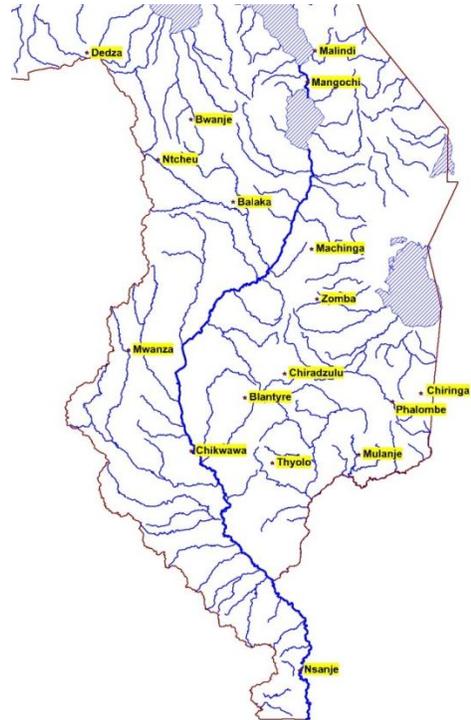


INTEGRATED FLOOD RISK MANAGEMENT ACTION PLAN FOR THE SHIRE BASIN

The Shire Integrated Flood Risk Management Action Plan is a 5-year Action Plan for strategic flood risk management of the Shire Basin, to provide the Government of Malawi with an integrated implementation plan, based on sound and detailed diagnostics, and provides essential guidelines to address the flood hazard situation in the Shire basin in an integrated and organized manner.

Malawi is affected by a number of natural and human-made disasters every year and between 1974 and 2003, hazards cumulatively affected 25 million people (GoM, 2010). Malawi is particularly vulnerable to severe weather events, with 40 weather related disasters in the last 40 years (GoM, 2010). This vulnerability is a result of a combination of physical geo-climatic factors (including erratic rainfall and tectonic activity), environmental factors and socio-economic vulnerability, including widespread dependence on rain-fed agriculture and use of biomass for household energy, a narrow economic base and extensive rural poverty (GoM, 2011a). The intensity, frequency and number of people affected by such disasters appears to be increasing, a trend attributed to climate change, population growth, urbanisation and environmental degradation.



The Shire River and its tributaries have the highest flooding frequency in the country, particularly in the Lower Shire valley. The Shire River is economically and environmentally very important, with hydroelectric schemes generating 98% of Malawi's electricity, extensive fisheries and wildlife conservation areas and provision of freshwater irrigation to cash crop plantations, industrial and domestic uses. The Shire River basin is important to the development of agricultural production and other economic activity given its geographic and climatic conditions and is therefore of national importance. If vulnerabilities and hazards could be addressed, intensified agricultural production, better transport linkages and secured homesteads can make the valley an economic hub of Malawi and the region, and lift many people out of poverty. In the short and medium term the focus is on building interventions on a better understanding of the risk profiles, and mitigating immediate loss that occur almost annually.

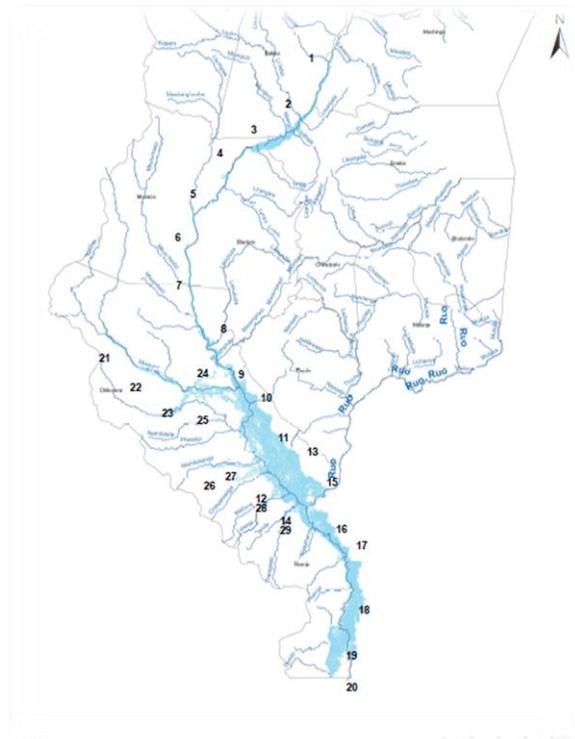
The Shire Integrated Flood Risk Management Project has successfully achieved the following main aims:

- ✓ Development of a hydrodynamic modelling framework for the long-term strategic flood risk assessment and management in the river basin, and provision of training to GoM staff to enable long-term use and further development of the model.

- ✓ Production of flood zone maps and designation of flood zones for development planning and for zoning development and activities away from high risk areas.
- ✓ Assessment of the need for flood forecasting and early warning, and development of detailed Terms of Reference for a flood forecasting and early warning system.
- ✓ Identification of a number of structural and non-structural intervention measures and assessment of intervention measures through economic appraisal of the options.
- ✓ Examination of the existing institutional capacity within Malawi in Flood Risk Management and production of a detailed institutional capacity development plan.
- ✓ Production of a costed 5-year Action plan for the implementation of flood mitigation measures.

The Action Plan is underpinned by three guiding principles as follows:

1. **Flooding is a development issue/natural process.** The Action Plan therefore aims to develop a detailed and robust understanding of flood risk by developing the modelling framework and tools further with improved data. It also aims to identify where human development and activities intersect high flood risk areas, and to implement measures that protect populations from flooding (structural and non-structural measures), moves populations and activities away from harm (establishing flood zoning), and prepares the GoM and the affected people in the Shire basin to effectively respond to flooding.



2. **Flood management requires a whole of government/country approach, involving partnerships between and among government agencies, donors, communities/land owners and private sector players.** The Action plan provides for improved institutional structure and increased skills to equip all stakeholders to contribute to a holistic approach to flood risk management.

3. **Adopting a pragmatic and integrated approach including flood management, risk reduction, preparedness, response and recovery.**

The Action Plan has identified approximately 100 intervention measures which have been categorised under four main themes:

- ✓ Hydrodynamic Modelling Framework
- ✓ Flood Forecasting and Early Warning System
- ✓ Institutional Development and Capacity Building
- ✓ Structural Interventions



BUILDING BLOCKS OF THE ACTION PLAN

Hydrodynamic Modelling framework

Sub-Theme	Summary
Topographic Surveys	Channel topographic surveys to extend the model to tributaries and increase the accuracy of model representation
Model framework update and development	Updating the modelling framework with better topographic and time series data
Data Sharing and Management	Establishment of data sharing procedures and protocols for long-term model data management
Additional Modelling studies	Modelling studies in support of geomorphological assessments, sedimentation assessments. Annual modelling assessment for flood season risk management and development of contingency plans. Development of additional modelling tools.
Modelling for feasibility studies	Modelling required for feasibility studies as the options are developed.
Training and Support	Structured training and support programme over the 5-year period.

Structural Interventions

Structural Interventions	Summary
Flood Defence Embankments	Flood defence embankments for critical villages in Chikwawa, Nsanje and other districts.
Food Stores	Construction of food stores in critical villages in Chikwawa, Nsanje and other districts.
Catchment Improvement	Further assessment of catchment improvement measures. This will include assessment of other catchments and of the relative merits of complete re-forestation or scattered vegetative cover. Implementation of catchment improvement measures.
Flood Storage	Assessment of the viability of flood storage options.
Dredging	The annual maintenance of waterways at culverts and bridges to ensure that flow conveyance capacity is maintained.
Flood Proofing of Buildings	A study of the benefits of flood proofing of existing buildings to act as flood shelters.



Flood Forecasting and Early Warning System

Sub-Theme	Summary
Inception Phase	Review of available documentation from past and ongoing studies; data collection and analysis; analysis of potential overlaps/duplication with other relevant projects; structured consultations with key stakeholders; field visits to selected communities, districts, gauges; develop work plan, risk matrix and programme for main phase
Monitoring - river and rainfall real-time data acquisition	Assessment of gauges to be improved or provided (in accordance with these ToR); identification of equipment required; preparation of tender documentation and advice on procedures for procurement; assistance with tender review and contract award; supervision of implementation; preparation of guidance documents and procedures; training and capacity building
Data interpretation and procedures for flood warnings	Assessment of requirements (in accordance with these ToR); recommendations for implementation; preparation of guideline documents and procedures
Dissemination of warnings to districts and communities	Assessment of overall requirements (in accordance with these ToR); Identification of equipment required; preparation of tender documentation and advice on procedures for procurement; assistance with tender review and contract award; supervision of implementation; preparation of guidance documents and procedures; training and capacity building
Establishment of Community-based flood warning schemes	Generic: Identification of schemes; community engagement; training and capacity building. preparation of guidance documents and procedures Schemes: preparation of tender documentation and advice on procedures for procurement; assistance with tender review and contract award; supervision of implementation
Establishment of Lower Ruo/Shire flood warning scheme	Design and implementation; preparation of guidance documents and procedures; community engagement; training and capacity building
Development of Flood Forecasting Capability	Design and implementation; preparation of guidance documents and procedures; training and capacity building

Institutional Development and Capacity Building

Stakeholder	Interventions
MWDI	Training in installation and maintenance of new river gauges. Training for staff to update, operate and maintain the hydraulic model programme management including training support package. Financial support to develop construction guidelines and provide training in their use.
MET services	Training in installation and maintenance of new rain gauges. Financial support to enable staff to digitise new and historic data. Support to improve weather forecasting Support to initiate data exchange with Mozambique
DNRDM	Provision of vehicles and communications equipment Provision of financial support to enable DNRDM to deliver its training responsibilities Enable DNRDM to improve, test standard operational procedures and internal management tasks.