

Water Resources Information - a vision for 2025

Prepared by WMO's Commission for Hydrology

Information and Communications Technology (ICT) in 2025 will offer virtually unlimited possibilities for the management of information about water resources. The global community will have recognised the vital need for sound data and information as a basis for sustainable resource management, and will be working hard to enable all its members to benefit fully from ICT. The principal restrictions that remain will be caused by institutional limitations and a lack of trained staff. Staff training using distance education, enlightened approaches to the transfer of knowledge and technology, and assistance with institutional development are some of the ways in which remaining barriers to the fullest possible use of technology are being removed.

Modern ICT will be in use in every country, with water information systems that are designed for use there. They will be suited to the particular circumstances found in each country, and in particular will be relevant to its social, economic and environmental aspirations. Information about water resources will address a wide spectrum of topics, from groundwater availability through to indicators of water quality or the health of wetland ecosystems, and including measurements of demand and use, supply and replenishment. Water information - will be integrated fully with that on other relevant aspects of the environment, society, and the economy. The information systems will be delivering information to all the potential users - officials, elected representatives, members of the public, vulnerable communities, educational institutions, and so on. The users will receive information when and where they need it, and in forms in which they can best make use of it - without information overload. Accordingly, they will be able to make decisions swiftly and respond with confidence, while minimising the risks and costs of poor decisions.

Comprehensive systems for managing water-related information will integrate many ICT components, from real-time transmission of observations, through high-capacity computers for data archiving and analysis, to sophisticated decision-support systems. Decision support will be available not just to water professionals, but to anyone with a computer linked to the system, and will facilitate a high level of interaction and feedback. As a result, 'stakeholder participation' in decision making will have become an effective reality. The greatest limitation on comprehensive systems for managing and using water information still will be the availability of basic, quality-assured observations, carded out over long periods of time. Observations on-site are costly and, even when they use, automated sensors, demand a considerable input of skilled human labour, for calibration, quality control, and maintenance. Nevertheless, the use of robust field sensors and telemetric data transmission, as well as -remote sensing of hydrological conditions over a large area by satellite, will be supplying increasing volumes of high quality digital data. These will be input directly into the information systems, enabling information about current conditions, as well as forecasts, to be available in near-real time to resource managers.

National and regional information systems will be inter-linked, so that, in effect, a world-wide information base enables a hitherto unmatched ability to understand the global climate system and water cycle. This in turn will enable medium to long term (weeks to months) forecasts of extreme weather conditions - particularly droughts and seasons of above average precipitation or storminess - with levels of confidence approaching those presently achieved for short range (2-3 day) weather forecasts. Real-time transmission of water and weather information, in conjunction with highly developed computer models of weather systems and river catchments, similarly will provide quantitative forecasts of precipitation, floods and low flows whose accuracy allows mitigatory measures to be taken with confidence. These forecasts will be on time scales ranging from 2-3 hours (for forecasting flash floods in the steep rivers of small tropical islands, for instance) through to 1- 2 months (needed for water management in large continental rivers).