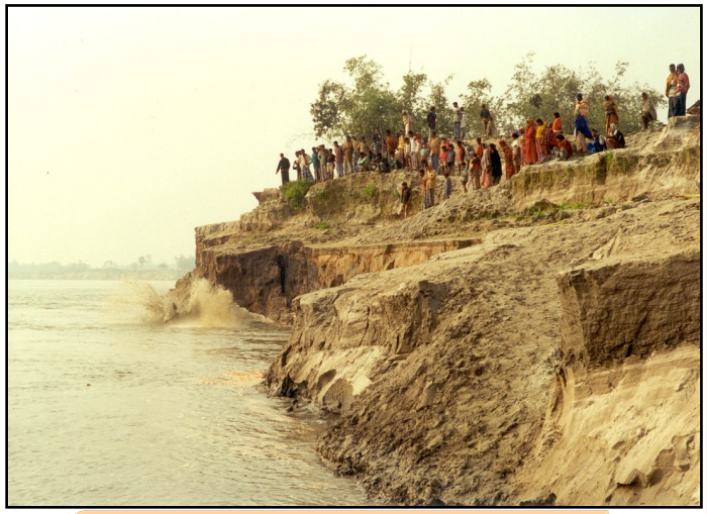
CRITICAL AND SPECIFIC ISSUES



River Bank Erosion

Issues of Bangladesh:

- landslides / erosion
- Sea level rise
- Temperature rise
- Depletion of ground water
- Hydropower
- Trans-boundary and international coordination (MRC)
- Biodiversity

Floods

Damage to biodiversity of Sundarbans

WRM Vulnerabilities:

- Biodiversity of the deltaic country is immensely affected by the activities in the upstream
- WR management becomes a challenge under climate variability and resource constraints

Effects of water diversion and climate change

Effect of Farakka

Salinity Intrusion

Loss of navigability

NEED FOR RESOURCES

Available Resources/Capabilities:

- Discharge measuring stations
- Water level measuring stations
- Groundwater level measuring stations
- Satellite images by SPARRSO
- Weather forecast by BMD
- Flood forecasting system by FFWC
- Well trained personnel of BUET & MoD
- Linkages with national & international organizations
- In-house training facilities

Lack of Capability:

- Improvement of climate & flood models
- Tools for impact modeling and assessment
- Vulnerability and risk assessment tools to various sectors
- Analytical tools to describe weather extremes and variability

ISSUES RELATED TO WATER NEXUS

Water-Agriculture Nexus:

- Huge demand of food for huge population
- Scarcity of surface water
- Over exploitation of groundwater for irrigation and drinking
- Arsenic contamination of groundwater and Arsenic in the food chain pose health risk
- Damage to agricultural land in the coastal region due to salinity intrusion

Water-Biodiversity, Ecosystem Nexus:

- Reduced dry season flows
- Upstream diversion of river water across the borders
- Damage to ecosystem in the rivers and biodiversity of Sundarbans
- Increased concentration of inland surface water

Pilot project Benefits

- **According to do this DP project of Myanmar, the some research works and capacity buildings were done to upgrade the flood forecasting system for the basin**
- **Impacts of Climate change and also Elnino and Lanina events on this basin will be analyzed. Climate change assessment and adaptation in this basin will also be studied.**
- **Cooperate and contribute to the next stage of AWCI.**

AWCI Phase 2 Implementation Plan: Nepal

- **Specific request to GEOSS/AWCI**
  - **Inventory: Water Resources Inventory and glaciers inventory**
  - **Future scenarios of GCM/RCM output for Nepal river basin**
  - **Distributed Hydrological Modeling techniques**
  - **Access to Satellite and radar data**
  - **Establishment of Regional data centre**

specific issues

- Challenges in Quantitative Precipitation Forecast for Flood Forecast

1. The forecast should be time and space specific.
2. It should not be an underestimate otherwise there will be an avoidable loss of life and property.
3. It should not be also an over estimate as same may result in unnecessary displacement of population resulting in diminishing confidence in forecasts and warnings.

- Inadequate network in Himalayan region
- Integration of Radar and Satellite data in NWP models.
- Sea level rise

The types of activities requiring the gap filling and capacity building

✓Analysis of the current variability of extreme hydrometeorological phenomena (probability of occurrence, duration of hazardous period by the territory) and their after-effects for vulnerability assessment.

✓Future risk assessment in line with the Climate Scenarios and application of the advanced methods and tools.

✓Development of the large-scale maps of the current and future risk for individual phenomena in line with the needs of the sectors (construction, transportation, recreation area, etc.) for identification the high risk areas.

✓Assessment of potential of the hazardous phenomena risk reduction via improvement of forecasting and warning.

Lao PDR's Implementation Plan input to AWCI 2

Implementation proposal

1. Steps and Strategy following the three approaches:

Framework development approach:

- National Disaster Management Committee (NDMC) is the high level decision making body which composing of ministerial members and chaired by Vice-Prime Minister.
- Existing developed framework and legislation tools are:

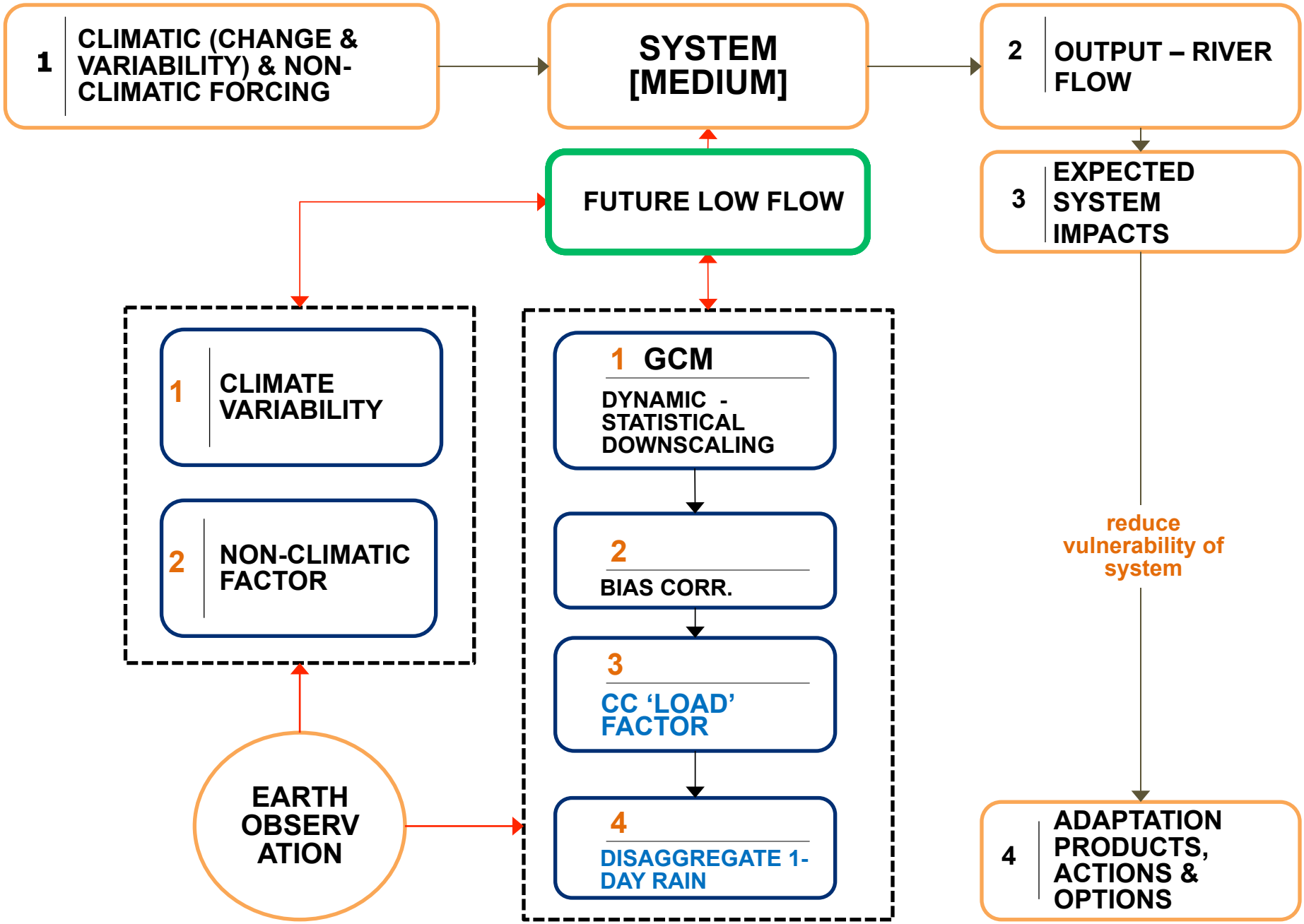
National Water Resources Policy and Strategy
National Strategy on Disaster Management
National Climate Change Adaptation Plan of Action (NAPA)
It is proposed to Develop :
(1). National Policy or Decree on Meteorology and Hydrology (Hydro- Meteorological Services Act)
(2). Strategy and SOP on National Early Warning Systems
(3). Guidelines and Procedures on Applications of AWCI over Demonstration Basin and Replication to Nationwide.

The Implementation Plan

- The National Action Plan has 4 broad goals, objectives and activities that constitute a road map for the next 10 years.
- The activities have been agreed upon through a multi-stakeholder discussion process.
- While the activities listed are numerous, the priority of implementation will depend on so many factors – alignment with implementation plan of others, prioritization based on priority of others, support form GEOSS/AWCI.
- The list has been presented so as to enable GEOSS/AWCI to identify which one could be supported.
- This road map has been adapted to the GEOSS implementation plan mainly to avoid the risk of duplication.

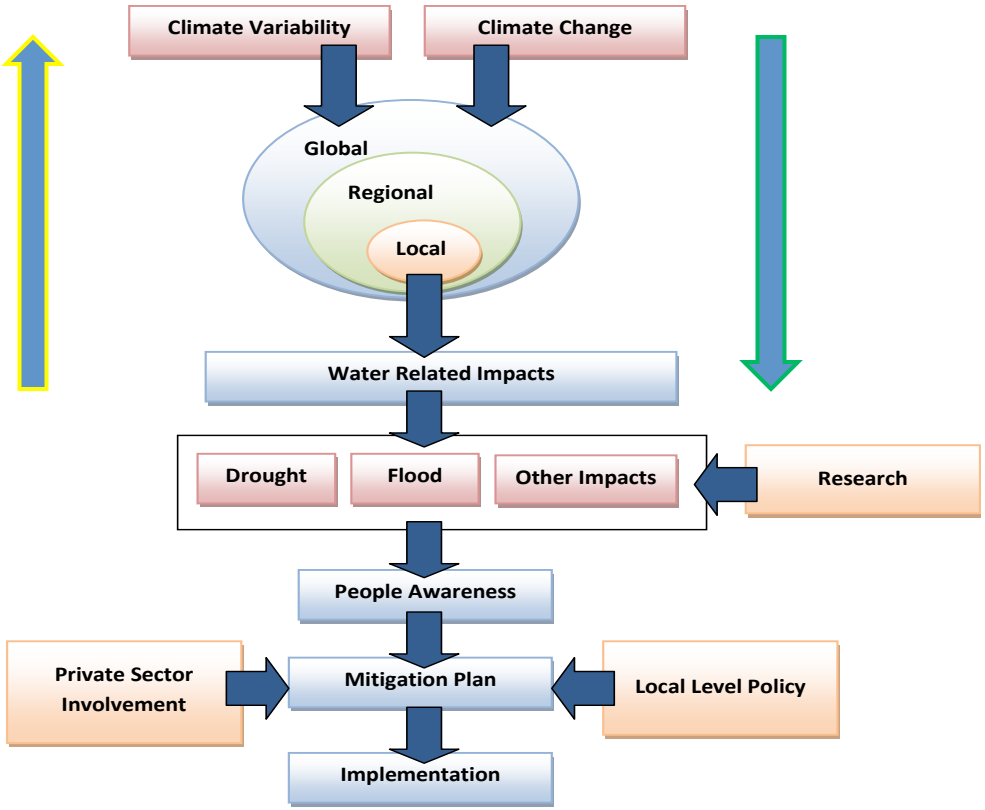
Goal 1: To improve understanding and increase awareness of the impacts of climate change on water resources

Log Framework	12	13	14	15	16
Objective 1.1 Conduct comprehensive water resources inventory					
1.1.1 Comprehensive water resources inventory; mapping, assessment of the quality and quantity of the major water sources for various uses.					
1.1.2 Development of database on the amount of water (rainfall, snowfall, reservoir storage, river discharges, groundwater levels, water quality) and water allocations (water intakes, water demand, and related seasonal changes).					
1.1.3 Monitoring of glacial and seasonal snow covers to assess the contribution of snow melt to water flow of Bhutanese rivers.					
1.1.4 Establishment of water quality and monitoring stations on all major rivers.					


1 CLIMATIC (CHANGE & VARIABILITY) & NON-CLIMATIC FORCING
SYSTEM [MEDIUM]
2 OUTPUT – RIVER FLOW
3 EXPECTED SYSTEM IMPACTS
FUTURE LOW FLOW
1 CLIMATE VARIABILITY
2 NON-CLIMATIC FACTOR
EARTH OBSERV ATION
1 GCM
DYNAMIC - STATISTICAL DOWNSCALING
2 BIAS CORR.
3 CC 'LOAD' FACTOR
4 DISAGGREGATE 1-DAY RAIN
reduce vulnerability of system
4 ADAPTATION PRODUCTS, ACTIONS & OPTIONS

Frame work Approach

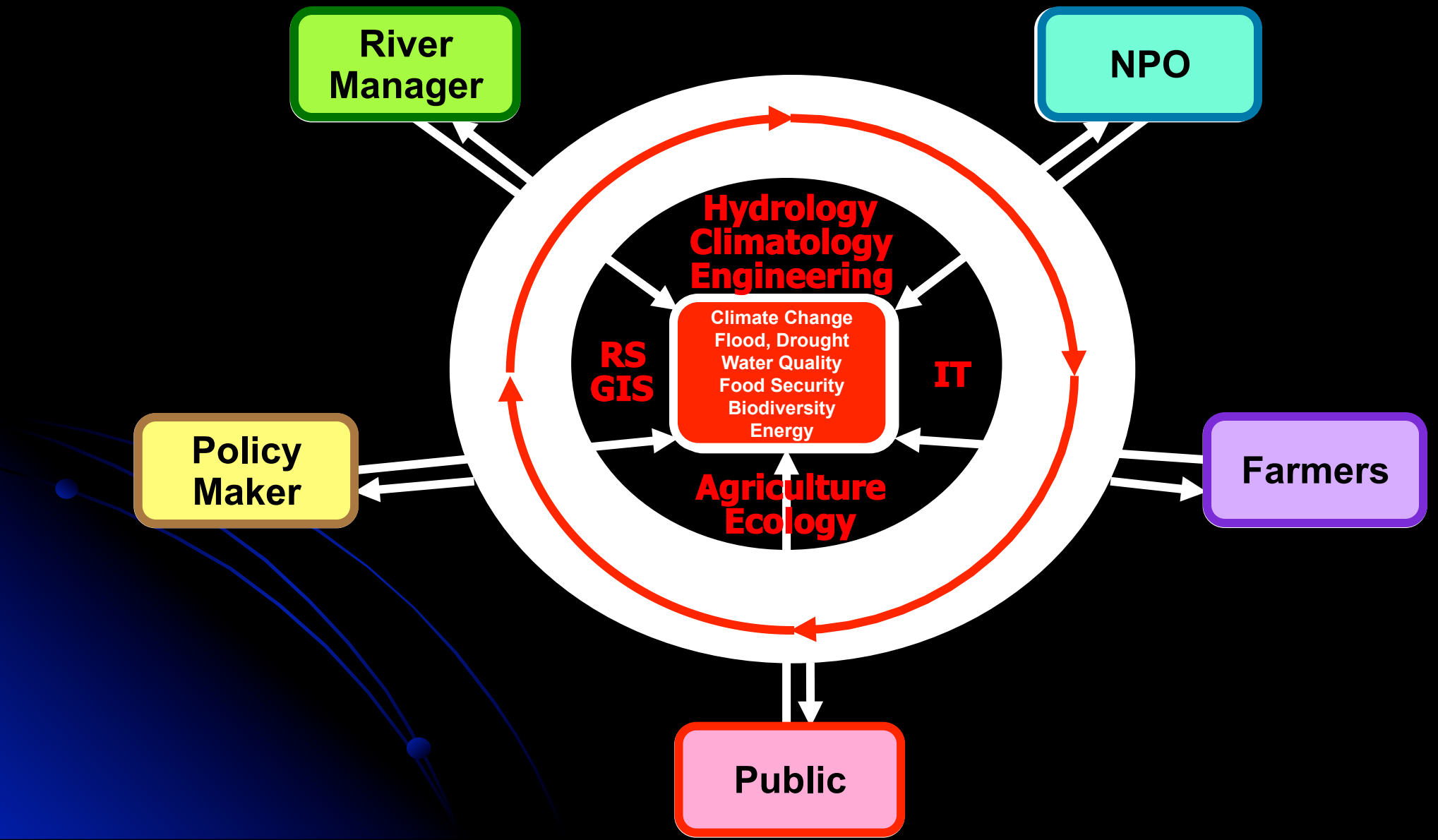
Country member



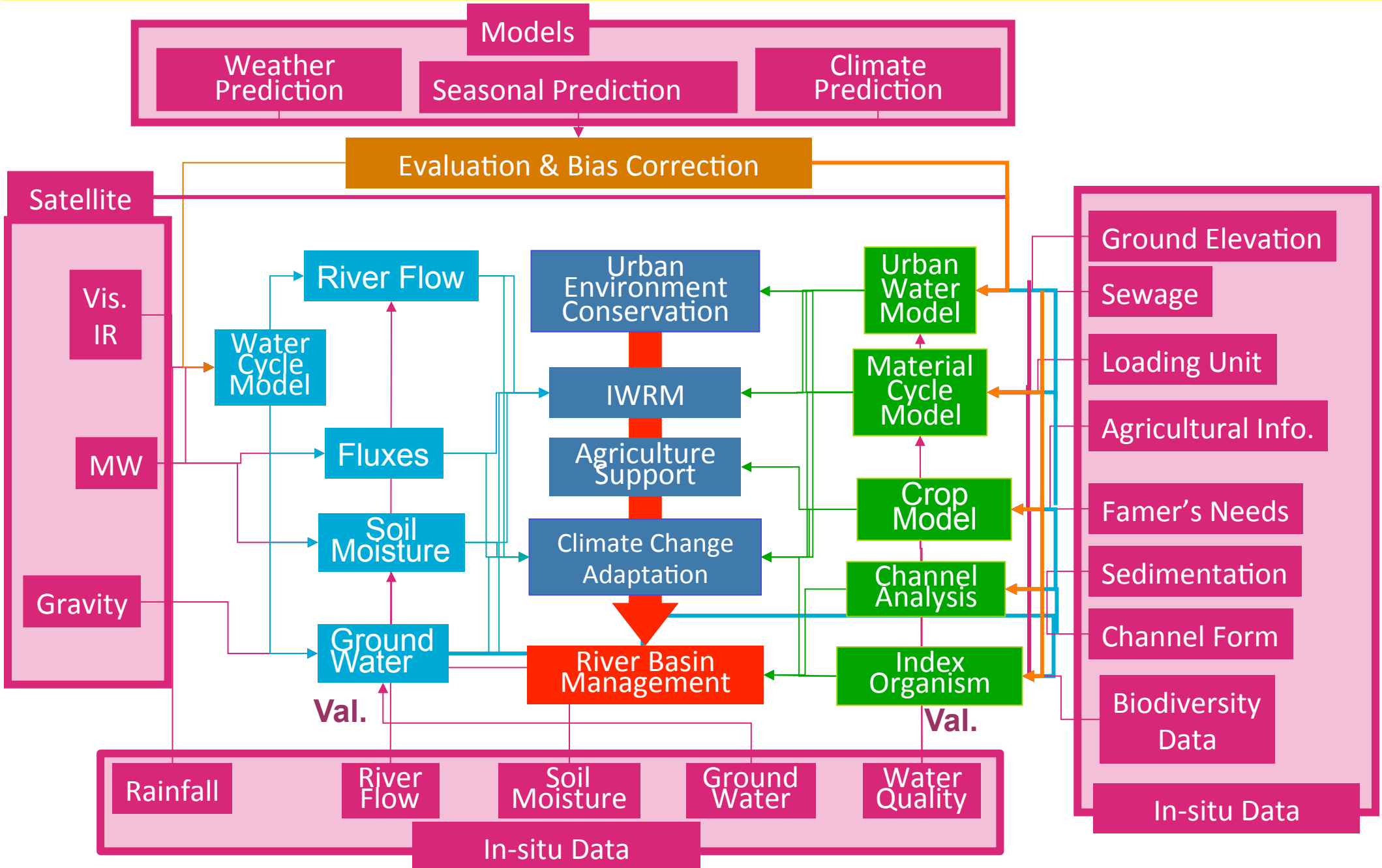
AWCI

Framework development based on simple approach

Sharing Data and Information
Exchanging Knowledge, Experiences and Ideas
Working Together



Data Integration & Information Fusion



Implementation proposal

1. *Mongol AMSR/AMSR-E/ ALOS validation experiment (MAVEX),Lead Prof. I. Kaihotsu, University of Hiroshima and Prof. T. Koike, University of Tokyo, Japan (GCOM-W2 (SHIZUKU) and ALOS-2 as an option)*

2. *Water and energy budgets and modeling in Selbe, Tuul centre of Mongolia(the river basin is included in the catalog of rivers in South East Asia, UNESCO-IHP) and Ulaan-Am river basins (in the Altay Mts.) (to support IWRM in these basins and to focus on extension of existing water cycle observation network, climate change assessment including downscaling, modeling, demonstration.*

RIGC, JAMSTEC, Japan and IMHE, Mongolia contributes to GEO

Specific request to GEOSS and to international community (data/tools accessibility)

Early warning systems for drought and flood

Use of GEOSS products (MOLTS, Satellite (GPM, soil moisture (MAVEX), lake and glacier (ALOS), lake, natural disaster monitoring, Numerical Weather Prediction, Reanalysis, Climate Projection)

Global and regional research results on water and energy budget monitoring, modeling and prediction

Capacity development needs:

Distributed hydrological modeling
Remote sensing and application
Downscaling technique in river basin scale

Training for not only researchers but also practitioners (e.g. UNU, UN-CECAR and etc).

Prediction of Impact of Climate Change and Management Water Resources

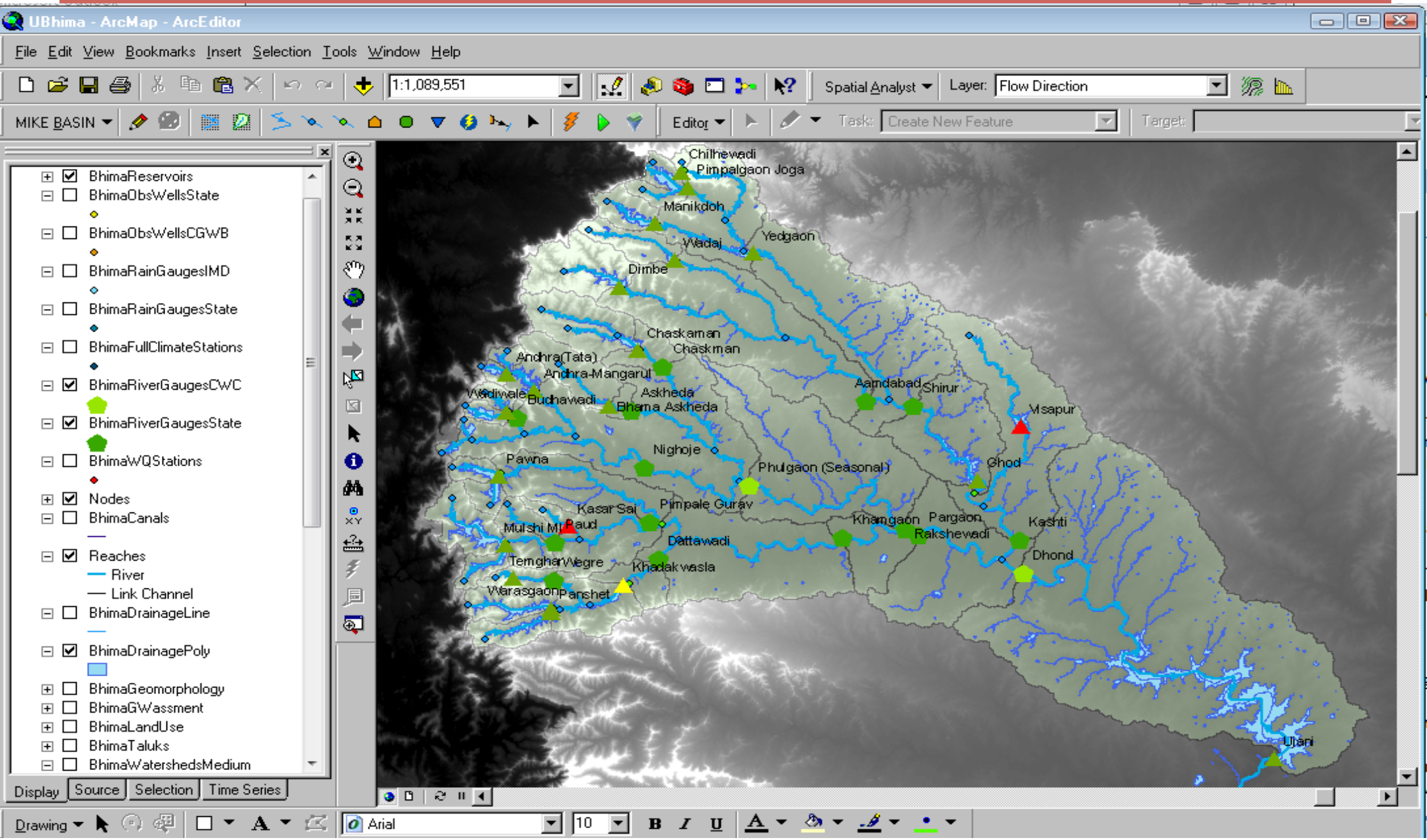
Downscaling of GCM Outputs for use in Hydrological Modeling on basin scale

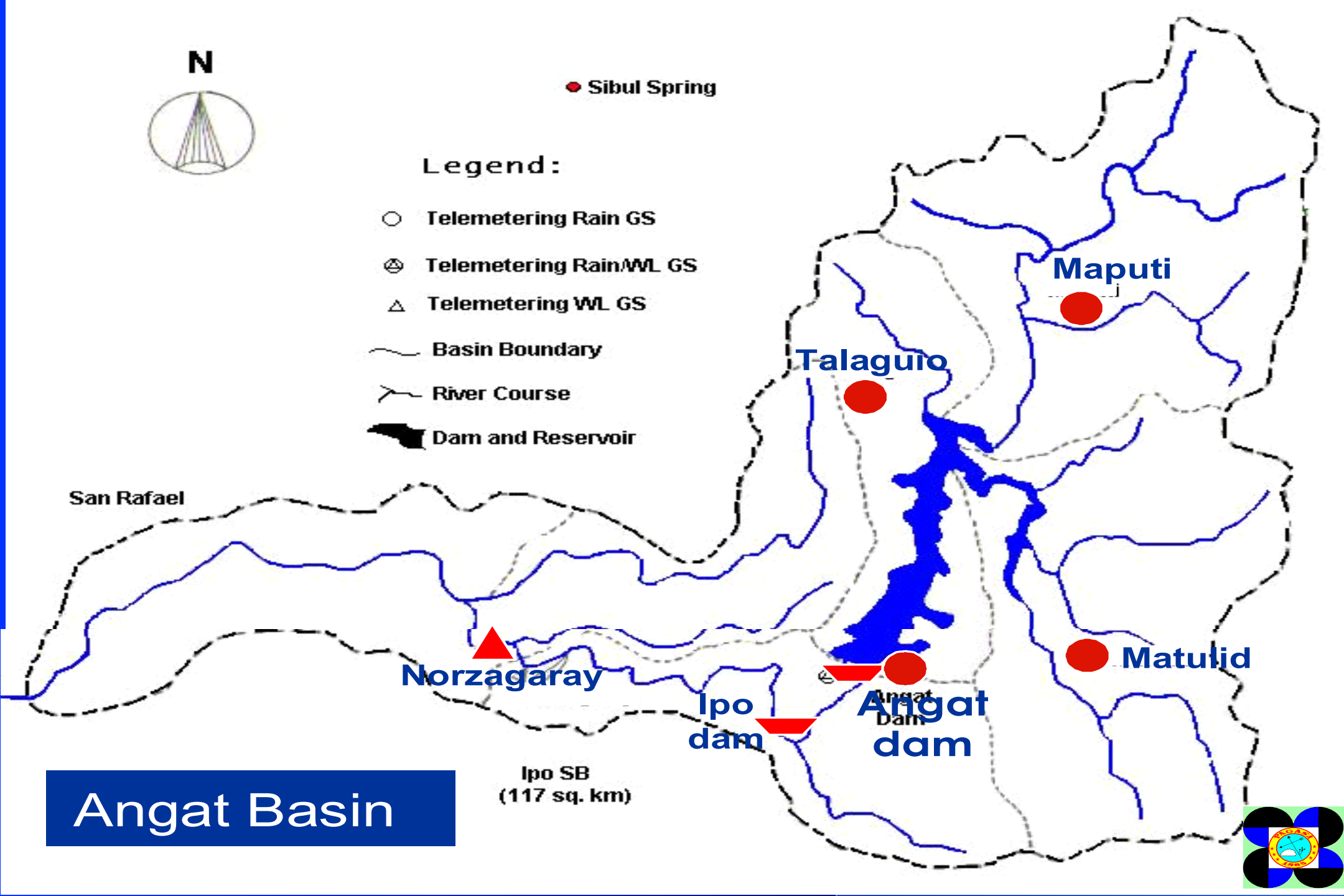
Applications of distributed Hydrological Model for making future predictions considering all the processes of land phase of hydrological cycle

IWRDM, Development of DSS (Planning), DSS (Real Time), Policy & Operational Approaches to Manage Water Resources in Medium to Long Term

Training on the developed software and techniques.

Mike Basin: Tracing of Rivers




N
Sibul Spring
Legend:
Telemetering Rain GS
Telemetering Rain/WL GS
Telemetering WL GS
Basin Boundary
River Course
Dam and Reservoir
Maputi
Talaguio
San Rafael
Norzagaray
Ipo dam
Angat dam
Matulid
Ipo SB
(117 sq. km)
Angat Basin

MAJOR ISSUES AND NEEDS RELATED TO THE WATER CYCLE AND WATER RESOURCES MANAGEMENT IN ANGAT BASIN

a)Development of a more accurate short and long-term weather/climate forecast model

b) Streamflow forecast model for the basin/ watershed

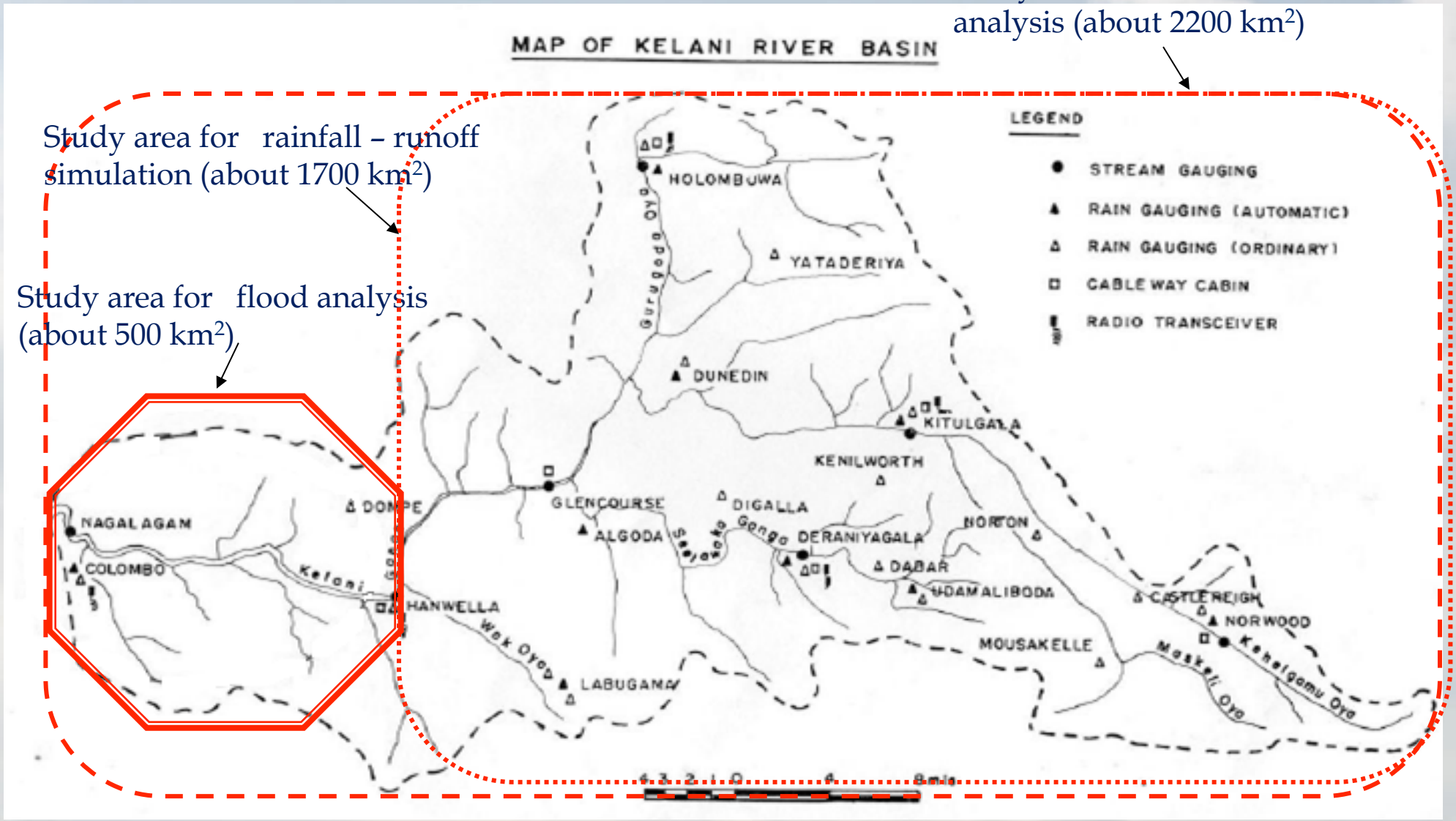
c) Decision support system for the management of the water resource of the basin/watershed

AWCI demonstration project

- Climate change projection using other GCMs

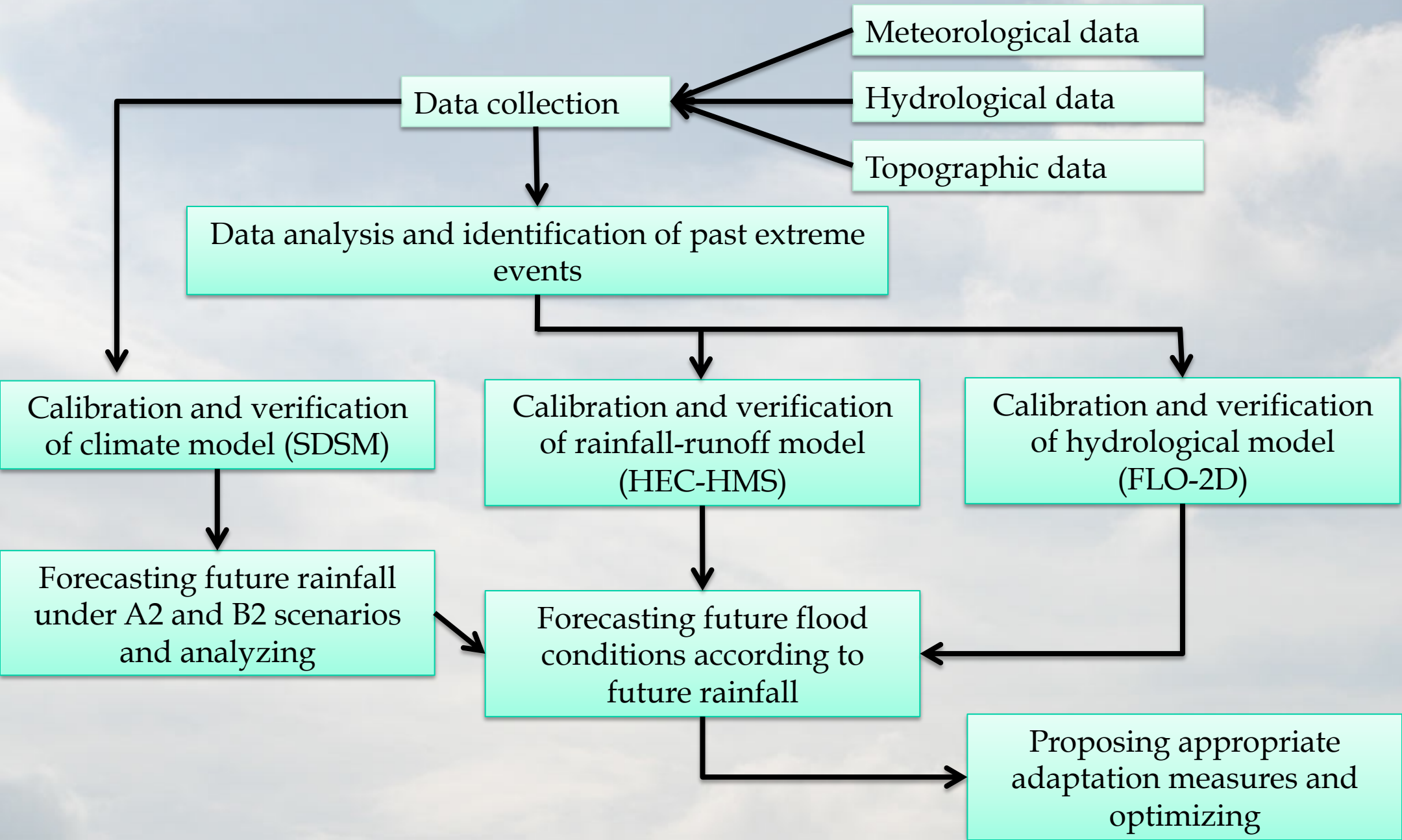
- Climate change projection to a finer resolution

Study Area



Source: Department of Irrigation, Sri Lanka

Methodology



Flood and Landslide Disaster Management System with Public Participation Model

Activity 1 : Finding the appropriate type of observation stations, data survey- collection and report methods with geoinformatic and disaster management system preparing for communities.

Activity 2 : Rainfall analysis and runoff yield assess by satellite images model.

Activity 3 : Real-time flood and landslide assessment model for upstream area

Activity 4 : Symbolic disaster warning system, technics and steps of warning for public sector.

NEED :

- Capacity building in enhanced observations, data integration, modeling and downscaling to local conditions

- Satellite Data Processing, Interpretation and its Application in Flood Forecasting and Warning

-

Project Proposal

Impact of Climate Change on Water Cycle Variability in Pakistan

Brief Introduction

Global warming resulting in accelerated melting of HKH glaciers and enhanced precipitation variability over time and space coupled to generate highly variable river flows. Upper Indus Basin comprises 10 sub-basins and fed by more than 5000 glaciers in addition to summer monsoon at lower reaches of the Indus River System. Surplus amounts of water associated with extreme events caused urban, riverine and flash flooding. Deficient rains gave rise to prolonged social, hydrological and agricultural droughts. Sustainable crop production and power generation have become a challenge due to lack of capacity of prediction with sufficient lead time and accuracy. A schematic diagram covers intended framework.

Pakistani Collaborators

Project PI: Dr. Ghulam Rasul
Project Coordinator: Dr. Bashir Ahmad
Participating Scientists: Furrukh Bashir, Waheed Iqbal, S. Ahsan Bukhari, Muhammad Arshad

Remark

For Vietnam, there are 3 proposals (2012-2014):

1. Urban Flood Risk Management considering impact of climate change, lead by Typhoon Committee
2. Proposed Regional Capacity Development Technical Assistance (R-CDTA) for Applying Remote Sensing Technology in River Basin Management for Philippines, Bangladesh, Viet Nam with ADB and JAXA
3. Comparative study on monitoring scheme of river water quality taken in consideration of water balance among different watersheds in Asia, lead by Prof. Hiroaki FURUMAI, UT