



Water markets and pricing

By
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Make Water Everybody's Business

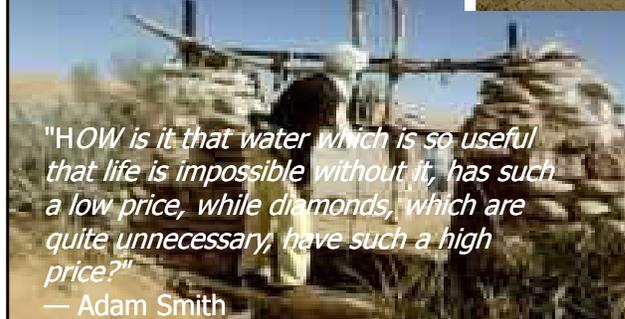


Valuing Water

If water is available, it has no value, if it is not available it is highly valuable

"HOW is it that water which is so useful that life is impossible without it, has such a low price, while diamonds, which are quite unnecessary, have such a high price?"

— Adam Smith




Initiate a Blue Revolution more crop per drop.

Kofi Annan Millennium Report



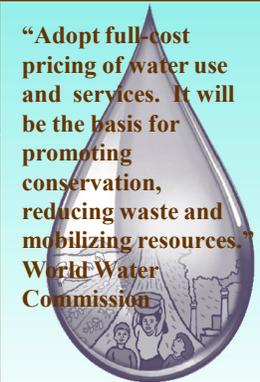
Water markets

A complex issue

- Water pricing
- Access by all (an ethical issue)
- Roles of public and private sector
- Political stability
- Transparency

“Adopt full-cost pricing of water use and services. It will be the basis for promoting conservation, reducing waste and mobilizing resources.”

World Water Commission

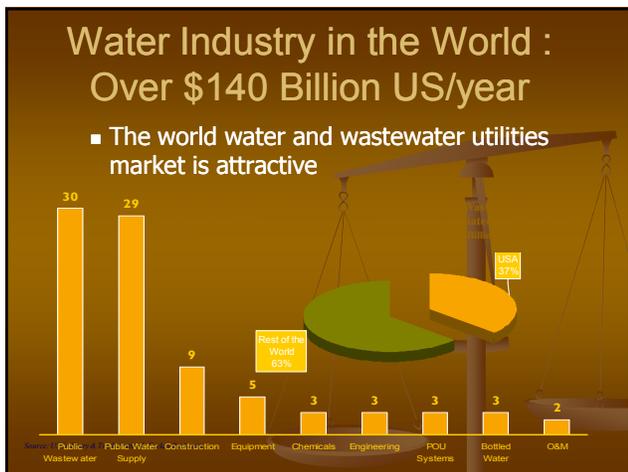


THE COST OF WATER SERVICES

	1995	2025 Vision	Notes and assumptions
Access to drinking water			
% of population with access	62%	95%	Target is to reduce unserved by half by 2015
Cost pa \$ bn	13.3	8	Spread evenly over the period. Mix of standpipe and household connections at average cost of \$80-90 per capita
Sanitation and hygiene			
% of population with access	39%	95%	Target is to reduce unserved by one third by 2015
Cost pa \$bn	1.3	13 - 17	Mix of level of service from sewers to pit latrines depending on location, rural, urban etc, average cost of about \$140 per capita
Municipal waste water treatment			
% municipal waste treated	10%	20%	Assumes secondary treatment only; average cost around \$70-80 per capita
Cost pa \$bn	14.2	70-75	

Industrial effluent			
Cost pa \$bn pa	7	30-40	50% of cost and coverage of municipal
Total of above \$ bn Per annum	35.8	121 - 140	
Agriculture	30-35	43-50	Information scarce and more work needed to make better estimates
Environmental protection	5-10	10	Excluding direct costs of waste water treatment
Total \$bn per annum	70-80	174 - 200	

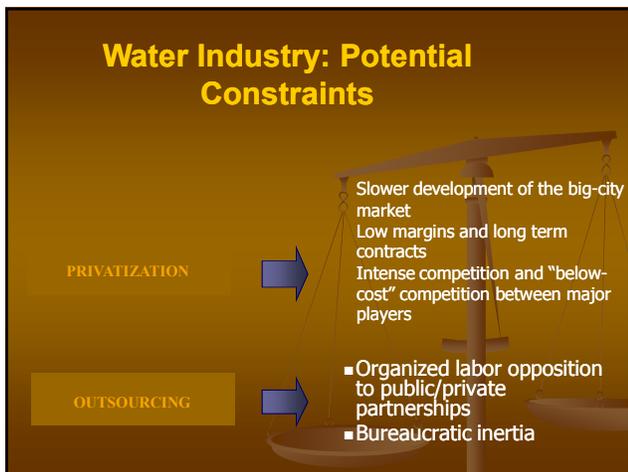
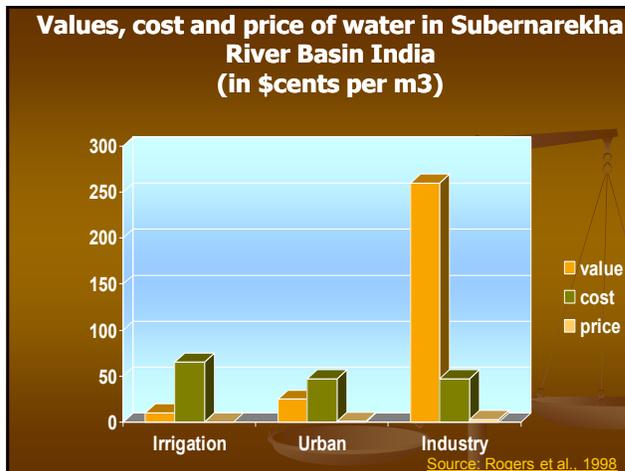
Source: Framework for Action. - GWP. Cost estimates include about 15% of capital cost for O&M



It Is Expensive To Be Poor

City	Tap water (\$/m3)	Vendor water (\$/m3)
Port-au-Prince, Haiti	1.00	5.50 - 16.50
United States, typical	0.40 - 0.80	
Jakarta, Indonesia	0.09 - 0.50	1.50 - 2.50
Lima, Peru	0.15	3.00

Country	Existing price	Full cost
Denmark	0.8	0.9
France	1.1	1.5
Germany	1.0	1.2
Greece	0.4	1.6
Spain	0.4	1.2
UK	1.2	1.3



- ### Options for Water and Sanitation
- ◆ Recognize the right to access
 - ◆ Recommend lower service standard for more people
 - ◆ Recommend targeted subsidies for the poor
 - ◆ Recommend community built, owned and managed systems (especially sanitation)

Access and Affordability

Cost estimates show that 80% of the unserved could be provided with basic requirements for 30% of the cost of providing the highest level of service to all.

"Given the opportunity to choose for themselves, poor communities will usually opt for systems which are affordable and locally sustainable....."

Increasing water productivity: shifting from conventional to drip irrigation

- Cuts water use by 30-60%
- Increases yields 5-50%
- Increases water productivity 70-250%
- Potential for drip in India: 10 million ha or 20% of area

Source: Givanappan (1994)

SOME SUGGESTIONS...

- integrate service development with the local consumer economy;
- develop pricing and charging schemes that will ensure the financial sustainability of water investments;
- facilitate poor countries' access to water funds and develop micro-credit mechanisms;

- encourage local development banks to invest in water;
- enable developing countries to attract and benefit from private sector funding.
- encourage new investments from the international private sector;

- *Encourage governments, traditional lenders and existing actors in the water sector to finance more water infrastructure*
- *Identify new ways to finance water infrastructure*

- *Debt relief arrangements*
- *Create an enabling environment to invest at the local level*
 - Securing property laws
 - Valuing water
 - Supporting microfinance

Urban water

Every Dollar invested in urban water supply without sanitation creates an off balance sheet liability of two to three Dollars

Status of urban water

- urban water accounts for 5–6% of the total water consumption in the country which is grossly inadequate in relation to water demand. This results in the continually rising demand for water
- although water is accessible to approximately 85% of the country's total urban population, it is 30–60% lower than the nationally established water consumption norms.
- Almost without exception, water distribution system is unreliable. Most households face limited hours of service and low pressure
- 20–60% of water is lost in the distribution system and to unauthorized use by urban households.

Public expenditure on urban water

- Public expenditure on urban water supply and sanitation accounts for 1.2% to 1.8% of the total plan investments, and is significantly short of requirements.
- The Rakesh Mohan Committee estimates the magnitude of investment to be of the order of Rs. 860.2 billion for the period 1996–2006 in India's urban areas.
- The Planning Commission has made a provision of Rs. 117 billion for a period of five years (1997–2001), which leaves a large unmet investment gap.

Instruments of urban water charging

- Three types of instruments are generally used for charging water. One is a connection fee or a fixed access charge. Such a fee is levied to provide to the user a connection to a municipal water supply. A connection fee or charge is based on the size of the plot or holdin or on the size of connection and ferrule.
- Two: a water tax for which a provision exists
- A third method of charging is a water charge. Conceptually designed as a charge on consumption, it is a ubiquitous instrument for charging both metered and unmetered water supplies. Besides a connection fee, a water tax

water pricing

- structures in India are extremely complex and clumsy. At one level, price structures distinguish metered connections from unmetered supplies as also bulk provision from non-bulk, discrete provision.
- At another level, price discrimination is common with
- (a) categories of water users which comprise not only the principal categories of domestic users and non-domestic users but also the assorted categories consisting of water use for washing motor vehicles, passages and stalls, cattle sheds, stables, and the like, and
- (b) income groups of households, assumption

Tariffs

- Several types of water tariff are used in the water sector:
- (a) Block tariff: A block tariff is a series of prices that increase in steps as consumption rises.
 - One feature of block tariff is that it contributes to equity by allowing low income households to pay lower rates for water than other households

Table 1. Examples of Block Tariff for Domestic Use

City	Size of the initial block (kl)	Number of blocks	Water tariff/kl Rs	
Bangalore	<15	5		3.5
Delhi	<10	4	0.35 paise plus 50% per 1000 ltrs.	
Hyderabad	<15	4		3.7

Table 2. Examples of Block Tariff for Non-Domestic Use

City	Size of the initial block (kl)	Number of blocks	Water tariff/kl Rs	
Bangalore	<10	6		33.0
Delhi	<50	2	5.0 paise plus 50% per 1000 ltrs.	
Hyderabad	<50	4		8.0

Volumetric tariff

- (b) A uniform volumetric charge forms an important part of water price structures in several cities and towns .
 - Although simple to use, a uniform rate does not provide any incentive to consumers to effect savings on water use.

Table 3. Examples of Single Tariff Rate

City	Uniform Tariff (Rs./kl)	
	Domestic	Industry
Kanpur	2.0	10.0
Indore	2.0	22.0
Surat	2.0	8.0
Madurai	5.0	20.0

Linear water tariff

- (c) A linear water charge which rises with consumption is prevalent in states such as
 - Kerala where a monthly water charge is specified for discrete quantities of water. Thus, a consumer in Kerala is required to pay a monthly charge of Rs. 22 for a consumption not exceeding 10 kls; the charge increases to Rs. 25 for a consumption level of 11 kls, and rises to Rs. 550 for a consumption of 100 kls/month.

Table 4: Example of Increasing Water Charge, Kerala

Kl Consumption/ Month	Charge including meter inspection charge (Rs)
10	22
11	25
12	28
13	31
25	67
50	182
100	550

Unmetered tariff

- (d) For unmetered supplies, price structures most commonly used are either annual fixed charges as shown below, or charges that vary with the size of water connection.
 - Separate pricing structures are applied to standpost connections where such charges are provided for in the rules.

Table 5: Examples of Pricing Structures of Unmetered Supplies

City	Annual flat rate (Rs.)		Annual ferrule based prices (Rs.)		
	Domestic	Industry	Ferrule size	Domestic	Non-domestic
Madurai	240	3360			
Chennai	500	4800			
Indore	720	3600			
Vadodra	-	-	1"	1440	25,200
Calcutta	-	-	1"	780	18,000
Jaispur	-	-	1"	4500	5,760

Minimum charge tariff

- (e) A minimum charge for a fixed quantity of water is observed in most cities and towns.
 - Conceptually, it is in the nature of a rent payable by all users having a water connection,
 - whether or not water is consumed. The minimum charges are so fixed that they are lower than the tariff rate laid down for the initial block, giving advantage of lower tariff to low water consuming households.

Cost-price linkages

- It is a common knowledge that prices charged for urban water do not cover the costs that are incurred on its provision.
- The annual deficits on account of water (average annual per capita expenditure minus average annual per capita revenue) were
 - Rs. 20 per capita in metropolitan cities,
 - Rs. 40 per capita in cities in the population range of 100,000 and one million, and
 - Rs. 30 per capita in towns which have a population of over 50,000 but less than 100,000 persons.

Table 6: Revenue Receipts and Revenue Expenditure of Urban Water Utilities

City	Year	Revenue Receipts (million Rs)	Revenue Expenditure (million Rs.)	% deficit uncovered by revenue receipts	% surplus after meeting revenue expenditure
Bangalore	1998/99	1936.3	2035.9	5.1	-
Chennai	1999/00@	2070.1	1818.1	-	12.2
Delhi	1999/00	2162.7	3175.8	46.8	-
Hyderabad	1997/98	1062.3	1365.5	28.5	-
Mumbai	1999/00#	9712.1	5820.8	-	40.0

@ Inclusive of debt services.

Inclusive of capital expenditure

Table 7: Water Tariff in Mumbai

User	Rates Effective from					
	April 1987	April 1993	May 1994	April 1996	June 1997	April 2000
Domestic	0.30	0.50	0.60	0.60	2.00-2.75	3.00
Industry	4.50	7.50	7.50	11.00	11.00	15.00
Commerce	8.00	12.00	12.00	18.00	18.00	22.00
Hospitals, Halls, etc	3.00	4.50	4.50	6.00	6.00	8.00
Race course, Hotels, etc.	10.00	23.00	23.00	35.00	35.00	35.00

The water supply sector in India has not been performing very well, perhaps due to the following reasons:

- Pricing mechanism is poorly organized — tariff rates not reflecting the true market situation.
- High maintenance bills (including wages/salaries and also power charges), resulting in high unit costs.
- Poor revenue realisation performance compared to the demand for tax/user charges.
- Heavy losses due to old system of infrastructure (e.g., corroded pipe lines and leaking joints), pilferage and theft.
- Large component of the slum/poor population necessitating increase in provision of the services without adequate financial return.

Fixed cost

Fixed cost is mainly concerned with borrowed money from the financial institutions for implementation of the project. The mode of debt servicing or repayment depends on the financing pattern of financial institutions. The fixed cost contains mainly:

- The repayment of principal amount borrowed.
- The repayment of interest on borrowed capital.

Variable cost

Variable cost deals mainly with operation and maintenance cost of the system and also sinking fund for the future replacement of the system. This cost mainly includes:

- Administrative expenses like salaries and wages.
- Repair and maintenance charges.
- Chemicals and consumables.
- Electricity charges.
- Depreciation charges.

Bottled water under controlled conditions?



THE WATER BOTTLE PHENOMENA

- We can divide the players present in this market into three categories:
 - companies which have diversified their production because they avail of the techniques of processing (agro-food companies, breweries),
 - medium sized companies which have invested in production units,
 - and small companies which have no modern equipment available to them. In 1998, 80 per cent were small units (Raphaël 1998).

THE WATER TANKERS

25 per cent industries were relying on private water tankers on a more or less regular basis in Delhi

- This market is also lacks of regulation and control:
- some of the companies are not registered, there is no quality control, etc. The firms do not have a real commercial strategy. They are mostly small structural units (encompassing around ten people) which have shifted to this activity
- either because they were formerly transport companies, or because the proprietor owned agricultural land, which gave him access, and property rights to the underground water table.
- The impetus for entering into this sector of activity is therefore the prior possession of at least one of the factors of production (land, tankers, wells) and the possibility of making a fairly high profit (30% of the sales according to Rao 1997).

Table 1. Characteristics of Different Modes of Water Supply in Delhi

Sources	Supplier	Origin and Treatment	Reliability of the supply	Reasons for the supply	Use as Drinking Water	Average Cost per Litre
Jar	Private enterprise	Mostly treated groundwater	Quality depends on the brand Reliable supply	To meet the deficiency of the public utility	Yes	Rs 0.5 per litre
Bottle	Private enterprise	Mostly treated groundwater	Quality depends on the brand Reliable supply	To meet the deficiency of the public utility	Yes	Rs 10 per litre
Private water tankers	Private enterprise	Mostly untreated groundwater and sometimes illegal appropriation of municipal water	Doubtful quality Reliable supply	To meet the deficiency of the public utility	Partly	Rs 0.08 per litre

VIABILITY OF THE PRIVATE OPERATORS AND THE EVOLUTION OF REGULATION

Municipal water through the network	Municipality (indirectly for illegal connections)	Treated surface water (90%) Treated groundwater (10%)	Doubtful quality Low pressure Intermittent supply	Main source	Partly	Free to those with illegal connections and around Rs 1 per m ³ for domestic use
Municipal water through pumps and wells	Municipality	Untreated groundwater	Doubtful quality Availability varies according to the electric supply and the groundwater table	Main or secondary source (depending on the area)	Partly	Free
Public water tankers	Municipality	Water produced by the municipality	Doubtful quality Availability sometimes	Distributed by the municipality in slums	Partly	Free for the slum dwellers Price then varies

						Insufficient for some households living in slums and residential areas also	and when required in residential areas	according to the users
Individual pumps and wells	Private	Groundwater sometimes treated by the consumers (filtering, boiling)	Doubtful quality Availability varies according to the electric supply and the groundwater table	To meet the deficiency of the public service	Partly	Free, but coping costs involved in installation and operation of private equipment		
<p>Note: The use of a source for drinking purposes varies according to the users. High-income households treat every source if they do not use bottled water or water in jars. Some households treat only the ground water. Others, finally, never treat the water whichever be its origin.</p>								

Property rights

- Conceptually, there are perhaps three major positions on the principles by which property rights to water could be allocated.
- the rights of those who own land at the source of the water (e.g., where the rain falls, or upstream actors generally) take precedence over others.
- "since the rain falls on our roof, it belongs to us".

History rights

- The polar opposite doctrine, "History", refers to the position that the rights of historical users of water, wherever they may be located geographically, should take precedence over others. since they made the investments and developed the water systems, their rights should come first.

"Hobbes" principle

- The third allocation principle dispenses with any concept of prior rights to water. It merely says that rights to water are what the interested parties agree to; the allocation of water rights is the outcome of a negotiation, a bargain, in which, inevitably, relative strengths will matter.
- This is the "Hobbes" principle, which asserts that the only way to decide the allocation over property rights is to "do a deal".

Dublin principle

- the World Bank has relentlessly spearheaded a campaign to push the Dublin principle — that water is an economic, rather than social, good. With the aim of improving access and sustainability of dwindling supplies, water trading and promotion of private water rights have been pushed onto developing countries.

Full cost recovery

- Significantly, the full cost recovery principle is a disguise to promote privatisation. Because it is easier to manipulate poor economies to set the trend, IMF imposed conditions of full cost recovery and/or privatisation in 12 of its 40 loans granted in 2000

Big business

- Water is indeed a big business.
- The entire water sector, including wastewater treatment is estimated global trade in water to be close to \$7 trillion.

Water: Pricing and control pressures

- IN LESS than half a century of independent existence, India, once water-rich, has been reduced to a water-insecure nation.
- Thanks to electoral politics that sustains itself on a culture of subsidy, a bureaucracy saddled with inefficiency, and a society wasteful in resource utilisation, water has become the country's scarcest resource.
- Between Cherrapunji's 11,000 mm and Jaisalmer's 200 mm, the country is averaged to receive 1,170 mm of annual precipitation.
- But desert-like conditions are now prevalent all across the country.

Danger signals

- Over the years, the annual per capita availability of renewable fresh water in the country has shrunk alarmingly. From a high of around 5,277 cubic metres in 1955 it dipped down to below 2,464 cubic metres in 1990. The projected increase in population by the year 2025 indicates that the per capita availability is likely to slip below the danger mark of 1000 cubic metres.

- The process of water distribution has continued to encourage inequality. Not only have the rich been served at the cost of the poor, they have literally been getting it free. For instance, at the cost of 1,600 unauthorised colonies and 1,100 slums in Delhi that are yet to get piped supply, the privileged class pays Rs 1.6 per cubic metre of water — the lowest in the country

- But, there is no 'free lunch' for the poor. Studies indicate that the poor pay 8-20 times what the rich pay to get water from unreliable sources. In contrast, what the rich pay for piped water is a fraction (less than 10 per cent) of the actual cost of producing potable water. It is clear that the poor face the brunt of this inequality

Water Pricing

In developed countries

Country	\$/M ³
Germany	\$1.91
Denmark	\$1.64
Belgium	\$1.54
Netherlands	\$1.25
France	\$1.23
United Kingdom of Great Britain and Northern Ireland	\$1.18
Italy	\$0.76
Finland	\$0.69
Ireland	\$0.63
Sweden	\$0.58
Spain	\$0.57
U.S.A	\$0.51
Australia	\$0.50
South Africa	\$0.47
Canada	\$0.40

City	Cost of water for domestic use (a)(house connection: 10 m ³ /month) in US\$/m ³	Price charged by informal vendors (b) in US\$/m ³	Ratio (b/a)
Vientiane (Lao PDR)	0.11	14.68	135.92
Male* (Maldives)	5.70	14.44	2.53
Mandalay (Myanmar)	0.81	11.33	14.00
Faisalabad (Pakistan)	0.11	7.38	68.33
Bandung (Indonesia)	0.12	6.05	50.00
Delhi* (India)	0.01	4.89	489.00
Manila (Philippines)	0.11	4.74	42.32
Cebu (Philippines)	0.33	4.17	12.75
Davao (Philippines)	0.19	3.79	19.95
Chonburi* (Thailand)	0.25	2.43	9.57
Phnom Penh (Cambodia)	0.09	1.64	18.02

Ref	Tool	Characteristics and application
2 Economic Instruments		
2.1 Paying for water		
2.1.1	Pricing drinking water	Pricing can enable cost recovery for delivery systems and provides signal for careful consumption.
2.1.2	Pricing for sanitation services	Charge levied on households and/or industry for waste water collection and treatment. Typically linked to volume of water consumed.

Ref	Tool	Characteristics and application
2.1.3	Pricing for irrigation water	Can be levied as flat rate, or time based, or volume based
2.1.4	Removing subsidies which may encourage excessive water use - <i>out of the box</i>	Subsidies in other sectors can encourage water use - such as on electricity or fuel for water pumping (India)
2.2 Establishing water markets and property rights in water Helping to improve allocation of water to higher value uses (eg to drinking)		

2.2.1	Setting up markets for surface water	Water allocations can be sold from one group of users to another
2.2.2	Transferable water rights	Water authorities sell water to the highest bidder, possibly for specific applications (eg irrigation)
2.2.3	Water auctions	

2.2.4	Setting up markets in groundwater	Land owners pumping ground water can sell excess to other farmers/users
2.3 Economic instruments for reducing polluting discharges		
2.3.1	Charging on the basis of pollutants discharged	Charges can be levied on pollutant discharges on basis of <i>load</i> or <i>concentration</i> . Charge aims either to raise revenue for environmental management and/or to provide disincentive to reduce pollutant discharges and hence reduce burden of charge.
2.3.2	Tradable discharge permits	Individual polluters can be allowed the right to buy and sell quotas of emissions subject to an overall upper quota on total emissions.
2.3.2	Taxing or price reform on certain pollution substances	Examples include introducing charges/taxes or removing subsidies on persistent pesticides to reduce their application

Ref	Tool	Characteristics and application
<i>2.4 Agricultural commodity pricing</i>		
2.4.1	Pricing policies affect crops grown and water used	Prices to support some crops may encourage high water use for irrigation ;
<i>2.5 Agricultural trade liberalisation</i>		
		Indirect instrument helping effective use of water ' virtual water' (water embodies in grain, food etc) can be imported from places where water abundant

- At present recovery of O&M and only a part of the capital charges is all that can reasonably be attained in many countries without adverse income impacts on small and marginal farmers;
- • the recommendations of the world water commission apply to all countries not just the developing countries. For example, in the area of full-cost pricing for irrigation in the oecd countries only one recovers capital costs, with many recovering only 70-90 % of O&M costs.
- water for basic needs for health, hygiene and livelihood should be available at low cost.