Combating flood with information driven actions, Bihar

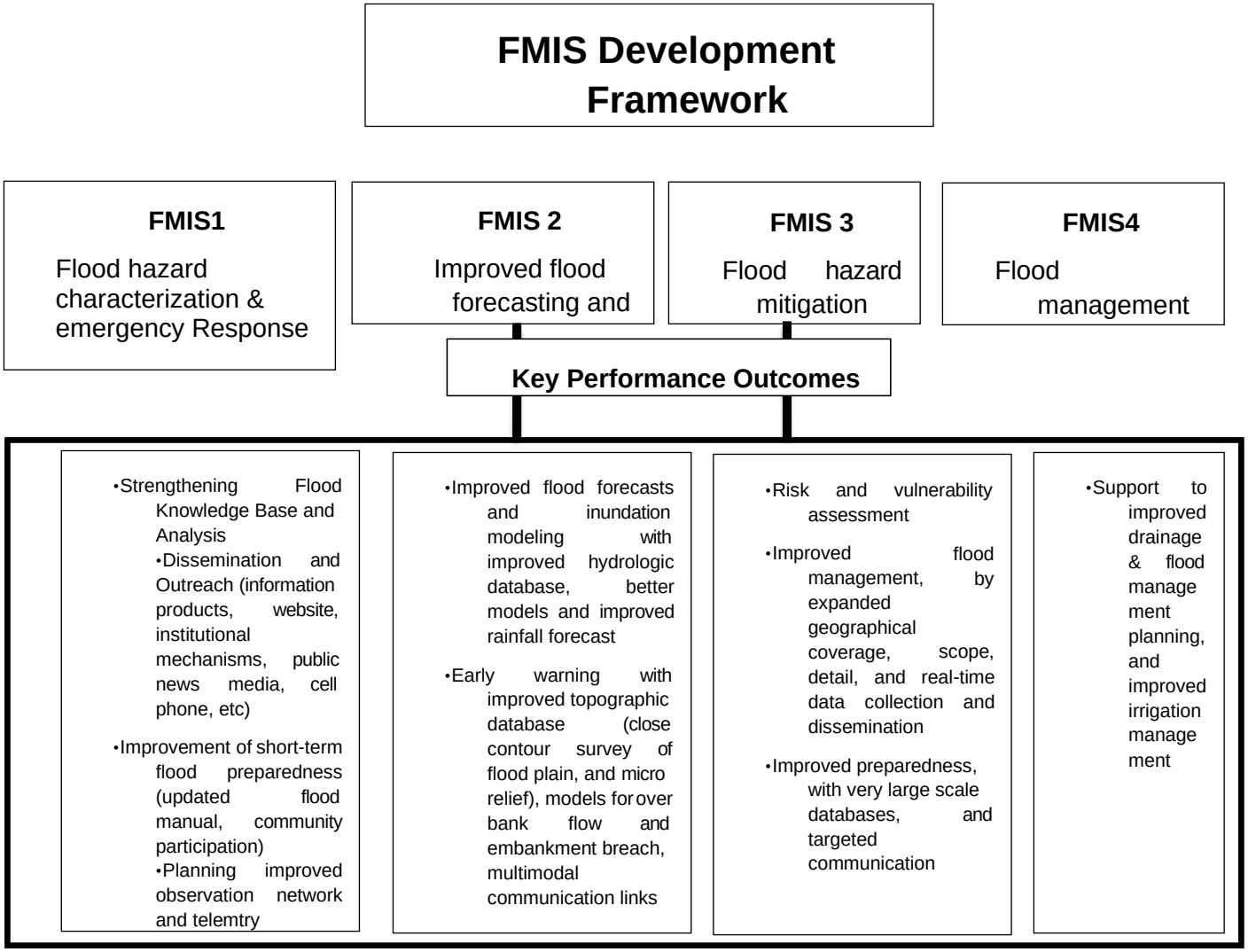
Project details:

- Scheme Name: Flood Management Information System (FMIS)
- Target Area: Bihar
- Total Project Cost: Bihar – Rs. 10.86 Cr. funded by World Bank
- Scheme Scope:
    - Development of technical and institutional capacity of the State for flood management
    - Improved flood forecasting in terms of lead time and accuracy
    - Prediction of expected inundation
    - Development of updated flood control manuals
    - Upgrading hydrologic measurements
    - Use of Online Analytical Processing (OLAP) and data mining tools for planning of schemes using forecasted data
- Implementing Agency: Flood Management Information System Cell (FMISC), Government of Bihar
- Area covered: Phase – I : Flood prone area in North Bihar, from Burhi Gandak river in the west to Kosi river in the east, including the districts of East Champaran, Muzaffarpur, Begusarai, Samastipur, Dharbanga, Sitamarhi, Sheohar, Madhubani, Supaul, Saharsa, and Khagaria covering about 26,000 sq. km. in area; Phase – II: Entire North Bihar together with Patna, Bhagalpur and Munger district have been targeted to be developed.

Intervention: Flood Management Information System, Bihar finds its genesis in the brainstorming meeting on Jan 18, 2006 in which the Government of Bihar (GoB) and the World Bank agreed on a water sector partnership matrix and action plan in three time horizons. In the short term, it was proposed to improve the technical and institutional capacity of the State of Bihar for flood management, introduce extensive use of modern information technologies, and develop and implement a comprehensive Flood Management Information System (FMIS) in priority areas. Flood Management Information System Cell (FMISC) was created under the overall supervision of Chief Engineer (CE), Monitoring and Planning, in Water Resources Department (WRD), GoB, and under Superintending Engineer (SE), Flood Monitoring Circle, to develop and operate the Flood Management Information System (FMIS) with technical assistance from the World Bank. Currently, one Executive Engineer as In-Charge, and six Assistant Engineers (and one peon) have been deputed to FMISC.

Major functions of FMISC are:

- To ensure operational readiness of FMIS prior to each flood season.
- To operate and disseminate information products as per plan and schedule.
- To respond to emergency data requirements through the use of FMIS.
- To follow-up on dissemination to enable effective utilization.
- To analyze feedback and experience of every flood season for improving FMIS.



The FMIS in the first stage covered the focus area from Burhi Gandak River in the west to Kosi River in the east in North Bihar which is the most flood prone area in the State. This included 11 districts i.e. East Champaran, Sheohar, Sitamarhi, Muzaffarpur, Madhubani, Dharbanga, Samastipur, Supaul, Saharsa, Khagaria, and Begusarai covering 26,000 sq. km.

The FMIS Phase I was initiated in August 2006 and was scheduled to be completed by October 2007. Further extension to the project till June 2008 was granted by the World Bank and the project was eventually completed on this date. The project components

included development of FMIS, improvement of flood forecasting, update of Bihar Flood Information Website, preparation of updated flood control manual, conducting training and upgradation of hydrologic measurements and telemetry.

FMIS Phase-II started on May 2010. In the meantime, the FMIS sustained itself on the internal resources of the Water Resources Department during 2008 to 2010. The FMIS Phase II was scheduled to be completed by 31 December 2012 , which was extended till 30 November 2014.

Impact: As a result of FMIS in Bihar, following achievements have been realized:

- Flood modelling: Real-time Flood Forecasts are made using statistical and deterministic model.
- FMISC is releasing monthly E-Bulletin since May-2007. This is an in-house production and gives a brief account of activities in FMISC.
- Flood Management Information System Cell, Bihar, Patna issues Daily Flood Information Bulletin during monsoon season generally from 15th June to 15th October. The bulletin carries information on observed rainfall in Nepal, Bihar and three days maximum rainfall forecast from IMD and river water level for all six sub-basins/rivers of North Bihar viz Gandak, Burhi Gandak, Bagmati (including Adhwara group of rivers), Kamala, Kosi and Mahananda.
- Inundation Maps: These maps indicate the extent of flood water spread. The inundation extent is derived from RADARSAT Layers/ Imagery provided by NRSC in processed 1bit image format.
- FMISC also provides regular embankment news, detailing the status of embankments in Bihar. Embankment Assets Management System for Bagmati and Kosi is currently functional and is providing up to date information on embankment conditions by collecting information from department officials and select community members through field data collection application and SMS.
- Following information products are regularly uploaded in the website for public viewing:
    - Inundation map
    - Flood intensity map
    - Village level inundation map
    - River status map during flood
    - Post flood River Status Map

Replicability: In order to address the flood situations in the flood prone states in India, the FMIS need to be rolled out across all states. Further the FMIS should contain modules

for addressing land planning, zoning of flood plains, silt management besides integrating with flood forecasting and hydro-meteorological observations. The water flow data can also be used for irrigation in arid and semi-arid regions.

Sustainability: Sustainability analysis mechanisms, including 'Dynamic Sustainability' concepts, may be adopted in the flood management planning process. To ensure sustenance of benefits realized through FMIS, it is imperative to upgrade the application models in the FMIS and also ensure seamless integration with new applications.

(References: http://www.fmis.bih.nic.in; KII as part of primary survey)