

# Charting a New Course

A Strategy for Sustainable Management of  
India's Water Resources in the 21st Century

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# Why is a new, Integrated approach needed?

- ◆ **In order to respond comprehensively to long-term challenges (the goals of water policy and management have changed over time – as elaborated in our book)**
- ◆ **In the last century, focus was on food production and hydro power. Challenges more complex for 21<sup>st</sup> century - increase in population, urbanisation, greater demand from industry, etc.; pollution and environmental aspects**
- ◆ **Too many departments involved in handling water resources, with little coordination, will not work**
- ◆ **Without an integrated approach (slide 4 below) it will be very difficult to deal with the complex challenges and to deal with 1 billion users and stakeholders**

# The Strategy - Key Suggestions

- 1. River basin approach to planning water use – RBOs as representative plus technical bodies**
- 2. Based on scientific and accurate information**
- 3. Regulate (at multiple levels) the allocation and pricing of water for different uses. RBOs will do this, or Public Regulatory bodies (till RBOs set up)**
- 4. New principles of water sharing have to be evolved [suggestions below]**
- 5. Restructuring of water resources department in the states for integrated planning [See chart 2]**
- 6. Involvement of CBOs – to be set up everywhere (total no. 7 lakhs) for this purpose [See table 2]**
- 7. Demand management – install systems for recycling and reuse; and increase irrigation efficiency**

# What does 'Integration' mean?

## Types of integration within a river basin:

- ◆ **Between rainfall, surface water and ground water.**
- ◆ **Between different uses based on environmentally sound principles.**
- ◆ **Between water harvesting structures for use of water and recharge of ground water to high dams on the main rivers.**
- ◆ **Transfer of water from bigger to smaller structures, when needed.**
- ◆ **Between land use (including forestry & agriculture) and use of water. Integrated land and water use policy for the whole country is needed.**

# River Basin Organisations - 1

- ◆ **Water availability, planning and use should be considered in an integrated way in each river basin. States should have a water resources department with wings for each river basin (see accompanying charts):**
  - **RBO: River Basin Assembly (RBA) + Technical Support Wing**
  - **River Basin Assembly (RBA) to consist of representatives from watersheds, WUAs, RWAs, Industries and other interests representing all other water users**
- ◆ **After river basin planning based on accurate assessment of water resources, and recycling/reuse wherever possible, the following may be considered on a case to case basis:**
  - **Desalination of brackish sea-water**
  - **Inter-basin transfer of water (if surplus water is available in a basin and other conditions are favourable)**

# River Basin Organisations - 2

- ◆ **Functions of RBOs: Allocation of water among different uses, pricing for different uses, laying down of rules and monitoring of water use in the basin (Till RBOs are set up, Regulatory Bodies will carry out these functions)**
- ◆ **RBOs: Advisory role in some matters like suggesting cropping patterns**
- ◆ **RBOs (for bigger, inter-state river basins) will be set up jointly by concerned states by mutual agreement**
- ◆ **RBOs can help in smooth resolution of inter-state and other water related conflicts**

# Regulatory Functions to be carried out by RBOs or Public Regulatory Bodies

- ◆ **Regulation of groundwater levels, upper and lower limits, on advice of hydrological experts.**
- ◆ **Regulation of downstream releases.**
- ◆ **Regulation of forest and tree areas.**
- ◆ **New industrial units to be set up.**
- ◆ **Regulation of cropping patterns (advisory). Export of water intensive crops means export of water and should be avoided.**
- ◆ **Pricing of water for different uses (in different areas).**

# Multiple levels at which regulation will be done

- ◆ **Lowest level: Gram Sabha or Village Water Committee under panchayat (1000 ha)**
- ◆ **Sub-watershed level (10,000 ha)**
- ◆ **Watershed level (50,000-1 lakh ha) (corresponds to district level)**
- ◆ **Full river basin level (RBO)**
- ◆ **Till RBOs can be set up, autonomous regulatory bodies at multiple levels will have to be set up**

# Proposed Principles and Assumptions for Allocation/Sharing of Water - 1

- 1. Sharing based on population density, including animals, estimated for 2050 (Stabilisation of population and urbanisation expected by then)**
- 2. Water availability/utilisation in 2050 at 90 % dependability (surface, groundwater and all storages)**
- 3. 100 lpcd water for domestic consumption and sanitation**
- 4. In urban areas separate allocation for industrial and commercial use**
- 5. In rural areas separate allocation for cultivated area, rainfed area and ground water recharge**

# Proposed Principles and Assumptions for Allocation/Sharing of Water - 2

- 6. Norms to vary for different rainfall zones**
- 7. Industry, commercial and large establishments should be mandated to provide 30-50 % of their water requirement by roof top water harvesting, recycling and reuse**
- 8. Community can decide on usage of water allocated, but should not use water allocated for downstream users**
- 9. The various factors to be reviewed after every population census**

## Total average annual availability of water

01.	Annual average rainfall	1170 mm
02.	Utilisable surface water	690 BCM
03.	Rechargeable annual ground water	433 BCM
04.	Total utilisable water	1123 BCM
05.	Population (2006)	1100 Million
06.	Estimated population (2050)	1600 Million
07.	Per capita water availability (2006)	1000 CUM
08.	Per capita water availability (2050)	700 CUM
09.	Urban population (2006)	33 Per Cent
10.	Urban population (2050)	60 Per Cent
11.	Storage of major and medium projects (2050)	3.9 BCM
12.	Storage in soil, water harvesting would be extra	---
13.	Net sown area (1991-2001)	141 Mha
14.	Net sown area (2003)	133 Mha
15.	Average food production (2000-2006)	210 Million Ton
16.	Rainfall zones at present	10-750 mm 750-1500 mm Above 1500 mm
17.	Per capita, 90 per cent probability, water availability (2050)	500 CUM 1370 lpcd
18.	Variability in 3 rainfall zones	250-1000 CUM 700-2700 lpcd

BCM - Billion Cubic Meters, CUM - Cubic Meters, Lpcd - Litres per capita per day

Sources: Central Water Commission; GOI, Ministry of Agriculture, Agricultural Statistics at a Glance, Nov. 2005; and Authors' estimates.

# Benefits of Suggested System

- ◆ **Better assessment of usable water resources based on principles of water sharing on objective criteria**
- ◆ **Water sharing and allocation task on an ongoing basis**
- ◆ **Involving communities, making them more responsible in efficient use of water and taking decisions**
- ◆ **Public private partnership**
- ◆ **Taking the public in to confidence and better ways of rehabilitating the displaced people**

## A better information system essential for scientific water assessment, basin-level planning and use

- ◆ **A national information system built on micro watershed level databases, covering both quantity and quality, through sharing of information from existing sources**
- ◆ **Should be available in the public domain through a website: Change in Official Secrets Act required – in spirit if not in letter**
- ◆ **Adopt uniform standards for coding, classification, processing and data collection**
- ◆ **Complete data collection from 30,000 sites in next 5 years, from 2000 at present**
- ◆ **Information and advise on groundwater levels in each watershed should be publicly available**

# Water Resources Management through Community Based Organisations (CBOs)

**Following types and number of community-based water user organisations to be involved (projections for 2020):**

- **Water User Associations (WUAs) for irrigated areas [1.3 lakhs for 65 mha irrigated area @ one WUA per 500 ha]**
- **Watershed Management Associations (WMAs) for watershed areas [2.5 lakhs for 125 mha @ one WMA per 500 ha]**
- **Joint Forest Mgmt Committees (JFMCs) for forest areas [1.32 lakhs for 66 mha forest area @ one JFMC per 500 ha]**
- **Resident Welfare Associations (RWAs) or Neighbourhood User Groups (NUGs) for urban areas [2 lakhs for 500 million urban population @ one RWA per 2500 population or 500 households]**

# WRM through CBOs – Guidelines (1)

- ◆ **Total number of community level organisations (WUAs, WMAs, JFMCs, RWAs/NUGs) required is approx. 6.68 lakhs today and 7 lakhs by 2020. These will have to be set up and supported – they will not come about on their own.**
- ◆ **Large-scale training and technical support needed. Large and technically competent NGOs can help CBOs and smaller NGOs.**
- ◆ **CBOs should work in association with panchayats / municipalities (this may be difficult in many states).**

## WRM through CBOs – Guidelines (2)

- ◆ Higher levels of government should provide information (e.g., about groundwater levels), technical support and finances.
- ◆ Government officials should not be part of CBOs.
- ◆ Women should have at least 30 % representation in community organisations.
- ◆ A community providing 40% project cost (including material and labour) should directly implement the project (rather than a contractor). MP/MLA funds could be used.

**Table 1**

**Land Area of India by Usage (mha): Current and Projections for 2020 and 2050**

Usage	Area Reported (1995-96)	Projections for 2020	Projections for 2050
Culturable area	195**	190	185
• Net <sup>1</sup> irrigated area	(54)	(65)	(85)
• Non-irrigated/rainfed area	(130)	(110)	(80)
• Rainfed area covered by trees*	(11)	(15)	(20)
Forest area	69	66	65
Non-agricultural use (urban, roads, etc.)	22	30	36
Barren	19	19	19
Total area reported	305	305	305

Source: CWC for current land area; projections by authors

\* This includes orchards and areas with low tree density, that are not classified forests and which yield fruits or NTFP, primarily for local use.

\*\* Out of this, area actually under cultivation is 142 mha and this is expected to go down to 140 mha in the future.

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<sup>1</sup> Net area refers to the actual area covered on the ground and should not be confused with the claimed irrigation **potential**

**Table 2**  
**Number of Community Based Organisations (CBOs) for Management of Water Resources at the Local Level**

Sl. No.	Type of Land Area/Population	Land Area (mha) and Corresponding Number of CBOs Required (lakhs)		
		1995-96	2020	2050
1.	Net Irrigated Area	54	65	85
2.	Number of WUAs required @ one WUA/500 ha	1.08	1.30	1.70
3.	Area that needs watershed management	141	125	100
4.	Number of WMAs required @ one WMA/500 ha	2.82	2.50	2.00
5.	Forest Area	69	66	65
6.	Number of JFM committees required @ one JFM committee/500 ha	1.38	1.32	1.30
7.	Urban population	350 million	500 million	700 million
8.	Number of RWAs/NUGs required @ one RWA/500 households	1.40	2.00	2.80
9.	Total number of community organisations required	6.68	7.12	7.80

# Our approach involves the following major paradigm shifts

- ◆ From irrigation-focus to focus on demand for multiple uses (drinking water, domestic, industry, power, etc.).
- ◆ From ad hoc utilisation to optimum utilisation of water based on planning at the level of the river basin and accurate information.
- ◆ From government control to community-centred control and management.
- ◆ From wasteful supply focus to focus on demand management, recycling and efficient use of water.
- ◆ From considering water as an abundant resource to considering it as a precious and scarce natural resource - to be reflected in how its use is regulated and how it is priced.
- ◆ From considering water as a free public good to considering it also as an economic resource.
- ◆ At present the services sector contributes 51% to the GDP, manufacturing contributes 32% and agriculture 17%. Population dependent on agriculture should be reduced from nearly 60% at present to 30% by 2050.

# Where do we go from here – and who will bell the cat?

## ◆ The next crucial steps:

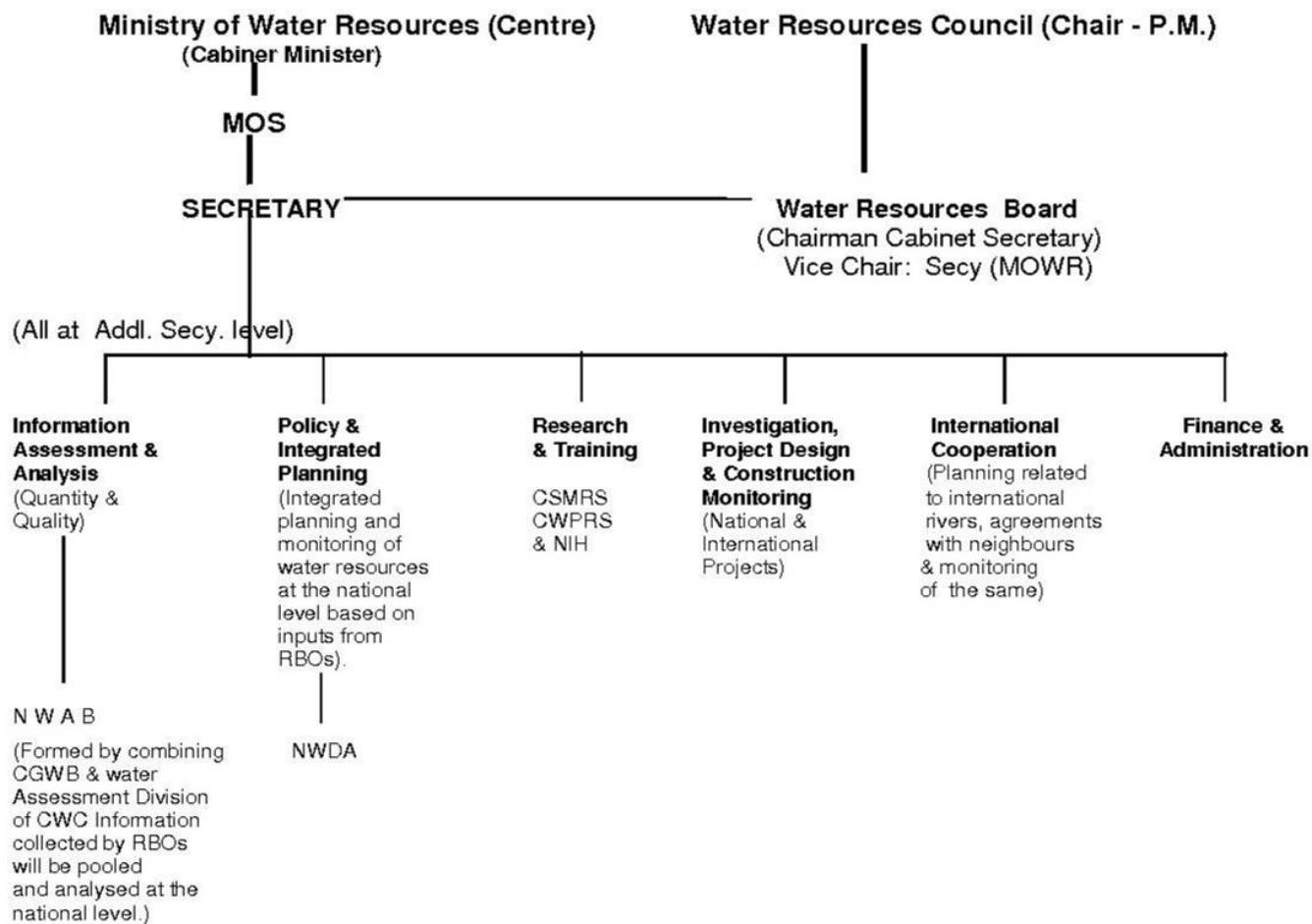
- Building consensus on the changes required
- Changing the mindset of decision-makers
- Overcoming political obstacles to change – by pressure from communities and enlightened individuals (engineers and professionals, political leaders, social activists)
- Strong measures against land and water grabbing are needed

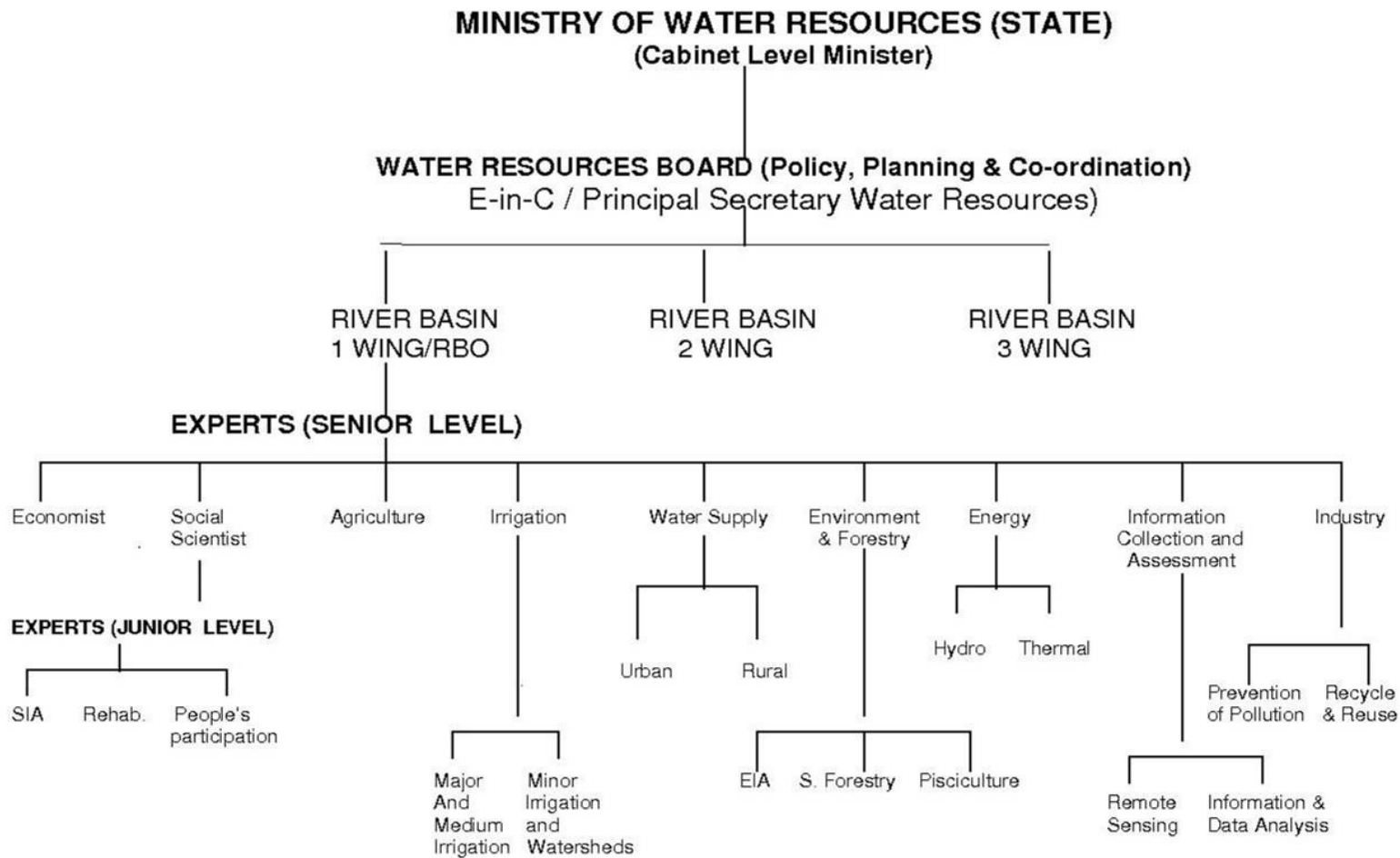
## ◆ Visionary social leaders, activists and professionals should push the IWRM approach and agenda outlined above to build consensus on this crucial issue

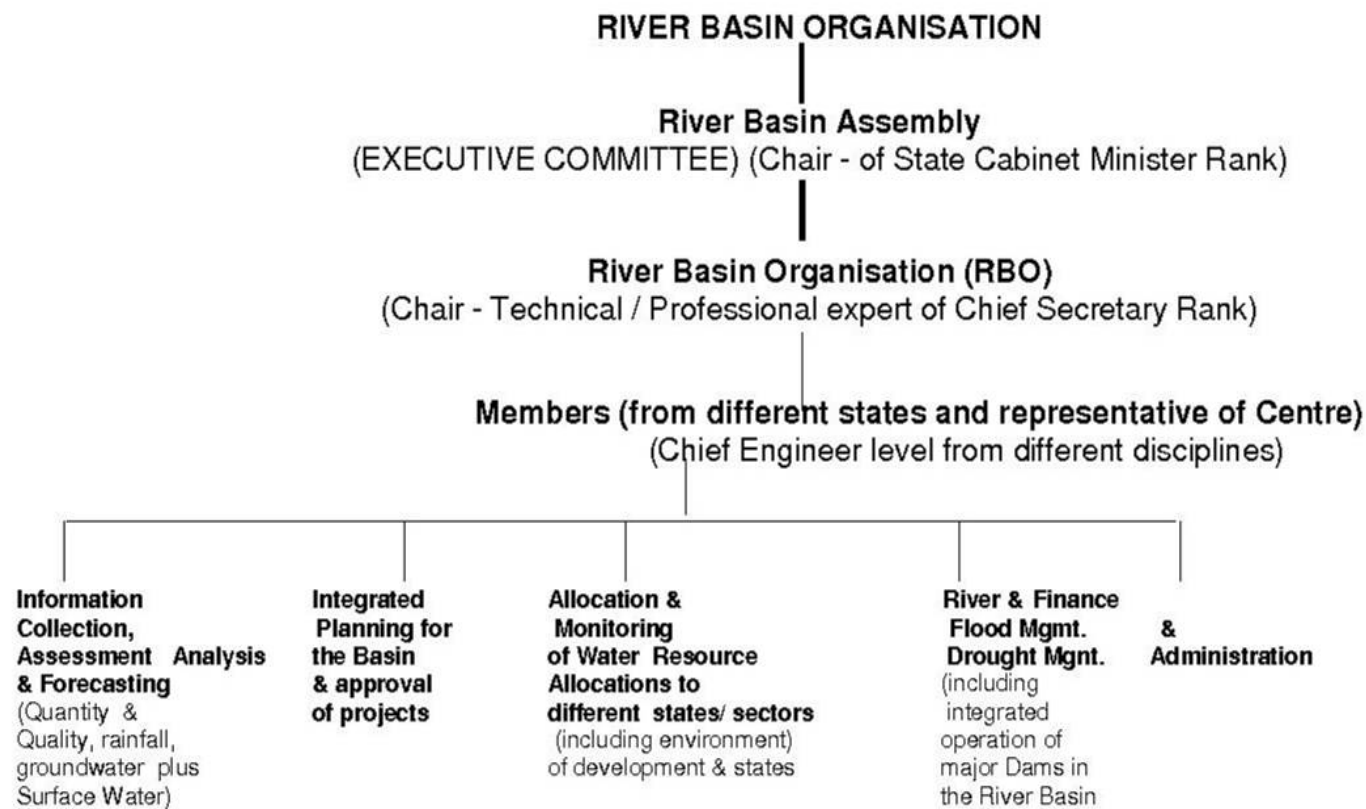
## ◆ Public-private-government partnerships needed to take initiative and take forward this IWRM agenda

## ◆ Involvement of all stakeholders, including local communities, water officials, industry in discussions and plans for change is required

**CHART-1**







## Action Plan Schedule for Implementation of Suggested Measures

