KNOWLEDGE AND EXPERIENCE SHARING SYMPOSIUM

Towards Highly Rewarding and Inclusive Flood-based Livelihoods

Prospects and Challenges for Mainstreaming Road Water Harvesting in Soil and Water Conservation Programmes in Malawi

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Context – Malawi

Land locked country - 118,000sqKm

annual average precipitation of 1037mm of which 196mm or about 19% is runoff. This translates into 18billion cubic meters per annum as surface runoff. As of the year 2012, the estimated domestic demand was 95 million cubic meters or about 0.5% of total runoff

Uncontrolled un run off from road sides and other ground surface is one of the major contributors to high soil erosion rates estimated at 29tonnes/Ha/year in 2017 up from 20tonnes/Ha/yr in 1990. (**Malawi Government (2018)**

A 10% increase in soil loss would produce monetary losses of about 0.26% of Malawian GDP and 0.42% of the total agricultural production value.

Impacts of uncontrolled run off

Soil erosion by rainwater arising from reduced vegetative protection, tends to deteriorate the ecological balance of the catchments

Inability in optimising the use of available rainwater at early stage in the hydrological cycle, it is the management of rainfall and resultant runoff

Expansion of the national road network in Malawi provides an opportunity for the promotion of road run off harvesting that can address water resource management on a watershed level by providing water for small scale irrigation, animal watering and household activities such as nursery gardens

Run off

Road construction

From roads to rivers

Approaches and tools

Integrated Catchment Management offers an opportunity for scaling up R4W initiative.

Tools

- Awareness raising campaigns
- Capacity building sessions (staff and farmers)
- Relevant workshops and conferences
- Demonstrations of best bet practices
- Media coverage
- Mainstreaming in curricula

Roads in Malawi

Road transport is the main mode of transport;

- 70% of internal freight and 99% of passenger traffic. Road transport also handles more than
- 90% of international freight and passenger.

It is estimated that 55% of the costs of production are taken up by transportation costs in Malawi compared by 17% of the other developing countries

Road Classification Malawi

Type	Paved		Unpaved		Total Network	
	Km	% share	Km	% share	Km	% share
Main (M)	2809	69	548	5	3357	22
Secondary (S)	442	11	2683	24	3125	20
Tertiary (T)	44	1	1077	36	4121	27
District (D)	8	0	3498	31	3500	23
Urban (U)	770	19	578	5	1348	9
Total Designated	4073	100	11378	100	15451	100
% Share	26		74		100	
Community Road Network	0		9478		9478	38
Total Road Network	4073		20856		24929	

Policy Direction

Malawi Growth and Development Strategy III (2017 -2022)

MDGS III

It represents a policy framework that articulates issues related to both economic growth and development.

Road infrastructure is critical to achieving the growth and social objectives of government. Investments in road infrastructure has a direct impact in liking production and marketing as well as improving access to social services

National Transport Policy

- Seeks to provide an adequate network of roads for the movement of goods and people within, into and out of Malawi, and facilitate the continued development of the country's rural areas.
- Through this policy areas of production would be linked to areas of consumption at national, sub regional and international levels.

Institutional Framework

- **The Roads Authority** - is a quasi-government body which was established by an Act of parliament in year 2006.
- **The Road Fund Administration** - responsible for collecting and disbursing road maintenance funds to both the Local Assemblies and RA
- **MASAF** - instituted by the government in 1995 to be directly funding rural communities in different development activities, road maintenance inclusive
- **Local Authorities** - under the Ministry of Local Government and were empowered to be maintaining roads within urban areas or districts
- **EU- Public Works Programme** - The programme funded by the European Union though local government to assist in road maintenance by using labor intensive methods

Opportunities/Prospects

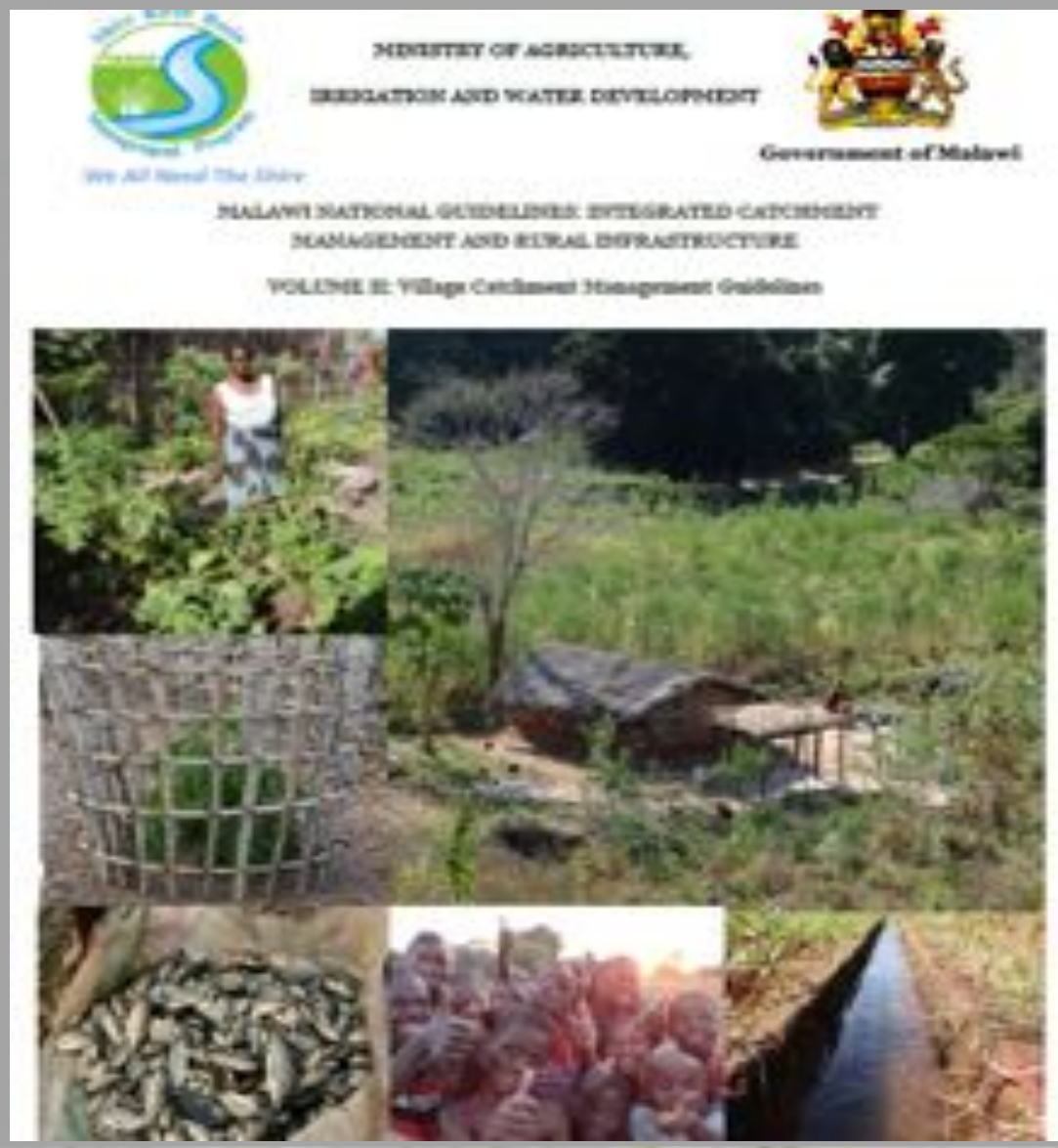
Shire Basin Programme - Catchment Management Guidelines provide instructions on how to harvest rain water from the roofs of buildings and from roads, using swales.

Programme for Rural Irrigation Development (PRIDE) programme uses the a participatory catchment management planning to identify the specifics soil and water investment measures that addresses land degradation in the scheme clusters

Malawi Agriculture Sector wide Approach Support Project II (ASWAp-SP II) - The programme aims to meet a number of objectives of improving productivity, diversification and market access of selected agriculture commodities in the project targeted districts to support small holder farmers. It will involve the rehabilitation and upgrading of selected roads in the targeted districts

Land Resources Conservation Department - The department is promoting a number of soil and water conservation practices, rainwater harvesting as well environmental conservation and education practices throughout the country

ICM Guidelines



MINISTRY OF AGRICULTURE,

IRRIGATION AND WATER DEVELOPMENT

Government of Malawi

MALAWI NATIONAL GUIDELINES: INTEGRATED CATCHMENT MANAGEMENT AND RURAL INFRASTRUCTURE

VOLUME II: Village Catchment Management Guidelines

6.3.2 Roads (tracks)

It is the diversion of runoff water from the road into channels/canals and distribution into ditches/basins or farm land for various uses such as crop production and fruit trees. The water can also be used for domestic purposes especially in rural areas where there is no potable water from taps.

Objective

- To slow down runoff
- To increase water infiltration into the soil for various uses
- To harness road runoff into infiltration pits or basins in order to enhance groundwater recharge for various uses.

Benefits

- Reduced soil loss from uncontrolled runoff from road or poorly constructed mitre drains
- Recharges groundwater
- Improves production e.g. fruit trees
- Easy to implement: hence can be accomplished by most rural land users with little technical support from external support agents
- Uses simple tools and materials to construct.
- Other activities like raising ducks, geese, fish and bees in or near open water reservoirs become possible.
- Sand harvesting from weirs and sand dams in gullies and riverbeds.
- Recharge of hand-dug wells near subsurface dams, weirs and sand dams in riverbeds from where domestic water can be drawn.
- Increased agriculture production from fields irrigated by road run-off water.
- Watering of cattle and livestock

Impacts addressed:

The impacts of not doing road rain water harvesting include those that derail or slow development. Some impacts are:

- The rain water may destroy the road by forming gulleys, making it impassable.
- Unharvested rain water from roads may cause destruction of crops and other infrastructure through flooding in times of heavy rains
- There is little groundwater recharge as the runoff doesn't have adequate time to percolate into the ground.

Catchment perspective

- Productive use of otherwise "lost water".
- Retain water in the catchment for as long as possible.

Criteria for application

- Purpose of the water so harvested from road catchments should be clear to avoid inappropriate use since it may contain pollutants that may be harmful.

Methodology

1. Clear the area for channel drains and ditches or basins
2. Excavate channel drains at a slope of 0.2% to lead surface runoff from the road into basins/infiltration pits or farm land.
3. Dig interconnecting ditches of about 1.5 m deep and 1m wide, and spaced 10m – 20m apart to allow overflow of the upper ditches into the lower ditches.
4. The technology is made such that once the first channel gets full, excess water is emptied into the next one hence without causing erosion.

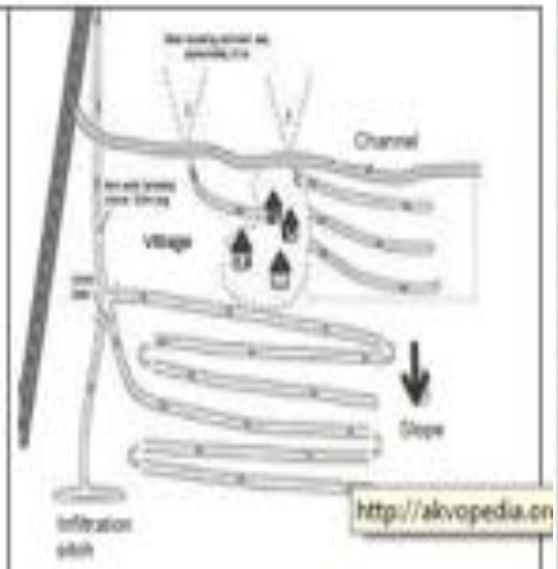
Road above

Road water runoff harvested into a ditch

Road water Harvesting within ICM

Rain water to be diverted into a ditch through diversion

Erosion on the road if no water harvesting mechanism



Road Rainwater harvesting

Maintenance requirements:	Equipment requirements:
• Periodically remove or scoop out sediments from channels, canals and ditches to maintain Channell basin capacity. • Repair broken sections of channel/canal and embankments. • Stabilize banks with any perennial shrub along the embankment. E.g. Vetiver grass. • Rebuild or repair basin embankments and spillways each time there is observation of damage. • Frequently replant grass or dried-up fruit trees along the embankment where necessary	• Measuring tape • Pegs, • Hoes, • Shovel, • Pick • Panga-knife, • Hammer • Axe, • Line level, • Cotton string or home-made rope • Measuring tape,
Seasonal variations: Smaller version can also be applied to walkways and paths, especially on steep slopes.	See also: • Zai pits Guideline Error! Reference source not found. • Permaculture Guide 6.1.4

Flood Based Livelihood Network

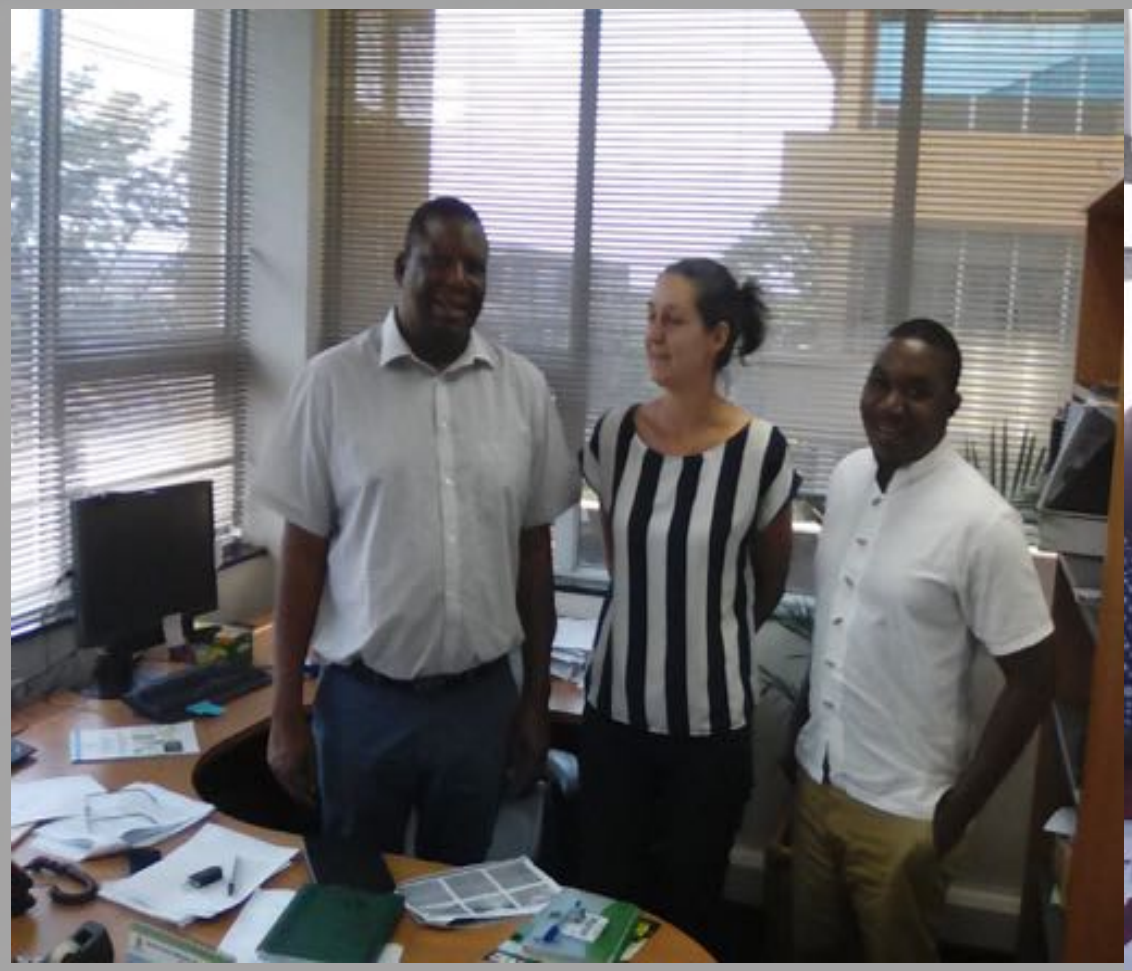
Staff and Farmer Capacity Building

Demonstration

Visibility at relevant Workshops/Conferences

Networking

Meeting World Bank Officials



Stakeholders Workshop

Participatory Action Research

Results Summary

Target group	2016	2017	2018	Cummulative
Policy Makers		28	14	42
Technical Experts, Practitioners and Professionals	17	14	156	187
Farmers	28	440	2262	2730
National Government Agencies	3	4	4	11
Donor Funded Programmes		2	4	6
Non Governmental Agencies	0	2	6	8
Public Universities		2	3	5

Impacts

Increased awareness among technical experts

Mainstreaming of R4W in Catchment Management Programmes – needs continuous engagement

Implementation and appreciation by communities

Interest from development partners (World Bank Malawi Office)

Putting people first

Challenges

- Lack of context specific guidelines on road water management
- Limited knowledge and skills (local authorities)
- Poor interagency collaboration (lack of MOUs, Binding agreements, working in silos)
- Lack of a coordinating body – duplication of efforts
- Policy, Institutional
- Land Tenure issues
- Culture of handouts
- Lack of attention
- Insufficient documentation

Recommendations

Need to adopt an integrated, inclusive and dynamic planning approach when planning and designing roads.

Strengthen the relationship between road development and rehabilitation and environmental assessment

Strengthen the institutional framework to support integration between the relevant sectors (road development, watershed management and agriculture)

Need to put communities at the center of the planning process. Paradigm shift in the working style for road engineers

Continued capacity building - Road engineers, agricultural and natural resource management experts, water managers, landscape architects are the target groups

New road design standard with a holistic landscape/watershed approach are needed.

There is a wide range practises which are giving positive effects in different contexts– there is need to build assets using adaptation technologies

Proposed Investments

Establishment and registration of Flood based and Spate Irrigation Schemes

Promotion of Integrated Agriculture – Aquaculture farming

Ground water Recharge using Road water

Village savings and Loans (VSL)

Restoration of degraded forests to benefit Bee Keeping

Post harvesting handling and marketing of produce

Establishment of Communication Hubs

Flood diversion infrastructure

Water Reservoirs for livestock and other uses

Need to improve water productivity

Inspiring future leaders