# Indian Rivers and Water Resources

Rivers: Himalayan and Peninsular categories

Drainage shaped by Himalayas, Plateau, Indo-Gangetic Plains

Water vital for domestic, agriculture, industry

Challenges: pollution, droughts, floods

Need sustainable, equitable water use

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# Himalayan Rivers – Lifelines of North India

## Major Systems

- Indus
- Ganga
- Brahmaputra

## Characteristics

- Originate from glaciers
- Perennial flow
- Flow north to south

## Tributaries

- Indus: Jhelum, Chenab, Ravi, Beas, Sutlej
- Ganga: Bhagirathi, Alakananda
- Brahmaputra: Tsangpo in Tibet

# Peninsular Rivers – Fixed Courses, Seasonal Flow

## Flow Patterns

Mostly non-perennial, fixed straight paths

## Water Divide

Western Ghats separate east and west flowing rivers

## Major Rivers

Godavari, Krishna, Mahanadi, Cauvery (to Bay of Bengal)

## West Flowing Rivers

Narmada and Tapati flow to Arabian Sea

# Water Use in Agriculture and Villages

## Crop Moisture

Rainwater and irrigation supply moisture

## Soil Moisture Balance

Too much causes flooding, too little causes drought

## Village Water Sources

Groundwater via wells and tube wells

## Water Stock vs Flow

Storage and inflow/outflow difference is key

# Water Use – Domestic, Industrial, and Conflicts

## Domestic Use

- Drinking, cooking, washing, animals

## Industrial Use

Competes with agriculture and domestic needs

## Water Availability

Varies by region and storage types

## Conflicts

Upstream vs downstream, urban vs rural

# Case Study – Tungabhadra River Basin

### Shared by Three States

Karnataka, Telangana, Andhra Pradesh

### Rainfall Variation

Upper basin wetter, lower basin drier

### Environmental Issues

Encroachment, deforestation, mining reduce water

### Dam Storage Loss

Siltation reduces Tungabhadra dam capacity

### Crop Impact

High water-demand crops worsen crisis

# Hiware Bazar – A Model of Water Conservation

## Location

Drought-prone Ahmednagar, Maharashtra

## Conservation Measures

Bans on tree-cutting, grazing, borewells

## Water Harvesting

Check dams, trenches, percolation tanks built

## Crop Planning

Based on rainfall and water availability

## Results

Higher productivity, less migration, better livelihoods

# Groundwater – A Common Pool Resource

### Connected Resource

Groundwater not limited to land ownership

### Over-extraction Effects

One landowner affects neighbours' wells

### Legal Flaws

Current laws link water to land ownership

### Management Need

Collective control like air or roads

### Proposed Solution

New laws and Panchayat-level control

# Law, Policy, and Public Participation

### Outdated Laws

Water laws need reform

### Case Example

Coca-Cola vs Perumatty Panchayat, Kerala

### Water as Right

Should be treated as human right

### Priority

Drinking water and sanitation essential

### Community Role

Community-led initiatives ensure sustainability

# Conclusion – Towards Sustainable Water Management

## Understand Water Cycle

Inflow, outflow, and stock management

## Learn from Examples

Tungabhadra crisis and Hiware Bazar success

## Key Actions

- Equitable sharing
- Crop choice
- Conservation

## Future Focus

Water as common resource for generations

## Need

Laws, awareness, responsibility from local to national