



**SSWM**

*sustainable sanitation  
and water management*

# Water Pricing & Tariff Structure

For IISD Leh Water Supply Workshop

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# Dr Srikanta K. Panigrahi's Acknowledgements

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(One Of the Key References + additions / subtractions / editing are done from Own Practical On the Site Experiences and Research of the Author **Dr Srikanta K. Panigrahi**)

Also Referred to the SSWM Toolbox are materials from various organisations and sources. **Those materials are open source.**

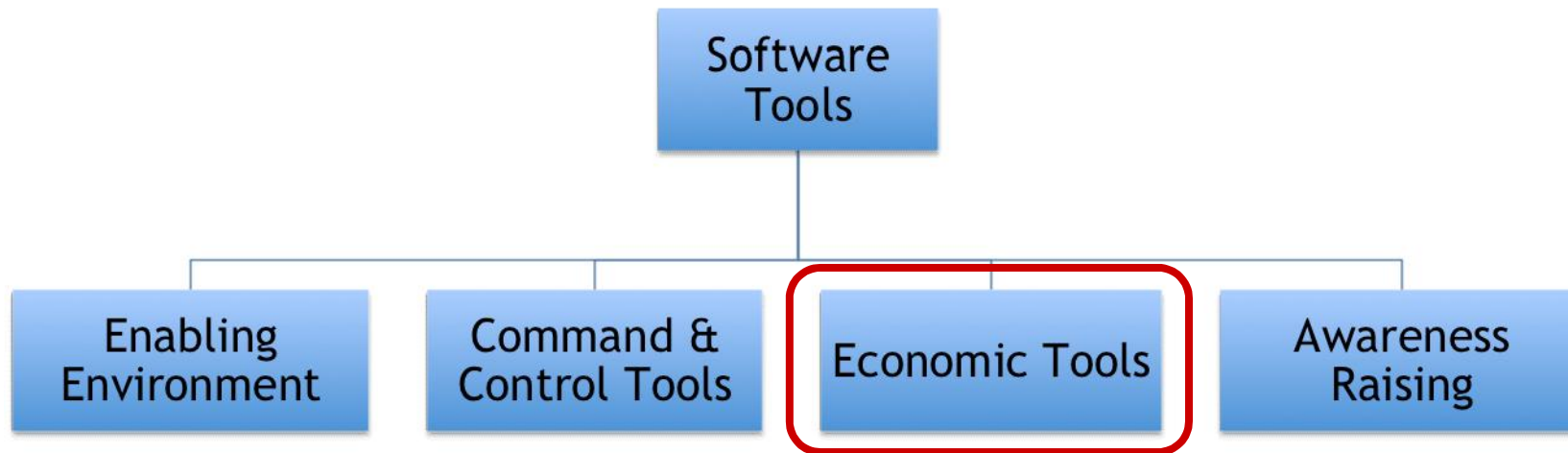


## Contents

1. Introduction
2. How can Water Pricing contribute to SSWM?
3. Social Implication of Water Pricing
4. Who Defines the Price of Water?
5. Types of Water Tariffs
6. Applicability
7. Advantages/Disadvantages
8. References

## 1. Introduction

### Where does Water Pricing belong to?



→ Pricing Water is an **economic tools** that belong to the software implementation tools in Sustainable Sanitation and Water Management

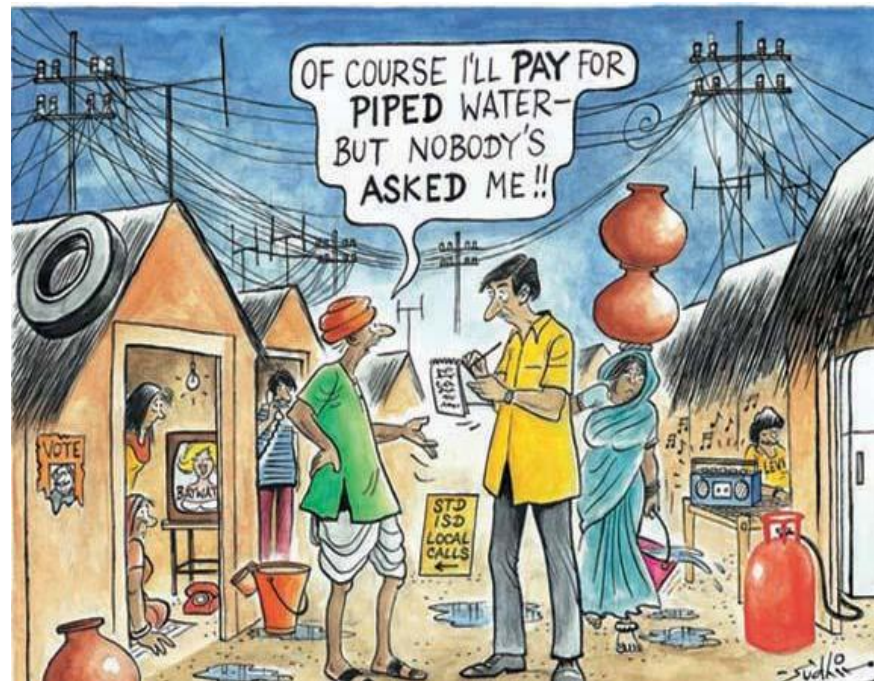
## 1. Introduction

### With Economic Tools...

...people change their behaviour because they want to achieve maximal benefit at minimal cost. Economic Tools involve the use of prices and other market-based instruments to provide incentives monetary incentives to change behaviour.

#### Tools:

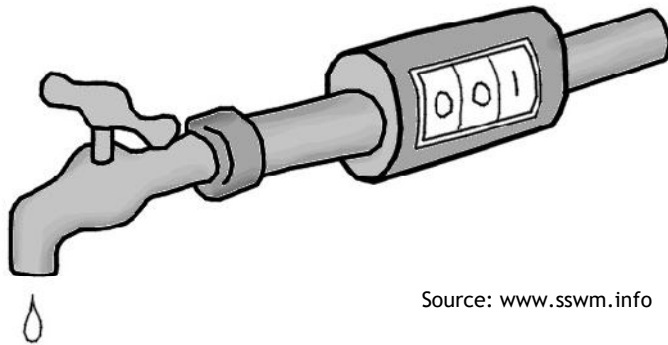
- Water pricing (tariffs)
- Subsidies
- Charges (irrigation, wastewater)
- Tradable water rights
- Etc.



Source: <http://www.wsp.org/userfiles/image/november2002.jpg> [Accessed: 23.03.2010]

## 1. Introduction

### Water Pricing in general



Source: [www.sswm.info](http://www.sswm.info)

- In July 2010, the UN general assembly proclaimed access to safe drinking water and sanitation as a **human right**. At the same time, water and sanitation are also **economic goods**.
- A **water tariff** is the price assigned to water supplied by a public utility generally for both freshwater supply and wastewater collection & treatment.

*Here we will introduce **water tariffs** as an important economic instrument for improving water use efficiency, enhancing social equity and securing financial sustainability of water utilities and operators.*

## 1. Introduction

### Water Tariffs

Water and wastewater tariffs determine the level of revenues that service providers receive from users in centralised or semi-centralised systems for the appropriate treatment, purification and distribution of freshwater, and the subsequent collection, treatment and discharge of wastewater.

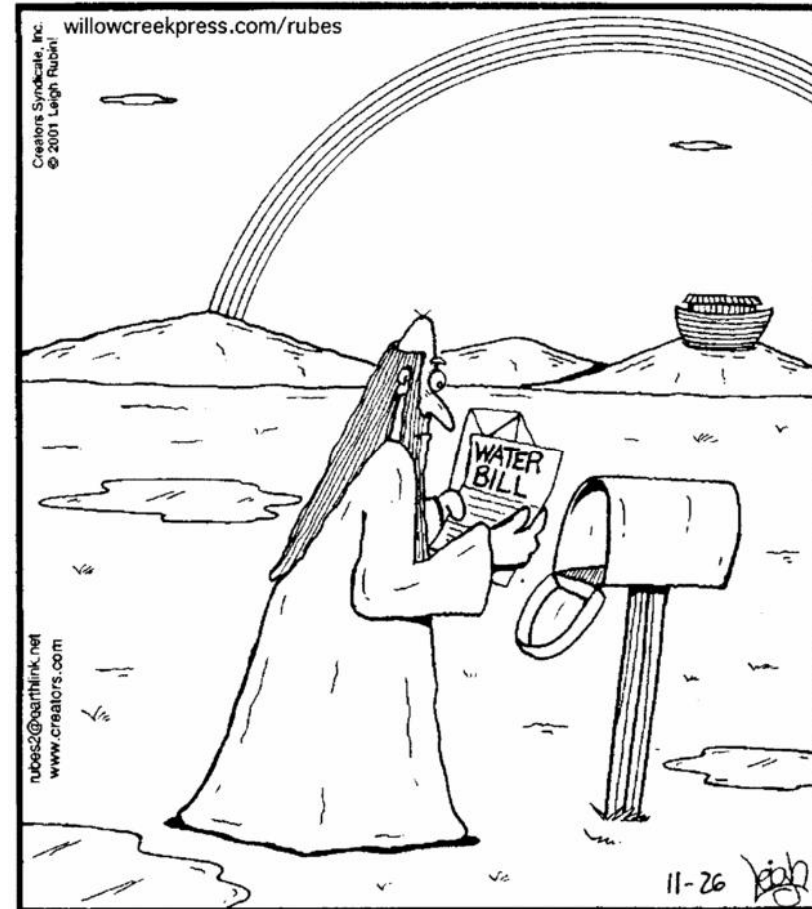
There is **wide variation of tariff setting** practices around the world, and there is no consensus on which tariff structure best balances the objectives of the utility, consumers, and society

## 1. Introduction

### Why Water Tariffs?

Providing water and sanitation services is costly.

In many countries consumers pay too little for water services. Revenue from water charges does not even cover operation and maintenance of water utilities, let alone re-investment for the infrastructure.



Contrary to popular belief, Noah faced his greatest challenge after the flood.



## 2. How can Water Tariffs contribute to SSWM?

### Why Water Tariffs?

A tariff is an important management tool that can be used to assist with efforts to improve the delivery of water and sanitation services



Having to pay for water encourages water-saving behavior, thus promoting water conservation

Source: <http://www.ec.gc.ca/education/default.asp?lang=En&n=5da49e15-1>  
Accessed 20.06.10

## 2. How can Water Tariffs contribute to SSWM?

How high should the price for water be?

**For  
Consumers**

It should be as  
cheap as  
possible

**For Utilities**

It should cover  
all running and  
reinvestment  
costs

**For the  
Environment**

It should be as  
expensive as  
possible (so it  
is not wasted)

***→ Defining an appropriate price for water can help to make Water and Sanitation Management socially, economically, and environmentally sustainable.***

### 3. (Social) Implications of Water Pricing

**Water is a human right, but also an economic good.**

**Water pricing decisions affect several different objectives or goals of policy makers, often in conflicting ways.**

**Objective of the Water sector:**

- Cost recovery
- Economic efficiency
- Equity
- Affordability



Source:  
[http://education.melbournwater.com.au/content/water\\_supply/saving\\_water\\_at\\_home\\_and\\_school/every\\_drop\\_counts/primary/the\\_weak\\_link.asp](http://education.melbournwater.com.au/content/water_supply/saving_water_at_home_and_school/every_drop_counts/primary/the_weak_link.asp)  
Accessed 20.06.2010

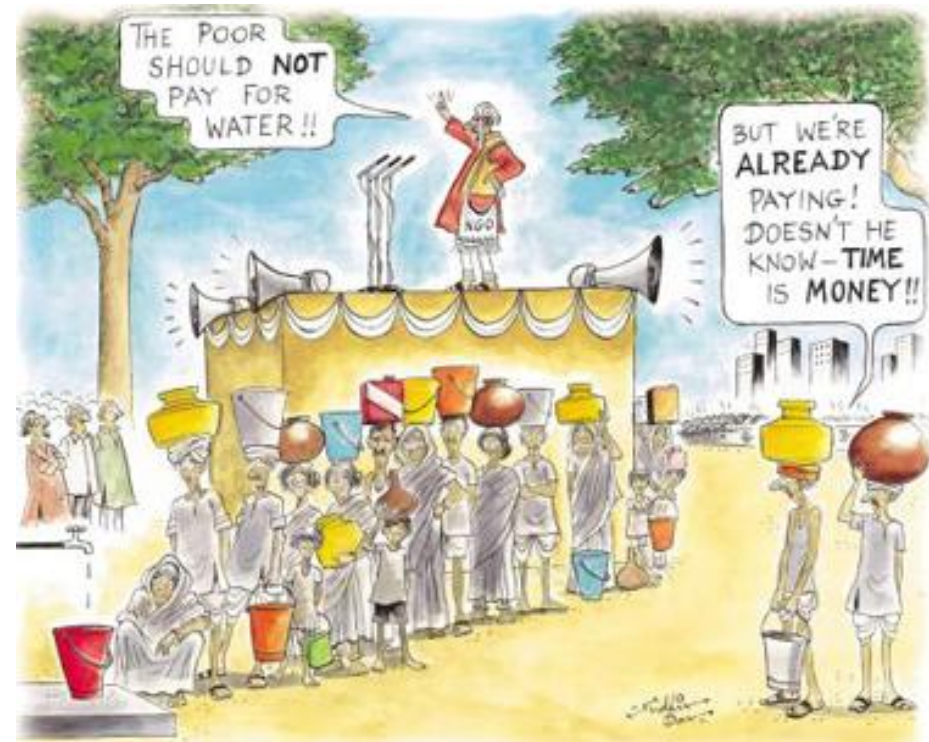
### 3. (Social) Implications of Water Pricing

#### Concerns:

Water tariff design is a political process that is rife with controversy

Rather than providing affordable water to the poor, pricing strategies may lead to

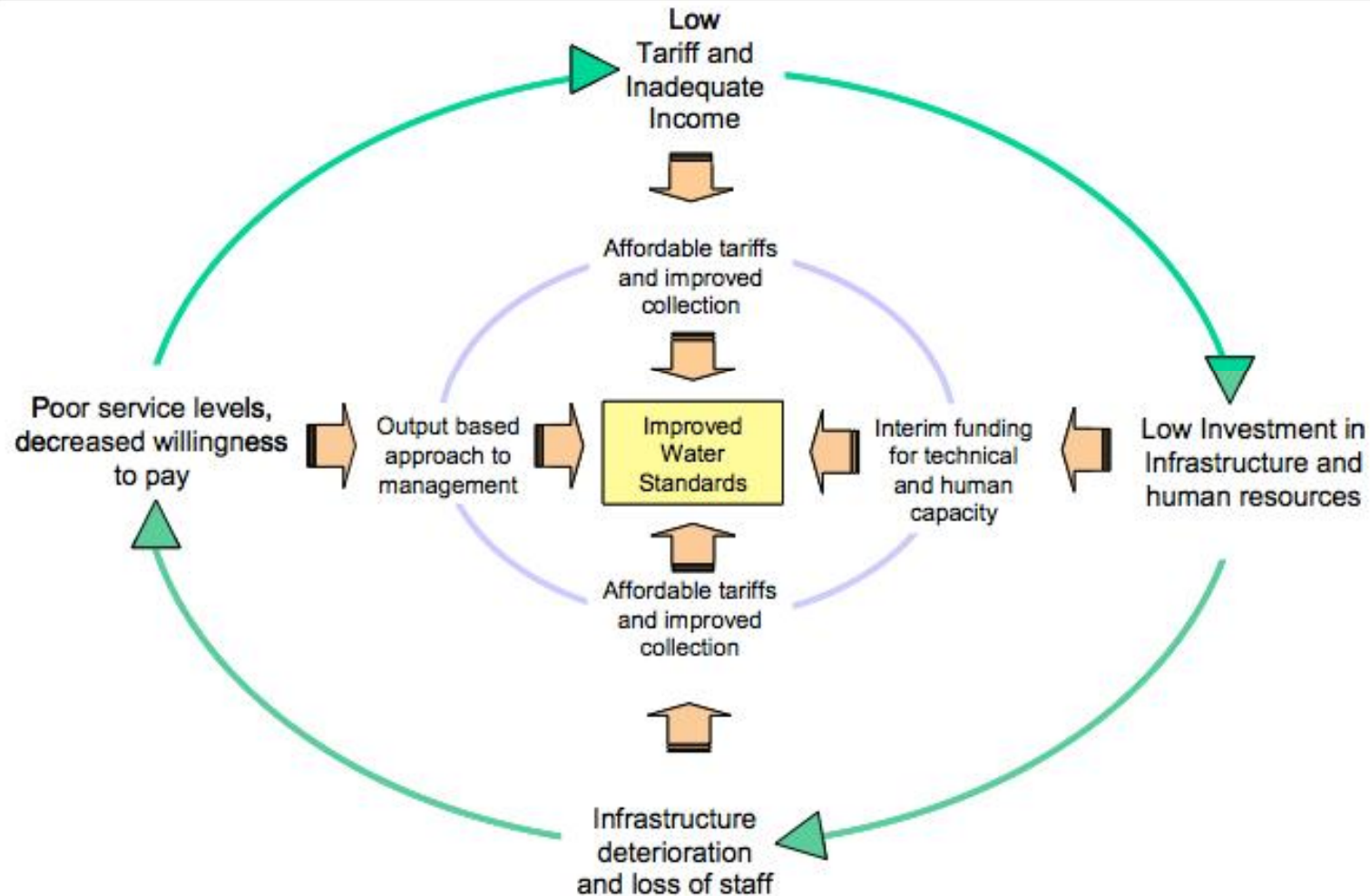
- Revenues do not cover operational and maintenance costs of utilities
- Hence, access to the services cannot be guaranteed for all
- Inequity



Source: [http://www.wsp.org/index.cfm?page=page\\_disp&pid=10820](http://www.wsp.org/index.cfm?page=page_disp&pid=10820)  
(Accessed 10.06.2010)

### 3. (Social) Implications of Water Pricing

## The vicious cycle of low water prices



Source: CARDONE & FONSECA 2004

### 3. Social Implications of Water Pricing

**Water tariffs** can be designed **addressing the need of the poor**

#### Social protection measures:

- Affordability measures:
  - Income support measures
  - Tariff-related measures
  - Subsidies



Source: <http://www.blacd.org/Gallery.aspx?PageID=27&Lang=en-US>  
Accessed 20.06.2010

## 4. *Who Defines the Price of Water?*

### Main Stakeholders involved

At the national level, the following entities usually have a say in defining the environment in which water and sanitation management take place:

- Government
- Regulatory Agencies
- Water utilities
- Municipalities
- Companies
- NGO's
- Water consumers

## 5. *Types of Water Tariffs*

### Types of tariff structures commonly adopted by utilities

#### 1. No Charge

- Free Water

#### 2. Single Part tariff

- Fixed Charge
- Volumetric Charges

*Uniform Volumetric Tariff*

*Increasing Block Tariff*

*Decreasing Block Tariff*

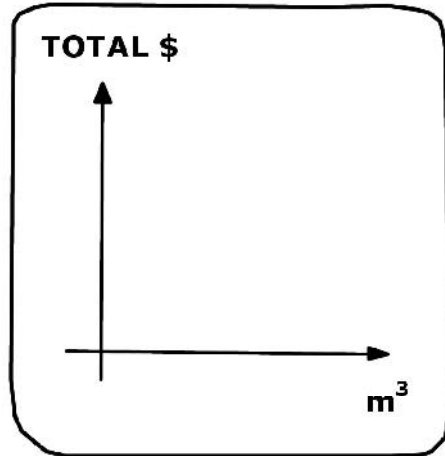
#### 3. Two parts tariff

- Usually a combination of a fixed charge and a volumetric charge



## 5. Types of Water Tariffs

### No Tariff: Free Water



- Water is free for consumers
- No metering system nor a administration to collect charges are needed
- Occurring costs are covered by the general budget of the government

*In: Common in certain States of India (e.g. West Bengal)*

#### Advantages

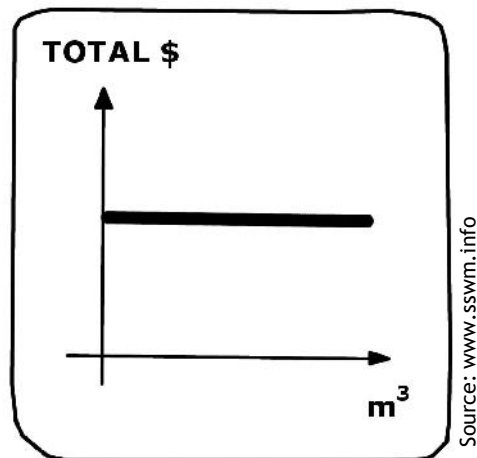
- no meter nor administration to collect charges are needed
- very simple (for consumers)
- consumers love it

#### Disadvantages

- no incentive to conserve water; water is wasted
- no awareness on value of water
- Cost recovery impossible; risk of deteriorating services very high

## 5. Types of Water Tariffs

### Fixed (uniform) charge



- Monthly water bill is independent of the volume consumed
- Only way to charge consumers in absence of a metering system

*In: Places without meters; large parts of India*

## 5. Types of Water Tariffs

### Example: Fixed Water Charge in Raipur (India)

Tariff structure in Raipur in 2009.

Type of Consumer	Size of Connection	Per Day Charge	Yearly Fee
Domestic	0.5" = 1.3 cm	Rs 2.00	Rs 730 = 15.86 USD
Commercial	0.5" = 1.3 cm	Rs 4.90	Rs 1'788.5 = 38.88 USD
	0.75" = 1.9 cm	Rs 15.00	Rs 5'475 = 119 USD
	1" = 2.5 cm	Rs 25.00	Rs 9'125 = 198.36 USD
	1.5" = 3.8 cm	Rs 40.00	Rs 14'600 = 317.39 USD
	1.75" = 4.4 cm	Rs 70.00	Rs 25'550 = 554.34 USD
	2" = 5.1 cm	Rs 100.00	Rs 36'500 = 793.47 USD
	2.5" = 6.4 cm	Rs 130.00	Rs 47'450 = 1'031.52 USD

Source: TERI 2010

## 5. Types of Water Tariffs

### Fixed (uniform) charge

#### Advantages

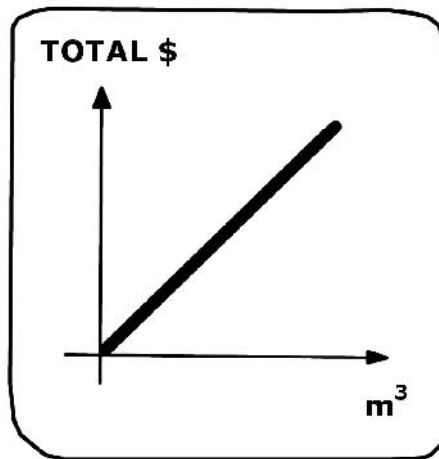
- No metering system needed
- Easy to administer
- Provides stable and foreseeable cash flow if set at appropriate level
- Advantageous for bulk consumers

#### Disadvantages

- no incentive to conserve water; water is wasted
- no awareness on value of water
- Water might be sold at higher prices by street vendors to the households with no access
- Cost recovery difficult

## 5. Types of Water Tariffs

### Uniform (linear) volumetric tariff:

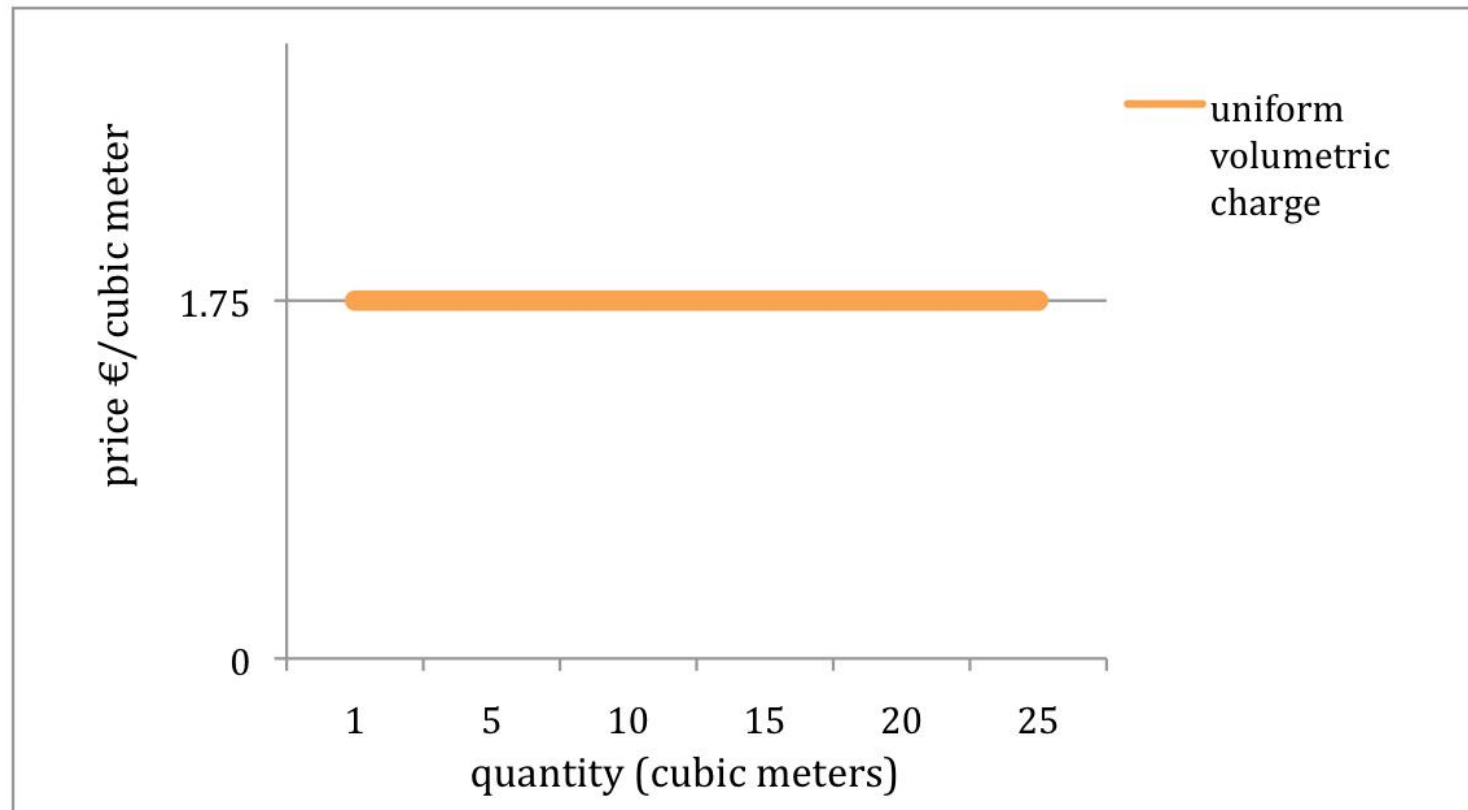


- All units (cubic meters) are priced the same rate, independently of total consumption
- metering system needed
- Often combined with a basic fixed charge

*In: Throughout the world; most common water charge in OECD countries*

## 5. Types of Water Tariffs

### Uniform (linear) volumetric tariff:



The graph and the above table show how the price per unit of water remains constant independently of the use

## 5. Types of Water Tariffs

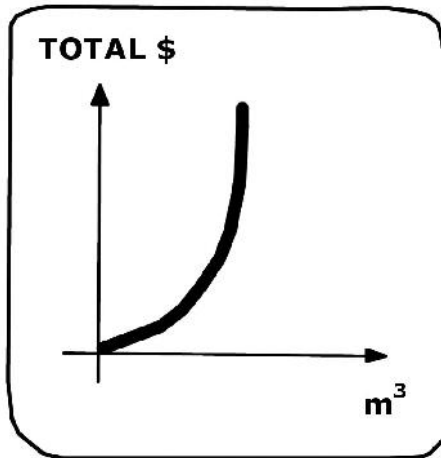
### Uniform (linear) volumetric tariff:

- No metering system needed
- Simple; relatively easy to administer
- Provides stable cash flow if set at appropriate level
- Pay what you use; ensures social equity
- People can limit their bills by reducing consumption → Incentive for water conservation

- Metering system needed
- High initial cost for installing meter system
- Rich and poor pay the same price for water indifferent of ability to pay

## 5. Types of Water Tariffs

### Increasing Block Tariff:



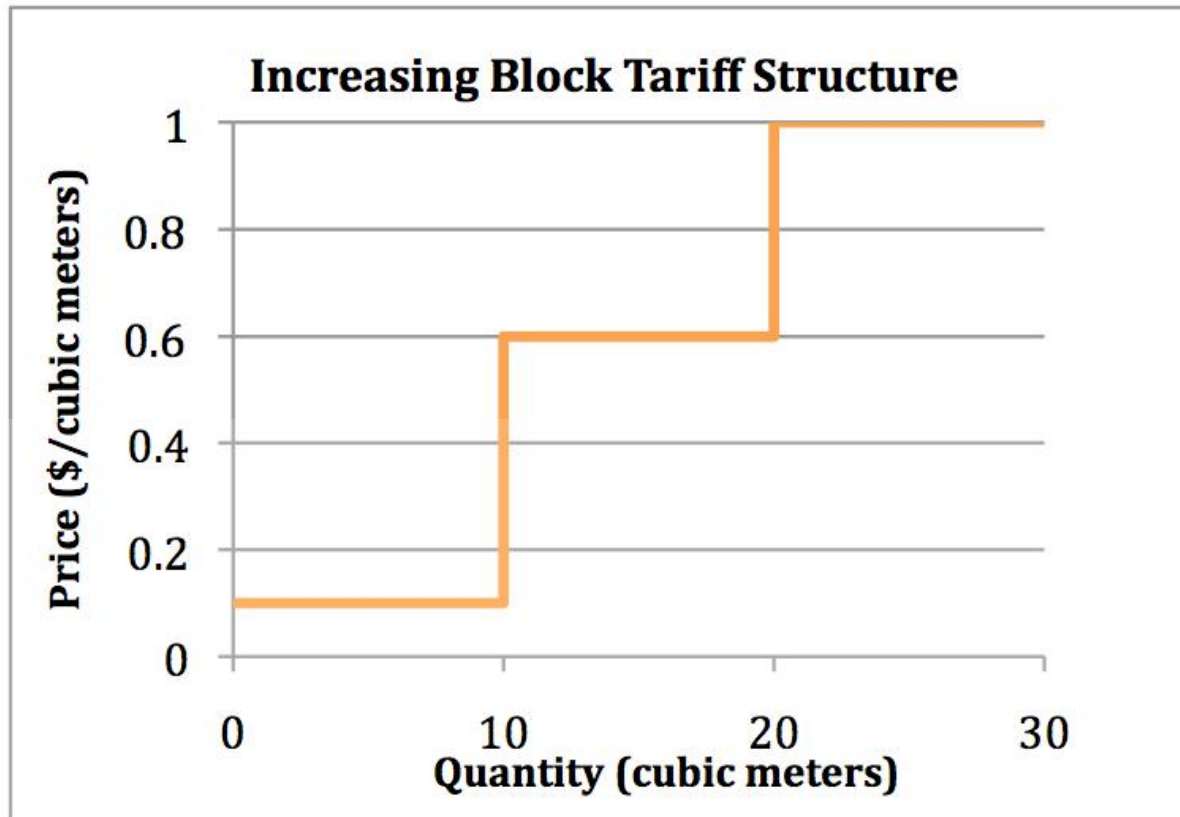
- The rate per unit of water increases as the volume of consumption increases.
- metering system needed

*In: Water scarce areas such as Spain or Middle East, many developing countries*



## 5. Types of Water Tariffs

### Increasing Block Tariff:



The graph shows an example of how the price of water to the consumer changes as the quantity of water used increases for increasing block tariff.

## 5. Types of Water Tariffs

### Increasing Block Tariff:

Increasing block tariff adopted in 1997 from the municipality of la Paz together with the local water utility (SAMAPA) and the Bolivian national tariff board.

Volumetric Charge (US \$ per m <sup>3</sup> )	Domestic Water Connections	Commercial Water Connections	Industrial Water Connections
0.22	1 to 30 m <sup>3</sup>		
0.44	31 to 150 m <sup>3</sup>		
0.66	151 to 300 m <sup>3</sup>	1 to 20 m <sup>3</sup>	
1.18	Above 300 m <sup>3</sup>	Above 20 m <sup>3</sup>	All water

*Notes: 99% all residential consumers use less than 150m<sup>3</sup> per month.  
The long run marginal cost is estimated at US \$ 1.18 per month.*

## 5. Types of Water Tariffs

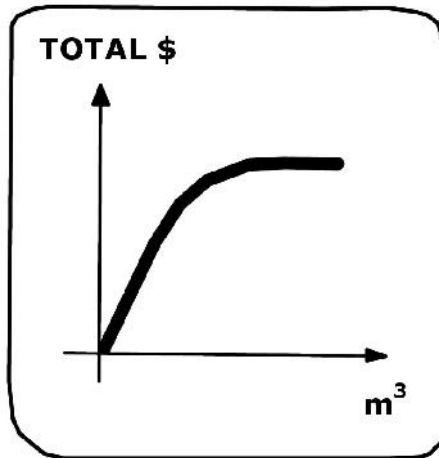
### Increasing Block Tariff:

- Ensures cost recovery by well designed size and height of the blocks
- Poor households connected to the network are provided with affordable water
- Promotes water conservation

- Tariff design is complex
- Difficult to implement, especially if there is no metering system in place
- Consumers do not pay according to the costs their water use imposes on the utility
- Penalises poor families with large households and/or shared connections

## 5. Types of Water Tariffs

### Decreasing Block Tariff:



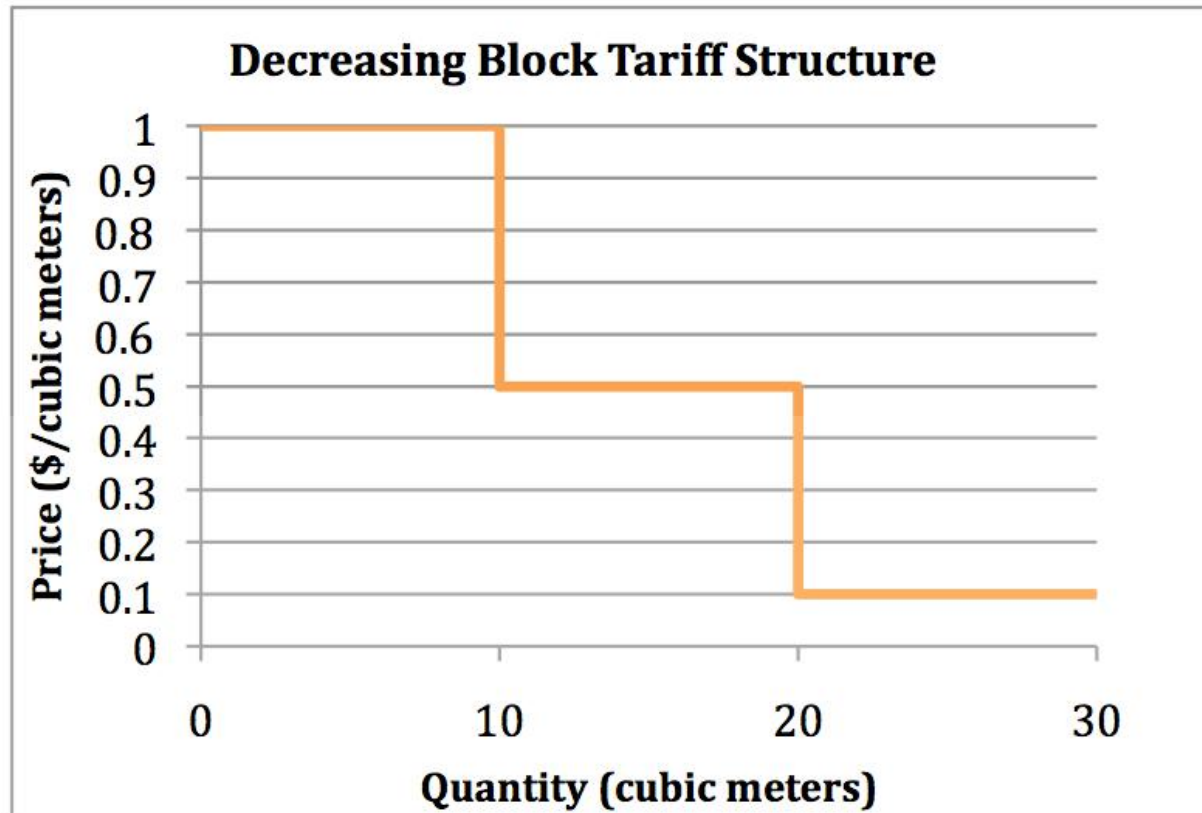
Source: [www.sswm.info](http://www.sswm.info)

- The rate per unit of water decreases as the volume of consumption increases.
- metering system needed

*In: Certain cities of the United States*

## 5. Types of Water Tariffs

### Decreasing Block Tariff:



The graph shows an example of how the price of water to the consumer changes as the quantity of water used increases for increasing block tariff.

## 5. Types of Water Tariffs

### Increasing Block Tariff:

- Allows cost recovery if the size and height of the blocks are well designed
- Advantageous for bulk consumers

- Encourages to consume more instead of less water and puts on more pressure on limited water sources
- Penalises those with low level of consumption (usually the poor)
- People do not pay according to the costs their water use imposes on the utility

## 5. Types of Water Tariffs

### Summary of performance of alternative tariff structures against design objectives

Tariff structure	Objectives			
	Cost recovery	Economic Efficiency	Equity	Affordability
Fixed Charge	(+) Provides stable cash flow if set at appropriate level, but utility may be vulnerable to resale of water and spiraling consumption	(-) Does not send a message about the cost of use of additional water	(-) People who use large quantities of water pay the same as those who use little	(+) If differentiated by ability to pay, but households are unable to reduce their bills by economizing on water use
Uniform Volumetric Charge	(++) If set an appropriate level, moreover revenues adjust automatically to changing consumption	(++) If set at or near marginal cost of water	(++) People pay according to how much they actually use	(++) Can be differentiated by ability to pay, and people can limit their bills by reducing consumption

## 5. Types of Water Tariffs

### Summary of performance of alternative tariff structures against design objectives

Tariff structure	Objectives			
	Cost recovery	Economic Efficiency	Equity	Affordability
Increasing Block Tariff	(++) But only if the size and height of the blocks are well designed	(-) Typically little water is actually sold at marginal cost	(-) People do not pay according to the costs their eater use imposes on the utility	(-) penalizes poor families with large households and/or shared connections
Decreasing Block Tariff	(++) But only if the size and height of the blocks are well designed	(-) Typically little water is actually sold at marginal cost	(-) People do not pay according to the costs their water use imposes on the utility	(-) Penalizes poor families with low level of consumption

(++) Good  
(+) Adequate  
(-) Poor

Source: WHITTINGTON et al. 2002



## 6. Applicability

- Water and wastewater tariffs are applicable for centralized or semi-centralized water and wastewater systems
- Water tariffs can be applied at different levels: national, district and local level
- The policy and regulative framework for water tariffs is different in every country
- Tariffs can be designed within a policy framework that addresses the needs of the poorest
- Policy makers need to decide which objective are the highest priority and, where possible, use more instruments

Adapted from WHITTINGTON et al. 2002

## *7. Advantages & Disadvantages of Water Pricing & Tariffs Structure in General*

### **Advantages:**

- Provide incentives for efficient water use and for water quality protection
- Provide funds for necessary infrastructure development and expansion
- ensure at the medium-long term that water services can be provided to all citizens at an affordable price

### **Disadvantages:**

- There is disagreement over the objectives of water pricing and tariff design
- Tariff setting is a complex process that need high volume of data
- Tariff setting process is often not transparent
- Water tariffs are often difficult to understand for consumer

## 8. References

WHITTINGTON D. et al. (2002): Tariffs and Subsidies in South Asia: Understanding the Basics. Washington, D.C.: Water and Sanitation Program; World Bank Institute; PPIAF. URL: <http://web.mit.edu/urbanupgrading/waterandsanitation/resources/pdf-files/WaterTariff-1.pdf> [Accessed: 20.07.2010]

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