



KNOWLEDGE AND EXPERIENCE SHARING SYMPOSIUM

Towards Highly Rewarding and Inclusive Flood-based Livelihoods

Drying Rivers of Malawi; Participatory Action Research for River Flow Restoration and Reducing Socio Economic Impacts

4TH TO 8TH MARCH, 2019

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Context

In Malawi high population growth has resulted in people settling and cultivating in areas previous considered as not suitable for agriculture. Currently the population is estimated to be 17 Million with a density of over 90 persons per square kilometer, is one of the highest in Africa (NSO 2018).

This has led to massive deforestation and poor agriculture practices which are contributing too high rates of soil erosion currently estimated at 29Tonnes/Ha/Yr (Malawi Government, 2014

This has led to siltation and sedimentation of rivers and streams which has results in declining water flows, making most rivers ephemeral or intermittent. (Monjerezi et al, 2014).



People centered research



Drying Rivers



Problem

The Malawi Government recently developed the Irrigation Master Plan and Investment Framework (Malawi Government, 2015)

Run-of-river projects are more vulnerable to climate change as has been the case with Malawi in recent years (Kumambala 2009). The lack of government focused interventions on the restoration of degraded rivers poses a risk to the sustainability of the proposed investments under the Irrigation and Water Supply Master Plan.



Previous studies

Studies on changes in river regimes have so far focused on the impacts on invertebrates and other biotic species including fish species. (Konrad and Booth 2005, (Leigh, 2010; Price and Leigh, 2006)

Studies have also advanced in areas of hydrology, with improved modelling techniques (e.g., Snelder et al. 2013, Mkhandi and Kumambala 2006, Prat et al. 2014), in biogeochemistry, nutrient and carbon cycling (e.g., Schiller et al. 2011).

There is a paucity of studies focusing on the socio economic aspects of drying rivers - Studies on the human and societal impacts would be useful in planning for river rehabilitation and flow restoration.

Other studies conducted in Malawi have focused on land cover changes and their impacts on flow regimes

Most river studies are researcher led – top down. There is need for more people centered investigations/studies

Proposed study

A Participatory Action Research approach (PAR) is being proposed in this study that will focus on three currently understudied areas of rivers that have transitioned from perennial to seasonal namely

- (1) understanding the socio-economic impact effects of rivers drying up on human population.
- (2) Evaluating the effects of field level field water harvesting practices and how their modification can enhance soil hydrological processes
- (3) Integration of field level hydrological processes in the a “framework for river flow restoration”



Key areas of Interest in restoration

1. Irrigation water supply
2. Other ecological values (environmental economic, cultural values)



Aim and Objectives

Research aim

The aim of this research to investigate and characterize drying rivers in the Malawi in order to develop a framework for reducing socio-economic impacts to communities and facilitate restoration of dry season flows. This will be achieved through Participatory Action Research to achieve the objectives



Objectives

- Identify and quantify the key features and characteristic of Rivers and Streams that have transformed from perennial to Seasonal.
- Assess the socio-economic impacts of drying rivers on riparian human population that depend on the rivers.
- Generate knowledge on soil hydrology and processes (Evaluate the effects of road run-off harvesting practices on groundwater storage and their influence Stream flow (Participatory Action Research)).
- Develop of a framework for River flow restoration that integrates Societal goals and field level soil hydrological processes.



Research Approach

Participatory Action Research has been described as a participatory process concerned with developing practical knowing in the pursuit of worthwhile human purposes. It seeks to bring together action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities (Reason and Bradbury, 2008)

- ❑ Social science methods – to study the human socio cultural aspects
- ❑ River Hydrology and Soil science approaches to characterize the road run off practices and impacts on soil hydrology and stream flow
- ❑ Use of appropriate hydrological models (validation and calibration)
- ❑ The process of PAR will be iterative, as such some of the issues emerging will be reflected upon and may lead to the review of objectives and research strategy



Policy Direction

The key policies that lay foundation for the management and development of the water sector among others are; 1) The National Water Policy (2005), The National Water Resources Act (2013), The Local Government Act (1998), The National Sanitation Policy (2008) and the Forestry Act 2013), The Malawi Growth and Development Strategy 3 (2017).

Restoration of flow In drying rivers would contribute to attainment of several policy goals espoused in the National Water Policy of 2005 including water resources management and development, rural water services, agriculture services and irrigation services.



Summary of Methods

Objective 1 Identify and quantify the key features and characteristic of Rivers and Streams that have transformed from being perennial to Seasonal.

A systematic review or meta-analysis - Studies focusing on river flows and variability globally and locally will be reviewed.

Identification and quantification of several River flow regime Components. A range of components are used to characterize a river's flow regime and are critical to the integrity of river ecosystems; **magnitude of discharge, frequency of occurrence, duration, timing, or predictability, rate of change, or flashiness**



Objective 2

Assessing the socio economic impacts on riparian human communities when a river changes from perennial to seasonal

Data collection methods and techniques to be used will include household questionnaire survey and informal discussion with the members of the communities. Other Participatory Action Research Methods to be used will include; group discussions, participant observation and Field notes, interviews, diary and personal logs, diagramming, survey Mapping





Objective 3

Objective 3

To evaluate the impact of Run-off Harvesting techniques (Infiltration Pits) on Groundwater Storage (Base flow Contributors)

Administration of semi structured questionnaire to assess the knowledge and attitudes on Run off water harvesting techniques - administration of a semi-structured questionnaire.

Absolute experiments will be conducted to characterize selected road run off harvesting techniques

Application of the WAMPA to characterize the potential of run off systems in river flow restoration



Proposed interventions



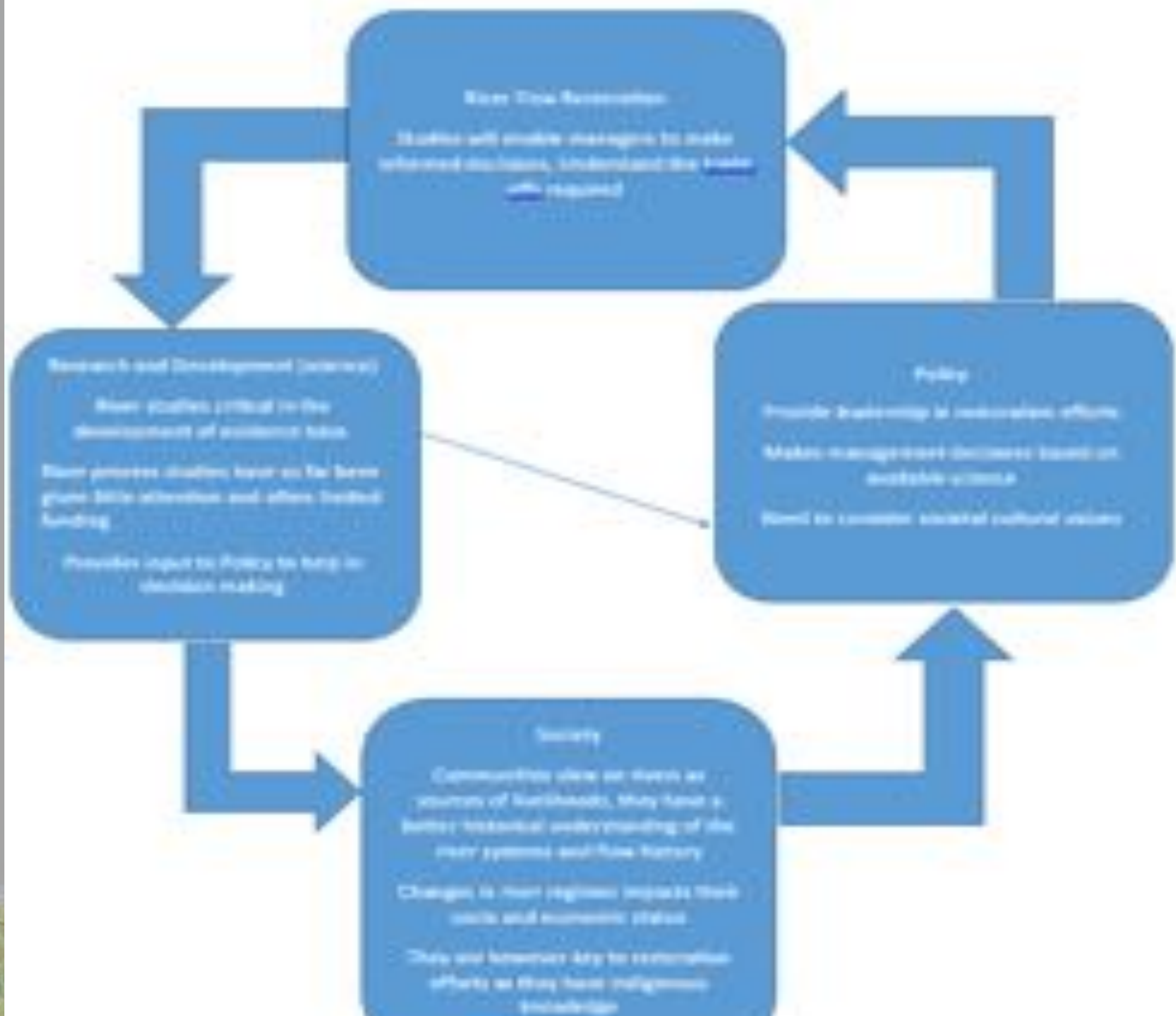


Objective 3

Development of a Framework for River Flow Restoration

By incorporating information and findings from the socio-economic assessments, field experiments conducted with communities, and review of relevant policies and plans, a Framework for river restoration will be proposed guided by the Conceptual Framework





Outputs and impacts

Research Outputs

The research main outputs will be;

A framework for river flow restoration that incorporates societal goals, values, concerns and needs

Papers will be published and shared with the wider scientific community

Research Impacts

Increased sense of ownership in restoration programmes

Improved sustainability of water resources development programmes



Sand river beds



The communities

