

# Senior Public Servants and the Management of Water Resources.

**Foundation Course** 

(Dr. MCR HRD, Hyderabad)

#### Outline of the Module on Water resources

#### Session – 1

- a) Significance of Water resources
- b) Economic and social dimensions of water as a natural resource
- c) Legal and Policy framework of water management in India

#### Session-2

- d) Institutional structure for water management
- e) Composite Water Index
- *f) Transboundary Issues, Disputes Resolution and Conflict management*

#### Session- 3

- g) Management of Water Sector Projects & Challenges involved
- h) Resource Conservation vis-à-vis Augmentation
- *i)* Towards a sustainable solution

# Session-1 Significance of Water resources

#### Introduction

- Water an important ingredient for life on planet earth;
- Role (individual and official capacity) of Senior Public servants in the management of water resources;
- Global Water resources though abundant are finite;
- Management of freshwater resources is the key challenge;
- Temporal and spatial variations add to complexity;
- Resource availability Is India water stressed ?

### Significance of Water Resources

- Water has enormous social, economic, political and Environmental importance;
- Harnessing productive potential and limiting its destructive potential is a challenge;
- Common property, open access resource with the free-rider problem;
- Every organism, individual, and ecosystem on the planet depends on water for survival.
- Poor water management leads to diseases, malnutrition, reduced economic growth, social instability, conflicts and environmental disasters.

## **Spatial variation of Rainfall In India**



# Temporal variation of Rainfall In IndiaMonthPercent of AnnualAverage Rainfall

Jan	1.24
Feb	1.33
Mar	2.12
Apr	3.46
Мау	6.03
Jun	15.42
Jul	23.76
Aug	19.89
Sep	14.19
Oct	7.69
Nov	3.45
Dec	1.42



# Major River Basins of India

#### Harnessing of water resources

- Right to water is indispensable for leading a life of human dignity;
- > A prerequisite for the realization of other human rights;
- The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and other uses;
- Prosperity and prospect of society depends on availability of fresh and unpolluted water.
- Knowledge of Hydrology and understanding the water cycle in it's natural form is important;

# Hydrological Cycle



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- It describes the continuous circulation of water throughout our environment as it moves from the oceans, to the atmosphere and to the land, eventually returning to the oceans.
- > It is driven by energy of the sun and gravity of the earth,
- > The hydrologic cycle consists of four key components
  - 1) Precipitation (Rain)
  - 2) Runoff
  - 3) Storage
  - 4) Evapo-transpiration

# **Global water situation**



# Water resources - India



## Importance of Water resources – Indian Situation

Rainfall [Not harnessed]Surface water [Polluted]Groundwater [Depleted]

Agriculture →
Health & Environment →

• Consumption  $\longrightarrow$ 

# SCARCITY

- Industrial Growth →
- Water Business →
- Service Sector —>

- Population  $\longrightarrow$
- Demand  $\longrightarrow$
- Future  $\longrightarrow$

## **Doctrines of Rights over Water Resources**

- ➢ Rights of Riparian;
- Prior apportionment;
- Territorial Sovereignty (Harmon Doctrine);
- Commonality of interest;
- >Equitable apportionment;

# Myth or Reality

- Water scarcity lead to wars;
- > Water is a free resource- that should not be charged;
- > Charging of water entails political cost;
- > Water should not be lifted, gravity flow is sufficient;
- > Need more water to produce more food grains.

# **Economic and Social Dimension**

#### Valuation Dilemma

- In most states water and power for agriculture is free or almost free
- Domestic charges depend on uses; the more one uses higher is the slab rate;
- Industries provide cross subsidy for both power and water;
- Volumetric, non-volumetric and market based methods;
- Pricing of urban water usually decided at the willingness to pay method.
- No objective criteria, pricing of water resources is done on political consideration.

- Basis of Initial allocation of water rights;
- Water as a flowing resource adds a different perspective to delineation of the property rights;
- Concerns of equity, access and affordability;
- Mechanism to use or trade water rights;
- Regulate uses that generate externalities;

### **Social Dimensions**

- Principles of allocation, access and affordability of water for all (delinking of water access and use from land control);
- Should there be different standards for urban, rural; rich and poor; and male, female?
- > Meeting inter-sectoral requirements in view of competing demands.
- Equity or efficiency in the management of water resources;
- Role of institutions supporting efficient bargaining and enforcing binding agreements;
- Supply augmentation (engineering centric) and multi-disciplinary approaches;

# Legal and policy framework for water management in India

#### Framework Before Independence

- Government of India Act, 1919 irrigation became a 'provincial' but 'reserved' subject;
- Government of India ACT, 1935- again placed irrigation in 'provincial' list. However, sections 130 to133 dealt with inter-provincial disputes concerning water; the Governor General was required to appoint a commission to investigate and report to him on important matters; the order of the Governor General was binding on all parties;

#### List-I (Union List-Schedule VII) - Entry No.56

"Regulation and Development of Inter State Rivers and River Valleys to the extent to which such regulation and development under the control of the Union is declared by Parliament by law to be expedient in the public interest."

#### List - II ( State list-Schedule VII ) - Entry No. 17

"Water, that is to say, water supplies, irrigation and canals, drainage and embankment water storage, water power, subject to the provisions of entry No 56 of List 1"

#### **Further Provisions**

#### Article 262 – adjudication of water disputes

Provides for the adjudication of disputes relating to the waters of Interstate rivers or river valleys.

Article 262 (1)Article 262 (2)Parliament may by law provide for the<br/>adjudication of any<br/>complaint with respect to the use,<br/>distribution or control of the waters of<br/>or, in any Interstate-Rivers or<br/>NiverNotwithstanding<br/>Notwithstanding<br/>constitution, Parliament<br/>provide<br/>that<br/>neither<br/>the<br/>Supreme<br/>distribution in respect of<br/>any<br/>or, in any Interstate-Rivers or<br/>RiverArticle 262 (2)Parliament may by law<br/>constitution, Parliament may by law<br/>constitution, Parliament may by law<br/>for the use,<br/>provide<br/>that neither the Supreme<br/>distribution or control of the waters of<br/>court nor<br/>any other Court shall<br/>or, in any Interstate-Rivers or<br/>River<br/>such dispute or<br/>complaint as is

referred to in clause (1)

#### Inter State River Water Disputes Act (1956)

- Most major rivers and some of their tributaries in India are inter-state;
- By virtue of the Authority given by Article 262, the Inter-State River Water Dispute Act has been enacted in the year 1956 :
  - adjudication of disputes, involving the use, distribution and control of the Inter-state River waters.
  - exclusion of the Jurisdiction of all Courts including the Supreme Court of India in this matter.
  - Delayed adjudication and weak enforcement;

Amendment of 2002 – any dispute settled by a Tribunal before ISWD Amendment Act 2002 shall not be reopened.

Tribunal	Date of Constitution of Tribunal	Date of Award	States concerned	Status
KWDT-I	April 1969	May 1976	Maharashtra, Karnataka, Andhra Pradesh	Dissolve d
Godavari	April 1969	July 1980	Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh, Orissa	- Do-
Narmada	October 1969	December 1979	Rajasthan, Madhya Pradesh, Gujarat, Maharashtra	- Do-
Ravi Beas	1986	1987	Rajasthan, Haryana & Punjab	Active
Cauvery	June 1990	Febrauary 2013	Karnataka, Kerala,Tamil Nadu and union territory of Pondicherry	Dissolved
KWDT-II	April 2004	December 2010	Maharashtra, Karnataka, Andhra Pradesh	Active

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Vamsadhara	June 2009	5(2) Report – Sep, 2017	Andhra Pradesh, Orissa	Active
Mahadayi	November 2010	5(2) Report — Aug, 2018	Goa, Karnataka and Maharashtra	Active
Mahanadi	2018	Pending	Odisha and Chhattisgarh	Active

- Upstream downstream that recognizes that each water use or water user potentially impacts on all the other uses and users;
- Institutional dimension to consider allocation, planning, regulations, implementation, monitoring and enforcement etc;
- Provision of services to different water uses and users to provide a reliable level of service to encourage productive water use;
- 'Diversion of water from surplus to deficit areas' or 'virtual water'
- National Water Policy various variants 1987, 2002, 2012 and draft policy of 2019;
- > The Water (Prevention & Control of Pollution) Cess Act 1977;

#### Water Allocation Priorities

- Drinking water;
- Irrigation;
- > Hydropower
- > Ecology
- > Agro-industries
- > Non-agricultural industries
- Navigation and other uses

## Policy framework in India

- need for a National Water Framework Law;
- optimum development of inter State rivers and river valleys to facilitate inter-State coordination ensuring scientific planning of land and water resources taking basin/sub-basin as unit and ensuring holistic and balanced development of both the catchment and the command areas.
- Enable establishment of basin authorities, comprising party States, with appropriate powers to plan, manage and regulate utilization of water resource in the basins.

#### **Ultimate Objective**

- Har khet ko pani, more crop per drop and doubling the income of farmers irrigation is to be provided in a cost effective and time bound manner;
- Water is valuable and water lifted is more so. Storage, pumping, distribution and on farm water use efficiency is needed.
- to supply water on demand for different crops at the desired quantity, rate and times to various users at the most efficient prices keeping in view capital and O&M costs of the autonomous water infrastructure.

#### Quantitative and Qualitative aspects

#### **Quantitative aspects:**

- Imbalances in demand and availability of water due to temporal and spatial variability, excessive and inefficient use, over exploitation and inequal access cause water stress and scarcity.
- > Water scarcity could be physical, economic and institutional.

#### **Qualitative aspects:**

- Defined as "those physical, chemical or biological characteristics of water by which the user evaluates the acceptability of water".
- A scientific rationale, on which decision or judgment on the suitability of water quality to support a designated use is based, is called water quality criteria.

#### Quantitative and Qualitative aspects - issues

#### Water Availability:

- The average annual per capita water availability in the years 2001 and 2011 was assessed as 1816 cubic meters and 1545 cubic meters respectively which may further reduce to 1486 cubic meters and 1367 cubic meters in the years 2021 and 2031 respectively.
- As per of National Commission for Integrated Water Resources Development (NCIWRD), 1997-98, the percentage of water used for irrigation out of the total water use was 83.30%. Further, for the year 2025, it was estimated as 72.48%.
- Uncontrolled deforestation
- > Neglect of traditional practices and systems, including rain water harvesting
- Inadequate integrated water management and watershed development.

### Water Pollution

#### Surface water contamination:

- > Massive bacteriological and chemical contamination.
- Growing urbanization and industrialization have increased the pollution load discharged into the Rivers resulting in loss of the river's assimilative capacity.
- > Eutrophication, Oxygen depletion & Ecological health.

#### **Groundwater contamination:**

- *Ground water contamination due to iron, arsenic, fluoride and nitrate.*
- > Also due to industrial effluents & Sea water intrusion.