Adaptive Management towards a Flood Resilient Kerala

Climate change and climate induced disasters are posing a significant challenge to achieving sustainable development and there is an urgent need to focus on its vulnerability, adaptation and coping mechanisms. Floods, being the most prevalent climate induced disaster worldwide, building resilience to it requires an even more urgent attention since there is a lot of uncertainty about its impacts. The conventional approach to flood management based on the assumption that climate is more or less stationary, is fizzling out. The best way to deal with the uncertainty of climate induced floods is to master the art of developing sustainable measures and flood defense that can evolve over time, to prepare for a wide range of plausible outcomes. A Knowledge Note published by World Bank Group outlines the following key principles for flood risk management in river basin scale:

- Understand the whole river basin
- Assess downstream impacts of flood management interventions
- Integrate flood risk management principles into river basin master plans
- Use technology to promote flood risk management.

While it is impossible to fully eliminate flood risk, actions can be taken to minimize its impact. A proactive river basin-wide approach, which is a 'whole systems' view to manage water resources and minimize flood risk, recognizes and balances all inter sectoral linkages in a given basin.

The State of Kerala which once boasted stabile monsoons and a benign climate, is also now facing the combined after effects of climate change and unscientific land utilization. Kerala had experienced unprecedented rains and floods in last two consecutive years and this comprehends that climate-change-induced floods are becoming an annual affair in the state. In the aftermath of recurring natural disasters, building a flood resilient State is now a pressing challenge for the policymakers and project managers alike. As identified in the Rebuild Kerala Development Programme (RKDP), an integrated approach for Flood Management in lines with Integrated Water Resources Management has become significantly imperative.

Congruent to it, the Water Resources Department of Government of Kerala is shifting the focus to Adaptive Planning, for generating a broad array of pathways for the widest set of plausible future scenarios. Kerala FloodCon 2020, the National Conference on Flood Management organized by WRD Kerala under the aegis of World Bank funded projects of DRIP and NHP, with a theme for developing 'Policies and Strategies for Flood Management' is a perfect indication of its kind. This National Conference, a symposium of brilliant minds in Water Resources Management sector was conceptualized for fast tracking the need for an Integrated Flood Management approach in Kerala, by interblending the Structural and Non-Structural measures. The deliberations of the conference paved way for drawing up strategies for flood control varying from large flood management actions such as Construction of Flood Control reservoirs and Dredging of drainage channels, which requires major policy decisions, to immediate solutions such as Establishing a Control Centre for management of data related to water and allied sectors, Developing Water Resources Information & Management systems, Flood Warning systems integrated with Reservoir Operations etc.

Pursuant to the above, Irrigation Department, Government of Kerala is setting forth the best practices such as

1. Establishing a Real Time Data Acquisition System (RTDAS) involving Supply, Installation, Testing, Commissioning and Operation of Real Time Hydro-Met equipments such as Tipping Bucket Rain Gauges, Automatic Water Level Recorders and Automatic Weather Stations.

    - To ensure availability of Hydrological and Meteorological data in regular intervals, say in every 15 minutes.

    - To evaluate the real time Hydromet data in real time at the Decision Support Center before passing the information to dissemination

2. Water Resources Information System for Kerala (Kerala-WRIS)

    - Web enables platform for integration of all data related to water and its allied sectors which otherwise is scattered amongst various departments

    - Extracting required information of different parameters of Weather, Water Availability (Surface and Ground Water), Water Demand etc from the integrated data.

    - Optimum Decision Support from Real Time Decision Support Modules such as Water Budgeting, Water Auditing, Water Conservation Management, Flood Management etc.

3. Real Time Operation of Reservoirs integrated with Flood Forecasting and Early Warning System (FFEWS & IROS)

    - Capable of providing fairly accurate information to the extent and duration of flooding at any location in the region corresponding to a rain event in any or whole of the said catchment basins and ensure sufficient lead time for response.

    - Reservoir operations through optimization techniques, to advise the right amount or pre-releases and releases at each reservoir in the likely event of flood, in order to minimize flood impact and meet other objectives of the reservoirs

4. Constitution of Hydrologic Modelling Team

    - In house Training/Capacity Building program in association with World Bank, for Department Engineers to capacitate as Master Trainers

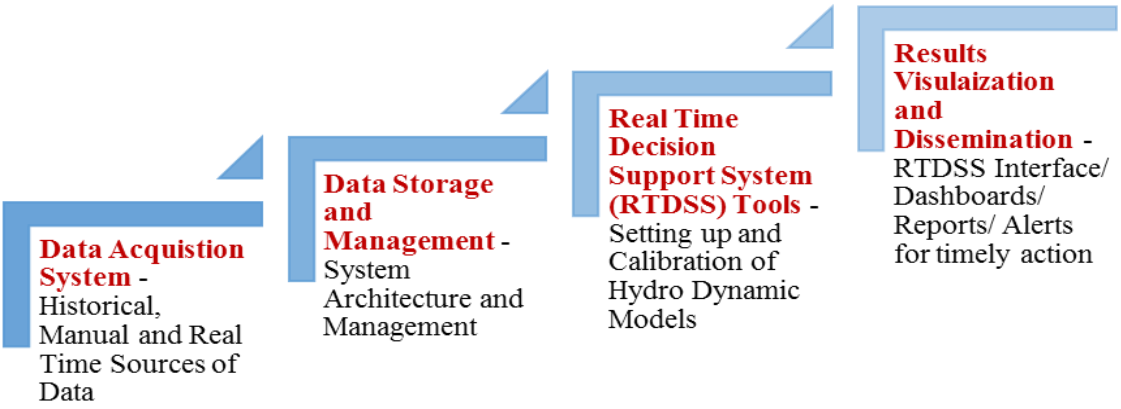
    - Online training for Basin Planning and Flood Forecasting & Reservoir Operations

    - Master Trainers to impart the training to other Engineers on the lessons learned.

5. Establishing an Integrated Command and Control Centre (ICCC)

    - Ensuring the convergence of Specialized tasks such as Kerala WRIS, FFEWS, IROS etc

    - Timely dissemination of the information to policy makers for Optimum Decision Support



6. Dam Safety and Reservoir Management
    - Operation & Maintenance Manual and Emergency Action Plans updated in congruence to CWC guidelines
    - Regulate the flow from the 16 dams and 4 barrages under the department's control, based on the existing Operation and Maintenance (O & M) guidelines and Rule Curves for release of water

Concluding Remarks:

The Real Time Decision Support Systems and Tools are presently on their different stages of implementation and the Department is making every possible effort to accomplish the speedy implementation of all the aforesaid state of the art systems so that these would be operational by the next monsoon period.

But now that we are amid another monsoon period, every earnest attempt has been made to ensure complete vigil and preparations to manage any crisis arising out of any emergency situation. Timely information on water level is received from the Field Engineers, on the stipulated intervals even though the data is collected manually. Dam Operators have ensured preparedness for any emergency response and operate their respective in coordination with the Disaster team of the District Administration and are regulating flow based on the rise inflow.

Additionally, to act toward any unforeseen circumstances, an Emergency Response and Crisis Management Team is operating in the Monsoon Control Room set up at Office o Chief Enginer, Irrigation & Administration, Public Office, on 24- hour basis throughout the monsoon period, to minimize inconvenience due to any unusual occurrences or impending dangers.