Annex 5

Narrative Interim Report

The report must describe in detail how the project has progressed and the results achieved so far, and must describe how the project funds have been used for the planned activities. The total length should not exceed 15 pages.

BMZ Project number:	***6815***
Project country:	***South Africa***
Project title:	***Community-Based Adaptation to Climate Change (CBCCA) to build resilience***
Organisation:	***Mahlathini Development Foundation (MDF)***
Project duration:	***01.10.2022 bis 31.08.2025***
Period:	***October 2023- March 2024***

1. General Information

The CbCCA project is based on working with Climate resilient Agriculture (CRA) learning groups of smallholder participants. These groups are set up a at village level across three provinces: KZN, EC and Limpopo. They work on an annual cyclical planning and review process for implementation of CRA practices (Field cropping, homestead food production and livestock management) – which are supported through training, mentoring and implementation support. The intention is to support both existing learning groups in the three provinces to deepen their implementation and to initiate new learning groups.

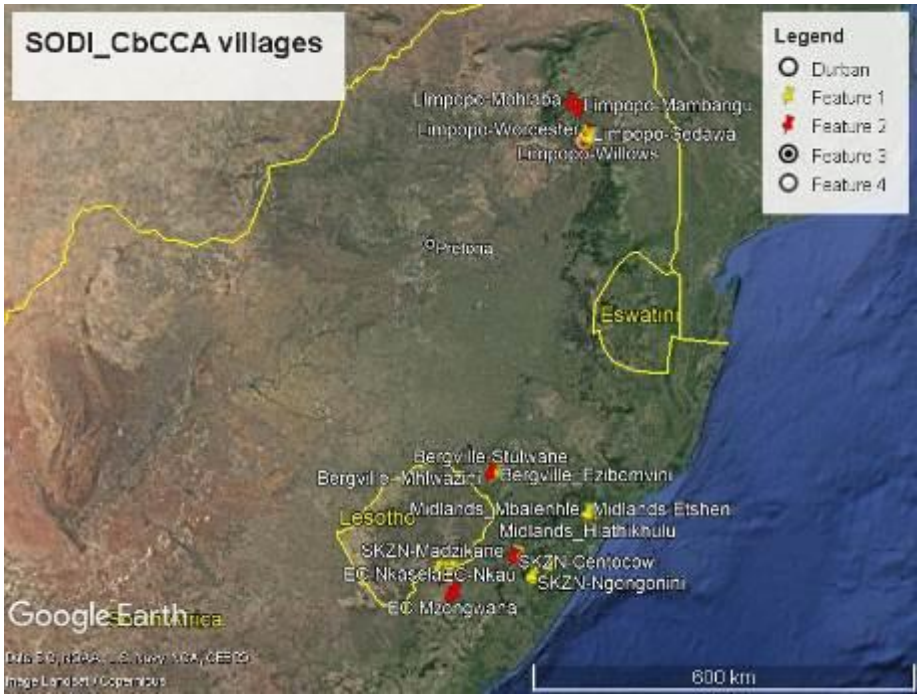

Figure 1: Map of SODI-CbCCA villages across EC, KZN and Limpopo

CRA learning group members also undertake a range of other associated activities according to their need, meaning that not all groups undertake the same activities:

- Setting up and running village savings and loan associations (VSLAs), with membership from the CRA learning groups and beyond, for savings and small loans for consumption smoothing and productive activities.
- Enterprise development and local marketing committees and groups, mostly to run the joint monthly produce markets in nearby towns, but also includes egg and broiler production and sales, livestock auctions and more formal market contracts.
- Water access and management through water committees linked to local governance structures, for planning and implementing integrated water management activities and
- Livestock committees, for development of conservation agreements for rangeland management and local livestock auctions.

The diagram below indicates the interactions with these local or micro level groups at the meso- level through clusters and platforms with multiple stakeholders and at the meso- and macro level through more formalized organizational forums and networks.

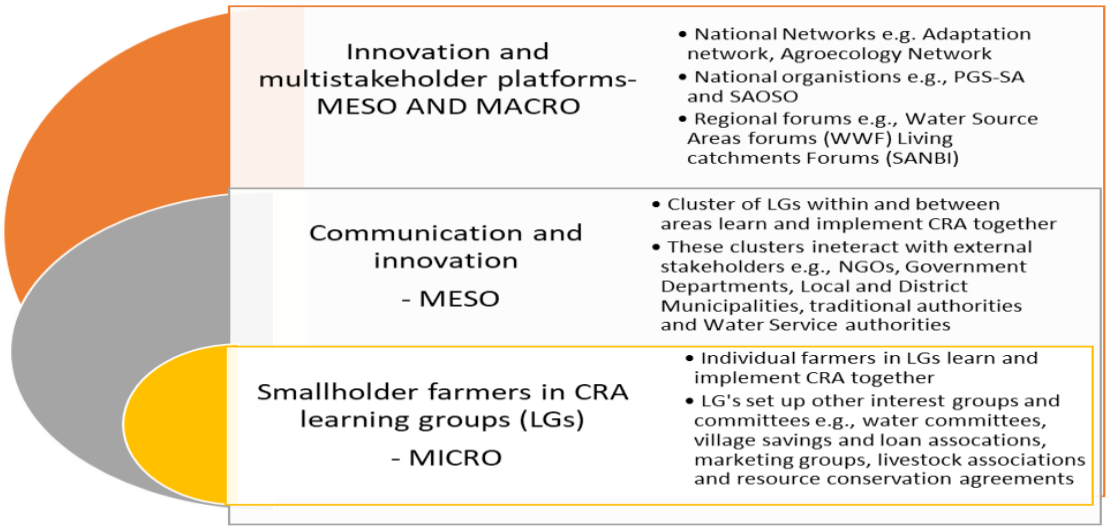

Figure 2: The micro-, meso- and macro-level interactions for the CbCCA programme and the Communities of Practice (COPs).

Quarterly project reports outline the training, field-based activities undertaken with the CRA learning groups and their progress related to economic empowerment (VSLAs, marketing etc.). Information on activities related to the innovation and multistakeholder platforms is also to be included in summary form.

Integrated water and natural resources management activities are more discreet in nature and will be reported on as progress is made. This also applies to the development of evidence-based indicators and the monitoring and evaluation handbook development.

1.1. Project Description / Project Objectives

The COVID-19 pandemic, global economic downturns and internal political and economic instability have exacerbated the already significant negative impact of climate change on smallholder farmer communities in South Africa. Unemployment is very high (60-80%), with very low incomes primarily through social grants (around R2000/month per household of 4-5 members). Smallholders need to find ways to provide for a sustainable livelihood for themselves through farming and resource use in their villages. The climate resilient agriculture

practices have been piloted and have been shown to significantly improve both livelihoods and social agency and now needs to be deepened and expanded.

The project objectives and outputs are summarized in the small table below.

Overall objective (impact)	**Communities have improved their livelihoods and their capacity to adapt to climate change and have strengthened their resilience climate change risks and shocks**	
Project outputs/objectives	O1	*Capacity is developed for creation of and strengthening institutional frameworks and mechanisms for including proven multi-benefit approaches that promote collective action and coherent Community based Climate Change Adaptation (CbCCA) implementation.*
	O2	*The farmer level decision support system for implementation of CRA is upscaled in eastern SA.*
	O3	*Appropriate frameworks for monitoring and evaluation of environmental benefits and agro-ecosystem resilience are developed at multiple scales*
	O4	*Improvement of water and natural resources management and governance through community ownership*

1.2. Source of Information

Each activity set within the project has a focused monitoring and evaluation process, to encompass the range of environmental, agricultural, economic and social indicators used for reporting. Monitoring forms include for example the CCA baselines, crop and garden monitoring, poultry production monitoring and fodder supplementation monitoring. Databases are collated for the monthly VSLA (village savings and loan associations) records and monthly market stall sales and incomes. Seasonal reviews for each learning groups consist of focus group discussions and individual interviews. Resilience snapshots and participatory impact assessments provide more summative evaluative content.

In addition, the provincial field team leaders (Betty Maimela and Mazwi Dlamini) provide monthly reports on training and implementation undertaken with the CRA learning groups. Photographs are included in these summaries and attendance registers are available. All interns are expected to provide monthly field work reports (for SODI – Sphumelelo Mbhele) and reports for events, workshops and meetings are submitted.

Erna Kruger uses these reports and databases to compile the SODI quarterly reports for the organization. Financial reports re compiled jointly by Erna Kruger and Sarika Ramsewak.

2. Project Status

Overall Objective (Impact): Communities are empowered to adapt to climate change and their resilience is strengthened.

Project Objective (Outcome):	**Indicator**		
	Base value (quantitative & qualitative) *Equivalent to proposal*	Target value (Quantitative & qualitative) *Equivalent to proposal*	Achievements (quantitative & qualitative)
Smallholder families in 3 provinces in South Africa apply climate-adapted agricultural practices and diversify their income opportunities in order to	As part of an MDF pilot project, 345 smallholder farmers have gained initial experience with local agricultural practices for climate change adaptation. There	2,625 beneficiaries of smallholder farming families and 75 stakeholders in 3 provinces are organized in Communities of Practice (CoP) and implement at	249 participants, of whom 107 are in new learning groups. (1 424 beneficiaries) 3 practices

stabilize food security in the long term.	is currently no coherent regional or local system for climate-adapted agriculture by smallholder farmers. So far, 9 community-based village savings and loan associations have been established by MDF	least 3 practices for climate-adapted agriculture according to developed standards. 18 villages are organized by the project in their own village savings groups	20 stakeholders: across meso and macro level CoPs 18 VSLAs of which 5 are new

Project Goals (Output)	**Indicators**		
	Base value (quantitative & qualitative) *Equivalent to proposal*	Target value (Quantitative & qualitative) *Equivalent to proposal*	Achievements (quantitative & qualitative)
1. Communities of Practice (CoP) are established at different levels and practices for climate-resilient agriculture are applied sustainably.	1.1 Learning groups (18) at local village level have gained initial experience with approaches to sustainable and climate-resilient agriculture. 1.2 Currently, smallholders are supported by 2 government organisations (ROs) and 2 non-governmental organisations (NGOs)	1.1 CoP at local and regional level are implemented and operational: - 27 CoP / Learning groups for climate-resilient agriculture are established at village level for community-based climate change adaptation (CbCCA) - 3 regional CoP with representatives from the local CoP are established in clusters as innovation platforms for exchange, planning and development - 3 regional multi-stakeholder platforms (ROs and NGOs) for strategy development, policy interactions, coherent planning and awareness raising are established 1.2 In the project regions, 6 ROs and 6 NGOs support smallholder farmers through learning and financing opportunities. From planning to implementation, they are involved in community-based adaptation to climate change activities.	**26 CoPs of which 8 are new.** -Mahhehle and Mariathal(SKZN) and Sophaya and Madeira (Limpopo), eMadakaneni and eMahlathini (Bergville), Nchodu and Ned (Eastern Cape) **4 regional CoPs** -Conservation Agriculture: Farmers' Open day Bgvl (5 villages Bgvl, 3 villages Midlands)- existing (in association with ASSET Research) -Mametja-Sekororo Participatory guarantee system (3 villages) – existing with SAOSO - Bgvl marketing cluster (5 villages)- newly established -Ozwathini: Calf rearing group (5 villages)- newly established **4 multistakeholder platforms** - uThukela catchment partnership (Northern Drakensberg Collaborative) -newly established catchment stewardship with WWF (quarterly meetings) - Adaptation network – national network - member – in capacity development working group with Flanders Government (3-4 meetings/year) -PGS SA – Organic participatory guarantee system South Africa – South African Organic Sector Organisation (2 meetings) -Conservation Agriculture forum – national (1 per annum) **6 NGOs**: Institute of Natural Resources (KZN), Association for Water and Rural Development (Limpopo), Environmental and Social Solutions (Eastern Cape),Lima Rural Development Foundation (KZN), Sociotech (Gauteng), Wildlands Conservation Trust (KZN) **3 ROs:** University of KwaZulu Natal (learning and funding in socio ecological mapping and adaptive planning), World Wildlife Fund -WWF (learning and funding support in water stewardship in Bergville KZN),

			Water Research Commission- WRC (learning and funding support in all sites and including also Giyani in Limpopo – through dissemination of farmer decision support project
2. A decision support tool that takes into account climate-resilient agricultural practices will be further developed and applied by smallholder farmers.	2.1 There are no specific criteria for the local assessment of climate-resilient production systems. 2.2 So far, there are no standardized and target group-oriented approaches for climate-resilient agriculture for the project regions. 2.3 120 smallholder farmers have developed an understanding of how to use a decision support tool for climate-resilient farming practices	2.1 Indicators for monitoring and evaluating the impact of specific agricultural practices for adaptation to climate change have been identified together with smallholder farmers. 2.2. A handbook has been developed and made available as a standard framework for use as "open source" for users at various levels (in digital and printed form). 2.3 A total of 300 smallholder farmers independently use the decision support tool for climate-resilient agricultural practices to implement community-based adaptation to climate change	-MoU development with PMERL specialist Karen Kotschy. Review of indicators and resilience snapshots initiated. - Livelihoods surveys designed and administered. (Nqe Dlamini) – research into VSLA contribution to livelihoods – to feed into the overall M&E framework – to develop best bet indicator set -Not done yet – to be initiated in 2024 **524 smallholder farmers** of whom 173 are in new learning groups have used the DSS to implement practices and review and plan their activities – facilitated but not independent
3. Community-based water management will be institutionalised and sustainably improved.	3.1 At municipal level, there are insufficiently functioning structures for sustainable water management. 3.2 Communities have only limited access to water	3.1. Six communities have been institutionalized and have a sustainable structure (e.g. Committee on Water Management) 3.2 Three community-based approaches to sustainable water management have been developed.	**5 communities:** Ezibomvini (9), Vimbukhalo (35), Stulwane(87) (Bergville), Nkau (18), Ned (50) (Eastern Cape) have been institutionalized, sustainable structures in 2 villages only (Constitutions, committee, do have meetings, problem solving, or deal with maintenance issues) **3 Community-based approaches:** Limpopo (Turkey, Sedawa), Limpopo (Giyani) and Bergville (Stulwane, Vimbukhalo)… in association with WRC – approaches have been outlined and proposed- working with water institutions to get some recognition. – policy and strategy development at regional and national level.

2.1. Explanations in the event of deviations from planning

Regarding small poultry production units for our smallholder farmers, the continued lack of easy access to point of lay hens for layers as well as difficulty in accessing day old chicks for broilers, is necessitating a change in strategy. Linked to the sharp rise in feed prices, it has meant that most of the smallholders who have small numbers of chickens (10-20) can not break even in terms of expenses and incomes. There has been a sharp reduction in the number of farmers undertaking poultry production because of this.

Our strategy now is to move to a hardy, easy to breed multipurpose chicken, in this case “Boschvelders” where this is a good supply of different aged pullets for sale at a reasonable cost. In addition, experimentation with mixing and supplying local feed rations will be undertaken. For those with an interest, small hybrid

(electricity/battery-solar) incubators will be tested out for breeding of chicks to bulk up flocks and for sale of chicks locally.

Micro-tunnel prices have again increased sharply- due to a hike in steel prices, necessitating a reduction in the number of tunnels that can be supplied this year. 30 tunnels have been planned – only 27 can be supplied.

Regarding development of scenarios for localized self-supply water access- proposals have been developed and submitted for both the KZN (Bergville) and EC (Matatiele) schemes, to the Czech Republic small scale project fund, the Japanese Embassy and the German Diplomatic Missions micro-projects fund in the last 6 months. No positive responses have been received. As a result, work in this particular aspect has been reduced, to avoid further building of expectations within communities. The initial water resource surveys and discussions started in Gobizembe (KZN_Midlands), will not be continued until more viable prospective funding options can be secured.

2.2. Status of implementation

The table below is taken from the project agreement. A column has been included on the right in Table 1 below, outlining the quantities and activities involved for greater clarity.

Table 1: SODI high level work plan and budgeting per activity

SODI Work plan and Budgeting													
Measures & Activities	***2022***	***2023***				***2024***				***2025***			***Activitties and quantities***
1. Implementation of Communities of Practice (CoP)													
Introductory workshops for learning groups (LG) at village level in 3 provinces	*x*			*x*	*x*		*x*						*9X 1day intro meetings*
LG operation; Roles, responsibilities, visions and planning: Workshops for 9 LGs in 3 provinces.		*x*	*x*			*x*		*x*					*9x1 day visioning and action plans*
Training on capacity development for climate-resilient production systems			*x*	*x*		*x*	*x*	*x*	*x*				*3x1day training in CRA for 9 groups (R17 500/month)*
Cyclical implementation of the LG at village level: implementation and mentoring for climate-adapted agriculture for 27 learning groups at village level; development of local marketing initiatives (3) and local food security initiatives (creation of value chains, seed banks, etc.); Community-based management measures for natural resources		*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*			*27 Learning groups in total - 9 per province (3 new). (67 days@R200/day, thus 10days/ LF/month x 6-7LFs (R13 551/month)*
Entrepreneurial support for food security: village savings and loan associations as well as local marketing support and development		*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*		*Printing of savings books (Zulu, Pedi), 24 days@R200/day, thus 4days/LF/monthx6 LFs and/or paying for marketing costs (R7 968/month)*
Cyclical implementation of innovation platforms and multi-stakeholder networks; Implementation and capacity building for innovation (3) and multi-stakeholder platforms (3); Meetings and exchange visits				*x*				*x*			*x*	*x*	*1-2 events/year: farmers day, x visit, Multi stakeholder meeting, (R8 400/event)*
2. Development of an M&E toolbox and a manual													
Development of M&E tools and indicators			*x*		*x*		*x*		*x*				*Materials for M&E, Software for e surveys (R19 460/year)*

Development of the Handbook on Community-Based Adaptation to Climate Change										x	x	x	
Regular M&E of MDF together with smallholders		x		x		x		x		x	x	x	
Seasonal evaluation by learning groups at village level				x		x		x		x	x	x	*36 Resilience snapshots per year (min)*
Participatory assessments improved climate resilience for a selection of village-level learning groups				x		x		x		x	x	x	*3 PIA's per year (Min)*
3. Sustainable water management													
Establishment and implementation of institutional structures such as water management committees		x	x	x	x	x	x	x	x	x	x		
Development of three concepts for sustainable access to water				x				x		x	x	x	

Investment		***2022***	***2023***	***2024***
Amount per person				
Tunnels	***R5 463,00***	***5***	***35***	***30***
Poultry	***R2 021,00***	***10***	***45***	***45***
Seed (CA, veg) and poultry feed	***R1 815,00***	***10***	***45***	***45***

To further outline the activites, annual tragets and actuals have been outlined in Table 2. This table will be updated quartely.

Table 2: Targets and actuals for project activities: March 2024

	Target 2022	Actual 2022	Target 2023	Actual 2023	Target 2024	Actual 2024	Target 2025	Actual 2025
No CCA Intro w/s	2	2	5	5	2			
No CCA Planning w/s	2	2	5	5	2			
Training days (demos)	6	10	12	22	12			
No of LGs	18	23	23	25	27	26	27	
No of participants - monitoring			108	220	108		108	
Platforms (3 Ips, 3 Multi stakeholders)	2	2	6	6	6		6	
Cross visits				3				
No CCA prioritization planning sessions	2		8	8	8		18	
No CCA review sessions	2	12	8	8	8		18	
No CCA re-planning sessions	2	12	8	7	8		18	
VSLAs (360 participants, 18 VSLAS)			18	18	18	18	18	
Water access scenarios (min 2)			1	4	1	1:Gobizembe (Midlands)	1	
Livestock agreements (Min 3)			1	1:Ozwathini	1		1	
Local facilitator days (6-9), total 114 days each			38	Isaac Malatji Phumla Nyembezi	38		38	

				Jerida Popela				
Tunnels	5		35	40	30	27		
Poultry	10		45	28 broilers, 17 layers	45	Boschvelders- EC (26), Bgvl (11), Limpopo (22),		
Seed (CA, veg), poultry feed	10		45	Seed – 502 (seed/seedlings vegetable production) Poultry feed - 45	45	Vegetable Seed – 160 – Limpopo , Matatiele Poultry feed _		

This information is further outlined according to the measures and activities, with dates and descriptions of activities provided in Table 3. Again, this table is to be updated quarterly.

Table 3: Description of measures and activites with dates and areas outlined: Oct-June 2023

Activity No	description	Date	Activity
1.2.1.	Establishing learning groups at village level	2022/11/25, 12/09 2022/11/15, 11/29, 2023/03/03 2023/02/09,02/16 2023/01/18 2023/03/27 2023/05/25, 06/08	Limpopo: Sophaya SKZN: Mahhehle -CCA workshop x 2 days, VSLA introduction workshop Bergville: Eqeleni EC: Ned, Nkau Limpopo: Madeira KZN Midlands: Ndlaveleni
1.2.2.	Training and mentoring for climate resilient agriculture	2022/12/02 2022/10/26 2022/10/08-14 2022/11/23,24,29 2022/02/10 2022/02/27, 03/28 2022/03/08, 03/17, 03/28 2022/03/15 2023/03/07,08 2023/03/29,30 2023/03/24,27,30 2023/04/, 2023/05, 2023/06 2023/04/21,25 2023/04/19,20 **2023/09/30** **2023 Oct-Nov** **2023/11/13** **2023/11/17** **2023/12/04** **2023/12/14** **2024/02/23** **2024/03/22**	Midlands: Ozwathini contouring workshop SKZN: Mahhehle – tower gardens EC-Matatiele: Drip irrigation workshops in 5 villages SKZN: CA demonstration workshops in 3 villages SKZN: Plainhill Drip irrigation training Limpopo: Sofaya trench beds SKZN: Mahhehle tower gardens, poultry production, trench beds SKZN: Mariathal gardens and experimentation Bgvl: Madakaneni, Mahlathini – gardening training EC: Ned, Nchodu poultry production EC: Nec, Nchodu, Mzongwana- Pest and disease control Limpopo and KZN: trench bed training with assembling of tunnels for 45 households across 8 villages, including distribution of seedlings, mixed cropping and mulching learning inputs and drip irrigation Limpopo: Willows, Sedawa, Mametja – Natural Pest and Disease control Bergville, SKZN: Poultry production: eMadakaeneni, Mjwetha, Mariathal, Mahhehle, centocow **-Matatieele-Nkau,Nchodu- value adding training** **-Boschvelder multipurpose chickens intro training in all areas** **-Midlands (KZN) goat production training with KZNDARD (3 sessions)** **-Matatiele-CA demonstrations and planting Ned (15), Nchodu (26)** **-Midlands: Gobizembe Youth group- seedling production training** **-Limpopo: Sofaya(10) , Madeira and Willows (16) CA training and demos** **-Limpopo: advanced nutrition workshop x 5 villages** **-SKZN: gardening refresher workshops (Centocow, Mahhehle, Mariathal, Ngongonini)**
1.2.3.	Cyclical implementation through mentoring for capacity development for LG at local level	2022/08/16,17,18,19,30 2022/10/16 2022/11/21-24 2023/01/24-30 2023/04/24-26	***CCA review and planning workshops*** -Bergville: CA review and planning (5) -Midlands: CA review and planning (3) -Limpopo: CCA review and planning (4) ***CCA prioritization of practices*** -Matatiele: 5 villages (Ned, Nchodu, Rahsule, Nkau, Mzongwana -Limpopo: Worcester, Willows, Mametja five finger reviews and planning

1.2.4.	Income diversification and economic empowerment of local farmers (LG at local level)		***Market days: monthly farmers markets***
		2022/10/02,11/03, 12/04, 2023/02/02, 03/02, 04/02, 05/08, 06/05	-Midlands: Bamshela (Ozwathini)
		2022/10/08,11/07, 12/02, 02/03, 03/03, 04/03, 05/02, 06/02	-SKZN: Creighton (Centocow**)**
		2022/11/05,06,07, 12/13, 2023/01/27, 02/07	- Bergville: Bergville town
		2023/06/02	-Wartburg farmers Market (Gobizembe
		2023/06/03	-Hoedspruit farmers' Market (Sedawa/Maetja, Turkey)
			Market exploration workshops
		2023/01/26	-Midlands: Mayizekanye, Gobizembe -PGS follow-up w/s Limpopo -EC_Ned-Nchodu market day in Matatiele
		2023/02/14	-SKZN: Mariathal
		April-June 2023	***VSLAs*** *VSLA introduction* -SKZN: Mahhehle -SKZN: Centocow- Sizakahle
		Oct23-March24	***VSLA meetings and share outs*** **-Bergvile: 9** **-SKZN: Ngongonini (3), Centocow (2)** **-Midlands: Ozwathini (2)** **Limpopo: (7)**
		2023/03/15,16	Youth tala table value adding training
		2024/03/05 and 04/02,04,16,23 and 05/04	**-Limpopo: Youth entrepreneurship dialogues with AWARD: Sedawa, Turkey, Willows, Sofaya ~100 youth**
1.2.5.	Implementation and capacity development for innovation (3) and multi-stakeholder platforms (3)	2022/11/18	-SKZN: Centocow P&D control cross visit and learning workshop
		2022/11/10	-uThukela water source forum: Visioning and action planning – Bergville
		2022/12/01	-Adaptation Network AGM
		2023/02/23	-Regenerative Agric farmers' day in Bergville incl Asset research, uThukela Water Source Forum, uThukela Development Agency
		2023/02/28	-Adaptation Network: CCA financing dialogue
		2023/03/08,09	-SANBI_gender mainstreaming dialogue
		2023/03/28,29	-WRC-ESS: Bglv Ezibomvini, Stulwane – resource management mapping and planning
		2023/03/30, 06/02	-Okahlamba LED forum
		2023/04/26	-Farmers X visit between Bulwer (supported by the INR0 and Bergville around CRA, fodder and restoration
		2023/05/09	-PGS-SA: market training input: Online training Session 5
		2023/08/29	**-Bergville: KZNDARD Okahlamba Agricultural show participation of MDF farmers (stall and presentation**
		2023/09/19	**- Bergville: marketing workshop and training -5 villages**
		2023/09/12	**-INR-Gcumisa_Midlands groups Multistakeholder innovation platform meeting**
		2023/09/29	**-Ubuhlebezwe LM flea market- participation by farmers from Centocow and Mahhehle**
		2024/03/12,20	**-Northern Drakensberg collaborative multistakeholder meeting in Bergville (55 participants)**
1.2.6.	Indicator development for evidence-based indicators, M&E and handbook development	2023/01/30- 02/03	Limpopo: Focus Group discussions for VSLA and microfinance for the rural poor x 3 (Turkey, Worcester, Santeng)
			Garden monitoring:
		2023/02/02	-SKZN: Plainhill, Spring Valley, Mariathal, Centocow
		2023/01/18	-EC: 5 villages
		2023/02/06-10	Bgvl:5 villages
			CA monitoring
		2023/01/18	-EC:5 villages
		2023/02/20	-KZN: Bergville -30, Midlands 15, SKZN 15
		2023/10/30	**-Livelihoods survey ~70 participants (EC, Limpopo, KZN)**
		2024/Feb-March	**-Poultry production in depth monitoring 119 participants (EC,Limpopo,KZN)**

1.2.7.	Implementation of sustainable water management	2023/01/03-02/03 2023/03/07 2023/03/25, 06/15 2023/04/25, 06/01,02, 06/14. 2023/**Nov-Dec.** **2024/01/18, 30, 2024/04/26** **2024/01/24**	KZN: Bergville: Stulwane – Conflict man and upgrading sprint protection KZN BGVl: Vimbukhalo system repair, committee meetings EC: Nkau: Water walk and meetings for spring protection and reticulation KZN: Bgvl Stulwane_ Engineer visits (Alain Marechal) for scenario development and follow up planning meetings with community. Set up committee, work parties and start on quotes and budget outline. **Finalise construction. Handover of water scheme** **-Midlands:Gobizembe – water resource survey and discussion**
1.2.10.	Organisational & capacity development	2022/11/17 2022/12/05 2023/02/13 2023/02/09, 02/16 2023/03/06 2023/03/13 2023/04/17 2023/05/26 2023/06/12 **2023/07/04** **2023/10/09** **2023/10/16** **2023/10/17** **2024/02/26**	-MDF AGM and organisational capacity development workshop -Mentoring and planning with new finance officer to implement SODI financial reporting system -Internal short learning event for rainfall and runoff results, as well as soil fertility and Organic carbon -Mentoring in CCA workshop implementation. Temakholo from Midlands assisted Bergville team -Team session on gender mainstreaming - UKZN- Ecological mapping and use of resource planning – Bgvl team -VSLAs review and discussion re group based rules, BLF updates - Nutrient analysis for livestock fodder options: facilitated by Brigid Letty from the INR -Small business development support planning and Livelihoods survey -**AGM and Org capacity dev workshop** **- Conservation agriculture participatory research outcomes and presentation for CA forum with interns and staff** **- Training plan development with interns** **- M&E frameworks discussion with Karen Kotschy and team members** **-Financial team: Introduction to online Sage platform**

NOTE: Temakholo Mathebula has registered for an M.Phil at University of Western Cape (Jan2024). Three interns (Sphume Mbhele, Hlengiwe Hlongwane and Nqobile Mbokazi) are in the process of completing a postgraduate certificate in Water resources management and training through Rhodes University -Amanzi for Food programme.

Below short narrative summaries are provided for some of the activities undertaken.

1.2.2 CCA training: learning and demonstrations

Trainings undertaken between October 2023 to march 2024 include the following:

Area	Villages	Dates	Themes	No of participants
Limpopo	Nchodu	2023/09/19	Value adding; Apple jam, lemonade, achar, sweet potato bites	32
Limpopo	Worcester,Willows, Sedawa,	2023/08/23,25,24	Seed saving review workshops	17,32,31
Limpopo, KZN, EC		Aug-Oct 2023	Mutipurpose chickens: feed, hygiene, housing	
Limpopo	Sofaya, Madeira, Willows, Sedawa, Turkey	Nov2023	Conservation Agriculture introduction and demo planting	35
Midlands	Gobizembe	2023/11/23 2024/03/04	Youth group: Seedling nursery training Natural pest and disease control	11

Limpopo	Willows, Turkey, Soaya,Sedawa	Feb 2024 2024/03/18 2024/03/26	Nutrition: vitamins and minerals, garden and crop diversification, medicinal herbs	18,16,24,15
Bergville	Stulwane, Eqeleni, Eibomvini	2024/03/13-15	Local marketing for winter season	13,14,11
Limpopo	Sedawa ,Mametja, Turkey	2024/04/04, 2024/04/16,ongoing)	Youth income and livelihoods dialogue	23,18

1.2.3 Cyclical implementation

The focus for this period has been introduction of multipurpose chickens (Boschvleders) and Conservaiton Agircutlure for all three areas: Limpopo, KZN and EC.

Poultry production

In addition to supporting existing participants with their broiler and layer production, MDF introduced a focus on multipurpose chickens.

Specifically for layer production, supply of point of lay hens has been very sporadic in 2022-2023. In addtion, feed and transport prices have escalated dramatically. This has meant a substinatial reduction in participants keeping layers. In Limpopo specifically, the rolling heatwaves has increased the mortality of layers substantially. In addtion, there has been a number of large scale outbreaks of avian influenza/bird flue across South Africa, which has negatively affected the industry. The trend for broilers has been similar, but not quite as severe.

A decision was thus taken to experiment with multipurose chickens as well as local production of feed rations and cultation of crops for feeding poutlry. The intention is to assist farmers to also breed their own flocks.

The Boschvelder chickens were bred in Limpopo in the late 1990s' from a combination of three indigenous Aafrican breeds (Venda, Ovambo and Matebele). They are suitable for both meat and egg production and can withstand extreme temperatures. The breed has inbred diseases resistance and is alert and active. It is best suited to fee-range conditions and doesn't do well in close confinement.

In terms of egg production they compare well with layer breeds and their production potential is on average around 70% of that of layers. They start laying at around 18weeks of age (4eggs/hen/week) and continue to lay for on average 2,5years. Laying declines in winter and declines sharply during molting. Hens go broody and make excellent mothers.Roosters mature at around 12 weeks.

Boschveld Chickens in Bela-Bela, supplies Boschvelderes at various ages. Givne thier longer maturing times, MDF has been procuring 4 week old chicks for the farmers. However they aren't sexed yet at that age, meaning a batch can contain many roosters. POL hens are also sold.

The small table below outlines the number of farmers who started with Boschvelders. Initially they were provided with 10x4wk old chicks, one bag of 10kg pullet grower and 10 kg of layers mash. From there any further orders of chickens and feed are to be managed by the farmers themselves. This is in keeping with the strategy of supporting farmers to try out new things, to reduce the opportunity risk for them, but not to create dependency in the longer term.

Area	No of villages	No of participants	No of 4wk old chickens (Oct 2023)
Bergville	5	39	390
Southern KZN	1	15	150
Midlands	2	30	300
Matatiele	5	40	400

Sekororo	5	50	500
	18	174	**1740**

The logistics for supply were intensive, as the uspplier delviered to central points and from there the pullets needed to be looked after and provided with food, water and protection to take them to the respective villages by LDV.

Figure 3: Above left: Boschvelder 4 week old pullet delivery to a village in Bergville, KZN. Above centre: Betty works with Mr Malatji in devliering pulltets for turkey viallge in Limpopo. Above right: Pullets and feed enroute to Matatiele.

Small learning and mentoring sessions were undertaken around Boschvlered management in each viallge, primairly to ensure good hygiene, proper feeding and approrpaite housing for these chickens. They are good at scavenging and can get a proportion of their nutrients in that way, but diets need to be supplemented with commercial feed. Quantities to be fed at specific times of day were covered, to avoid over or under-feeding.

A poultry monitoring process was undertaken for all areas between February and March 2024.Learning group participants were selected: those who had ordered more rounds of broiler chicks and layer hens (although this number has been very small due to unavailability of commercial POL hens) and Boschvelder chickens.

Table 4: Poultry monitoring Feb- March 2024: Participant numbers and poultry types.

Area	Village	No of farmers	Gender (% female)	broilers	Layers	Boschvelders	Traditional chickens
October 2023-March 2024							
EC, Matatiele	Nchodu	3	73%	1		3	2
	Ned	7		1		7	4
	Rashule	5		2	1	4	4
Limpopo, Sekororo	Turkey	12	64%		1	12	7
	Willows	10		3	1	10	4
	Sedawa	10			1	10	7
	Worcester	3				3	
Southern KZN	Ngongonini	6	74%	1	1	5	5
	Mariathal	4			1	4	2
	Mahhehle	11		1	11		4
	Centocow	3			1	3	2
	Spring Valley	6		1	1	6	4
	Nkoneni	5			1	5	3
Midlands, KZN	Gobizembe	9	85%	5	1	9	2
	Ozwathini	14		2	3	12	9
	Noodsburg	5		4		4	3
	Ndlaveleni	6				6	4
Bergville ,KZN	Eizbomvini	5	79%	5	3	5	ND
	Eqeleni	8		1	3	8	
	Emajwetha	5		20		5	
	Emadakaneni	6		5		6	
	Ezinyunyane	3				3	

	Stulwane	6		6	4	5	
	Vimbukhalo	5				5	
Totals		**157**	**75%**	**58**	**34**	**140**	**66**

Overall, the number of participants still invovled in layer production has dwindled from 70 participants in 2022-2023, to 34 participants in early 2024. The number of participants involved in broiler production has also decreased substantially from 249 participants in 2022-2023 to 92 participants in early 2024. These trends are a combination of reudced availability of chickens commercially, drastically increased prices of feed and fuel and less expendalbe cash at household level. This was compounded by MDF's decision to only supply bulk orders where farmers have come together to collect their monies and ordered 1 large consignment, rather than assisting a few individauls at a time, as was done before. The latter was a conscious decision as it became clear that most participants were working with numbers of broilers and layers which are too small to be profitable (<50 broilers per round and fewer than 10 layers) and that for these farmers this production was only possible through the' subsidisation' by MDF (ordering, transport nad delviery). The plan is to move as much as possible to multipurpose chickens, production of fodder and feed rations and home breeding to develop a local value chain for poultry production which is more independent of commercial fluctuations and more sustainable.

Below is a suammrized anlaysis for the in-depth moniotring of the management of hte boschvlder chickens for 119 participants across Limpopo, KZN and EC.

Table 5: In-depth monitoring for Boschvelder chicken management across 4 sites.

Record keeping for Boschvelders.	**Matatiele**	**Limpopo**	**SKZN**	**Midlands**
No of farmers	14	35	23	31
Number of birds in flock	99	350	124	225
New chicks born			62	4
Mortality	7	16	80	
Number of hens/rooster (Ratio)	0,9	2	1,5	0,3
No of participants selling birds	2	9	4	7
Price per bird?	R110,00	R120,00	R150,00	R130,00
No of birds sold	4	57	24	30
No slaughtered for home consumption	29	59	28	51
No of hens laying eggs	28	109	64	36
No of farmers selling eggs	2	8	8	5
Ave eggs sold/week/farmer	30	65	31,5	38
Price /egg	R3	R2	R2	R2
Ave eggs consumed/week/farmer	6	27	36	12
Ave monthly income/farmer	R580,00	R715,00	R402,00	R354,00
Ave monthly cost of consumption	R128,00	R326,00	R235,00	R226,00
Ave total income (incl consumption)	R708,00	R1 041,00	R637,00	R580,00
Ave monthly costs	R642	R456,00	R649,00	R649,00
Ave monthly'profit'	**R56,00**	**R585,00**	**-R12,00**	**-R69,00**
Feed bought no of farmers:				
Maize crush only	7	1	14	10
Mix of maize crush +layers mash	5	3	1	8
Layers mash only	2	22	5	15
None		7	3	

From the analysis the farmers in Limpopo have grapsed the concept of working with their multipurpose chickens better than the other areas, already realizing that they are a good alternative to layers and feeding them layers mash to promote egg production for sale. They have also comparatively consumed fewer of the birds provided and focused more on breeding with these chickens. They have focsed more on providing good housing and laying arrangements for thier birds than the other sites.

Figure 4: Two examples of housing arrangements for the Boschvelders in Limpopo

The Midlands learning group bore the brunt of the distribution between hens and roosters- as 4 week old brids are not yet sexed and it only become apparent a bit later on. For this group most farmers had many more roosters than hens, and thus also the trend of more consumption as roosters have been eaten at home. They are not that easy to sell as their meat is tougher.

It is clear from the table above that those farmers who have not fed their Boschvelders, and treated them like „normal“ traditional chickens have not reaped the potential benefits of this breed.In addtion those who have fed their boschvelders layers mash or a mixture of layers mash and maize crush have seen the best results. The belief in the villages that maize crush is cheaper than layers mash has not been shown to be correct. Generally when farmers buy maize crush they buy in small quantities (5 or10kg bags) which are in fact proportionally much more expensive. The feed costs in Limpopo were quite a bit lower than KZN and EC, partly because farmers worked together to buy larger quantities in bulk and then shared the feed between them.

Figure 5: Examples of Boschvelder housing, a hen with chicks and an egg laying box for the Bergville villages (here the in-depth monitoring has not yet been undertaken)

Conservation Agriculture

For this season Conservaiton Agircuture interventions focused in Matatiele Limpopo and Bergville. It was decided not to pursue this activity in Southern KZN or Midlands that actively as farmers' uptake of the practise in these areas has been very patchy. It is in the regions where climate change has had the greatest impacts, where uptake of CA has also been alot more consisten. Farmers have realized that thier potential procution and yeidls without a different farming practise has become very low and danger of complete crop failure has been high.

In limpopo the emaphsis was on farmers who could supply supplementary irrigation for their CA tirals, given that dryand cropping in this region has led to crop failures for 5 consecutive years. The focus was thus on Willows (at homestead level), madiera and Soafya (both homestead and irrigated field level).

The CA experiments consisted of 3 plots/strips (Maize+cowpeas, maize+SCC mix , bird resistant sorghum)) with 1 control plot of maize. The Summer cover crop mix consisted of sunflower, sunnhemp and fodder sorghum). Farmers were also provided with fodder seeds to plant. In Willwos most the farmers didn't plant the fodder as december and January were extremely hot, with very little rain, depsite having irrigation. Their arugment was that germination under these conditions is very difficult.

Figure 6: Growth ot the M+Cp, M+SCC and Brid resistant sorghum plots for Syllus Malepe in Willows

Figure 7: Above left: Bird resistn sorghum planted by Mrs Mogofane Shai in Willows, Above centre and right: Sun hemp and lucrene planted by maria Mathipa.

In Sofaya, this was thei first season of CA epxerimentation for this new group. Unfrotunately the large plot planted in thier irrigation shceme was not weeded and was evnetually lost ot the weeds. A few of the farmers did very well with thier homestead plots. Most of the farmers did not follow the instructions well, but thier efforts have shown promise for a more concerted effort in the upcoming season.

Figure 8: Clockwise from top Left: A bird resistant sorghum plot for Martina Sekgobela in Sofaya and her M+SCC intrcropped plot at homestead level. The irrigation scheme field trail planted by the group, butn not subsequently weeded is shown. Here the bird resistant sorghum is still visible- but all crops were ultimately lost toe the weeds.

In Bergville we continued with the collaboratively managed CA trails under the WWF programme and also worked three other organsaitons on field cropping experimentation:

1. Zylem: Sustainable Agirculture corpoate organistaiton- new amzie varieties 9OPV, high Lysine)and liwuid fertilizer regimes
2. Farmer Support Group: Use of biochar for mazie production
3. Forge Agri-Mooriver: Agircultural input comanpy- a variety of fodder beet varieites.

The 2nd season of CA experimentation included the same CMT's (26 participants 1000m^2), as the first season, to be able to build on their results. The fenced (to improve soil cover- 2 participants) and remedial (to improve soil condition and fertility- 1 participant) trials were also continued. In addition, a further 102 farmer managed trials (400m^2) were also included in the process.

Weather conditions this season have followed a similar trend to the last two years, with very dry, hot conditions early in the planting season (October-November), followed by very high levels of rainfall between December and January, interspersed with three hailstorms and followed by dry, hot conditions mid-February to mid-March. As a result, despite a good annual rainfall a yield reduction of around 16% is expected compared to the 2022/23 season. Mid-season crop growth monitoring placed the participants in three distinct groups:

- Those with good germination and growth planted the earliest – 1st week of November (28%)
- Those with moderate growth experienced hail 3 storms between mid -December and mid-January (52%)
- Those with bad germination and growth planted later (end November- mid -December) and experienced high levels of water logging (high percentage clay soils with low organic matter) (20%).

Figure 9: Ezibomvini. Above Left: Phumelele Hlongwane, whose field recovered well from hail damage to provide for moderate growth and Above Right: Dumazile Dlalisa, whose field showed 100% germination and very good growth

A larger emphasis on fodder crop production for this season is seeing 21 participants growing extra plots of fodder crops including cowpeas, Dolichos, Lespedeza, Tall Fescue and turnips. The total area under fodder crops for CA trials is around 2 100m^2, over and above the 12,4ha of CA trials being undertaken. Three new villages have been included namely Emadakaneni, Emajwetha and Ezinyonyane, as considerable interest in implementation of CA was generated through the open days and multistakeholder processes.

Trial plot layouts have been kept the same for the past three seasons, to be able to clearly and quantitatively measure trends and changes for the inter cropped plots. This season, 2023/24, the participants have started on rotation of crops and have also opted to include both cowpeas and Dolichos. Plot layouts are as shown in the diagram below.

Layout(Plots and Strips)	yr1	yr2	yr3	yr 4
Plot 1	M	M	M	M+B
Plot 2	M+B	M+B	M+B	SCC
Plot 3	SCC	M+B	SCC	M
Plot 4	M	M	M	M+B
Plot 5	M+B	M+B	M+B	CP
Plot 6	SCC	M+B	SCC	M
Plot 7	M	M	M	M+B
Plot 8	M+B	M+B	M+B	Dolichos
Plot 9	SCC	M+B	SCC	M+Pk
Plot 10	M+Pk	M+Pk	M+Pk	M
or	M+CP	M+CP	M+CP	M

NOTE: M=maize-PAN53, B=beans-Gadra, CP=cowpeas-Mixed Brown, SCC=summer cover crops- Sun hemp, sunflower and fodder sorghum, Pk=Pumpkin-Flat White and Dolichos=Lab-Lab beans.

Figure 10: Input for CA trials wieghed nad packaged for distirbution to farmers

All participants contributed financially towards the procurement of inputs – a subsidy amount of roughly 30% of the cost of the inputs. These inputs were delivered and distrusted through the learning group facilitators in each village during the month of October 2023. The practise is for learning group members to work together to plant each other's trials in each of the villages, to ensure timely planting. Planters and equipment are shared between the group members.

Fodder production and supplementation.

This aspect introduces farmer level experimentation in the production of fodder crops for both cut and carry options and in situ grazing as well as a fodder us0plementation process, linked to cutting and baling of veld grass for the winter season. The number of participants for this aspect is reasonably small, with 11 participants in 2023/23 and 15 participants in 2023/24.

Table 6*:* Fodder planting participants, crops planted and date of planting.

Villages	Name and surname	Size (m^2)	Crops	Planting dates
Stulwane	Nelisiwe Msele	400	Scc and cow peas	15/12/2023
	Nothile Zondi	800	Lespedeza, sorghum, turnip, cow peas, tall fescue	02/12/2023
	Thulani Dlamini	800	Turnip, sorghum, lespedeza, tall fescue	04/12/2023
	Khulekani Dladla	420 400	Pan 5A 190 (short season maize hybrid), tall fescue, lespedeza, turnip, sorghum, cow peas Old lespedeza, cow peas, Scc	05/12/2023 09/12/2023
	Dumephi Hadebe	200	Cow peas, sorghum, turnip and tall fescue	12/12/2023
Emajwetha	Lungile Dladla	200	Tall fescue, cow peas, sorghum	28/11/2023
	Bukiwe Mlambo	400	Sorghum, cow peas, turnip, tall fescue and lespedeza	28/12/2023
	Simephi Hlatshwayo	140	Cow peas, sorghum	06/12/0023
Eqeleni	Tholwephi Mabaso	400	Cow peas, sorghum, cow peas	07/12/2023
	Nomusa Hlongwane	400	Cow peas, sorghum and Scc	12/12/2023
	Balungile Sishi	200	Cow peas, sorghum, Scc	12/12/2023
	Ntombakhe Zikode	216	Lespedeza, tall fescue, turnip, sorghum, cow peas	08/12/2023
	Sizeni Dlamini		Damaged by hail	
	Mthokosizi Shange	200	Lespedeza, turnip, cow peas	14/12/2023
Ezibomvini	Bongani Phakathi	720	Scc, cow peas and sorghum	12/12/2023

Note 1: The Sorghum planted was a specialised bird resistant variety.

Note 2: 10 of the 15 farmers planted the fodder and cover crops in strips intercropped with the Zylem regenZ maize varieties.

Monitoring of the fodder crop trials showed a range of germination and growth:

- Good germination, weeding and growth (33%)
- Good germination, but late weeding and average growth (45%)
- Little to no growth- lack of weeding and water logging (20%)
-

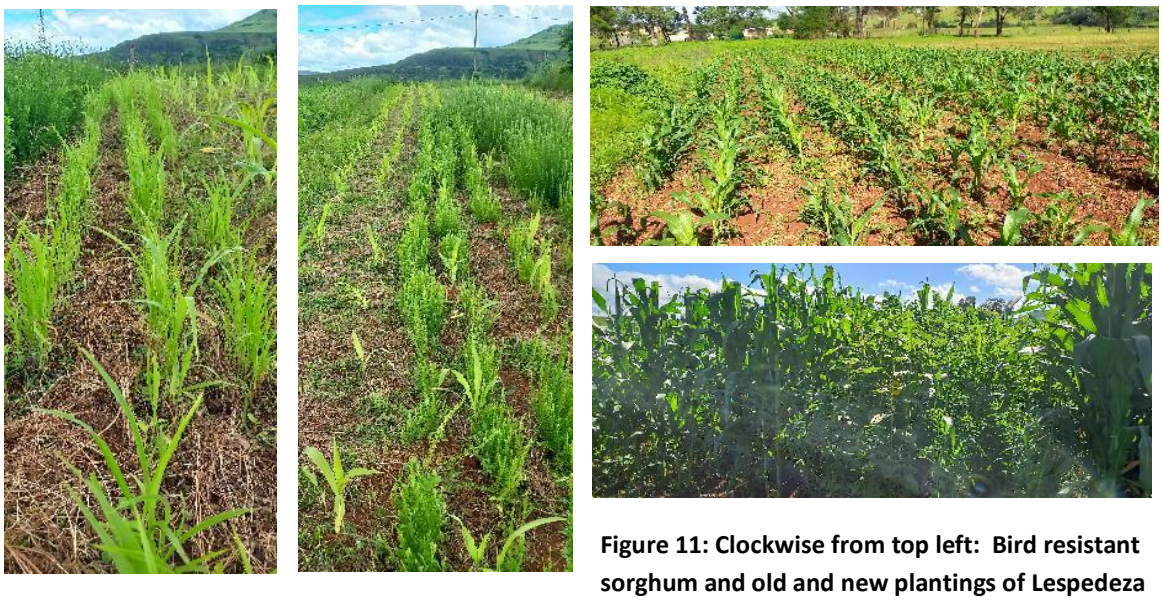

Figure 11: Clockwise from top left: Bird resistant sorghum and old and new plantings of Lespedeza at Khulekani Dladla (Stulwane) and a Zylem maize variety trials and summer cover crop strip cropping plot at Sthabiso Manyathi (Eqeleni).

1.2.4 Indicator development, Monitoring and evaluation.

To date, informal monitoring has taken place. An arrangement has been put in place with Karen Kotschy, an M&E specialist, to assist in the process of indicator and handbook development. Below is her latest submsision around strengthening of the theorietical framework and development of an indicator set for the resilience snapshots

Revision of farmer-level resilience indicators for Mahlathini Development Foundation

By Karen Kotschy, 3 December 2023

1. Introduction

Mahlathini Development Foundation (MDF) has spent many years developing and refining various tools for monitoring and evaluating their work of building resilience among smallholder farmers. These tools are varied and are used for different purposes and on different time scales, for example:

- Baseline assessments are once-off assessments of farming practices used when working in an area for the first time.
- Regular farmer monitoring forms are used for monitoring various aspects, at different frequencies (e.g. savings groups are monitored monthly but poultry only every 6 months).
- Seasonal reviews are done together with farmers to assess changes and benefits.
- Participatory impact assessments are done by farmers in focus groups on a less frequent basis (e.g. every few years).
- Livelihood surveys are also carried out occasionally.
- Research projects sometimes provide opportunities for more in-depth monitoring or focused case studies.
- The "Resilience Snapshot" tool is used to provide a summary of resilience, either annually or at the end of a project. It is based on a questionnaire for farmers as well as bringing together data from some of the other sources mentioned above. Farmers are asked to compare their current situation and farming practices to their situation and practices before they started working with MDF, to see whether resilience has indeed increased as intended.

MDF requested assistance to strengthen and further develop the Resilience Snapshot so that it is more strongly tied to resilience theory and more generalisable across agro-ecological zones and hierarchical levels.

MDF conceptualizes climate change adaptation for smallholder farmers through climate-resilient agriculture or CRA on three nested levels: micro-, meso- and macro-levels (**Error! Reference source not found.**). At the micro-level, participants are farmers interacting with each other - and possibly others in their community - in peer learning groups, interest groups and committees. As one moves to the meso- and macro-levels, the range and diversity of people and organisations involved broadens out to include other players such as local and national government, civil society organizations (CSOs), non-governmental organizations (NGOs), the private sector and academic institutions. The connections across the three levels or scales are important for ensuring that farmers' issues, concerns and preferences are understood and taken up regionally and nationally (e.g. into policy, planning and communications), and that farmers are able to benefit from the support of these diverse stakeholders (e.g. through relationships, learning exchanges and training).

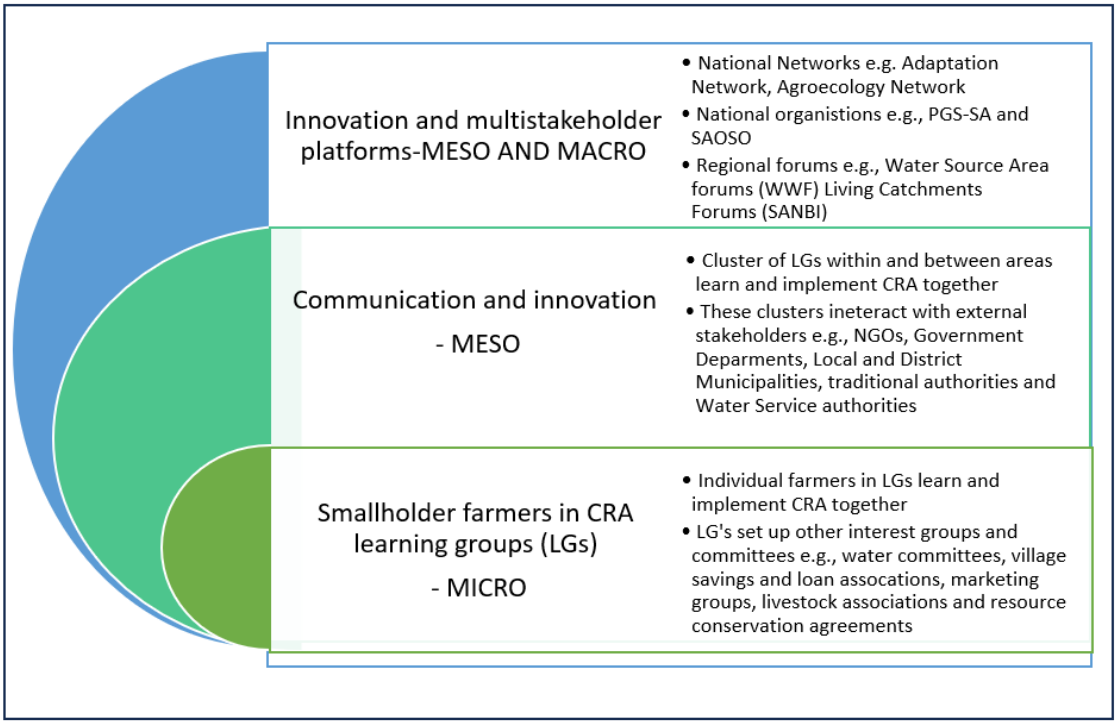

Figure 12: Micro-, meso- and macro-levels of organisation for climate-resilient smallholder agriculture

2. A theoretical foundation for assessing resilience of smallholder farming systems

The first step in strengthening MDF's tools for assessing smallholder farmer resilience was to strengthen the underlying theoretical framework. This was done by combining Cabell and Oelofse's indicators of agroecosystem resilience (Cabell and Oelofse, 2012) with the concept of absorptive, adaptive and transformative resilience capacities as used by Oxfam and others (Jeans et al., 2017), to produce the theoretical framework shown in Figure 13.

Cabell and Oelofse's (2012) indicators of agro-ecosystem resilience have a solid foundation in that they are based on the resilience principles outlined by Biggs et al. (2012), Biggs et al. (2015) and numerous other resilience scholars (see Folke, 2006 for an overview). Cabell and Oelofse (2012) present thirteen behaviour-based indicators[1] which together provide a measure of agro-ecosystem resilience, particularly for smallholder farmers (see Table 7). Agroecosystems are defined as social-ecological systems bounded by the intentionality to produce food, fuel or fibre and influenced by farmers' decision-making, including the physical space and resources used as well as related infrastructure, markets and institutions at multiple, nested scales (Cabell and Oelofse, 2012).

Cabell and Oelofse's framework forms the basis for the SHARP+[2] tool (Hernandez et al., 2022; https://www.fao.org/in-action/sharp), which is being widely used by the FAO and others to assess household climate resilience based on the knowledge and priorities of farmers, using an integrated approach. For example, the IFAD and GEF-financed Resilient Food Systems Impact Programme is currently using SHARP+ in seven countries in sub-Saharan Africa as part of its monitoring and evaluation framework, and SHARP+ has also been

[1] These are not specific, measurable indicators, but rather aspects or dimensions of resilience that should be included.
[2] Self-evaluation and Holistic Assessment of climate Resilience of farmers and Pastoralists.

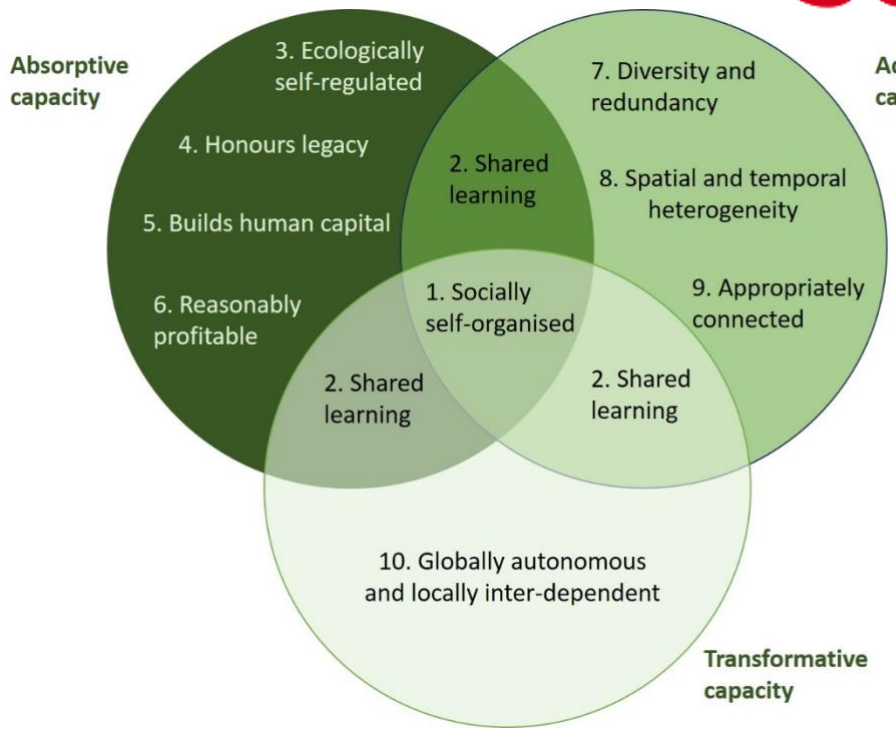

Figure 133: Theoretical framework for assessing resilience of smallholder farmers. Based on Cabell & Oelofse (2012) and Jeans et al. (2017).

included in operational guidelines on monitoring and evaluation of nature-based interventions, climate adaptation in agriculture, and implementation of resilience thinking (Hernandez et al., 2022).

The Oxfam Framework for Resilient Development, *The Future is a Choice*, describes three types of resilience capacity: absorptive, adaptive and transformative capacity (Jeans et al., 2016). Resilience is seen as a result of enhancing the capacity (ability, agency, power) of people to proactively and positively manage change in ways that contribute to a just world without poverty. The three capacities are seen as interconnected, existing at multiple levels, and mutually reinforcing (Jeans et al., 2017). This is in line with prominent resilience scholars' characterisation of resilience as having dimensions of persistence, adaptability and transformability in complex social-ecological systems (Walker et al., 2004; Folke, 2006; Folke, 2016).

Absorptive capacity ensures stability because it aims to prevent or limit the negative impact of shocks. It is the capacity to 'bounce back' after a shock, through anticipating, planning, coping with and recovering from specific shocks and short-term stresses. Adaptive capacity is the capacity to make intentional incremental adjustments in anticipation of or in response to change, in ways that create more flexibility in the future. Transformative capacity is the capacity to intentionally change the deep structures that cause or increase vulnerability and risk as well as how risk is shared within societies and the global community (Jeans et al., 2017).

For the purpose of creating a coherent theoretical framework for resilience in this context, the different aspects of agroecosystem resilience described by Cabell and Oelofse (2012) were mapped onto the three types of resilience capacity as shown in Figure 1, to produce a guiding framework for monitoring and evaluating resilience. This framework includes the different aspects of resilience as well as the interplay between stability and change.

3. Revision of the MDF resilience snapshot tool

The SHARP+ tool was considered too complicated for MDF's current purpose, as it involves a very lengthy survey which MDF felt would not be practical in the contexts in which it works. Although the length and the questions can be customised to some extent, it was considered not ideal to combine all the monitoring and evaluation into a single survey carried out at one point in time. As described above, MDF staff already do several different types

of monitoring and evaluation activities with farmers on different time scales, because different activities require different monitoring frequencies. Furthermore, MDF's Resilience Snapshot tool has been tested and refined for the South African context over many years. It was therefore decided to align what MDF is already doing with the Cabell and Oelofse framework, and to strengthen and modify the Resilience Snapshot where necessary.

Comparing the Resilience Snapshot indicators with the Cabell and Oelofse (2012) aspects of agroecosystem resilience (Table 1) revealed that the Resilience Snapshot did cover most areas, although some more strongly than others. By comparison, the Committee on Sustainable Assessment's (COSA)[3] resilience indicators used by the Adaptation Fund do not cover all the aspects of resilience (Table 77).

The thirteen aspects of agroecosystem resilience described by Cabell and Oelofse (2012) were reduced to ten as follows. One was removed because it was felt not to be relevant to South African smallholder farmers ("carefully exposed to disturbance" – South African smallholder farmers do not have the luxury of controlling the amount of disturbance to which their activities are exposed). Another ("coupled with local natural capital") was removed because it was felt to be sufficiently covered by another ("globally autonomous and locally interdependent"). Finally, "functional and response diversity" and "optimally redundant" were combined because in practice having more diversity usually also provides redundancy, or the ability of some entities (e.g. inputs, outputs or crops) to functionally compensate for the loss of others (Kotschy, 2013).

Table 7*:* Alignment of the MDF Resilience Snapshot indicators and the COSA resilience indicators with the dimensions of agroecosystem resilience described by Cabell and Oelofse (2012)

Cabell & Oelofse (2012) Agroecosystem resilience	**MDF Resilience Snapshot**	**COSA resilience indicators used by Adaptation Fund**
ABSORPTIVE CAPACITY (STABILITY)		
Socially self-organised - social components able to form their own configuration based on their needs and desires (e.g. grassroots networks, coops, markets, associations, advisory networks)	Collaborative actions/ social agency	
Reflective and shared learning - collaborations, knowledge sharing, record-keeping, ability to learn from past experimentation	Informed decision-making (information used)	Access to information Early warning systems
Ecologically self-regulated - stabilising ecological feedback mechanisms (e.g. maintain cover, soil health, regulate predators & pests, use ecosystem engineers)	Embodied in soil and water conservation practices of agro-ecology and conservation agriculture	SWC practices, including integrated pest management
Coupled with local natural capital - using local natural resources and ES, reduced need for external inputs	Increased water use efficiency (including rainwater harvesting, water holding, water access, and water productivity)	
Honours legacy - maintaining memory of past conditions and experiences (e.g. heirloom seeds, elders, traditional practices)	Informed decision-making (information used)	Access to information?
Builds human capital - constructed (economic activity, technology, infrastructure), cultural (individual skills and abilities), and social capital (social organizations, norms, networks)	Savings Collaborative actions/ social agency	No. of agricultural productive assets (equipment, livestock, land)
Reasonably profitable - farmers able to make a livelihood, able to invest in the future (buffering capacity), not needing to rely on distortionary subsidies	Increased livelihood security (income) Increased livelihood security (household provisioning & food security) Increase in farming (size) Increased productivity Savings (safety, security, achievement) Positive mindsets	Net household income
ADAPTIVE CAPACITY (FLEXIBILITY)		

[3] A non-profit independent global consortium which has developed an indicator library for resilience. COSA indicators are aligned with global norms such as the SDGs, multilateral guidelines, international agreements, and normative references. The indicators ensure comparability and benchmarking across regions or countries, making it easier for managers and policymakers.

Socially self-organised - social components able to form their own configuration based on their needs and desires (e.g. grassroots networks, coops, markets, associations, advisory networks)	Collaborative actions/ social agency	
Reflective and shared learning - collaborations, knowledge sharing, record-keeping, ability to learn from past experimentation	Informed decision-making (information used)	Adoption of new practices/equipment Access to information Early warning systems
Appropriately connected - relationships between system elements. High no. of weak connections imparts flexibility, few strong connections impart dependency and rigidity (e.g. no. of suppliers, outlets, farmers, crops)	Collaborative actions/ social agency?	
Functional and response diversity - diversity of ES, inputs, outputs, markets, income sources, pest control. Diversity of response options to environmental & other changes.	Increased diversity in farming Increased diversity of practices Increased water use efficiency Increased livelihood diversity options	Adoption of new practices/equipment Diversification of income
Optimally redundant - duplication (partial functional overlap) of components and relationships in the system (e.g. crop types, equipment, water sources, nutrient sources, sales outlets), but not so that it is too costly/unwieldy	Increased diversity in farming Increased diversity of practices Increased water use efficiency Increased livelihood diversity options	No. of income sources
Spatial and temporal heterogeneity - patchiness of land use, rotations, practices, in space and over time	Increased growing season Increased diversity in farming (gardening/ fieldcropping/ livestock/ trees)	
Carefully exposed to disturbance - disturbance not excluded totally but managed where possible (e.g. pest and disease exposure allowed to promote selection and resistance)		
TRANSFORMATIVE CAPACITY (STRUCTURAL CHANGE)		
Reflective and shared learning - collaborations, knowledge sharing, record-keeping, ability to learn from past experimentation	Collaborative actions/ social agency	Adoption of new practices/equipment Access to information Early warning systems
Socially self-organised - social components able to form their own configuration based on their needs and desires (e.g. grassroots networks, coops, markets, associations, advisory networks)	Informed decision-making (information used)	
Globally autonomous and locally inter-dependent - relative autonomy from exogenous control, but with a high level of cooperation locally	Collaborative actions/ social agency	

Specific, measurable indicators were then developed for all the aspects of resilience and resilience capacity as shown in Figure 1, using the existing indicators in MDF's Resilience Snapshot and the COSA indictors as a starting point (Table 8). Further development is still required, for example to add the methodology, people responsible for data collection and analysis, frequency of collection and data limitations for each indicator.

Future work will involve developing a visually engaging way of presenting and sharing the data. This could include:

- A "traffic light" system (red, orange, green) for each indicator to provide a simple overview of status and progress.
- Web-based dashboards which convert the data into engaging visual representations (e.g. graphs, charts, tables, word clouds) and make it accessible to stakeholders.
- An interactive network mapping tool such as Kumu (https://kumu.io/), which allows stakeholders to map and visualise their connections interactively and can also be used to gather and analyse data such as numbers and types of connections, strength of connections and social self-organisation.

Table 8*:* Expanded and modified set of resilience indicators for MDF's Resilience Snapshot

Indicator name and no.	Rationale	Definition	Unit of measure
Absorptive capacity			
1. Socially self-organised (Focus on support networks)			
1.1 Support networks/groups	Support networks build absorptive capacity by helping farmers to absorb and survive shocks.	Networks or groups which farmers use for emergency and psycho-social support.	Average no. of groups, % of farmers belonging to different types of groups.
1.2 Increased social agency (collaborative actions)	Absorptive capacity is enhanced by support networks that enable individual and collective agency to make farming activities more efficient and productive.	Extent of collaboration e.g. Market days, assistance with ploughing, labour, seed sharing, saving groups etc.	Average no. of collaborative actions in which farmers are involved.
2. Shared learning (Focus on learning for productivity)			
2.1 Increased knowledge sharing	Sharing of knowledge helps farmers to farm more effectively and to mitigate the impacts of shocks and disturbances. Also, the act of sharing knowledge promotes learning for the person doing the sharing as well as the recipient. Sharing shows that people have internalised information.	How knowledge is shared (e.g. informally with other farmers, in meetings with local orgs, meetings with external orgs such as DoA interest groups, in coops). What is shared: categories/ types of knowledge or sharing.	List of who shared with, list of types of knowledge shared.
3. Ecogically self-regulated			
3.1 Increased water use efficiency Five fingers indicators Pest and disease management Pollinators	The 5 fingers principles promote ecological self-regulation through improved nutrient cycling, water use efficiency, soil health, maintenance of indigenous vegetation and pollinator populations. Important for resilience but MDF has not had any success with monitoring most of these. Most farmers are not aware of things like pollinators, pests and diseases, soil health.	Whether the soil's water-holding capacity has improved (Y/N).	% Y vs N responses
4. Honours legacy			
4.1 Traditional practices, crops and livestock in use	Traditional practices are a way of maintaining memory of past conditions and experiences.	Which traditional practices are in use? (e.g. seed saving, heirloom/indigenous seeds or breeds, banana basins) - or changes to these.	List of traditional practices being used by farmers
5. Builds human capital			
5.1 Increased savings	Savings provide a buffer, allowing farmers to absorb and recover from shocks, and to plan and manage their cash flow.	Average increase in savings	Average increase in savings (Rands)
5.2 Use of savings for livelihoods improvement	If farmers are using savings for livelihood improvements, rather than just on essentials such as food, it suggests that human capital is being built.	How savings are being used	List of options
5.3 Increased knowledge and agency as a result of CRA	Building skills, knowledge and agency increases human capital, which enables farmers to farm more effectively.	What farmers are able to do now that they weren't able to do before	List of options
5.4 Increase in agricultural productive assets	Agricultural assets enable farmers to farm effectively and to absorb and recover from shocks.	Change in agricultural productive assets	List, maybe count and categorise (equipment, livestock, etc.)
6. Reasonably profitable			
6.1 Increased income	If farmers are able to make a livelihood through farming, they are able to remain in their communities and provide for their families, avoiding the social and psychological disruption of migration or circular migration.	Average monthly incomes, mostly though marketing of produce locally and through the organic marketing system.	Average monthly income (Rands)
6.2 Increased household food provisioning	If farmers are able to produce sufficient food locally, it reduces their dependency on store-bought food.	Food produced and consumed in the household.	Overall food produced (kg per week)
6.3 Increased food security	Having a dependable supply of food and a good variety of foods is beneficial for health and wellbeing.	No. of food types and how often eaten. A recognised food security indicator.	No. of food types/ no. of times per week

6.4 Increase in size of farming activities	An expansion of farming indicates that farmers have the resources and commitment to make this possible.	Size of farming activities (cropping, trees & livestock).	Cropping area (ha), no. of fruit trees and no of livestock.
6.5 Increased productivity	Apart from food security, increases in productivity create opportunities for participation in markets or value-added activities.	Increase in yields and/or livestock.	Overall kg produced in a season, livestock increase/decrease
6.6 Increased savings	An increase in savings reflects successful livelihoods. Savings also allow farmers to invest in the future.	Average increase in savings.	Average increase in savings (Rands).
6.7 Positive mindsets	This is an integrative measure of whether farmers feel they are "making it".	How positive farmers feel about the future.	SCALE: 0=less positive about the future; 1=the same; 2=more positive; 3=much more positive.
Adaptive capacity			
1. Socially self-organised (Focus on learning networks)			
1.4 Learning networks/groups	Learning networks build adaptive capacity by promoting experimentation and evaluation of results.	Networks or groups to which farmers belong which enable learning about CRA. (Will be mainly just the MDF learning group in most cases).	Average no. of groups, % of farmers belonging to different types of groups.
2. Shared learning (Focus on learning for adaptation)			
2.2 Use of information from past experimentation in decision-making	Successful adaptation is more likely when experimentation and learning inform farmers' decisions.	Whether information from past experimentation is used	% of farmers using info from past experimentation
2.3 Prevalence of record-keeping	Record-keeping facilitates recall of past events/results and analysis of trends.	Whether farmers keep records of anything	Question Y/N
2.4 Most significant change in farming practices	Changed practices indicate learning (?)	Most significant change in farming practices	List of practices
7. Diversity and redundancy			
7.1 Increased livelihood diversity options	Having a diversity of livelihood options increases farmers' response diversity (capacity to adapt to different shocks).	No. of livelihood options (sources of income), e.g. Social grants, remittances, farming incomes, small business income, employment.	Average no. of options per farmer
7.2 Increased diversity of farming activities	Having a diversity of farming activities also increases response diversity and provides for spreading of risks.	No. of farming activities (gardens, field cropping, livestock, trees etc.).	Average no. of activities per farmer
7.3 Increased crop diversity	Increased crop diversity increases functional and response diversity (different crops perform different roles, provide different nutritional benefits, and respond differently to stress, disease and disturbance).	No. of crops planted by farmers which were not planted previously ("new" crops).	Average no. of "new" crops added, overall and per farmer
7.4 Increased CRA practice diversity	Different practices have different functions within the agro-ecosystem (functional diversity).	No. of CRA practices used by farmers which were not used previously (e.g. mulching, trench beds, liquid manure, raised beds, mixed cropping, inter-cropping, crop rotation, tunnels, drip kits, eco-circles, , greywater use and management, Conservation Agirculture, cover crops, inclusion of legumes, pruning of fruit trees, picking up dropped fruit, pest and disease control ,feeding livestock on crops and stover, cutting and baling, fodder supplementation, health and sanitation for poultry, brooding, JoJo tanks, RWH drums).	Average no. of "new" practices added, overall and per farmer
7.5 No. of water sources	Redundancy in water supply reduces the impact of failure of one source.	List of water sources available to farmer.	Average no. of water sources, overall and per farmer
7.6 No. of nutrient sources	Redundancy in nutrient supply.	List of nutrient sources available to farmer.	Average no. of nutrient sources, overall and per farmer

7.7 No. of suppliers	Redundancy in of supply of inputs.	No. of suppliers available to farmers for gardening, field cropping and livestock needs.	Average no. of suppliers available, overall and per farmer
7.8 No. of sales outlets	Redundancy in sales outlets.	No. of sales outlets available to farmers for selling produce from gardening, field cropping and livestock.	Average no. of sales outlets available, overall and per farmer
8. Spatial and temporal heterogeneity			
8.1 Increased season	Seasonal variation of activities determines how farming benefits are distributed in time.	Has the seasonal extent of farming increased? (i.e. autumn and winter, and all-year options).	Question Y/N
8.2 Heterogeneity of land use	Spatial variation in land use influences landscape connectivity, which may influence movement of fire, pests and diseases, pollinators or water. It also provides response diversity because areas under different land use may respond differently to shocks.	Size and spatial connectivity of fields and natural vegetation.	?
8.3 Crop rotation / mixed cropping	Crop rotation and mixed cropping allow time for soil and vegetation to recover and increase temporal variation.	Whether farmers practice this and to what extent.	Question Y/N with comments, maybe a degree
8.4 Livestock integration	Livestock and crop integration such as through grazing management, rotational grazing, fodder production, buying fodder or baling, allow for functional integration of spatially and temporally heterogeneous activities.	Which livestock integration practices are used?	List of practices used per farmer from drop-down list
9. Appropriately connected			
9.1 Flexibility of networks	Flexibility of networks (many weak connections) allows configurations to change according to members' needs and desires.	Could be applied to networks of suppliers, marketing networks, governance networks etc.	No. and strength of connections between people
Transformative capacity			
1. Socially self-organised (Focus on networks for structural change)			
1.7 Inclusivity of networks/ groups	Inclusive social and governance structures build transformative capacity by reducing marginalisation, exclusion and inequity.	Extent to which farmer learning groups include women, youth and marginalised individuals (e.g. disabled, minority languages).	Average % of group members who are women, youth or from marginalised groups
1.8 Extent to which networks cross scales or hierarchies	Connections across scales or hierarchies provide opportunities for advocacy and structural change.	No. of "active" connections between farmer learning groups and macro-level stakeholders (meaning that there has been interaction or exchange of information etc. within the past year).	Average no. of active cross-scale connections
2. Shared learning (Focus on learning for transformation)			
2.4 Changes in personal attitudes, motivations or beliefs	Such changes reflect personal transformation, which is the foundation for and motivator of broader transformation.	Farmers' perceptions on how they think they have grown and how their personal attitudes have changed.	Average no. of farmers reporting changes
10. Globally autonomous and locally interdependent			
10.1 External vs local inputs	If farmers are highly dependent on external inputs, they will be at the mercy of external structures and circumstances (e.g. wars, politics, inflation, multi-national corporations) and will therefore have little ability to bring about structural change. If inputs are obtained locally, it suggests local interdependence.	No. of external inputs divided by no. of local inputs (e.g. seed, fertiliser, pest control products, feed etc.)	Ratio of external to internal inputs

An important consideration in developing the indicators in Table 88 was how to promote coherent monitoring and evaluation across the different scales (micro-, meso- and macro-levels as shown in Figure 122). The two aspects of resilience shown in the intersections between the three circles in Figure 13, namely social self-

organisation and shared learning, are important for all three types of resilience capacity and at all three levels, although they are expressed in slightly different ways in each. For example, at the micro-level, farmer self-organisation is measured by the number of local groups that provide support, the inclusivity of groups, and the extent of collaborative actions among farmers. At the macro-level, similar indicators for social self-organisation are used, but they are applied at the regional or national level (e.g. collaborative actions would not be between individual farmers but between organisations or groups). Additional indicators may also be included at higher levels, such as whether all stakeholder groups are adequately represented.

These indicators will now be used to re-design the participatory impact assessment review workshops and the individual resilience snapshot questionnaires, to do a trail run prior to finalisation of the overall methodology and process.

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