WATER SECTOR REGULATION IN SMALL ISLAND DEVELOPING STATES: AN APPLICATION TO CAPE VERDE

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Abstract

Small Island Developing states (SIDs) present challenges for analysts and policy-makers attempting to strengthen island-nation infrastructure. This study applies lessons to one SID to illustrate how benchmarking can improve the performance of water utilities. The archipelago-nation of Cape Verde is characterized by severe water scarcity and relatively low per capita income (the GDP is the 93th of the world and the 11th of Africa). These national characteristics have been considered the main constraints for the water supply development. Analysts find a close relationship between the socioeconomic conditions of a country and the precarious level of water and wastewater services, including their coverage. Nevertheless, after the creation, in 2003, of a multi-sector regulator, the Economic Regulation Agency (ARE), citizens had high the expectations for improved sector performance. To achieve significant network expansion and cost containment will require the regulator and operators to draw lessons from countries who have successfully addressed water issues despite comparable socioeconomic/hydrologic features. This study provides the rationale for a regulatory model for ARE that is based on benchmarking analysis (for quantifying performance) and yardstick competition (for incentivizing utility managers). The study recommends a design for a performance evaluation system and discusses the major issues associated implementing such a system.

Keywords: Benchmarking; Cape Verde; Regulation; Water Sector; Yardstick Competition

INTRODUCTION

All Small Island Developing states (SIDs) face hurdles in the provision of infrastructure services—generally related to low income, lack of scale economies and economies of density, complex geographic challenges, and hydrological limitations. Here, we draw upon the case of Cape Verde to analyze typical constraints and to develop strategies for addressing hurdles limiting water sector performance. Recommendations developed here can also be applied to other SIDs, though fine-tuning would be necessary to capture the unique features of the particular island-nation, including exposure to natural disasters, citizen awareness of water issues, the political power of different stakeholders, and the specific hurdles that must be overcome to improve the performance of the water sector. Ajakaiye and Ncube (2010) emphasize the importance of infrastructure as potentially limiting economic development. They characterized infrastructure as involving three important dimensions: quality, quantity and access. Those dimensions are explored here in the context of the Cape Verde water sector. Given the geographical and hydrological features of the archipelago country, utilities in Cape Verde are compelled to rely on desalination (which has high costs, *vide* Becker et al., 2010). In addition, the national socioeconomic context has not been conducive to high levels of Water/Wastewater service and coverage. The archipelago-nation of Cape Verde is characterized by severe water scarcity and relatively low per capita income (the GDP is the 93th of the world and the 11th of Africa). Despite the developments observed in recent years, the weak performance is even more pronounced for sanitation services. Increased water consumption jeopardizes water resource sustainability, underscoring the need to adopt an appropriate resource management policy—integrated water resource planning.

Successive governments of Cape Verde have undertaken several reforms in the water sector (INGRH, 2003). In addition to the creation of the Water Code (Law No. 41/II/84), which established the legal regime of ownership, protection, conservation, development, management and use of water resources in Cape Verde, as part of that set of rules, the Cape Verdean Government established the Legal Framework for Regulatory Agencies (Law No. 20/2003). Through this law, a multi-sector regulator was created: the Economic Regulation Agency (ARE) was responsible for providing oversight for water and wastewater services (as well as electricity, transportation and fuel). In general, the role ARE has played a positive role in implementing

infrastructure policy. However, the regulatory model for the water sector is not as well defined as in the other regulated markets. This paper presents a regulatory model for the water sector in Cape Verde. The model (developed in the context of Portugal (Marques, 2006)) could be adapted to local circumstances in other areas. For example, Indonesia consists of thousands of small islands and five large ones. The Philippines faces similar issues. The application of benchmarking (to identify utilities on the frontier) and use of yardstick competition (to provide incentives for meeting feasible targets) represents one way to address the issues facing archipelagos and SIDs. Cape Verde is similar to other island states in the Caribbean and the Pacific: so the authors hope that this case-study can enrich the literature on the water utility regulation and benchmarking.

After this brief introduction, section two provides an overview of the current situation in Cape Verde's water sector. Section three describes the current state of regulatory affairs. Section four develops some principles and recommendations for the regulation of water utilities based on the best practice worldwide. Section five develops a specific proposal for the ARE regulatory model and discusses its strengths and limitations. The same principles apply to any SID as well as to large country archipelagos. Finally, concluding remarks are presented in the last section.

WATER SECTOR IN CAPE VERDE

Market Structure

The water sector in Cape Verde comprises fifteen operators, of which twelve are responsible for drinking water supply and three for the wastewater. The largest operator in the country, ELECTRA, providing energy in the entire country, ELECTRA is also responsible for the drinking water supply for four islands (Praia, Sao Vicente, Sal and Boavista), covering about 200,000 inhabitants (40% of the Cape Verdean population), and for the wastewater treatment service in the Praia. The other islands and cities are supplied by municipal companies (100% public ownership).

ELECTRA was partially privatized in 2000, with partial ownership going to a consortium formed by Electricity of Portugal (EDP) and Águas de Portugal (ADP): the national government has been its major shareholder since 2007. The private companies left the country in 2008 in

response to the failure of the Cape Verdean government to fulfill its obligations: the government prevented tariff increases that were necessary for financial sustainability. Laffont (2003) identified politically-induced enforcement failures in Africa as reflecting information asymmetries and opportunism—damaging prospects for high performance in infrastructure. The political decision led to insufficient utility investment and, consequently, to a decline in service quality. The populist opposition to price increases led the companies to end their contracts, with the companies losing several million Euros as a result of their exit. However, since the Portuguese companies that had partial ownership are public (and due to the links between the two countries—Cape Verdean is a former colony of Portugal) the Portuguese government assumed the economic damages imposed on EDP and ADP. Currently, the Cape Verde government has plans to re-privatize the company, though that will require increasing investor confidence in the regulatory system (that includes the potential for governmental intervention). The remaining operators correspond to eleven municipal companies which operate under local ownership. There are also some private pump trucks that provide water in the peri-urban and rural areas which are unregulated and compete with the utilities.

Sector characteristics

The level of drinking water supply coverage has been growing but it is still far from what citizens expect. Access to piped water is limited, with low geographic coverage and significant discontinuities in service. In Cape Verde, the average water consumption by customers connected to the network is estimated at 50 liters per capita per day for residential connections, and 15 liters per capita per day for fountain users (ranging between 7 and 25 liters).

In 2009, the main operator in Cape Verde, ELECTRA, produced about 4.5 million m^3 of drinking water, of which 4.2 million m^3 was desalinized water (93% of total production). This was an increase of 313,050 m^3 over the total water produced in 2008. Figure 1 shows the trends in desalinated water produced, groundwater intake, and total water produced.

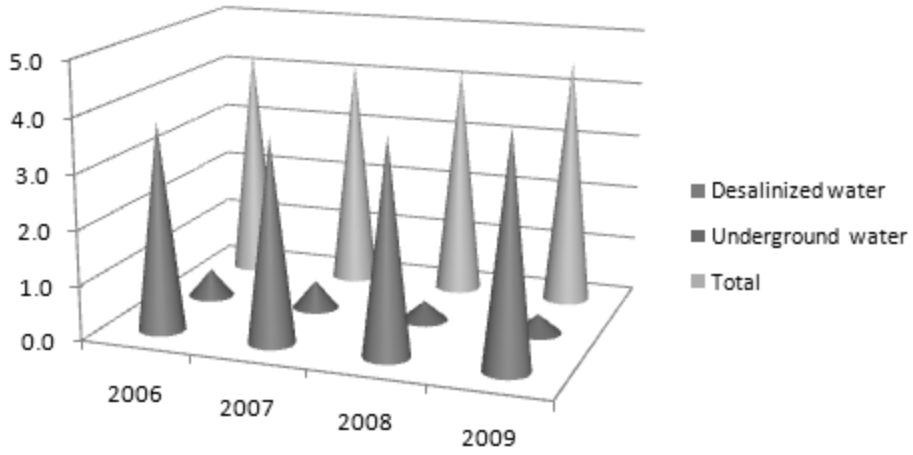

Figure 1 – Trends in water production

Regarding wastewater service, the situation is even worse. The Survey of Well-Being Indicators (INE, 2009) shows that only 30.4% of the national population benefits from sewerage or septic tanks, the latter with greater concentration in urban areas. Wastewater treatment service is only provided in the cities of Praia and Mindelo.

Following the global trend of the sector development, ELECTRA has increased total staff, although staff per thousand customers has declined from 6.07 to 5.1. Table 1 shows the growth of ELECTRA's customers and staff:

Table 1 Staff and Customers: ELECTRA

Year	2006	2007	2008	2009
Staff (no.)	679	655	687	709
Customers (no.)	111,918	118,704	126,633	139,467
Customers / Staff	164.8	181.2	184.3	197.7

The increased staff productivity is a plus, but customer expectations regarding service quality are not being met. The indicator "customer complaints" has been gradually growing since 2006: in 2008, ELECTRA reported 414 complaints). In 2009, there was also a small increase at the level

of bill collecting. Table 2 shows the distribution of water billings and collections for individual customers.

Table 2 ELECTRA Billings and Collections: 2007 and 2009

	2007		2009	
Client (€)	**Billings**	**Collected**	**Billings**	**Collected**
State	773.552	1.024.200	825.146	1.018.080
Municipalities	784.172	907.505	692.452	753.318
Residential	5.212.656	4.978.774	5.940.559	5.558.868
Public companies	133.214	118.614	172.272	199.533
Private companies	2.206.896	2.516.768	2.621.127	2.628.389
Total	**9.110.490**	**9.545.861**	**10.251.512**	**10.158.188**

It seems that, overall, there has been a decline in collections (and therefore, cost recovery), though the different customer categories have different patterns. Residential customers experienced a slight decline: a collections/billings ratio of 95.5% to 93.6%. Such performance indicators warrant systematic attention from regulators (and managers), since they provide evidence of divergent trends for different types of utilities.

WATER SECTOR REGULATION

Economic Regulatory Agency (Agência de Regulação Económica - ARE)

The ARE, regulated by the Decree-Law No. 26/2003, is an independent multi-sector agency, covering the water, wastewater, transport, electricity and fuel markets. Among its major functions there are oversight in the areas of quality standards, supervision of prices, and sanctioning the non-achievement of targets. Moreover, the agency enjoys administrative, financial and asset management autonomy.

The ARE's mission is to guarantee and promote economic efficiency and financial sustainability and stability among the utilities. In addition, the ARE tries to ensure the fulfillment of public service obligations (e.g. universal service), to protect customer rights and interests (e.g. balancing higher tariffs *versus* the increased costs associated with higher service quality), to ensure impartiality in regulatory decision-making and transparency (between operators

themselves and between utilities and their customers), to implement and enforce legislation, to coordinate the application of competition law principles, to ensure the (economic) viability of the sectors regulated, and, finally, to keep the customers well informed about all regulatory procedures.

Besides the ARE there are two other main bodies with responsibilities for the water sector in Cape Verde: the National Institute of Water Resources Management (INGRH) and the National Council for Water (CNAG). The INGRH is a public institution with administrative and financial autonomy and with its own assets, headed by the Minister of Agriculture and Fisheries. The INGRH responsibility relies on the planning and management of water resources and water quality. The CNAG is the inter-ministerial body responsible for the coordination of water resources management.

Tariffs

The ARE is responsible for tariff and price setting for the water utilities, according to the legislation; at the same time, ARE (1) ensures compliance with tariff standards imposed in the concession contracts and licenses, (2) defines rules for cost accounting and (3) proceeds with the revision, adoption, and implementation of the tariff system.

The current framework for wastewater service is generally characterized by the absence of charges or by a great deficit between the revenues and its real operational cost. Two (distinct) consequences derive from this, i.e. the service degradation and the imposition of constraints to drinking water consumption. Considering the weak purchasing power of the poorer segments of society, the wastewater service requires important measures in order to assure its viability,

The tariff system is defined by a two part tariffs, comprised of an increasing block system, where the jump point and marginal prices depending on the final customer type. The tariff is implemented through a fixed tariff, which takes into account the meter size, ranging between 0.69 € and 6.93 € (ARE, 2010), and a variable tariff, defined by increasing blocks that vary according to consumption.

Quality of Service

The scarcity of water resources that characterizes Cape Verde and the lack of capital for infrastructure investment, together with the weak "affordability" by customers, have significant consequences for the water sector development, affecting both service provision (hours per day) and drinking water quality (meeting World Health Organization standards). In fact, the water supplied does not always meet the minimum quality standards for human consumption. During periods of high demand, there are often (unexpected) interruptions of water supply.

The percentage of water losses is not very high, reflecting water's opportunity costs and the social value the Cape Verdeans ascribe to this resource. The issues related to quality of service (reduced hours and water pressure) are mainly due to financial constraints associated with cash flows; however, regulatory targets (and associated incentives) could be given greater attention. Nevertheless, the social priority involves increasing service coverage and the availability of water resources.

Public Service Obligations

The public service obligations in the water sector in Cape Verde are mainly established by the Decree-Law No. 75/99, encompassing, *inter alia*, universality, quality of service, accessibility, and reliability. The universality and accessibility principles, in accordance with legislation and the terms of concession contracts, seek to ensure that all customers within the concession area that require the service will be served, reflecting a trade-off between tariffs and quality of service. Moreover, the creation of the regulatory agency fosters the principles of equality, social solidarity, and transparency in processes affecting water services. The first two principles are targeted at the application of non-discrimination in service provision. In this sense, the tariff system has to take into account the needs of low-income customers and other special cases. Transparency relates to access to information and opportunities for citizen participation: the rules implemented by the water regulator need to be debated, justified, and available to all stakeholders.

PRINCIPLES AND PRACTICES OF SOUND REGULATION

Besides summarizing the current regulatory model for the Cape Verde water sector, the current study identifies lessons from countries facing similar socioeconomic circumstances (e.g. Philippines, Uganda, Mozambique, Zambia, etc.). Marques (2010) outlines the principles of water regulation that promote significant performance improvements in developing countries. These principles address issues ranging from (i) the scope of regulation, (ii) stakeholder participation, transparency, and accountability, (iii) definition and prioritization of public service obligations, (iv) the design and implementation of performance incentives based on benchmarking studies, and (v) the development of agency leadership and professional support staff who can adapt to new challenges:

i) ***The scope of regulation***

In developing countries, an infrastructure regulatory commission will not achieve public acceptance and political legitimacy unless the agency focuses on the universal provision of water and wastewater services, adhering to principles that support feasible prices (financial sustainability), improvements in service quality, and the achievement of public service obligations (see Gerlach and Franceys, 2010). To achieve these objectives, the regulator requires autonomy from direct political interference, since politics leads to powerful pressures for prices that are below cost or for patronage systems that staff agencies with relatives rather than professionals. Such interference destroys the financial sustainability of utilities and denies agencies technical capacity and tools required to perform their oversight responsibilities.

The regulator's aim should be the defense of the consumer interest (both today's customers and future customers); thus, the regulator defines the services to be provided, regulates the minimum levels of service quality (meeting health standards) and supply (continuity and reliability), and sets customer tariffs that assure financial sustainability for utilities. In addition, the regulator is in a position to provide technical advice to policy-makers who must make decisions about market structures, ownership arrangements, and resources to be devoted to environmental remediation and water resource management. In that advisory role, the agency is in a position to recommend strategies for meeting social objectives. On a daily basis, the agency has the responsibility for global supervision of

the sector adopting rules and mechanisms to ensure the water supply. For example, in the case of Manila, public policy led to privatization and the creation of two utilities—allowing the regulator to benchmark one against the other (Fabela, 2006). The Metropolitan Waterworks Sewerage System-Regulatory Office (MWSS-RO) in the Philippines illustrates how a city-level regulator can provide oversight and promote performance improvements in the water sector. Of course, such oversight should not drift into micro-management of utility operations.

While water resource management is generally under the purview of another regulatory agency (or a Ministry of Water), the utility regulator must still interact with that agency. In the long run, the financial sustainability of the utility depends on access to raw water. If hydrological/biological conditions are not monitored and taken into account by decision-makers, costs of depleted and contaminated water resources end up being transferred to future customers. The water utility regulator has a responsibility to represent future stakeholders who are not currently able to voice their concerns. So although the scope of regulatory authority may be narrowly defined as water and wastewater, the agency must still coordinate with and support other agencies whose activities affect future sector performance.

ii) Participation, transparency and accountability

Analysts have reached a strong consensus regarding the principle that the regulatory processes should be transparent, understandable, and accessible to all stakeholders. Regulatory commissions are established to move oversight responsibilities out of Water Ministries; their creation is primarily due to the need to open up decision-processes to the public and to enable the development of professionals who can take the long term implications of decisions into account. Prior to the creation of regulatory commissions, decisions may not have been made on the basis of realistic business plans or with much public input.

In addition to improving public accountability, young or fragile regulatory institutions are strengthened through public participation (Franceys and Gerlach, 2011). Open processes

increase public awareness and allow preliminary decisions to be criticized and commented on. Since citizens are entitled to their own opinions but not their own facts, open processes enable external observers to distinguish between rhetoric and reality (facts). For example, regulatory hearings get information into the public domain, so that targets can be realistic and (ultimately) their achievement can be monitored by stakeholders. Managers (and regulators) are then held accountable for performance improvements. For an example of the benefits of stakeholder participation, see the study by Larangeira (1996) of Porto Alegre, Brazil.

Thus, regulation (establishing and implementing the "rules of the game") must be carried out in a transparent way, insulated from daily political pressures. Decision-making processes should be clear, understandable, accountable, easily verifiable, and public (schedules are published and adhered to). Relevant regulatory activity should be conducted in a timely manner. It is said that delays do not affect all stakeholders equally: "decisions delayed are decisions denied." In addition, final decisions should be communicated without excessive jargon and available to all stakeholders (Trémolet and Hunt, 2006).

Although regulators should be somewhat independent from those with political power, they must be accountable to all stakeholders, including those who establish public policy (Ehrhardt *et al*., 2007). Accountability allows for the public to evaluate whether regulatory processes are unfair or whether decisions are based on evidence and appropriate methodologies. Therefore, the regulatory framework should include mechanisms that foster accountability, such as the clear delimitation of regulatory functions, the possibility of dismissal of the members of the board of directors (or commissioners) if unethical behavior arises, stakeholder participation in the decision process (often through the creation of an advisory council), clear procedures for the appeal of decisions (to an ombudsman, specialized court or a competition authority), and the establishment of regulatory procedures that promote informed decision-making. The definition of the operator's objectives, responsibilities, monitoring and reporting

requirements (on financial developments, operations, and quality standards) also help to increase the transparency in the sector.

iii) The need to define and prioritize public service obligations

If public service objectives are neither defined nor prioritized, citizens cannot hold political leaders, regulators, or operators accountable for performance improvements. It is generally understood that public service obligations should promote social cohesion: universal access involves serving all customers with an appropriate quality of service at affordable prices throughout the territory of the country. Thus, regulators in developing countries should pay special attention promoting social cohesion and improving access in rural areas and for poor segments of society. In this context, public service obligations have a crucial role in the development of a sustainable water service in these countries (Cook, 1999). Comprehensive strategies must be developed in the context of the unique features of each nation; however, complex and ambitious regulatory schemes may be inappropriate in developing countries characterized by severe resource constraints, socioeconomic problems, and low levels of water service coverage and quality. It is better to be successful in taking small steps that to fail at achieving infeasible objectives.

Thus, the principle of universality must ultimately address realistic public interest requirements, ensuring the provision of an essential service. Given customers' ability to pay, achievable quality, and network expansion targets are constrained by affordable prices and by funding from external agencies (development banks, aid agencies, or non-governmental organizations). Affordability takes into account the condition of all customers and incorporates special schemes for low-income or special care citizens (the aged and infirm). Other methods for achieving distributive justice to achieve universal service exist, such as providing a limited amount of water for free (as in South Africa). However, such procedures should be used with care since untargeted subsidies can threaten the financial viability of the utility (Berg and Mugisha, 2010). Subsidy programs in developing countries often primarily benefit the middle class or and well-to-do. So the design of special programs requires the targeting of subsidies and monitoring systems to

ensure that the actual beneficiaries are those in need of external support (Komives, et. al., 2005).

To promote the expansion water service coverage, the regulator could raise some prices, cross-subsidizing some residential customers with revenues from other customer classes. However, trying to extract substantial revenue from industrial and commercial customers could lead to their by-passing the utility water system (through self-provision)—ultimately damaging the financial sustainability of the utility. An alternative strategy involves helping to create a Water Access Fund, with the collaboration of the national government. The purpose would be to subsidize access for the deserving poor; of course, some customer payment for water usage should be required to establish a "culture of payment."

Performance indicators can be utilized to document the achievement of quantifiable targets that contribute to the financial sustainability. For example, percentage of residential customers actually paying their bills is one indicator of consumer satisfaction and utility cash flow management. Improving collections represents one way to obtain funds that can be utilized for maintenance and improvements in service quality. In addition, realistic targets need to be accompanied by predictable sanctions in order to penalize the customers/operators who do not meet the standards. For instance, the regulator, in collaboration with the operator, could set performance targets, such as responding to complaints within 15 days as CRA has done in Mozambique (Alvarinho, 2002).

Continuity is not always dealt in a consistent way by operators. For example, the service continuity in Cape Verde is regulated but is not required due to conditions of water abstraction in this country. When raw water flows are insufficient, uninterrupted service is not a feasible objective.

When public policy focuses on ensuring citizen access to affordable water services, then policy-makers are obligated to develop mechanisms supporting that objective (unless

everyone expects elected officials to ignore political promises). Subsidization could be based on geographical location or the special needs of low income groups. In the case of Cape Verde, with high cost desalinization being the production technology, the State (taxpayers) could bear part of the production cost, reducing the burden of cost-recovery for these services. However, there are other social programs (education, hospitals, and transportation) that also have legitimate claims on tax receipts. Furthermore, for allocative efficiency, the price signals faced by customers should reflect the opportunity cost of providing customers with water; otherwise, the result is the over-consumption of expensive water services.

iv) Benchmarking and incentives for better performance

At several points in this paper, the value of quantifying performance has been alluded to; here, we focus on use of benchmarking to improve water utility operations (Berg, 2010). Since water systems are often viewed as natural monopolies, those regulating a utility must identify comparable utilities in order to monitor and assess relative performance: Is the utility a high performer whose managers should be rewarded or is the utility a weak performer whose managers need to strengthen their skills (or to be replaced)? Through the collection and analysis of appropriate financial and operating information, regulators can identify high-performing utilities which might be used for establishing targets. Indeed, benchmarking is sometimes labeled "yardstick competition": firms are not competing in a particular market, but studies of their relative performance reduces information asymmetries and improves transparency. Therefore, performance evaluation methodologies represent an important regulatory tool. For example even though Key Performance Indicators (KPIs) like output per worker or workers per thousand connections are only partial indices of performance, they are easily understandable (compared with other methods); they can be used to evaluate performance and to establish targets (for example, as is done in the Philippines and Zambia (Kayaga and Franceys, 2008).

Through appropriate regulatory rules, operators are incentivized to carry out continuous and systematic evaluations of their services and operational methods (through process

benchmarking). Meter reading, billing procedures, pumping, intake, maintenance schedules, and other steps in the production process can be improved through operator workshops and capacity-building. However, without targeted incentives for cost containment and service enhancements, performance is unlikely to improve (Mugisha, 2011). Thus, benchmarking can trigger political changes internal to organizations. As performance is highlighted on a regular basis, those responsible for implementing successful cost reduction programs are likely to gain influence within the utility. In addition, greater transparency and public awareness of relative performance puts pressure on weak utilities to restructure their management teams or to develop better incentives for meeting well-defined targets.

There is substantial evidence that in the developing world, regulation that uses (performance) incentives based on benchmarking induces improvements in the quality of service and network expansion (Mugisha and Berg, 2008). Operators "manage what they measure," so the development of information systems that track KPIs improves utility productivity. With rewards for meeting targets, the operators take on more risks, but can also increase their gains (Marques, 2006). Mugisha *et al*. (2007) highlight the role of contractual incentives in Uganda in promoting dramatic performance for the state-owned national water utility. So incentives can be applied to publically or privately-owned water utilities.

A core use of regulatory benchmarking is to establish targets**.** The best-performing decision-units provide evidence of best practice: the current frontier. How quickly other decision-units should be able to move to that frontier is a more complicated question requiring input from all stakeholders, including utility management. However, with benchmarking, the burden of proof is placed on decision-makers to explain their organizations' relative performance and their ability to move to the frontier.

v) Leadership and Staff Professionalism: Adapting to Change

Water utilities are subject to operational and financial challenges, requiring some regulatory adjustments in order to achieve public interest objectives and to avoid

damaging stakeholders (operators and customers). However, adapting to change requires that regulators balance flexibility and predictability. The public and investors seek the latter, but circumstances can result in benefits to the former. Water utility managers, too, should be flexible and able to deal with unpredictable events and changing conditions. Therefore, leaders within the regulatory system (regulators, operators, and other stakeholders) should have a long term view when facing immediate problems; decisions cannot be based solely on their short term popularity. Furthermore, in the developing world the operational environment is highly unpredictable, placing a premium on the ability to adapt without creating further uncertainty (Mugisha, 2011).

PROPOSAL FOR WATER SECTOR REGULATION IN CAPE VERDE

Given its mandates, the ARE has great potential for improving water and wastewater services. The regulator is aware of financial, hydrological, and environmental constraints limiting network expansion and service quality. The agency will have to deal openly with the difficulty task of ensuring improvements in what may be an economically unsustainable service. Staff professionals and leadership are also aware that the benefits expected from the transfer of private know-how will not overcome all the weaknesses of Cape Verde's water sector.

Thus, the regulator should try communicate the importance of achieving a suitable trade-off between quality, price and coverage (and continuity) of service. The regulator should not accept "solutions" proposed by the operator or others which would lead to the substantial jumps in tariff levels: this strategy would be neither politically acceptable nor would it maximize social welfare. At the same time, citizen expectations need to be shaped with education programs and participatory workshops.

The basic conclusion from numerous studies is that the regulator should implement a model that creates more incentives for the operators to improve their performance. In this context, Cape Verde, like other SIDs, should consider implementing a benchmarking program involving data collection, analysis, and incentive-based regulations). The strategy facilitates the achievement of three objectives: the protection of customer interests, safeguarding the economic sustainability

of the operators, and ensuring environmental sustainability. To implement a benchmarking strategy, regulators could with a set of 15 performance indicators, like those listed in Table 3.

Table 3 – Performance indicators suggested for ARE

	Performance Indicators	Unit
1	Drinking Water Coverage	%
2	Sewerage Coverage	%
3	Wastewater Treatment Coverage	%
4	Unaccounted for Water	%
5	Metering	%
6	Continuity	Hours
7	Staff	Employees / 10^3 customers
8	OPEX Coverage	Revenues / OPEX
9	Bursts in the water mains	Bursts / 10 Km
10	Blockage in the sewers	Blocks / 10 Km
11	Residual Chlorine	% of sample > 0.5 mg/L)
12	Turbidity	% of sample > 5 UNT)
13	Complaints	Complaint / 10^3 Customers
14	Billing	Revenue charged / Revenue Collected
15	Pressure	Water column

In the case of the ARE, to promote better performance among the utilities it regulates, the agency could implement its model based on sunshine regulation adopted in other nations; the steps involving, data collection, analyses, development of comparisons, and the publication and disclosure of performance results for utilities. As has been noted with respect to water sector regulation in Chile and Costa Rica, the potential for publicity and managerial embarrassment produces incentives for better performance. With this objective, the ARE could present the benchmarking results (performance indicators) in its annual report. This document would include an assessment of the utility performance, with comparisons among the regulated utilities, including indicators and overall performance scores. Furthermore, an individual assessment of each operator comprising both quantitative and qualitative indicators should be carried out. The

results would be reviewed by the media, NGOs, and other external groups, generating pressures for performance improvements.

If the press sensationalizes the comparisons and vilifies managers and regulators, the leaders will have to provide a balanced response: the purpose is not to humiliate decision-makers, but to hold them accountable for meeting reasonable targets. Nevertheless, comparisons are bound to create problems for those utilities identified as "weak" or for those divisions (within a utility) identified as poorly performing. People will point fingers and managers will scramble. When dramatic change is called for, such disruption is quite appropriate. However, the analyst needs to be completely candid about his or her confidence in the results (or rankings) determined by the analysis. Managerial and political careers can be affected by performance benchmarking studies.

In order to introduce even more incentives, a regulatory commission such as the ARE, could prioritize a set of indicators (reflecting national objectives). Based on the importance of different objectives, the agency could develop rankings based on weights given to the various indicators—creating an overall index of performance for each utility (or division of a utility). Moreover, the regulator could recognize, through some kind of award (or prize), the managerial team of the best rated utilities; penalizing poorly performing utilities is more difficult, since if price is reduced, the firm as less cash flow is available to maintain its network: ultimately, customers suffer. Still, the negative publicity has some impact. Table 4 shows a hypothetical weighting system for the set of performance indicators.

In this weighting system, the regulator must also identify targets for each indicator, i.e. goals that the regulator considers as feasible for the utilities (Gerlach and Franceys, 2010). However, the regulator must not neglect the external factors that characterize (and often constrain) the services provided (Marques and Monteiro, 2001). Thus, utilities could have different targets, depending on present baselines.

Table 4 – Weight of performance indicators

	Performance indicators	Weight (w_i)
1	Drinking Water Coverage	10
2	Sewerage Coverage	5
3	Wastewater Treatment Coverage	5
4	Unaccounted for Water	10
5	Metering	5
6	Continuity	10
7	Staff	5
8	OPEX Coverage	5
9	Bursts in the water mains	5
10	Blockage in the sewers	5
11	Residual Chlorine	10
12	Turbidity	5
13	Complaints	5
14	Billing	10
15	Pressure	5

Thus, in order to improve the quality of service that is provided across utilities, the ARE could establish scores based on the utilities' performance: for example, excellent, good, satisfactory, non-satisfactory, or poor. Table 5 shows the targets for an example of the continuity performance indicator. In addition, these components of this classification could be assigned a value between one and five, which would be used as basis for developing rankings.

Table 5 - Illustrative Targets and Classifications for the Continuity Indicator

	Target	Value (V_i)
Excellent	20 - 24h	5
Good	16 - 20h	4
Satisfactory	12 - 16h	3
Non-satisfactory	6 - 12h	2
Poor	< 6h	1

The final classification of each operator would be a weighted average of the value assigned to the performance level and the weight given to each performance indicator, as follows:

$$Final\ Classification = \frac{\sum_{i=1}^{15} w_i \times V_i}{\sum_{i=1}^{15} w_i}$$

Based on these ratings, the regulator could provide recommendations to each operator with the aim of improve their performance and, accordingly, contribute to the overall development and improvement of the entire water sector.

This system would alert decision-makers for (recurrent) cases of poor results. In such cases, the regulator would develop mechanisms to compel the operator to introduce stricter monitoring than the (normal) annual reporting system, for example, through monthly reports. Such compliance reports could include all the decisions taken by the board of directors as well as the performance evaluation results. Thus, the operator would be under a tighter supervision until such time that performance targets are met and maintained.

Moreover, this process of quality of service regulation could be linked to a color system that captures the performance of regulated entities. This system could be implemented with the adoption of green for excellent performance, off-green for good performance, yellow for satisfactory performance, orange for unsatisfactory performance, and, finally, red for poor performance. Table 6 shows the layout of a benchmarking system that could be used for ARE. Each nation would need to develop weights appropriate for its stage of development and citizens' values.

Table 6 – Illustrative Benchmarking system for the ARE

	Target	Weight (wi)	Color
Excellent	20 – 24h	5	Green
Good	16 – 20h	4	Off-Green
Satisfactory	12 – 16h	3	Yellow
Unsatisfactory	6 – 12h	2	Orange
Poor	< 6h	1	Red

The benefits of such a color system are mostly related to the ability of customers to view the performance results of specific operators. Studies have documented the performance improvements achieved in various sectors and countries when citizens have a clear understanding of who are the weak and who are the strong performers (e.g. in the Portuguese water sector, ERSAR, 2010). What matters is that the customer would be informed about the real quality of the service that is provided. Of course, before the results are finalized and published, the ARE should promote a period of comment from utilities, to ensure that submitted data, were correct.

This system would increase the impact of the regulator's annual report, providing the results for each performance indicator for each regulated entity. This work could also be utilized to draw comparisons between (international) utilities, provide recommendations to be followed by the utilities and present explanations for the (possible lower) level of performance. For example, there are several islands in the Pacific and the Caribbean whose water sector and its utilities present similar problems and features. Benchmarking consortia could be promoted (see Berg, 2010 about the use of benchmarking in the Caribbean region).

Beyond the adoption of this new policy of quality of service regulation, SID regulators such as the ARE could begin adopt strategies for achieving public service obligations. Table 7 presents some of the principles related to the public service obligations (Marques, 2010).

Later, according to the performance evolution, these regulatory schemes could evolve and be complemented by other elements of economic regulation: such as the setting of tariffs and targets for network coverage. Some national regulators have applied performance-bases price cap regulation, where the X factor (partly reflecting expected productivity advance) depends on the performance evaluation and its evolution for each utility over time. Or, the incentive system could involve compensation for users due to non-compliance with the principles such as those listed above.

Table 7 – Example of principles that could be adopted by the ARE

Principles	
▪ Provide good quality of drinking water in compliance with regulations and information to the customers; ▪ Maintain and repair the networks; ▪ Provide regular reading of meters; ▪ Send the debit notes to customers before the payment of the bills is due; ▪ Inspect the customer infrastructure; ▪ Respond to requests and complaints within a maximum period of 15 days, except for complaints regarding the bills value (10 days);	▪ Bill average consumptions if the connection does not have a meter; ▪ Notify the customers and take timely measures to repair unscheduled interruptions; ▪ Inform the customers about the tariff system and establish water connections; ▪ After ascertaining the viability of a connection and the (connection) fees have been paid, if the connection is within 25 meters of a network main, the company must activate the connection within a maximum period of 20 days.

As a way of increasing affordability for the water and wastewater services by the customers, the regulator should (at least) propose to the municipalities and operators to implement a pricing system that includes social measures, i.e. by adopting a targeted subsidy that takes into account the number of people in the household or other type of social tariffs, based on criteria of age, income, illness, etc.

Although in some cases they can be too demanding and critical, in general, the customers are the ones who have the best perception of the quality of service provided (e.g., interruptions, chlorine level, etc.). In order to take advantage of this, the regulator should encourage customers

participation in the regulatory process, not only through the creation of voluntary groups especially responsible for safeguarding user rights in the water sector and disseminating the information available on the service provided to them, but also by establishing a permanent place in the process of making decisions (with some relevance so as to also encourage their participation). For example, the regulator for Zambia created Water Watch Groups (Kayaga and Kadimba-Mwanamwambwa, 2006). These groups could be responsible for receiving complaints and suggestions from users and compile this information to send to the operator itself (with copies to the regulator). They represent a kind of first channel for dealing with claims. Although the regulator may delegate some powers, the resolution of difficult cases must be a responsibility of the regulator. Moreover, these groups also have duties with respect to informing users about the regulatory process.

CONCLUSIONS

Cape Verde faces a number of challenges in water sector development. The need for desalinization (to deal with the water scarcity), the poor quality of water service (especially in rural areas), and the low coverage level of the services are some of the problems which require particular attention. Despite the governmental concern about these issues (enacting new standards and laws), the water regulator (ARE) has a key role in the implementation of the reforms needed in the water sector.

Although the ARE is assigned the tasks of tariff setting and quality of service regulation, assuring the viability of the sector, and the defense of the customer interests, its actions have been somehow limited until now. Therefore, one could argue that it is time to take major steps towards improving sector performance. In this regard, the benchmarking scheme described about could create strong incentives for the operators to be efficient and innovative; reducing operating costs and freeing up funds for capital outlays. These objectives can be achieved through the promotion of transparency and the reducing information asymmetries between the regulator and operators. The public disclosure of performance comparisons will not only create virtual competition in the water sector but will also promote greater accountability for both utilities and the regulator.

The identification of other regulatory approaches (best practices) in countries/regions in similar situations allows us to infer that there is room for improvement in the ARE's regulatory policy and in the strategies currently used by SIDs. The recommended regulatory model for the drinking water supply and wastewater services should be explored by ARE, to take advantage of the incentives that can be created through benchmarking and sunshine regulation.

Of course, data analysis involves both subjective and objective elements. The subjective part arises from placing weights on the different dimensions of performance (for example, expanding network coverage versus improving service quality). Social values, as translated into laws, determine the weights to be given different performance objectives. The objective component relates to the application of appropriate methodologies for evaluating performance over time and across decision-making units.

All would agree that multi-period information on operations and financial conditions is essential for decision-making: regulatory analysts can create Key Performance Indicators and Overall Indicators, identify trends, and (later) conduct more robust statistical analyses. The fundamental objective of a Benchmarking Study is to measure efficiency and productivity so that the analyst can make comparisons. *Productivity* considers the link between inputs and an organization's outputs. *Efficiency* is related to productivity, but it involves establishing a standard and determining how close the firm comes to meeting that standard: how far is the utility from "efficient practice"? How near is the utility to the frontier? With performance indicators, regulators are in a position to evaluate utilities and establish incentives for improving performance.

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