Efficiency and Equity in Urban Water Access: Case of Kolkata

The increasing demand for water

Present Water-use and Future Requirement in India 1990-2050

Year	Population (million)	Sector-wise Water-use and Future Requirements (million hectare-metres)				
		Irrigation	Domestic & Livestock	Industry	Thermal Power	Total
1990	800	46.0	2.5	1.5	3.0	53
2000	1000	63.0	3.4	3.6	5.0	75
2025	1400	77.0	5.0	12.0	16.0	110
2050	1700	70.0	6.0	20.0	16.0	112

Declining Quality

Human Induced Pollution

New emerging realities:

How can we ignore?

One third of the world's population is now subject to water scarcity

Population facing water scarcity will more than double over the next 30 years

Source- IPCC 2001

Future Uncertainty

Risk Reduction
and
Resilience Building

Efficient and Equitable Management of Water

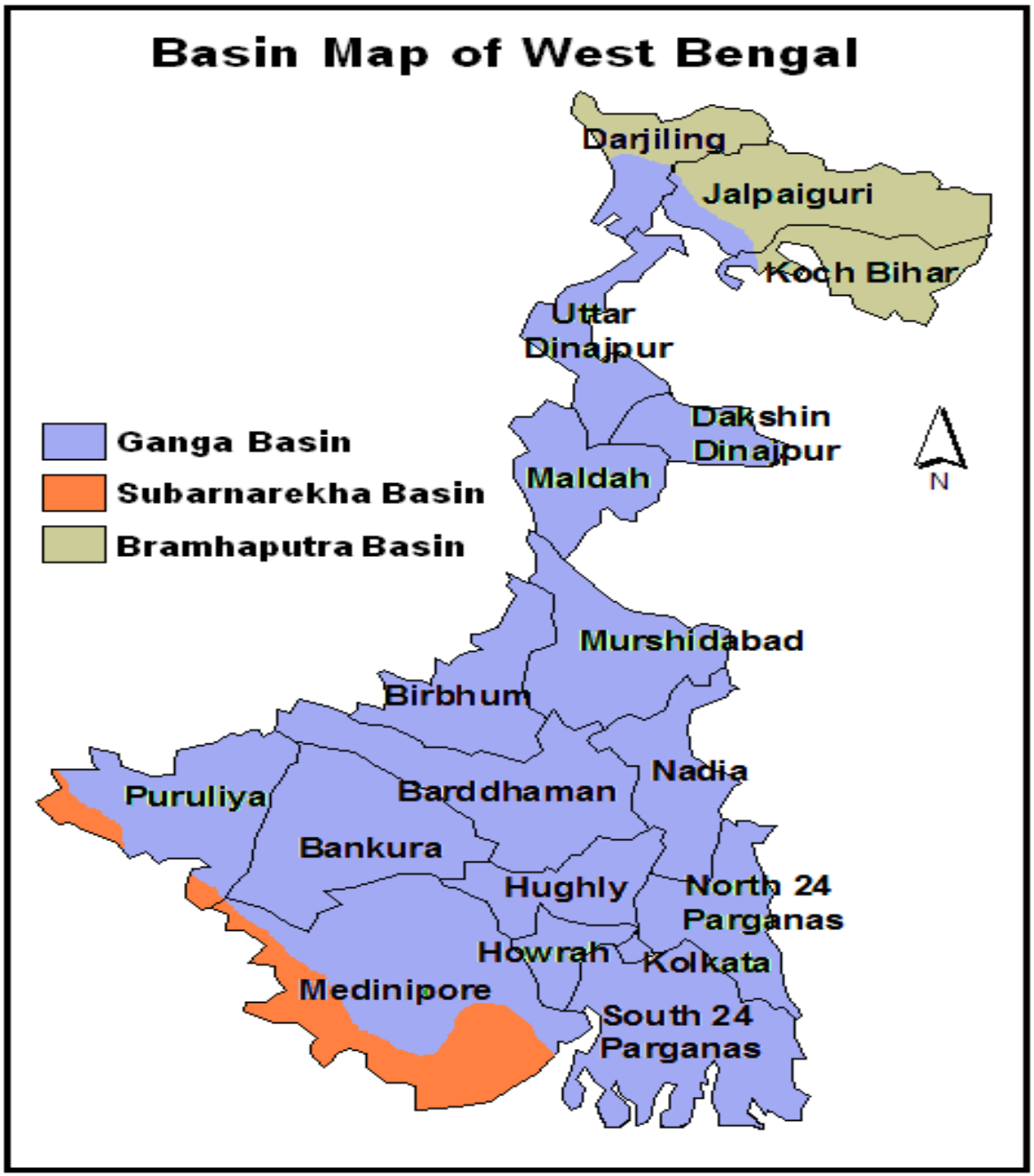
Multiple Challenges

Unfinished agenda

Proportion of Population with Sustainable Access to Water Source

	1991	2000
Rural	55.54	86.77
Urban	81.38	82.22
Total	62.30	85.22

GOI 2005


Basin Map of West Bengal
Darjiling
Jalpaiguri
Koch Bihar
Uttar Dinajpur
Dakshin Dinajpur
Maldah
Murshidabad
Birbhum
Nadia
Barddhaman
Puruliya
Bankura
Hughly
North 24 Parganas
Howrah
Kolkata
Medinipore
South 24 Parganas
Ganga Basin
Subarnarekha Basin
Bramhaputra Basin
N

Ganga Basin is stressed more:

Population share 75%, Surface water share 35%

Brahmaputra Basin: 9% population, 46% surface water share

Water Resource accounting

ASSET ACCOUNT (in mcm) 2009	TOTAL
OPENING STOCK	
GROUND WATER	683781.4
SURFACE WATER	51010
TOTAL WATER	78456.99
CHANGES DUE TO HUMAN ACTIVITIES	
Abstraction	102699.78
Return	
CHANGES DUE TO NATURAL PROCESS	
Precipitation	165640.6
Inflow	
from upstream	598562.8
from other territories	1491.6
Evapotranspiration	80422.2
Outflow	
to downstream	683781.4
to other territories	
other volume changes-storage	4351.9
CLOSING STOCK	133741.11

Water: SD Management

Declining per capita availability : Supply management -water use efficiency through water intensity reduction

The increasing demand for water: Demand management through Formal t Economic Instruments

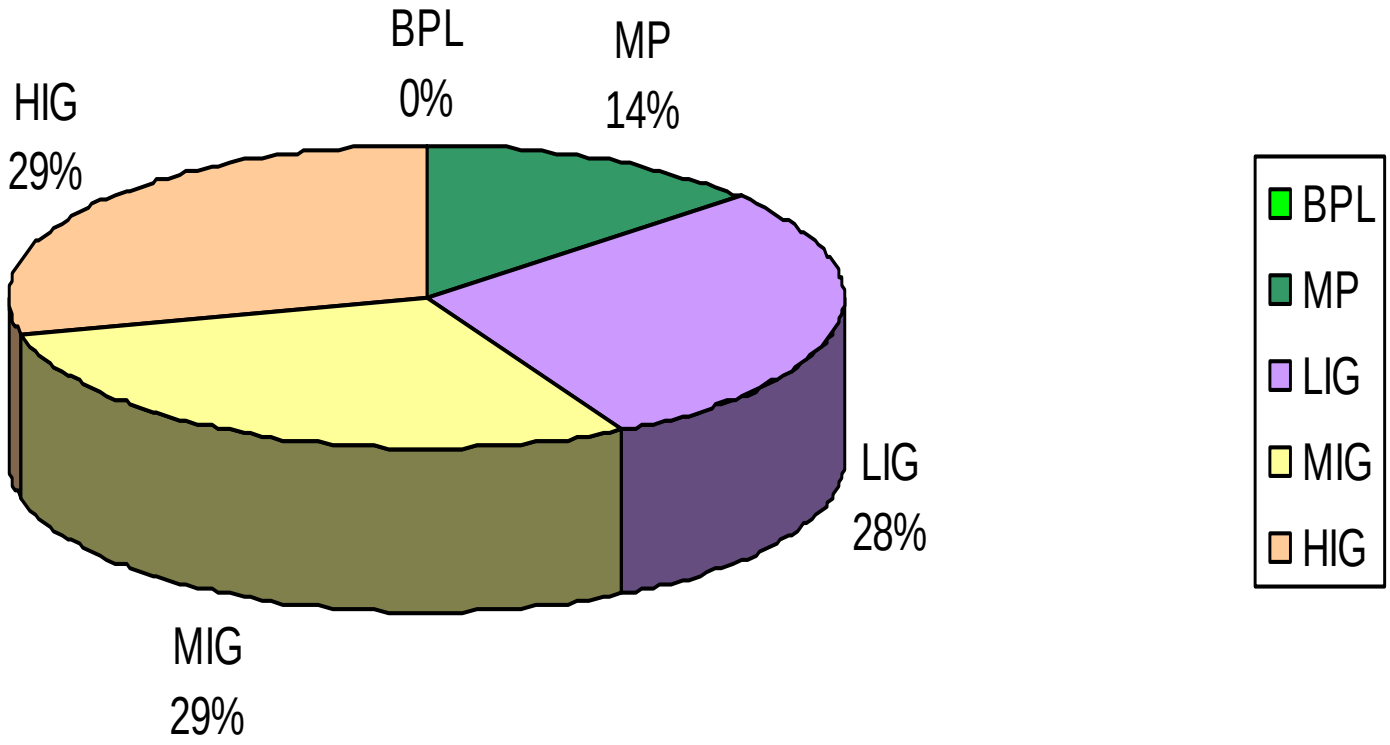
Deteriorating quality: Technology, Policy

Future uncertainty on quantity under climate change scenario: SEEAW

Efficient and Equitable Management of water :Information, Water Footprint

Efficient and Equitable Management of Water

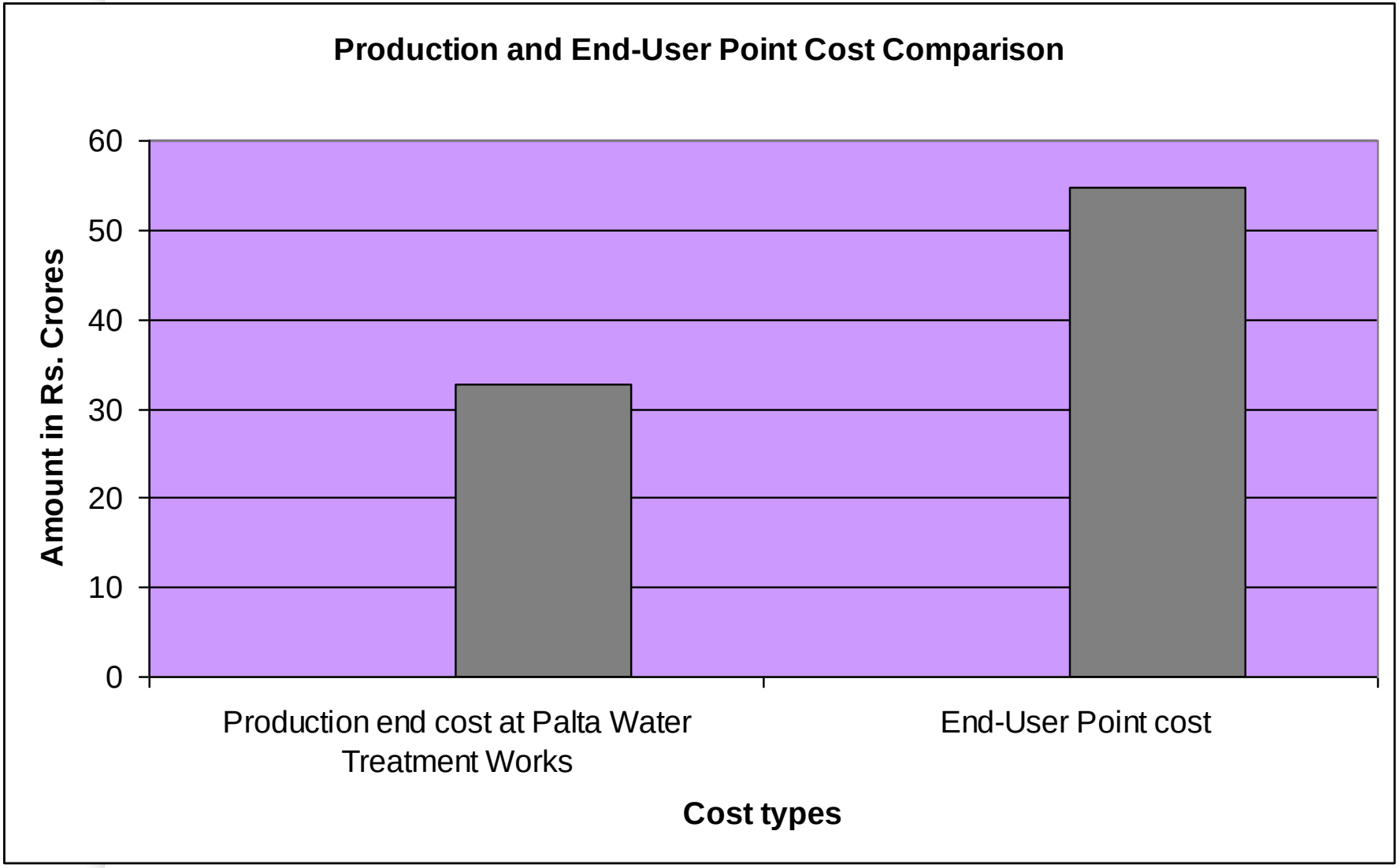
% of HHs with In-House KMC Connections



Beneficiaries do not pay

- Proportion of beneficiaries of the piped water service among total population: 82%
- Proportion of cost un-recovered: 83.7%

Cost of unjust city



Note: For 40% UFW

Inequity is water use

BPL

- per capita (in lts)
- **Drinking: 2.5**
- **Cooking: 9**
- **Other end uses: 100**

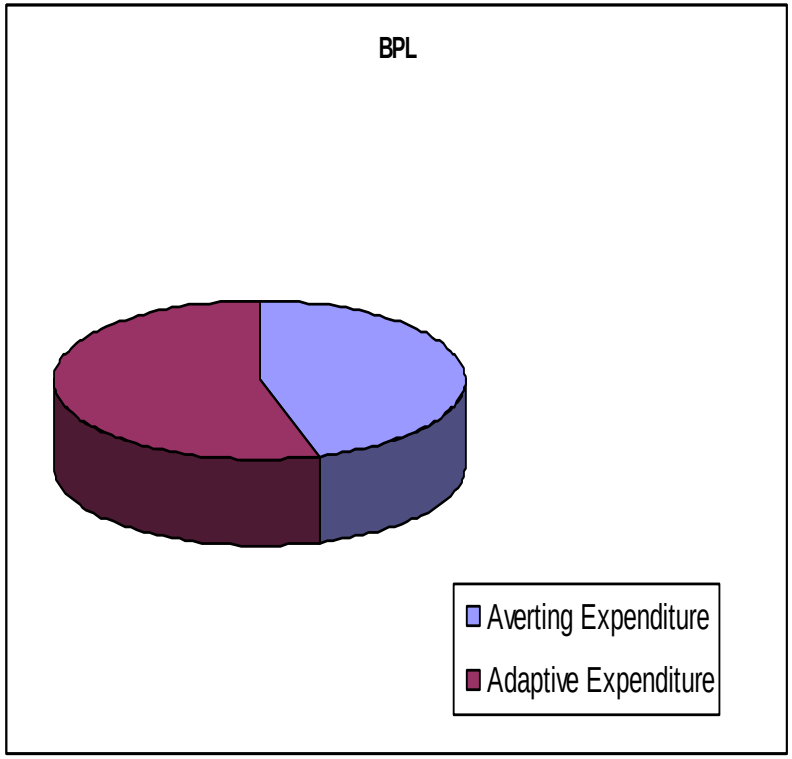
HIG

per capita (in lts)

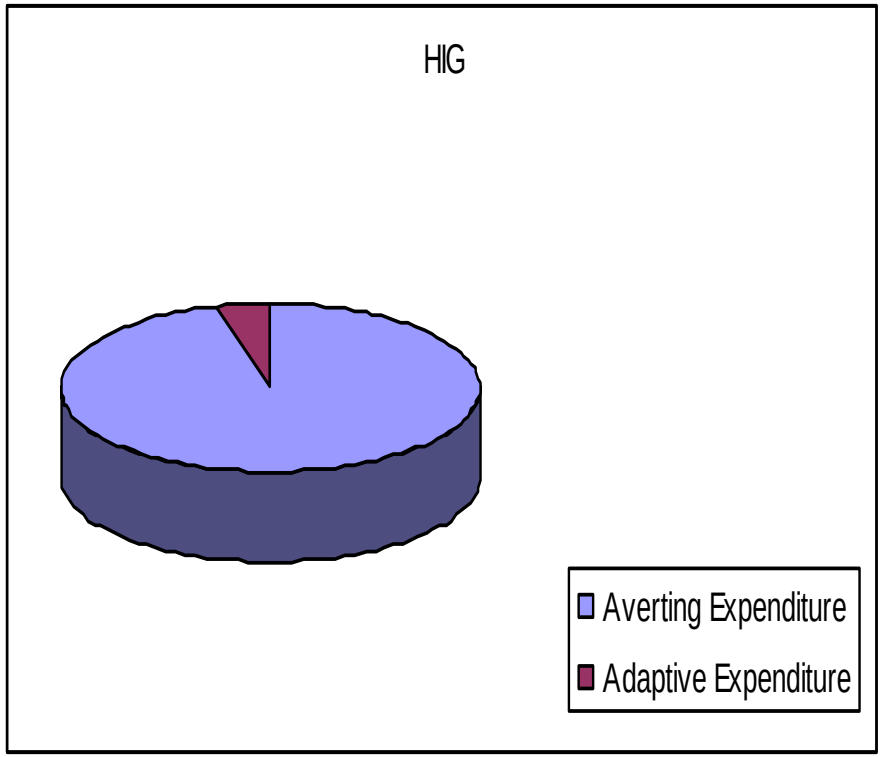
Drinking: 2.5

- **Cooking: 18**
- **Other end uses: 220**

Society bears the burden



More private cost



More private benefit

Cost society pays

Reason is free distribution and no accounting for water use by beneficiaries

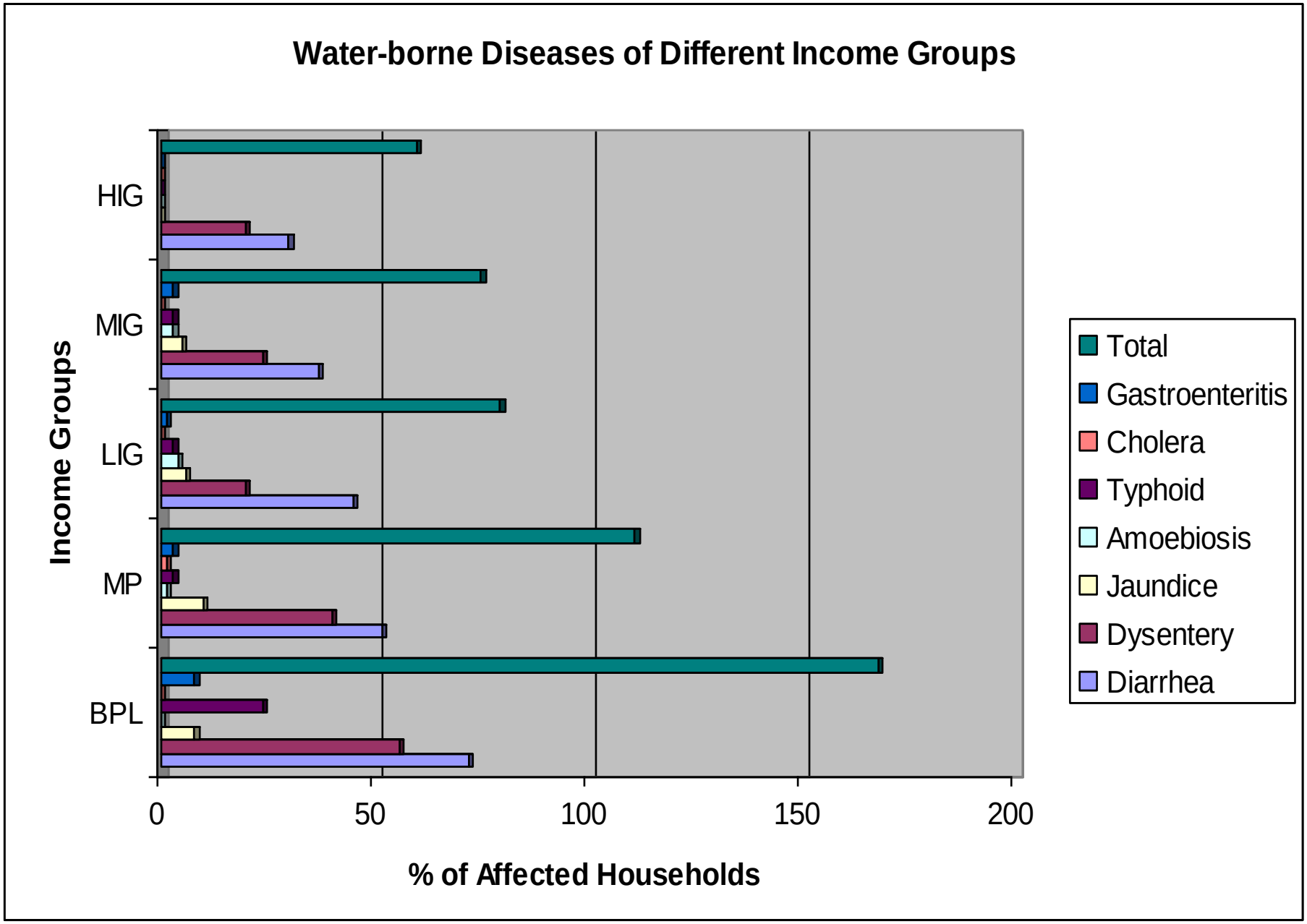
Per day wastage of treated water: 103.2 MG, cost wise Rs 8 lakhs lost /day

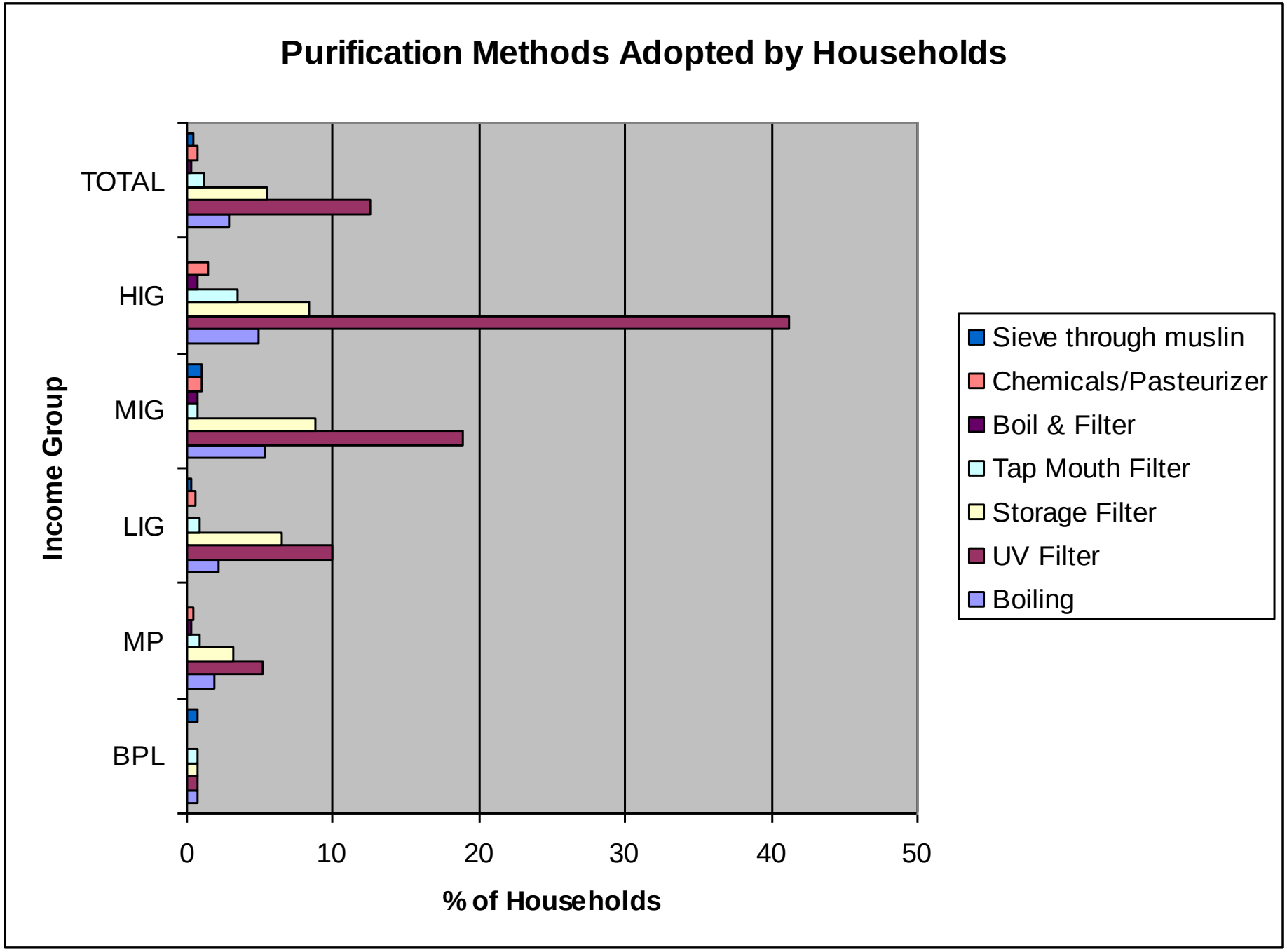
Electricity required to produce 103.2 MG treated piped water: 108,478 units

Awareness of Poor Quality of Water of the End users

Income Category	Awareness (%)
BPL	39
MP	41
LIG	46
MIG	50
HIG	60

Source: Socioeconomic Survey


Water-borne Diseases of Different Income Groups
Income Groups
HIG
MIG
LIG
MP
BPL
0
50
100
150
200
% of Affected Households
Total
Gastroenteritis
Cholera
Typhoid
Amoebiosis
Jaundice
Dysentery
Diarrhea


Purification Methods Adopted by Households
TOTAL
HIG
MIG
LIG
MP
BPL
Income Group
0
10
20
30
40
50
% of Households
Sieve through muslin
Chemicals/Pasteurizer
Boil & Filter
Tap Mouth Filter
Storage Filter
UV Filter
Boiling

To move towards
a Safe city which is a Just city

Policies to build a zero water waste city

At operational phase

Technology specification

: **metering water use for each end user**

Economic incentive design

: water service user fee

At construction phase

metering, harvesting runoff, recycle

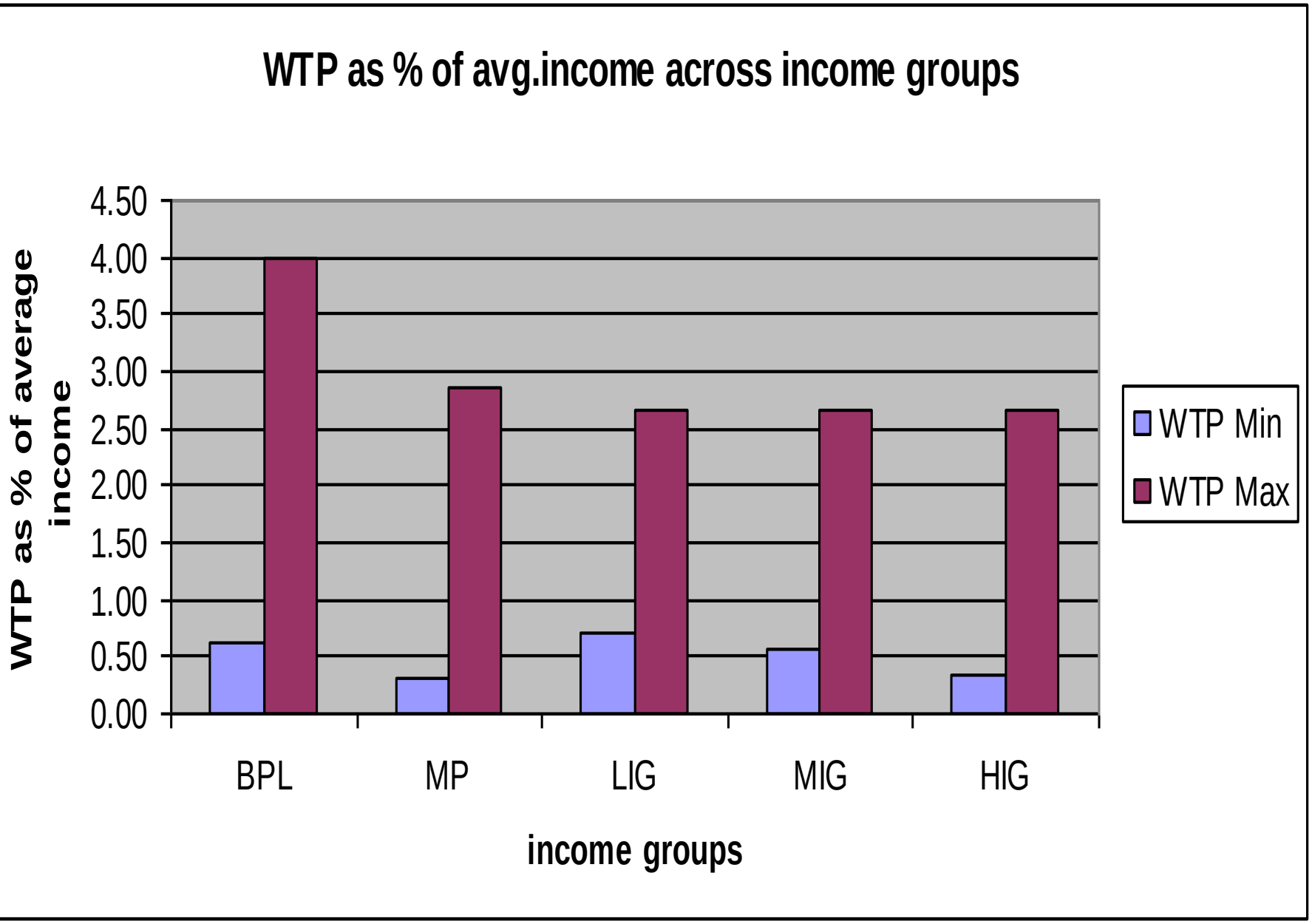
Let’s fix the responsibility

Cost sharing by beneficiaries

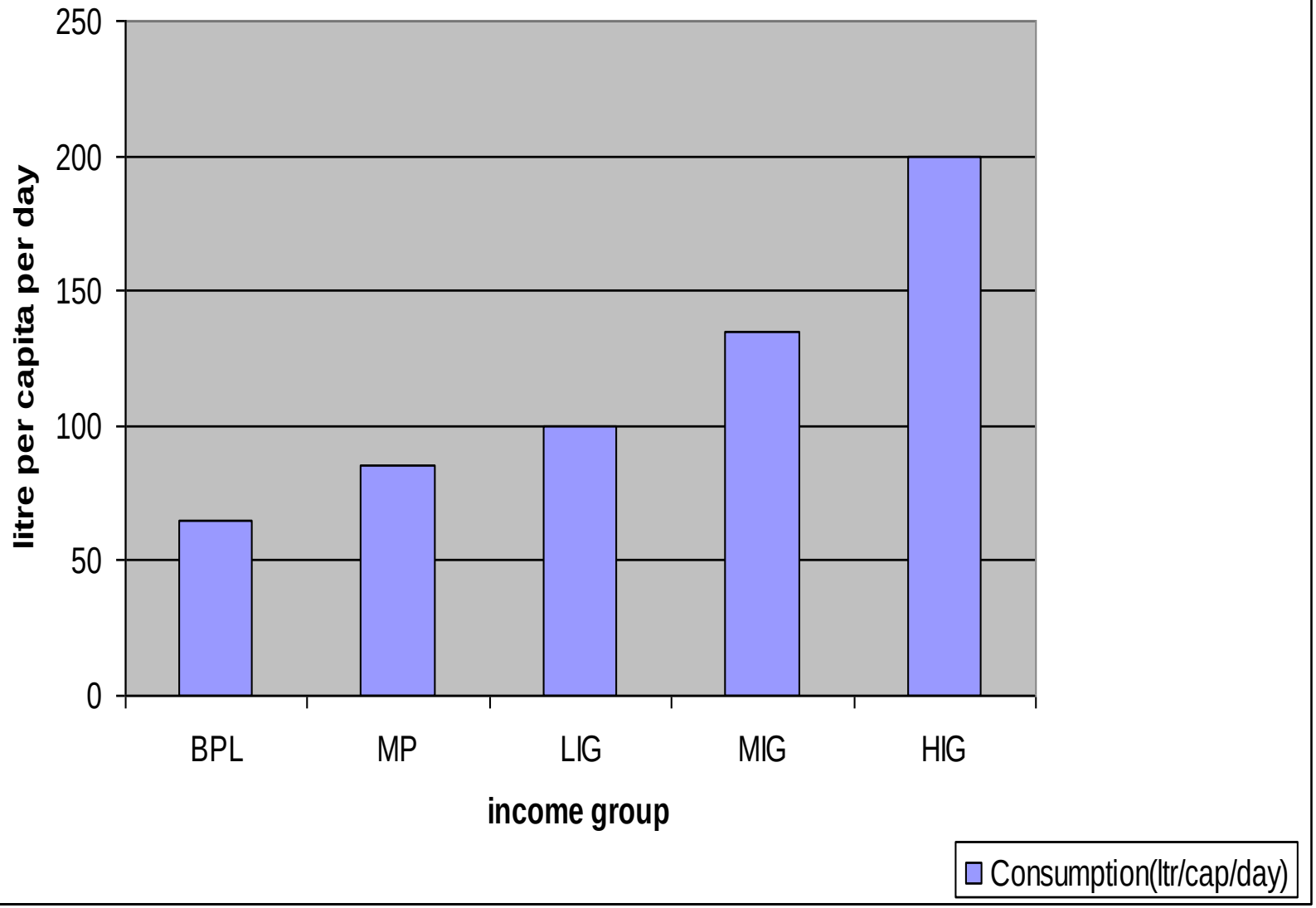
Accountability of Service Provider

Question

Is this Achievable


WTP as % of avg.income across income groups
WTP as % of average income
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
BPL
MP
LIG
MIG
HIG
income groups
WTP Min
WTP Max

Actual Consumption of water across income groups



Multi-criteria based Strategy

WTP

ATP criteria for basic amenities

Access to Basic Minimum need

Financial Sustainability

Accountability of Service Provider

Need for new rules

Past and Present Regulations

- 2003 regulations allowed :

10mm, 15 mm ferrule – 0 water charge

20mm, 25 mm ferrule – positive quarterly charge

- 2004 onwards:

Free for all ferrule sizes (residential connections)

Outcome

- No incentive for wastage reduction
- Efficiency is violated
- Distributive justice is violated

Volumetric Water Charge

Payment based on service enjoyed

Similar service examples:

1. **Electricity**
2. **Telephone**
3. **Transport**

Income Category-wise Water Service Charge Burden on Consumers (Provisional Estimate)				
Income Category	**Consumption**	**Estimated Bill/Month**	**Median Income**	**Share of Proposed Bill in Income (%)**
BPL (Slab 1)	**65**	**10**	**1000**	**1**
MP (Slab 2)	**85**	**35.2**	**2500**	**1.4**
LIG (Slab 3)	**100**	**82.2**	**5000**	**1.6**
MIG (Slab 4)	**135**	**166.2**	**10000**	**1.7**
HIG (Slab 5)	**200**	**361.2**	**20000**	**1.8**

Source: Research Team's provisional estimate (Not to be quoted without permission)

Jadavpur University