BELIZE: National Integrated Water Resources Authority (NIWRA)

Consultancy Report

Submitted to the Ministry of Natural Resources, Government of Belize and UNDP

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This Consultancy Report summarizes the state of water resources management—defined as managing water as a resource, water services and the trade-offs needed to balance supply and demand—globally, in Latin America and the Caribbean and in Belize. The report is based on research and analyses of trends in water resources management as well as on consultations with stakeholders. The report will be revised to reflect final consultations with stakeholders through to the end of May 2014. The report's factual information and assessments serve as the basis for the forthcoming Financial Sustainability Plan.

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LIST OF ABBREVIATIONS AND ACRONYMS

BECOL Belize Electric Company
BWS Belize Water Services Ltd.
BZD Belize Dollars
DBT Decreasing Block Tariff
EU European Union
EUWI European Union Water Initiative
FAO Food and Agricultural Organization
FWG Financing Working Group
GDP Gross Domestic Product
GLAAS Global Analysis and Assessment of Sanitation and Drinking Water
GOB Government of Belize
IBT Increasing block tariff
IFI International Financial Institutions
LAC Latin America and the Caribbean
MAR Managed Aquifer Recharge
IWRM Integrated Water Resource Management
MDGs Millennium Development Goals
NIWRA National Integrated Water Resource Authority
NSDR National Sustainable Development Report
OECD Organization of Economic Development
PUC Public Utility Commission
PWS Payments for Watersheds
UN United Nations
UNDP United Nations Development Programme
UNESCO United Nations Educational, Scientific and Cultural Organization
UNWWMR United Nations World Water Management Report
WHO World Health Organization

I. The Global Water Crisis and Water Resource Management

The state of the current world water crisis is well documented: 1.2 billion people (or 20% of the world's population) lack sustainable access to drinking water, partly due to lack of regional availability of water resources and partly due to the inability of the relevant governments to provide potable water for all. Development patterns, increasing population pressure, and the demand for better livelihoods in many parts of the globe all contribute to a steadily deepening global water crisis. Development redirects, consumes, and pollutes water. It also causes changes in the state of natural water reservoirs—directly, by draining aquifers, and indirectly, by melting glaciers and the polar ice caps. When considering a sustainable relationship between water and development, policy makers are challenged with balancing current requirements against the needs of future generations.

Water has been internationally recognized as a fundamental human right. More recently, water has been acknowledged, as an economic good. Many developing countries are now acknowledging these features explicitly in the laws. While setting prices for water, developing countries grapple to balance the issues of equity, sustainability and affordability. As an equity consideration some governments try to make water available to the poor through lower tariffs that often reduce the revenues for water utilities, making them unable to fulfill their obligations and provide little incentive for conservation of water. More broadly, many internationally agreed development goals, specifically the Millennium Development Goals (MDGs) depend on major progress in access to safe water and adequate sanitation.[1] Access to safe water is the first step in breaking the poverty cycle.

With the most annual rainfall of any region in the world, the water crisis in Latin America is particularly perplexing. Notwithstanding relative abundance, Latin American countries face many of the same problems as countries with chronic fresh water shortages. Tourism demand has increased water stress on many Caribbean countries. In Latin America and the Caribbean (LAC), the rising interests in biofuels and electricity subsidies to farmers have negatively affected the sustainability of aquifers.[2] In 2006, the United Nations Development Program (UNDP) reported the "The scarcity at the heart of the global water crisis is rooted in power, poverty and inequality, not in physical availability." And since Latin America has one of the most inequitable income distribution rates in the world, water access in the region is equally skewed.

Although there is no universally accepted definition of water resources management[3], the term 'water management' covers a variety of activities and disciplines (Box 1). Nevertheless, it is useful to distinguish between functions related to water governance—such as water planning, policymaking, stakeholder involvement, allocation of water permits—and infrastructure oriented programmes—such as wastewater treatment and the

[1] MDG #7, "To Ensure environmental sustainability" includes the goal to reduce by half the proportion of people without sustainable access to safe drinking water by 2015.
[2] UN (2014).
[3] EUWI, Pricing Water Resources to Finance their Sustainable Development, May 2012, p. 6.

provision of bulk water supply including for agriculture. As water becomes scarcer and as its quality continues to deteriorate, policy makers have been compelled to explore new approaches to improve the management of water.

As noted, population growth is translated into increased water demand including for drinking water, health and sanitation, as well as for energy, food and other goods and services that require water for their production and delivery. As 70% of the world's water use is devoted to agriculture[4], actions to promote food security and to reduce poverty require successful water management policy and water governance. Moreover, irrigation explicitly accounts for more than 90% of freshwater withdrawals in most of the world's developing countries.[5] If water supply is not managed effectively conflict frequently arises around the allocation and pricing of water as has been the experience in Latin America.[6] In this regard, water-related risks and the competition for water resources are perceived by a majority of countries to have increased over the past 20 years.[7]

Box 1. What is Water Management?

Water management covers three categories: (i) managing the resource, (ii) managing water services and (iii) managing the trade-offs needed to balance supply and demand. Each activity has different requirements, but together they add up to what is called water management.

- **Water resource management** is about managing water found in rivers, lakes and groundwater. This includes water allocation, assessment and pollution control; the protection of water-related ecosystems and water quality; natural and man-made infrastructure for the redistribution and storage of these resources; and groundwater recharge.

- **Water service management** consists of managing reticulation systems from the bulk water supplier, through the processing phases, up to the point of need by the end user; and again capturing the waste streams for reticulation back to a wastewater treatment plant for safe onward discharge.

- The **management of trade-offs** concerns a range of administrative activities that meet allocation and entitlement agreements across a wide spectrum of socio-economic interests.

Source: 2012 UNWWMR, Managing Water Under Uncertainty and Risk.

Consumer demand and increasing standards of living are also a major stress on water resources driving increased demand for water. Most notably in developing economies, as income rises so does the demand for and production of food, energy and other goods

[4] UN (2014).
[5] FAO, 2011.
[6] Spronk, et. al (2010)
[7] Status Report on the Application of Integrated Approaches to Water Resources Management, page vi.

require significant quantities of water. Water of acceptable quality and in adequate quantity is needed to meet food production demands. At the same time, food production and supply have a negative impact on the sustainability and quality of water resources.

Alongside natural forces affecting the world's water systems, human activities interact and unite to create pressures on water resources, for which there are no substitutes. In addition to population growth and increasing affluence, the stress on water resources is also affected by a range of other factors including rapid urbanization, expansion of business activity, technological development, political, institutional as well as financial conditions, and climate change.

Typically, the water resource political economy operates within a given physical, legal, social, economic and political environment that imposes constraints and affects choices including pricing reforms notwithstanding what might be efficient from an economic perspective or sustainable from a financial perspective. A special concern for developing countries, with respect to the management of water resources, is that economic development can negatively impact water supplies in terms of quality and quantity. It is in this vein that countries are pursuing sustainable resource management practices for limiting the impact of wasteful consumption and unsustainable water resource use.

As reported by many countries, the key challenges for water management identified are as follows:[8]

- Increased competition between water users including households, private companies, industries and farmers.
- Excessive withdrawal of water from and degradation of aquifers by saline intrusion.
- Pollution of freshwater resources.
- Untreated wastewater from cities and effluents from agriculture, primarily in developing countries, deteriorate water quality.
- Increased risks of floods with attendant damage to people and economic assets.
- Diminished access to water supply and sanitation among urban dwellers for the last two decades.

Policy responses to meet these challenges imply increased collaboration among stakeholders to agree on goals, priorities, and approaches, as well as financing to put in place water management systems, to maintain and improve existing assets as well as to invest in new infrastructure as well as innovative approaches and systems.

[8] OECD Environmental Outlook to 2050.

Improved collaboration among stakeholders in many developing countries has increased awareness resulting in a decline in adverse water-related practices. There is still room however for improved dialogue between the water resource management authorities and water users on issues such as water rights, clarity over watershed management roles, and water quality and pollution. The involvement of civil society and NGOs in different stages of the elaboration of water resource management plans has helped to make those plans more viable and realistic. [9]

The management of water requires a mix of measures and skills including technical assessments, changes in legislation, policies, prices and other incentives, as well as changes in institutions, infrastructure and physical installations. In this regard, integrated water resources management (IWRM) focuses on the necessary integration of water management across sectors, policies and institutions.

Yet, water management is challenged by a high degree of uncertainty. Uncertainty arises as a consequence of climate change, global trends in demography, consumption patterns and migration resulting in increased levels of risk. Adapting to these uncertainties and developing strategies that help to mitigate emerging risks makes water management policies, institutions and regulations more resilient, thereby increasing their chances of generating benefits to society. Adaptive water management extends to IWRM by focusing on a more flexible management process to address uncertainty and include actors whose decisions affect water, but who do not currently participate as an active part of the water management process.

In response to the challenges posed to water management, new structures for water management have been put in place in many countries. Usually these have been influenced by the need for integrated approaches to water management and consist of national (and state where relevant) coordinating and regulatory structures, basin management and local water user structures. There are variations according to local circumstances but usually water management structures have been used to decentralise decision-making and to give more voice to stakeholders.

However, new structures and coordinated systems take time to establish and become fully operational as reported by several countries implementing IWRM systems.[10] According to the WHO, the institutional frameworks for water resources management are in place in many countries but the coordination between a diverse array of stakeholders including government, civil society and the private sector needs to be strengthened, supported by the availability of expertise and resources to pursue effective integration. Experience also shows efficiency gains, the need for political will and support from community leaders

[9] WHO, 2012, Status Report.

[10] These include Albania, Uganda, Ghana, United Republic of Tanzania, Brazil, Armenia, Cape Verde. See WHO, 2012 Status Report on the Application of Integrated Approaches to Water Resource Management.

for success but also shows that structures are most effective at the lower level and so should be built from the bottom up. [11]

It bears repeating that IWRM requires cooperation between various government agencies, and others, with a stake in water. One of the most common practical issues arising from the ground challenging integration is the reluctance to share information between ministries as well as the tendency for resource management and planning to be sector driven. There are success stories reported but it seems that integrated approaches "do not arise by decree but from mutual trust, appropriate mechanisms and gradual acknowledgement of the benefits. [12]" Cooperation at the national level is often more difficult than at the lower levels of basin management and thus generally require a national agenda or master plan. Findings from the analysis of data from over 130 countries show that there has been widespread adoption of integrated approaches with significant impact on development and water management practices at the country level.

On the financing of water management, as elaborated below (Section III), discussions in international fora, focus on the notion of sustainable financing. This at first glance appears to be a departure from the traditional focus on advocating for public resources. The new approach rests on the idea of setting goals based on financial realities and the financing tools available. This involves the setting of priorities, the costing of those priorities and the assessment of revenue streams. In most countries, this exercise usually results in the identification of funding gaps (or fiscal gaps)—that is insufficient or unstable revenues to implement water policies.

The cost of the provision of water services and water services management given the prevalence of water subsidies as well as the construction and maintenance of water and sanitation infrastructure is constantly increasing and requires long-term sunk investment. These costs more than often cannot be met with only public funding and these costs potentially crowd out the financing of water resource management. Water pricing then is a key element of sustainable financing for the provision of water services and also for other aspects of water resource management. This notwithstanding, most countries continue to rely extensively on public funding and as a result water resource management in many countries is grossly underfunded.[13] This suggests water pricing as an important option for closing funding gaps.

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[11] WHO (2012), Status Report on Integrated Approaches to Water Resources Management. For example, see the cases of Estonia, Samoa, Tanzania and Brazil discussed in WHO 2012 Status Report.

[12] Success stories include Uganda and Mozambique for flood and drought management see WHO, 2012, Status Report.

[13] EUWI-FWG, Pricing Water Resources to Finance their Sustainable Management, May 2012.

II. Water pricing

Water pricing can be a powerful instrument of water management. Water pricing is important because of its incentive effects—aimed at resource efficiency and conservation—and also for its revenue effects. Table 1, indicates the many water policy instruments classified by objective. The use of water pricing needs to take into account its

Table 1. Water Policy Instruments

Economic Instruments	Regulatory Instruments	Informatin-based Instruments	Direct Provision
1. Water pricing 2. Tradeable water quantity quality permits 3. Subsidies	1. Permits to discharge effluents inwater bodies 2. Environmental impact assessment	1. Eco-labelling 2. Disclosure of water polluters ratings 3. Environmental education	1. Flood control infrastructure 2. Public rescue and emergency services 3. Wastewater treatment plants

Source: EUWI-FWG (2012).

impact on the multiple objectives of water management, and the trade-offs between these different water policy objectives. In this regard, there is general international acceptance that water could no longer be treated as a free service that governments should provide for the people. It has been recognized that water has an economic value and when pricing water, factors such as public right to access to water, the need to maintain affordability, and reduction of wastage, needs to be taken into consideration. The various international declarations made after the Dublin Statement and UNCED confirm this. For example, the **Ministerial Declaration of the 3rd World Water Forum,** held in Kyoto in 2003, declared *inter alia* that:

> "Funds should be raised by adopting cost recovery approaches which suit local climate, environmental and social conditions and the 'polluter-pays' principle, with due consideration to the poor. All sources of financing, both public and private, national and international, must be mobilized and used in the most efficient and effective way."

Water has two essential qualities for it to be treated as a commodity, a ready market, due to the need for water for human survival and its scarcity, and the cost involved in developing water facilities and enabling public access to water. The need for water as a basic human need would allow some to argue that water is a right of the people and provision of free water is a duty of governments. However, the cost involved in development and provision of water facilities supports the argument that although access to clean water remains a human right and public responsibility, scarcity-driven conservation is imperative. This compels policy oriented at setting water tariffs to reflect water's true cost, aimed at reduced consumption and the encouragement of conservation and efficiency.

A water tariff structure is a set of procedural rules used to determine the conditions of service and the monthly bills for water users in various categories or classes based on agreed

priorities. Any tariff structure should be designed such that it meets the goals of equity, efficiency and sustainability, as discussed in Box 2. Different societies will place difference emphasis on these goals. For developing countries where income levels are

Box 2.The Goals of a Tariff Structure for Water

1. **Revenue sufficiency:** The revenue from water users should be sufficient to pay the operation and maintenance costs of the water utility's operations, repay loans undertaken to replace and expand the capital stock, provide a return on capital at risk and maintain a cash reserve for unforeseen events.
2. **Equity:** Equity means that the water tariff treats similar customers equally, and that customers in different situations are not treated the same. This would usually be interpreted as requiring users to pay monthly water bills that are proportionate to the costs they impose on the utility by their water use.
3. **Economic Efficiency:** Water prices should signal to consumers the financial and other costs that their decisions to use water impose on the rest of the society. This means that volumetric water charges should be set equal to the marginal cost of supplying water.
4. **Affordability:** Since water is a basic commodity linked to human health and well-being, it is believed that all people should have adequate access to it regardless of their ability to pay. Hence, water prices should be kept minimal so that poor people can afford it.

lower on average and the cost of water takes a larger percentage of lower daily expenditure, water pricing and policy tends to target mainly equity considerations.

There are a number of trade-offs between different objectives that have an impact on the average price of water supplied by the utility through domestic connections.[14] For example providing water free through private connections in order to achieve the objective of affordability conflicts with the objectives of cost recovery and efficient water use. Also poor customers can sometimes be relatively expensive to serve mainly due to outlying location, and hence it might not be regarded as entirely equitable to charge them the same as, or less than, other customers.

The basic types of water tariff systems are one-part tariffs, based on volume used, and two-part tariffs, based on both a fixed charge and water use with details as follows:

- Fixed charge: The monthly water bill is independent of the volume consumed.
- Uniform Volumetric: A single part tariff based on consumers' quantity use of water times the price per unit.
- Block Tariff: Block tariffs where the unit charge is specified over a range of water use for a specific consumer come in two main varieties—increasing and decreasing. For an increasing block tariff (IBT), consumers face a low volumetric per unit charge up to a specified quantity (or block) and then for any water

[14] See OECD(2010) for a fuller discussion of trade-offs between water policy objectives in the context of water pricing.

consumed in addition to this amount they pay a higher price up to the limit of the second block.

- Decreasing block tariff (DBT): designed to reflect the fact that when raw water supplies are abundant, large industrial customers often impose lower average costs because they enable the utility to capture economies of scale in water source development, transmission, and treatment. DBT has fallen out of use given increased need to promote water conservation by large consumers.
- Increasing Linear Tariff: The price that a consumer pays increases continuously as the quantity of water used increases. This structure is rarely used. It sends the consumer a powerful message that increased water use is costly.
- Two-part tariff: The consumer's water bill is based on the sum of two calculations: a fixed charge, and a charge related to the amount of water used. The fixed charge can be either positive or negative (i.e. a rebate). The water use charge can be based on any of the volumetric tariff structures. Two-part tariffs have an important role to play in balancing the diverse goals of a tariff structure for water.

The effectiveness of each system in meeting the conflicting range of objectives are outlined in Table 2. In most cases performance depends not only on the choice of tariff structure but also on the level at which the tariff is set as well as whether or not some kind of subsidy scheme is built in to address the affordability issue.

An efficient tariff will create incentives that ensure, for a given water supply cost, that users obtain the largest possible aggregate benefits. There are additional considerations involved in setting water tariffs: the structure should be easy to understand, explain and implement. The tariff will also need to conform to local perceptions of fairness a concept distinct from equity. Water tariffs may be designed to discourage "excessive" use, thus promoting water conservation. It is important for developing countries to ensure that people have access to safe water. It is also generally agreed that providing such access would require the development of infrastructure facilities and that such development activities would require sufficient funds, technology and management skills.

Although engagement with the private sector is one solution, the commercial viability of such projects would determine private sector participation. Moreover, there is a diversity of actually existing and proposed alternatives to privatization in the water sector and in urban and rural areas in Latin America.[15] Thus, in establishing a water tariff structure, striking a sustainable balance between treating water as a human right and maintaining affordability and as a scarce economic good is a key challenge for developing countries. In this regard, some countries have considered structures in which the utility company takes on the risk of operating the company, with tariffs set to cover operating costs, but investment including in water resource management remains a public sector responsibility supported by international financial institutions (IFIs).[16]

[15] Spronk, et. al (2010).
[16] Akhmouch (2012).

Table 2. Basic Types of Water Tariff Structures

Tariff Structure	Revenue Sufficiency	Economic Efficiency	Equity	Affordability
Fixed Charge	***Adequate***, provides stable cash flow if set at appropriate rates	***Poor*** Does not inform Consumers about the marginal cost of water	***Poor*** Bills paid do not depend on water consumption	***Adequate*** Smaller houses usually owned by poorer people, are charged less
Uniform Volumetric	***Good*** If set at appropriate levels, revenues automatically depend on consumption	***Good*** If set near marginal cost of water supply	***Good*** Consumers pay according to how much they actually use.	***Good*** People can adjust consumption levels depending on ability to pay
IBT:	***Good*** Only if the size and height of the blocks are well designed	***Poor*** Large amount of water is sold at much less than marginal cost.	***Poor*** Bills paid do not depend on the actual cost that people's water uses impose on the utility	***Poor*** Penalizes poor families with large households or shared connections.
DBT	***Good***	***Poor***	***Poor***	***Poor***
Two part tariff	***Good***	***Good***	***Good***	***Good***

A successful tariff design is also one that is not controversial and it should avoid public criticism of the water supply agency. In this regard, Whittington argues that although it is possible for a state to provide free water or subsidize water through tax revenues collected outside the water and sanitation sector, this is not at all a good policy.[17] Not only does it reduce funds for capital expenditures and operating costs, it discourages water conservation and eventually leads to declining quality and quantity of water supply.

Achieving balance between the conflicting objectives of efficiency and sustainability in water pricing, as discussed above, can be difficult. In this regard, it is clear that there is wide variation in policy objectives, tariffs, and tariff setting practices around the world. Accordingly, there is no consensus on which tariff structure best balances the objectives of consumers' wellbeing and society. Hence one observes that cities across the world have adopted various types of water tariff structures and varying tariff rates—Table 3.

[17] Whittington (2003).

Table 3. Water Tariff Rates
(US$ per cubic meter)

	Domestic	Commercial	Agriculture
Australia	1.64	1.64	0.02
Belize	**1.05**	**1.05**	**n.a.**
Canada	0.70	1.59	0.01
Portugal	1.00	1.26	0.02
US	1.25	0.51	0.05
Guatemala	1.62	2.40	n.a.
Mexico	2.97	n.a	n.a

Source: Author's Calculations

According to a 2006 World Bank study average water tariffs in Latin America are the highest of any region of the developing world. Tariffs are about four times higher than in South Asia, three times higher than in Eastern Europe and Central Asia and almost twice as high as in East Asia. Nevertheless, tariffs are less than half as high as in OECD countries. Based on a sample of 23 major cities in Latin America the average residential water tariff for a monthly consumption of 15 cubic meters was US$0.41, equivalent to a monthly bill of only about US$6 in 2005[18] or US$0.60 per gallon. Currently, in Belize the average residential water tariff is US$0.80 per gallon well below rates in the Caribbean region and Central America.

Increasing block tariffs are virtually universal in Latin America including Belize and unfortunately badly designed. Many countries including Belize, have implemented a fixed charge up to some threshold (1000 gallons in Belize). Thereafter, an IBT is triggered. However, the first subsistence block is generally too large, averaging 25 cubic meters a month in Latin America. Most residential customers use less than these concessional subsistence amounts. Tariff structures also are generally quite flat such that tariffs cover costs only at extremely high rates of consumption. Indeed, in more than half the utilities, tariffs do not reach the cost recovery level, so that tariffs are effectively subsidizing all residential consumers.

Valuation essentially provides evidence that economic benefits are relinquished when policy, management and investment cause avoidable environmental degradation. For producers of goods and services who use water directly, water prices and costs are the basic criteria for water-use decisions. But prices often do not reflect the real production costs or economic value of water. In particular, prices often do not reflect the decline in the natural capital stocks that support the production of all ecosystem services. Therefore, decisions taken on infrastructure investments are disconnected from what is efficient and sustainable for the economy and the environment as a whole.

In addition to water-use tariffs applied to residential and industrial users, there are other water-related charges determined and ***levied*** by administrative purposes. Four additional

[18] Foster, Halpern and Komides (2005), p. 21, drawing on data from the Latin American water regulator association ADERASA

types of water levies: regulatory levies water, pollution levies, water service levies, and fines and damage compensation penalties are identified in Table 4. These payments are compulsory and are related to services provided or regulations and are classified according to rationale for the levy.

Table 4. Water Levies

Pricing Instrument	Who Pays	Rationale	Use of Revenue
Regulatory Levies	Regulated parties that require regulatory services	The processig of certain regulatory services, e.g. issuing of licences) entails costs with benefits accruing to regulated party.	Revenues can be used to fund the cost of processing of licenses and other regulatory services
Water Pollution Levies	Water Polluters	To ecourage reductions in pollution and to apply the polluter pays principle	Revenues generated by effluent charges and pesticide taxes can fund actions to compensate for the damage produced.
Water Service Levies	Users and beneficiaries of water-related services	Users and beneficiaries derive benefits such as flood cotrol, bulk water provision, wastewater treatment	Revenues generated by these charges and taxes can be used to fund the provision of these services.
Fines and damage compensation penalties	Regulated parties that do not comply with regulations.	Encourage the compliance with water regulations.	Revenues canbe used by water authorities to fund the cost of remediation of the damages caused by the illegal behavior or to cover the cost of compliance promotion and enforcement

Source: EUWI, 2012.

Finally, there are "negotiated payments", determined by negotiation between a limited number of parties. Those parties may be private or public, but public parties take part in negotiations in the same role as any other economic agent (such as paying for a service that another party provides) and not as an authority that exerts regulatory powers. Table 5 outlines the rationale for negotiated payments and indicates potential use of the revenue generated. In the case of negotiated payments, water authorities do not receive the payments to fund water resource management. Instead private actors receive the revenues and use them to fund water resource management services. The two-subcategories of negotiated payments are payments for watershed services, and payments for tradable water-related rights such as water abstraction rights, water pollution rights, or wetland development rights.

Table 5. Negotiated Payments

Pricing Instrument	Who Pays	Rationale	Use of Revenue
Payments for Watershed Services	Downstream beneficiaries of upstream land use change	Changes in practices upstream land managers generate benefits for downstream users that will exceed the costs of the changes for land managers	The reveneues generated accrue to the upstream land managers that will partly use them to fund the change in management practices
Payments for tradable water-related rights	Buyers of water-related rights	Prices emerge from the exchange of water-related rights such as water abstraction, polution and wetland development permits between two parties to mutual benefit	Revenues accrue to the original holder of the water-related rights-which may partly use them to fund e.g. investments in water-saving, wastewater treatment equipment, or wetland restoration.

The defining aspect of payments for watershed services (PWS) initiative is that an entity makes a payment to a land manager in exchange for the adoption of land use practices that will generate watershed services. PWS programmes are able to raise significant financial resources from water users and beneficiaries that allow well-defined watershed management activities to take place. In many cases, PWS programmes are able to leverage funds from other sources as well. In the largest PWS programmes, the entity that makes the payments is the government—and the origin of the funds is general tax-payers and not water users. Thus, in some cases PWS programmes may be more easily understood as a policy instrument for watershed management rather than a revenue-raising instrument.

A recent review of PWS as a source of revenue for integrated resource management, found that in 2008 there were 113 active payments for watershed services initiatives in 24 countries, mostly in developing countries.[19] Of the 113 programmes, Latin America had 36 (up from seven in 2000) that contributed US$31 million to watershed conservation measures impacting 2.3 million hectares. Of all regions, Latin America has the longest running and most robust experience in the application of PWS mechanisms. Moreover, a more recent global survey of PWS programmes applied in cities identified 22 schemes in Latin America out of a total of 36 schemes in the world. [20]

An example of a PWS programme that has served to protect watersheds and increase water as a renewable resource as well as leverage funds from other sources is presented in Box 3. It is noteworthy, that most urban water users, in Belize and across the globe, are not aware of the source of their drinking water or of the rural communities that populate

[19] Stanton et. al. (2010).
[20] Buric and Gault, 2011.

watershed areas. PWS provides a way to link water users with natural ecosystems and landowners with positive implications for water conservation.

Box 3. The Quito PWS Programme and Water Fund

The Quito Water Fund (FONAG) is an example of a water trust fund. Municipal drinking water and electrical utilities, a private brewery, and a water bottling company commit resources through a long-term financial mechanism, or 80-year trust fund, as defined by local NGOs, governments, and Overseas Development Assistance. These funds, in turn, are invested in critical conservation projects that involve strengthening parks and protected areas, supporting rural families to restore degraded lands and adopt sustainable farming practices, reforestation, and educating children about sustainable water management.

FONAG has generated an endowment of more than USD 6 million from its members, which has allowed it to invest USD 2.3 million and leverage an additional USD 7 million to spend in key conservation activities. Watershed protection activities financed through FONAG from 2000 to 2008 amounted to USD 9.3 million.

The Quito model is now being replicated for many Andean cities in Colombia (Bogota, Medellin, and Cartagena), Lima (Peru), and Ecuador (Zamora and Ambato).

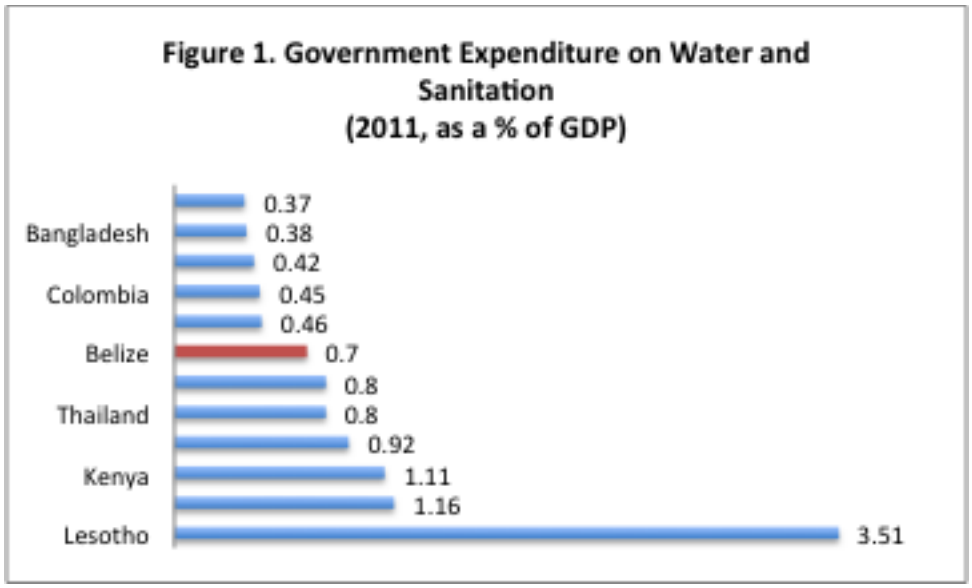
Source: EUWI, 2012.

III. Water Financing

Global financial volatility and "water-related stress" have combined to bring a new set of challenges to the developing world. More frequent floods and drought as well as the uncertainty around financing for water management means that countries must analyse trade-offs and make difficult decisions about how to finance water management. Funding for water (and sanitation) is required for operations (where there are shortfalls in coverage from tariffs), capital maintenance, capital investment and the costs of capital—interest payments on loans and any required dividends, and returns to equity providers.

Meeting the financing requirements for water management requires the application of a range of instruments (See Table 4) as well as more targeted subsidies for the poor, improved collection and higher user charges in particular for bulk water usage and for profit commercial enterprises. The instruments for water management from a financing perspective are referred to as the "3 Ts"—tariffs (payments by water users for water and water service, taxes originating from domestic taxes that are channeled to the water sector by government (national, regional and local) and transfers which refer to funds from international donors and charitable foundations.

There is a dearth of information on how countries finance water resources management. According to a UN Survey,[21] respondents reported that financing of water resource management is mainly from central government budget allocations. This represents about 47 percent of financing for water management (US $19.8 billion expended by respondent countries). Transfers—financing from external sources—have contributed about 7 percent. Government spending on water and sanitation financed from both taxes and external transfers ranged from 0.37% to 3.5% of GDP (Figure 1). In comparison, government expenditure on health and education in developing countries is 3 times as large as expenditure on water and sanitation Table 6.



Sources: 2012 GLAAS, GOB budget data and Author's calculations.

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External support was a major source of financing for only a few countries, whose water sector management is characterized by strong government-donor coordination as well as clearly articulated water sector investment priorities. More than US$8.9 billion in development aid was directed to drinking water and sanitation in 2009. Major recipient countries in terms of external aid received include China, India, Indonesia, Peru, Turkey, the United Republic of Tanzania and Viet Nam comprising about US$1.5 billion in annual water and sanitation aid.[22] External support represented more than 25% of financing for only 7 of the 74 survey respondents including Bangladesh, Honduras and Lesotho. Finally, the top recipients of external financing for water and sanitation, as a

[21] Seventy-four countries participated in the 2011 UN survey conducted for the 2012 GLAAS report. However, only 4 countries submitted partial information. Many countries could provide information on central government allocations for the water sector but most were silent on the other sources of financing.

[22] This represents the 2008-2009 average for these countries. 2012 GLAAS, p. 27.

Table 6. Government Expenditure on Health, Education and Water and Sanitation
(as a % of GDP)

	Health	Education	Water and Sanitation
Belize	**3.0**	**7.2**	**0.7**
Colombia	5.4	4.7	0.5
Egypt	1.9	3.8	0.9
Honduras	4.6	-	1.2
India	1.3	-	0.2
Kenya	2.1	6.9	1.1
Lesotho	8.4	-	3.5
Panama	6.1	3.8	0.5

Sources: 2012 GLAAS, GOB Budget Data and Author's Calculations

percent of GPD in 2008-2009 were low-income developing countries (Timor-Leste, Samoa, Burundi, Nicaragua, and Lesotho).[23] In comparison, the limited data available on the contribution of household tariffs to the financing of water resource management indicate material contributions of tariffs to cover operating expenses for water utilities.

Given the large investment requirements for water sectors, notwithstanding countries' efforts at reducing costs and/or increasing revenues, financing gaps have remained. These funding gaps have been bridged with loans on both commercial and concessionary terms and equity investments from private investors. If repayable financing is not available then financing gaps are transformed to investment gaps. This means that investments in infrastructure and institutions relevant to integrated water resources management are not undertaken. Repayable finance may not be available because the cost of borrowing is high relative to expected revenue streams; and/or because domestic markets are undeveloped and equity and debt financing are not available options; and/or because countries face debt overhangs and limited access to financing,

Recent surveys and analyses of water management arrangements in developed and developing countries alike highlight the lack of finance as a major challenge for implementing water policies in an integrated system. According to an OECD study,[24] funding gaps for water resources management are widespread in developing countries and arise because of market (and coordination) failures. Funding gaps (or fiscal gaps) refer to insufficient or unstable revenues to implement water policies across ministries and levels of government. The market failures that feed funding gaps are as follows:

[23] 2012, GAAS, p. 27.
[24] OECD, A Framework for Financing Water Resources Management, October 2012.

- Markets do not capture many of the benefits of water resources management and tend to under provide essential water-related services.

- Beneficiaries of water-related services do not usually pay the full cost of the provision of such services or may free ride.

- Public vs. private benefits of water management are not clearly identified so that pricing is not effective or efficient.

Closing funding gaps implies applying an appropriate mix of instruments and in a dynamic sense, which means that the mix of instruments is changing overtime. In line with this, there is a clear and urgent need for governments to strengthen the financial dimensions of water resources management. In this regard, there is broad agreement in international fora on four principles as critical for sustainable financing of water sectors as elaborated in Box 4.[25]:

Box 4. Principles for Sustainable Financing for Water Resources Management

Four principles provide a framework to help ensure adequate financing to effectively manage water resources.

The polluter pays: pollution is a costly activity and polluters should pay and compensate for the welfare loss to society arising from pollution.

The beneficiary pays: this allows for the sharing of the financial burden of water resources management across public and private actors.

Equity: to ensure affordability and pricing based on users' capacity to pay.

Coherence: This is required between policies that affect water resources to ensure that polices are mutually supportive and are not in conflict.

Source: OECD (2012).

Turning to the modalities of financing water management, these differ substantially between countries including in LAC. Some countries that have reached higher levels of cost recovery, such as Chile and some utilities in other countries (Brazil and Mexico) rely on commercial credit financing. However, because the cost of borrowing is high relative to expected revenue streams and/or because domestic markets are undeveloped or because countries face debt overhangs and limited access to financing,the vast majority of countries rely on funding from national governments i.e. transfers to municipalities, regional and local government levels.

[25] Ibid.

These can take various forms:

- In Colombia municipalities are legally entitled to receive transfers calculated through a formula based on their costs and poverty levels;

- In Mexico municipalities can apply for matching federal grants provided they fulfill certain conditions that vary by program;

- In Ecuador municipalities receive transfers based on a formula that takes into account their choice of management model and improvements in cost recovery;

- and in other countries transfers to municipalities and regional governments can vary from one year to the other without any conditions.

The level of transfers from national governments is highly variable and often far from sufficient to increase coverage and improve service quality or fund water resource management. Some countries pass loans from IFIs on to water management bodies and utilities in the form of credits. However, these international loans only account for a relatively small share of water and sanitation financing in Latin America.

Water does not receive sufficient funding notwithstanding the fact that it underpins economic performance and all parts of a modern economy and its productive uses essential for poverty reduction. A precondition for adequate financing for water is a full understanding of the social and economic purposes that it serves. As discussed, increased financing is necessary for all facets of water management, ranging from 'hard' infrastructure to equally important 'soft' items such as management; data collection, analysis and dissemination; regulation and other governance issues.

Effective water management will require minimizing funding gaps through appropriate pricing reforms, internal efficiency and other measures; improving the generation of revenues from users, government budgets and official development assistance (ODA); and use of these flows to leverage repayable finance such as bonds, loans and equity with the caveat that the level of financial sophistication in a country and its financial and debt profile may serve as a material constraint to financing options. The current climate for international finance is difficult. It is therefore important to exploit all available risk-sharing tools. International financing institutions (IFIs) in particular have a key role to play.

IV. The State of Belize's Water Sector

Like many developing countries, Belize faces material gaps in systematic data and information on the water sector that constrain integrated water resources management. In addition, like many of its neighbors, the Government of Belize faces ongoing water resource management challenges. Belize used an estimated 579 million m^3 (15.3 billion gallons) of water in 2007. The majority of the water in Belize originates from the Maya Mountains Massif, and is utilized by over 128 communities, with an estimated population

of over 76,500.[26] A further 180 communities in Guatemala also rely at least partially if not totally, on water draining from the Massif. Removal of the forests in these water catchment areas will seriously and critically impact all communities.

On access to water, the Statistical Institute of Belize (SIB) reported that the proportion of Belize's population with improved access to water rose from 43.6% in 1995 to 76.4% in 2006.[27] A later report indicated a higher degree of access, showing 98.8% of urban dwellers with access to safe drinking water, and 95.4% in rural areas. Belize appears to be well on track to achieve their 2015 target of 100%. Similarly there has been progress in improved sanitation, especially in the rural areas. In 2001, 54.8% of all households had access to sewer systems or septic tanks. By 2007, 64.5% of households had adequate sanitation connected to a sewer system or to septic tanks. However, as of 2008, as many as 30% of Belizeans, largely rural, still relied on systems classified as inadequate. Moreover, the reservoirs from which that water is drawn are threatened by contamination from a number of sources (Box 5).

Box 5. Water Pollution in Belize

According to a report by the Department of Environment in 2007, water in Belize is a "precious and endangered resource". The pollutants identified at that time consist of organic and inorganic chemicals such as heavy metals, petrochemicals and bacteria. Other threats identified include climate change, the over use of water for development, the loss of biodiversity and water rights issues.

The main sources of pollution include the Belize Sugar Industry, the Citrus Industry, the Banana Industry, Aquaculture, Mining, Sewage and Oil.

The aquaculture industry was assessed to be the biggest effluent producer in the country. Fish and shrimp farms are using 40,000 acres of coastal land. These farms extract hundreds of millions gallons per day from the sea, estuaries, lagoons and rivers, producing millions of gallons of effluent per day, but less than a quarter of the 12 farms do any sort of treatment before releasing its effluent. They also contaminate environment in the disposal of waste such as shrimp heads, oil and fuel storage, etc.

Source: Independent Reformer, August 17, 2007, pp. 1 & 3.

There is no current inventory of water resources in Belize and without such an inventory any financial sustainability plan (FSP) is materially limited as this must necessarily precede an FSP. The most recent inventory dates to 1999[28] and identifies 18 major river catchments with 16 principal watersheds which are roughly grouped into six main watershed regions based on general characteristics of topography, geology, soils, rainfall

[26] Walker et al., (2008).

[27] Belize, NSDR (2012).

[28] Boles (1999).

and land use. These watershed regions include the Northern Watershed Region, the Northeastern, the Central, the Southeastern, the South western and the Southern Watershed Region.[29]

In addition to Belize's rivers, numerous freshwater and brackish water lakes or lagoons dot the Belize's low lying coast. Groundwater is a vital source for freshwater in rural Belize, where almost 95% of the freshwater supply comes from groundwater. It is important to note however that the existing groundwater aquifers and their annual recharge rates have not been adequately quantified. Deforestation accounts for the degradation of half a million acres (almost a tenth) of the nation's land in the past thirteen years. Most of the clearings occurred in central Belize, particularly in the Belize River watershed, with negative implications for drinking water quality should the trend continue. In Belize, the renewable internal freshwater resources per capita (cubic meters) was 48.02 thousand cubic meters in 2009 down from 49.6 in 2008.

In 2010, the National Integrated Water Resources Policy was finalized. The GOB passed legislation establishing the National Integrated Water Resources Authority (NIWRA) as a statutory body to help encourage the efficient use of Belize's water resources.

The Organizational Review and Institutional Development Consultancy for NIWRA in 2013,[30] provides a good account of the public and private institutions engaged in Belize's Water Sector. These reports also discuss the existing situation with respect to the institutional and legal framework. They also present recommendations for the enhanced functioning of water resources entities and identify key collaborating institutions. The organizational framework presented focuses on four key areas in water resource management:

- Supply of water and sewage services
- Water safety for human consumption and health
- Protection and Conservation of Water Resources
- Water Abstraction

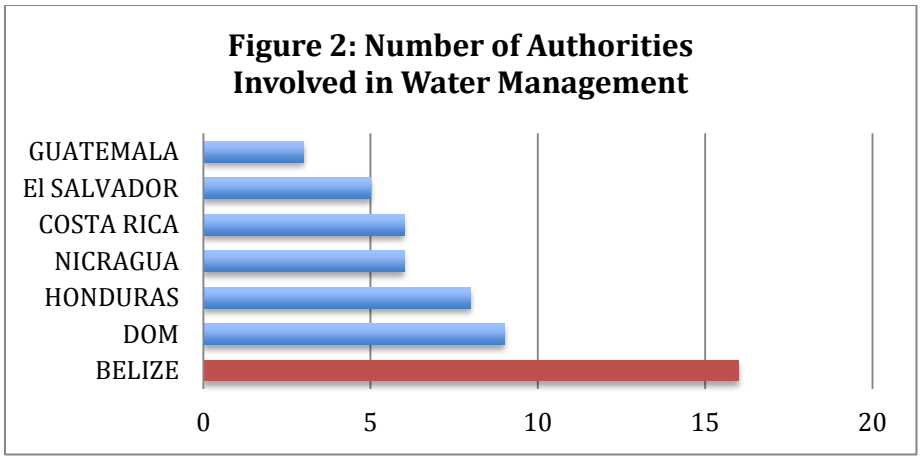
There are 16 Government institutions with responsibilities in these four focus areas. In addition, there are other institutions that have legal obligations with respect to water resources including City and Town Councils as well as Village Water Boards. There are also other institutions, agencies and businesses operating in the water sector under or

[29] According to the NSDR, this is as reported by a 2010 World Bank Report.

[30] National Integrated Water Resources Authority of Belize) *Recommendations for the Enhanced Functioning of Water Resource Management Entities* (4/09/2013) and *Organizational Structure and Staffing Requirements*.(4/15/2013) going forward referred to as the Williams Consultancy Reports.

bypassing the legal oversight of the Ministries and Departments with material impacts on each of the four focus areas.

A main conclusion of the Williams Consultancy Reports is that the responsibility for water resources management is "fragmented" and legally dispersed across many Government Ministries, Departments and agencies. Since the redistribution of government portfolios in line with the 2012 elections, water stakeholders are dispersed across many ministries. As indicated in the reports the "scattering of the water stakeholders presents a logistical challenge, since many certifications previously required by departments of the Ministry of Natural Resources will now require the attention of other Ministries.[31] Indeed the number of public institutions involved in water resources management exceeds that in other countries in the Latin American and Caribbean region (Figure 2).



Source: Akhmouch (2012) and Author's calculations.

Most water and sanitation utilities in the Caribbean are state-owned statutory institutions. A typical state-owned water utility in the Caribbean is characterized by:

- Overstaffing with typically around 8 employees per 1,000 connections.
- High levels of unaccounted for water, typically more than 50 percent.
- Commercial losses due to illegal connections, faulty meters, and under billing typically explain the unaccounted water.
- Below cost-recovery-revenues, which in most cases do not cover operating costs.
- Lack of funds to make capital investments to repair and expand the network.
- Political involvement in network expansion and recruitment decisions.

[31] NIWRA subsection 51.(b), 52.(4), 74.(1).

The combination of these issues leads regional utilities into a vicious cycle of value devaluation and recurring losses. The inability to invest in network expansion, in turn, constrains revenue growth.

Belize Water Services Limited (BWS), is the regulated monopoly water and sewage utility for the country. BWS, is regulated by the Public Utilities Commission (PUC). BWS' rates are established by the PUC.[32] As of October 2012, BWS supplied 47,814 customers with 229 million gallons of water. The Belize District accounted for 38% of BWS customers and 44% of water consumption. Although BWS distinguishes between residential and commercial consumption, there is not a classification for agriculture. BWS also provides water to villages in all districts except Dangriga and Corozal (Table 7).

In providing water services, BWS use watersheds and rivers for water collection including the Belize River, North Stann Creek River, wells along the bank of the Macal River and sea water cleaned through reverse osmosis.[33] These water sources are increasingly threatened by pollution.

Like most utilities in the Caribbean, BWS is struggling to ensure financial viability. Given constraints for price increases associated with Government ownership, BWS has focused on increased efficiency and water loss reduction techniques and other efficiency improvements including:

- Employees per 1000 customers reduced by 9%
- Non-direct operational expenses reduced by 21%
- Electrical consumption reduced by 34%
- Production Efficiency increased by 48%

[32]BWS which was vested with the Asset and Liabilities of the Water and Sewerage Authority ("WASA") in March 2001, went through the transformation from a Statutory Body to a private company owned by a transnational water company and then to majority Government ownership.

[33] BWS internal document.

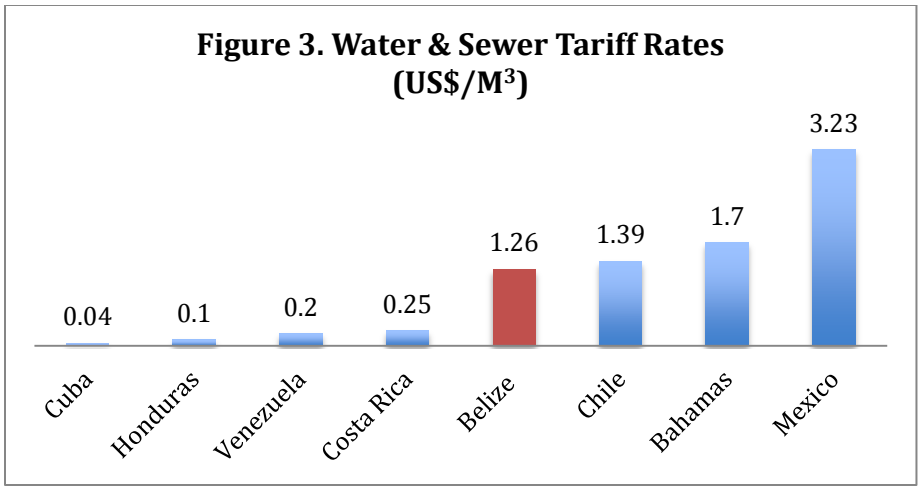
Table 7. BWS Water Services
(as of end 2012)

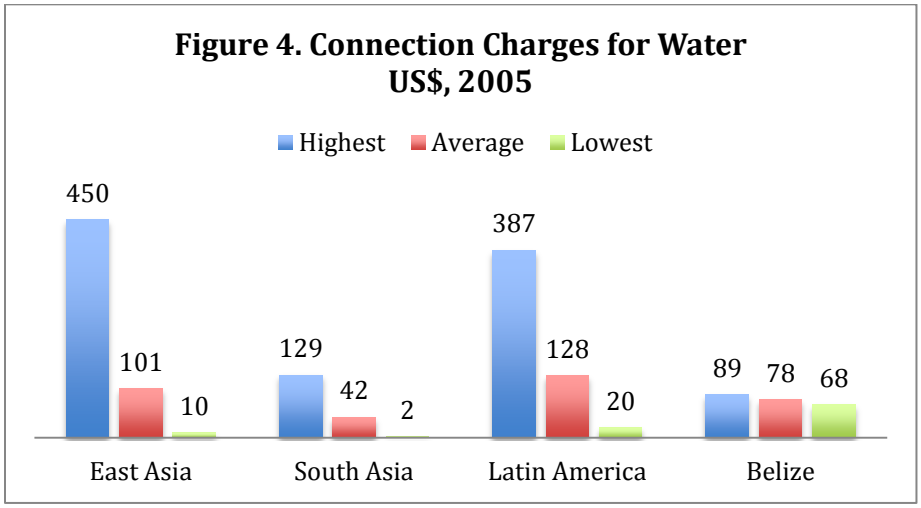
District	Village
Belize	Haittieville Sandhill Ladyville Lords Bank Burrell Boom
Dangriga	None
Corozal	None
Cayo	Red Creek Camalote Tea Kettle Cotton Tree St. Matthews Franiks Eddy
Orange Walk	Trial Farm

BWS water and sewage tariffs and connection rates (Figures 3 and 4) appear relatively low as compared to countries in the Latin American and Caribbean region. BWS has been constrained from increasing tariffs and also from differentiating consumption use beyond the distinction of residential and commercial. However, BWS has proposed changes to the water classification and tariff structures.[34] Under the new system, tariffs would be based on zones and customer classifications of residential, non-residential and commercial. A lower flat rate ($6.50) would be charged but for a lower block—500 gallons; there after incremental usage would be charged at increasing rates per gallon in blocks of 1000 gallons. This would represent an increase of the water tariff to $10 for consumption of 1000 as compared to the current flat rate of $8.00 for 1000 gallons. The proposed charge for non-residential users would be $10 for the first block of 1000 gallons. Similarly for non-residential users after the first block incremental rates per gallon would increase at an increasing rate per 1000 gallon block. In comparison, commercial users would pay a flat rate of $110 for up to 5000 gallons (or 2.2 cents per gallon for 5,000 gallons). Blocks would increase by 5000 gallons at increasing incremental rates per gallon. For instance, commercial users would pay $194 for usage of 8000 gallons of water (or 2.425 cents per gallon) as compared to $106.63 (or 1.333 cents per gallon) under the current tariff rate structure.

Belize's largest consumers of water in the agricultural sector—the citrus, sugar and banana industries as well as the agricultural commercial enterprises operating in Belize's Central Corridor pay zero or the flat rate for unlimited use of water. Moreover, commercial profit seeking enterprises, such as hotels and water bottling companies, using

[34] These proposals have been put forth to the PUC.





Sources: Komives, BWS, others and Author's calculations.

significantly more water on average than households face the same low tariff structure as households.

Water pricing must necessarily be revisited aimed at generating financing for water management, meeting conservation objectives and guaranteeing social justice for the poor. This suggests that before additional increases in water tariffs for households are introduced, there needs to be a stock taking of water resources, usage by type of customer and pricing aimed at a rationalization of water pricing. This compels a reevaluation of pricing in particular for profit making entities to align rates more closely to reflect usage in line with practices in other developing countries.

As concerns pricing reforms, consistent with practices in many countries, water tariffs in Belize for the agricultural sector can be based on large discounts for volume. If not in the purview of the PUC to introduce differential rates for commercial enterprises then these are potential areas for the levying by NIWRA of fees for water management based on the principle that beneficiaries pay. Moreover, given the deterioration of the quality of water resources in Belize application of the "polluter pays" principle is imperative. This, in turn

requires, the periodic and systematic collection, monitoring and reporting of data on water quality.

Given the current water tariff structure, Belize's greatest challenge will be to secure financing for badly needed investment in infrastructure and water resource management. This means that government has the burden of financing BWS' operational expenses as well as investments in water resource management in the context of the scarce availability of financing, given Belize's debt burden and limited access to international financial markets and undeveloped domestic financial markets. This suggests that unless there is pricing reform, financing for water resources management in Belize will be crowded out by the need to address funding gaps faced by BWS.

The costs of not investing are high. Experience advises that it is highly desirable for infrastructure providers to be able to finance expansion as demand grows. Historical investment in the water sector in Belize in 1990-2002, as compared to investment requirements are the lowest in the Caribbean with the exception of Haiti. The investment requirement for Belize per capita through 2015 to meet the MDG goals for water and sanitation is higher for Belize than all Caribbean countries with exception of Haiti.[35]

Finally, concerning water rights, important for financial sustainability, Belize as many developing countries has entered into foreign financial investment contracts—agreements between foreign investors and host country governments, with major negative implications for sustainable development and explicitly for the water sector.[36] In a 2001 contract with Fortis Inc. (referred to as The Third Master Agreement[37]), the GOB provided Fortis Inc. with exclusive rights to the Macal River and all of its tributaries for [50] years. Payments to Fortis doubled and Fortis was absolved of all liability in providing electrical services to Belize via its registered company—Belize Electric Company (BECOL):

> "In no event shall the Producer [BECOL] be liable, whether in contract tort, negligence, strict liability or otherwise for any direct incidental or consequential damages of any nature arising at any time or from any cause whatsoever."[38]

In this regard, if there is a catastrophe or natural disaster involving the dams on the Macal River Fortis can walk away. Fortis-BELCO pays no taxes or export/import duties. Fortis Inc.- BECOL also is guaranteed yearly rate increases independent of demand and pays no taxes or import/export duties to Belize except payroll taxes, under a special law written, allowing Fortis-BECOL to operate tax and duty-free.[39]

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[35] Jha (2012).

[36] Ayine, D., Blanco H. et. al., (2005).c

[37] The Third Master Agreement is comprised of a Power Purchase Agreement, Franchise agreement and an Amended and Reseated Power Purchase Agreement.

[38] Power Purchase Agreement, Sec. 17.2, p. 17.

[39] Franchise Agreement, Sec.12.1, p. 29. The name of the law is Mollejon Hydroelectric Project (Exemption from Taxes and Duties) Act, Chapter 59.

The Government of Belize is charged to take care of all necessary matters to give control of the river and all tributaries to BECOL-Fortis.[40] Because of it is unregulated by the Public Utilities Commission (PUC), Fortis-BECOLcharges Belize high prices for electricity. Moreover, there is evidence that the existing hydro facilities on the Macal River, (the Mollejon and Chalillo and Vaca dams) are polluting Belize's main water source. Based on the Thrid Master Agreement, Fortis-BECOL is exempt from the principle of "polluters pay".

It is noteworthy that Latin American was the first region to revisit and cancel contracts with private water and electricity companies, returning the management and delivery of services to public and state control. Due to popular mobilizations for control over natural resources, private contracts in Argentina, Bolivia and Uruguay were nullified.[41] As noted, the Latin American and Caribbean region today has higher rates of access to improved water sources than Asia and Africa.

Countries report a gradual but positive trend in financing for water resources development[42] and management with more diverse sources of financing but little progress on payment for water resources services. Developments in Belize's water sector are in line with this general assessment. Nevertheless, Belize is well positioned for sustainable access to water at affordable prices, if water resource management is taken seriously and financed. In this regard, more effort will be needed to increase levels of financing for water resources management including via tariff reform and to raise revenues from water resource and ecosystem services including protected areas. With the demise of protected areas globally and deterioration of usable land-to-population ratios, Belize with its still high ratio of land to population is well positioned to protect and leverage its water and land resources. This makes it imperative to maintain Belize protected areas also to ensure future water supply.

V. Report on Stakeholder Consultation

Consultations with stakeholders were undertaken from December 2013 to May 2014 and aimed at updating the national situation in Belize since the passing of the legislation NIWRA legislation in 2010;[43] identifying the main priorities of the NIWRA including through engagement with key water sector stakeholders; and facilitating an analysis of the elements of an enabling environment including cross-sectoral and institutional capabilities and requirements for the sector.[1] In this regard, about 50 stakeholders representing different interests in the water sector including from the public and private sectors were contacted to discuss water resource management in Belize and the role of the NIWRA.

[40] Franchise Agreement Sec.3.3, p.25.
[41] Spronk et. al. (2010).
[42] OECD (2012).

Most of the consultations were face to face and a few stakeholders opted to complete a survey.[44] It is noteworthy that most stakeholders did not know the price paid for water though they did know what they paid for electricity. In this regard, most stakeholders acknowledge that this might be an indication that water rates are too low in Belize. Moreover, as discussed water prices in Belize for consumption are below those in developing countries including in the Caribbean and Central American region. It is notable that unlike most countries—developing and developed countries alike—Belize does not charge differential rates based on different uses of water—water for use by households as compared to water for use for profit driven commercial and industrial activities.

Main Views of Water Sector Stakeholders

A. Challenges facing Water Management in Belize

In the view of most stakeholders with whom consultations were undertaken, Belize though small and with relative abundance of water as compared to Caribbean peers faces several formidable challenges with respect to water resources and water management:

- Increased water demand for consumption arising from mounting population pressures arising from a relatively high birth rate and immigration.
- Incomplete accounting and monitoring of water resources in Belize.
- A misperception by the public that Belize is water abundant with negative implications for conservation.
- Unlimited water extraction at zero or low rates by the main agricultural subsectors—citrus, sugar, banana.
- Unlimited water extraction at zero or low cost by farming enterprises located in the central corridor.
- Several Master Agreements that confer exclusive rights at zero or low costs to BECOL
- Watersheds compromised by pollution.
- Increased energy demand for water: present and future.
- Shared water sheds with Mexico and Guatemala resources
- Limited monitoring and tracking of water quality and a perception nevertheless of declining water quality based on experiences with contamination in the north and south.

[44]The revised Consultation Report will have attached a list of stakeholders.

B. Stakeholder Views on the Role of NIWRA in the Water Sector

Notwithstanding diverse interests and goals there were some common themes that emerged from the consultations with respect to the water resources, water resource management in Belize and the role of the NIWRA, given the profile for the water sector, that emerged from the consultations:

- An inventory of Belize's water resources and the state of those resources is required with urgency in advance of water pricing reforms. This will facilitate an assessment of the status and value of water resources Compiling such an inventory should be an immediate priority of the NIWRA. Some stakeholders were skeptical that Belize's aquifers and watersheds would be able to provide for Belize's future generations.

- The pricing of water should be reviewed, aimed at conservation and equity while preserving affordability for the poor. This implies revisiting the existing Master Agreements.

- Water quality is an increasing issue in Belize. The NIWRA should be charged with testing and monitoring water quality. In this regard, stakeholders were early unanimous in calling for the NIWRA to establish a National Lab.

- A top priority for the NIWRA should be to prepare the National Water Resources Management Master Plan as a context for the reform of water abstraction and usage and pricing reforms.

- A priority for the NIWRA should be to review existing water rights—implicit and contractual with a view toward conformity with incentives that promote the objectives of improving water quality and conservation.

- Increases in water rates for consumption/households should not be considered until large commercial entities are paying for abstraction.

Other key points emphasized by some stakeholders were as follows:

- There should be a distinction in the pricing of water use between water for consumption and water for commercial use including for agriculture, power generation, private water companies and hotels.

- Investment in the water sector and water utility is critical to financial sustainability for the sector.
- Private water sources such as wells should pay at a minimum for an annual license for water extraction.

- NIWRA should lead the development of Belize's technical human resources in water resource management by providing incentives including via scholarships.

There were concerns that Belize trails comparator countries in applying up to date conservation related practices in the sector—for instance managed aquifer recharge (Box 6) partially because of the perception that Belize is water abundant.

- NIWRA should be responsible for educating the general public as to the importance of water resources management.

Box 6. Aquifer Recharge

Managed aquifer recharge (MAR) is the process of intentionally banking, and in some cases treating water in aquifers. MAR is used both to prevent degradation of ground water resources and to generate additional sources of drinking water via storage or bioremediation of waste water. There are several types of MAR, some of which require energy—aquifer storage and recovery—and some of which do not. Energy consumptive MAR are used mostly in the USA and in Australia, while non-consumptive MAR are used in nearly every region of the world. The use of MAR to create or augment existing water supplies could have measurable energy savings and carbon emission reductions. For example, a study examining parts of the San Francisco Bay Area in the US showed that creating local water supplies could save 637 million kWh/year. Given that the energy required to pump ground water increases with depth, preventing groundwater depletion also resulting in long-term energy savings.

Source: Kirstin I. Conti, *IGRAC* and University of Amsterdam.

VI. Conclusion

The forthcoming companion financial sustainability plan takes into account the state of the water sector in Belize, stakeholders' views as well as the current financial landscape

in Belize and internationally. For NIWRA to be financially sustainable there will need to be clear prioritization of NIWRA's functions and goals and a phased approach to NIWRA assumption of those functions and goals. Several key "take aways" from this analysis are as follows:

- Belize's NIWRA faces a material funding gap for water management in the immediate to medium-run.

- The path to financial sustainability for water resource management will be lengthy and arduous largely because the main financing instruments including water tariffs and charges for pollution are under the authority of other institutions.

- In the absence of a comprehensive and current inventory of water resources, it is not clear what assets are available to leverage for financing.

- To garner external financing to support NIWRA, clear articulation of NIWRA's priorities as well as strong coordination with key stakeholders in the water sector will be essential.

- In the immediate run, consistent with the experience of other developing countries on the path to implementing national integrated water management systems NIWRA will be in the "immediate run" dependent on Government budget financing.

- Belize's financial markets are unsophisticated. Repayable finance is unlikely to be available as equity and debt financing are not readily available. The cost of financing is also high in Belize. Debt financing options may be available in the domestic market over time. However, external debt financing options are limited given Belize's debt overhang and recent debt restructuring.

- If GOB is willing to use NIWRA to articulate and coordinate a master plan for the water sector external financing will be a more promising option, noting that external financing has not be a significant source of financing to close funding gaps for water management.

References

African Development Bank. Guidelines for User Fees and Cost Recovery for Rural, Non Networked, Water and Sanitation Delivery, March 2011.

Akhmouch, Aziza, Water Governance in Latin America and the Caribbean, A Multi-Level Approach, OECD, 2012.

Ayine, D. ,Blanco, H. Cotula, L Djire, M., Gonzalez, C., Kotey, N., Reyes, B., Ward, H. and H. Yusuf, Lifting the Lid on Foreign Investment Contracts: The Real Deal for Sustainable Development, 2005.

Belize: National Integrated Water Resources, Act, 2010.

Belize, National Sustainable Development Report (NSDR), MFFSD, UNDESA, UNDP, 2012.

Dinar, Ariel, The Political Economy of Water Pricing Reforms, World Bank, 2000.

Drumm Consulting Co. Sustainable Finance Strategy and Plan for the Belize Protected Area System, 2013.

EU Water Initiative – Finance Working Group (EUWI-FWG) Pricing Water Resources to Finance their Sustainable Management, May 2012.

Faye, Marianne, et.al. Infrastructure in Latin America and the Caribbean: Recent Developments and Key Challenges, World Bank, 2007.

Guzman-Arias, Isabel, Planning and development of Costa Rica water resources: current

status and perspectives, August 2013.

Haas, and Robert Aukerman.. Draft Comprehensive Protected Areas Fee Policy and Framework: Increasing the Efficiency in the Collection, Administration and Investment of Protected Areas Fees in Belize, August 22, 2012.

Huitema, Dave, Mostert, Eric, Wouter Egas, Mollenkamp, Sabine, Pahl-Wost, Claudia. and Resul Yalcin Adaptive Water Governance: Assessing the Institutional Prescriptions of Adaptive (Co) Management from a Governance Perspective and Defining a Research Agenda.

Jha, Abhas Kumar, Institutions, Performance, and the Financing

Le Blanc, David, A Framework for Analyzing Tariffs and Subsidies in Water Provision to Urban Households in Developing Countries, Division for Sustainable Development, UN, 2008.

Lehmann, Paul, Challenges to Water Pricing in Developing Countries, The Case of Lima, Peru. August 2010.

McPhail Alexander, Locussol, Alain and Perry, Chris. Achieving Financial Sustainability and Recovering Costs in Bank Financed Water Supply and Sanitation and Irrigation Projects. June 2012.

Nauges, Celine, and Dale Whittington, Estimation of Water Demand in Developing Countries, An Overview, 2005.

OECD, A Framework for Financing Water Resources Management, October 2012.

OECD, Managing Water for All, An OECD Perspective on Pricing and Financing, 2009.

Riquelme, Rodrigo, Regional Overview of Water and Sanitation in Latin America and the Caribbean, Inter-American Development Bank, (IADB), 2011.

Spronk, Susan, Crespo,, Carlos and Marcela Olivera, Struggles for Water Justice in Latin America, Public and 'social public' alternatives, 2010.

UN and WHO, Water Global Analysis and Assessment of Sanitation and Drinking Water, The Challenge of Extending and Sustaining Services (GLAAS 2012 Report), 2012.

UNDP. Water Governance for Poverty Reduction Key Issues and the UNDP Response to the Millenium Development Goals, January 2004.

UNESCO, Managing Water under Uncertainty and Risk, United Nations World Water Development Report (UNWWR) 4, Volume 1, 2012.

UNESCO, Facing the Challenges, Volume 2, UNWWR 2014, 2014.

UNESCO, Water and Energy, Volume 1, UNWWR 2014, 2014.

United Nations Environment Programme Finance Initiative (UNEPFI), Financing Water: Risks and Opportunities, An Issues Paper, 2006.

Vasquez, William, Household Preferences and Governance of Water Services, A Hedonic Analysis from Rural Guatemala, International Food Policy Research Institute (IFPRI), December 2011.

Wildtracks, Rationalization Exercise of the Belize National Protected Areas System, Draft Final Report, 2013.

Williams, Rudolph, Draft Organizational Review and Institutional Development Consultancy (National Integrated Water Resources Authority of Belize), Draft Organizational and Operational Charter, June 2013.

Williams, Rudolph, Draft Organizational Review and Institutional Development Consultancy (National Integrated Water Resources Authority of Belize), Recommendations for the Enhanced Functioning of Water Resource Management Entities, April 2013.

World Business Council for Sustainable Development (WBCSD), Water, Facts and Trends, 2013.

World Health Organization (WHO), Status Report on the Application of Integrated Approaches to Water Resource Management, 2012.