

RTSF & ROS for Krishna-Bhima - Pilot Project

General Information about Real Time Stream Flow Forecasting - RTSF and Reservoir Operation System - ROS for Krishna-Bhima Basin - A Pilot Project

Introduction

Under Hydrology Project phase- II (HP-II) project, Real time data acquisition system (RTDAS) is installed and commissioned for Krishna and Bhima basin in the Maharashtra state. Real time decision support system consisting of real time stream flow forecasting and integrated reservoir operation system for Krishna and Bhima basin is also developed to manage the floods and operate reservoirs optimally for multiple uses. The conventional Hydro meteorological network (HIS) developed in Hydrology Project phase- I (HP-I) consisting of rainfall stations, river gauge stations, full climate stations, reservoir water level stations, spillway gates of reservoirs in Krishna Bhima basin is upgraded by installing different kinds of electronic sensors, data collection platform, solar panel, solar charger, batteries etc., and employing VSAT, GSM communication system to convey data in real time mode at an interval of 15 min to VSAT Master station/data center at Pune. This real time data precipitations forecast on 9 km X 9 km grid, received from RIMES Bangkok and NCMRWF, New Delhi is used as input for decision support system developed in HP-II. The real time DSS developed is now helping reservoir operators for better flood management and prepare stakeholders for the floods. The water level, inflow and outflow forecast for reservoirs, forecast of river water level and river flow is helping in taking the decisions for optimal operation of reservoirs well in advance. In addition to this the reservoir operation system is facilitating in the optimization of the storages for ensuring flood cushion and improving agricultural productivity.

The Real Time Stream Flow Forecasting and Reservoir Operation System for Krishna and Bhima Basin is developed in consultation with DHI(India), Water and Environment Pvt. Ltd., New Delhi as a prime Consultants with DHI, Denmark and Riverside Technology, USA as sub consultants.

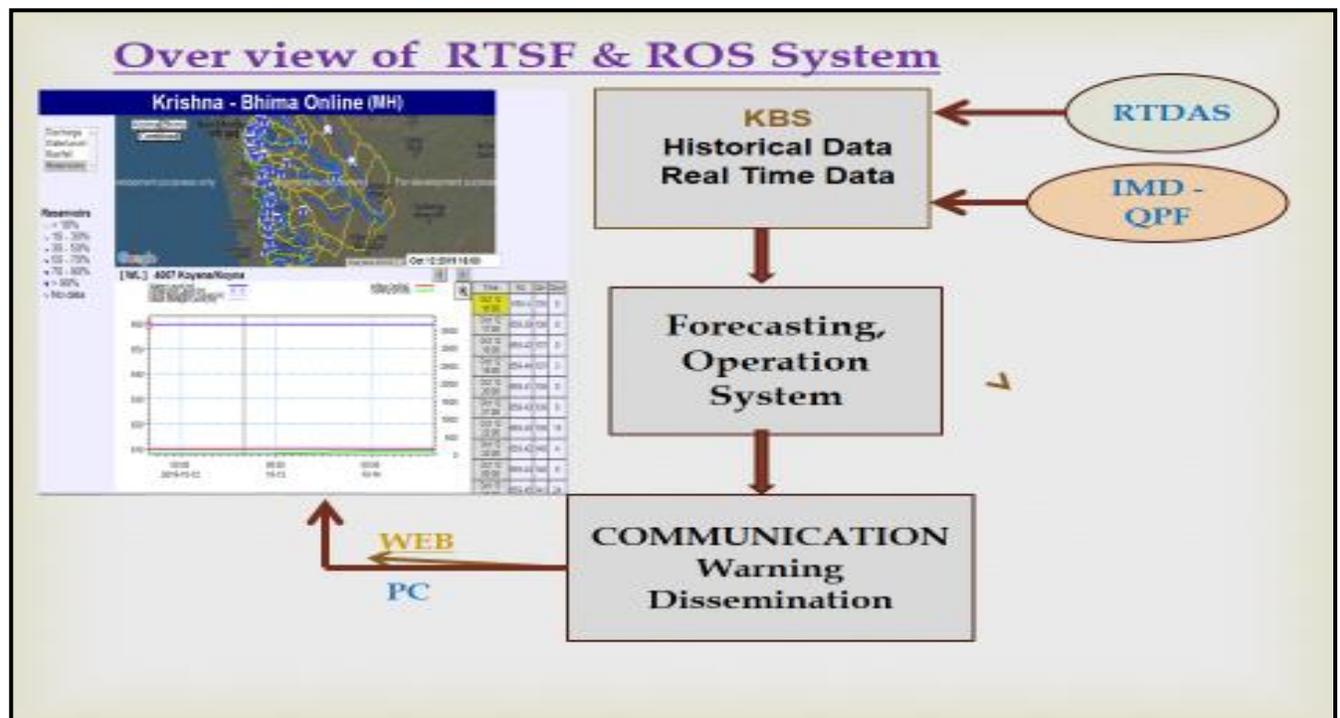
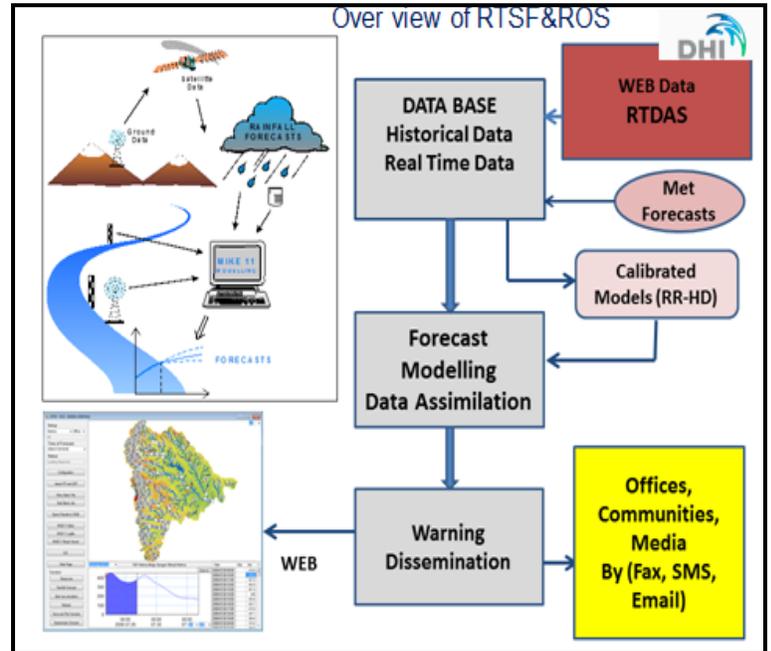
Modeling system developed in this project is built using the customized MIKE model and consists of

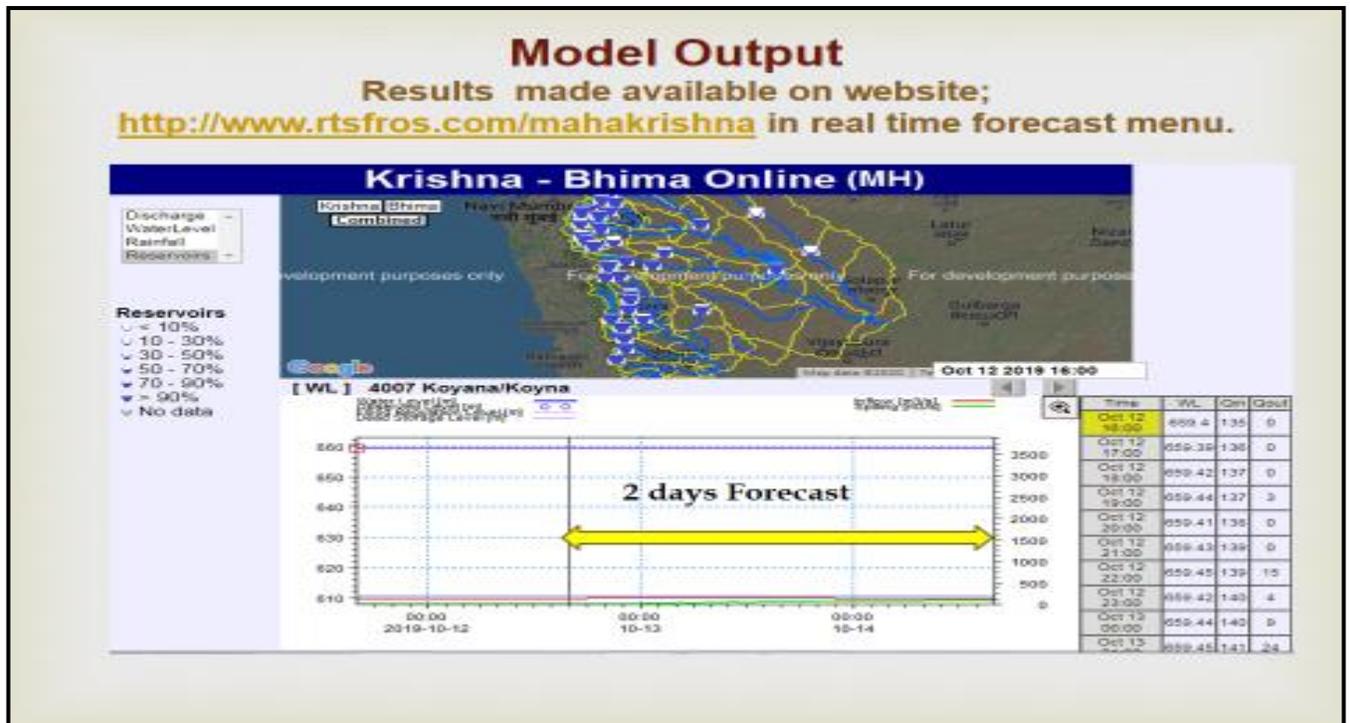
1. A Hydrological model (Rainfall-Runoff model) for generating runoff from a number of catchments schematized in two basins.
2. A Hydrodynamic model for routing flows through the river and reservoir system to compute flows, water levels.
3. A Structure Operation module which incorporates Reservoir operating system (ROS) and Gate operating schedule (GOS).
4. A Data assimilation module which applies real time corrections to the simulated water level and discharges.

5. A user interface integrating the above models for forecasts, reservoir operation guidance, scenarios management and flood warning and dissemination.

Sequence of Steps in Forecasting System

1. Import data from RTDAS
2. Import data from Pune Flood Control website.
3. Import QPF – from I.M.D.
4. Mike 11 Simulation
5. Results in .dfs0 files
6. Prepare Results for WEB
7. Archival of Results
8. Saving Forecast in KBS and Uploading Forecast to Web site





The real-time stream flow forecasting was shared with reservoir managers from monsoon 2013. The Real Time Stream flow forecast for viewing/use of all stakeholders of the basin is made available on website; <http://www.rtsfros.com/mahakrishna> in Real time Forecast menu.

Capabilities of model

1. A Hydrological Rainfall-Runoff model for generating runoff from a 122 sub catchments, schematized in Krishna and Bhima basins.
2. Three days advance forecasting system which forecasts Inflow, outflow and water levels of reservoirs and hence this forecast of river flow and mapping of flood zone will help in taking the decisions such as evacuation of the areas likely to be affected well in advance.
3. Discharges and water levels in the river on downstream of reservoirs at various locations, critical from flood point of view with Simulated flood maps.
4. Reservoir operation system with Short term and Long term optimisation.
5. In the Offline mode various scenarios can be generated for integrated operation of multiple reservoirs.

6. This hydro-Meteorological monitoring system in the Krishna basin became a MILE STONE and similar kind of system has been proposed in other Basins under National Hydrology Project- (NHP)
7. An user interface integrating the above models for forecasts, reservoir operation guidance, scenarios management and flood warning and dissemination