

Reality Bites!

Water and Environment GIS in the Developing World

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Abstract

Spatial Information Systems are a very promising tool for development. Their use in the developing world, especially in areas of water resources management and environmental management (river basin management, service delivery, water quality, air quality), poses unique challenges that one does not generally face in more developed countries. The paper/presentation will set the broad context of developmental challenges in water and environment from an international development support institution perspective and what kind of a crucial role GIS and other spatial technologies can play in addressing these as we look ahead. This paper will explore these unique challenges (institutional, policy, infrastructural, technical, financial), drawing on examples from the developing world, and indicate how these concerns can be addressed. The possible role of various stakeholders in providing an enabling environment for improving public awareness and supporting decision for fully realizing the promise of these tools will be discussed.

The Water Context in SAR

The Problems are Many...

Inefficient Water Use

Poor Productivity of Water

Weed

Degraded Lands

Natural Disasters

Dilapidated Infrastructure
Need for asset modernization/development

Pollution

Public Health Problems

Poor Access to Safe Water and Sanitation

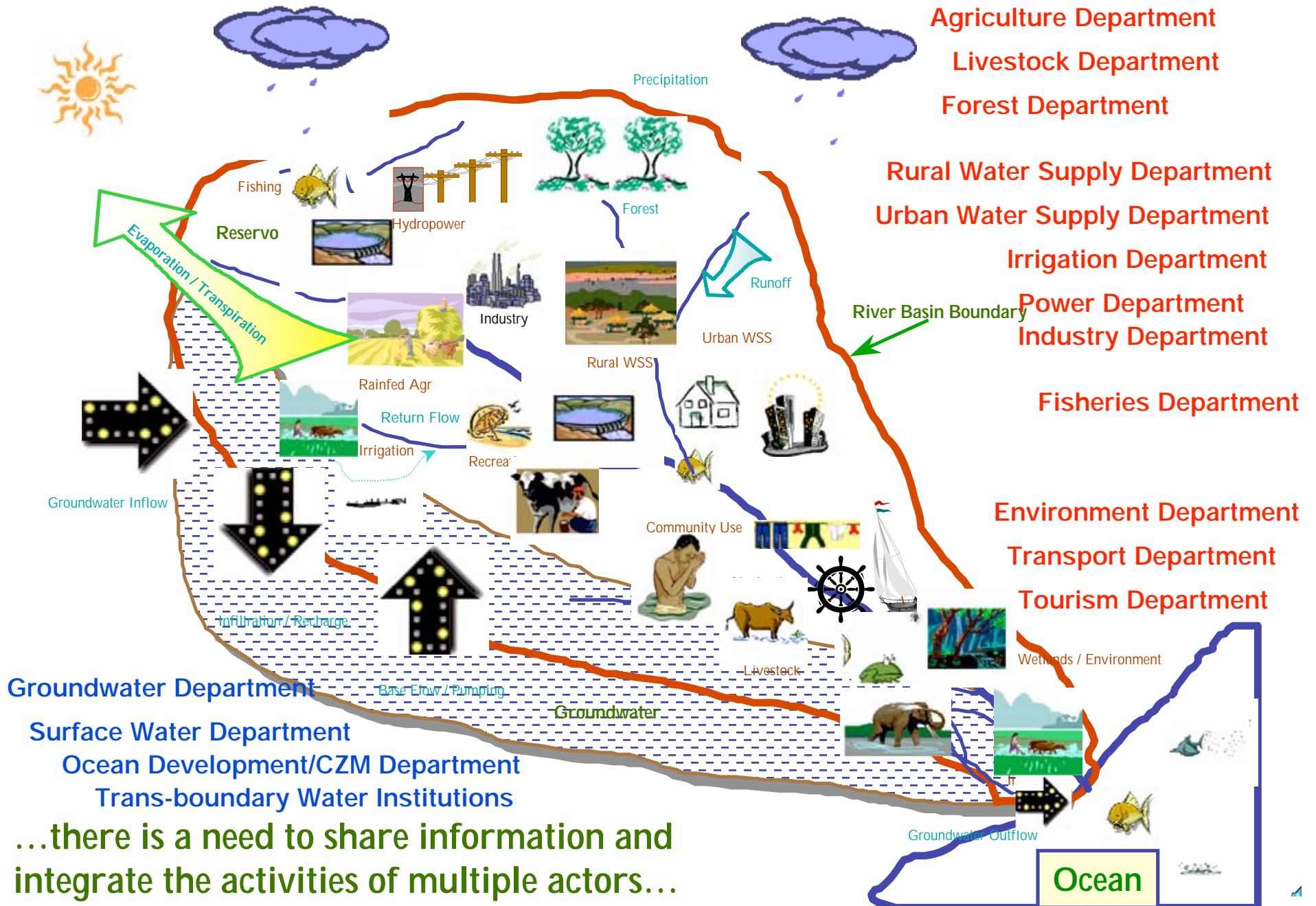
High Costs, Low Prices/ Collection, O&M, Competing Demands, Financing Gaps

Weak Institutions for Resource Management and Service Delivery

Poor Knowledge Base/Analysis
Often Bloated, Inefficient Bureaucracy

INDIA TODAY
MAHARAJGURU'S WINDLESS MINISTERS • UNDOM PRICE
Thirsty India
Why water has become problem No. 1 in cities and villages

Water Resources A Typical River Basin...

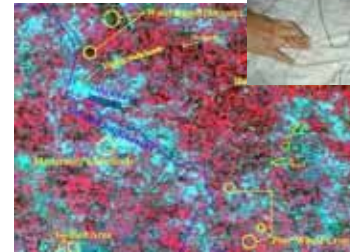


...there is a need to share information and integrate the activities of multiple actors...

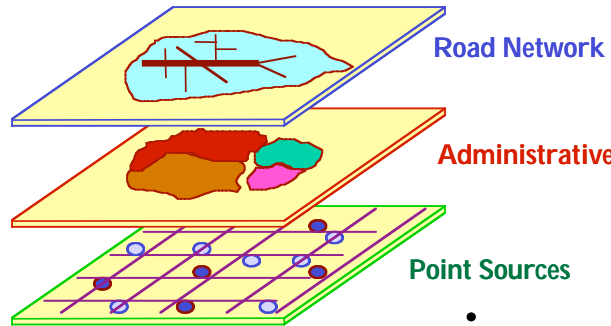
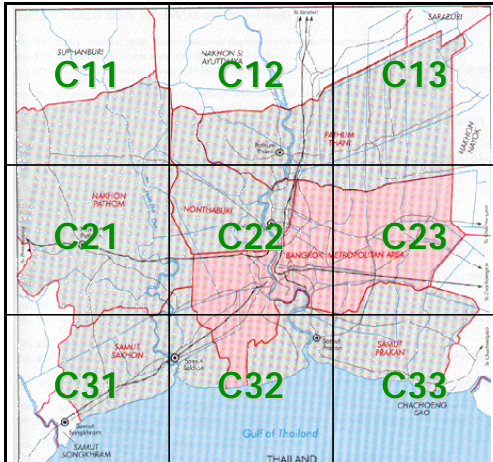
Irrigation Service Delivery

Some Possible Applications

- Asset Inventory and Management Systems
- Maps for Joint Walkthroughs
- Planning
- Operations Management
- Environmental Management
- Billing Systems
- Monitoring & Evaluation
- Benchmarking
- Public Information Access



GIS for Air Quality Management



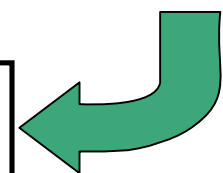
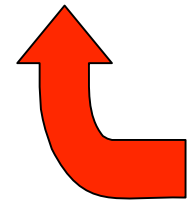
Air Quality

- Knowledge Base
- Modeling Options
- Remote Sensing



Integrated Air Quality Management

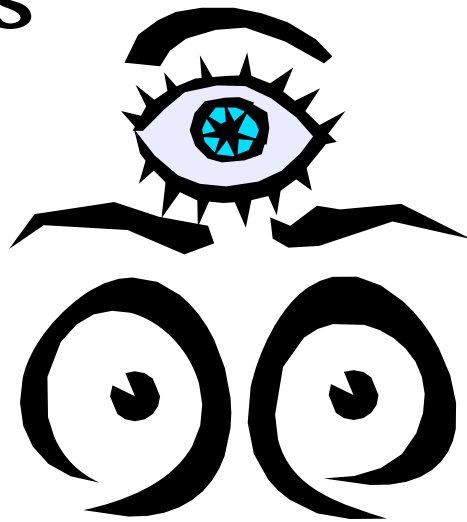
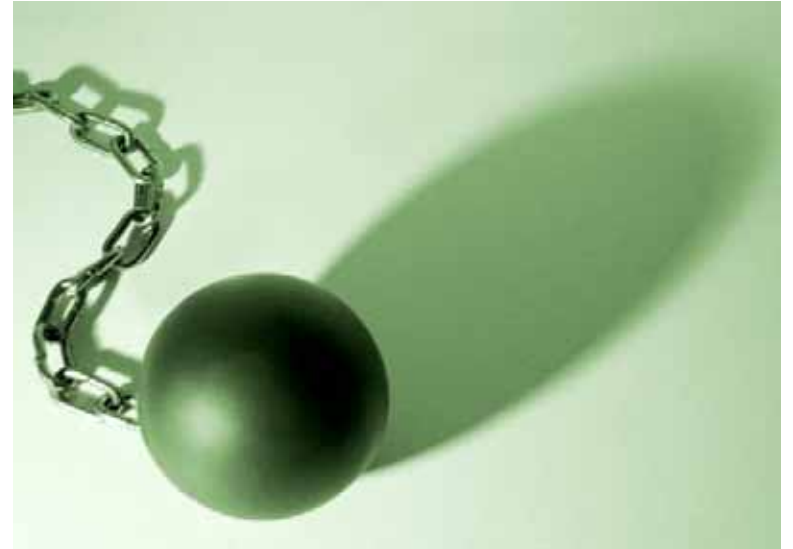
Management Options



Reality – Real Constraints

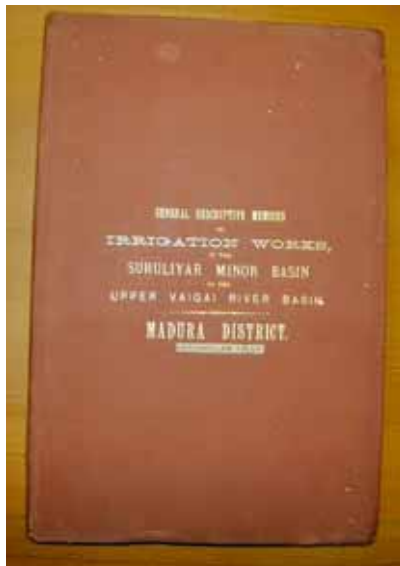
...the 3 i's

- **I**nformation
- **I**nfrasturcture
- **I**nstitutions



Information

- Data Coverage and Quality
- Format and Organization of Information
- Antiquated Access Policies/Secrecy

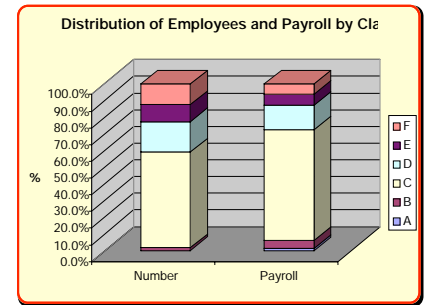


Infrastructure

- Electricity and backup
- Basic office infrastructure
- Computer hardware and software
- Internet access



Institutions



- Large number of stakeholders
- Limited capacity for analytical knowledge tools
 - Government institutional capacity
 - Private sector capacity
 - Academia capacity
 - General Public
- Institutional coordination
- Competing demands

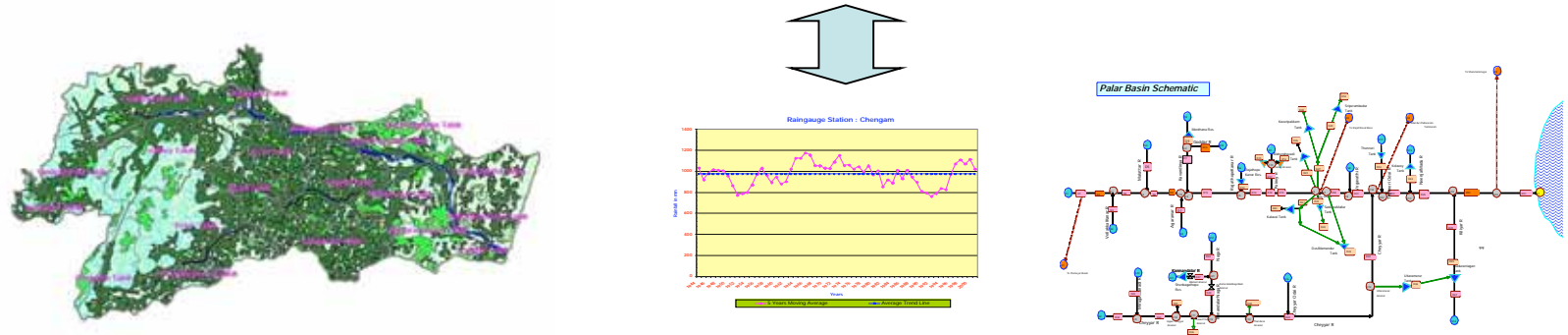


New Opportunities

- IT advances “small tools for big problems” as things become faster, cheaper, better
- Spatial data is becoming cheaper and more accessible
- Skilled person-power availability on increase
- Infrastructure improving
- Awareness of key development challenges and stakeholder participation is improving
- Decision making moving away from “data-free analysis and analysis-free decision-making”

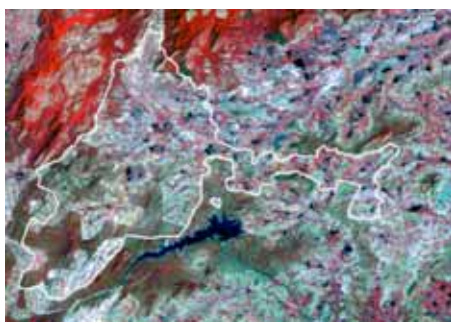
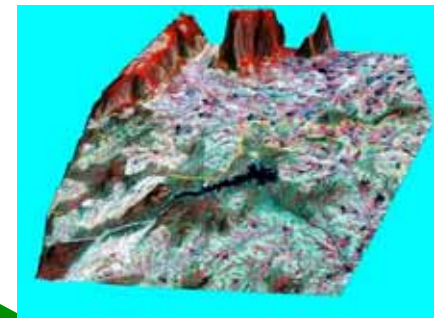
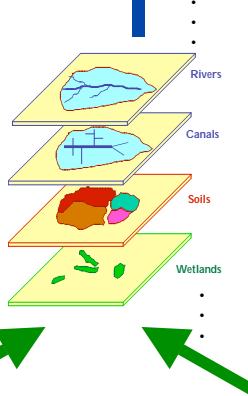
Top-down and Bottom-up approaches are Improving Stakeholder Decisions on Water Supply, Demand Planning & Management

Analytical Tools
Knowledge Base



Spatial & Non-Spatial Analyses

Models/Decision Support Systems



Remote Sensing



GPS



Surveys & Stakeholder Views



Maps/Attribute Data

Some Suggestions

- Don't focus on GIS – focus on problem to be addressed
- Integrate GIS into overall information management system
- Don't “parachute” in solutions – build local institutional capacity
- Develop appropriate systems – Cadillacs vs. a faster Bullock Cart?
- Start with clear objectives but maintain flexibility
- Address the **three i's** ...
 - Push to make more **information** public and accessible; Build **institutions** and make supporting investments in **infrastructure**
- **Don't forget the Real Clients!!!**



New Opportunities



Presentation by an Industry representative in Tamil Nadu, India

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