

WWF-MDF_ID1854-ZA06370C_Water stewardship in the upper uThukela: Smallholder climate resilient agriculture and water provision.

Milestone 6: Final report.

EXECUTIVE SUMMARY

Overall achievements of this project include:

1. CRA implementation: 2nd round of CA planting for 22 collaboratively managed trials (CMTs across 6 villages) plus 102 participants crop growth monitoring (124 participants in total) with a total of 12,4 ha of CA trials and 37,2ha of CA fields in total. Annual reviews were undertaken, as well as planning, financial contributions and inputs sourcing and delivery.
2. Runoff and water productivity results were compiled for 8 of the 22 CMTs for the 2022/23 season. Data collection for the 2023/24 season is still ongoing. Yield measurements were undertaken for 75 of the 124 participating farmers.
3. Crop diversity: Introduction of a range of crops including different varieties of maize and dry beans, bird resistant sorghum, cowpeas, pumpkins, summer cover crops (sorghum, Sun hemp sunflower) and fodder crops (turnips, tall fescue, lespedeza and fodder beet) into the system.
4. Water access: 3 small water source development and reticulation schemes to communal standpipes were undertaken. In Vimbukhalo and old borehole was refurbished and reticulated via two header tanks (7500l) to 6 taps servicing 35 households. In Costone/Stulwane a spring was protected and reticulated via two header tanks (10 000L) to 7 taps servicing 19 households. In Costone/Stulwane a further 2 small stream abstractions via 2 header tanks (10 000l) have been reticulated to 15 taps servicing 69 households.
5. Improved governance through the planning, implementation and review learning cycles for the climate resilient agriculture learning groups and formalization of village level water committees in association with the Traditional Councils and Local Authorities.
6. Multistakeholder engagement has been undertaken at a number of levels:
 - a. Local level cross visits between villages for showcasing and learning related to conservation agriculture, resource conservation implementation and governance considerations
 - b. Community level cross visits between areas: Ozwathini and Impendle smallholder farmer visits to the Bergville villages to share learning around CA, village savings and loan associations and fodder production.
 - c. Regional stakeholder engagement: through the Northern Drakensberg Collaborative (water resources management) and the Asset Research CA forum and working group (CA), KZNDARD (soil health and fertility, livestock production and CA) and the uThukela District Municipality (water access).
 - d. National networking and collaboration with the African Climate Development Initiative, SANBI, SEAON-EFTEON, the Water Research Commission and the Adaptation Network, through various events, processes and working groups.

PROJECT NUMBERS AT A GLANCE.

PROPOSED	ACTUAL	COMMENTS
110 participants across 5-8 villages	124 participants	Increased number of participants across 6 villages
20ha	37,2ha	Increase in area planted – includes trials and controls
11 fodder trials	11 fodder trials	Also included other partners: maize variety trials (Zylem), fodder beet trials (Forge-Agri) and biochar trials (FSG-UKZN)
Runoff replenishment: 500 000L/ha	240 000L/ha	Lower than expected due to flooding
Water access: 20 households	131 households	Three small schemes (borehole, spring, stream) supplying households with between 50- 150l/day of water.
Water access quantity:7300kL (20 households)	6 350kL	Lower availability of water -increased number of sources servicing 123 households.
Water productivity replenishment: 7 million L/ha	7 million L/ha	Expected target reached

NARRATIVE REPORT

PROJECT DETAILS

Assessment: The project is going well and is on track to finish by the set date	On track to achieve outcomes	1	Yes
	Concern about progress	2	
	Did not achieve outcomes	3	
Project No and Title	WWF-MDF_ID1854-ZA06370.C_Water stewardship in the upper uThukela: Smallholder climate resilient agriculture and water provision		
Date of approval	6 th October 2020		
Start and end date	1 st July 2022- 30 April 2024		
Project value	R1 285 000		
Contractor's name	Mahlathini Development Foundation		
Project objectives	<p>106 farmers across 5-8 villages improve on CA in their farming system (20ha's). A volumetric water benefit (VWB) for reduced runoff (~500 000l/ha/annum) and reduced consumption (~7 million l/ha) are assumed and measured.</p> <p>Spring protection (v box) with limited reticulation to header tanks and taps for 20 households which is community owned and managed is implemented in at least 1 village with full involvement of institutional stakeholders to explore governance and stewardship options.</p>		
Project outcomes	<p>1.3.2. <i>Monitoring and measurement of VWB of Conservation Agriculture and livestock integration practices in the upper uThukela for smallholder farmer communities</i></p> <p>1.3.2.1 Development of CA farmer level trials for a minimum 75 participants with measurement of run-off, rainfall, bulk density, evapotranspiration and water productivity for around 8-12 participants.</p> <ul style="list-style-type: none"> a. 5 Members of 5 CRA learning groups plan, layout and plan CA collaboratively managed trials (CMT's). Run-off pans installed for 8-12 participants for round 1 b. Crop growth monitoring for 25 CMTs, run-off and rainfall results compiled, bulk density and water productivity sampling undertaken and analysed, and yield measurements undertaken for round 1 c. 5 Members of 5 CRA learning groups plan, layout and plan CA collaboratively managed trials (CMT's). Run-off pans installed for 8-12 participants for round 2 d. Crop growth monitoring for 25 CMTs, run-off and rainfall results compiled, bulk density and water productivity sampling undertaken and analysed and yield measurements undertaken for round 2 <p>1.3.3 <i>Improved crop diversity, yields, and marketing for three local value chains leading to improved livelihood and incomes for smallholder farmers in the upper uThukela</i></p> <p>1.3.3.1 Inclusion of a range of options for cropping different varieties of maize, legumes and cover crops for 110 CA participants undertaking CA farmer level experimentation. Measurement of cropping areas, crop growth and yield for a minimum of 75 participants.</p> <ul style="list-style-type: none"> a. CA trials set up for 110 participants across 5 CRA learning groups in the Emmaus area. Planning meetings, demonstration and learning workshop and planting support. Cropping areas measured. Round 1 b. Monitoring for a minimum of 20% of 110 farmer level CA trials. Yield measurements done. Round 1 c. CA trials set up for 110 participants across 5 CRA learning groups in the Emmaus area. Planning meetings, demonstration and learning workshop and planting support. Cropping areas measured. Round d. Monitoring for a minimum of 20% of 110 farmer level CA trials. Yield measurements done. Round 		

	<p>1.3.4 <i>Improved livestock management through fodder supplementation and production awa rangeland management practices</i></p> <p>1.3.4.1 Fodder supplementation farmer level experiments undertaken for a minimum of 11 participants with monitoring of growth, yield and animal condition scoring</p> <ol style="list-style-type: none"> a. Planning for fodder supplementation trials across 5 CRA learning groups. Participants outline their trials, are provided with layout and logistical support and start planting. Round 1 b. Monitoring of 11 fodder trials, planning for winter fodder supplementation. Planning for fodder supplementation. Round 1 c. Planning for fodder supplementation trials across 5 CRA learning groups. Participants outline their trials, are provided with layout and logistical support and start planting. Round 2 d. Monitoring of 11 fodder trials, planning for winter fodder supplementation. Planning for fodder supplementation. Round 2 <p>1.3.5 <i>Improved access to water at household level for both consumption and farming through community owned water provision projects.</i></p> <p>1.3.5.1 Water committees and external service providers plan and implement a local water supply scheme through protection of at least 1 spring and reticulation to ~20 households</p> <ol style="list-style-type: none"> a. Meetings with water committees, walkabouts and local surveys, engineering support for layouts and scenarios, planning for local water provision options, implementation initiated. b. Local water provision implementation completed. Meetings with water committees re maintenance, operations and conflict resolution <p>1.3.6 <i>Improved governance and water stewardship in the communal tenure areas of the upper uThukela through multiple stakeholder engagement activities with the CRA learning groups.</i></p> <p>1.3.6.1 CRA learning groups undertake meetings for planning, analysis and review and also undertake cluster meetings to jointly explore and share information and options. They participate in multistakeholder level activities and liaise and negotiate with relevant role players such as the uThukela District Municipality, councillors, and Traditional Authorities</p> <ol style="list-style-type: none"> a. Review and planning meetings held with a min of 2 CRA learning groups, Cluster meetings held around specific thematic issues. 2 Workshops to discuss water and resource stewardship and management. Attendance of 1-2 multistakeholder events
Reporting period	July-December 2022
Significant approved changes	Beneficiary numbers for CA changed from 250 to 110, with concomitant reduction in hectares to 15,8 ha. 25 Fodder supplementation trials reduced to 11.
Changes in capacity to deliver outcomes	None

Milestone 6	
1.	Receipt and approval of 4rh and final Project Report
3	Completion of Outcome 1.3.6 Activity 1.3.6.1 a
2.	<p>1.3.2.1 d. Crop growth monitoring for 25 CMTs, run-off and rainfall results compiled, for round 2.</p> <p>1.3.3.1 d. Yield measurements not undertaken as yet -as harvesting only undertaken in May-June.</p> <p>1.3.4.1 d. Monitoring of 11 fodder trials. Planning for winter supplementation only undertaken around June-July.</p>
3.	1.3.6.1 a Review and planning meetings held. Final seasonal review to be undertaken around July-August 2024. Cluster meetings held around specific thematic issues (marketing). 2 Workshops to discuss water and resource stewardship and management. Attendance of 1-2 multistakeholder events including Northern Drakensberg Collaborative.

1 PROGRESS PER OBJECTIVE AND OUTCOME

Table 1: Progress against specific outcomes and activities March 2024

Outcome	Activities	Progress (Milestone 5)
CA with VWB for reduced runoff and water productivity	Development of CA farmer level trials for a minimum 25 participants with measurement of run-off, rainfall, bulk density, evapotranspiration and water productivity for around 8-12 participants.	<ul style="list-style-type: none"> ✓ 22 CMT's across 6 villages plus 102 participants crop growth monitoring (124 participants in total) ✓ CA trials (12,4ha), CA total (37,2ha), planned and planted for year 2 ✓ Runoff and rainfall results compiled for 8 participants (yr1). Installation of runoff pans x 8 for year 2
	Inclusion of a range of options for cropping different varieties of maize, legumes and cover crops. Measurement of cropping areas, crop growth and yield for a minimum of 75 participants	<ul style="list-style-type: none"> ✓ Range of trials including remedial fenced and fodder trials alongside strip cropping and block trials for intercropping and crop rotation ✓ Inclusion of 12 new maize varieties and liquid fertilization trials for 10 participants in collaboration with Zylem Regen Z.
	Fodder supplementation farmer level experiments undertaken for a minimum of 11 participants with monitoring of growth, yield and animal condition scoring	<ul style="list-style-type: none"> ✓ Fodder trials for 11 participants planned for year 2, incl. cowpeas, Dolichos, cover crops, tall fescue and lespedeza. ✓ Inclusion of small experimental fodder beet production plots (supported by Forge Agri in Moorriver).
Improved access to water at household level for both consumption and farming through community owned water provision projects.	Water committees and external service providers plan and implement a local water supply scheme through protection of at least 1 spring and reticulation to ~20 households	<ul style="list-style-type: none"> ✓ Stulwane/Costone: Finalisation of new water access process from 2 in stream springs in upper catchment for 69 households, with 4 header tanks and 15 taps (27 February 2024). ✓ Water samples submitted to Umgeni water and analyses done (February 2024).
Improved governance and water stewardship in the communal tenure areas of the upper uThukela through multiple stakeholder engagement activities with the CRA learning groups	CRA learning groups undertake meetings and stakeholder engagement	<ul style="list-style-type: none"> ✓ CA farmer video production through Screensahre Africa, in successful CA implementation. ✓ uThukela Water Partnership -Northern Drakensberg Collaborative (NDC) – Core team and stakeholder meetings and stakeholder (12 and 20 March 2024). ✓ Meetings with Water service Providers, Local Municipality ward Councillor and traditional ward councillor to formalise the self-supply water provision options in Costone/Stulwane. ✓ Finalisation of water committees' roles and responsibilities development process for the 2 sub-committees for Sections A and B in Costone/Stulwane (February 2024).

This project has been undertaken in 4 main villages in the Emmaus region of Bergville , with two new villages incorporated: Eqleni, Ezibomvini, Stulwane/Costone, Vimbukhalo and Emdadakneni and Emajwetha.

Below is a small map and GPS coordinates of these villages.

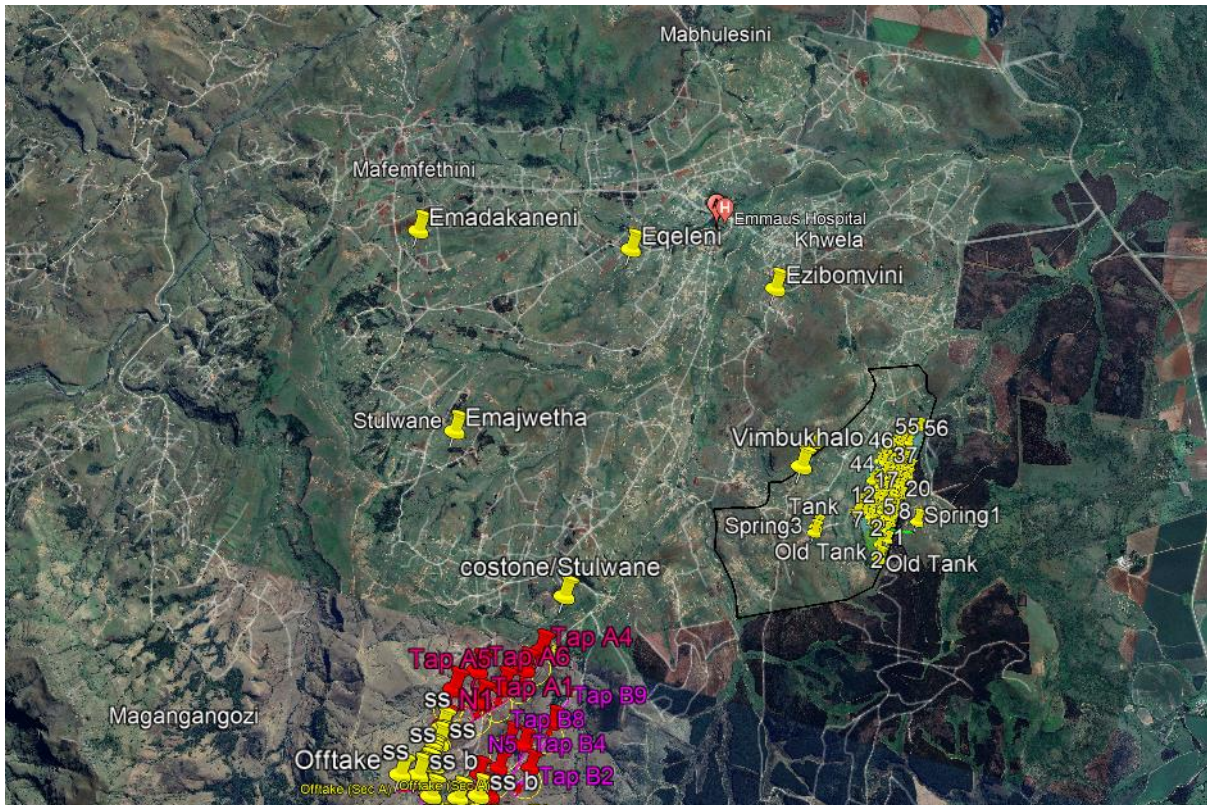


Figure 1: Map of area with 6 villages indicated for Conservation Agriculture implementation. In addition, the local water schemes for Costone and Vimbukhalo are indicated.

Village Name	GPS coordinates.
Ezibomvini	-28.877401, 29.392335
Qeleni	-28.863970, 29.375138
Stulwane	-28.911230, 29.375236
Vimbukhalo	-28.877292, 29.412480
Emadakaneni	-28.904890, 29.358744
Emajwetha	-28.878032, 29.384272

1.1 CA WITH VWB FOR REDUCED RUNOFF AND WATER PRODUCTIVITY

The intention was to provide for 2 seasons of the collaboratively and farmer managed trials to have two sets of data for the run-off, water productivity and yields. Data analysis has been completed for 2022/23 to date. Finalisation of the present season will only be possible around July-August 2024.

For the 2022/23 season the following table provides an overview of the results obtained (detail is provided in Annexure 1 of this report).

Table 2: Metrics for Conservation Agriculture trials in Bergville 2022/23.

Plot description	Bulk density (g/cm ³)	Runoff (% of rain converted to runoff)	Water productivity (kg/m ³)	VWB (kiloL/ha)	Maize yields (t/ha)
CA trial multi cropped plots (Maize and beans and maize and summer cover crops intercropping)	1.91	6.4%	3.4	6 996	4.9
CA control (Maize mono cropped plots)	1.95	6.2%	1.5	270	1.8
Conventional tillage control plots	2.04		2.1	0	2.1

COMMENTS	Lowest bd for CA trial plots	No difference between trial and control for this season. ~VWB of 223kiloL/ha	CA trial WP double that of CA control	~7000kiloL water benefit for CA trial compared to conventional tillage.	Yields for CA trials are 270% higher than CA control.
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This table clearly indicates the advantages of using a multi cropping (intercropping, crop diversity and crop rotation) strategy in Conservation Agriculture with a combined volumetric water benefit of 7,2 million litres/ha. The VWB of clearing alien trees is around double that number per hectare cleared (based on daily water use of the trees, rather than streamflow reduction). There is however a significant water benefit for using Conservation Agriculture in this landscape, with very positive implications for water stewardship and land use management.

1. Collaboratively managed trials (CMTs)

The 2nd season of CA experimentation included the same CMT's (26 participants), 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.

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 2: 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 2100m², over and above the 12,4ha of CA trials to be 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.

The table below outlines the CMT participants with associated activities such as runoff pans and rain gauges (8 participants), specific trials in stover retention/ fencing (2 participants) and remediation of plots (1 participants) and the fodder experimentation trials.

Table 3: CMTs and associated activities outlined for ?? participants; November 2023

	Village	Name and Surname	Trial type	Plot Size (msq)	CMTs	Fenced 500 m ²	Remedial trial	Runoff pans (3/field)	Fodder: grasses	Fodder; Cowpeas	Fodder: Dolichos	Fodder SCC	
1	Ezimbovini	Phumelele Hlongwane	Strip	1000									
2			Blocks	1000									
3		Landiwe Dlamini	Blocks	1000									
4		Zodwa Zikode	Blocks	1000									
5		Nombono Dladla	Blocks	1000									
6		Mantombi Mabizela	Blocks	1000									
7		Cabangani Hlongwane	Blocks	1000									
8	Vimbukhalo	Sbongile Mpulo	Strips	1000									
9		Zweni Ndaba	Strips	1000									
10		Bukisiwe Mpulo	Strips	1000									
11		Balungile Mkhathini	Strips	1000									
12		Sindisiwe Makhathini	Blocks	1000									
13	Eqeleni	Thulani Dlamini	Strips	1000									
14		Ntombakhe Zikode	Strips	1000									
15		Sthabiso Manyathi	Strips	1000									
16		Thulile Zikode	Strips	1000									
17		Nomavila Ndaba	Strips	1000									
18		Makosonke Mabizela	Strips	1000									
19		Smephi Hlatshwayo	Strips	1000									
20	Stulwane	Nelisiwe Msele	Blocks	1000									
21		Nothile Zondi	Blocks	1000									
22		Thulani/Danger Dlamini	Strips	1000									
23		Khulekani Dladla	Strips	1000									
24		Nondomiso Zondi	Blocks	1000									
25	Emajwetha	Lungile Dladla	Strips	1000									
26	Madakaneni	Xolile Zikode	Strips	1000									
27		Sibongile Zikode	Strips	1000									
28		Buyisiwe Sithebe/ Ndaba	Strips	1000									
29		Buyisiwe Hlongwane	Blocks	1000									
					28	29	2	1	8	10	5	3	2

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.

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 distributed 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.



Figure 3: Inputs for CA trials weighed and packaged for distribution to farmers.

2. 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 supplementation 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 16 participants in 2023/24. Fodder nutrient analysis was included for the 2022/23 season to assist farmers to plan both quantities and mixes of fodder crops to feed to their livestock. This process was explained in the milestone 4 report.

The table below summarizes the nutrient analysis undertaken in both march and June 2023 and indicates fibre and protein content as the two main ingredients.

Table 4: Fodder nutrient analysis for a range of fodder production options in the Bergville villages (July 2023).

Species	Moisture %	NDF %	ADF %	Quality	Protein %	Quality
Lespedeza (Cut Feb)	39,02	67,13	54,59	Very bad	10,31	Good
Lespedeza (June regrowth)	25,64	40,42	32,77	Good	4,84	Poor
SCC (Mature, still green)	54,07	59,09	36,56	Moderate	10,49	Good
SCC (dry, seeded)	47,28	38,65	27,79	Very good	4,73	Poor
Beans (full plants with seed)	58,27	46,40	36,49	Moderate	16,73	Very good
Beans (dry stover, without seed)	10,13	34,17	26,02	Very good	8,94	Good
Maize (dry stover)	18,16	39,07	20,92	Very good	5,90	Maintenance
Veld (Cut Feb- green)	51,88	78,76	45,50	Very bad	5,08	Maintenance
Veld (Cut May- June- dry)	11,27	40,36	23,06	Good	7,12	Moderate

The quality indicators used in the community level workshops to outline the feed value are shown alongside. This indicates that the best options are mature green summer cover crops, bean stover with seed, maize stover and veld grass cut in May-June).

Uses	NDF %	ADF %	protein
Prime dairy (Very good)	<40	<30	>11
Good dairy (Good)	40-44	31-35	>8<10
Good beef (Moderate)	47-53	36-40	>7-8
Maintenance	54-60	41-42	<7
Poor quality	61-65	43-45	<7
Very bad	>65	>45	

Recommendations developed with the farmers are:

- Maize and veld grass would benefit from supplementation with a source of non-protein nitrogen such as urea/SP33 or premix54, which would allow the rumen microbes to digest it, and then to serve as a protein source.
- The fibre content of the Lespedeza could be improved by harvesting it before it is mature to reduce the stem: leaf ratio (December-January). Lespedeza needs to be harvested and dried carefully to reduce the loss of leaf materials.
- The dry bean residue can be fed ‘as is’ but would benefit from retaining some of the bean seed, though this is perhaps a loss in terms of household income or nutrition. In this regard, planting of cowpeas to use full plants (leaf, stem and seed) as feed has been suggested. NOTE: Farmers planted cowpeas before as a part of the experimentation process but discarded this in favour of dry beans. Now, with a better understanding of the potential value of cowpeas as fodder, interest has resurged.

- It is possible that the livestock that are given access to the summer cover crops will discard some of the stalky material and this could be returned to the maize lands to provide soil cover, which is one of the requirements of conservation agriculture.

For the 2023/24 season 15 farmers planted fodder trials, as shown in the table below.

Table 5: Fodder planting participants, crops planted and date of planting.

Villages	Name and surname	Size (m ²)	Crops	Planting dates
Stulwane	Nelisiwe Msele	400	Scs 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	Pan 5A 190 (short season maize hybrid), tall fescue, lespedeza, turnip, sorghum, cow peas	05/12/2023
		400	Old lespedeza, cow peas, Scs	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	06/12/2023
Eqeleni	Tholwephi Mabaso	400	Cow peas, sorghum, cow peas	07/12/2023
	Nomusa Hlongwane	400	Cow peas, sorghum and Scs	12/12/2023
	Balungile Sishi	200	Cow peas, sorghum, Scs	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	Scs, 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.

Zylem is an agricultural services company based in Pietermaritzburg that supports and promotes sustainable and regenerative agriculture. They provided 10 varieties of both white and yellow maize: a mixture of open pollinated varieties as well as drought tolerant and vitamin A rich hybrids, alongside liquid based fertilization.

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 4: 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 WATER ACCESS

Localised, community led, self-supply options were explored with both Vimbukhalo and Stulwane villages. The process relies on specific interest shown by the community, followed by a water source survey undertaken with a small group of key informants. Thereafter, depending on the strength and position of the sources a few scenarios are mapped out with the assistance of an engineer, to show water source protection and gravity fed reticulation options as well as costs. At this stage the specific households who can benefit from each scenario are also outlined. The intention is to provide for a patchwork of reticulation options that can as a whole provide access to tapped water for the whole community. Water committees are formalised on the basis of the sub-locations and participants decide whether to be part of the process or not. Those involved provide both a financial and labour contribution to the process, as these small schemes are built by the community themselves, with some guidance from an engineer and a building foreman.

Three small schemes have been supported.

Village	Type and no of taps	No of Households	Comments
Stulwane (Milestone 2 report)	Protected spring in wetland with 7 taps	25	Strong perennial source, supplying around 100l/hh/day. Scheme works very well, with highly functional water committee
Vimbukhalo (Milestone 4 report)	Refurbished borehole with 7 taps	53	Pumping for 8hrs per day requirement was not followed, thus reducing the available water. The group is too big to manage well. Supplies ~50l/hh/day
Stulwane (Milestone 5 report)	Small stream abstractions (2) with 14 taps	67	Divided into two sections (A and B), with committees for each to allow for better ongoing management. Supplies ~70l/hh/day.

One aspect that was not well planned for is the need for reasonably substantial budgets for ongoing maintenance and post-installation repairs and tweaking of the system. Community members seem to learn only from experience the dangers of over-utilization and attempts to add further taps and pipes to the designed system. This is despite setting up the rules and processes for operation at inception. Management is thus somewhat of an iterative and ongoing process. Each committee has thus focused more on ongoing contributions from the members to allow for maintenance.

The Stulwane stream abstraction scheme was divided into two sections, village A and B with separate sources and systems and committees. Work for these small schemes was divided into 3 phases, to allow for full community involvement and also to keep joint track of budgets. Phase 1 consisted of developing the sources and reticulation to the first break pressure tanks. Phase two consisted of laying the pipes and setting up the header tanks for both schemes and phase 3 consisted of the reticulation to the allocated taps. As the sources are quite high up in the surrounding hills, getting the materials on site was a huge undertaking. Getting the pipes across the extensive dongas in the area was also a challenge. The community were extremely enthusiastic and fully involved in provision of labour, for all three phases.



Figure 5: Above left to right: the source development consisting of a settling chamber and v-box in stream, the rigid carbon steel piping installed to cross the gullies and installation of the break pressure tanks.

Phase 3 was initiated in early January 2024. The first challenge was having to refurbish the sources and some of the piping. Sever upstream flooding compromised the design – despite having planned for this outcome. The v-box lids were washed away and piping was broken by tumbling rocks. Lids have now been anchored better, and sleeves provided for the vulnerable sections of the piping.



Figure 6: Above left to right> A view of the flooded source, the v-box lid now anchored with an additional layer of masonry and hard piping sleeves added for vulnerable piping, which cannot be buried due to rocky streambed conditions.

A further break pressure tank also had to be included in the Village A reticulation as the air valves included in December weren't functioning properly. Thereafter pipes for reticulation to the households and installation of taps were undertaken.



Figure 7: Above left to right: The Village A break pressure tank, installing pipes and an example of one of the 15 taps installed.

Water quality tests undertaken by taking samples from the header tanks, in January 2024 and analyses for drinking quality by Umgeni Water, indicated high levels of turbidity as well as coliforms and E.coli. the intention is to undertake further sampling when the streamflow is lower and more stable as a comparison. Participating households are aware of the need to filter and purify water if it is to be used for human consumption. A total contribution of R26 500 has been provided by the participants. There are however still some households who have not paid their fee. A full community meeting is planned for early April to clearly outline the operational rules and constraints of this system, set the roles and responsibilities for the two water committees and outline a management and maintenance process for these two small schemes.

The design of this system falls within the free basic water allocation and also within the pre-defined rules from the Water Service Authority (WSA) for abstraction and storage from streams for self-supply options. Both the traditional Council and the ward councillor have been centrally involved in the implementation process. repeated attempts to directly involve the WSA (uThukela Water) have been unsuccessful.

1.3 GOVERNANCE AND WATER STEWARDSHIP

1. **Local governance – adaptive planning – community level implementation**

In association with the Centre for Water Resources Research at UKZN, and under the auspices of the Water Research Commission a social-ecological mapping of land use patches, including a technical mapping of ecological and water resources as well as a veld assessment was undertaken. This participatory approach was then developed into a resource management adaptive planning process with the CRA learning groups and village-based management structures.

Through the efforts of the Livestock association, the CRA learning group and the Water committee in Costone/Stulwane, community members have been mobilized to work together, in a genuine effort to implement the co-developed community

resources management plan (detailed report in Milestone 5). In Costone/Stulwane the community have focused on erosion control in the grazing area, fixing of fencing and movement of cattle, river clean-ups and digging of communal refuse pits, wattle clearing on the stream edges and management of the restoration experimental site (initiative led by the Institute of Natural Resources. The eco-champs, originally employed through the DUCT Amanzi Ethu programme, we kept on to provide support to the community groups undertaking these activities. extremely interesting to note how the communities, and especially the Costone/Stulwane group are taking on challenges that are starting to encompass the broader community and spearheading a process for broader involvement as an organic, evolutionary step in this process and also how the government stakeholders are slowly being brought on board by the community themselves to provide the needed support and assistance. The fact that the community has developed enough confidence to engage stakeholders and ask for support it a significant step in their improved agency and in developing improved governance in their communities.

The efforts in Ezibomvini have been somewhat more sporadic, but have included river health monitoring, river clean ups and some wetland rehabilitation to date.

These planning and implementation processes are to be continued going into the future. Focus areas now would include erosion control and restoration in upper catchment area of Costone/Stulwane to protect both the water schemes and previous erosion control works form previous damage, as well as protection of roads and low-level bridges in both Stulwane and Ezibomvini from flood damage. Follow up with the fire protection teams employed under the EPWP to undertake firebreaks in these communities is also planned.

2. Stakeholder engagement

Through the SANBI-funded Living Catchments Project, a multi-stakeholder partnership was initiated in the upper uThukela Catchment in 2021. Building on this, WWF-SA has supported the strengthening and expansion of the partnership to include other stakeholders within the Northern Drakensberg Strategic Water Source Area (SWSA). This partnership is now known as the Northern Drakensberg Collaborative (NDC). Over the last two years, face-to-face and online meetings of partners have taken place and have allowed for sharing of experiences as well as discussions around the vision and functioning of the partnership. A field trip to the Stulwane community outside Winterton, was also undertaken in October 2023, to allow for learning and reflection around real-life cases of spring protection, community action, climate smart agriculture and environmental rehabilitation. One of the intended outcomes of the fieldtrip was to take the partnership forward towards establishing themes of communities of practice that have more focused interactions. This process is to be continued in the next Northern Drakensberg Collaborative meeting planned for the 20th March 2024.

Figure 8: A recent video production on regenerative agriculture was undertaken in association with Screenshare Africa. Here they are interviewing Nombono Dladla in Ezibomvini around her conservation Agriculture practices.

A wide range of stakeholders and role players at local, provincial and national level have been involved. The list below provides some examples:

- Farmer level cross visits between villages in the same area and from smallholder farmers in other regions of KZN (Implendle, Ozwathini).
- Village cluster workshops and events including Conservation Agriculture open days and local marketing initiatives review and planning workshops.
- Involvement of the Traditional Council and ward councillors in resource management and water stewardship activities.
- Involvement of the uThukela Development Agency, the Okahlamba Local Municipality and the KZN department of Agriculture in ongoing agricultural and marketing activities.
- Partnership with SEAONS-EFTEON node in the uThukela region
- Collaboration with a number of commercial partners including Irrigation and Drainage Services, Zylem RegenZ, Forge Agri, Capstone Seed and AGT Foods.
- Collaboration with academic institutions including the ARC (Agricultural Research Council), the WRC (Water Research Commission), UKZN, University of the Free State, Rhodes University and University of Cape Town. And



- Close working relationships with sister NGOs including The Farmer Support Group, the Institute of Natural Resources and the Wild Trust.

2 FUTURE AND RECOMMENDATIONS

The project has been proceeding according to plan and all activities are on track. There is increased interest in neighbouring villages and the region to work with Conservation Agriculture and the model for development of resource conservation implementation and improved governance at village and community level. In addition, there is a great need for further activities related to water access in the region, as well as building improved relationships with the local authorities and the newly formed Umgeni-uThukela Water Service Authority.

3 COMMENT ON FINANCIAL REPORT

The scope of activities undertaken, far exceeded the contractual brief, primarily due to high demand in the villages. Budgets for implementation were overspent but augmented by significant community level contributions.

Table 6: Summary of expenditure on CRA and water access activities 2022-2024.

Cost breakdown	Feb-24	Remainder (2022-2024)	Budget (2022-2024)
Inputs for Conservation Agriculture	R262 598,56	R50 681,44	R250 000,00
Spring Protection	R246 164,40	-R4 464,40	R218 000,00
Engineering fees	R143 715,52	-R47 268,52	R96 447,00
Sub-totals	R652 478,48	-R88 031,48	R564 447,00
Total 2022-2024	-R88 031,48		
Community contributions (CA and water access).	R89 780,00		

NOTES ON EXPENDITURE

Expenditure has been compiled for the full implementation period.

1. Disbursements received to date equal R1156 500,00

4 FINANCIAL REPORT

The financial report excel sheet is attached as a separate document: "**WWF-ZA06370C-Smallholder CRA and Water Provision_MDF_ Financial reporting template_Milestone 6_20240315**" Documentation for explaining full expenditure summaries is available on request.

Project number and Name:		WWF_184-ZA063760C – Water stewardship Mahlathini						
Completed by:		Erna Kruger						
		ESTIMATES		ACTUALS				
Code	Description	Total Project Budget	Current Year budget	Previously Reported Actuals	Current Year Actuals	Total Actuals to date	Total Current Year Budget minus Current Year Actuals (D - G = I)	Total Project Budget minus Total Actuals to date (Variance) C - H = J
	Reporting Period	May 2022-April 2024	July-December 2023	June-December 2023	July 2023-December 2023			
	A - OPENING BALANCE	R 0,00	R 0,00	R 0,00	R 0,00	R 0,00	R 736 500,00	R 0,00
	Approved WWF Income	R 1 285 000,00	R 420 000,00	R 556 500,00	R 420 000,00	R 976 500,00	R 0,00	R 308 500,00
	B - TOTAL income + o/balance	R 1 285 000,00	R 420 000,00	R 556 500,00	R 420 000,00	R 976 500,00	R 736 500,00	R 308 500,00
	EXPENDITURE by code							
1	Staff costs	R 432 000	R 216 000	R 405 000,00	R 27 000,00	R 432 000,00	R 189 000,00	R 0,00
2	Third party fees	R 96 447	R 48 000	R 90 431,07	R 6 015,93	R 96 447,00	R 41 984,07	R 0,00
3	Travel and Subsistence	R 211 770	R 109 350	R 205 245,29	R 6 524,71	R 211 770,00	R 102 825,29	R 0,00
4	Capital Asset costs	R 218 000	R 109 000	R 174 989,35	R 43 010,65	R 218 000,00	R 65 989,35	R 0,00
5	Operating expenses	R 250 000	R 125 000	R 228 228,91	R 21 771,09	R 250 000,00	R 103 228,91	R 0,00
6	Meetings / Education / Training	R 20 533	R 10 267	R 15 399,00	R 5 133,50	R 20 532,50	R 5 133,00	R 0,00
7	Project Promotion / Communication/ Printing / Publication	R 56 250	R 28 125	R 43 217,87	R 13 032,13	R 56 250,00	R 15 092,87	R 0,00
	C - TOTAL EXPENDITURE	R 1 284 999,50	R 645 741,50	R 1 162 511,49	R 122 488,01	R 1 284 999,50	R 523 253,49	R 0,00
	D – CLOSING BALANCE	R 1 284 999,50	R 645 741,50					R 0,00