



# **Water Economics and Financing**

## **Water Markets in Integrated Water Management**

### **Breaking the Gridlock in Water Reforms through Water Markets**

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## ***Breaking the Gridlock in Water Reforms through Water Markets***

### **Organization of Talk**

- The Context
- Water Markets in India
- Way Forward
- Conclusion

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**The context**

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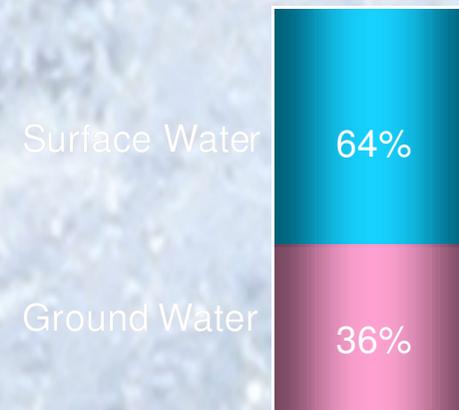
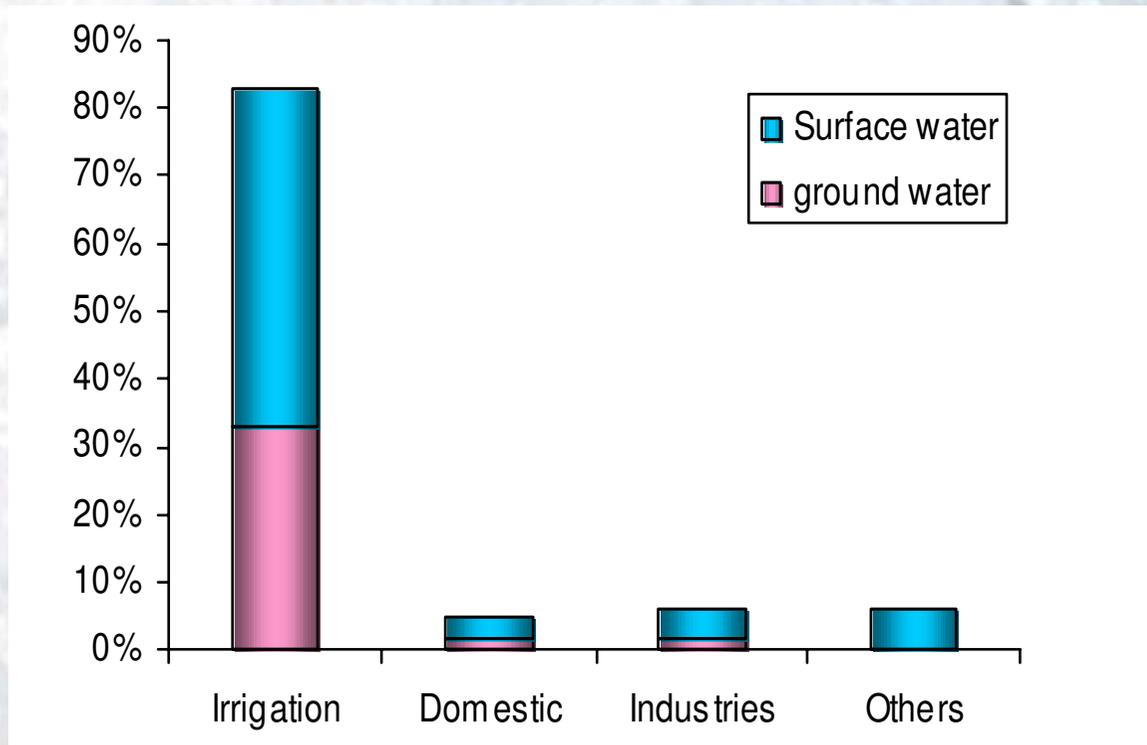
## *Breaking the Gridlock in Water Reforms through Water Markets*

### **Legal Framework and Rights to Water**

- **India is a federal set-up**
  - Water is predominantly a state subject
  
- **Surface water: Indian law treats all surface water as government property**
  - Individualized (riparian) rights requires time consuming litigation
  
- **Groundwater: Absolute rights rest with the owner of overlying land**
  - Rights are private and unrestricted; not clearly assigned
  - Groundwater is “attached like chattel” to land property
    - ❖ Restricts potential for inter-sectoral allocation
  
- **No legal basis for trading: States are non-interfering**

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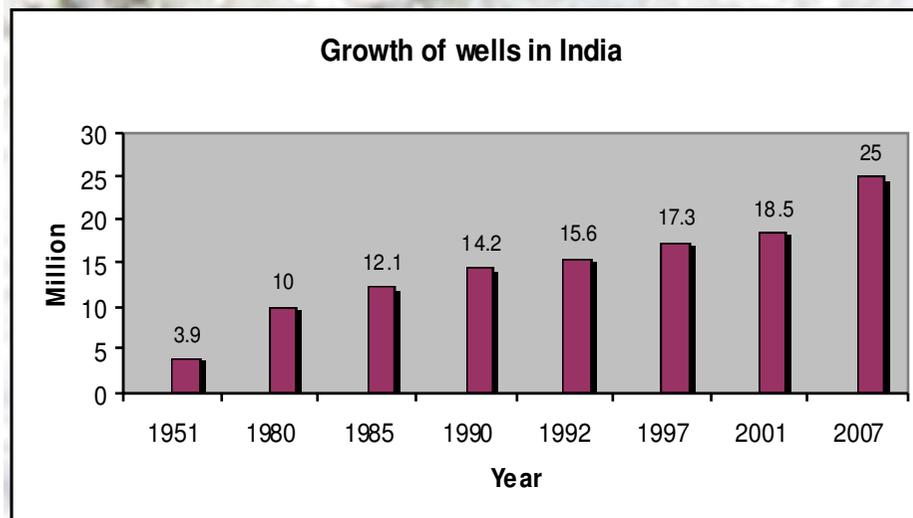
**Irrigation is the biggest water user:  
groundwater plays a key part**



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### Development of G'water and Growth in Water Markets



#### Political economy of G'water development

- Multi-purpose dam projects time consuming
- Food security concerns
  - ⇒ Massive rural electrification to facilitate g'water development
  - ⇒ Huge power subsidy

#### Development of informal water market: the sub-context

- Spontaneous response to changes in demand-supply conditions
  - Supply side: Lumpy investment, fragmented holdings
  - Demand side: poor farmers with little access to institutional credit

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**Water Markets in India**

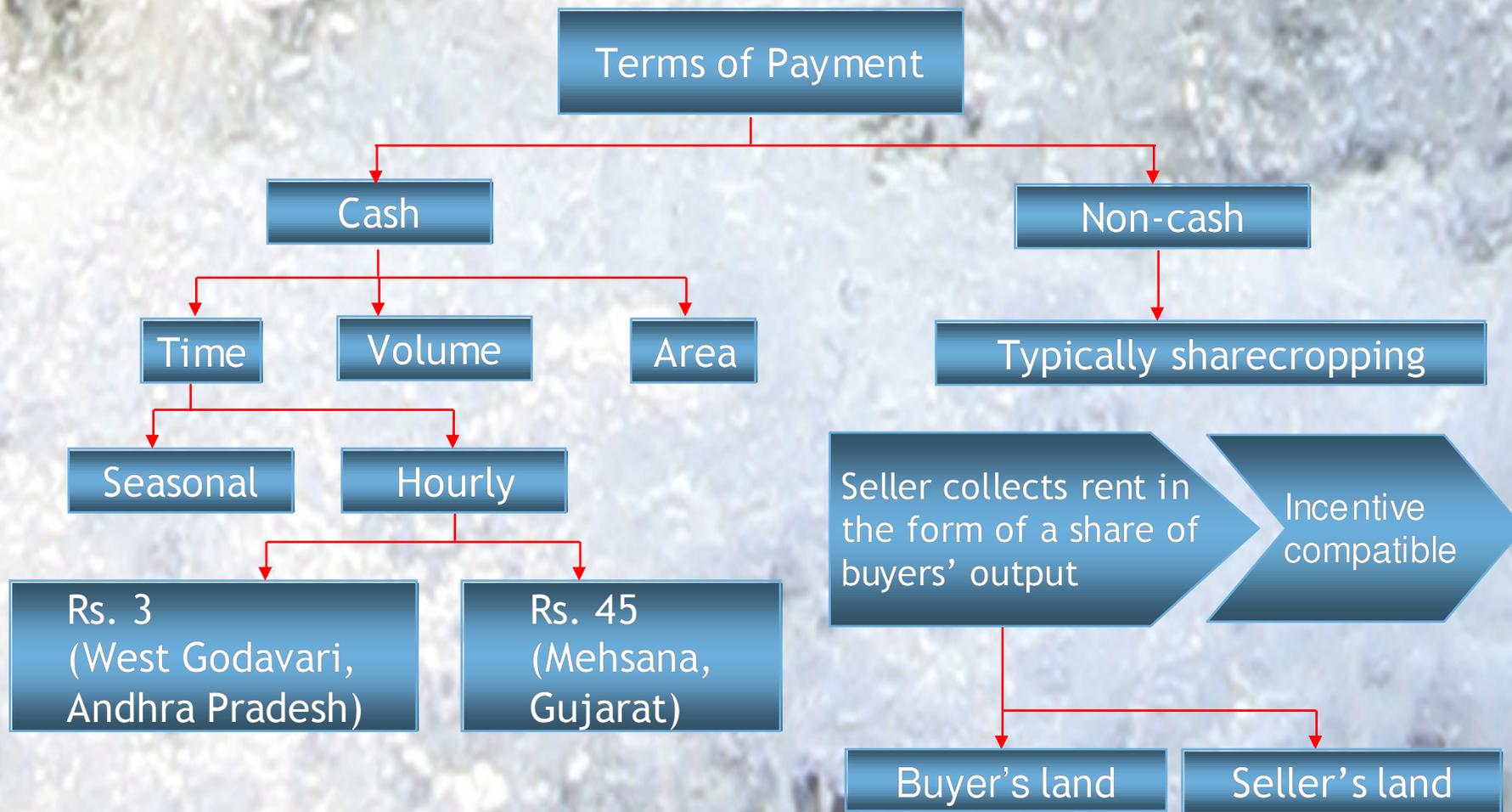
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# Breaking the Gridlock in Water Reforms through Water Markets

## Widely Varying Terms of Payment



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### **Ineffective Regulation**

- **Few states have introduced groundwater legislation**
- **Limited area and limited period**
  - Not enough supervisory resources for large number of wells
- **Mechanisms: Permits for new wells, spacing and depth norms**
  - Control on withdrawal can control trading
- **Restrictions on number of wells can be overcome through larger pumpsets**
- **Limited power supply through shift to diesel pumps**
- **Only the rights of existing owners recognized--inequitous**

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### **Consequences**

#### ■ **Equity: Two ways**

- Expanded access, higher demand for labor
- Concentration of pumping capacity with rich
  - Exacerbated by vague property rights

#### ■ **Efficiency**

- Enhanced tube well efficiency
- Higher crop intensity

#### ■ **Ecology: Two ways**

- Water surplus region (positive externality)
- Water scarce regions: Salinity, contamination (negative externality)

#### ■ **All negative consequences are due to over pumping**

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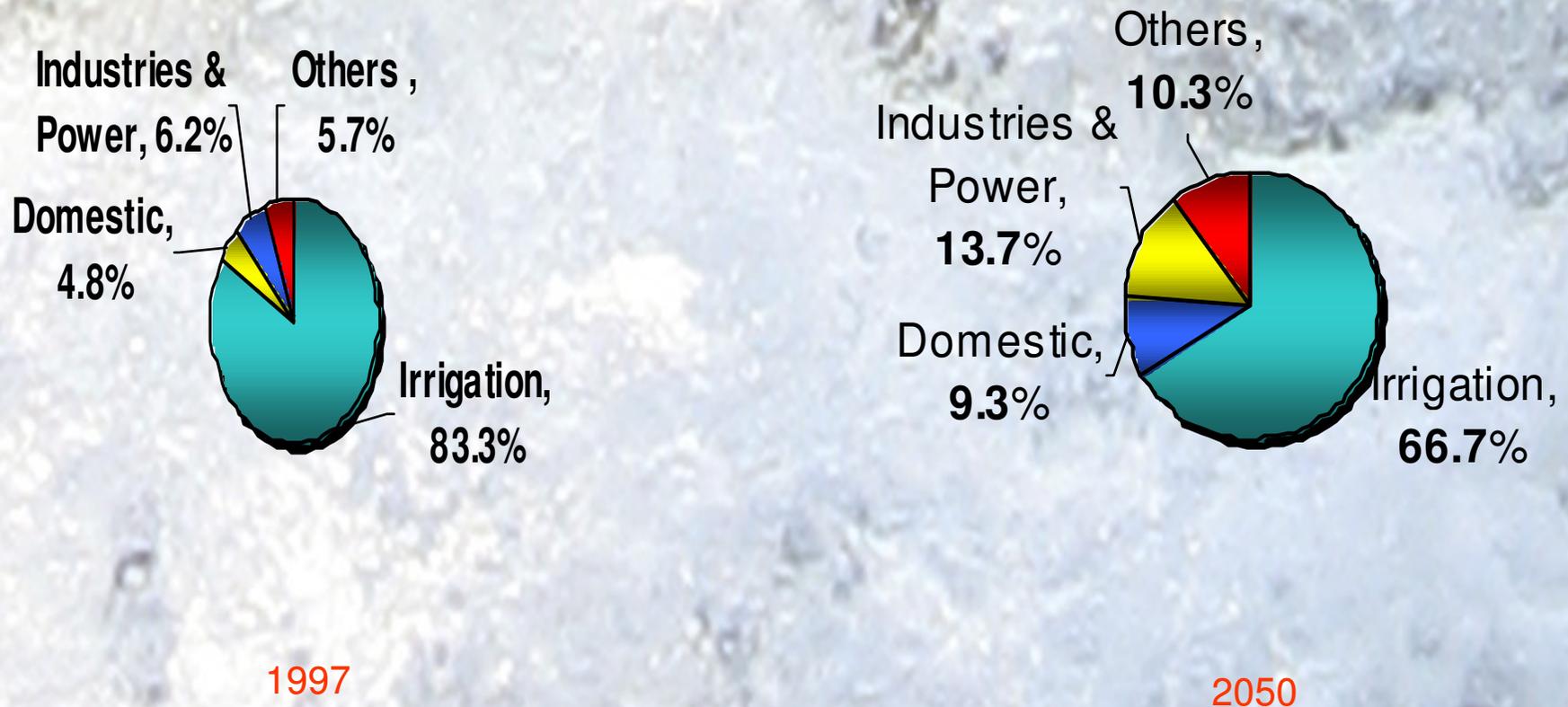
**Way Forward**

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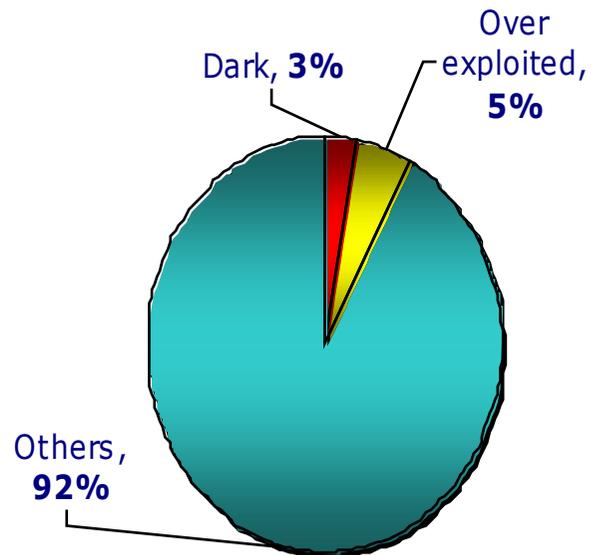
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## **Changing Nature of Water Demand**

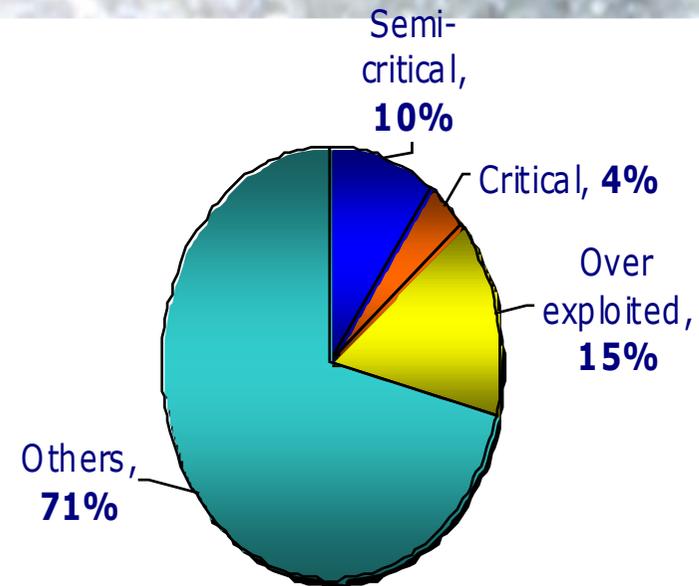


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### **Water scarcity is growing**



1995



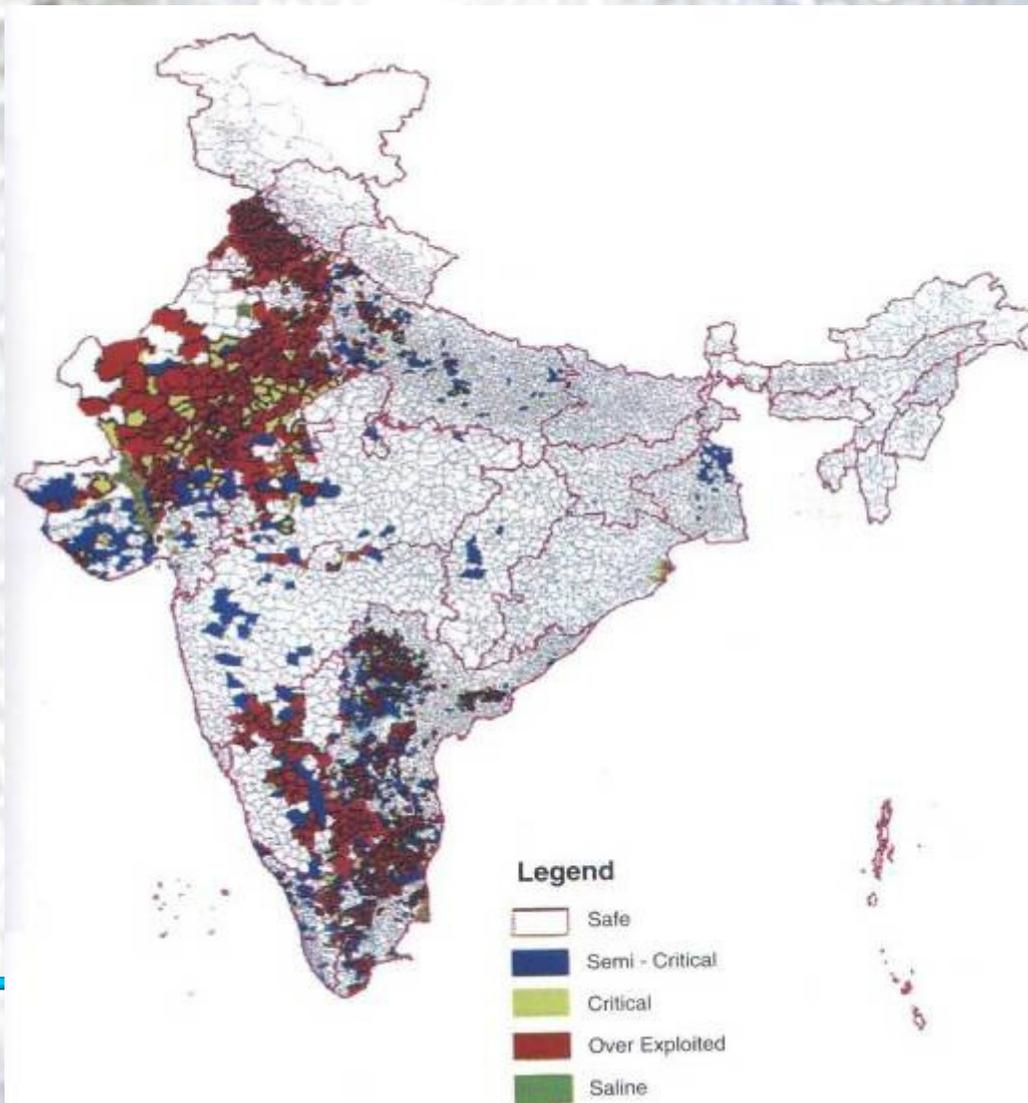
2004

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- Another sign of growing scarcity is rising number of conflicts, particularly between farmers and urban water utilities
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## **Categorization of Blocks as on March 2004**



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### **... inefficient water use continues**

- **Surface water: Prices are set below supply costs for every use except industry**
  - No political will to rationalize tariff
  - Maharashtra tariff (Rs/ kl): Agr: 0.05, drinking: 0.45, ind: 3.7, O&M: 0.25 (Unpublished data)
  
- **Surface water: Low investment in and poor management of irrigation**
  - Head end vs. tail end
  
- **Groundwater: Low extraction cost due to subsidized power**
  - Exacerbated by no limit on extraction
  
- **Two recent initiatives may provide clues for future reforms**

## **Initiative # 1: Purchase of Groundwater by Chennai Metro Water**

- **2000-2004: when drought conditions prevailed, Metro purchased groundwater from farmers in peri-urban areas**
  
- **Through written contracts (PVC pipes) and ad hoc basis (tankers)**
  - Voluntary transfers; 13-59 percent of Metro's supply
  
  - Written contracts: Rates fixed through negotiation; between Rs 20 – Rs 26 per hour (about Rs 1 per kl); power bill and PVC pipes by Metro
    - ❖ 400 kilo-liters a day (18 hours of pumping) from each farmer
  
  - Tankers: Rs 4 – Rs 6 per Kl; transportation cost borne by Metro

## Experience at and Lessons from Chennai Metro Water

- **Formal segment of economy accessed groundwater on a large scale**
  - Reduction in cropped area in dry season, but no switch to different crop or change in crop intensity
  - Helped Metro tide over a difficult time
- **1999-2004: Severe depletion with all attendant problems**
  - Extensive damages to peri-urban areas
  - Livelihood problems, migration to cities
- **Since 2005, Water table has risen substantially due to:**
  - Mandatory rooftop rainwater harvesting; better rainfall

### Lessons

- **Large scale transfers are possible**
- **But first a framework to manage groundwater extraction**

# Initiative # 2: Entitlements to Surface Water—Creation of a Framework

## Four Pillars of Framework

Instrument	Objective
1. State Water Policy 2003	<ul style="list-style-type: none"><li>▪ Priorities among users</li><li>▪ Principles of tariff</li></ul>
2. Farmers' Act 2005	<ul style="list-style-type: none"><li>▪ WUA in each minor</li></ul>
3. Water Resources Regulatory Act, 2005 -> Regulatory Authority	<ul style="list-style-type: none"><li>▪ Fix tariff</li><li>▪ Distribution of entitlements</li><li>▪ Trading criteria</li><li>▪ Dispute Resolution</li></ul>
4. Separate (draft) bill for groundwater	<ul style="list-style-type: none"><li>▪ Cooperative management</li><li>▪ No proposal for entitlement</li></ul>

## How does the system work?

- **Entitlements are distributed among uses subject to priorities set in Water Policy and availability in reservoirs**
  - 15 % for drinking purpose and 10 % for industrial purpose (by Government order)
- **Basis for allocation within use differs**
  - Drinking and industrial--first come, first served and reasonable use basis
  - Agriculture—to WUAs, specifying volumetric allocation per hectare and total volumetric quota
  - Farmers' allocation proportional to land held (not crops grown)
- **Entitlements to WUAs are legal rights, but not allocation to individuals (current interpretation)**
  - Enables trading: contours being discussed
- **Right to water permanent but quantum varies from year to year**

## Experience and Issues

- **Pilots in 20 irrigation projects since 2006; being scaled up**
  - Surface water entitlements have been determined
- **Canal rehabilitation not complete, a prime requirement for WUA to take over**
- **Entitlements on subsurface water not being pursued**
- **Information campaign**

### Issues

- **Large scale upfront investment for rehabilitation necessary**
  - Do states have enough resources?
- **Entitlements have not been given at individual level to farmers**
  - Only informal trades possible within individual WUAs
- **Trading allowed only within each category of use**
  - No scope for intersectoral trade; subsidy issue
- **What is permissible trading quantity?**
  - Entire entitlement or only savings?
- **What about the landless?**

# Assessment of Maharashtra Initiative

- **Transparent distribution of entitlements**
  - Tail-enders can claim water
  - An essential first step toward formal trading
- **Tariff is based on volume of water use and not on crops grown**
  - Would create right incentives
- **Irrigation department is subject to discipline**
  - Transparency in transfers
- **Limited scope of trading**
  - Can be scaled up with experience and lessons from other countries
- **Other states need to adopt similar initiatives**
  - Leverage reforms

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**Conclusion**

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# Conclusion

- **Informal markets have provided access to irrigation for many small farmers**
- **Also led to groundwater depletion and added to the woes of power sector**
- **As scarcity grows, entitlements and trades become significant**
- **Scaling up without effective regulation dangerous**
- **Setting and monitoring withdrawal limits for groundwater is difficult; need to develop institutions**
- **Possible to start with only surface water**
  - Maharashtra has shown the way
- **Entitlements are useful, even if formal trades are not allowed**