

UPPER GODAVARI SUB BASIN

The Godavari river system is the second largest river basin in India and the basin area within Maharashtra represents 50% of the state's land area. The population of Maharashtra exceeds 114 million and irrigated crop production in Godavari basin is of major importance to Maharashtra and India. The basin experiences variation in rainfall and water availability and equitable distribution of water in a major public concern.

The Government of Maharashtra engaged eWater to develop a science-to-policy modelling framework to support the development of an integrated water resources management (IWRM) plan for the Upper Godavari. Using the eWater Source platform, we worked with the Water Resource Dept. and the recently formed Maharashtra Water Resource Regulatory Authority to develop and analyse a range of resource planning options and operational recommendations for water in the Upper Godavari basin. The model scenarios support selection of water governance options to improve equitable water access across the Upper Godavari sub-basin.

The Upper Godavari sub-basin occupies an area of 21774 km². It can be considered to have two-sub regions, the upper reach is along the Sahyadri range, and the lower reach is downstream. The upper reach receives heavy monsoon/Kharif rainfall while the lower reach is in a rain shadow belt with much lower rainfall. The Upper Godavari sub-basin receives 85 to 90% of its annual rainfall during the southwest monsoon period (June to September). Rainfall, and water availability, varies widely in space and time.

There are 25 storages in the sub-basin; each is managed independently without an integrated water management approach for the entire sub-basin. Population growth and ongoing industrial and agricultural development have put stress on the available water resources. Therefore there are conflicts over competing uses, particularly in low rainfall years.

The need for more equitable sharing of water resources is a significant challenge for the region. The systems for licencing and allocation of water resources are in development and are not yet supported by science-based decision support systems. The Government of Maharashtra, asked us to help build capacity in river basin modelling and water management. They needed to compare and test water management options in the Upper Godavari, and use these tests to develop a sustainable water entitlements policy and operations system for the sub-basin. Using eWater Source, eWater and Maharashtra developed a flexible, scientifically based Integrated Water Resources Management modelling framework to evaluate water governance options for the Upper Godavari.

SUMMARY

CUSTOMER

Government of Maharashtra through Government of New South Wales

CHALLENGE

Climate variability and highly variable water availability.

Requirement to test and compare water management options for allocation of water resources during low availability periods - before implementing them

SOLUTION

Conceptual modelling of water sharing scenarios using the eWater Source platform

Capacity building for technical modellers and knowledge transfer of Australian water entitlement systems for water managers in the Upper Godavari Basin

BENEFITS

Improved ability to examine new water management options

Improvement in water sharing

LOCATION

Godavari Basin, India

SOFTWARE

eWater Source

Model components

Using the eWater Source platform, the Godavari integrated policy/operational river basin model included:

- Combined supply, demand and storage modeling
- Water allocations/resource assessment
- Rainfall runoff modeling
- Groundwater and surface water conjunctive use

Transferring Knowledge, Building Capacity

Throughout the project, eWater provided continuous training and capacity building to promote effective knowledge transfer and provide support leading to long-term success.

eWater, the Government of New South Wales (NSW) and the Government of Maharashtra worked together to equip Government of Maharashtra with the tools to manage their complex water governance issues both now and in the future.

eWater provided training in both river basin modelling in Source and best practice modelling principles, which help ensure implementation and application are the best achievable. eWater workshopped potential water management options and water sharing rules for consideration in the Upper Godavari sub-basin and investigated them, using the eWater Source model.

eWater and NSW Office of Water shared with Government of Maharashtra their collective expertise and experience in Australian water resource allocation systems including lessons learned from the successes and failures during the Australian water reform process

Integrated Solution, Practical Benefits for Water Policy

Breakdown/Demonstration of how solution practically solved aspects of the problem at hand – what water management options and water sharing rules were chosen by using Source model to evaluate alternatives on water supply reliability and equitable sharing of the water resource e.g.

We used a scientific approach to evaluate what the options were for sharing water between the upstream reservoirs and the downstream reservoir. Previously the government has mostly managed reservoirs individually.

The outcomes of these studies were presented to senior water policy advisors and irrigation development corporation representatives at a one-week workshop in December 2017, in Mumbai. The workshop discussed the proposed Water Entitlements Framework and how to enhance basin management policies and governance. A key discussion topic at the workshop was how river basin models can be used to inform the development of new water management rules and policies.

eWater then hosted a visit to Australia by senior Government of Maharashtra officials to enhance understanding of the practical application of a science-to-policy framework in the Murray Darling Basin. The visit included federal, state and regional authorities, and a field trip including a visit to an irrigated farm and a conversation with the farmer.

Promoting Future Development:

eWater will continue to work with the Government of Maharashtra to promote basin wide planning, supported by robust, testable hydrological modelling. As skills build and capacity increases within the Maharashtra modelling team, the model will be used as a communication tool with multiple stakeholders. Increasingly complex policy options can be examined, leading to comprehensive river basin plans.