BUILDING PUBLIC AWARENESS TOWARDS HYDROLOGICAL SERVICES

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Organizational Structure

- **Hydrometeorological service,**
  - a single national agency combining the Hydrological and meteorological service

- **National Hydrological Service**
  - A single agency responsible for most of hydrological activities in a country.

- **Hydrological services distributed among several national agencies,**
  - neither National nor Regional Hydrological or Hydrometeorological Service

- **Hydrological services are mainly under the jurisdiction of state or provincial governments**

  - Regional Hydrological or Hydrometeorological Service.

- *Note: this is not universal classification*

Roles of a National Hydrological Service

- **Main goal of a NHS**
  - meet the general requirement of all interests in the country, for hydrological information and services

- **Information& services used**
  - Water Resources assessment (including potential for water-related development and the ability to supply actual or foreseeable demands)

  - Assessing the environmental, economic and social impacts of water resources management practices, existing and proposed, and adopting sound policies and strategies.

  - Assessing the impacts on water resource of other non-water sector activities such as afforestation /deforestation

  - Providing security for people & property against water-related hazards, particularly floods & droughts

  - Informing and educating the public and decision makers.

  - forecasts and warning of hydrological extremes (flood & droughts) and design and operation of water-management structures

Activities of NHSs to generate needed information and services

- Establishing the **requirements of present and future uses** of information

- Designing and establishing **use-specific and basic hydrometric observing networks**

- **Developing methods for transferring information** from measurement sites to other locations

- **Collecting data and maintaining quality control** over data collection procedure

- **Processing the archived data** and maintaining control of the **quality & security of data**

- Making data **accessible to users** when, where and in the form that they require.

- **Inform potential users of the data and information** that are available and assisting them to make the best use of them.

- **Developing new technology** and **developing and training** staff

- **Carrying out research** into hydrological and related processes to assist users to interpret and understand the information

Hydrological Services to the Public

- **Water use**
  - withdrawal of water mainly from rivers, lakes and aquifer; and water supply for use in various socioeconomic sectors
  - **Domestic use**
  - **Agriculture (Food production)**
  - **Hydropower generation**
  - **Industrial use**
  - **Navigation**
  - **Fishing Industry**
  - **Recreation**

- **Water control:**
  - ensure **security for people & property** against water-related hazards e.g. floods & droughts

  - design of **flood protection works** such as
    - levees and dams
    - plain delineation and policies to regulate development within flood plains
    - erosion and sediment control works
    - storm water detention and diversion projects

  - provision of **forecasts and early warnings** of hydrological events on real-time basis to the community

- **Pollution control**
  - prevention of the spread of pollutions or contaminants in natural water bodies

  - determine the source and extent of pollution, how quickly and how far the pollution will spread and where the pollutants will ultimately end up.

  - Locating point and non-point sources of pollution, such as

    - landfills and channel waste damps
    - drainage or runoff of pesticides and fertilizers from agricultural lands

Emerging Issues and Challenges in Hydrology and Water Resources (Thematic Areas For Public Awareness Campaign)

- **Increasing need to sustain freshwater ecosystem while meeting the demands of human uses;**

- **Increasing adoption of IWRM as the framework for water management;**

- **Growing demand for a wider range of water-related information services (e.g. low flow forecasting)**

- **Impacts of Climate Change on Water Resources**
  - **floods and droughts are becoming more frequent, causing increased severe disasters**
  - **threatening governments' in meeting MDGs (e.g. poverty alleviation; and sustainable development targets)**
  - **problem of designing appropriate water management systems**
  - **destruction or loss of aquatic ecosystems.**

- **Competing uses of water**
  - Increasing demand for water has intensified competition and conflicts between and among sectoral uses

  - drought worsens situation in some countries

  - In future may have excessive water scarcity (increasing demand due to population growth, urbanization, agricultural expansion and industrial development)

- **Catchment Degradation**
  - population pressure precipitating poor land use practices

    - Cultivation on steep slopes,
    - clearing forests for agriculture, fuelwood, building
    - overgrazing exposing the top soil,

  - All altering surface runoff and infiltration rates, accelerating soil erosion and significantly affecting water resources.

- **Loss of Biodiversity**
  - **Improperly planned and managed water development projects**
    - **threaten the terrestrial and aquatic biodiversity.**
  - **Increased agricultural activities**
    - **threat to lake ecosystems (eutrophication)**
    - **fish kills due to reduced dissolved oxygen**

- **Uncoordinated water resources management**
  - **Inadequate coordination in developing a coherent water policy and institutional framework, resources development and protection, pollution control, and pricing has lead to**

    - **inefficient utilization of water resources,**
    - **weakened institutions and**
    - **occasioned the deterioration of water resources and water environment.**
    - **to a scenario where gaps and overlaps are not addressed while scarce resources are wasted.**

- **Water pollution**
  - Pollution exacerbates water scarcity because it limits use
  - Pollution may arise from
    - agricultural activities,
    - untreated or partially treated waste water from municipal waste water treatment plants
    - industrial effluent which injects significant heavy metals and other toxic substances into receiving waters
- **International waters**
  - have potential international implications and pose complex challenges.
- **Environmental issues**
  - Land use changes and water diversions for agriculture, have been major drivers of the degradation and loss of ecosystem
    - river and groundwater are depleted with consequent
      - degradation of downstream aquatic ecosystems, including wetlands, estuaries and coastal ecosystem;
      - pollution from overuse of nutrients and agrochemical affecting aquatic ecosystem and human health; and
      - loss of natural resource base affecting peoples livelihoods

- **Water Management and Allocation**
  - **making difficult choices and learning to deal with tradeoffs such as**

    - **Water storage for agriculture – water storage for environment;**
    - **Reallocation - overallocation;**
    - **Upstream – downstream (development upstream will affect downstream in a river basin, often without discussion);**
    - **Equity - productivity; and**
    - **This generation - The next one**

  - **Allocation of water resources should be a process involving all stakeholders**
    - **To foster social action and public debate**
    - **To share knowledge and information equitably (to empower stakeholders through better awareness and understanding)**

Public Awareness Campaign towards Hydrological Services

- **Above issues/challenges form thematic areas for public awareness campaign**

- **The aim is to**
  - **inform and educate the public and users** on these issues
  - **enhance user awareness** of the services available and how they can be accessed;
  - **enhance user understanding** of the information and services presented; and
  - **user faith** so that they can act on the information received.

- **Desired Results**
  - **behaviour** or **attitude** change
  - **strengthened links** between the hydrologists & water managers and users
  - individuals, communities and organizations **can make effective use of the available** hydrological information and services.

Mode of Building Pubic Awareness Campaign

- **Public education programme**
  - **associated with learning within the formal education system,**
  - **products or services**
    - **education material about hydrology, Water Resources, etc**
    - **curriculum development and**
    - **support for educators (not aimed at professional)**
- **Outreach programme**
  - **provision of community services**
    - **involves short-term contact with members of the public and other users of hydrological services**
    - **To provide information, raising awareness and exciting interest**

Steps to develop public awareness campaign programme

- **Initiate the programme by defining the**
  - **– driving forces, goals, and objectives;**
- **Identify and analyze the target audience;**
- **Create the message;**
- **Choose the strategy;**
- **Package and distribute the message;**
- **Implement the programme; and**
- **Evaluate the programme**

- **Driving forces**
  - forces that are driving the need for public education and outreach programme (public awareness campaign) and

    - help in determining the scope of the programme and
    - provide a clear focus for it as to what is required to get it done
- **Suggested driving forces**

  - Alleviation of poverty and disease;
  - Protection against natural disasters;
  - Water conservation and reuse;
  - Sustainable urban development;
  - Agricultural production and rural water supply;
  - Protection of aquatic ecosystems;
  - Resolving waster conflicts;
  - The enabling environment;
  - The knowledge base;
  - Capacity building;
  - Sustainability of water resources management and development for the benefit of entire human society and future generation.

- **Goals**:
  - **General statements** [aims or mission statements] that express the broad focus of your effort (what you hope to accomplish) and

    - they **create a setting of what you are proposing.**
    - **Goals should link back to the driving forces**,

  - **Goals aim at bringing changes in**
    - **behavior, attitude, knowledge or understanding**.

- **Suggested goals**
  - Capacity building in
    - human resources development;
    - information base& know-how;
    - institutional & legal arrangements;
    - public awareness;
  - institutional and financial framework in support of water assessment; collection and archival of water-related information;
  - assessment of the resource and dissemination of water information;
  - create public awareness on impact of climate change and variability on freshwater resources and the hydrological cycle;
  - increase awareness on the impact of a sea-level rise from climate change;
  - water resources protection and conservation;
  - water pollution prevention and control;
  - protection of groundwater;
  - protection of aquatic ecosystems and freshwater living resources;
  - efficient and equitable allocation of water resources;
  - protection against depletion and degradation of water resources;
  - enhanced access to water, sanitation and waste disposal;
  - minimized health impacts from urban water resource management;
  - integrated rural water management for sustainable development.

- **Objectives:**
  - **The objectives indicate how the goals are to be realized.**
    - They should be specific, measurable, action-oriented, relevant and time-focused (SMART).
  - **Several objectives are developed for each goal to be achieved.**
  - **The desired outcomes are considered when formulating the objectives.**
    - e.g. is outcome to create awareness, provide information or to encourage action among the target audience?
  - **SMART objectives help**
    - to identify specific tasks and
    - to evaluate whether one has achieved the objective.
  - **Specific objectives for goals listed above can be developed.**

- **The target audience**:
  - people you want to **reach with your message** or **whose behaviour or attitudes** the public education and outreach programme is attempting to change.

  - Can be grouped into **four common groupings** based on:
    - **Geographic location** (e.g. region, district)
    - **Demographic characteristics** (e.g. gender, age, organizational affiliation, ownership of property)
    - **Occupation** (e.g. farmers, fishermen, students, educators)
    - **Behaviour patterns** (e.g. people who do not heed to warnings)

- **Create Message**:
  - messages are designed to **raise general awareness, educate, or motivate action.**

  - To **be effective** it must
    - be **understood** by the target audience and
    - **appeal** to the people on their own terms.

      - message must be **clear, specific, and tied directly to something the target audience values** and
      - also should **articulate what actions they are supposed to take**.

  - The **message for behaviour or attitude change** of the audience, could be developed such that:

    - It **affects emotions in order to provide motivation** for change of behaviour or attitude
    - It **highlights individual benefits associated** with taking the desired action and consequences of not acting
    - It **builds upon the existing behaviour**
    - It **proposes actions which are relatively low cost** in terms of time, energy, money and materials and avoid actions requiring a lot of steps or training.

- **Choose the strategy**:
  - Strategy deals with the mode of reaching the target audience.
  - The key strategies that can be employed are:
    - Electronic and print media (radio, television, newspapers)
    - Conduct seminars, workshop, visits and training courses
    - Organizing public events (open days to public)
    - Use special events such World Water Day
    - Holding meetings at community levels
  - Make strategies
    - are appropriate to your target audience and
    - Must be clear what each strategy will achieve.

- **Package and distribute the message:**
  - The **format used should** be appropriate for the target audience.
  - **Factors that influence the format** of the message in terms of **content, language and presentations** are:

    - Size, geographical distribution, age and educational background of the target audience
    - Existing level of awareness of the audience
    - How the target audience normally receives information and their preferred formats & learning
    - How the target audience will access the information and frequency of access
    - Availability of existing formats or materials that can be used directly or adapted.

- **Programme Implementation:**

  – **It is action plan and contains information such as**

    - **risks and mitigation,**
    - **what needs to be done (problem/need),**
    - **when it should be done (plan period/timeframe),**
    - **who should do it (includes stakeholders/partners),**
    - **where to do it (locale),**
    - **why do it (objectives/goals/targets)**
    - **how to do it (strategies/procedures/methods).**
    - **a set of inputs (activities and the resources required-staff, financial, &others) and**
    - **outputs (immediate results to be obtained from proper use of the inputs).**

- **Programme Evaluation:**
  - **To be incorporated in the plan from the beginning**
    - **helps in assessing the programme success.**
    - **provides a feedback mechanism for ongoing improvement of your outreach effort.**
  - **The types of evaluations are:**
    - **Process evaluation:**
      - **Focuses on implementation activities and allows for modification or adjustments to the implementation plan depending on findings**
    - **Impact evaluation:**
      - **Focuses on how far the original objectives have been realized.**
    - **Participatory evaluation process:**
      - **Focuses on the extend of involvement of the stakeholders**

Conclusions/Recommendations

- **Building public awareness towards hydrological services to include both public education and outreach progrmmes.**

- **As a start, it is recommended to have pilot projects:**

  - **Pilot project on the Public education be initiated, with driving force**

  "Creating awareness on and understanding the 'Natural Water Environment'- Hydrological Cycle"
    - **targeted : formal education system (primary and secondary schools).**

  - **Pilot projects on the outreach programmes be initiated having**

  "Poverty alleviation" (or any of the above listed driving forces), as the driving force
    - **Targeted: policy and decision makers and the community living in a region (watershed, district, etc)**

- **The success of such pilot projects would then be duplicated in other areas or regions.**

THANK YOU