

Water and Biodiversity- An Economic Perspective

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Water as an Economic Good

- Dublin Principles
- Scarcity of Water requires allocation based on value
- Valuation and Pricing of Water in Different Sectors
 - Agriculture
 - Industry
 - Drinking
 - Ecosystems/Biodiversity
- In some cases, recovery through pricing provides revenues for the state.

Available Water Resources in India

Utilisable Surface and Ground water 1100 BCM

Percapita availability (2001)	1100 cubic meters per year
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Percapita availability (1947)	3000 cubic meters (1947)
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Agricultural Requirement	80-85%
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Agricultural Use

- * Predominant Water Use in Agriculture
 - Agricultural use is highly consumptive (75-80%)
 - Very little return flow to rivers
- * Scope for extending irrigation is limited
- * River flows are affected by excessive withdrawal
 - Environmental Flows cannot be maintained
 - Potential for dilution / assimilation affected
 - Estuaries will have inadequate fresh water
- Value of Water in agriculture is very low

ECONOMIC VALUE OF IRRIGATION WATER USE

- * Traditional Assessment:

- Return on Irrigation Infrastructure Cost
- Charges based on O & M cost

(Vaidyanathan Committee)

- Not based on value of water

- * Value of water in agriculture

- net value of crop output per unit of water
- Crop per drop / Water Productivity

- * Quantity of water used: 462 cubic Km or 462 BCM
In irrigation

- Economic Value : Rs.46,200 crores per year @ Rs.1 per cubic metre

CASE STUDY

<u>Case Study</u>	<u>Net Value of Crop Output / cubic metre</u>
Haryana	Rs.0.86
Subarnekha	Rs.1.22

Source: Rogers, Bhatia and Huber (1998).

- * Typically value of irrigation water is Rs.1 per cubic metre
- * Urban consumers purchase water from vendors at Rs.25-50 per cubic metre
- Farmers prefer to sell water to other users rather than raise crops

DRINKING WATER REQUIREMENT

Provide rural supply	(40 lpcd)	11 BCM
urban supply	(100 lpcd)	11 BCM
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		22 BCM 2.2%
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- Physical scarcity is not the problem
- Social cost of transport, storage, purification and distribution
- Rajiv Gandhi Drinking Water Mission (Rural)
- Jawaharlal Nehru Urban Renewal Mission (Urban)

Water Supply Options for Chennai

- Existing Sources – Tanks/Reservoirs
 - Krishna River/Veeranam Tank
 - Local aquifers (farmers willing to sell)
 - Recycled Sewage
 - Desalination of Seawater
- high cost

Water Tariffs/Charges

- Irrigation Water Charges-Area/Crop based
- Ground Water Extraction-Electricity charges
- Drinking Water – Domestic Consumer Tariff
- Industrial Water – Industrial Tariff
 - Water Cess (PCB)

Other Economic Instruments

- Eco-taxes (on products or inputs)
- Subsidies
- Payments for Ecosystem Services
 - Protection Forests/Wildlife
- Tradable permits (GHG)

Water Markets

Markets reveal price preference of consumers/users especially during times of scarcity

- Sale of Water through Tankers
- Sale of Water / Irrigation rights to State
- Bottled Water
- Purchase of wastewater by industry

Water and Biodiversity

Ecosystems:

- Forests/Vegetation (Green Water)
- Wetlands (Blue Water)
- Coastal/Estuaries
- Riverine Ecosystems (Blue Water)

Reasons for Valuation

- Missing Markets
- Imperfect markets and failures
- Alternative uses of bio resources
- Conservation of natural resources
- Green Accounting

Wetland Ecosystem Services

Ecosystem is the stock of natural capital,
Ecosystem Services are the flows (benefits) from
the stock

- Provisioning – Food, Freshwater, Fibre and Genetic material
- Regulating – Hydrological Regimes, Pollution Control, Protection against Natural Hazards
- Cultural – Spiritual, Recreational

ECONOMIC VALUATION

Sl.No.	Benefit	No. of Observation	Economic Value (Rs./ha) at 2011 prices
1	Fish	10	9,616
2	Fodder	4	11,350
3	Vegetation	9	2,258
4	Agriculture	4	12,913
5	Water	5	18,233
6	Recreational	6	5,18,859
7	Water Purification	2	2,469
8	Ground Water Recharge	1	38,798
9	Existence Value	6	2,18,461

TEEB – India Report (2012)

THANK YOU