Chapter 6

Water: Approach and Data Requirements

Traditionally, water is drawn from local surface or groundwater sources and then treated and distributed by registered water supply utilities. These utilities may be owned or operated by state or local municipal governments, private developers, or community management organizations, among others. Most water treatment facilities have a design life of several decades or more. They represent a major capital investment and normally significant ongoing operating and maintenance costs. Usually, tight regulations govern the water service subsector and cover areas including but not limited to infrastructure, production, distribution, sewerage, sanitation, human health, environment, and price schedule.

Water distribution includes outdoor and indoor outlets for residential as well as nonresidential water customers. The economics of water uses assumes that water can be priced in two ways: direct pricing and indirect pricing. Direct pricing involves setting prices, fees, and charges payable by users, reusers, and disposers of water. Indirect pricing assesses parameters and mechanisms to derive the cost of using water and the associated resources. Historically, direct pricing has been preferred for ease of observation. But as standardized water pricing systems evolve, indirect pricing may provide more accurate indicators comparable across economies.

The ICP 2011 global core list (GCL) for the household consumption survey of the International Comparison Program (ICP) was designed to collect the associated cost of water consumption through the direct pricing method. It covered three items under the basic heading 110441.1, water supply. Participating regions/economies collected prices for one cubic meter (1 m^3) of (1) drinking water, excluding sewerage; (2) drinking water, including sewerage; and (3) tap water for individual consumption. Prices and quantities were collected for each item and validated at the economy, regional, and global levels.

In the past, the ICP adopted different approaches to collecting prices for water supply services. During the ICP 2005 round, for example, prices were collected using different lists of items in the regions—in particular during the Ring exercise. As a result, the purchasing power parities (PPPs) derived had comparability issues. The statistical discrepancies observed in the ICP participating economies were mainly related to differences in water sector regulation, nature of the provider (public versus private), water treatment, water service quality, and forms of distribution of drinking water through individual versus collective taps. It was also reported that in some regions the provision of water services at the municipality level varied according to location. For example, prices in urban areas tend to be higher than in rural areas, where the water service is sometimes subsidized.

DATA COLLECTION FORM FOR WATER TARIFF

In order to better understand the formation of water tariffs in the ICP economies, the Global Office developed for ICP 2011 a special form for collecting important structural information. This form was intended to capture indirect pricing and featured the status of the water service management company (e.g., public or private), the tariff structure type per block of consumption volumes for water and sewerage, the typical monthly variable and fixed costs, consumption patterns, exchange rates, and a few data assessment indicators such as an economy's gross domestic product (GDP) per capita, per capita domestic consumption volume, and the water/wastewater bill as a percentage of GDP per capita. The block pricing concept can be uniformly applied across economies. The thresholds may vary from economy to economy, but almost all economies would have blocks for lower, average, and higher household consumption expressed in volume (cubic matter or cubic feet).

Calibration information collected through the data collection form for the water tariff (see figure 6.1 for an example) was expected to support the prices collected under the water supply basic heading, including GCL items and regional items. This information may be used to adjust prices or PPPs for quality at both the regional and global comparison levels, if needed.

WATER TARIFF SYSTEMS

Several different types of water charges are used in the domestic, industrial, and agriculture sectors in various parts of the world. The price structure is typically influenced by the availability of water, consumer income, purpose and usage, and certain socioeconomic factors. The types of charges typically include flat or uniform rates, block rates, seasonal rates, peak rates, conservation rates, and capacity rates.

The choice and formulation of an effective pricing system are based on factors influencing the price such as the characteristics of water demand, depletion of resources, cost recovery, social well-being, religious obligations, legal and administrative requirements, and consumer acceptance. The charged price should reflect, among other things, the quality, timing, convenience, and reliability of the water supply, while accounting for social and political considerations (UN Economic and Social Commission for Western Asia 2005).

Water and wastewater tariffs include volumetric components in which metering is applied or a flat rate with no metering is applied. Many utilities apply two-part tariffs when a volumetric tariff is combined with a fixed charge. The latter may specify minimum consumption. The level of the fixed charge often depends on the diameter of the connection.

Volumetric tariffs vary, depending on the actual practice in a location. The most common volumetric tariffs include:

- Proportional consumption, a pure volumetric tariff with no rate changes
- Increasing-block tariffs (IBTs) in which the rate increases with consumption. Two of these are popular:
  - IBT-variable band—the rate changes according to the volume consumed.[1]
  - IBT-fixed band—the rate changes when the consumer reaches a specific consumption level.
- Decreasing-block tariffs (DBTs)—the rate decreases with consumption.
- Minimum consumption tariff
- Prepaid tariff per specific consumption.

Additional charges may apply to water, including a metering charge that varies according to the diameter of the water pipe. The typical size is 5/8 inch or 20 millimeters, but a different size may be used in selected locations. The meter reading charge and the water abstraction fee also increase the volumetric tariff.

Wastewater charges include pollution fee, wastewater treatment fee (separate from wastewater collection), environmental fee, and rainwater collection fee.

DEFINITION AND TERMINOLOGY

The value added tax (VAT) is a consumption tax levied at each stage of production based on the value added to the product at that stage.

Figure 6.1 Example of Data Collection Form for Water Tariff, ICP 2011

Collection Form of Water Tariff (All tariffs, charges, and fees in local currency)

Country name:	USA
Contact person details (Name and Email Address)	John Doe - jdoe@email.com
Time period:	2012
Volume measurement system (Metric/Imperial)	Imperial
Measurement unit	1000 Gallons
VAT rate on water (%):	0
VAT rate on wastewater (%, if different):	0
Sales tax on water (%):	0
Sales tax on wastewater (%, if different):	0
City name:	Rockville, Maryland
Total population served:	200,000
Utility company name:	WSSC - Washington Suburban Sanitary Commission
Link to the tariff for water:	http://www.wsscwater.com/home/jsp/content/mainfeetable.faces

1	**Management (Public/Private)**	**Public**	
2	**Combined wastewater billing (Yes/No)?**	**Yes**	
3	**Tariff structure type**	**Increasing-block tariffs (IBT Variable Band)**	**Comment**
31	**The blocks tariff (water)**		
311	First block upper limit in m^3 per month	2.151111111	"=(50000*3.872)/90000
312	First block tariff per m^3 (Excluding VAT)	0.728305785	"=2.82/3.872
313	Second block upper limit in m^3 per month	4.302222222	"=(100000*3.872)/90000
314	Second block tariff per m^3 (Excluding VAT)	0.821280992	"=3.18/3.872
315	Third block upper limit in m^3 per month	6.453333333	"=(150000*3.872)/90000
316	Third block tariff per m^3 (Excluding VAT)	1.00464876	"=3.89/3.872
317	Other blocks (describe)[1]		See attached schedule picture
32	**The blocks tariff (wastewater)**		
321	First block upper limit in m^3 per month	2.151111111	"=(50000*3.872)/90000
322	First block tariff per m^3 (Excluding VAT)	0.844524793	"=3.27/3.872
323	Second block upper limit in m^3 per month	4.302222222	"=(100000*3.872)/90000
324	Second block tariff per m^3 (Excluding VAT)	0.983987603	"=3.81/3.872
325	Third block upper limit in m^3 per month	6.453333333	"=(150000*3.872)/90000
326	Third block tariff per m^3 (Excluding VAT)	1.154442149	"=4.47/3.872
327	Other blocks (describe)[2]		See attached schedule picture
39	**Other volumetric charges on water and wastewater**		
391	Other volumetric charges on water and wastewater	0	
392	Other fixed charges (per month) on water and wastewater	Bay restauration fee: 2.50 Account maintenance fee: 3.66	Bay restauration fee: 7.50/3=2.50 Account maintenance fee: 11/3=3.66
393	Other percentage charges on water and wastewater	0	
395	Other fees and taxes (describe)	0	
4	**Water and wastewater/m^3 for 15m^3/month use via most common pipe type**		
41	Specify pipe diameter (e.g. 5/8'')	5/8"	5/8"
42	Water charges/m^3 for 15m^3/month use (Including taxes and fees)	1.12664876	"=((3.89/3.872)*15 + 3.66/2)/15
43	Wastewater charges/m^3 for 15m^3/month use (Including taxes and fees)	1.61872865	"=((5.15/3.872)*15 + 2.5 + 3.66/2)/15

Comments:

Notes: 1,2. Description if there are more blocks available in the countries. Please attach official tariff structure and sample bill.

Source: ICP, http://icp.worldbank.org/.

Sales taxes are imposed by governments at the point of sale on retail goods and services and collected by retailers before they are passed on to the government. For water and wastewater, these taxes are set by the state or local government based on a percentage of the selling price.

Usually, water and wastewater companies charge either the VAT or sales taxes. However, the VAT and sales taxes are combined in some economies.

SOURCES OF INFORMATION ON WATER TARIFFS

Economies participating in the ICP were expected to fill in the data collection form shown in figure 6.1, preferably using information from utility companies, water bills, and water sector studies in their economies. They were also required to specify the link (URL) and attach an official document of their water tariff on the form and provide scanned copies of actual bills.

NOTE

1. The IBT with variable bands assesses the total volume consumed and then determines which bands system to use for the applicable rates. For example, a utility could use consumption levels of 0–10, 11–25, and 26–50 for consumption below 50 cubic meters and levels of 0–15, 16–40, 41–100, and 100+ for higher consumption. Inside each bracket, the per unit rate would be constant per unit of consumption for each category, but the rates for the second category are usually higher than for the first one.

REFERENCE

UN Economic and Social Commission for Western Asia. 2005. "ESCWA: Valuing Water Resources—Training of Trainers on the Application of IWRM Guidelines in the Arab Region." Kuwait, May 14–18.