiative works specifically with climate change adaptation processes with smallholder communities in the lower Olifants River basin. It is being implemented jointly by Mahlathini Development Foundation and AWARD.

The Agricultural Support Initiative (AgriSI) addresses two of the RESILIM-O programme objectives directly:



- i. To institutionalize systemic, collaborative planning and action for resilience of ecosystems and associated livelihoods through enhancing the capacity of stakeholders to sustainably manage natural resources of the Olifants River Basin under different scenarios
- ii. To reduce vulnerability to climate change and other factors by supporting collective action, informed adaptation strategies and practices and tenable institutional arrangements.

2.2 Sub-grant Project Objectives

Sound agro-ecological practices for soil and water conservation (SWC) and the ability to self-organise and act collectively are regarded as fundamental for building adaptive capacity and resilience. Not only do agro-ecological farming approaches require minimum external inputs - which may be expensive and increase dependency if subsidised - but they foster farmers' sense that they can build sustainable futures from local inputs and efforts. With knowledge about the potential impacts of climate change included in the learning journey, farmers can make purposeful decisions around practices such as seed and crop-type. This approach supports livelihood diversification - also fundamental for increased resilience - through 'value-added' associated activities such as seedling production, tree nurseries and bee-keeping.

The overall aim of the Agricultural Support Initiative is to enhance the resilience of the people and ecosystems in selected villages (5-6) in the Lower Olifants River basin, using a systemic social learning approach, exploring the question: *What are you learning about the socio-economic and biophysical characteristics of your environment and how these are changing and how are you able to respond to that?*

The overarching objective of this work is to provide support for increased adaptive capacity and resilience to the effects of climate change for households involved in agriculture in select communities of the Olifants River Catchment through:

- Improved soil and water conservation and agro-ecological practices for increased food security
- Livelihood diversification and supplementation through alternative climate resistant production;
- Increased community empowerment as a result of self-organisation and collective action.

3 Milestone Description

3.1 Definition of milestone and purpose

Each milestone and progress report indicates activities under the broad themes of learning and mentoring, introduction to innovations and experimentation, collaborative work and networking undertaken during the reporting period.

The table below summarises these activities against the milestone and indicate achievement of these milestones.

Table 1: Summary of deliverable completion under Milestone 5: April- June 2017



	Activities planned	Completed?	Expected outcomes	Completed?	Verification documentation	Completed?	Reference
Learning & Mentoring: In all 6 communities each 2 days	Learning & Mentoring: Local Facilitator training Local Facilitator mentoring of new practices Farmer ongoing self-monitoring, -assessment and learning	C	-Training of LFs in mentoring, learning and monitoring (2 days x 6 villages) -LF's undertake garden mentoring and monitoring with farmers (3-4 days ea), supported by field team- -Learning groups; learning sessions - overview of practices- natural P&D control, tower gardens, CA	C C C	Progress report on outcomes including the following documentation: 1. Photos & photo diaries 2. Farmer work plans 3. Garden monitoring 4. Monthly assessments 5. Monitoring forms 6. Cluster activity records 7. Event materials, attendance registers	C	1. Photos in reports and- All photos saved in directories and kept by Erna and Lenkie 2. Farmer work plans are recorded in the garden monitoring forms 3. 38 Garden monitoring forms across five villages 4. In this report 5. 36 garden monitoring forms 6. Appended to this report 7. Appended to this report
Intro to innovations and experimentation: In all 6 communities each 2 days	Mentoring by trainers and LFs'	C	- Garden monitoring including trainers and LFs- all participants visited at least once by LFs and a garden monitoring form completed	C		C	
Collaborative work: In all 6 communities each 2 days	Site assessments and community contributions to infrastructure support; tunnels, drip kits and RWH storage tanks	C	-Preparation for and construction of tunnels (x10) and RWH storage tanks (x3) complete.	C		C	
Networking: 1. Local facilitator networking: all 6 Memetje villages reps 2. Village 3 (Oaks) & village 4 (Lepelle) open days (1 day each)	DICLAD workshops (Sedawa, Botshabelo, Willows and The Oaks, Finale and Lepelle	C	- 3 DICLAD workshops exploring CC impacts and adaptation options	C		C	



4 Approach/ Process/ Activities

4.1 Summary of activities

This section gives an indication of activities undertaken during the reporting period to achieve the outcomes for this period, time spent and people involved.

Table 2: Summary of activities for the reporting period July-September 2017.

DATE	DESCRIPTION OF ACTIVITY	Time	WHO WAS INVOLVED
2017/07/06-07	Reports, arrangements for workshops	2 days	Sylvester - 1 day
2017/07/05-07	Baseline questionnaires database	3 days	Erna
2017/07/05	Trygive planning at AWARD office	1 day	Trygive
2017/07/07	Household garden monitoring with BB, Lenki, Happy at Botshabelo, Mammetsa	1 day	Trygive
2017/07/20,21	Follow up meeting Christina at sedawe, Norah in Mametja, Merriam Botshabelo. Follow up On building of pits for tanks, Christina at Sedawe, Norah in Mametja, Merriam Btshabelo	2 days	Trygive
2017/07/23-29	Week in Hoedspruit- tunnel and tank construction, hh visits	7 days	Sylvester
2017/07/25,26	Building tunnel at Meriam with Sylvester in Botshabelo. Indaba on Climate change Maruleng Municipality	2 days	Trygive
2017/07/31-08/06	Dam construction with Chris Stimie and Southern Irrigation team	7 days	Sylvester, Chris
2017/07/25	RWH DKA report and invoice	1 day	Erna
2017/07/28-29	AgSi case study for implementation review (5 fingers)	1 day	Erna
2017/08/01-02	Database for baseline questionnaires and monitoring forms - started	2 days	Erna
2017/08/14	Logistics around RWH tank sites and prep for tunnel construction	1 day	Sylvester
2017/08/15	Visit to LFs	1 day	Sylvester
2017/08/16	Construction of tunnel, Sedawa	1 day	Sylvester
2017/08/17	DICLAD workshop Sedawa	1 day	Sylvester
2017/08/18	DICLAD workshop Lepelle (cancelled) Logistics Botshabelo + Sedawa	1 day	Sylvester
2017/08/19	Travel to PMB	1 day	Sylvester
2017/08/14-19	Visits to LFs; Willows, Oaks, Sedawa. Finance meeting with Julia, Mayford, DICLAD prep and DICLAD w/s Sedawa, Lepelle,	6,5 days	Erna
2017/08/21-26	Chris Stimie, Southern Irrigation team -finalisation of underground RWH tanks	6 days	Chris
2017/09/18-19	Workshop in Willows	2 days	Sylvester
2017/09/20	Visits to LFs	1 day	Sylvester
2017/09/21	Workshop in The Oaks	1 day	Sylvester
2017/09/22, 25	Garden monitoring	4 days	Sylvester
2017/09/26, 27,29	Workshop Sedawa, Lepelle, Botshabelo	3 days	Sylvester
2017/09/28	DICLAD Workshop - at the Oaks	1 day	Sylvester
2017/09/30	Travel, reporting	2 days	Sylvester
2017/09/13-15	Milestone report	3 days	Erna



2017/09/28-30	Milestone report- garden monitoring consolidation	3 days	Erna
---------------	---	--------	------

Sylvester: 36 days, Erna: 20 days, Chris: 10 days, Trygive 6 days

4.2 Progress and Results

4.2.1 Learning and mentoring

This quarter was devoted mainly to working with the Local Facilitators (LFs) to do the household visits and garden monitoring for learning group participants.

An implementation summary of this process is provided below.

4.2.1.1 LOCAL FACILITATOR ACTIVITIES AND PROGRESS

Below are a selection of photographs showing the Local facilitators in action



Above Left to right: Melida Shaai and Tomspen Motseo from Willows in an LF meeting, showing the seeds to be distributed for spring planting. Mr Motseo in his garden next to one of the trench beds he is making and Christina Thobejane from Sedawa showing some of her produce being harvested.





Above left and right: Florence Lewele from the Oaks working in a small group with a garden monitoring form to interview a participant. Josias Seboyane and Patricia Ngobeni from Lepelle show a participant how to mulch her furrows and ridges during a household visit.

4.2.1.1.1 Progress summary

Nine Local facilitators have been selected, instead of the original six planned for. This is due to distances between villages, sizes of the groups (1 LF per 25 learning group members), gender requirements and limited skill sets for these facilitators.

Formal terms of employment have not been agreed to with the LFs', and their payment is seen as stipends supporting their activities. Each, fills in a detailed timesheet of their activities per month up to a maximum of 10 days (@R200/day). Activities for LFs' include:

- Monitoring implementation in participants' gardens on a regular basis, using the gardening monitoring forms provided. It is expected that LFs can visit 3 participants per day.
- Assistance to individuals in their gardening practices by providing advice, doing small demonstrations and assisting in setting up gardening experiments. It is expected that LFs will help in doing some of the work required
- Set up small localised training events where required.
- Providing a link between the implementation organisation and the participants in helping to set up meetings for example or in distribution of seeds as well as raising requests and issues from the participants with the implementing organisation. Keeping lists of participants' names and helping new participants integrate into the learning group.

It was expected that most of the LFs' time would be devoted to doing regular gardening monitoring visits. Because the groups are in fact still quite fluid with new members coming and going, they have had to spend more time on induction of new members and introducing new practices to them as well as those who had not attended some of the training/learning sessions for the group. This requires considerable awareness raising and facilitation skills, which some of the LFs are excelling at, but others are not. This means that some of the learning groups are expanding quite rapidly, while others are shrinking at a rather alarming rate. The intention was not for the LFs to manage the learning groups in this way, but this aspect of their role has somehow been accentuated; partly due to an assumption on our part that the learning group membership is reasonably stable and partly due to the LFs taking on this management process as part of their "jobs". There has been a strong and unexpected trend for the LFs to attempt to ensure that they maximise their activities to the maximum time of 10 days and they have thus taken on roles that were not expected of them.

Most of the LFs have a reasonable understanding of the practices they are promoting, but a number of them are trying to "force" the participants to implement these practices. This has also been a bit unexpected and doesn't fit into the ambit of their negotiated roles. It has also led to some conflict between the facilitators and the learning group members.

These issues are being worked through by having intensive one on one mentoring sessions with each LF. An aspect of this process is to look for ways to re-invigorate the failing learning groups. This would mean re-introducing some trainings, finding ways to include those working in fields rather than at homestead level, re-introducing the idea in the villages using different entry points such as the clinics and home based care workers and working with schools where appropriate.

Another major difficulty for them has been the extreme water shortages in their villages; specifically Botshabelo, Sedawa, Willows and Finala. There literally are no options for irrigation for most of the participants, who are paying for small quantities of household water, often needing to transport it in drums from the distribution points. Those that have boreholes or have managed to make some kind of arrangement for tapping into the municipal water lines are the only ones who can irrigate. Participants cannot pay for irrigation water.

4.2.1.2 Village levels summaries



Table 3: Summary of implementation by the Local facilitators; September 2017

Village	LFs	group size	New HH	Active hh	Practices promoted	Activities	Comments
Sedawa	Christina Thobejane Alex Makgopo	51	11	~30-35	*Greywater management *mulching *pest control remedies *soil fertility improvement *Liquid manure *drip kits *check soil erosion and control, eg stone bunds, diversion ditches *trench beds (shallow and deep) *mixed cropping *5 Fingers assessment *Saving water *eco circles *farmer experimentation	*Garden monitoring *Small group trainings and follow up support *garden level advice and small demonstrations of practices * Bringing on board new participants *Distribution of seeds * Support for new innovation construction processes; tunnels and RWH tanks *	*Garden monitoring has been done together *12 forms filled to date *A local training conducted in Mametje (Mabins A) has led to a subgroup of 16 participants there learning and working together - meeting monthly *Another new group has requested entry (close to the turn off at the hardware store) *1 new volunteer for RWH tanks supported * There are severe water shortages
Willows	Melida Shaai Tomson Motsiea	40	11	-10-15	*Greywater management *mulching *pest control remedies *soil fertility improvement *drip kits *diversion ditches *trench beds (shallow and deep) *eco circles *Mixed cropping *Good irrigation practices * furrows and ridges on contour *farmer experimentation	*Garden monitoring *garden level advice and small demonstrations of practices * Bringing on board new participants *Distribution of seeds	* Garden monitoring has been done together *10 forms filled to date *Seeds distribution managed well, with follow up on planting * Difficulty with motivation of members and many have withdrawn * Requested another training from MDF *There are those who work in the fields not their households and believe these practices are not for them *There are severe water shortages in the village
Oaks, Finala	Florence Lewelle	10	2	8	*mixed cropping *mulching * garden layout *Liquid manure-plant based *trench beds (deep and shallow) *CA	*Garden monitoring *garden level advice and small demonstrations of practices * Bringing on board new participants *Distribution of seeds	*7 forms filled to date- but not done well *Garden monitoring attempted but participants often not home. She does not have their contact details *Quite a number of original learning group members have lost interest or resigned *Linkage made with the local school- but no interest shown There are those who work in the fields not their households and believe these practices are not for them *There are water shortages in the village - but not as severe as in other places.



							*She requested support from Lenkie and another training session run by MDF
Lepelle	Patricia Ngobeni, Josias Seboyane	11		11	*mixed cropping *mulching * garden layout *Liquid manure-plant based *trench beds (deep and shallow) * natural pest and disease control *CA	*Garden monitoring *Garden level advice *Distribution of seeds	*5 forms filled to date *LFs not practising many of the methods and thus do not demonstrate them well to participants. *Participants have worked in and expanded their gardens. Materials for packing trench beds is a challenge *Seed was distributed to specific individuals in the learning group to grow as seedlings and distribute; rape, chinese cabbage, green pepper, swiss chard, chilli, marigold, parsley, coriander, beans *Seedling production and distribution has not happened as planned- in future seeds to be given directly to participants *Linkage made with the local school-
Botshabelo	Mariam Makghobo	28	4	10	*Greywater management *mulching *pest control remedies *soil fertility improvement *Liquid manure *drip kits, tunnels *check soil erosion and control, eg stone bunds, diversion ditches *trench beds (shallow and deep) *mixed cropping *eco circles	*Garden monitoring *garden level advice and small demonstrations of practices * Bringing on board new participants *Distribution of seeds	*Monitoring conducted with support as Mariam is not literate. - *Some practices not focussed on as the LF is not using them and has forgotten *Focus in this quarter on tunnel construction and underground RWH tanks. *Seed distribution done and seedling production by participants undertaken

4.2.1.3 Promotion of good practices

Some of the practices and processes introduced in the learning workshops are being promoted well. These include:

- Mulching
- Mixed cropping
- Trench beds
- Pest control remedies
- Eco-circles

Some practices have not been internalised all that well and are difficult to implement:

- Soil erosion control
- Diversion ditches
- Nurseries
- Seed saving of new varieties and crops introduced
- Promotion of herbs and multi-functional plant species



Some practices have been under-emphasised or not well remembered

- Liquid manure
- Bucket filter for greywater
- Contours and placing furrows and ditches on contour

4.2.1.4 Monitoring forms

LFs are struggling to do these individually. For the most part, they have gone as a team of 2 to fill in these forms. They have been unsure about filling in forms for participants who are not doing much, or have not implemented the new practices. They have also been unsure about recording of garden monitoring for follow up visits, finding the present forms quite long - sometimes not much has changed - or there are only 1-2 small changes and it seems too much to have to fill in the whole form again.

A decision was made to make a simplified garden monitoring follow-up visit form to accommodate for this.

Generally, LFs have claimed for 10 days/month of household visits and support. The number of forms filled in for participants do not tally with these and there appears to be a trend for LFs to spend time, so as to be able to claim.

It was emphasised to LFs that they are expected to do at least 3 hh visits in a day and thus three forms. If their group is small then they cannot claim for a lot of time. They will be paid for forms completed and submitted- not just visits.

4.2.1.5 Overall trends

- Where LFs have got the process right of working with participants and promoting farmer experimentation the support has worked well - for example in Sedawa. Where they have however tried to 'force' participants to implement the practices introduced, there has been some resistance - for example Willows and The Oaks. Some of the LFs are seeing themselves as being in charge of the learning groups and this is not leading to good cooperation.
- LFs' holding small workshops around specific themes in small sub groups within their village has worked well. This has led to a considerable expansion of the learning group in Sedawa for example and also to learning group members undertaking to meet regularly and discuss their issues.
- There is an expectation from participants that LFs will help them to do the work of implementation. Although this has been emphasised by the facilitation team as a good thing, LFs are not keen to actually work in participants' gardens.
- Not all the LFs are practising the whole suite of methods and processes introduced during the learning processes and as a result what they are promoting to their learning group members is biased more towards what they are doing and are familiar with.
- Generally the garden monitoring forms have been difficult for LFs to complete and have not been done well, despite training sessions and mentored practice rounds with the facilitators.
- LFs have all set up good working systems with the participants relating to seed distribution and seedling production.
- LFs have provided a good link with the facilitation team and have generally coordinated meetings and have processes such as beneficiation for tunnels and underground tanks. They have been able to communicate challenges and successes in their groups.

4.2.1.6 Recommendations

- LFs have asked that another round of training or learning sessions be done by the facilitation team- providing a quick overview of all practices introduced - this was done towards the end of September, 2017
- LFs have been asked not to fill their time, but only claim for actual hh visits - and to undertake 3hh visits per day. The support provided in this project is not a full time 'job'.
- A garden monitoring follow-up form- a much simplified version of the full garden monitoring form, has been designed for LFs to use on repeat visits to households
- LFs have been given mini refreshers workshops- on a one to one basis for the introduction of farmer experimentation with participants, as a way to promote learning and implementation.



4.2.2 Learning workshops

Through review sessions held with each of the LFs, workshop agendas were tailored to suite the present needs and suggestions from the participants in those learning groups.

The learning agendas for the workshops conducted in September 2017, for each village is shown below. Materials required, which are supplied by Mahlathini and contributions from participants are relevant for each of the workshops, but here have only been mentioned in the first workshop

4.2.2.1 Sedawa and Mabins A

- Disease and Pest control
- Introduction to pest control (farmers experience or knowledge of pest control)
- Traditional disease and pest control methods
- Disease and pests control innovations (companion planting, use of herbs and multipurpose plants, making mixes)
- Design of an eco-circle
- Tower garden demonstration

Material required

- Plants and herbs (Tzaneen) to be purchased, can also source some from the other participants
- Seed (available already for this group)
- Mixes (chili, onion, garlic, soap) to be purchased
- 4x droppers/poles, 2x3 m805 shade cloth, 10l bucket

Contribution from participants

- Manure (chicken, goat, cattle)
- Banana stems
- Blackjack Seed
- Tools (grater, chopping board, 2 l bottles, and buckets)
- Ash and stones

4.2.2.2 Willows

- Soil fertility (from the last training the focus was more on use of fertilizer, we need to shift to simple ways)
 - o Deep trench beds
 - o Shallow trench beds
 - o Key hole gardening and tower garden
- Water movement and water management (use of line level in making stone lines and diversion furrows)
- Disease and pest control
- CA (use of Mbili planter)

4.2.2.3 Oaks

Introduction of the project (MDF and AWARD and the AgriSI project) (new participants expected)

- Water management
 - o Water movement and use of line level
 - o grey water system
- Soil fertility
 - o Liquid manure (manure, blackjack leaves and banana stems)
 - o Tower garden



- Disease and pest control
 - o Mixes
 - o Introduction to herbs and multipurpose plants
 - o Design of an eco-circle

4.2.2.4 Lepelle

- Soil fertility
- Five fingers
- Keyhole bed and tower garden
- Trees (pest control in fruit trees)

4.2.2.5 Botshabelo

- Five fingers principles
- Water issues (infiltration pit, zai pits and other techniques)
- Tower gardens
- Keyhole beds

The keyhole beds and tower gardens are being specifically introduced to give participants further opportunities to use and work with greywater systems. Keyhole beds require stones for their construction and thus work well in rocky areas.

The 'Five fingers' approach is being reintroduced as a method for remembering and assessing good practices for those villages where LFs have not been confident to work with these principles with their learning groups



Above left and right; A photograph and schematic representation of a keyhole bed showing the stonewalls and central composting basket for greywater

Right: An example of a newly planted tower garden - Here the crops are planted into small holes made in the side of the bag, which is packed with a compost, soil and ash mixture for use of greywater.





4.2.3 Garden monitoring

A total of 38 forms have been completed and analysed across 6 villages by the LFs between April and July 2017.

These garden monitoring forms have been analysed for the no of participants who have implemented various practices; including local good practices, new interventions (new ideas around gardening and S&WC introduced through learning sessions), new innovations (such as tunnels, drip kits and underground RWH storage tanks) and who have done farmer experiments.

The results are presented in the sun burst diagram below





Figure 1: Diagram showing implementation of good practices, both local and introduced by the gardening participants between April and July 2017.

From the diagram, it can be seen that participants have included the new gardening techniques and ideas alongside the good local traditional practices in the area.

Those practices that more than 80% of participants have implemented include: the traditional practices of planting multipurpose plants (windbreaks, hedges, medicinal and fruit) and use of greywater as well as planting of seed and production of seedlings and mulching

Those practices that between 50-79% of participants have implemented include: the traditional practice of planting in furrows and ridges, making of stone lines and bunds for controlling water movement and local RWH techniques (collecting water in basins and drums), trench beds and seed saving.

Those practices that only a small percentage of participants have implemented (8-39%) include; contours, eco-circles, liquid manure, natural pest and disease control methods and conservation agriculture. For the traditional practices, nurseries for propagation of multipurpose plant species is quite rare (around 18% of participants). These practices will all be re-emphasised in the upcoming learning events for the programme.

Around 58% of the participants have tried out farmer experiments. These experiments have been promoted by the local facilitators and include for example gardeners comparing their normal planting techniques with planting in trench beds, in planting with and without mulch and in planting beds to single crops or mixed crops.

We then compared the percentage implementation of new innovations and interventions for the two periods where individuals have been interviewed; November 2016-March 2017 and April-July 2017. See Figure 2 below.

From these two sets of data, it can be seen that there has been a substantial increase in the implementation of a number of different interventions including; mulching, trench beds, mixed cropping, production of seedlings, diversion ditches, stone lines, natural pest and disease control and use of liquid manure.

In addition, the new innovations of tunnels, drip-kits and underground RWH structures have been introduced and implemented in the second period.

Generally, these implementation results are very promising and show good implementation of new ideas by the project participants.

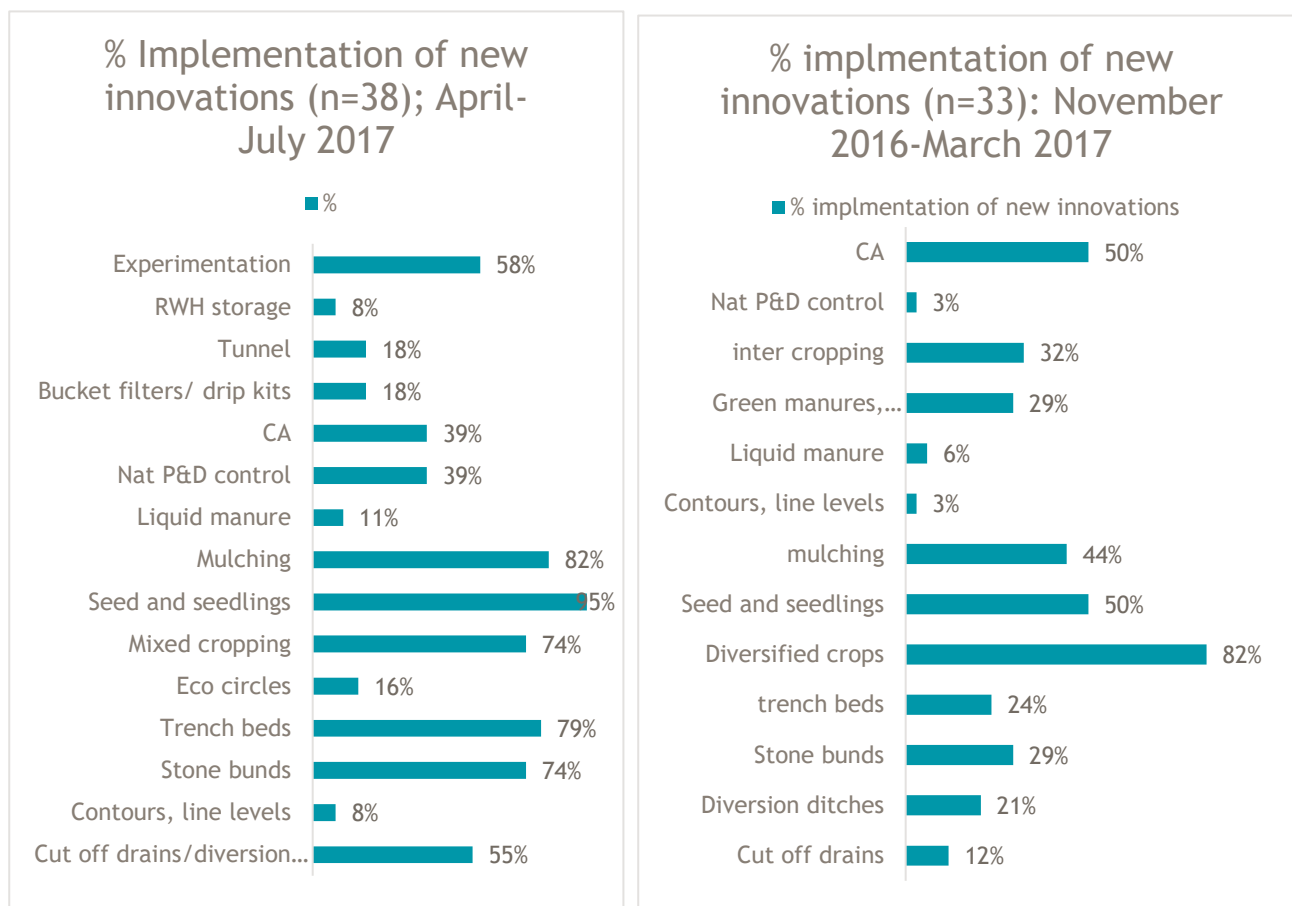


Figure 2: Comparison of percentage implementation of new innovations by project participants

In addition, participants are also increasing their implementation of local good practices, as these are being promoted in the learning sessions and through the local facilitators alongside the new ideas. See figure 3 below

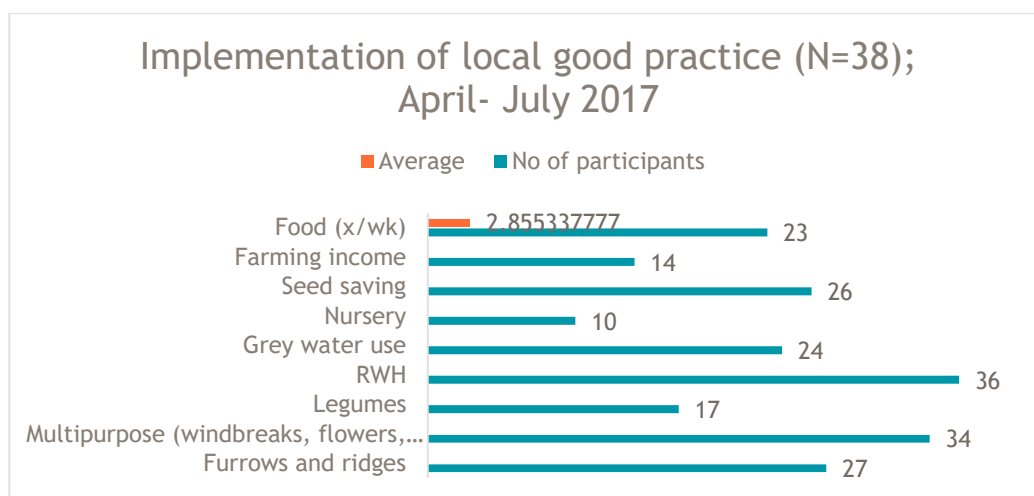


Figure 3: Implementation of local good practices by project participants.



From this chart, it can be seen that around 61% of participants are able to harvest produce and eat from their gardens on a weekly basis (average of 2,8x/week) and that around 37% of participants sell produce locally to make small amounts of additional income. The results for the survey conducted during the rainy season (November 2016-April-march 2017) showed a somewhat different result, where 85% of participants were able to eat from their gardens 3x/week and 55% of participants were selling small quantities of produce. The reduction in production is directly related to lack of access to water for irrigation.

Below are a selection of photographs meant to be indicative of gardening implementation over the last few months.



Above left: Magdalena Malepe in Sedawa with her beautiful small garden- trench beds, mixed cropping and mulching visible. Above middle and Left: Alex Makgopa's (Sedawa) well tended and diverse garden



Above left and middle: views of Christina Thobejane's garden (Sedawa). She has implemented the whole suite of options including nurseries, trench beds, drip irrigation, mixed cropping and mulching and Above right; Florence Lewele's garden (The Oaks). She has tried out trench beds, mixed cropping and mulching.



Above left: carrot harvest from a trench bed - with nice straight carrots in the foreground compared to a normal planting in the background with deformed roots. Above middle: harvest of chillies, parsley and fennel and right: Maria Malepe's garden (Botshabelo); she has tried fencing her garden. Mustard spinach is in the foreground of the picture.



Left: A good tomato crop for Sophy Molotho in Sedawa and Right; Linah Malepe's trench beds planted to mixed vegetables and mulched.



Above left: Matibeng Morema's garden (Sedawa). She was not doing any vegetable production prior to the start of this process, but has made a beautiful fenced garden. And above right: Mapeu Malepe from Botshabelo who also started vegetable production during this process.



4.2.4 Collaborative work

4.2.4.1 TUNNEL CONSTRUCTION

One of the new innovations introduced in the communities of Mametja through the AgriSI project is homemade shade cloth tunnels. The purpose of introducing this innovation was to help participants deal with some of the effects of climate change (e.g. extreme temperatures, increased evaporation and water loss and increased outbreak of pests) in vegetable production.

Two community based workshops including participants from 3 villages each were held between November 2016-March 2017 to train participants in the construction of these tunnels. At the seasonal review workshop, a process was initiated for individual participants to access tunnels. The requirement was that they dig 3x 1x6m trench beds and pack them to be eligible for a tunnel. Household visits were conducted by the facilitation team in May to assess progress. 10 Tunnel and drip kit packages were ordered and distributed among participants. Subsequently more participants have finalised their trench beds. There is however a requirement to access further funding support before more tunnels can be supplied.

Participants however did not feel confident to build the tunnels by themselves.

An additional local workshop was held in Botshabelo including the three ladies there who were to build tunnels. Sylvester, Trygve and Chris assisted.

Right: The ladies busy sewing the panels for the tunnel and Far right: using the template to place the tunnel and the positions of the arches.



Participants however still felt a little intimidated by the technicalities of the tunnel construction. A further workshop training the LFs in the construction, so that they could assist participants was then held by Sylvester.

The one day demonstration on how to construct a tunnel was organized with the local facilitators from Sedawa. A LF from Oaks was also invited as were tunnel kit recipients. The photographs below give some indication of the process



Far left: Mariam Malepe fixing the tunnel door panels and Left: Christina and Norah sewing the nets/panels of shade cloth together



Far left: Christinah thobejane and Esinah Malepe sewing the shade cloth onto an arch and Left: Esinah Malepe and Norah Mahlaku joining arches.

Below: the ladies putting on the final touches of the door panels prior to completion of the tunnel

After completion of the tunnel, LFs with help from Sylvester drew dimensions of the how the remembered it. This exercise was done to help LFs remember the dimensions of the tunnel.

After this fourth workshop local facilitators together with members of the learning groups were able to construct the tunnels without further assistance. In Sedawa and Mabins A, 3 tunnels have been constructed by members of the learning group with help of the local facilitators (Christina Thobejane and Alex Molgopa). Feedback from LFs included that they worked well with the community members nad that even a few people helped who were not beneficiaries of these tunnels.





6 of the 10 tunnels for which materials have been delivered have been erected to date: Oaks (2), Sedawa (2) Botshabelo (3) and Mabins A (3). The table below shows the list of participants who have erected their tunnels.

Table 4: Progress with construction of tunnels by individual participants.

Name of participant (s)	Name of village	Tunnel constructed / not (Yes or No)
Mariam Malepe	Botshabelo	YES
Flora Nthlamo	Botshabelo	NO
Marwale Mokgotho	Botshabelo	YES
Magdalene Malepe	Sedawa	YES
Esinah Malepe	Sedawa	YES
Florence Lewele	Oaks	NO
Betty Nkgogo	Oaks	NO
Dronah Morema	Mabins A	NO
Norah Mahlako	Mabins A	YES
Makibeng Morema	Mabins A	YES

One logistical issue that has been slowing down progress is the need to move the jig for bending the arches from one village to another. As it is a heavy metal structure, a vehicle is required for this.

4.2.4.2 UNDERGROUND RWH TANKS

The initial idea was to build 4 underground RWH storage tanks (24m³); 2 each in Botshabelo and Sedawa respectively using two designs: ferro cement and geofabric with bitumen. The households were to dig the holes, provide sand for construction and also labour for construction. The facilitation team was to assist in the initial construction and in training the local building teams to construct these tanks. A small additional budget was sought from DKA for this work.

In reality, a number of processes did not work as planned;

- Householders took some time to dig the original holes and did not pay much attention to the proposed dimensions. Rocks in the ground made digging heavy going.



Far left: Christina Thobejane's hole with rocks in the bottom that she could not remove.

Left: Norah Mahlako's hole with huge rocks making digging very difficult



- This meant both that the technical teams could not continue with construction as planned, when they arrived (and thus had to schedule in further visits) and that a lot of extra time and resources needed to be channelled into getting the holes the correct shape- in all cases having to build up the walls again prior to starting construction



Above left and right; Views of the corrective plastering that needed to be done at Norah Mahlaku's site to get the walls the correct shape and angle for construction.

- Householders could not supply the sand as promised - they completely underestimated the amounts required and tried to bring the sand to the sites by hand and wheelbarrow. This meant that sand had to be physically loaded and brought to site by the building teams.



Left: Collecting sand for the building process - now being done by the construction team. A vehicle had to be hired for the purpose.

- The local teams for assisting with labour and building did not really materialise. Two people were eventually trained - one in particular, Israel, having enough previous building experience to be able to tackle these structures with reasonable confidence. In addition, these people expected payment, which had not been budgeted for under the initial arrangement.

Right: Israel and Noah, the local builders assisting Eric (in this picture busy mixing cement). Noah was one of the young men who wanted to learn to do the construction. He had very little previous experience. Israel's help was invaluable and he would be able to continue into the future to construct similar tanks without much supervision. Eric is employed by Southern Irrigation as a master builder and has years of experience building these tanks.





- The pre-prepared bitumen impregnated sheets bought were a failure on site and had to be replaced with the more original process of using fabric and then painting the bitumen on.



Left: The pre-prepared bitumen impregnated sheets There were too many overlaps and folds in the sheets to be able to confidently prepare a sealed surface and this process was abandoned. Middle: The traditional geofabric, 3.8m wide, being sealed to create one sheet for the tank and Right: the Geofabric placed in the hole with one layer of bitumen painted

- Special attention had to be given to build the silt traps for these tanks - providing for both the inflow and overflow for the tank. In addition, the furrows directing water to the tanks had to be carefully constructed. In the end, this had to be done by a specialist and could not be taught to the local building team.



Above left and middle: Eric from Southern Irrigation carefully digging out the silt trap. Right: A view showing the inlet furrow in the foreground of the picture, the silt trap in the middle and the overflow furrow from the silt trap moving downslope to the left of the tank.

- The walls were constructed for the sole purpose of raising these tanks off the ground to make the safer. Roofing had to be constructed of the thicker corrugated iron for the same purpose- to ensure that if someone or something walked over the roof it would remain stable. It then meant that the trapdoor in the roof had to be well constructed and be tamper proof to ensure full safety



of the tank. Special trapdoors were constructed off site. These had also not been properly budgeted for prior to construction.



Left; Noah pop riveting the trapdoor in place in a hole cut in one of the roofing corrugate iron sheets. And Above; Eric busy securing the roof sheets with the trapdoor installed onto Christinah's tank. The sheets are secured and then cut to be flush with the wall of the tank.

In all, three tanks were constructed instead of four. The last tank in Botshabelo took time as Gogo (Florah Nthlamu) had to employ youths to dig her hole. They ended up digging it far too wide and roughly and there was almost no way to reconstruct the sides to finalise a tank. She was reimbursed for her expenses.



Left: A view of Magog's very wide and shallow hole, which could not be 'fixed' to be able to build an underground tank with the resources and time at the team's disposal.

The tanks overshot on budget by 100%, but have now been completed to everyone's satisfaction



Above left: Norah Mahlaku's finished RWH Tanks. Aboveright: Christina Thobejane's finalised tank and Left: Mariam Malepe's tank in Botshabelo. the roof is still held down with bricks in this picture as the last two layers of bitumen are still to be painted onto the walls.



4.3 Success and Challenges in meeting milestone.

4.4 MERL.

4.4.1 Indicators: Assessment September 2017

Figures in the table reflect numbers for the period of reporting, in this case July-September 2017. A combined team meeting to review this assessment sheet has not been conducted in the reporting period. Figures have been summarised from field reports and discussions with the field team.

Indicator	Overall target	Actual_ Nov 2016	Actual_ Jun 2017	Actual_ Sept 2017
No of participants in learning groups	100	108	73 (Open day, Soil fertility and natural P&D control workshops)	46,43 (DICLAD workshops), 55 - household visits and garden monitoring, 60 learning workshops
No of learning groups	5	5	5	5
No of local facilitators	5		7	10
Percentage of participants engaged in CC adaptation responses	1-2 (45%) 2-3 (25%) >3 (10-15%)	1-2 (10%)	1-2 (67%) 2-3 (15%) - for this time period OVERALL: 1-2 (60%) 2-3(15%)	1-2(75%) 2-3 (20%) >3 (10%) This time period OVERALL 1-2 (65%) 2-3 (20%) >3 (10%)
No of participants experimenting with new innovations				
-local	15	5	5	20
-co-designed	45		50	60
No of participants showing increased knowledge	80		73	89
Percentage of participants engaged in collaborative activities	45%	-	14%- individual implementation of tunnels and drip kits- 10 Underground RWH tanks - 4	12% individual implementation of tunnels and drip kits- 10 Underground RWH tanks - 3
Percentage of participants with improved livelihoods			(summarised from garden monitoring)	(Summarised from garden monitoring)
-increased availability of food	40%	-	-15%	- 25%
-increased income	5%	-	-	- 15%
-increased diversity of activities and livelihoods options	5%	-	-	
Qualitative assessments; -stakeholder engagement	Stories, case studies, photos,		Stories: -Open day	Stories: Local facilitators- progress Building of RWH storage tanks



<p>-Increased understanding and agency to act towards increased resilience - Adaptation and innovations into local context -Potential for increased resilience -Social engagement</p>	<p>cluster activity records, group session minutes,</p>		<p>-Underground storage tanks implementation - garden monitoring</p>	<p>Implementation of construction of individual tunnels Case studies: WRC-AgSi project implementation</p>
<p>Understanding: Examples of people showing an increased understanding of CCA adaptation</p>	<p>- Through the DICLAD workshops many people have shown a coherent understanding of the impacts of CC and the value of their activities in SWC and gardening in dealing with these. There is however also a sense that this is not enough and that peoples' livelihood options are steadily deteriorating. There is a general feeling that more people in the community need to appreciate these problems better and that youth need to be educated. There is a request for support for larger production efforts (field based) and a call for support for saving the natural environment (grazing, indigenous trees, water) -</p>			
<p>Actions: Examples of people showing an increased agency towards increasing their resilience</p>	<p>- For the winter planting season a substantial number of participants have initiated their intensive homestead food gardens under difficult conditions and with very little water available. Participants have made trench beds, planted seedlings, used mulching, implemented mixed cropping, planted herbs and multipurpose trees and shrubs, made liquid manure, used pest control brews and constructed diversion ditches and stone bunds.</p> <p>- Many individuals >25 have constructed the 3x6m trench beds for eligibility for tunnels. This innovation is seen as a very good option to continue planting under difficult conditions, save water and also make a small income. The demand for this infrastructure is much higher than the project can afford to supply</p> <p>- Drip kits are in use for a number of individuals</p> <p>- Many participants are buying water to be able to continue their gardening processes. Greywater use is common across all participants.</p> <p>- Christina Thobejane for example is forgoing her income as a local facilitator to save to have a borehole drilled in her yard. She will then have access to a range of water provision options- pumping from the river when there is water, greywater, RWH- Jo-Jo tanks and an underground tank and a borehole</p>			
<p>Examples of increased potential towards resilience</p>	<p>- Tunnel, trench beds, diversion ditches, conservation agriculture, grey water management and use, rainwater harvesting and storage</p>			

4.4.2 Project Life Change Questions:

1. *Do we have examples or stories of how we or others are in the process of adaptive management related to CC? (adapt, reflect and respond to....) and examples of what this adaptive management is?*
 - o This is evident in a number of small changes and improvements made by participants in the gardening practices: including mulching in traditional furrows and ridges, making



trench beds, mixed cropping, collecting grass and leaves for mulching, use of greywater, making diversion ditches to channel water and planting in and on these, seedling production and diversification of crops in vegetable gardens.

- Learning inputs are being tailored by the facilitation team to also be more appropriate for field cropping as participants are finding applying the principles from gardening into their fields a difficult task. They requested assistance with this.
- Participants are making small intensive gardens to accommodate for the lack of water.
- Some participants have attempted to manage their microclimates, by making windbreaks with grass and feedbags around their small gardens.
- The shade cloth tunnels introduced show a huge potential to increase production and all participants with tunnels are using them actively. They are selling small quantities of produce from these tunnels.
- A few individuals have volunteered to build their own underground RWH storage tanks to have access to water.
- In Mametje learning group participants have formed small subgroups in their localities who meet regularly to discuss issues, exchange ideas and ensure that they know how to implement the new practices.

2. *Do we have stories that show innovation or lack of innovation towards positive change? What insights have we gained into how innovation can lead to positive change?(INCREASED RESILIENCE)*

About 65% of participants have tried out some of the new innovations introduced and are able to clearly articulate the potential benefits of these practices. For many however the cost of water does not justify the outcomes of their gardening activities. They feel that what they produce does help with food, but does not help them with increasing their incomes and they still spend more on production than they make. Many of the older female participants believe that having fresh food available locally outweighs the cost issues and will continue to try and improve their gardening to be able to make a small income from this. For the younger participants- their feeling is more that they are not even prepared to try unless it looks like they will make reasonable amounts of money.

3. *Do we have stories that show evidence of, or an interest in self organisation towards collective action? What insights have we gained into how self organisation can lead to collective action?*

Local facilitators are already playing an important role in bringing people together and providing for collective action, albeit on the level of working in the gardens. They are dealing with conflict in the groups and supporting individuals in their implementation. They are coordinating some collective action in the villages. New members have been joining in the last three months in most of the villages and in a few groups are meeting by themselves to learn and implement together.

4. *Do we have stories to show that learning together is happening or that there is an interest in learning together? What insights have we gained about how to learn together?*

The LFs who have grasped the concept to learning with the participants and working with experimentation as an idea to promote implementation have been very successful - notable Sedawa, Mametje and Botshabelo. Those who have worked within a model of being in charge of the groups and 'ensuring' that they do the right thing have in fact seen their groups dwindle to almost nothing- Willows, The Oaks and Lepelle.

Participants feel that learning in the groups vastly outweighs what they can learn on their own and have set up ways in which they work together. They also feel however that the LFs may not know enough about these new techniques and still value the input of the facilitation team higher than that of the LFs.



5. *Do we have stories of how we and or others are able to think systemically? What insights have we gained?*

The DICLAD workshops have pointed to a remarkable capacity in the community members to make the linkages and realise the larger impacts of actions. It is however hard for them to translate this into ideas about how collective action can change the systemic interactions- or more precisely they do not feel that they can work together on these issues without assistance from the outside.

6. *Do we have stories of how we and or others are able to be inclusive and democratic? What insights have we gained about how this can be achieved? (STAKEHOLDER ENGAGEMENT).*

Some advances have been made in stakeholder interaction in working with other NGOs active in the area towards working together and limited sharing of implementation budgets. Cementing the process around climate change and adaptation has assisted stakeholders to more clearly understand the needs for this cooperation. Lima RDF has agreed to share the learning and training processes and to augment the process where they have specific strengths. They have agreed to be party to the CC adaptation approach and to frame their interventions and discussions in this way and also to support beneficiaries with small grants for provision of more tunnels and drip kits.

4.4.3 Work Plan for the coming three months.

The last three months of this intervention will focus on the following activities:

1. Continuation of the 2nd workshop in the DICLAD process, combined with a review of activities and impacts of implementation in the learning groups to date.
2. Negotiation for continuation of the process through AWARD for the coming year
3. Negotiation of a partnership with the WRC project on community level adaptation to ensure continuation and co-funding of the process going forward (2-3 years) - albeit on a much reduced level of implementation
4. Collaboration with Lima RDF in combining activities across the two programmes- their food security and small business initiative and AgSI. Training of facilitators in climate sensitive facilitation and implementation of best bet options for good practices will be undertaken.
5. Continuation of garden monitoring and support for Local Facilitators
6. Finalisation of learning workshops around review of gardening techniques and conservation agriculture.
7. Limited support for a focus on fruit tree production, notably in Lepelle and Willows where participants have requested trees.
8. Monitoring processes are to be put in place for management of the tunnels constructed and also the 3 underground RWH tanks.
9. Village level cross visits for all participants to explore and interrogate the options for tunnels and RWH storage, as well as other innovations introduced.
10. Compilation and analysis of garden monitoring information.
11. Writing of a final report for this process.

The next field visit for the Mahlathini team will be from 16-27 October 2017.



4.5 Communication Materials from this milestone.

The production of communication materials is still being negotiated with the Agricultural Coordinator and the communications team. The mid term community level review has been posted on the Mahlathini website. www.mahlathini.org

4.6 Other outputs

A case study has been written (See Appendix 1) jointly between Mahlathini and the relevant AWARD staff for a Water Research Commission (WRC) brief entitled: **Collaborative knowledge creation and mediation strategies for the dissemination of Water and Soil Conservation practices and Climate Smart Agriculture in smallholder farming systems. Deliverable No.2: Report on stakeholder engagement, case study development and site identification (August 2017)**

The MDF has participated in the planning and implementation of the DICLAD process in the Mametje area. The overall purpose of these workshops was to build climate change literacy among stakeholders with regards to climate projections and impacts related to small scale agriculture. These workshops particularly involved small scale farmers who are participating in the learning groups being established and guided by the sub grant Mahlathini in the Mametja area (Lower Olifants).

The expected outcomes were the following.

- An understanding of some core concepts related to climate change and localised climate projections.
- An understanding of general climate change impacts pertaining to small scale farming practices in the Middle Olifants.

Three workshops were included:

- 17 August 2017 with Sedawa and Willows (48 participants);
- 21 August 2017 with Botshabelo (13 participants); and
- 27 September 2017 as a combined workshop with Lepelle, Oaks and Finale.

A draft report has been compiled for the DICLAD workshop undertaken in Sedawa (**Appendix 2: DICLAD_ Conversations about farming and climate change_ Principles for good farming practices - Sedawa 20170817**)

5 Overall Progress of Project

5.1 Integration of milestone status.

The table below indicates overall completion of activities according to milestones. Activities are all well on track for completion in December 2017

Table 5: Milestone target completion July-September 2017.



MAHLATHINI MILESTONE COMPLETION: target completion to date % (in black) vs actual (in red)							
Key activities / Milestones	MILESTONE 1	MILESTONE 2	MILESTONE 3	MILESTONE 4	MILESTONE 5	MILESTONE 6	MILESTONE 7
Inception report	100% / 100%						
Setting the scene		67% / 65%	100% / 80%	100% / 90%	100% / 100%		
		less coverage, more villages	visioning + final LFs outstanding	Some visioning + 2 LFs outstanding	LF selection and training complete. Additional visioning in Lepelle		
Learning and mentoring		10% / 15%	30% / 40%	50%/65%	70%/85%	90%/95%	100%
		6 villages not 4	6 villages Some garden mon + LF outstanding	6 villages; continuation with learning schedule; LFs elected in 3 villages	6 villages; continuation with learning schedule; soil fertility and P&d control. Mentoring and garden monitoring by LFs	6 villages; review learning sessions including tower gardens P&D control and CA	
Experimentation & intro to innovations		25%	25% / 50%	50%/75%	75%/85%	90%/90% For all 6 villages	100%
		for all 6 villages	6 villages not 4	6 villages	For all 6 villages		
Collaborative work				25%/40% 6 villages: Introduction to drip kits and tunnels; 3 villages RWH and erosion control options	50%/65% 6 villages; tunnels, drip kits, greywater management, RWH and erosion control options	75%/100% 10 tunnels with drip kits constructed, 3 underground RWH tanks (24m ³) constructed	100%
Networking and cross visits				25%/25% cluster based workshop in good farming practices	50%/50% Open day: cross visit of all learning groups. World biodiversity day workshop	75%/75% LF visits to other villages, 2 DICLAD workshops	100%

5.2 Project risk and mitigation summary.

5.2.1 Implementation risks and mitigation

- Stability and continuity of learning groups: It is clear now that the local facilitators have had a major impact on the learning groups; in some cases they have grown substantially and interest has increased and in other they have dwindled quite dramatically. This was unforeseen as the intention of the LFs was more to assist individual gardeners with their implementation and do garden monitoring. A strategy has been put in place to manage the impact of the LFs on the groups. In some villages another process of expansion of groups is required. This will be managed through the facilitation team and minimising the influence of the LFs. In the other cases, where positive change has been noted, LFs will be supported to expand their work



- Extreme water shortages brought about by the continued dry and hot conditions and further collapse of some of the municipal water provision schemes has put extreme pressure on productive activities. In cases where participants now have to buy water, they have not been able to afford buying of water for gardening, only household necessities. An increased focus on greywater use and management will provide a small ambit of relief. In addition the focus on RWH storage and also on water conservation has shown to be advantageous for those individuals who have some access to water. The larger issues of water supply in these villages through government processes are however outside of the scope of this project
- High levels of poverty and food insecurity in the villages have made the introduction of self motivated action a challenge. There is a huge cry for external support from community members. Many lose interest the moment they realise that free inputs are not forthcoming. In this social climate the response from the individuals in the learning groups has been remarkable and a number of participants have taken on the challenge of improving their lives even under these difficult circumstances. They are to be commended for their courage and hard work.

5.2.2 Financial risks and mitigation

- Extra financial and in kind support from AWARD was planned into this project in the early phases of implementation, recognising the ambitious nature of trying to implement in 6 villages, as opposed to the initially proposed 3-4. As implementation has progressed this support has become more and more difficult for AWARD to offer and justify. Adjustments have therefor been made in planned expenditure to accommodate for this.
- Over expenditure on the implementation of new innovations such as shade cloth tunnels and underground RWH storage tanks has been high due to an attempt by the facilitation team to accommodate for the demand from beneficiaries. This can be considered a mistake and shortfalls have been accommodated for outside of the AWARD budget and brief.
- Budgets allocated for paying the stipends for local facilitators were very low, given that some of the assumptions made during the proposal phase did not hold. In most villages 2 LFs have now been instated, rather than one- to accommodate for lack of skills and different interest groups and in addition LFs have regarded these stipends more as salaries rather than just a token of support.
- In addition, time spent by the lead facilitator and coordinator in management of this project have far outstripped the budgeted amount. To accommodate for these shortfalls the coordinator has undertaken to reduce time spent. In addition, MDF has internalised a large proportion of this additional cost, over and above the cost share allocation.

6 Conclusion and Recommendations

In conclusion, the project is on track to fulfil all deliverable requirements and also to be able to continue and expand into the future.

7 Appendices



1 Appendix 1: Case studies; WRC CCA

1.1 Climate Change Adaptation, Limpopo

1.1.1 Description of the programme

RESILIM-O is large multi-faceted, multi-stakeholder, cross-boundary programme to reduce vulnerability to climate change through building improved transboundary water and biodiversity governance and management of the Olifants Basin through the adoption of science-based strategies that enhance the resilience of its people and ecosystems through systemic and social learning approaches. The programme has been running for four years and is being implemented by AWARD (The Association for Water and Rural Development) with funding from USAID.

The Agricultural Support Initiative (AgriSI) was initiated as a sub-grant process within the larger programmed towards the end of 2016. This initiative works specifically with climate change adaptation processes with smallholder communities in the lower Olifants River basin. It is being implemented jointly by Mahlathini Development Foundation and AWARD.

The Agricultural Support Initiative (AgriSI) addresses two of the RESILIM-O programme objectives directly:

- iii. To institutionalize systemic, collaborative planning and action for resilience of ecosystems and associated livelihoods through enhancing the capacity of stakeholders to sustainably manage natural resources of the Olifants River Basin under different scenarios
- iv. To reduce vulnerability to climate change and other factors by supporting collective action, informed adaptation strategies and practices and tenable institutional arrangements.

The overall aim of the Agricultural Support Initiative is to enhance the resilience of the people and ecosystems in selected villages (5-6) in the Lower Olifants River basin, using a systemic social learning approach, exploring the question: *What are you learning about the socio-economic and biophysical characteristics of your environment and how these are changing and how are you able to respond to that?*

The overarching objective of this work is to provide support for increased adaptive capacity and resilience to the effects of climate change for households involved in agriculture in select communities of the Olifants River Catchment through:

- Improved soil and water conservation and agro-ecological practices for increased food security;
- Livelihood diversification and supplementation through alternative climate resistant production; and
- Increased community empowerment as a result of self-organisation and collective action.

1.1.2 Problem

A key vulnerability which was identified during Phase I of this programme is the potential for increasing food insecurity under climate changing conditions, especially for the poor in former Apartheid bantustans into which many people were forcibly re-settled. Not only are poor land-use practices impacting production and ecological health and integrity but these impacts are likely to be greatly exacerbated under the hotter and more erratic rainfall conditions that are predicted for the Lowveld as a result of climate change. For example, with a 2°C increase maize farming and livestock production is likely to become marginal whilst with a 4°C increase both will be untenable (AWARD; internal reports 2016).

Small-scale farming is widely evident throughout communal lands ranging in scale from small, so-called 'backyard' gardens to larger plots of between 0.5 and 2 ha. All of these are individually farmed. These form an important component of livelihood security and in particular, offer important safety-nets in times of crises.



However, not only are current poor farming practices exposing farmers to unnecessary risks through loss of ecological health but these are likely to be highly exacerbated with climate change. Current practices typically do little to manage water movement and retention, soil health and loss and offer little resilience in terms of crop choices, for example. From a social and institutional perspective there is little evidence of farmers working together to learn from each other or others or to plan for the future. Collective action and the ability to self-organise are regarded as critical components of adaptive capacity. Furthermore, although some farmers have indicated that they have heard of climate change, none expressed a sense of urgency and few voiced any ideas about how to respond. This suggests that collectively they are not resilient in a way that the magnitude of the impacts of climate change might demand. Building adaptive capacity for food security is thus a key priority of the project.

1.1.3 Rationale

Sound agro-ecological practices for soil and water conservation (SWC) and the ability to self-organise and act collectively are regarded as fundamental for building adaptive capacity and resilience. Not only do agro-ecological farming approaches require minimum external inputs - which may be expensive and increase dependency if subsidised - but they foster farmers' sense that they can build sustainable futures from local inputs and efforts. With knowledge about the potential impacts of climate change included in the learning journey, farmers can make purposeful decisions around practices such as seed and crop-type. This approach supports livelihood diversification - also fundamental for increased resilience - through 'value-added' associated activities such as seedling production, tree nurseries and bee-keeping.

The overarching objective of this work is to provide support for increased adaptive capacity and resilience to the effects of climate change for households involved in agriculture in select communities of the Olifants River Catchment through:

- Improved soil and water conservation and agro-ecological practices for increased food security
- Livelihood diversification and supplementation through alternative climate resistant production;
- Increased community empowerment as a result of self-organisation and collective action.

1.1.4 Implementation of practices

Six villages were given priority due to their medium to high vulnerability status with respect to food security under climate changing conditions and the existence of already active and interested smallholders. These villages, shown in **Error! Reference source not found.**, are Botshabelo (Mabins A); Mametja (Mabins B); Lepelle; Willows, The Oaks and Finale.



Figure 1 Map showing the location of the project site villages along the lower Olifants River

In each of the villages a CCA baseline was constructed through group explorations and discussions dealing with the present situation in the villages, past, present and future agricultural practices and present and future adaptations that could improve resilience, productivity and diversification.

In addition, a baseline household survey was conducted with 34 (of around 108) participants with the intention of using this baseline to track changes and livelihoods improvements. The majority of participants are women between the ages of 18 to 84 years. The household sizes average around 5 members and for the majority of participants (68%) reporting their monthly household income to be lower or equal to R3200/ month. This equates to around R20 per household member per day. Around 30% of respondents suggested a household income of between R3200-R6400/ month. See Figure 3 below for the detailed breakdown.

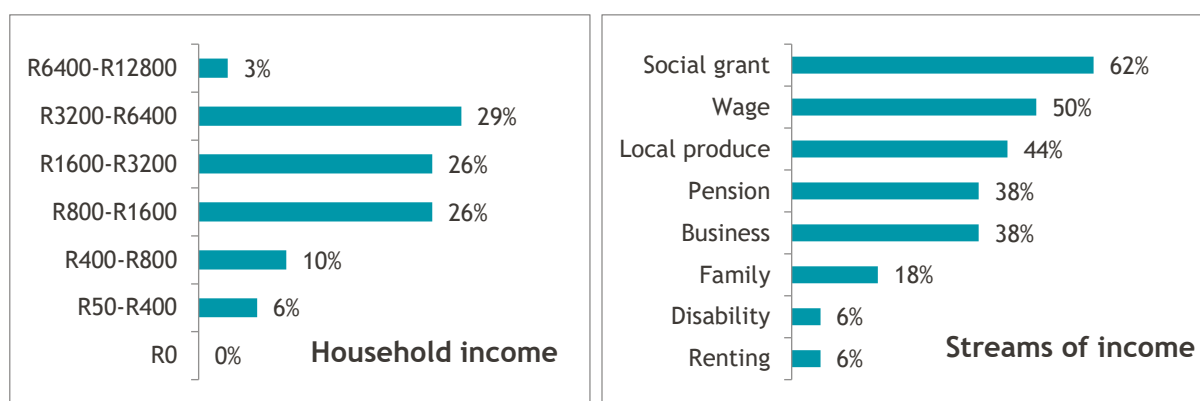


Figure 2 Ranges of household income and streams of income reported by participants.

Sources of income include social grants as the primary and most common source (62%). Wages from day labour, selling of local produce, small businesses, support from family members and rentals provide further sources of income in a descending order of contribution. It is interesting to note that sale of local produce provides an income source for almost half (44%) of the respondents - indicating smallholder farming as a central livelihoods' component in these villages.

Nearly all respondents reported that they grew vegetables (94%) and fruit (4%). The majority also farmed field crops (91%), herbs and other multifunctional plants (86%) and livestock (68%). In terms of their diversification of farming enterprises; looking at the number of different products within these, there was



far more diversification of vegetables and fruits than of field crops, livestock or herbs and other vegetation. Most of the households grew only one type of field crop; none grew more than 3. The same was true of livestock.

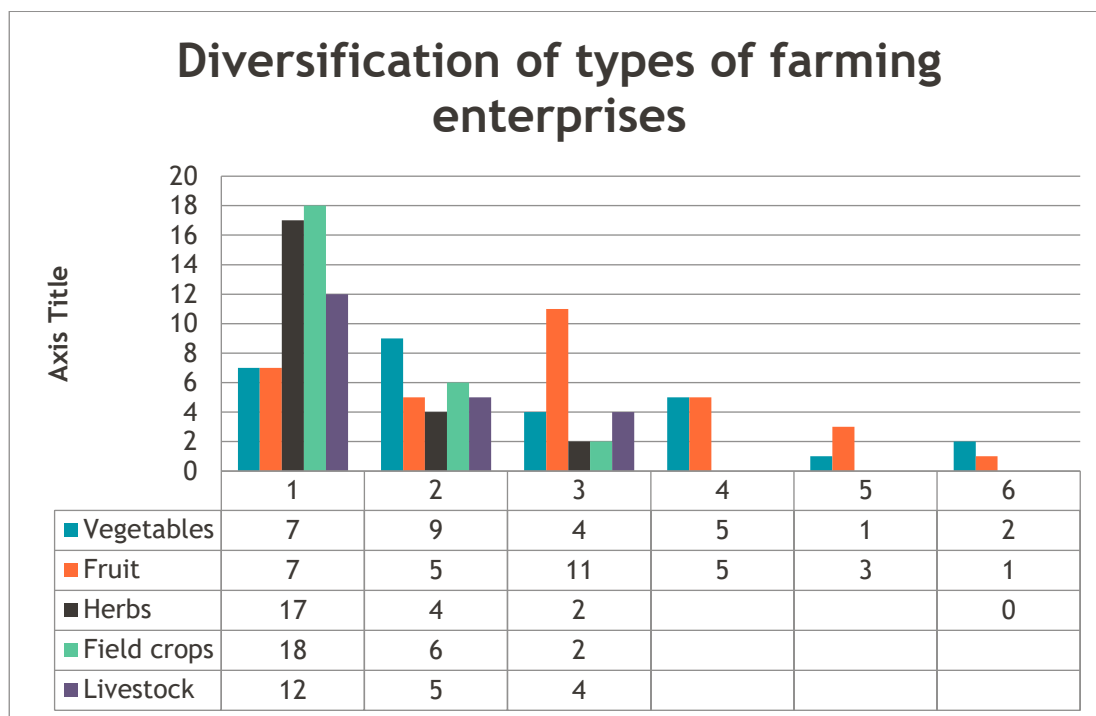


Figure 3 Number of participants with one or more type of produce for different types of farming enterprises

The diversity of types of vegetables, fruits, field crops, livestock and herbs and other vegetation that were reported are shown in Figures 6 to 8 below.

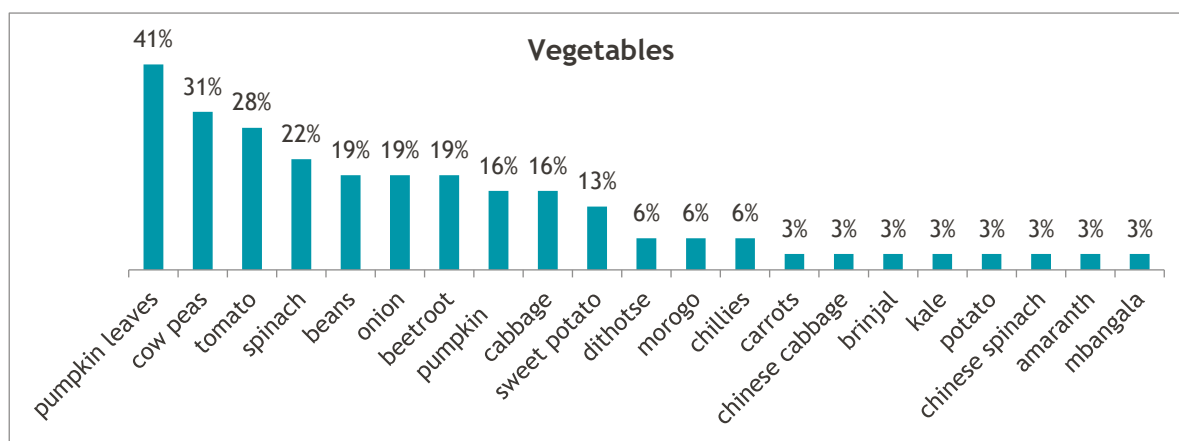


Figure 4 Percentage of participants who reported growing different vegetables

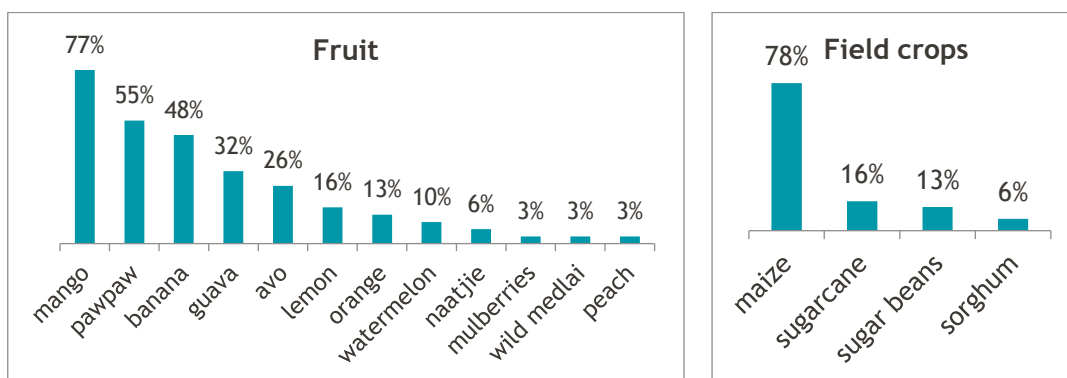


Figure 5 Percentage of participants who reported growing different fruit and field crops

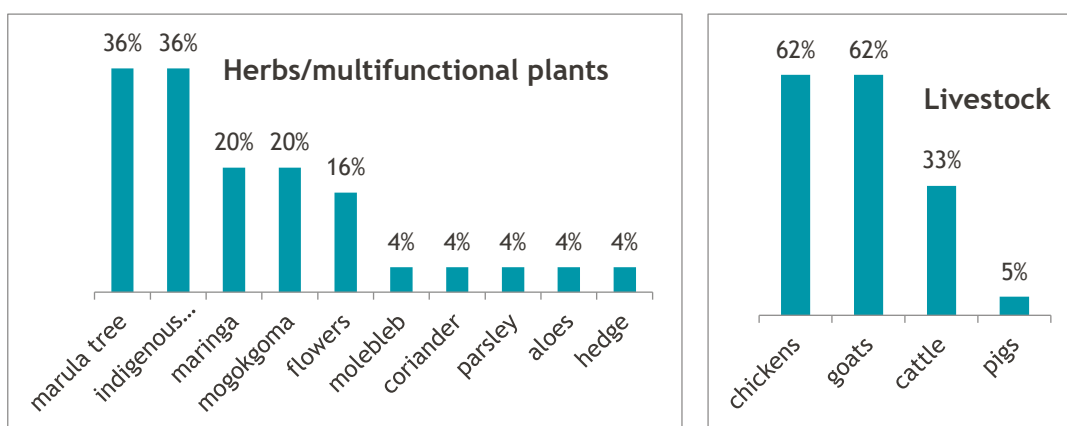


Figure 6 Percentage of participants who reported growing different herbs or multifunctional plants or raising livestock

Only 79% of respondents reported using any soil fertility management practices - meaning that 7 of the 34 respondents just plant their crops without addition of any soil fertility amelioration; believing that the soils can naturally provide fertility and that addition of manure can burn their crops. Of those respondents that do practice soil fertility management strategies, the application of livestock manure was by far the most common practice, reported by 75% of those using soil fertility management practices. Other practices that were mentioned were the use of plant residues, use of legumes, commercial fertilizer, compost and sawdust.

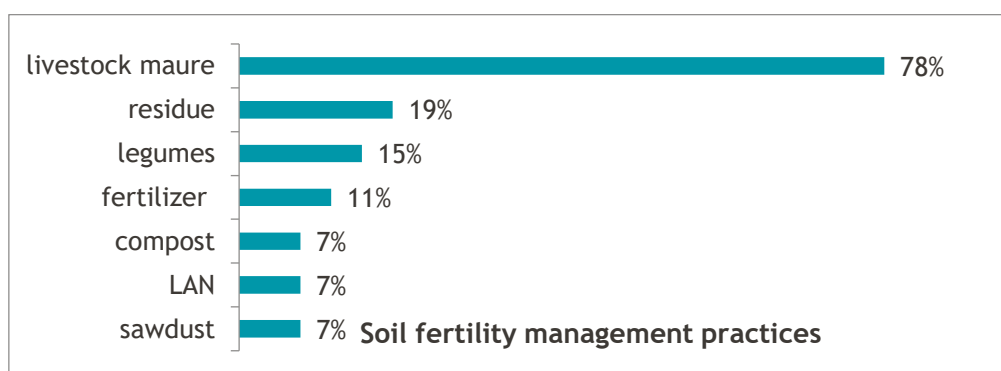


Figure 7 Soil fertility management practices reported by participants

Present implementation of good farming practices was explored with the respondents. A number of different themes were explored See Figure 10 below. These included for example:



- The use of dedicated beds and specific bed design practices for soil and water management - such as the construction of furrows and ridges or planting basins (garden beds). Around 50% of respondents use these practices
- Water management in the form of use of greywater and rainwater harvesting (RWH) are being practiced by 85% and 35% of respondents respectively.
- Propagation in the form of seed saving and nursery management is being practised by 62% and 47% of respondents respectively
- And Multipurpose plants such as propagation of medicinal plants and growing and use of indigenous fruit trees (such as Marula and Makgogoba) are being practiced by 76% of respondents.

85% of respondents manage to eat produce from their gardens on a weekly basis, on average 3 times per week and harvesting between 1-3 different crop types in this time. 56% of respondents make a small income from their production practices- mostly from the sale of fruit and vegetables. They make an average of around R150-R300/month from sale of vegetables and as much as R6400/ season for sale of mangoes and making of Marula beer, although the average is around R1 500 per season.

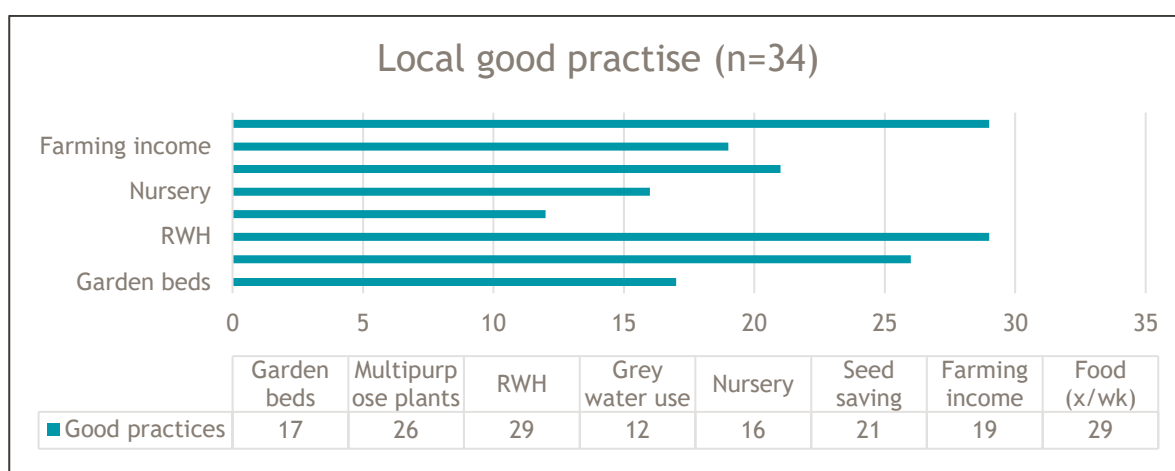


Figure 10: Local good practise in farming activities

Another outcome of this survey was the ability to design methodologies and practices for implementation that build on the local good practices and traditions and incorporate local innovations into the learning processes.

1.1.5 Methodology

The methodology of this project involves working with groups of interested farmers (learning groups) in selected villages by building a local picture of risk and resilience (socio-ecological) using a systems approach (vision and principles), scenario planning (farm design processes) and a spiral model of implementation (action and learning). Participants try out new ideas (farmer level experimentation) individually and jointly and through a process of reflection and adaptation of these ideas enhance their adaptive capacity.

Emphasis is being placed on methodologies and approaches for improved soil and water conservation strategies, livelihood diversification (increased and diversified production of vegetables, fruit and field crops and integration of small livestock) and value adds (such as entrepreneurial opportunities and diversification of income options).

Monitoring is important and in addition to monitoring being conducted by the facilitators (both trainers and local champions/facilitators) a local framework for self and peer assessment and monitoring of progress is employed using the ‘five fingers’ principles (developed by AWARD) for on farm practices, to enhance abilities for self-organisation and collective action. Local criteria for assessment of each ‘finger’



(things we are doing and changing) are to be developed alongside an easy scoring process to track implementation and progress. Each finger represents a principle as follows:

- **Water Management:** Manage water movement so as to slow down the water speed so as to reduce erosion and enhance infiltration
- **Soil management:** Manage soil movement so as to limit erosion and soil loss
- **Soil health:** Manage soil so as to maintain or improve soil health (nutrients and structure)
- **Plant (Crop) Management:** Manage plants and crops so as to ensure plants appropriate for the area and to meet the vision
- **Looking after indigenous plants:** Enhance practices that maintain indigenous fauna and flora and ecosystem health of the area

A key component of building adaptive capacity (resilience building) is strengthening peoples' ability to self-organise, to learn together and to act collectively. Aspects included in the design process are:

- The collaborative identification of champions/local facilitators in each village to act as local facilitators and motivators for change;
- Working with learning groups within and between villages;
- Networking and meeting with others (within group and external);
- Building locally appropriate collaborative activities (such as seedling production, small nurseries, village level savings groups, joint work parties, sharing resources and joint input supply and marketing processes)

Learning and innovation workshops have been held covering a range of themes within soil and water conservation, greywater management, intensive gardening techniques, micro climate management (tunnels) and improved irrigation practices.

The box alongside outlines a list of practices introduced in the learning groups for farmer experimentation and implementation.

Local facilitators were elected for each learning group to support the group and undertake the household-level garden monitoring for each participant.

BOX 1: Climate Smart Agriculture practices introduced in the AgriSI learning groups in the lower Olifants River basin.

Soil and Water Conservation

- Cut off drains - ditches across a contour at top of garden/catchment
- Contours - measured with line level
- Diversion ditches - carry water to the garden
- Stone lines/bunds - made on contour
- Banana pits
- Improved furrows and ridges - made on contour with mulching and plantings

Gardening practices

- Dedicated paths and beds
- Mixed cropping; companion planting
- Mulching
- Trench beds
- Shallow trenches - an easier version of trenches incorporating manure and OM in a 30cm ditch or line, covering and planting on and next to that
- Eco-circles - combines double digging with bottle irrigation
- Incorporation of manure - large quantities
- Making improved manure - composting manure with grass and OM and inclusion of urine fraction from kraaling
- Making compost
- Liquid manures
- Pest control brews: Chilli-soap derivatives, onion-paraffin derivatives,
- Planting of herbs (mixed in veg beds, incl. coriander, parsley, fennel, chives, lemon balm, lavender, rosemary)
- Seed successions; seed beds with a range of seed (diversification) planted in succession for continual supply of seedlings, incl. okra, brinjal, green peppers, Amaranthus, mustard spinach, Chinese cabbage, kale, leeks, spring onions, broccoli, cauliflower, among others)

Field cropping

- Conservation agriculture; clos spacing and inclusion of lime and bone meal with manure
- Diversified crops; maize, millet sorghum, sugar beans cowpeas
- Intercropping

Associated practices

- Greywater management and use; ash, tower gardens
- Greywater bucket filter
- Drip kits
- Small nurseries; propagation of fruit and indigenous crops and trees
- Tunnels
- RWH storage tanks (underground)
- Soil erosion control; check dams, stone packs...



The feasibility of implementation of new practices at a local level with available resources has been an important consideration. Thus, kits are provided for the tunnels, grey water filtration and drip irrigation that are constructed locally. For the underground storage tanks, support has been provided in terms of technical advice and materials, while the construction itself is done by local teams and individuals.



Figure 11 Left: A group of participants from The Oaks and Lepelle construct a tunnel together. Right: A working tunnel in Sedawa, where a drip kit has also been installed and crops are planted in trench beds. Mulching is in evidence.

1.1.6 Outcomes and learnings

An **implementation and learning review** was conducted in April 2017 for all learning groups to provide an opportunity for members from all 6 villages to visit a good working example of innovations and good practices in agroecology and soil and water conservation and review their practices. This also provided an opportunity to mentor the local facilitators and showcase the work to stakeholders such as AWARD and other NGOs, the local municipality, and representatives from government. The process and learnings from this review are presented below to illustrate the potential benefit of both CSA practices and the community based systemic approach.



Figure 8 Introduction of facilitators (left) and discussion of practices (right) at implementation review

The definition of the five fingers as broad principles in good practice for climate change adaptation was reviewed with the group. Participants named the five fingers (easily!!) and gave a few brief examples of what they meant. Good practices were elicited from the group and then assessed using the traffic light method for how well they are being implemented by the groups in each village. We arranged the scale as shown in the box alongside. The table below describes the outcomes of this exercise. Participants were fully engaged and really enjoyed this process.

Scale used for assessment of practices and their implementation

- **RED:** We know about this but have not done very much
- **YELLOW:** We have started implementing these practices, or a few individuals already use these, but there is room for expansion
- **GREEN:** These practices are implemented by most of the participants.

Table 1: Summary of monitoring assessments for CSA and good practice implementation by learning group members

Note 1: The percentages in the last column represent the number of participants who indicated they had implemented the practices. This is indicative only as there were community members present who had not yet been involved as well as a number of visitors.
 Note 2: Practices highlighted in light grey are those for which participants felt they needed more input and mentoring.

Principles	Practices	Assessments (traffic light)	Percentage implementation in the group
Water Management	Cut off drains and swales	Red	Not yet implemented by most participants
	Diversion ditches	Yellow	~20% (10/52)
	Greywater (filtration, use)	Red	~8%
	Small dams	Red	~14%
	Organic matter (incorporation in soil)- leaves, bones, woodchips etc buried to increase water holding and fertility	Green	~60%
	Drip irrigation	Red	~6%
	Saving water; Rainwater harvesting in drums, management of leaks of communal stand pipes, no longer letting irrigation water run 24/7 - Lepelle	Green	All participants involved in some way in saving water
Control soil movement and erosion	Stone bunds	Yellow	~24%
	Banana basins and circles	Yellow	~22%
	Strip cropping (aloes, sisal) and planting grass to reduce run-off	Yellow	~8%



	Contours- water flow for collection		Not yet implemented
	Ridges and furrows-planting of crops on ridges; sweet potato, sunflowers...		~30%
	Sacks with sand for rehabilitation of gulleys		~2%
Crop management	Planting in basins, mulching and direct watering of basins only		~60%
	Close spacing in field crops and vegetables		~20% - Not everyone agreed with this practice
	Planting to provide afternoon shade and planting windbreaks		~22% - Not everyone agreed with this practice
	Crop rotation and intercropping		~52%
	Natural pest control		~18%
	Conservation Agriculture		~36% - more ideas still to be tried
Soil fertility	Trench beds		~60%
	Mulch		~60%
	Liquid manure		~20%
	Compost		~46%
	Application of manure (cattle, chickens)		~70%
	Legumes; planting for food and soil fertility		~68%
Looking after indigenous plants	Stop burning veld		No one doing and not needed or all areas
	Don't chop whole trees- just cut branches		Most participants
	Plant indigenous trees in the yards to protect and save them		Most participants

Small group stations were set up for physical demonstration. The Local Facilitators ran the stations. The following stations were set up, each with a board of illustrative photographs:

WATER MANAGEMENT: Diversion ditches, waterflow line levels and making furrows and ridges on contour, planting on ridges and mulching were discussed.

TRENCH BEDS: The packing of trenches was discussed as was mixed cropping, mulching and a micro drip kit irrigation system. The use of herbs as pest repellent plants and for nutritional and medicinal purposes was also discussed and demonstrated.

TUNNELS: The Local Facilitators took participants through the construction process of the tunnel and discussed advantages and potential disadvantages of crop production in tunnels. The larger drip kit (210 L) was also demonstrated and discussed.

CONSERVATION AGRICULTURE AND LIQUID MANURE: the principles and practices of conservation agriculture including the use of hand planters for no-till situations, close spacing and the importance of soil cover and diverse crops. Liquid manure from animal and plant sources was explained.

A few other practices were also showcased during the review session including a selection of herbs and indigenous trees for planting, (such as lemongrass, num-num, marigolds, aloes and fennel. Well-tended banana circles (a local innovation) were also showcased.



Figure 13: Demonstration stations at the implementation review workshop

Left: tunnel and drip kit. Centre: A well mulched trench bed with mixed cropping (Okra, brinjal, onion and swiss chard) and close spacing. Right: A diversion ditch mulched with the ridge planted to sweet potatoes.

A selection of the feedback collected from participants on the workshop is provided below.

General feedback on the day and process

- This whole process has given people purpose. We are no longer just going to wander in the streets and gossip, but are going to be busy. We are going to see some health improvements in our communities.
- The way we taught ourselves was great - it opened our minds.
- I was a bit overwhelmed by gardening and the difficulties but from these examples shown today things look doable.
- I liked the idea of waterflows and harvesting water off the road for your fields. I never knew this was possible.
- I was afraid with this approach that I would be troubled by pests. I now realise I can use the resources I have to counter pests.
- This has built more relationships between farmers - we can talk about our issues together.
- (Newcomer) We learnt a lot and I was struck by the idea that one can improve the soil you have and do not have to rely on a bad soil.

Practices: Water

- I was bothered by my neighbour letting water run into my garden - now I realise I can use that water.
- I am impressed by the line level - that one can use simple methods like that to measure complicated things.
- What used to be a burden (gardening) now is going to become gold.
- I used to sweep up the leaf litter and throw it away. Now I will use it for mulch.

Practices: Trench bed

- Regarding the use of top soil versus sub soil in the trench bed I see now that the top soil is more fertile and so it is good to use in the bed. I initially thought you just put the soil back as it came out.
- Trench beds are also a way of cleaning the yard.
- Combining the trench bed with the drip kit seems like a very good recipe for saving water.
- Now, with permanent beds, we will not be walking all over our beds and causing compaction.

Practices: Tunnel

- The relationship between the tunnel, the trench beds and the drip irrigation is now clear. Doing all three things together works well and reduces evaporation.

Practices: Conservation Agriculture

- We learnt how to plant maize using the MBLI hand planter. It works really well and then you won't need to plough.



- I have seen the importance of intercropping for soil cover.

The figure below provides an initial assessment (5 months into a 13 month process) of respondents' implementation of the new innovations and practices being promoted. This is a work in progress, but gives an initial indication of new practices introduced that respondents have already implemented and also in which areas more mentoring would be required.

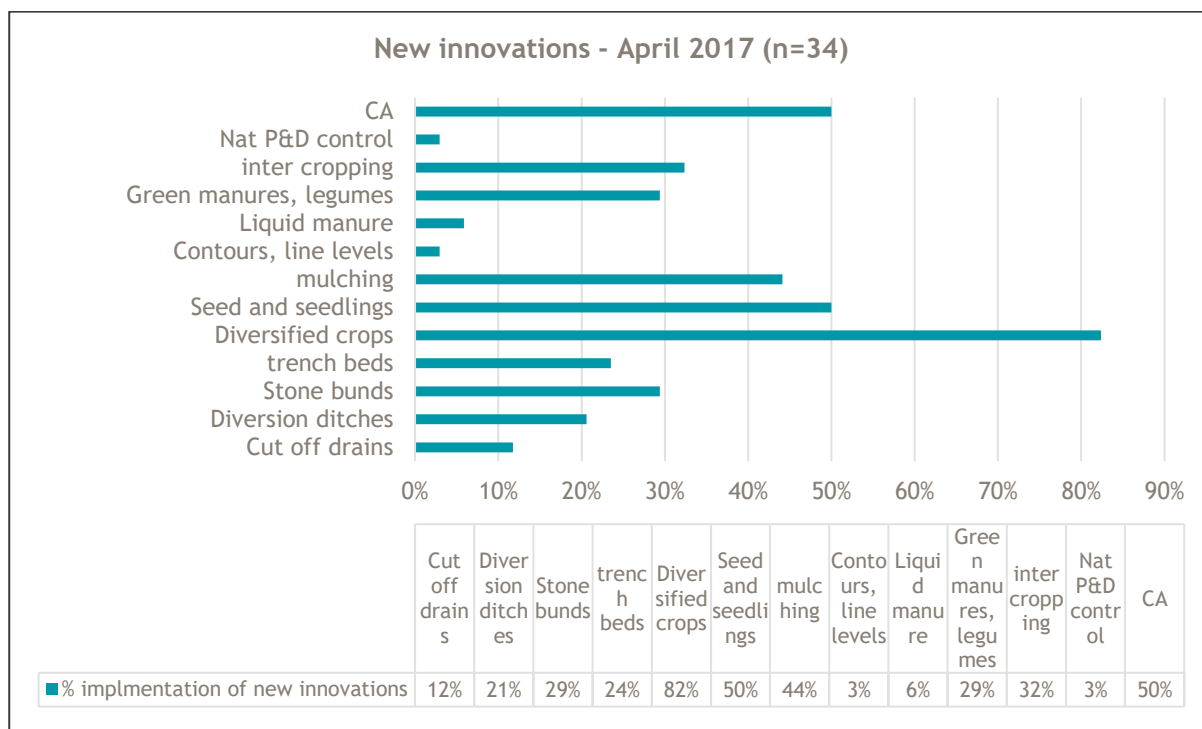


Figure 14: Implementation of new innovations by a selection of participants in the learning groups (n=34)

Future planning

Activities that were discussed for the winter season included:

- Learning sessions would continue in the various villages and specific attention would be given to topics participants had highlighted for more attention. A refresher mini-workshop would be held to include the new participants and bring everyone up to speed. Local facilitators would play an important role here.
- Local facilitators would begin to visit all participants to support and mentor them and also monitor their progress with implementation of the innovative practices.
- The winter season when people are at home is a good time to start on the collaborative erosion control efforts in and around the participants' homesteads.
- The implementation of a process for participants to access tunnels and drip kits was introduced. In both cases a limited number of kits can be provided by the implementation team. Participants are required to show their commitment by digging and packing the required trenches prior to receiving materials.
- For the piloting of underground RWH tanks it was suggested that participants who do not have access to municipal water in any form be prioritized. Also volunteers are required to do all the labour and demonstrate an active interest in gardening to be considered. These criteria were ratified by the group present as reasonable and acceptable.



1.1.7 Suitability of this community as an implementation site for the CSA project

The community level groundwork used in the AgriSi project serves as a good basis for working with a decision support system with the smallholders and their supporting originations and stakeholders: participants are already aware of many of the practices that can be included in a basket of options, they have experience with trying out a selection of these practices and some ideas about the potential benefit that each can offer and they are starting to appreciate the concept of synergies between practices to create a resilient farming system for themselves.

There is good basis for establishing a successful and meaningful community of practice in terms of organizational collaboration and synergies between programme outcomes.

Aspects of this process that could be useful in designing a decision support system include:

1. The villages are situated in a part of Limpopo that is feeling the effects of climate change; with increased heat and reduced precipitation already necessitating some adaptations. These can be recorded and analysed.
2. The traditional practices of the area are unique to these communities and the locality and will provide interesting options and some good practices examples to work with.
3. The impacts of different CSA practices and combinations of practices can be carefully compiled, as participants are already implementing some of the techniques and have shown a willingness and motivation to continue.
4. Participatory analysis learning and monitoring methodologies employed in this programme are innovative and unique and can be used to good effect in building an overall methodology.
5. Opportunities for scaling out and scaling up are available and important to consider in the decision support design process.
6. The impacts of certain technologies and innovations can be measured and criteria developed to be used in a decision support system.
7. Social organization and collective action and various methodologies and approaches to support these can be explored.
8. A good opportunity exists for meaningful stakeholder collaboration for building a CoP.
9. Synergies exist also with the Amanzi for Food networking process and options for embedding this learning into more formal learning processes at Agricultural training Institutes.



2 Appendix 2: DICLAD_Conversations about farming and climate change_ Principles for good farming practices - Sedawa 20170817

2.1 Agenda

Time	Agenda Item
8:45	1. Registration
9:00	2. Welcome, prayer and introductions
9:15	3. Setting the collective intention for the day
10:15	4. Foundational concepts for DICLAD <ul style="list-style-type: none">a. Climate vs. weatherb. variability and 'normal' cyclesc. CC brings change beyond "what is expected/ normal"d. Climate projectionse. Uncertainty and a range of possibilities Multiple future/predictions
10:45	Tea
11:00	5. Systemic exploration of climate change impacts and initial exploration of potential adaptation actions
13:15	Lunch
14:00	Repots back
14:45	6. Closing and reflection

2.2 Introduction

Sharon led this discussion;

Start with organisations who they are what they do.

AWARD working with water and livelihoods for more than 20 years with communities and government. Work hand in hand with Mahlahtini to do this work around farming and water and soil conservation. And also want to work hand in hand with Lima so that we support each other. Their programmes are around food security (Arelemeng) and the Jobs Fund for larger farmers supplying of loans and training.

Introdcution to the day's agenda and background information of activities to date

Today we are going to talk about climate change. But before we do that let's remind ourselves what we have been doing with MDF and AWARD- as all of that is meant to help with coping with changing conditions.

The process so far: We looked at History (past, present) and thought about the future a bit... then learnt more about soil and water, trying new techniques to improve soil and water and learning about and trying new innovations/tools (such as dirp irrigation, furrows on contours, tunnels etc.).



Exercise to remind people about activities undertaken (using photos of activities)

Go through the photos- ask people to tell us what is happening in the photos- soil bottle for telling soil type, tunnels, for helping with heat and saving water,

Problems and issues

Some of the problems mentioned were for example: drying wetlands in Willows, Lack of fencing, No planning of our farms... pests (e.g red spider on tomatoes), problems with baboons and monkeys, bird damage on crops such as millet. In some areas people are ploughing with tractors - very expensive *Are there problems with the soil using a tractor -*

Comments; Tractors not a problem- has to plough properly on contour then there is no erosion
Tractor helps because it digs deep and helps the crops to grow.

Mahlathini said that if you use a tractor you expose parts of the soil from underneath to soil surface which means that we can lose fertility and it actually increases some forms of soil erosion

Labour is expensive Lack of water and drought big issues- appears to be less rain, lack of water management and storage, boreholes too expensive, ways of cleaning grey water and water from the river for water use and consumption over watering of plants when water is available.

Poor harvests... lack of soil fertility, soil erosion soil compaction and loss of structure- hard when dry and collapse when wet. Seeds - lack of knowledge on seed types and quality and harvesting and storage of seeds.

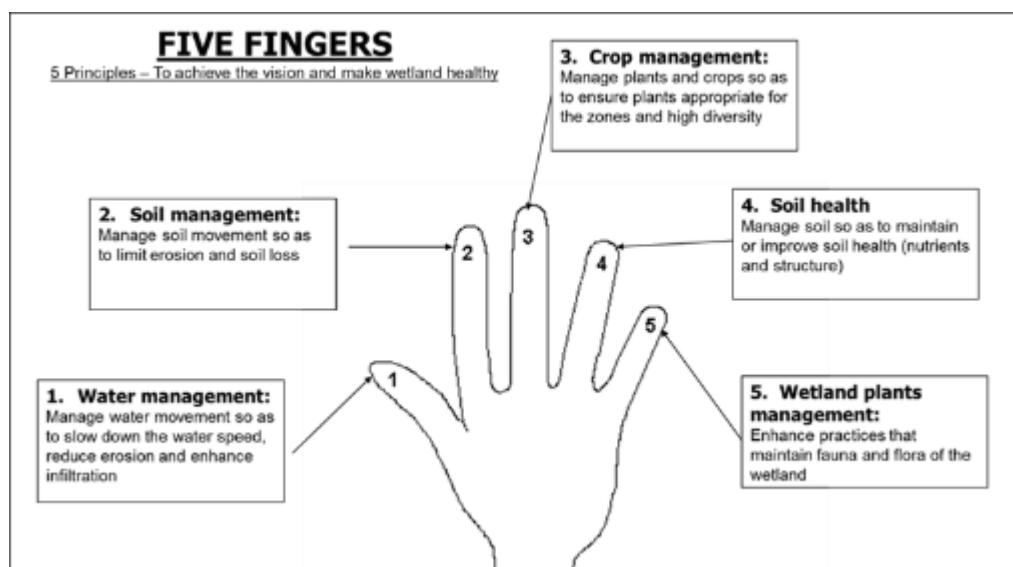
Introduction to Climate change

CCA: We also discussed climate and climate change:

-Less grass - lower harvests - having to plant at different times - crop failures- water in irrigation pipes is very hot-new diseases in people, plants and animals - purchasing of water for domestic purposes and irrigation.

-Seeing a change in rainfall - when the rain arrives- less rain - boreholes are slowing down and drying up - it is a lot hotter- drought for last three years -

PRINCIPLES: Then tried to help people to improve the situation and have a vision for the future. We also talked about principles and how these could help us focus and we talked about the “five fingers” to help us remember the key principles/ideas. - water management, soil erosion control (controlling soil movement), soil fertility management, crop management, indigenous plants/resources. We can remind ourselves of the things we have been learning about.



Learning journey; what was covered (examples)

- Soil fertility management : trench beds,
- Keeping the soil healthy/powerful - liquid manure, change pictures
- Looking after crops: mixed cropping
- Good water managements - mulching, RWH storage and proper irrigation in furrows and ridges...



- Controlling soil movement; diversion ditches, trench beds, furrows and ditches, eco circles. (fertility and water management)
- Crop management- companion planting, to help with pest and disease and maintenance of soil fertility. Seed bank, tunnel...
Traditional system' dry aloe and grind it and use that to store seeds...)
- Looking after indigenous plants- planting moringa trees -

2.3 Climate Change Concepts

Now talk through climate and climate change..

Word for CC; Petogo ya leratadima

Climate change is everybody's business- it will affect all of our and our children. Not something only for the scientists. You as farmers know this well as you see it..

Climate---- weather----

A small telephone exercise -Phone-

WEATHER: coming for weekend what should I bring? What will weather be like Well it sll be hot for most of the weekend, but evenings are a little cool...JUST FOR THE NEXT FEW DAYS

CLIMATE: Thinking of moving ot Sedawa to a few years- what will I need to bring what are the summers and winters like... WHAT DID YOU HEAR THAT WAS DIFFERNET TO WEATHER? THE WHOE YEAR WHAT YOU EXPECT IN DIFFERENT SEASONS

WHAT DO WE EXPECT IN SUMMER? Hot, rain, WINTER? Windy, cooler, no rain...

(in Cape Town for example the climate is the opposite.

Climate is what you expect, but weather is what you get...

CC- The things that we expect are going to change.... Scientists have looked at this area and there are two things.

- TEMPERATURES WILL INCREASE - going to go up from around 38 ° Celsius to over 40°C. For example, what temperatures does maize like? We know they like cooler temperature don't do well if it is too hot.
- We are less certain about the rainfall and scientists don't always agree RAIN WILL BE OVERALL THE SAME BUT DISTRIBUTION DIFFERENT - FEWER MONTHS- start later, finish earlier... and also more intense (more rain in shorter time- so storms). - strong intense rainfall events.

When scientists try and think into what will happen in the future is that they cannot be completely sure- so there is some uncertainty, there is a small chance for example that something can happen- so rain should be less , but it can also be more...

2.3.1.1 Sweet game

1. Start with 2 sweet
2. If you take a green marble- 1 more sweet
3. If you take a blue(10) - 2 more sweets
4. If you get a white marble - you lose your two sweets

Temperature increase is like the green marble.. it is likely to happen- high certainty - but there still is a small chance that it might not happen.

2.4 Small group work

- Seasonality diagrams...rain, temp... and systemic drawings around climate change issues and impacts.
- Break into 4 groups:



2.4.1.1 How does climate change make you feel personally?

- Anxious about my children
- How will I lay out my crops in my field - uncomfortable- Unhappy it is directly affecting our food supply, - Unhappy farming was my way of living can no longer do that -worried about children in the future - scared- might just be losing plant species and animals and in future children may not know that - this will affect employment in the future for our children and everyone - more worried about our health as humans - sad- some of the medicinal plants we rely on are already disappearing - Knowing that the probabilities are high makes it specifically scary -

When you want to have a conversation, it is important to know how people are feeling - as it will impact on your conversation- listen and feel with people -so if we are anxious and scared then the conversation will be different. nN CC there is no clear enemy - nothing directly to fight against- but here we are the enemy -

2.4.1.2 Seasonality exercise

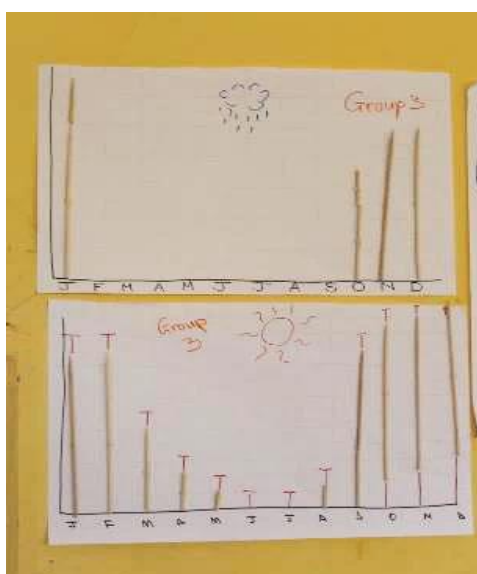
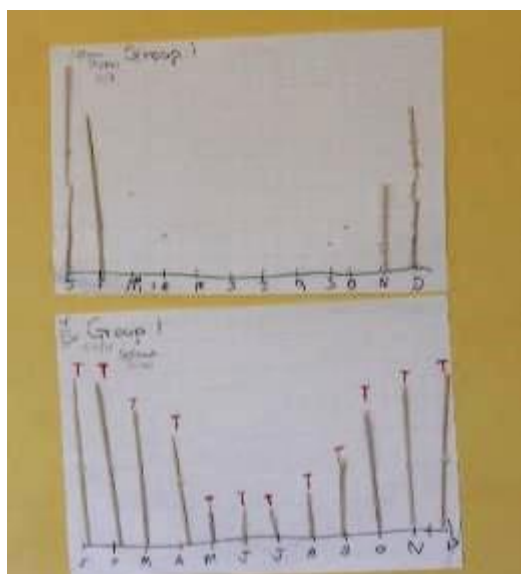
When do we get the most rain?

Group discusses and agrees around the rainfall pattern. Start by asking in which month there is the most rain...

Do the seasonality then introduce the concept of how it will change- same rain in shorter period...will have a much longer dry season.

Seasonality using temperature. Start by asking which is the hottest month.. Then continue with the predictions. And use one example eg mulch- it cools down the soil, helps infiltration in heavy rain, reduces run off and increases infiltration to hold the water for longer.

Below are two examples from small groups showing their seasonality diagrams.



2.4.1.3

2.4.1.4

2.4.1.5

2.4.1.6

2.4.1.7

2.4.1.8

2.4.1.9

2.4.1.10

2.4.1.11

2.4.1.12 Systems

diagram on impacts of climate change...

Start by ensuring all are comfortable to write and suggest they work in pairs if not - and that they can use pictures

Then ask what the picture means - It's too hot - the person is sweating

Then introduce the main theme: What does increasing temperature mean for you as farmers?

(Spend a moment on talking about writing big and clearly onto the cards.

(Facilitate the building of the system diagram- either get them to discuss the linkages or do it together- start with one of the cards and then talk through what happens and draw in the other cards that relate here)



(Explore causality start with something then explore what happens then eg crop failure- leads to famine- leads to malnutrition - which then also gets into the issues that CC are not just a farmer's problem -it affects everyone- including doctors and nurses

- Crop Failure, With the high temperatures even if you have irrigation it will still not help that much. And then also the rainfall will be severe and
- Soil will be hotter and crops will wilt faster...*The water for irrigation is also hotter... there is more evaporation... (in dams we can lose nearly all the water to evaporation so under CC open dams are not such a good idea. - even small tanks open to the sun will lose a lot of water)(Higher evaporation means less water) - talk through this to get to less water in the rivers, boreholes etc.. Ask why is borehole water going down? They believe because the soil is hot and the recharge does not get down into the soil and also the water table drops... that's why people drill boreholes/ underground? Through the river and the rain but the rain is intense - so it does not infiltrate well -it runs off. When you talk about crop failure - is it all crops? Or Certain crops? . there are some plants that are drought resistant, For example ibece, beetroot, onions, groundnuts, cowpeas, sorghum, millet. Susceptible are tomatoes, beans, pumpkins, jugo beans, cabbage, Chinese cabbage, bananas...*
- **What will crop failure lead to?** Lack of food- famine - then lack of food leads to lack of nutrition, increased diseases in humans, but also in plants- when your crops are weak they are more susceptible and plants that are water stressed also get more diseases...It is more of an immune system thing and it also affects humans - also when it is dry the only green plants are the ones in your garden and so they are under increased pest attack.....*What does lack of food lead to also - no jobs- then what happens if there are no jobs - people steal or move away or die*

Then at some stage hand over to the group to draw in the linkages - draw in arrows... then look at this and see whether there are any feedback loops and talk through these circles that are self re-enforcing and very dangerous

2.4.1.12.1 Relate the impacts related to farming and think through possible solutions.

Mark the farming ones, the water ones, the health ones, the economy ones etc...Draw circles around the themes and show the climate change will affect all the different things - water, farming health, society...So as farmers you have a very central role in holding all of these things together...



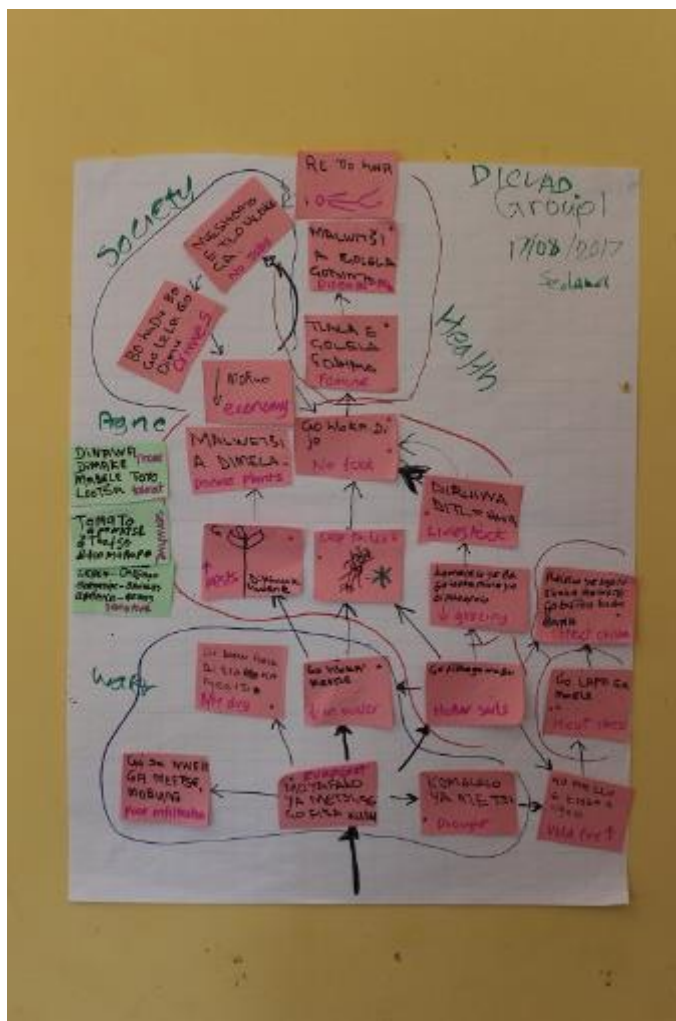
Now move to what kinds of adaptation strategies we need to think about....what can we do as a group?

For example, what can we do about the water in our rivers?

We can put some dams in the river to get more water -To keep rivers healthy however we need to keep the river flowing and also water from dams evaporate a lot faster....So it might be an idea to revegetate the banks of the river as they are now exposed and also to draw water away from the river rather than dam the river. There are laws to try and keep the rivers healthy and still send some through to Mozambique..

We can use the small streams and tributaries to make some dams- don't have to do it in the river. We can do RWH. Must put water from the roof in tanks... Boreholes here have a lifespan of around 20years so that is an option, but pumps are being stolen. We could make a savings group in the community and get a pipe from the river and share that. But there is a need for water licences... Maybe the savings group can be for RWH. RWH is an option but storage facilities are a challenge.

Alongside is an example of the systems diagram designed by one of the small groups in their discussion. It indicates that participants have a strong understanding of the effects and potential impacts of CC on their farming situation and also how it impacts on other issues such as health and the economy



2.4.1.13 Report back- just the big messages- not going to report back on every card...

2.5 Way forward

- Ask Municipality to provide jo-jo tanks
- MDF and LFs to communicate better regarding access to tunnels and drip kits- some people are still waiting
- Talk about CC to the younger people and at the schools