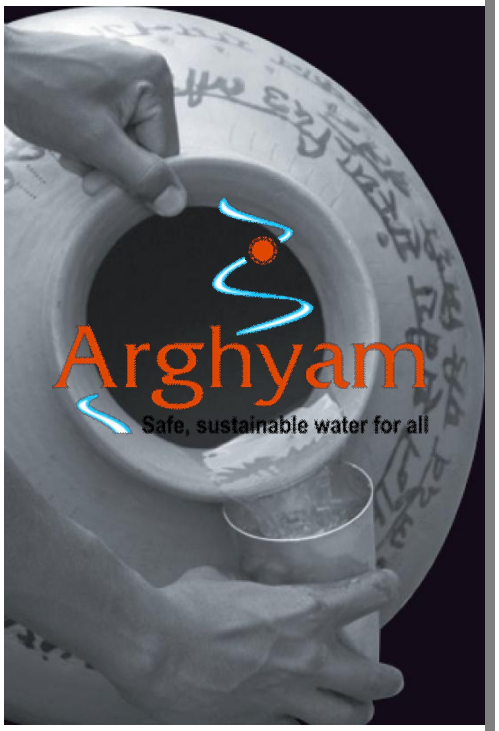
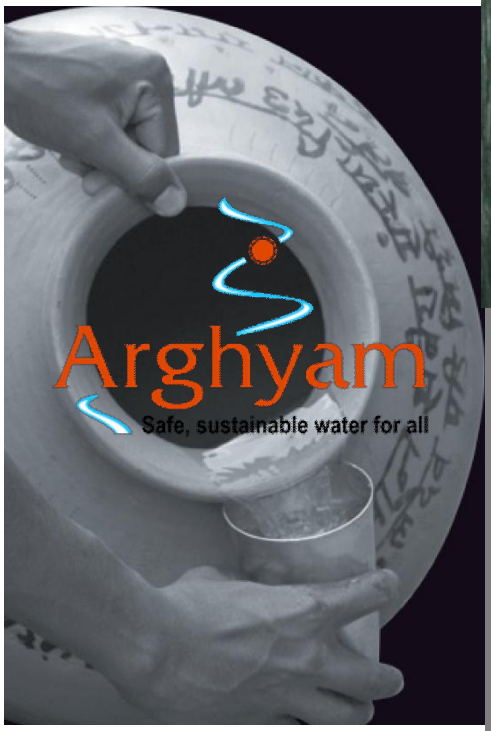


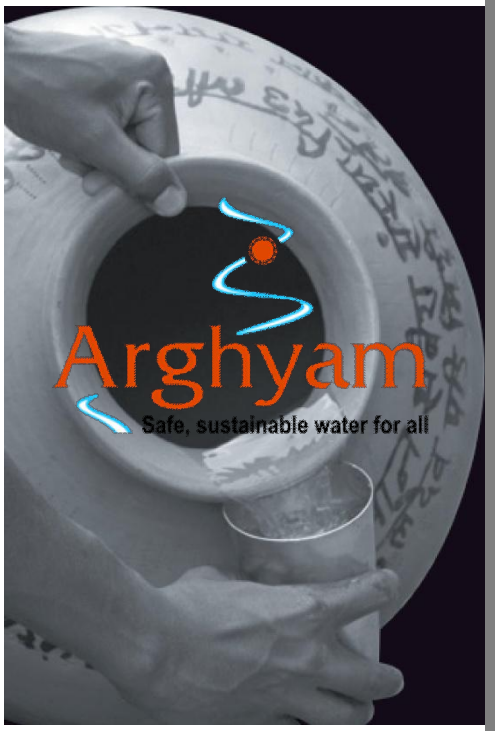
Managing groundwater pollution: The Arghyam experience

ROHINI NILEKANI
CHAIPRESON
ARGHYAM
New Delhi
March 15, 2010

www.arghyam.org



- Public charitable trust
- Working in water sector since 2005
- Vision: safe, sustainable water for all
- Rs. 150 crore endowment; Rs 12 crore annual budget
- **60** projects across in **18** states
- Footprint - more than **5000** villages



Drinking water systems

Sustainable Sanitation

Integrated Village Water Mgmt

Wastewater

India हिन्दी waterportal

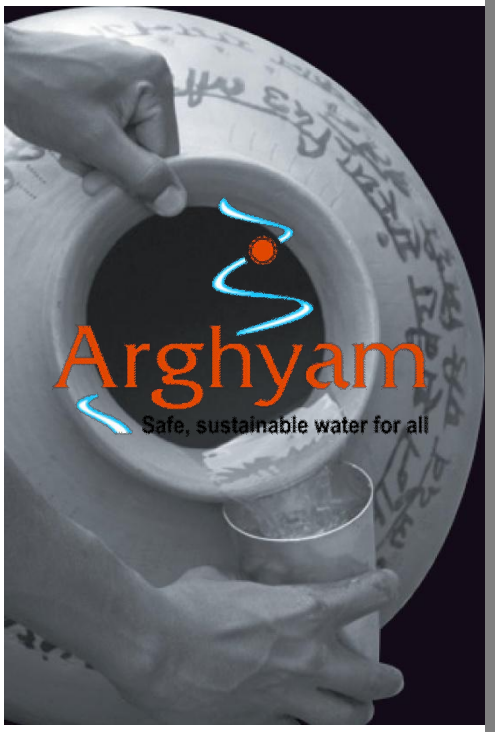
Groundwater Management

Water body Revival

Water Quality

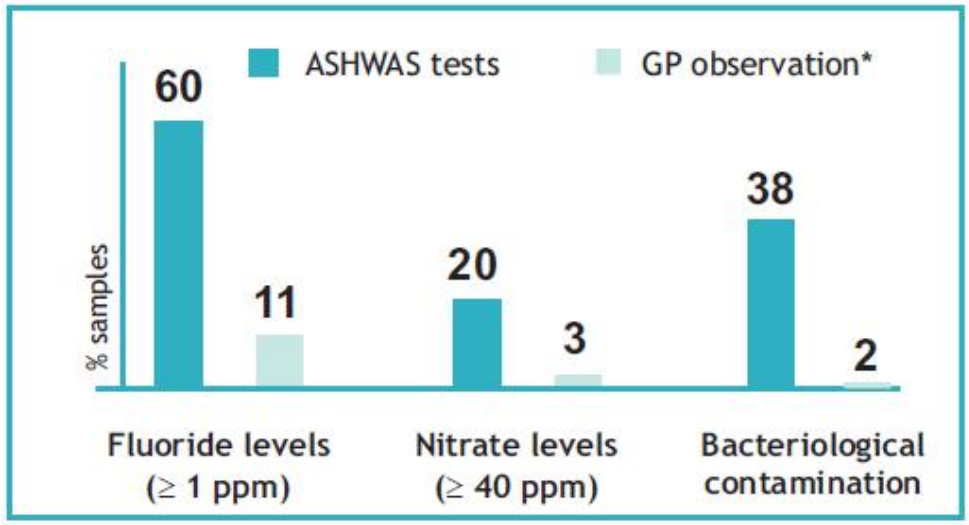
IUWM

KEY ISSUES



Water quality—a growing concern needs urgent and undivided attention

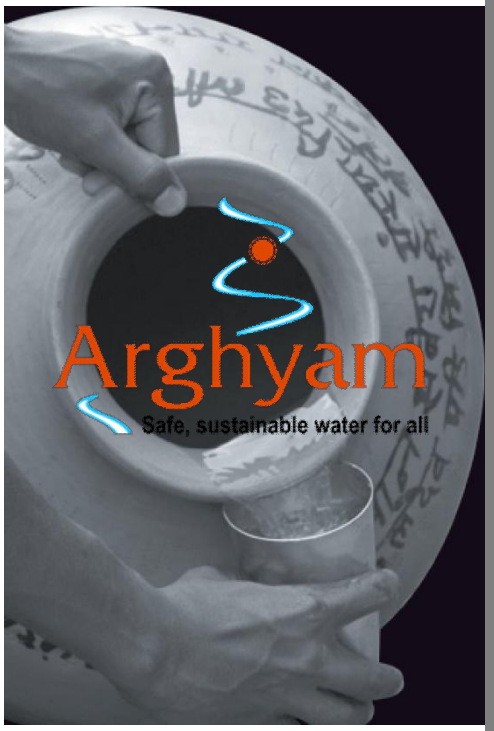
- **Geo-genic:** Fluoride [90 million at risk in 200 districts in 17 states and excess]; Arsenic: 3-4 million people at risk 8 districts of West Bengal &other Eastern States;
- **Anthropogenic: Over extraction, pollution** (Bacteriological (sewage) , nitrate (sewage & fertilisers), pesticide contamination- & industrial waste) an emerging issue



- **Linked to over dependence/over extraction of groundwater**
- **Linked to poor water demand management/water mis management**
- **Linked to poor regulation**

KEY ISSUES

Groundwater management: CHALLENGES



SOCIAL

ENVIRONMENTAL

TECHNICAL

Water source uncertainty

Conflicting demands (urban, rural; agriculture; domestic, industrial)

Reliable data; sound monitoring

Knowledge & capacity gaps

LEGAL

Equity (access & use)

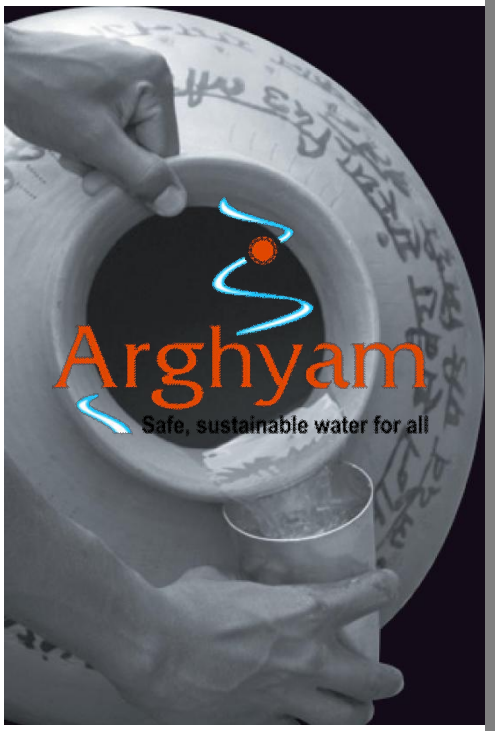
Waste disposal, pollution

Governance weaknesses; rights

FINANCIAL

INSTITUTIONAL

WAY AHEAD



Key lessons from our work so far

1: Need for participatory groundwater management

2: Need for comprehensive monitoring for reliable dataset for informed decision making

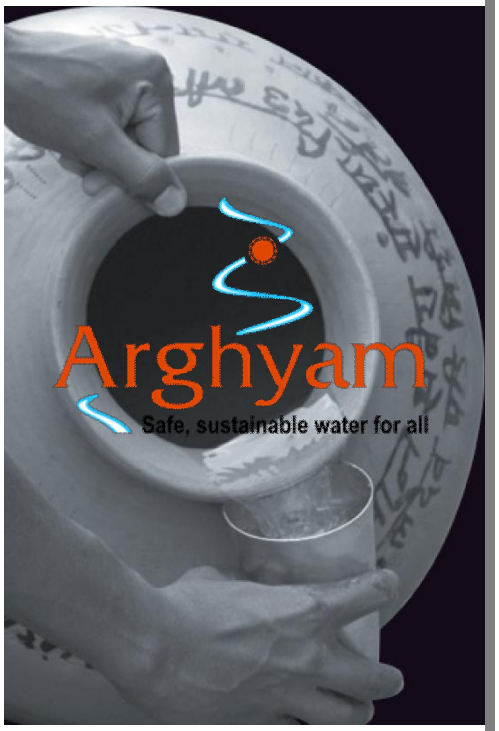
3:Need for integrated approaches that recognize inter-linkages

4:Need for area specific strategies

5: Need to create capacity at the grassroots

6: Need for legal right to safe, adequate water

WAY AHEAD



1: Participatory groundwater management

1. Groundwater as a **common property resource**

2. **Minimum unit of management** is a local aquifer and maximum a regional aquifer; More than micro watershed and less than a river basin. Range between 30-100 sq km (3000- 10000 ha) area.

3. Principles and processes of management should **cut across different uses (drinking water, irrigation etc) and users**

4. PGWM is **community centric**; Planning, management and monitoring by the community;

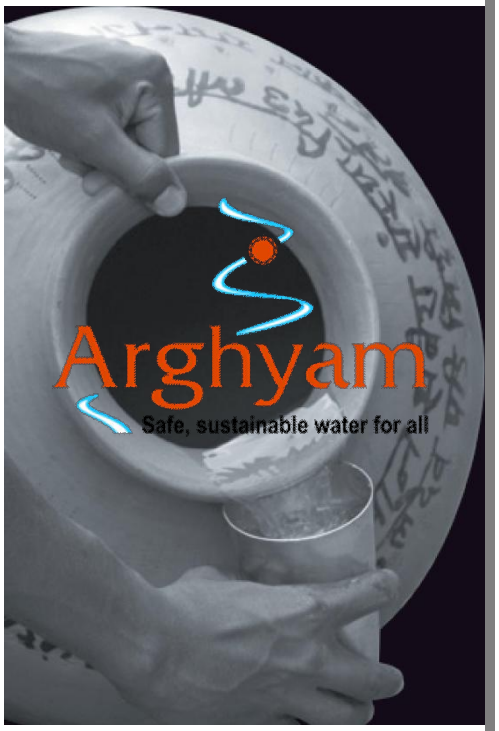
5. Need for **reliable dataset** which clearly defines the contours of the problem.

6. Need capacity building & rural water resource management experts [parab]

7. Need long term commitment

Need strong institutions (gram panchayats) assisted by barefoot hydro-geologists

WAY AHEAD

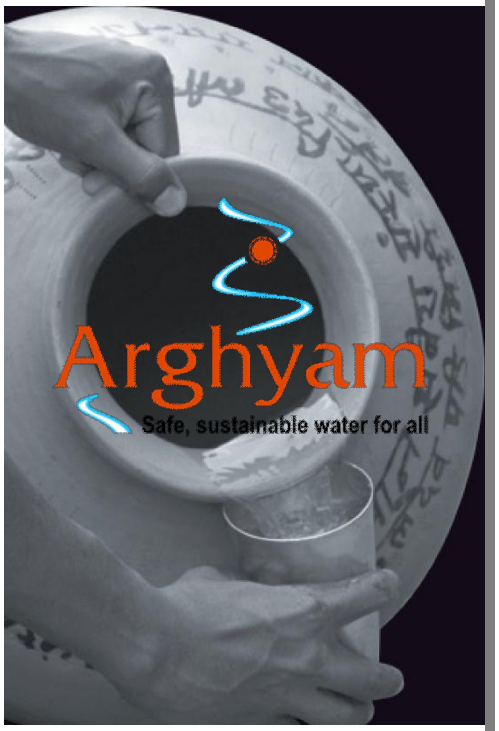


1: Participatory groundwater management

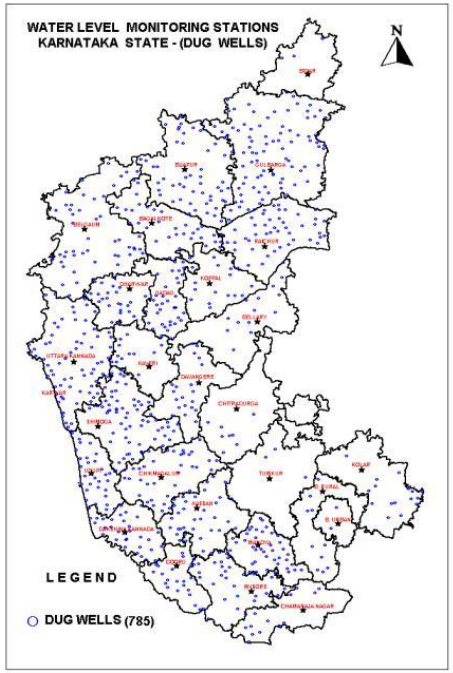
Community Water Quality monitoring

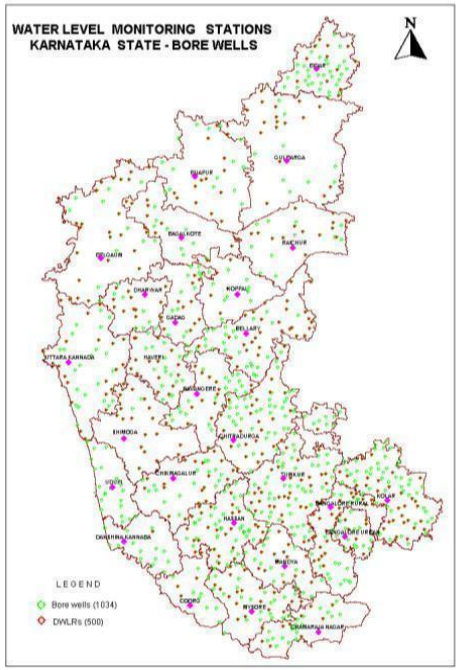
Field Test Kits issues; Availability; Capacity; Usage; Follow up (Evidence from ASHWAS: 58% GPs did not receive kits; Only 49% kits distributed in use)

WAY AHEAD



2: Need for comprehensive monitoring for a reliable dataset



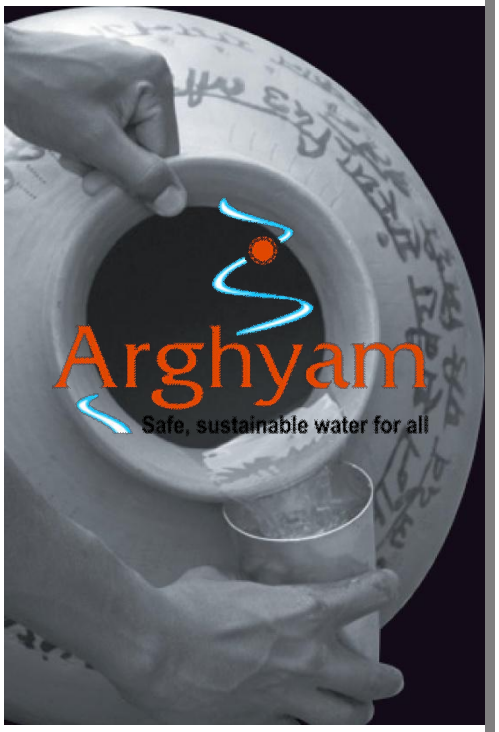


Karnataka = 1,91,791 sq.km, 2319 monitoring stations
1 station per 82 sqkm

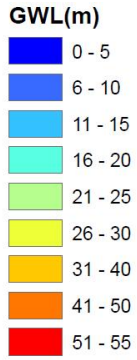
1 measuring point 10 sqkm Mulbagal town area

Monitoring-lessons from Mulbagal- a 9 sq km town in Kolar district

WAY AHEAD



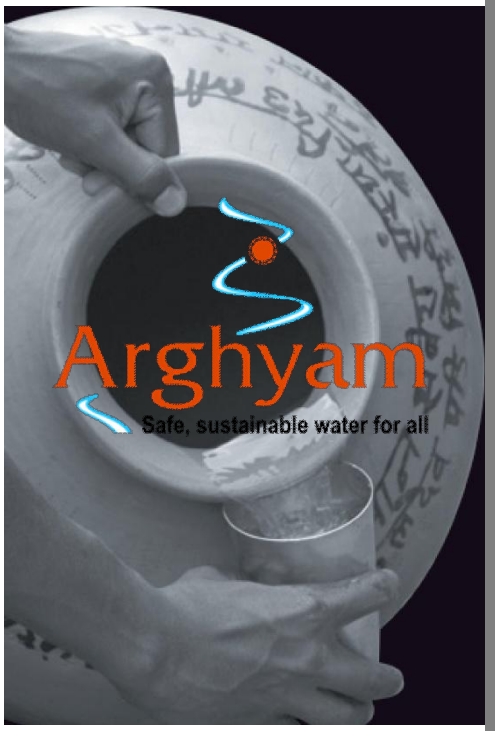
Desired: A debate & revision of monitoring protocols especially density of monitoring stations



275 measuring points in 50 sq km Mulbagal micro-catchment area
135 measuring points within 9 sq km Mulbagal town area
14 points per sq km area

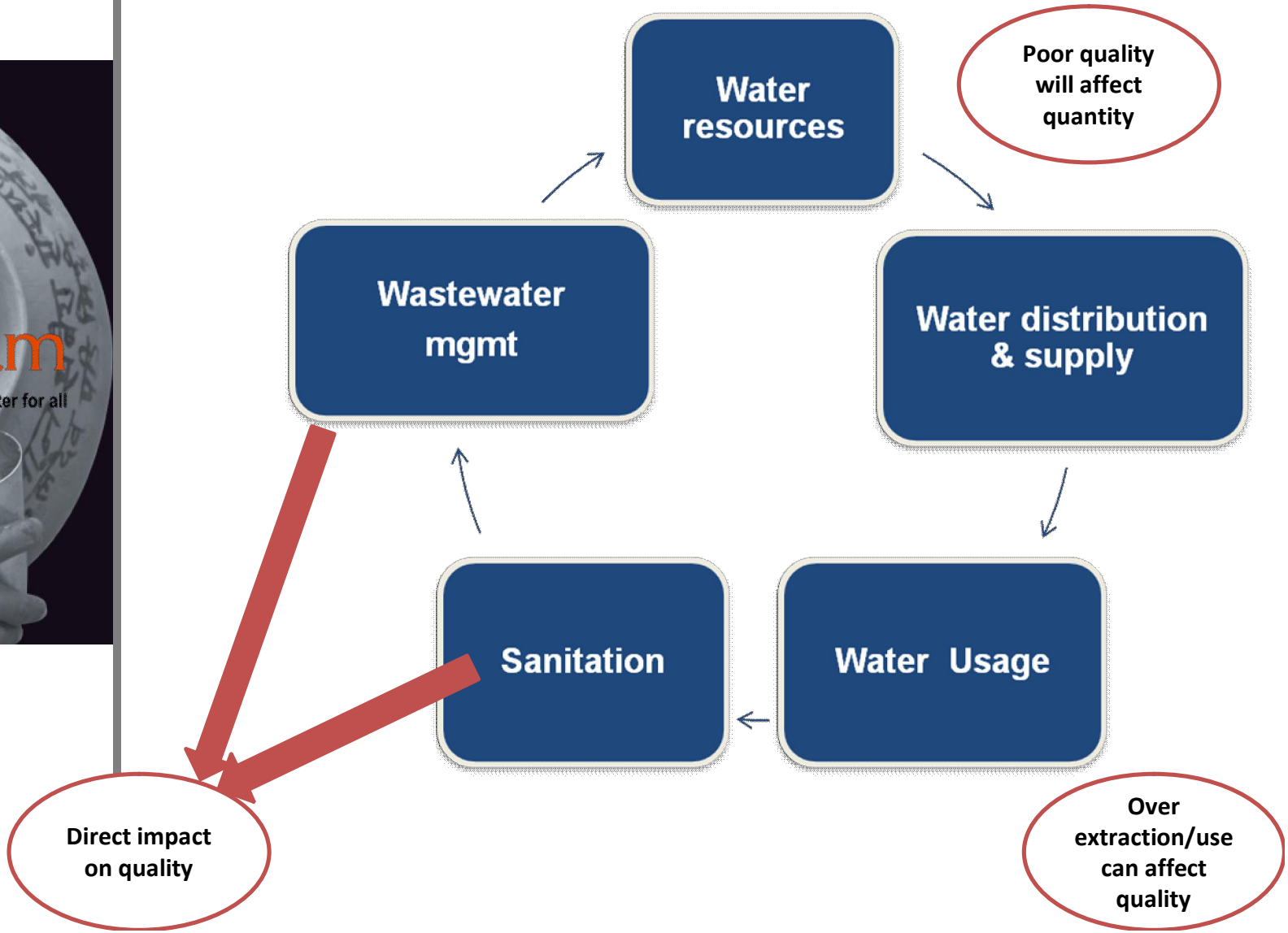
Urban groundwater may perhaps be the starting point for more granular monitoring; Need to build institutional (ULB) & technical capacity (trained hydro-geologist etc)

WAY AHEAD



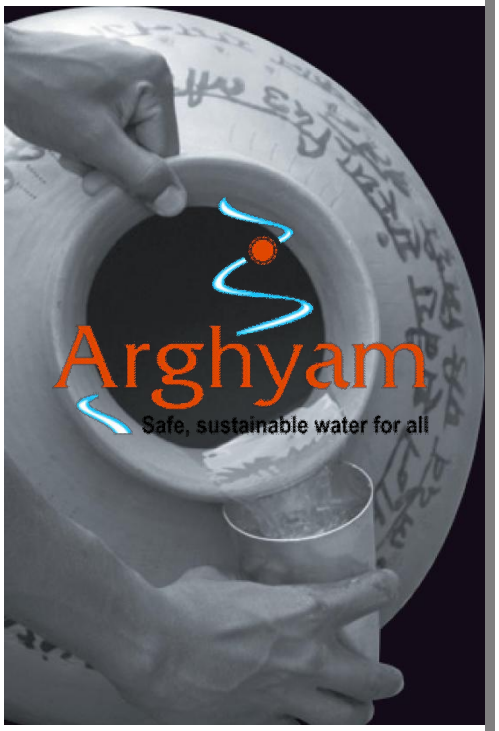
3: Integrated approaches

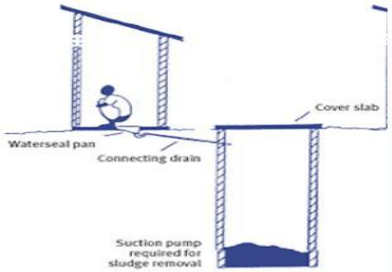
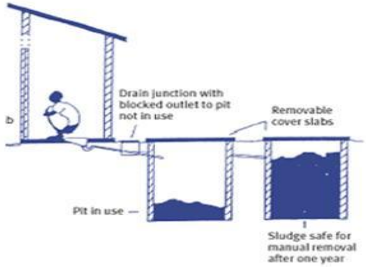
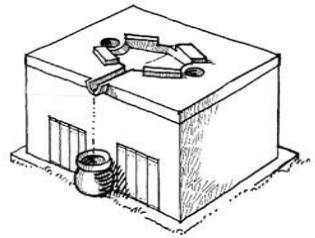
recognize inter-linkages

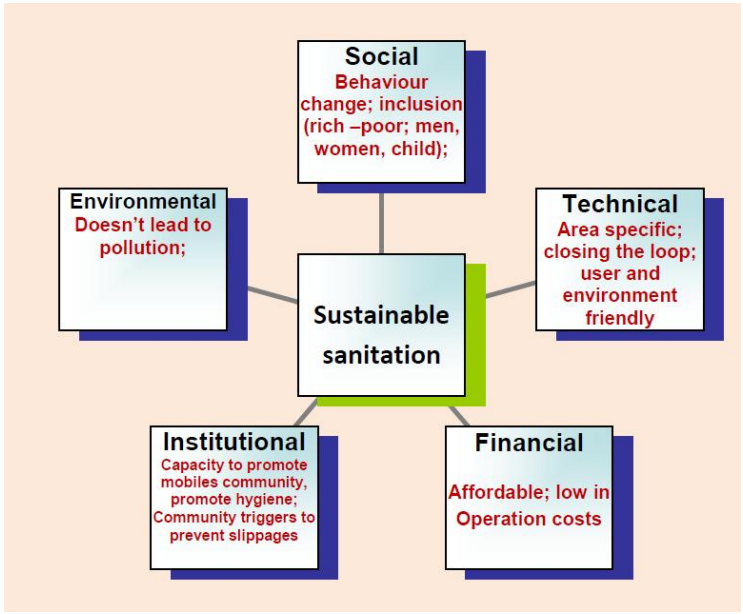


Sustainable sanitation is key

WAY AHEAD



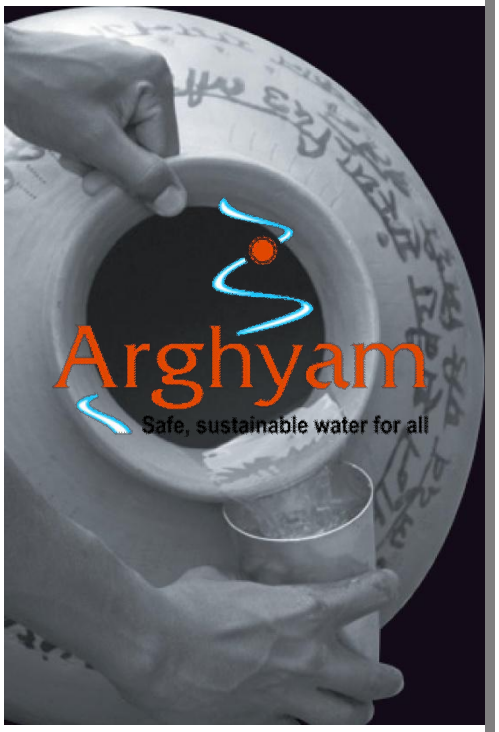
Single pit	Twin pit	Eco San toilet
		
Not suitable in waterlogged, shallow water table areas Rs 3000-3500	Not suitable in waterlogged, shallow water table areas Rs 5000-6000	In water scarce; Areas where water table is deep; waterlogged areas; hard rock region or region with impervious soils Rs 8000-12000



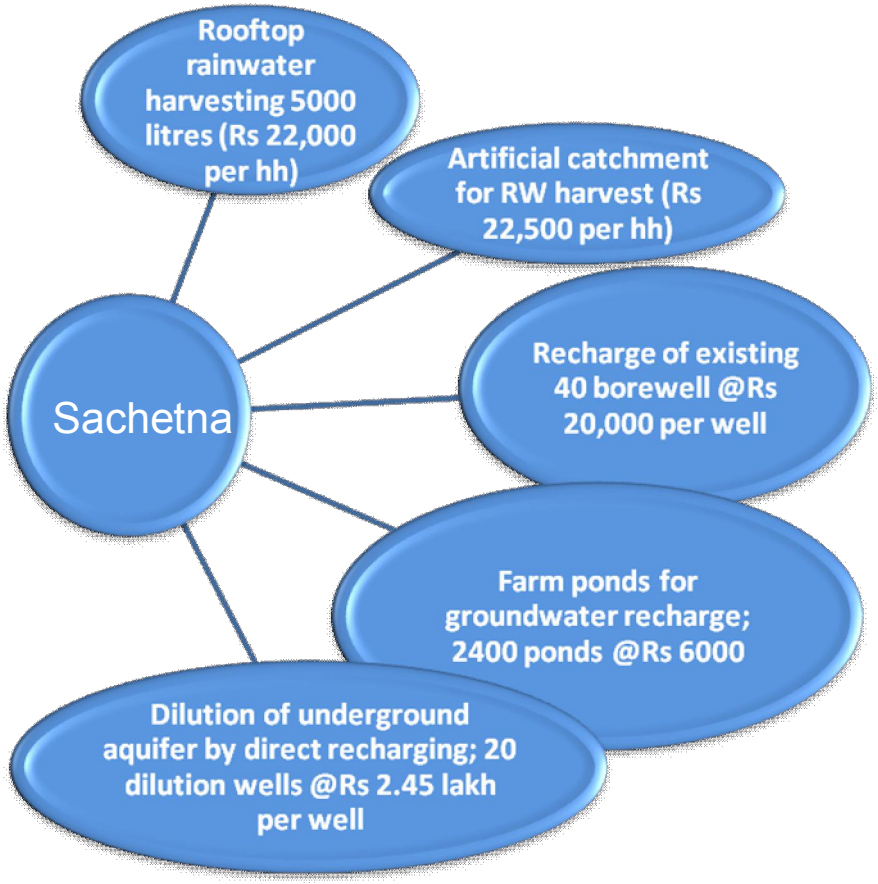
Principle 4: Promote area specific strategies

WAY AHEAD

Tapping shallow aquifers; recognizing that the shallow aquifer is the dynamic water table; recharge promoting conjunctive use (groundwater+ rainwater);



Sachetna Plus: Fluoride 1-5 mg/l
Gadag, Tumkur, Chikballapur– Karnataka;
64 villages, 60,000 people, 5600 households ;
Conjunctive use; dilution by artificial recharge



Principle 4: Promote area specific strategies

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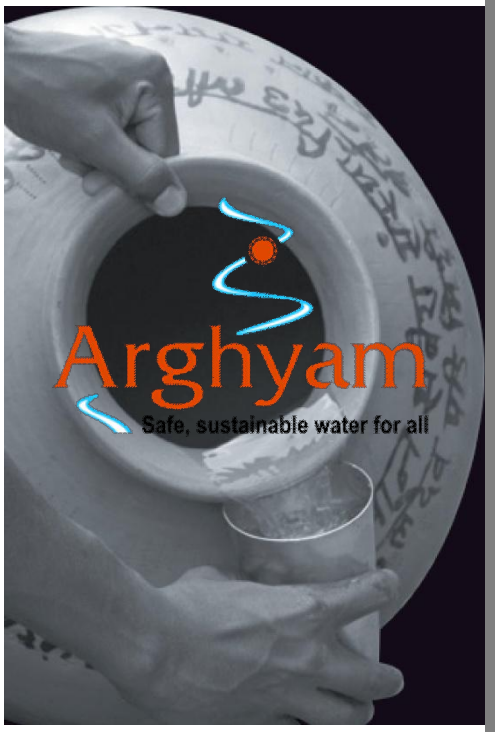
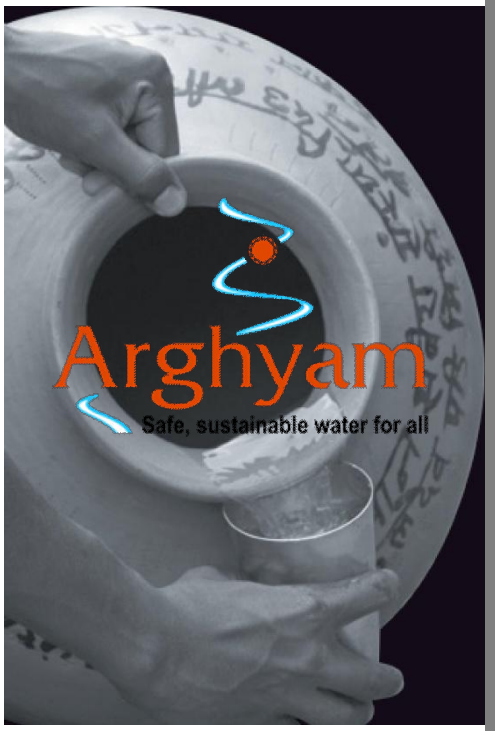


Mazhapolima, Thrissur district, Kerala;
4.5 lakh open wells (6 lakh households)to be recharged; Different well recharge models for diff hydro geological regions Addressing sustainability (quantity & quality)

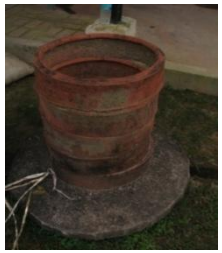
WAY AHEAD



4: Promote area specific strategies

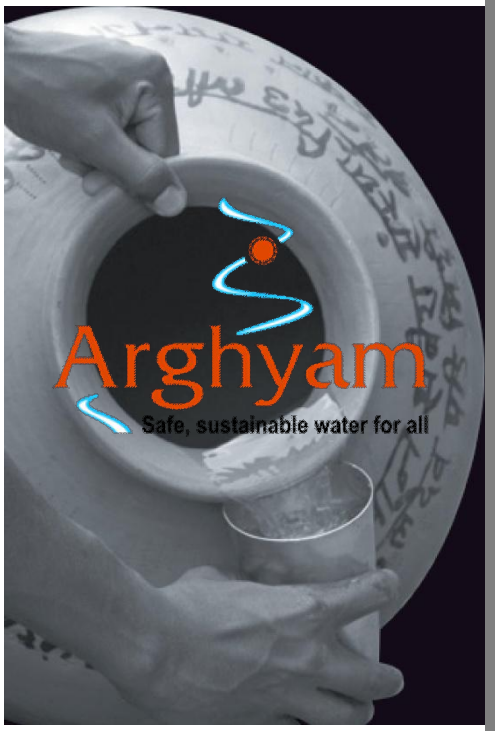
Tapping shallow aquifers; recognizing that the shallow aquifer is the dynamic water table; recharge promoting conjunctive use (groundwater+ rainwater);

Arsenic filters with regeneration facility; Habra block, 24 Parganas, West Bengal



Megh Pyne Abhiyan, North Bihar; 21 panchayats; Rainwater harvesting; dug well renovation; matka filter and ecosan

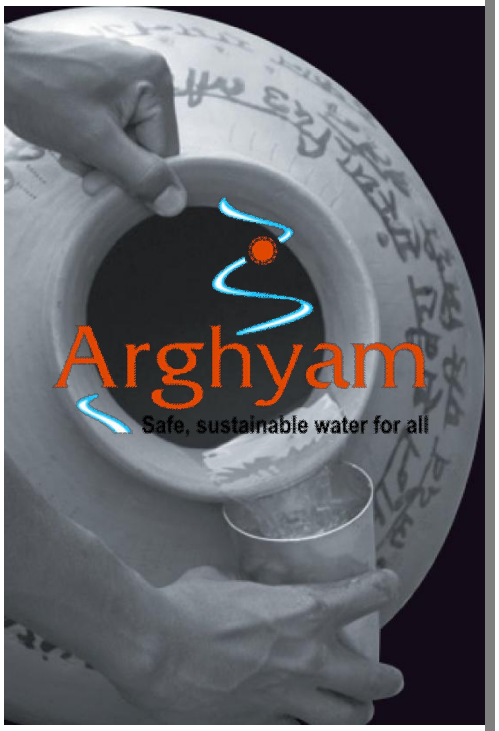
WAY AHEAD



5: Creating capacity at the grassroots

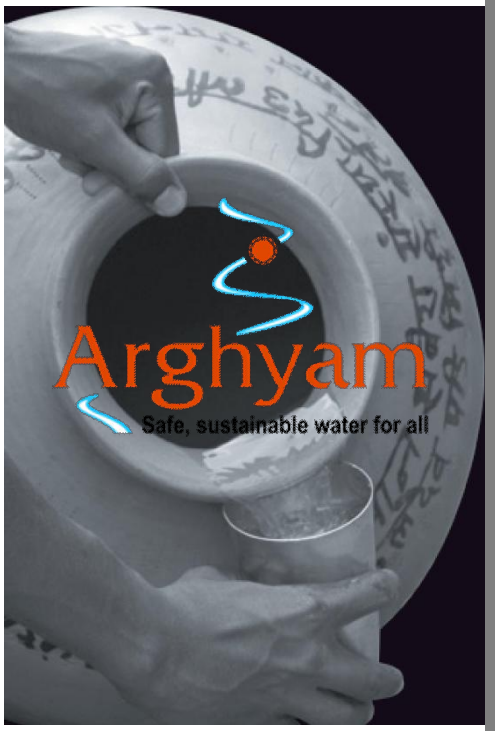
- ***Kachchh, Gujarat***
- ***Parab***—barefoot engineers*;* trained on basic geo-hydrology & water resource planning;
- **6 months programme [4 months class room+2 month onsite]**
- 64 local youth trained; **52** technical proposals prepared and approved
- **WASMO hired 20 parabs** to support paani samiti and monitor projects in other talukas
- Enable regional institutions to build capacities on ground water management

WAY AHEAD



6: Legal right to safe, adequate water

- Quality with its linkages to health, productivity, livelihood is a rights issue
- Second revision of IS 10500: 1991 lists 67 parameters [Organoleptic and Physical parameters (7 nos), General Parameters (24 nos) toxins other than pesticides(14 nos) radio active (2 nos); pestcides (18 nos) bacteriological (2 nos)]
- Need a legal standing



THANK YOU

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