

# **HYDROLOGICAL SERVICES FROM WATER MANAGERS' PERSPECTIVE**

**by**

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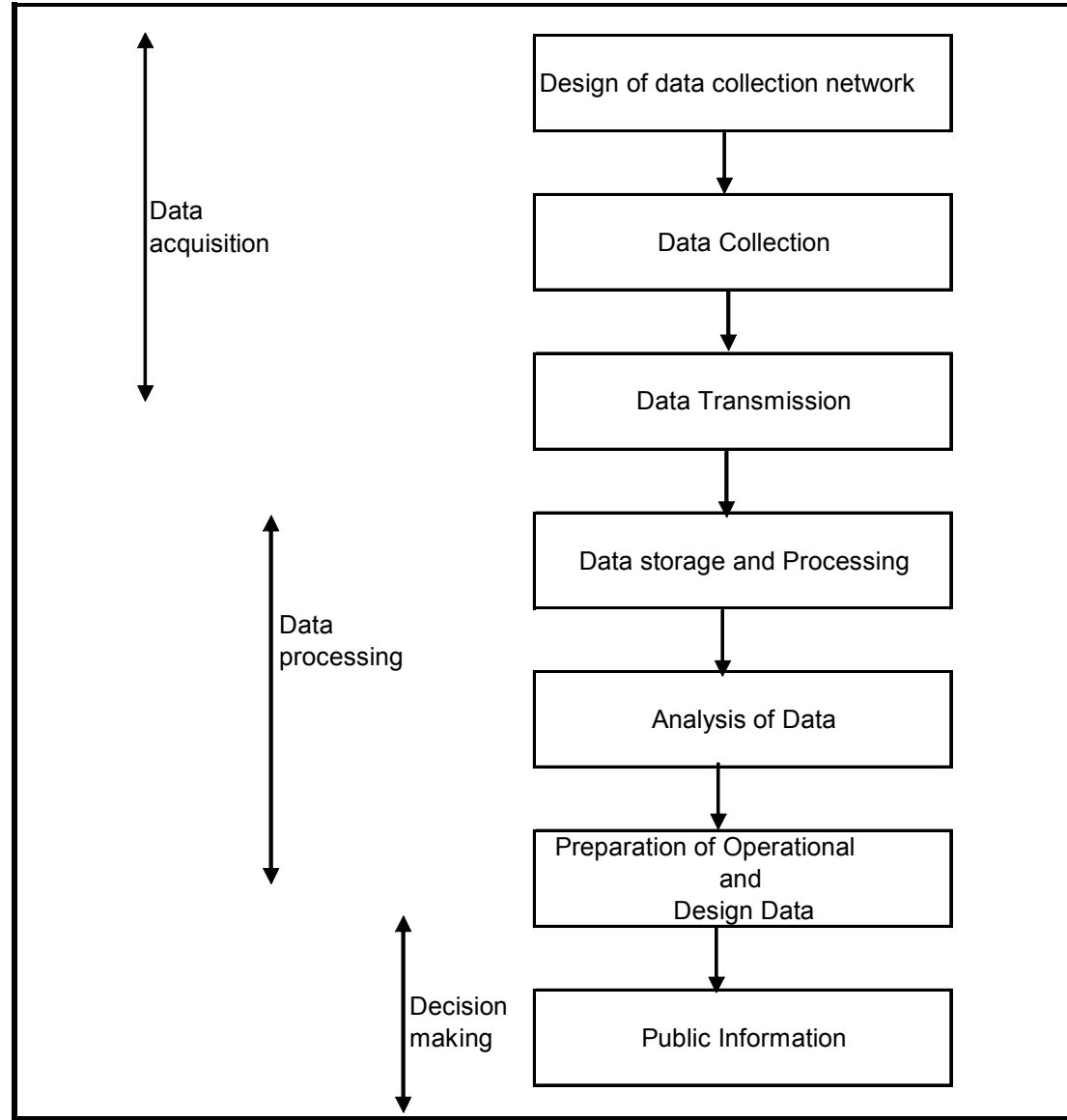
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## Plan of Presentation

- Functions of Hydrological Services
- Uses of Hydrological Data and Information
- Nature of Hydrological Products and Services
- Water Managers' Needs for Services
- Hydrological Products and Services for Water Managers
- Interaction Between Hydrological Service Providers and Water Managers
- Conclusion and Recommendations



Activities of a Hydrological Service

## **Uses of Hydrological Data and Information**

- **Assessing a country's/regions' water resources (quantity, quality, distribution in time and space), the potential for water-related development, and the ability to supply actual and foreseeable demand;**
- **Planning, designing and operating water projects;**
- **Assessing the environmental, economic and social impacts of existing and proposed water resources management practices, and adopting sound policies and strategies;**

## **Uses of Hydrological Data and Information** **(cont'd)**

- **Assessing the impacts on water resources of other non-water sector activities such as urbanisation, waste management, forest harvesting, etc.**
- **Providing security for people and property against water-related hazards such as floods, storm surges, droughts**

## **Nature of Hydrological Products and Services**

- A ‘Public Good’ is one that is **NOT**:-
- ***Appropriable*** – one cannot appropriate good for sole use;
- ***Excludable*** - cannot prevent other persons from using good once made available;
- ***Depletable*** – good is not “used up” by one person, always available for others

- **A ‘Private Good’ is:**
  - ***appropriable, excludable and depletable***
  
- **A ‘Merit Good’ or ‘Social Good’ may be a public or private good**
  - **regarded as having significant value to society at large**
  - **there is merit in providing it to everyone for social progress or equity, whether one can afford it or not**
  - **Eg. provision of flood warnings**

# **Water Managers' Needs for Hydrological Services**

**Water Managers need data, information and products for:**

- **water allocation;**
- **water utilisation;**
- **flood control**
- **expansion of existing facilities**
- **management of water projects/facilities (irrigation, water supply, hydro-power generation, flood control, etc.)**



## **Water Managers' Needs for Hydrological Services (cont'd)**

- **monitoring the environment (water quality, sediment transport, pollution/contamination loads, effluent discharges, wetlands, etc.)**
- **environmental impact assessments and environmental management plans**
- **reporting to environmental and other regulatory agencies**

## **Hydrological Products and Services for Water Managers**

- **product and service provision involve value-addition to data and information**
- **water managers require products and services, in addition to data and information, for decision-making**
- **product and service requirements are specific to water use and purpose**

## **Common data and information needs**

- **some data and information needs are common to water uses, these include:**
  - **mean daily discharge series**
  - **monthly and annual volume of streamflow series**
  - **low-flow frequency distribution**
  - **high-flow frequency distribution**
  - **frequency distribution of large-volume floods**

## **Common data and information needs (cont'd)**

- **shapes of typical flood hydrographs**
- **ice cover information**
- **sediment transport and load**
- **water quality**
- **precipitation distribution in space and time**
- **evaporation distribution in space and time**

## **User-specific needs of water managers**

### **❖ For Water Resources Managers**

- **Hydrological regimes of river catchments, catchment yields; aquifer yields and extents; aquifer recharge rates; streamflow forecasts; drought forecasts; statistical analyses of flows; trends; hydrological models; seasonal forecasts and outlooks; development potential of water resources; existing and projected demands for water resources.**
- **Forecasts are more useful if given with probabilities of exceedance or non-exceedance**

## ❖ **For domestic, municipal, industrial water supply managers**

- **Surface water quantity and quality (springs; streams, rivers, lakes); groundwater quantity and quality; pumping test results; aquifer recharge rates; streamflow forecasts; low-flow analysis; drought forecasts; statistical analyses of flows; trends; seasonal forecasts and outlooks; existing and projected demands**

## ❖ **Water Managers for Irrigation**

- **Precipitation; evaporation rates; hydrological regimes of river catchments (dry and wet periods), surface water yields; aquifer yields and extents; groundwater levels; aquifer recharge rates; flow volumes; drought forecasts; seasonal forecasts and outlooks; soil erosivity due to runoff (requires modelling); sedimentation rates.**

## ❖ **Water Managers for Hydro-power generation**

- **stage-discharge relationships of contributing streams to reservoirs; flow-duration curves; area-capacity curves; rule curves; tail water depth-discharge relationships; annual peak discharges to assess designed spillway risks; streamflow forecasts; flood forecasts; drought forecasts; statistical analyses of flows; flow trends; hydrological forecast models; seasonal forecasts and outlooks; weed infestation; sediment rates; evaporation losses from reservoir surfaces; minimum downstream discharge requirements.**



## ❖ **Environmental Water Managers**

- **statistical analyses of flows; trends; hydrological models; seasonal forecasts and outlooks; development potential of water resources; existing and projected demands for water resources; compensatory releases from reservoirs; environmental flows; instantaneous quality of water and trends; quantity and quality of effluent discharges; pollution/contamination loads; contributions to state of the environment reports.**

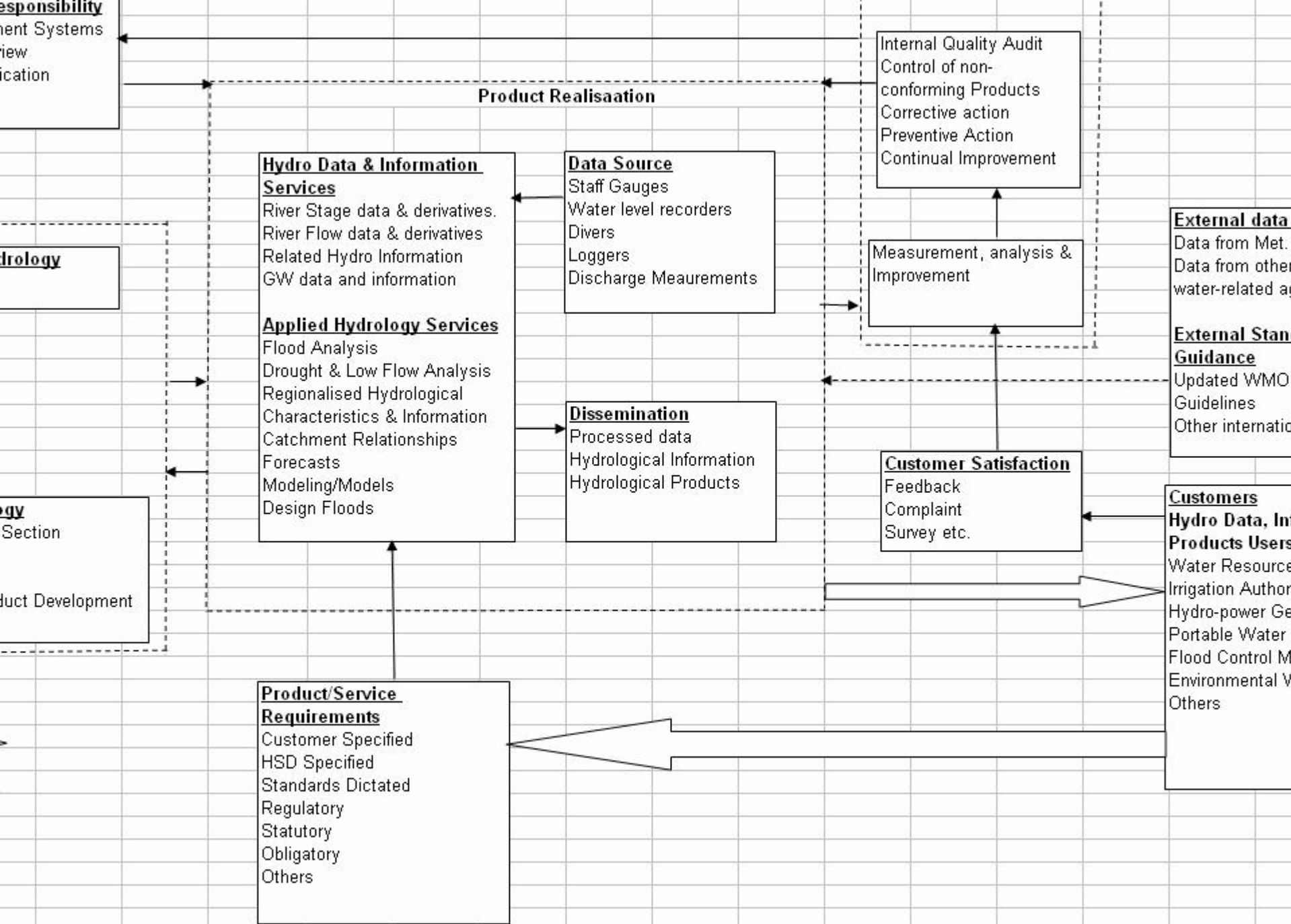
## ❖ **Managers of Flood Protection Structures**

- **flood forecasts and associated return intervals; depth-discharge relationships; assessment of capacity of downstream channels to cope with flood releases; flood plain maps; time series and statistics of heavy precipitations; flood series and their related precipitations; snow melt estimates; time lag between precipitation and runoff; flood routing and derivatives (eg. time to peak discharge, travel time of floods, attenuation, etc.); scour and sedimentation caused by floods.**

## **Interaction Between Hydrological Service Providers and Water Managers**

- **Water managers desire:**
  - ✓ **accurate, reliable quality-controlled data and information without missing records or where gaps occur, scientifically filled in;**
  - ✓ **accurately predicting or forecasting models, with minimum margins of error;**
  - ✓ **reliable, accurate, readily-usable and user-friendly products;**
  - ✓ **Updated products that take into account climate change effects.**

- **To be able to meet the requirements and expectations of water managers, hydrological service providers need to:**
  - ✓ **Interact with water managers to find out about their needs and expectations;**
  - ✓ **endeavour to obtain feedbacks from services provided to managers and other users;**
  - ✓ **endeavour to continuously improve upon services provided;**
  - ✓ **deliver services promptly and timeously**
  - ✓ **in short, introduce and implement quality management systems into their operations and practices.**



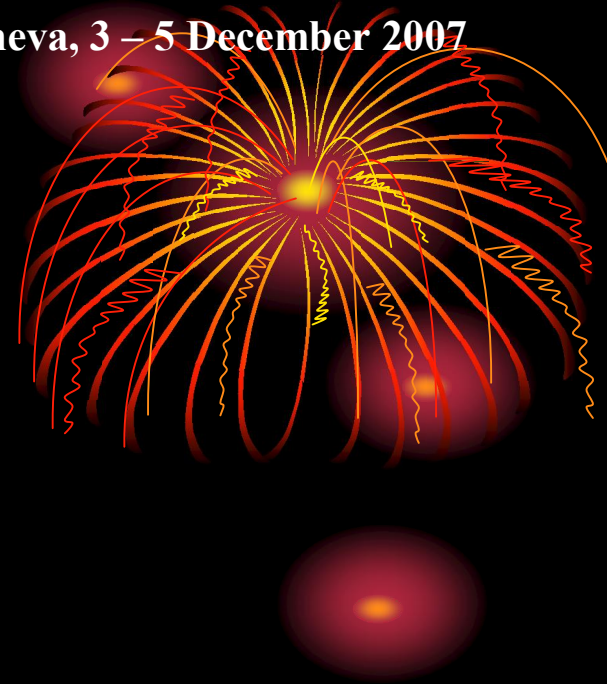
Hydrological Service Business Process Map

## **Conclusion and Recommendations**

- **Managers have general and common needs for data, information, products and services, as well as, specific needs to suit their purposes;**
- **Hydrological service providers need to meet and even exceed requirements and expectations of water managers;**
- **Hydrological service providers need to apply QMS in operations and aim ultimately at TQM;**

## **Conclusion and Recommendations (cont'd)**

- **Products and services should take into account climate variation and change effects;**
- **Routinely provide outlooks and general advisories on water to create greater awareness in provision of hydrological products and services;**
- **Keep in mind possibility of providing services for “*a futures market for water*” in the near future.**



***Thank You***

***&***

***A Happy Yuletide !!!***