Directorate of Water Resources Management

Joint Sector Review

Operation and Maintenance (O & M) of the Surface & Ground Water Monitoring Network

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Holding Fort For Commissioner, WRM&A

DWRM – MWE

Presentation Outline

1. Description of the Water Resources Monitoring Network;
2. Monitoring infrastructure;
3. Data Collection, Archival and Dissemination
4. Utilization of the data and information
5. Challenges, Needs and Gaps
6. Strategy to address the challenges

Description of the Ground & Surface Water Monitoring Network and Products

1. **Surface Water (River flow, Surface water levels in Lakes & Wetlands, Sediment loads);**

   Historical (162) & Current (82)

   i. Manual,

   ii. Automated (recording + transmission)

2. **Ground Water Quantity (recharge, trends and status of aquifer saturation levels, regulation of water abstractions,)**; (45)

   i. Manual,

   ii. Automated (recording + transmission)

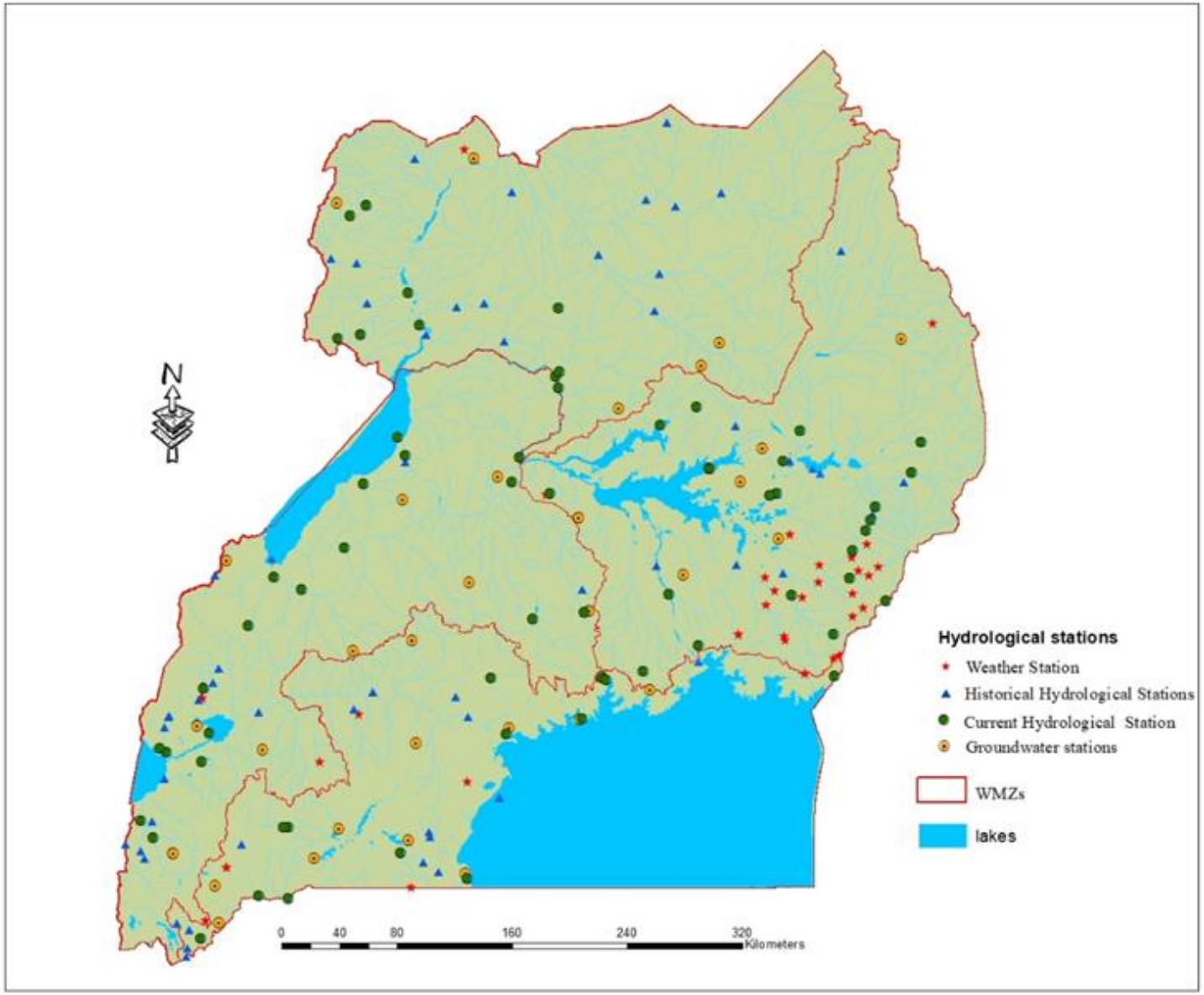
3. **<u>Climate information required for WRM & Decisions e.g. flood warning and evacuation, demand scheduling for power generation and irrigation (10)</u>**

   i. Manual & Automatic rain gauges for rainfall depths,

   ii. Automatic Weather Stations (rainfall intensities, evapo-traspiration)

We are currently reviewing the MoU to ensure commitment by all parties to share

Illustration of the Spatial Distribution of Monitoring Stations



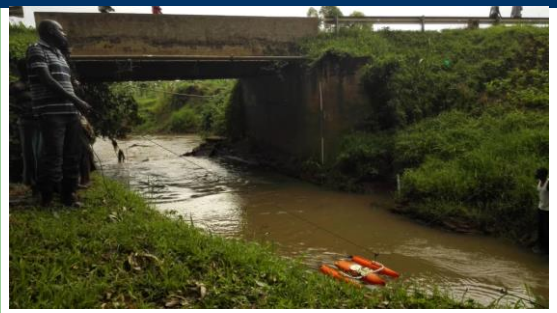
Monitoring infrastructure

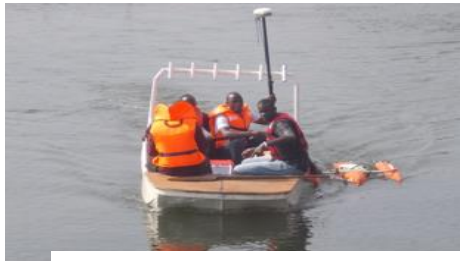
Telemetry

Electronic data logging devices (SW & GW)

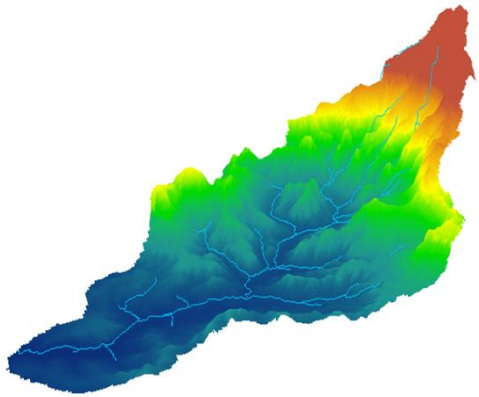
Manual SW & GW

Data Collection Transmission & Archival





Flow Measurement



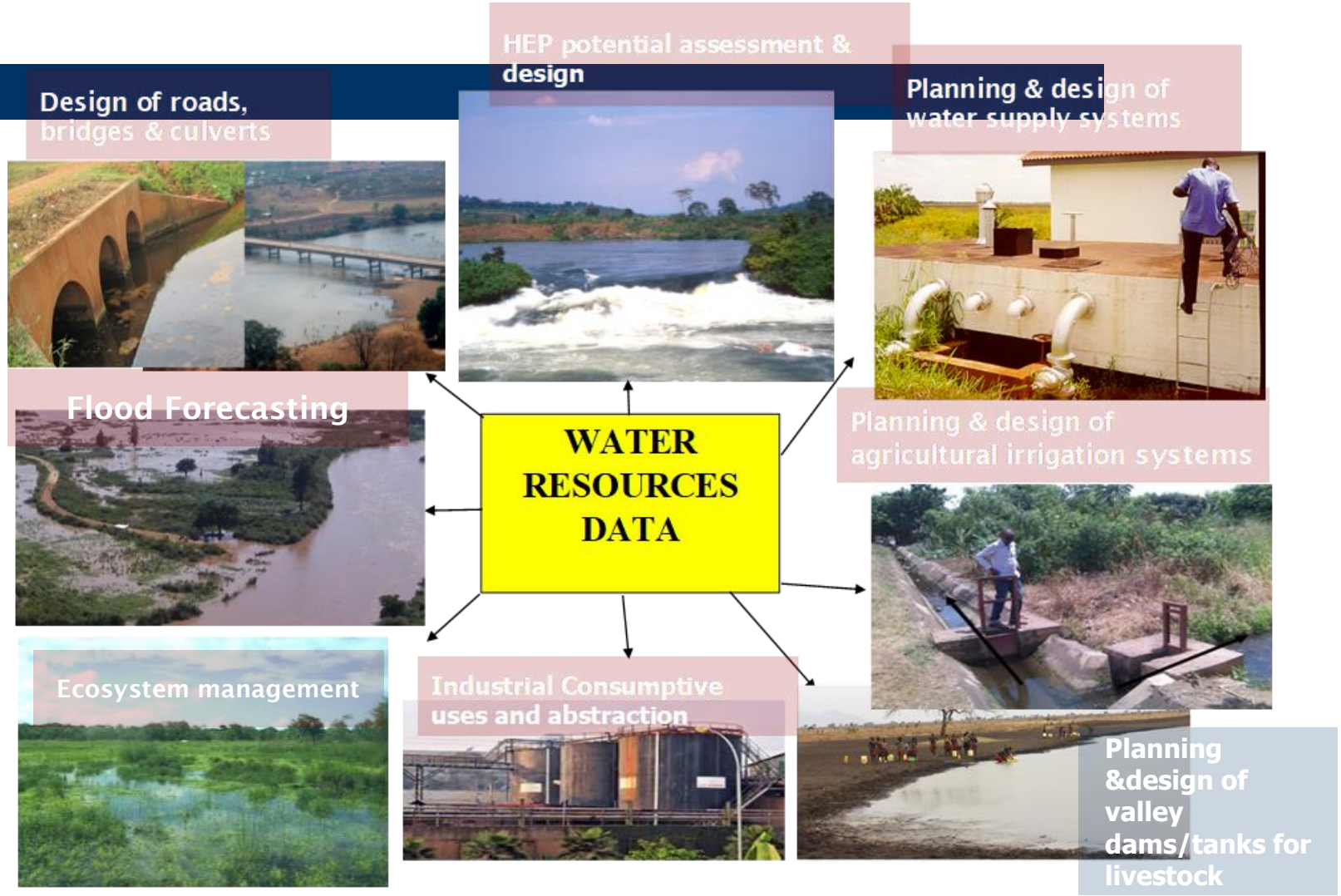
Typical Catchment

Data Recording

Receiving Data

Data Transmission

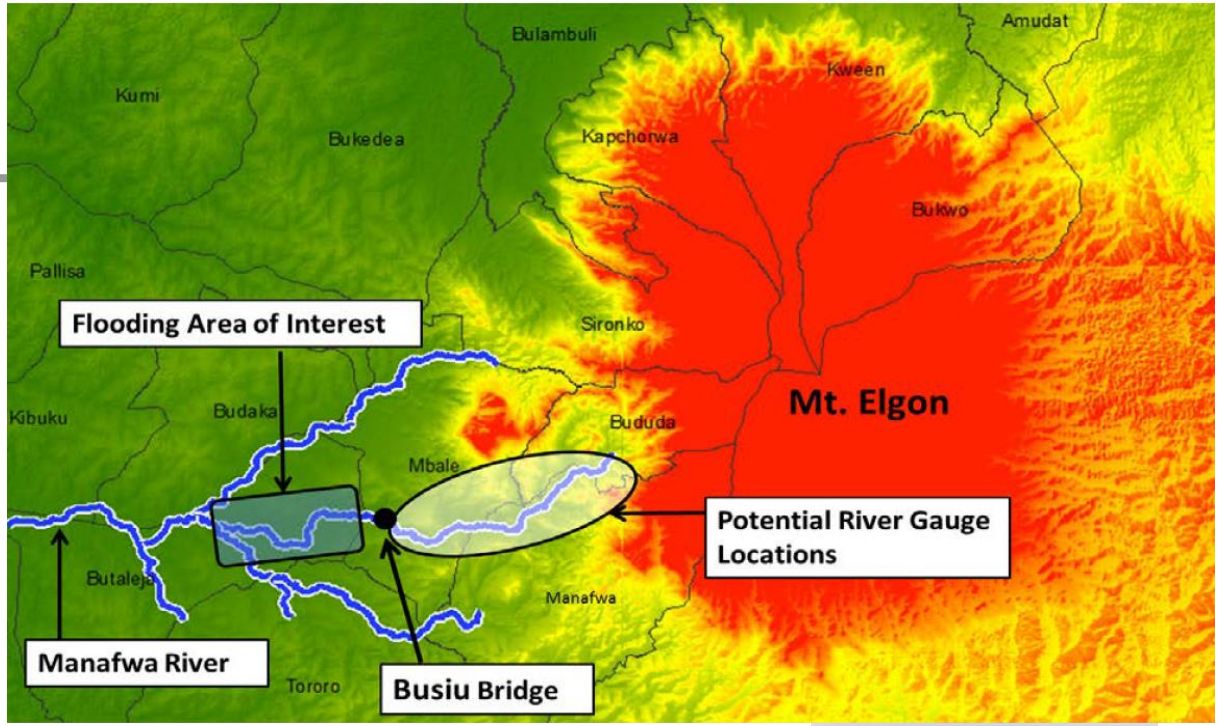
Common Uses of Water Resources Data



Flood early warning systems based on river flow forecasting

Manafwa River Early Flood Warning System

A precipitation based flood forecasting system for the Manafwa River in Uganda. It is based on hydrologic watershed modeling using HEC-HMS, HEC-RAS, ArcGIS. The forecast is utilized by DWRM, Ministry of Disaster Preparedness, Butaleja District and Uganda Redcross. It activates a siren for flood warning. Lead time is less than 7 days.

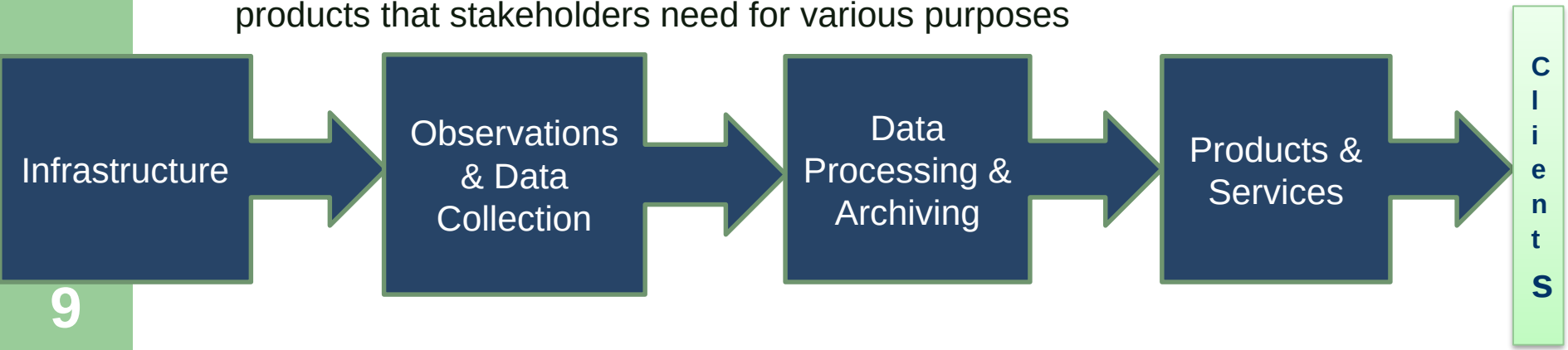


Challenges and Needs

- WRM&A operates several SW/GW/AW monitoring stations. Many have been rehabilitated and upgraded to telemetry with support from UNDP, GIZ, IGAD, World Bank. Budget requirements to sustainably O&M the revamped network have been determined. Current GoU funding allocation staffing to operate and maintain the network is inadequate

- Vandalism & Hydrological cycle

- There is need to add value to data that are being generated to provide information products that stakeholders need for various purposes



Challenges and Needs

Annual Budget for O&M of Hydrological Stations				
No.	**Station Type**	**Qty**	**Rate UGX (000)**	**Amount UGX (000)**
1	Surface Water Station	82	20,000	1,640,000
2	Weather Station	35	2,200	77,000
3	Ground Water Station	45	2,200	99,000
Total		**162**		**1,816,000**

- On average, 11.2m is required annually to operate a station
- 2018/19 GoU Financing: **136M** for entire Department. About 12 stations may be covered. *Priority will be for Lake Level stations and Flow monitoring along River Nile*

- JPF Financing has been discontinued: 400M annually during past 5 years. This would cover 60 stations and with GoU, at least 70 stations.
- Need for increased allocation for O&M of the Surface & Ground Water Monitoring Network.
- Motivation: Study on contribution of water resources information products to national economy. NTR generated.

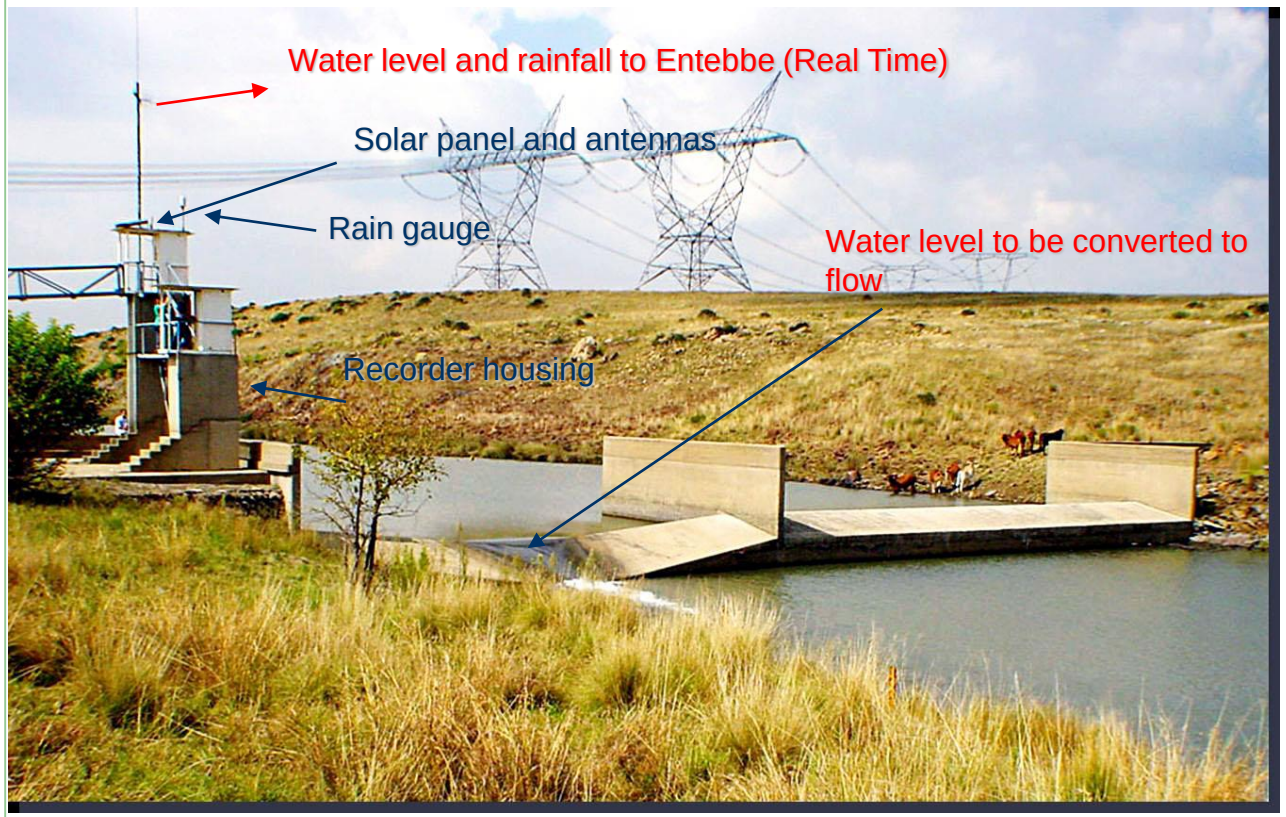
Strategy to address major challenges

We have elaborated a costed water resources monitoring program and developed an O&M Manual

Capital development costs: 6.02bn

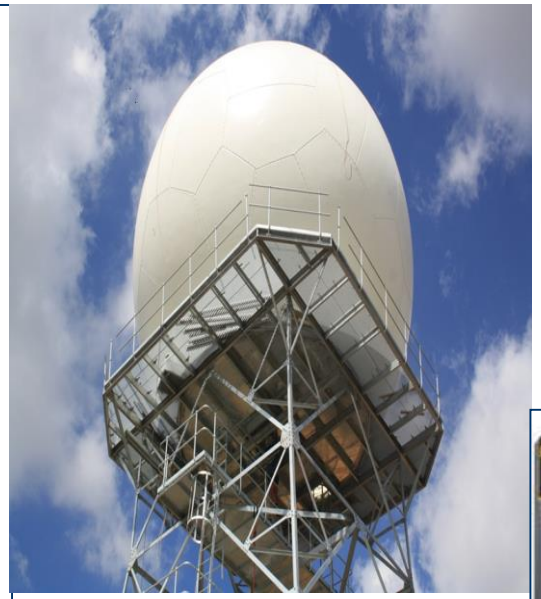
- Installation of stations received under UNDP,
- Construction of hydraulic structures
- Mechanical & calibration center,
- Spare parts and technical support

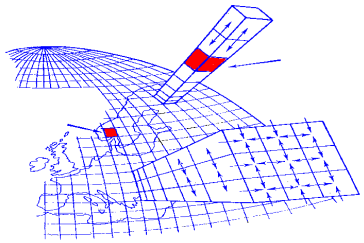
Incorporation of Hydraulic structures can potentially reduce annual O&M costs: **1.8bn**



Strategy to address major challenges

- Shift data acquisition to radar, satellite and remote sensing technologies
- Embrace river flow forecasting schemes currently under development by NBI.
- Utilize data disseminated under regional monitoring programs (WMO,ICPAC, IGAD)





Strategy to address major challenges

A NEEDS ASSESSMENT FOR A MODELLING AND FORECASTING UNIT HAS BEEN CONDUCTED.

IT INCLUDES A PROPOSED INSTITUTIONAL & OPERATIONALISATION FRAMEWORK, PRODUCTS MARKETING AND FINANCING STRATEGY

End

THANK YOU