



mahlath ni
development foundation



Water stewardship in the upper uThukela

Progress April 2023

Smallholder climate resilient agriculture and
water provision

SODI!





Outcome	Activities	Progress (Milestone 3)
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, 3 fenced and 3 remedial trials. 20 participants crop growth monitoring (124 participants in total) ✓ CA trials (9,3ha), CA total (27,9ha) ✓ Runoff and rainfall results compiled for 8 participants. ✓ Soil samples (17 CMTs and 5 other participants) analysed. ✓ Bulk density and WP undertaken for 8 participants (Sampling in May'23)
	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 ✓ Yield measurements for 25 CMTS and 50 participants (overall 75 participants)_ May'23
	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 supplementation trials planted and monitored for 9 participants. ✓ Fodder biomass and feed quality analysis ✓ Fodder supplementation experimentation – 7 participants + ✓ Fodder supplementation w/s for planning and review planned in June/July



Outcome

Improved access to water at household level for both consumption and farming through community owned water provision projects.

Activities

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

Progress (Milestone 3)

- ✓ Vimbukhalo finalisation of localised scheme for 53 Households
- ✓ Follow up meetings re management and maintenance.
- ✓ Follow-up meetings and maintenance activities in Stulwane for protected spring and reticulation system (11 extra Households)
- ✓ Total of 2 700K1 of water access per annum (1 908K1 in Vimbukhalo and 792K1 in Stulwane)



Outcome	Activities	Progress (Milestone 3)
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"> ✓ Attendance of the Bergville LM Extravaganza -6Dec 2022 ✓ Bergville regenerative agriculture farmers' open day – 23 February 2023 (focus on CC and water) ✓ UKZN-ESS: Thematic workshops in Stulwane and Ezibomvini: 28,29 March 2023 ✓ uThukela Water Partnership (11 April-core group, 23 May)



Layout of CA trials

BLOCKS (10x10m) x 10 plots	1 M	2 M+B	3 SCC	4 M	5 M+B
	10 M+CP /Pk	SCC	8 M+B	7 M	6 SCC
Strips (2mx50m) x10 strips	1 M				
	2 M+B				
	3 SCC				
	4 M				
	5 M+B				
	6 SCC				
	7 M				
	8 M+B				
	9 SCC				
	10 M+CP/Pk				
Fodder Strips (2mx50m) x 8 strips	SSM				
	B/WCC relay				
	SSM				
	Lespedeza				
	SSM				
SSM: PAN4A128 / SC701	Tall Fescue				
	SSM				
	B/WCC relay				

FENCED
TRIALS -500m²
(10mx10m)x5
Compared to
normal blocks

To keep all stover
-zero grazing



REMEDIAL
TRIALS –
1000m²

Limed and
ploughed
contours and
swales
Dense planting
of cover crops

To correct 'bad'
soils that are not
improving



	Village	Name and Surname	CMTs	Fenced 500 m ²	Remedial trial	Runoff pans (3/field)	Soil sample results	Lime	Fodder (sampling, exp)
1	Ezimbovini	Phumelele Hlongwane							
2		Landiwe Dlamini							
3		Zodwa Zikode							
4		Nombono Dladla							
5		Mantombi Mabizela							
6		Cabangani Hlongwane							
7	Vimbukhalo	Sbongile Mpulo							
8		Zweni Ndaba							
9		Bukisiwe Mpulo							
10		Zibonele Sithole							
11		Sindisiwe Makhathini							
12	Egeleni	Thulani Dlamini							Veld hay
13		Ntombakhe Zikode					4,5t/ha (9bags)		
14		Sthabiso Manyathi							Veld hay,SCC
15		Thulile Zikode					3-9t/ha (5bags)		
16		Nah Khumalo							
17		Nomavila Ndaba							
18		Lungile Dladla							Beans, veld hay
19	Stulwane	Nelisiwe Msele					0 – 3t/ha (4bags)		
20		Dombi Ntshingila /Dlamini							
21		Nothile Zondi							Veld hay, lespedeza
22		Thulani Dlamini (Danger)					1,5-6t/ha (4bags)		Veld hay
23		Khulekani Dladla					0-4t/ha (8bags)		Veld hay, lespedeza, SCC
24		Nondomiso Zondi							
25	Emahlamadakane	Xolile Gambu					4,5t/ha (9bags)		
26		Nokuthula Mabaso							
27	Emahlathini	Buyisiwe Sithebe/ Ndaba							Veld hay
28		Buyisiwe Hlongwane							





Measurements

Runoff – Pans in CA experimental and control plots in cropping fields

% Rainfall conversion to runoff (N=8)	Runoff CA trial plot (L)	Runoff control plot (L)
2019/2020	4%	7%
2020/2021	6%	11%
2021/2022	5%	7%
2022/2023	6,4%	6,2%
Average	5,4 %	7,8%

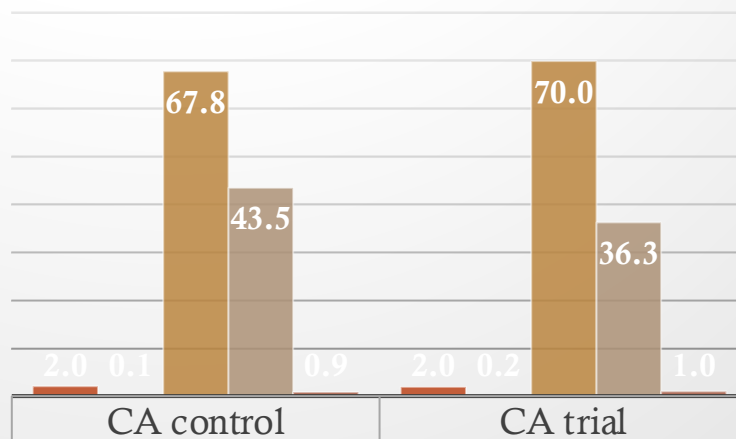
Right: Installation of run-off pans in a CA trial plot.



- Run-off averages across all CA trial plot 31% lower than runoff in the control plots (CA control maize or ploughed- mono cropped)
- Between 2%-5% (ave 2,4%) of total rainfall is saved through reduced runoff in the CA trial plots
- As rainfall increases, the difference in runoff becomes less noticeable.
- For Bergville with 9,3ha of CA trials savings are 9,232K1/annum

24 Liter /m² now in the soil.
That is
240 000 L/ha on average,
per year, more water in the soil and available to crops

Bergville 2022 N=25 Soil fertility results for CA control and CA trial samples across 7 villages



	CA control	CA trial
■ Average of Org. C %	2.0	2.0
■ Average of N %	0.1	0.2
■ Average of N Required (kg/ha)	67.8	70.0
■ Average of P required (kg/ha)	43.5	36.3
■ Average of Lime req t/ha	0.9	1.0

- ◆ Average % Org C for CA control plots are 1,5% and CA trial plots 1,9%.
- ◆ Average % N for Ca control plots is 0,15% and for CA trial plots is 0,19%
- ◆ The P requirement for the CA trial plots is substantially lower than for the CA control plots

Soil conditions are not significantly different for the CA trial and control plots.

Notable difference where CA trial plot fare better are in %N and in fertilizer P requirements. These do indicate an improvement through judicious fertilizer use, multi cropping and crop roaiton.

Measurements

Fodder nutrient analysis for veld, and stover (beans, SCC and Lesepdeza) April 2023

Sample ID	Species	Name	Location	Moisture %	NDF %	ADF %	Protein %	Fat %
NN beans	Beans	Nomavila Ndaba	Eqeleni	75,21	58,72	46,63	12,19	3,20
LD Beans	Beans	Lungile Dladla	Eqeleni	41,32	34,08	26,34	21,26	2,04
KD-Fodder	Lespedeza	Khulekani Dladla	Stulwane	38,56	65,18	54,88	8,95	2,96
NZ Fodder	Lespedeza	Nothile Zondi	Stulwane	39,48	69,07	54,30	11,67	2,97
NZ Veld	Veld	Nothile Zondi	Stulwane	49,25	78,59	44,51	5,53	2,51
TDS Veld	Veld	Thulani Dlamini_Stulwane	Stulwane	48,48	80,65	47,03	4,80	2,65
TD Veld	Veld	Thulani Dlamini_Eqeleni	Eqeleni	57,91	77,04	44,96	4,91	2,66
SM SCC	SCC	Sthabiso Manyathi	Eqeleni	59,74	59,68	36,23	7,35	2,72
NZ SCC	SCC	Ntombakhe Zikode	Eqeleni	48,81	54,35	32,91	10,46	2,96
NM SCC	SCC	Nelisiwe Msele	Stulwane	53,66	63,25	40,54	13,67	2,47

Veld nutrient and protein availability is too low for maintenance of condition in livestock

SCC nutrient and protein availability is good for both growing and lactating animals

Lespedeza provides high protein but is not that palatable

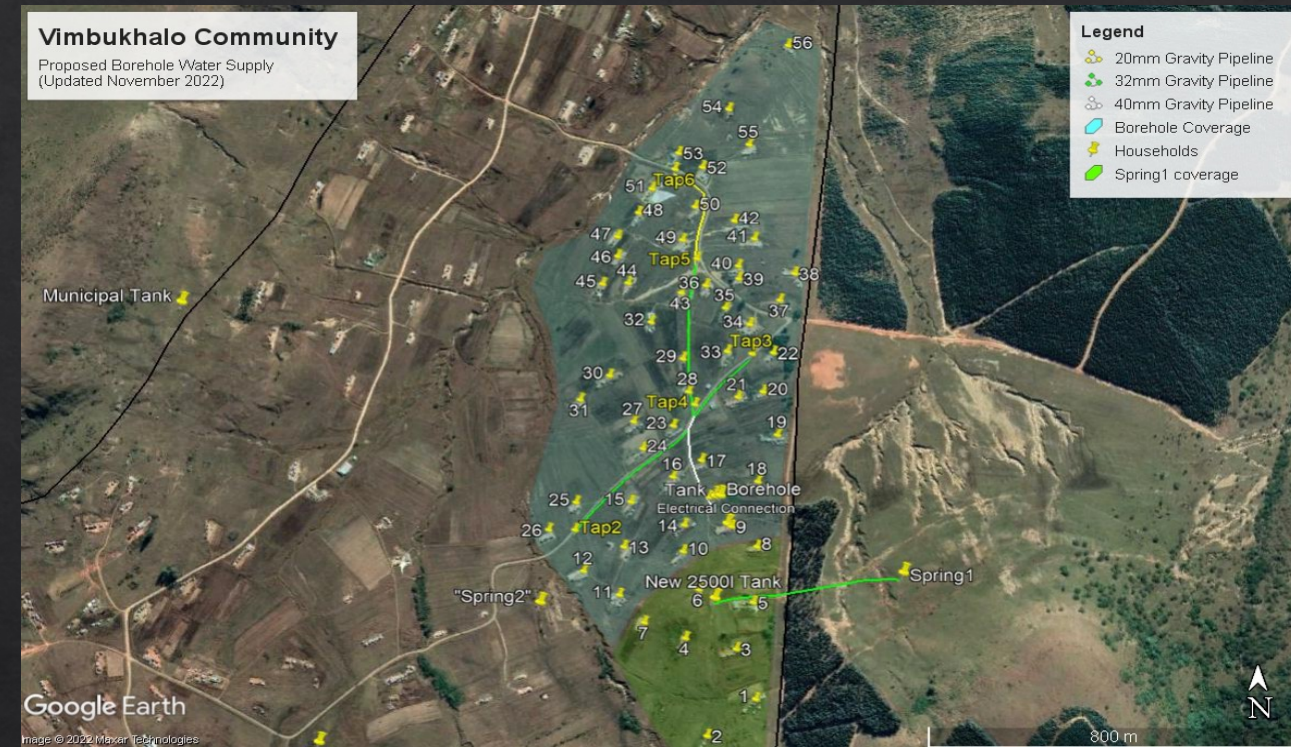
Bean stover has the best protein content and potential nutrient availability

Further analysis and community level workshops to follow in June-July 2023

Water access

Vimbukhalo borehole refurbishment and reticulation

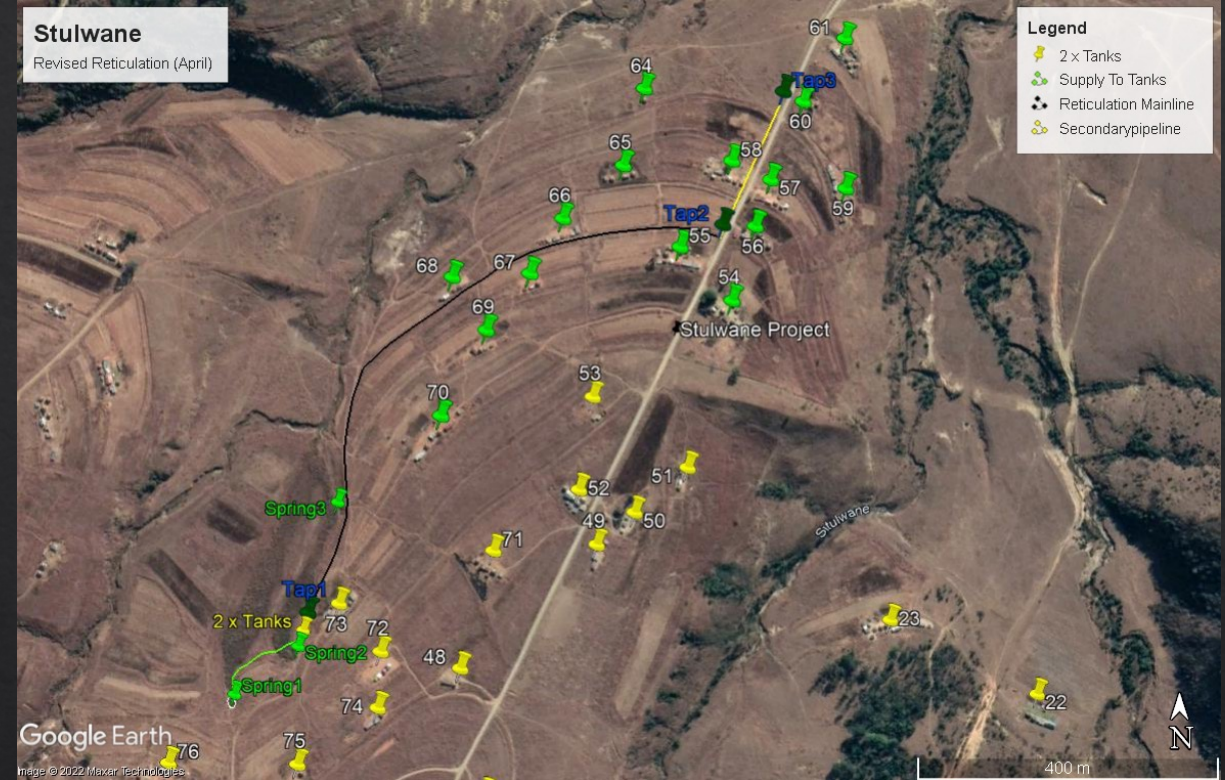
Tank(L)	No of HH	L/hh/day	Monthly water use (L/mth)	Annual water use (L/yr)
2500	13	96	37 440	
5000	40	62,5	75 000	
TOTALS	53		112 440	1 349 280
Averaging	53	100	159 000	1 908 000



- ◆ 53 HH receive ~100l of water per day from 6 taps within 200m of their homesteads
- ◆ Annual water access is 1908Kl
- ◆ Management includes
 - ◆ Not pumping for more than 8 hours/day
 - ◆ Payment of R10/month by each household for pumping costs- managed by two small sub committees
 - ◆ Payment of R200/hh for maintenance costs

Water access

Stulwane spring protection and reticulation upgrade



- ◆ 17HH originally another 11 now added through inclusion of 3 extra taps - all gravity fed.
- ◆ Each HH can collect between 200-380l per day
- ◆ Further 792Kl of water access per annum provided.
- ◆ Water committee elected to manage process and liaise with ward committee and Local Municipality

Work on further local water sources to start in May 2023

- ◆ Full laboratory analysis provided for the Vimbukhalo borehole – indicating an elevated level of fluoride.
- ◆ Springs undergo quarterly tests for contamination using E Coli kits - which Eco champs have been trained to use and record.

KEY:

S1- is the protected spring with V-box

S2- is the spring lower down

E – are the header tanks of the protected spring

Stulwane	E Coli test results		
Date	Time	Place	Colour
2022/02/17	12:03	S2	Clear
2022/02/17	12:11	S1	Clear
2022/02/17	12:56	E	Clear
2022/02/24	10:00	S2	Clear
2022/02/24	10:13	S1	Clear
2022/02/24	10:20	E	Clear
2022/03/04	09:13	S2	Green
2022/03/04	09:17	S1	Green
2022/03/04	09:22	E	Green
2022/03/10	09:22	S2	Clear
2022/03/10	09:27	S1	Clear
2022/03/10	09:56	E	Clear
2022/04/21	09:07	S1	Clear
2022/04/21	09:15	S2	Clear
2022/04/21	09:20	E	Clear
2022/06/16	08:06	E	Clear
2022/06/16	08:15	S1	Clear
2022/06/16	08:29	S2	Clear
2022/06/23	09:10	E	Clear
2022/06/23	09:25	S1	Clear
2022/06/23	09:32	S2	Clear
2022/09/14	09:56	E	Clear
2022/09/14	09:59	S1	Clear
2022/09/14	10:03	S2	Clear
2022/12/05	09:15	S2	Clear
2022/12/05	09:18	S1	Clear
2022/12/05	08:25	E	Clear
2023/03/03	09:54	S2	Clear
2023/03/03	10:01	S1	Clear
2023/03/03	10:05	E	Clear



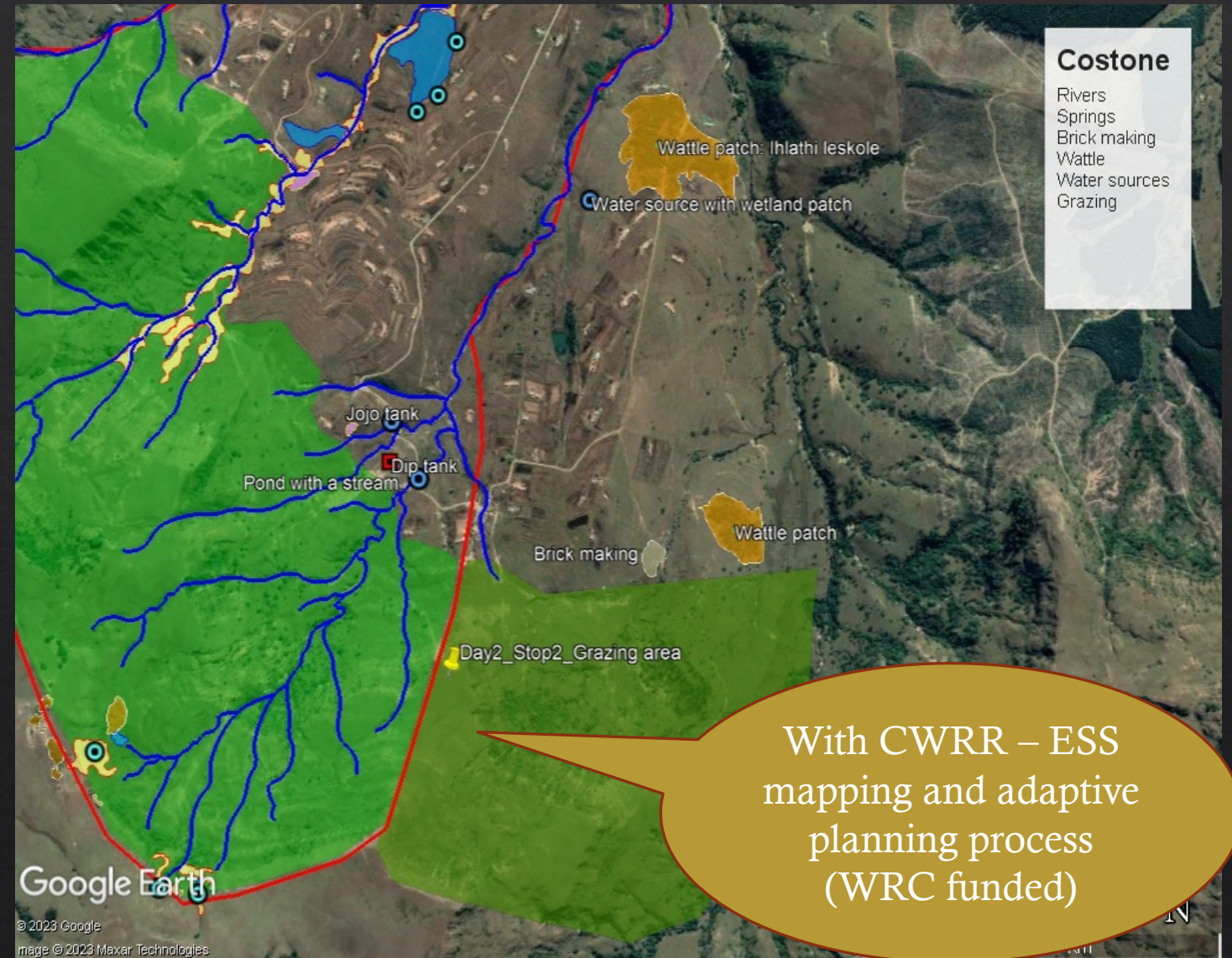
Contamination coincided with overland flow after rain – after which a berm/ swale was constructed above the spring to divert the water

Governance and resource management

Adaptive planning in Stulwane (and Ezibomvini)

Local resource management areas for improved eco system services- Community defined

Key Area	Management required	Notes
Grazing areas (Amadlelo) -Livestock feed and water, firewood, medicinal plants,	Restoration and management. -Clear Lantana and use poison after cutting to stop regrowth -Rotational grazing -Control wildfires and make firebreaks. Storage drums for emergencies with fire one can use -Explore financial benefit – grant/incentive mechanisms -Monitor and manage nutrition of veld (erosion control, overgrazing control, removal of poisonous weeds, re-seed of palatable species) -Awareness raising in the community and for livestock owners.	-Eco-champs to do clearing -Dip tank committees and livestock associations -Better community collaboration with dip tank committee as well as TA and councillors -Community workdays
Wetlands (Amacaphuza), -Reeds (incema) -Food and water for	Small management changes to manage condition of wetlands. -Fencing to ensure good condition and make drinking troughs for livestock -Awareness raising on wetlands functions and services	-TA involvement and 'landowners' in wetland areas to outline rules and responsibilities -Community as a whole to follow these -Local water and land use



Thank You
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