



**CONSULTANCY SERVICES FOR FIELD ASSESSMENT ON ROAD WATER
MANAGEMENT & HARVESTING STRUCTURES ALONG THE 18.1KM ROAD
REHABILITATED BY THE REACH PROJECT IN RUBANDA DISTRICT.**

Subcontract No. 2020/REACH/UGA/002



FIELD ASSESSMET REPORT ON WATER MANAGEMENT – REACH UGANDA PROJECT

Submitted by:



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LIST OF ABBREVIATIONS

IFDC	International Fertilizer Development Centre
REACH	Resilient Efficient Agribusiness Chains
PIO	Public International Organization
DLG	District Local Government
DE	District Engineer
SoW	Scope of Works
ToR	Terms of Reference
CAO	Chief Administrative Officer
RDC	Resident District Commissioner
GPS	Global Positioning System
MMR	MetaMeta Research
UGX	Uganda Shillings

EXECUTIVE SUMMARY

International Fertilizer Development Centre IFDC is implementing the “Resilient Efficient Agribusiness Chains” (REACH – UGANDA) project, an innovative four – year agribusiness initiative. One of the objectives of the REACH – Uganda project is to improve availability and uptake of public and private support services related to core commodity value chains, infrastructure being one of the services.

As part of the program, IFDC realized that one of the access roads under rehabilitation located in Rubanda District needed road water management and best practices applied to avoid damage to the roads by run off and protecting crops in farms/gardens adjacent to the roads. The roads link the established farmer to markets thereby contributing towards the objectives of the REACH – Uganda project. The roads are rehabilitated in partnership with the district local governments.

For IFDC to achieve its objective, it contracted METAMETA Research to conduct a field assessment and find opportunities for water management along the 18.1km road in Rubanda District.

In this field assessment report, we discuss findings from the field on the proposed interventions that will ensure that water from roads is well managed, used to improve farmers’ agricultural yields and make the community along the 18.1km Ihanga-Kyamabare-Butobore-Nyaruhanga road in Rubanda District more resilient.

The community in Rubanda is we found a great deal of indigenous knowledge on water management along the road however this was on common to all roadside communities in some case people knew the benefits of harvesting water and making a living off that. However, in most cases the knowledge was missing and lack of capacity to harness the road generated runoff.

If we conduct some training coupled with Horizontal learning and some interventions, Rubanda can become a model district and communities along the Ihanga - Nyaruhanga Road will be more resilient to extreme weather events.

INTRODUCTION

1.1 Background

The International Fertilization Development Center (IFDC) is a non-profit, Public International Organization (PIO) established on October 7, 1974, with its headquarters in Muscle Shoals, Alabama, United States of America. IFDC strives to improve the livelihood of people in developing countries throughout the world by facilitating the sustainable improvement of agricultural productivity through the development and transfer of effective and environmentally sound plant nutrient technology and agricultural marketing.

1.2 Project Background

IFDC is implementing the “Resilient Efficient Agribusiness Chains” (REACH – UGANDA) project, an innovative four – year agribusiness initiative. The project will improve market engagement for 40,000 Market – oriented farmers, strengthen household resilience, and deepen availability of agriculture support services for farmers and businesses. The project is targeting two value chains, rice and Irish potato and is being implemented in Eastern and South Western Uganda.

The third objective of the REACH – Uganda project is to improve availability and uptake of public and private support services related to core commodity value chains. One of the services is infrastructure.

As part of the program, IFDC proposes the upgrading /rehabilitation of a total of 18.1 kms in Rubanda District. The access road will link the established farmer to markets thereby contributing towards the objectives of the REACH – Uganda project.

It is proposed that the project will rehabilitate the roads in partnership with the district local governments. As part of the effort to achieve this, IFDC has contracted METAMETA Research to carry out a condition field assessment of the roads for possible road water management options along the route.

1.3 Project Location

The project area is located in Rubanda district, which is bordered by Kisoro District in the West, Kabale District in the East, Rukiga District in the North-East, Kanungu District in the North-West, Rukungiri District in the North and the Republic of Rwanda in the South. The project road crosses through three sub counties.

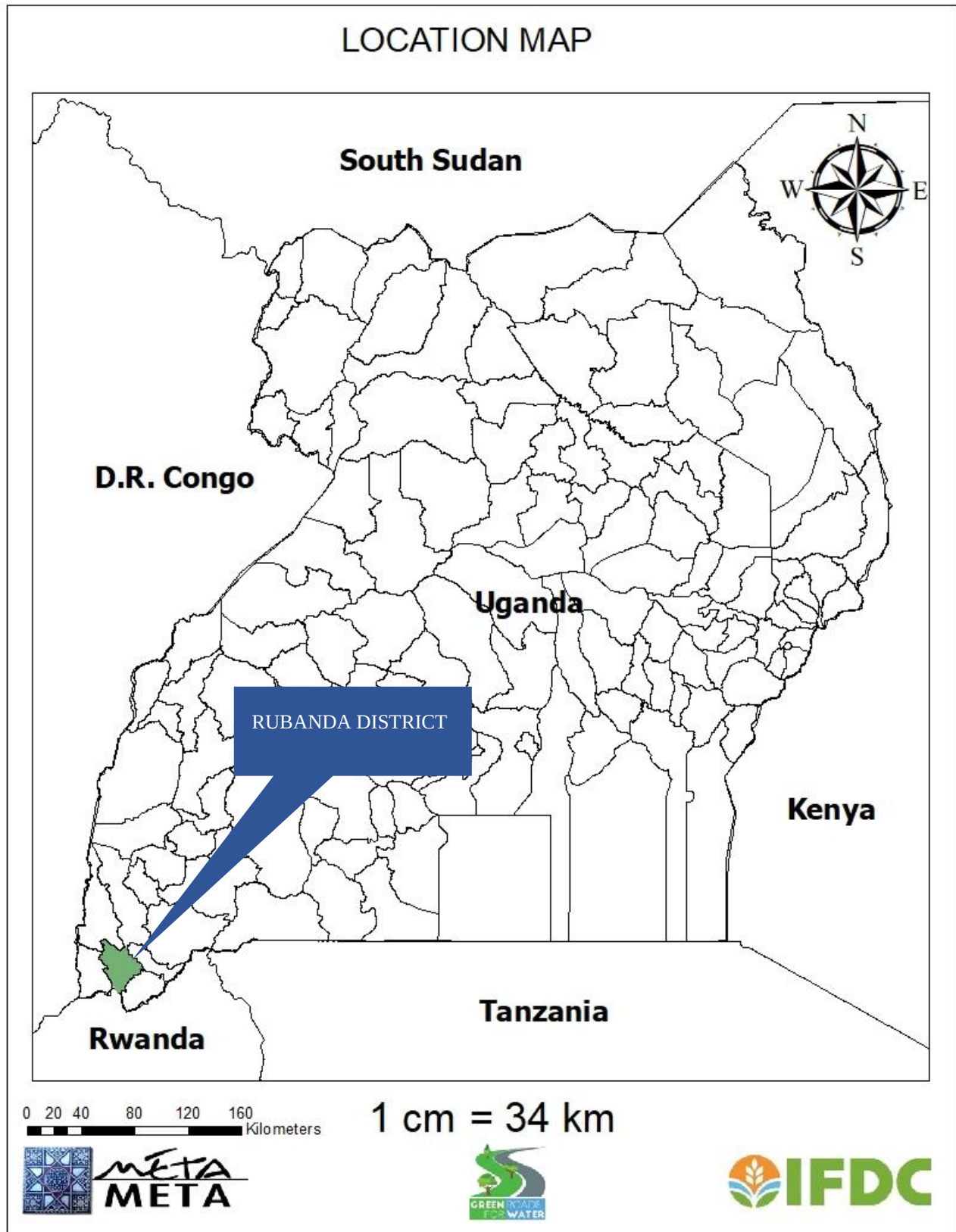


Figure 0-1A map showing Project location District

1.4 Scope of Works

The filed assessment SoW along the road stipulates the following activities to be carried out by MetaMeta:

1. Review of existing Documents on the selected roads
2. Conducting a transect Survey on the roads
3. Developing a road inventory of main features and issues noted(georeferenced) plus suggestion for roads water harvesting along the road including water ponds where possible.

This was done by two local roads for water experts.

1.5 Contract period/Duration of Assignment

The period of performance of this Subcontract/Assignment is from 23rd January 2020 running up to 13th February 2020.

2 RUBANDA DISTRICT

2.1 Introduction Meeting and Site Visit

We went to the District offices on Wednesday morning where we got introduced to the District Team by Madam Hellen (IFDC Regional Team Leader). Here the CAO received our introduction letter and he referred us to the District Engineer whom he asked to give us all the necessary support. We then left to the field with the IFDC Western Region team and moved along the road starting from end point in Nyaruhanga near the district offices to Ihanga towards Kabale Town. Along this transect, key points were shown to us by Madam Hellen and we noted them and several others for our consideration in the detailed survey. Below are some of the pictures from the activities of Day one in the field.



2.2 Detailed Survey and Key observations

On Thursday and Friday, detailed surveys and community engagement were made with special emphasis and priority given to areas where it is possible to locate water harvesting ponds.

The two local experts moved around with local leaders and some farmers. We approached and had discussions with some landowners of locations that are suitable for the ponds. This was done to find out what is exactly needed for the landowners to give to the land to the community for construction of water ponds.

2.2.1 Existing Road protection interventions

We noted a number of road protection interventions that included mitre drains, constructed side drains at certain locations and live fencing. For this particular community, the live fencing used along the road can be used for medicinal purposes which is a better option compared to vetiver grass. In some locations this was used together with locally available stones to control erosion as shown in the pictures below.



2.2.2 Identified Water harvesting techniques

At some particular locations, we found water being harvested from roads into personal ponds commonly known as Ebisizi to the locals. These ponds measured about 3m wide 5 m deep with varying length. Ponds were surrounded with live fencing to protect kids from falling into them and had a cement lining at the bottom to avoid infiltration.

During our interaction with the community, it was realised that herdsmen purchase harvested storm water at a unit cost of UGX 1,000 per jerrycan during dry seasons from those who harvest it during heavy rains to feed their animals. This illustrates the existing varying gap in road water harvesting knowledge within the community which can be addressed through community trainings. The figures below show one of the existing ponds along the road owned by one of the community members.



Figure 2-1A woman leads us to an existing water pond (Ebisizi) where they buy water



Figure 2-2 A small pond created near the road, this can flood the road on heavy showers

2.2.3 Road water management challenges.

From the field observations, it was noted that soil erosion, siltation, local flooding, road pondage among other effects from road runoff were no exception for the feeder road under question. In the sections below, we captured some of the effects as observed at various point along the road.

A. Water Logging and road-induced flooding.

The existing drainage system was found incapacitated to accommodate the gross amount of water collected by the road catchments in the project area. This was due to insufficient side drains, cross culverts and/or rolling dips in some location which will lead to development of potholes and iterative flooding eventually as shown below.



Figure 2-3 Waterlogging due to lack of cross culvert



Figure 2-4 Water logging along road section



Figure 2-5 Shows field that gets flooded by water from culvert, see arrow

B. Erosion

The road was also endangered by a number of erosional problems seen at various points along its length as shown in the figures below. The many erosion incidences have led to drains and culvert siltation, rillies, gullies and boulders' mobility that will damage the infrastructure and community safety. This has been greatly caused by the sharp topography of the project area and lack of scour checks on steep road slopes.



Figure 2-6 Erosion at culvert outlet

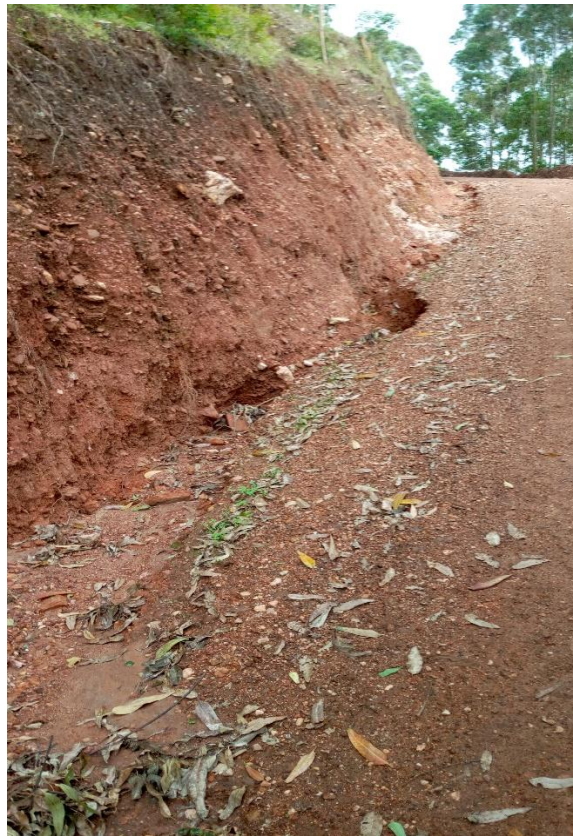


Figure 2-7 Due to lack of scour checks, water is eroding the marram away

C. Sedimentation /siltation

During our field assessments, extreme road-induced siltation occurrences were observed. Siltation is caused by the piling debris carried by running water along the road in relatively flat slopes. Along the project road in Rubanda district, the siltation was more pronounced at downstream culvert outlets which blocks them from conveying the water from one side of the road to another thus leading to road pondage.



Figure 2-8 Silting at culvert outlet opposite Vision Primary School

2.3 Proposed remedial Measures

Water from the road and drainage structures like culverts and diversion trenches will be harvested for beneficial use. This will be implemented by using various road water management techniques/interventions as listed below.

- Cut-off side drains
- Gully Prevention and reclamation
- Deep Trenches
- Tree planting and live fencing
- Infiltration Ditches
- Diversion from Culverts
- Community water Ponds
- Stone bunds/ Scour checks

This will be done through community engagement and labour based approach. For ponds, excavating equipment from the district can be used if available. However, land ownership was identified as the main challenge for big structures such as ponds. Therefore, communities must mobilise resources and acquire land where ponds are to be situated. The following techniques can be trained to road gangs, technical people and roads side farmers

2.3.1 Tree planting and live fencing

Some sections of the road have existing trees and live fencing along the road. However, with reference to the table 1 below, some sections of the road are bare and require tree to be planted along them. A total distance of 9,943 meters. If a spacing of 3 meters is considered and planting trees at both sides of the road that makes a total of approximately 6650 tree seedlings.

Table 2-1 Shows road section that requires tree planting

Sn	Description	Proposed intervention	Tree Planting Length (m)	Eastings	Northings
1	Beginning Point at Ihanga			826052.2	9867281.67
2	Collapsible slopes on the left	Tree and live fencing planting	200	825921.41	9867208.77
3	Collapsible slopes on both sides	Tree and live fencing planting	383	825566.74	9867153.25
4	End of tree planting	Tree and live fencing planting	370	825607.05	9866999.17
5	Tree planting	Tree and live fencing planting.	622	825739.6	9865777.75
6	Need for slope stabilisation	Tree and live fencing planting.	300	825202.15	9865376.85

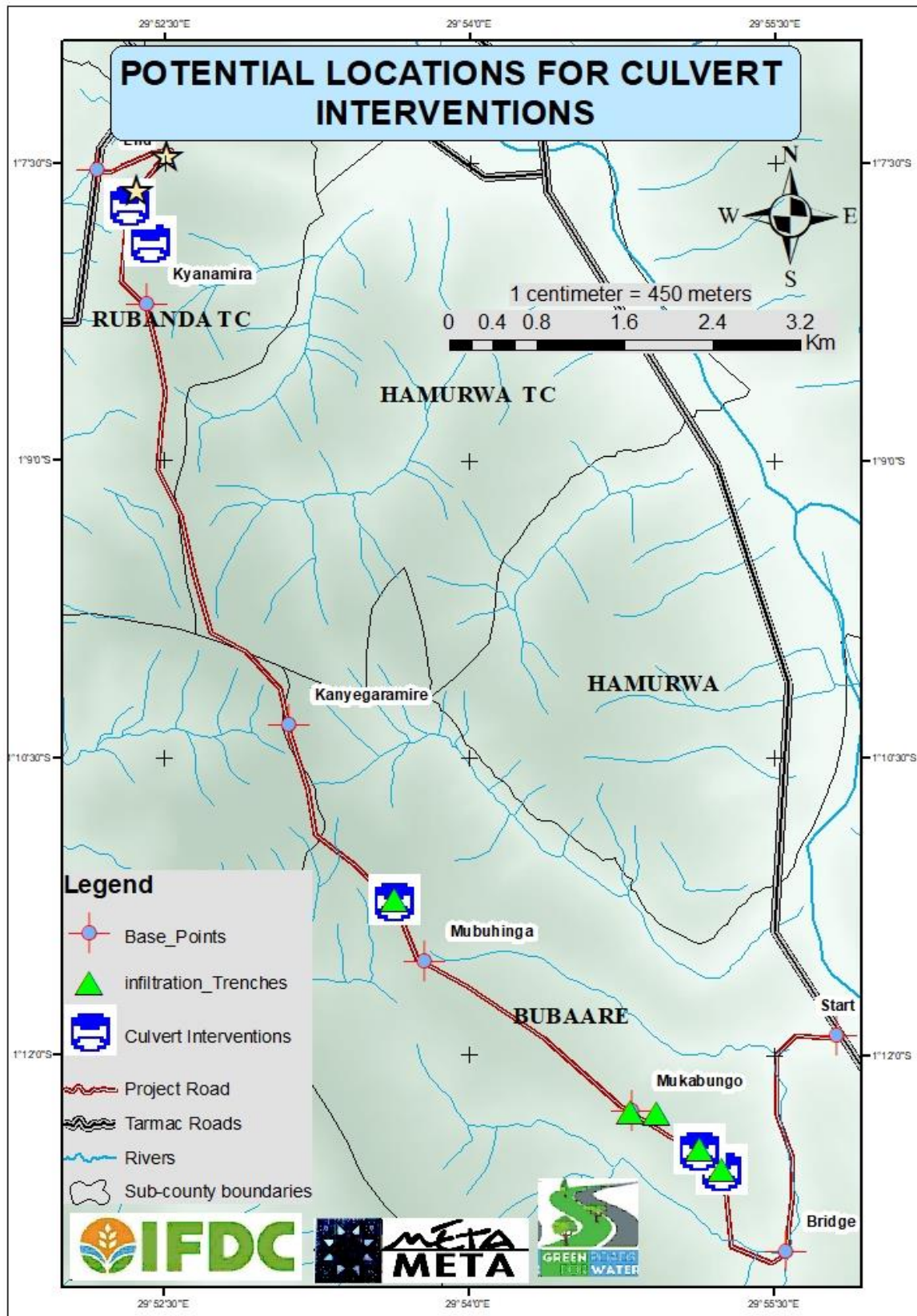
7	Start of tree and live fencing planting	Tree and live fencing planting	300	825142.13	9865600.93
8	End of tree planting	Continue with tree and live fencing planting on the left-hand side	400	825193.51	9865621.14
9	start of tree planting	Plant trees and live fencing	124	825273.34	9866062.49
11	Start of tree planting	Plant trees and live fencing	94	825171.14	9866157.97
11	Roadside Farmer include: Nalisi Katara and Mrs. Niwamanya Callist	Tree and live fencing planting on both sides.	400	825065.83	9866123.22
12	Collapsing slopes	Plant trees and live fencing on both sides.	300	824712.32	9866446.03
13	Collapsible soils and collapsing slopes on roadsides	Plant trees and live fencing on both sides	350	824278.83	9866649.95
14	Collapsible soils and collapsing slopes on roadsides	Plant trees and live fencing on both sides.	400	823455.77	9867311.73
15	Collapsing slopes	Plant trees and live fencing.	500	822808.67	9867756.96
16	Culvert silting near Vision Primary sch.	Plant trees and live fencing on both sides	700	822073.47	9868636.11
17	Road water destroying the road.	Plant trees and live fencing on both sides	800	821355.65	9869462.48
18	Possible pond location for Mr Enock's plantation of tea	Plant trees and live fencing on both sides of the road.	1,700	820713.95	9871013.46
19	Collapsing slopes and soils	Plant trees and live fencing on both sides.	2,000		
20	End of the route. (18.1km)			819510.31	9874861.59
		TOTAL	9,943		

2.3.2 Culvert interventions/Trenches/infiltration Ditches

At various culvert outlets and mitre drains, a number of interventions including use diversion trenches that follow contours, with combination of infiltrations ditches, deep trenches and equal spreaders can be used to retain water o farms and reduce the runoff speed hence minimising erosion.

Table 2-2 Showing proposed off drain interventions

Sn	Description	Proposed intervention	Eastings	Northings
1	Farmers for the place include: Nalisi Katara and Niwamanya Callist	Culvert interventions, Infiltration trenches and pond. Tree and grass planting for the next 200 m on both sides of the road.	825065.83	9866123.22
2	Climbing beans and Irish being grown. Quantifiable runoff but no existing side drains.	culvert interventions, infiltration trenches, side drains and contour trenches.	824860.89	9866312.33
3	Suitable site for infiltration trenches	Infiltration trenches.	824465.89	9866649.95
4	Suitable site for infiltration trenches	Infiltration trenches.	824224.81	9866656.65
5	Culvert silting the Irish and causing flooding in the farm/ gardens of Mr Tinomugisha Maxmus.	Culvert interventions, infiltration trenches along contours and silt traps. Plant trees and grass on both sides up to the 9+700 chainages	822073.47	9868636.11
6	Culvert siltation	Culvert interventions, stepped trenches, mitre drains needed, Steep slopes, boulders existing	819850.9	9874770.5
7		Culvert interventions, stepped trenches, mitre drains needed, Steep slopes, boulders existing	819613.65	9875163.98



2.3.3 Community Water Ponds

Below are some of the pictures from the sites with ponds and potential sites for bigger community ponds. During interviews with locals, locals told us that the cattle have to move through a distance of over 6 km to get drinking water at a source near Lake Bunyonyi. This makes it very crucial to have water harvesting ponds established for the communities.



Figure 2-9 Some of the existing water harvesting ponds along the road



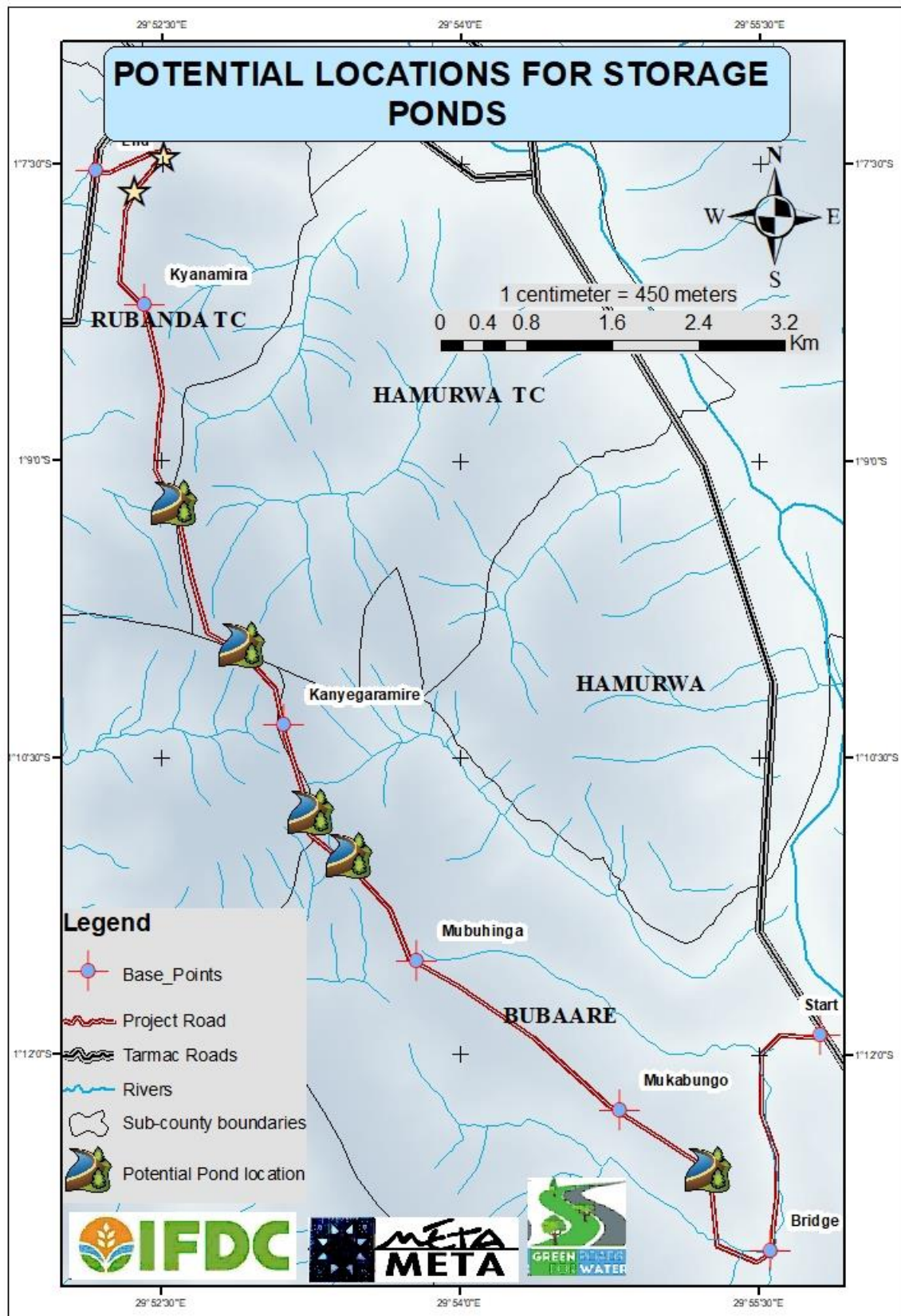
Figure 2-10 Picture above show some of the suggested locations for water ponds, arrows show exact points

Table 2-3 Showing possible water pond locations

Sn	Description	Proposed intervention	Eastings	Northings
1		Infiltration ponds	825702.2	9866040.05
2		Infiltration ponds	825739.6	9865777.75
3	Farmers for the place include: Nalisi Katara and Niwamanya Callist	Infiltration ponds	825065.83	9866123.22
4	Pondage of water from the road, siltation of culvert	Storage pond for storing road water, side drains required.	821712.05	9869055.67
5	Road water destroying the road, Pondage along the roadside.	Storage Pond for crops, G/W recharge and brick laying. Two culverts needed.	821355.65	9869462.48

2.3.3.1 Key considerations for location of ponds

- The land must be relatively flat to avoid soil collapse and landslides in case of leakage and seepage.
- Distance from households should be at least 500m away from people's houses.
- Availability of adequate amount of water from the road and point should be relatively low in the targeted road catchment.
- The soil depth is considered to avoid exposing rocks and encouraging erosion.
- The community should be in of the water to be harvested.

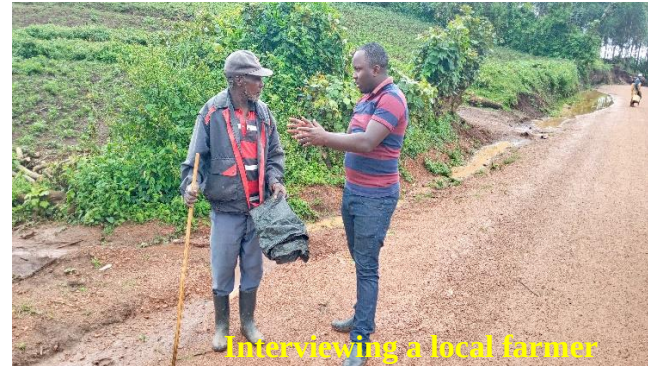


3 RECOMMENDATIONS

1. A number of water-harvesting ponds can be constructed along the road to provide water for irrigation to grow crops like vegetables and feed animals. The community members through their leaders should acquire land where ponds are to be constructed. This ensure that water is used by the entire community and create ownership of the structures.
2. We recommend trainings for roadside communities and interested technical people from the sub-counties, such as community development officers, production officers, extension workers and road gangs. The training can be hosted at each of the following centres: Mukabungo, Mubuhinga, Kanyegaramire and Kyanamira. The training is vital to sensitise the community members on road water management initiatives and to discourage actions of blocking mitre drains as shown in one of the pictures in Appendix A.
3. Road gangs should put in place scour checks at steep road sections where cross culverts were not installed to reduce erosion.

APPENDIX

APPENDIX A: Other observations along the road



APPENDIX B:

RUBANDA PROJECT WORKPLAN FOR THE “REACH – UGANDA”

Table 4-2 Work plan for REACH – Uganda

ACTIVITY	DATES
1. Contract Signing	23 rd January 2020
2. Desk studies >Developing the Work-plan > Drafting Data Collection sheets >Reviewing the information and ToR, Final Feasibility Report	23 rd January – 3 rd February 2020
3. Field Assessment (Including Data Collection and meetings with communities)	5 th – 7 th February 2020
4. Field Assessment Report Submission	13 th February 2020