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Lebanon Water Forum Report



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LIST OF ACRONYMS AND ABBREVIATIONS

BWE	Bekaa Water Establishment
CDR	Council for Development and Reconstruction
CTB	Central Tender Board
IBR	Increasing Block-Rate
IFI	Issam Fares Institute for Public Policy and International Affairs
LIBNOR	Lebanese Standards Institute
LRA	Litani River Authority
MoA	Ministry of Agriculture
MoE	Ministry of Environment
MoEW	Ministry of Energy and Water Resources
MoF	Ministry of Finance
Mol	Ministry of Industry
MoIM	Ministry of Interior and Municipalities
MoPH	Ministry of Public Health
NRW	Non-Revenue Water
NLWE	North Lebanon Water Establishment
NWSS	National Water Sector Strategy
O&M	Operation and Maintenance
RWES	Regional Water Establishments
USAID	United States Agency for International Development

1. INTRODUCTION

Under the patronage of the Ministry of Energy and Water Resources (MoEW) and funded by the European Union, the first meeting of the **Lebanon Water Forum** was held on May 26th 2016, at Issam Fares Institute for Public Policy and International Affairs (IFI), organized by Oxfam Lebanon in collaboration with IFI. It called for 'Rethinking Water Service Provision in Lebanon', bringing together government authorities and their institutions, services providers, academics, experts and practitioners in the field, to reflect on water service provision in Lebanon.

The water sector in Lebanon is currently impeded by both external and internal obstacles, hindering the provision of high quality services to customers. Besides the increasing threat of climate change on water availability, the sector is facing considerable financial, technical and administrative constraints. Consequently, public water services have been operating with annual deficits and low recovery costs. In parallel, water consumers' trust in public services has substantially decreased over the years, as intermittent and limited hours of water supply forced customers to rely on the informal parallel water market (private sector).

In this context, the forum called on the knowledge and expertise of different stakeholders in the field (governmental agents, civil society groups, researchers and others) to address the scope and diversity of challenges regarding water service provision in Lebanon. The forum gave space for a dialogue amongst stakeholders, to find a way forward amidst growing water-related constraints. By tackling the major policy gaps and institutional voids, it aimed to provide contextualized recommendations pertaining to improved public services and increased cost recovery for Regional Water Establishments (RWEs).

The forum's agenda was divided into three thematic sessions which tackled the different challenges raised by governmental and non-governmental agents, bringing forward cross-cutting observations and recommendations regarding service provision. The first session engaged the general directors of two Regional Water Establishments (RWEs) in Lebanon, in a series of open-ended questions regarding the challenges they are facing, their strategic planning, and their cost recovery and customer relations experiences. The second and third sessions pertained to discussions focusing on the legal foundations of water service provision, the implementation of tariffs in the water sector in order to enhance RWEs' cost recovery, the socio-economic implication of the current water services on water customers, and exploring the current accountability mechanisms for contracting infrastructural project and water governance and integrity in Lebanon. The forum wrapped up with a round table discussion, engaging stakeholder dialogue about the main issues and recommendations highlighted throughout the previous sessions.



2. BACKGROUND

Law 221 and NWSS

Various water laws and regulations in Lebanon date back to the periods of the Ottoman Empire and the French Mandate. Some laws and decrees are still in application within the Lebanese water sector, such as Decrees 144 and 320, issued respectively in 1925 and 1926. The former decree defines water as a public good, and the latter decree highlights the necessity of its management. Currently, the water sector in Lebanon is mainly regulated through the overarching Law 221 of 2000 and its amendments (in addition to Laws 228/2000 and 337/2001). Law 228/2000 enacts a national privatization law, encouraging the participation of the private sector. Law 337/2001 formally renamed the Ministry of Hydraulic and Electric Resources the Ministry of Energy and Water Resources.

Law 221 was issued on May 29th 2000, and completely restructured the water sector in the country. Prior to this law, water was governed under the responsibility of 21 Water Authorities and over 200 Water Committees which had largely overlapping duties and unregulated structures. Since its implementation, Law 221 has consolidated pre-existing water authorities under the regulation of four RWEs (Beirut-Mount Lebanon, Bekaa, North and South Lebanon) and the Litani River Authority (LRA), responsible for the management of all rivers in Lebanon. Law 221 exclusively administered the MoEW primary authority over the water sector and the RWEs. However, secondary stakeholders also play a critical role in the governance and management of water resources. These institutions include the Ministry of Agriculture (MoA), Ministry of Environment (MoE), Ministry of Public Health (MoPH), Ministry of Interior and Municipalities (MoIM), the Council for Development and Reconstruction (CDR), Ministry of Industry (Mol) and to some extent the Ministry of Finance (MoF). The table below describes the duties and responsibilities of key stakeholders in the water sector.

Table 1. Roles and responsibilities of governmental stakeholders in water sector (Farajalla et al., 2015)

	Description of responsibilities	MoEW	WEs	MoA	MoE	MoPH	MoIM	LRA	CDR	Mol
Policy-making	<ul style="list-style-type: none"> Definition of sector policy, institutional roles and structures Enactment of legislation and regulation Development of investment and subsidy policy 	💧								
Planning and Implementation	<ul style="list-style-type: none"> Establishment of long-term consolidated planning for water, irrigation and waste water Evaluation of infrastructure and investment requirement Water rationalization Design, construction and operation of major water infrastructures Funding and execution of investment programs 	💧	💧	💧		💧		💧	💧	
Conservation and Resource Management	<ul style="list-style-type: none"> Allocation of resources across regions, e.g., water reuse Identification and promotion of water conservation campaigns 	💧		💧	💧			💧		
Regulation and Enforcement	<ul style="list-style-type: none"> Issuance of regulations Enforcement of regulations and standards for cost recovery, service quality, water quality, and consumer relation 	💧				💧	💧			💧
Operation and Distribution	<ul style="list-style-type: none"> Billing and collection of tariffs Maintenance and renewal of infrastructure 		💧					💧		
Waste Water Treatment	<ul style="list-style-type: none"> Operate, maintain and renew sanitation infrastructure 		💧							
Control and Monitoring	<ul style="list-style-type: none"> Management of all information including data collection, analysis and reporting Implementation of service quality and contingency planning 	💧								

As per Law 221, the MoEW was granted an overarching role in the water sector, as the primary policy maker, regulator and resource manager, including strategic and master planning. Parallel reforms under Law 221 placed RWEs at the center of water services provision, as they became responsible for carrying out studies, O&M, implementation and renewal of projects for drinking and irrigation water, and wastewater. Other duties such as infrastructure maintenance, setting tariffs, collecting bills and ensuring water quality also fall under the responsibility of RWEs. In addition, within the perimeters fixed by the present Law 221, RWEs are expected to operate with financial and administrative autonomy. However, RWEs have not reached such autonomy, as they have been stacking up annual debts and falling short on staffing capacity. In light of such discrepancies, the MoEW has taken several steps to amend the gaps engendered by the implementation of Law 221, notably through the development of the NWSS in 2010. This strategy aimed to fully complete reforms set by Law 221, provide financial initiatives for RWEs and initiate policy frameworks to overcome the legal, institutional and organizational gaps and sets investment requirement to achieve water provision targets in the water sector. However, the NWSS has currently fallen short in accomplishing these goals, which were set to be achieved by 2015.

Water Code

The draft Water Code or 'Code de l'Eau' is another prospective form of regulation in the water sector. This code was drafted in 2005, with the assistance of the French government and primarily promotes Integrated Water Resource Management (IWRM). This Code was partly developed to fill the institutional gaps of Law 221 (USAID, 2013). Other aims of the Water Code include the promotion of the 'user pays' and 'polluter pays' principles and a decentralized approach to water planning and management, through the definition of River Basin Plans. One of the goals of the NWSS was to enact this code; however its drafting has not been completed and is still pending.

The key components of the draft Water Code include the following:

- Appointing Public Authorities as the main entity responsible for overseeing and regulating freshwater quality, providing safe drinking water and wastewater treatment, drought and flood management and the protection of all water resources;
- Developing a National Water Council acting as policy and planning institution for the water sector (including ministry and municipality members and other relevant professionals);
- Developing a National Water Plan and River Basin Plans, in order to identify the qualitative and quantitative needs of the sector and accordingly allocate resources and define areas in need of protection; and
- Encouraging private sector participation.

3. **RWEs AREAS OF CONCERN: EXPERIENCE OF WATER ESTABLISHMENTS**

This section outlines the main areas of concern of Law 221 and cost recovery in the water sector, according to the experience of the Director Generals of two RWEs (North Lebanon and Bekaa). A series of open-ended questions allowed them to identify the major obstacles hindering their work at the water establishments that pertain to cost recovery, as well as future aspirations and plans. Following are the open-ended questions that were asked to the general directors:

1. Considering the 16 years since the enactment of Law 221 of 2000 and the establishment of the four RWEs; what do you retroactively see as the obstacle(s) for the implementation of Law 221 that were not foreseen when the Law was initially developed and agreed to in year 2000? Where are today's options to improve or correct this?
2. Do your RWEs have a water strategy or master plan for your region? Does it include demand management? Is the NWSS in line with your RWEs goals?
3. Cost recovery for water utilities is often considered a cornerstone of efficient and sustainable water supply. With the current tariff system in place, are your costs covered? What financial capabilities do you need to improve your services? How can a different tariff system contribute to an improved overall cost recovery?
4. What are your views about your subscribers and their ability and willingness to pay for water and respective services?
5. Does your Water Establishment have plans to reduce water losses in distribution systems and encourage water conservation? How on the long run, can the tariff system financially contribute to these?

Three main areas of obstacles were identified as a result of the discussion with the Director Generals of RWEs:

Weak legislative infrastructure and lack of monitoring mechanisms

There are large discrepancies pertaining to the implementation of Law 221, which have impeded the functioning of RWEs. The most prominent obstacle has been the distinct overlap of duties and responsibilities amongst and within institutions in the water sector. Indeed, responsibilities such as service provision, project planning and implementation and capital expenditures are scattered amongst various entities, without the proper coordination amongst authorities, hindering efficient performance. Some reforms have been initiated to overcome this overlap of duties; however they have not been completed, urging the need to provide a distinct description of the roles of all stakeholders in the water sector. There is also a lack of a regulatory entity responsible for the enforcement and follow-up of violations. Indeed, RWEs have no proper enforcement mechanisms to deal with the corruption and lack of compliance across their regions. All these discrepancies clearly warrant a strong need for legislative restructuring to ensure the RWEs' efficient performance and autonomous functioning.

Lack of financial and administrative autonomy

Inconsistencies between legal and de facto responsibilities of all water authorities have been singled out as major obstacles in the water sector. Indeed, operating as autonomous entities on the financial and managerial level is one of the legal responsibilities set by Law 221. RWEs are currently suffering from a significant shortage in staff however, specifically in managerial positions such as the head of the wastewater and irrigation units. Instead, RWEs largely rely on contractor-based staff, which consists of workers performing O&M duties (MoEW, 2010). This is due to budget shortages, which forced RWEs to hire 50% of their staff as contractors. On the other hand, a majority of the RWEs' permanent staff are nearing retirement age, and lack strong technical expertise. Thus RWEs do not have the proper resource to manage their establishments independently. In addition, the BWE and NLWE have been operating with yearly financial deficits, often failing to fully cover O&M costs. Although external institutions have had some financial contributions to the RWEs, their annual budget is strictly reviewed by relevant ministries for approval and usually results in the provision of low financial resources. In addition, unpaid customer bills and illegal access to water services have further aggravated these financial deficits. This lack of financial sustainability has rendered RWEs unable to perform some of their responsibilities, such as rehabilitating and restoring water networks in designated areas. Currently distribution networks in Lebanon are facing severe losses (between 20-40% according to the latest reports), which also reflects financial losses for the establishments as it increases the level of their non-revenue water. Although NWSS goals have aspired to financially promote RWEs, these goals have yet to be put into action.

Illegal connections and lack of compliance

In the areas of Bekaa and North Lebanon, the rate of unpaid bills has been reported to be very high (reaching almost 40% in some cases). In addition, only 60% of inhabitants in those areas are actually connected to the water network, most of them relying on external means for acquiring water services. Some of these external means include illegal connections and permitting, and over-abstraction. Although the MoEW is in charge of issuing well permits, it does not hold the authority to shut down an unlicensed well as this duty rests with the MoIM. In addition, RWEs do not have the authority to ensure customer compliance, and do not operate a process which documents financial remittance of bills. These discrepancies hinder RWEs to monitor illegal connections and properly collect customer bills.



4. CHALLENGES OF WATER SERVICE PROVISION

The second session of the forum focuses on three major challenges faced by RWEs in providing water services; lack of cost recovery within the sector, socio-economic impacts of water service provision, , and weak water integrity, governance and accountability.

Cost Recovery in the Water Sector

Specific attention was drawn to the current tariff system and its repercussions on the RWEs' financial recovery. Experts in the field were called to discuss their relevant experiences and executed pilot projects, on cost recovery in the water sector.

Current Tariff System

As required by law, the implementation of a tariff system falls under the responsibility of RWEs. The current system in Lebanon relies on annual flat tariff subscriptions and is not related to the actual per capita consumption. The main parts of the water bill are composed of fixed charges, pertaining to the volume of water supplied to consumers, which is fixed at 1m³/household/day and the other part is contingent upon connection charges. The tariff structures in the regions of BWE and NLWE are respectively the following: \$118/ year and \$140/ year (MoEW, 2010). Although this lump sum tariff is relatively affordable, it is highly inefficient as it impedes consumers' incentives for water conservation and RWEs' commercial incentive for efficient production and cost recovery. Should there be a leakage in customers' households, they would not have any financial motive to fix it, hindering efficient consumption. RWEs are already facing significant financial deficits, not allowing them to meet their O&M costs and with their high amount of non-revenue water (NRW), they are far from achieving cost recovery. Over-abstraction, illegal connections and irregular updates of customer registration further contribute to low cost recovery. Another obstacle mentioned in the forum has been the incongruence between the actual consumption and design. While, as mentioned above, the water supplied to each household is set at 1 m³/day which corresponds to approximately 220 L/capita/day¹, the design criteria as per NWSS are 165-180 L/capita/day (MoEW, 2010). A pilot study revealed that the average water consumption in rural settings was calculated at 145 L/capita/day (Pierpaoli, 2016). On the face of these figures, it appears that per capita consumption in Lebanon is significantly less than the provided 1 m³/day and reforming the level of supply may be necessary.

Besides the poor customer compliance with billing, unsystematic and low collection rates of bills have further aggravated the cost recovery of RWEs. Bill collection occurs only on a yearly basis, with a lack of monitoring of customer compliance.

Absence of Water Metering Systems

A necessary component of a volumetric tariff system is the installation of water meters. Currently there is no actual relational link between cost, consumption and prices since neither the water utilities, nor the consumers have the ability to measure volumes of water effectively used or paid for. Indeed, only 10% of the connections in Lebanon are currently metered, none of which are operating on a volumetric tariff, and rather rely on the normal lump sum tariff (Saliba, 2016). Moreover, bulk water meters are also lacking at the production level, as most connections are not being metered, impeding RWEs' ability to evaluate their production rate and network losses.

¹ Per capita consumption is calculated based on average number of individuals in a given household (HH). In this case the average used was the following 4.5ind/HH= 220 L/capita/day (MoEW, 2010).

Absence of Data

Currently, RWEs are using inconsistent and imprecise data regarding the volumes produced, distributed, sold and their associated costs. Inconsistent data is not only the result of the lack of water metering, but also of the overall data confidentiality in the country. Indeed, due to geopolitical conflicts and national security issues, water data is considered confidential in Lebanon. Customer databases are largely lacking throughout all RWEs, making it hard to monitor illegal connections. All these discrepancies in the system do not allow for demand management in the water sector, and the only way RWEs are achieving this is through rationing and water supply scheduling. In this context, establishments are not achieving cost recovery, and customers are not relying on public services anymore, paying over five times the actual tariff amount, through informal water supplies (Chahine, 2016).



Socio-Economic Impacts of Water Service Provision

In cooperation with Oxfam, the Edessa group conducted an environmental and social impact assessment study in Chtaura, in order to upgrade and rehabilitate the water distribution network. The study was presented during the forum by Mr. Jacques Chahine. The study consisted of a detailed socio-economic survey to assess the cost of water services to consumers. The surveys covered 16.5% of the households and focused on both Lebanese and Syrian populations. Chtaura gets its water from the Jdita wells, where water is abundant but, due to the technical losses, not a lot of water is reaching the households. With time, water shortages will become more critical, as increased demand is coupled with significant network losses. The water at the source appears to be clean, however the water at various points across the distribution networks was tested and was revealed to be of poor quality due to the cross contamination with the sewer network. The water distribution network is in poor condition and its supply is intermittent, leading to a lower pressure inside the pipes, and thus increasing the risk of contamination seepage.

The study assessed the income and expenses of the population, the number of households connected to the network, their distribution according to income, the proportion of customers who pay their bills, the perception of public services and finally, the cost of the parallel informal market. The study considered the official water distribution amount set at 1m³/household, compared to the amount of water purchased on the parallel market and the volume of water used through public services. The study revealed the following:

- The monthly average income in the town of Chtaura was calculated at \$800, with more than \$433 of this income usually spent on food and beverages;
- Only 65% of the households are actually connected to the network. Other households either have private wells or rely on the parallel market, and many of them do not have networks available in their area;
- The distribution of network connections was evaluated in relation to income, and a high proportion of high income households were not connected to the networks. Financial reasons do not appear to drive the lack of connection to the networks. Instead financial stability appears to drive households to rely on the private sector, for more reliable services;
- Of the 65% of the households connected to the network, 48% of them directly pay their bills. Thus 92% of the people connected are paying their bills (adding those who pay their bills as part of their rent), considering that the prices are fair;
- 48% of the users rely on the water provided by public services for drinking purposes, rating it as good quality water;
- However, public water service provision is not always provided and as such, 60% of households also rely on water trucks as an additional source of water provision. Drinking water is usually provided in the form of water gallons and bottles, or through the water provided by public services;
- The annual subscription fees to the public water services in the BWE are set at 237,500 LL, and is supposed to correspond to a total of 25,187 L/month (according to the official water distribution

volume of 1m³/household/day). Due to the intermittent water supply, customers are instead paying over 1,171,308 LL per year, for only 4,813 L/month, which represents only 16% of the monthly water needs. The parallel market is therefore five times more expensive than the price of public water services. This implies that cost is not rather the unavailability of water which pushes consumers to pay such high prices.

To sum up, households are generally willing to subscribe to the public water supply and would pay much less, if water was readily available. The responsibility lies in the hands of RWEs, to provide the required level services. The rehabilitation of the water network could reduce the cost to water establishment, through reduced number of pumping hours, and fewer losses and maintenance, while also providing savings on the consumers' end. Drinking water is mostly acquired from the private sector, through the purchasing of water gallons. It will take more time for the population to trust and accept relying on public water for drinking purposes. In parallel, RWEs will need to provide drinking water of proper quality, and which meets national standards.



Water Governance, Integrity and Accountability

This section discusses integrity, governance and accountability in the water sector. The first presentation discussed the modernization of the public procurement system, to enhance water integrity, presented by the central tender board (Samneh & Deeb, 2016). In Lebanon the CTB (Central of Tender Board) is mandated to review all the bidding documents of tenders which are above the threshold of 100 million LL. All ministries have to send their bidding documents to the CTB for review, in order to see if there are any clauses and statements that might hinder the tendering process such as limiting competition or inadequate specifications.

In January 2016, 20 water projects were awarded by the CTB including well drilling, dam maintenance, water distribution networks and lines, stream protection walls, sewer lines and irrigation canals, with a total cost of almost \$16 million. Currently, legal reforms are being initiated and a law for public procurement is being drafted which will shift CTB's role towards a more regulatory one. The aim of this draft law is to promote fairness accountability, and transparency, by ensuring the implementation of certain standards which are not enforceable by law (such as LIBNOR standards). The CTB's role would be to ensure that every bidding document they receive includes a term which enforces them to abide by those standards. In parallel, the CTB is enhancing its internal practices through the development of an internal management system, and the development of a database of the bidding documents for better monitoring. The CTB also aims to enhance transparency through the development of a new website, containing reporting information, statistics, archives guidelines and regulatory information, which will be accessible in the public, explaining the decision-making process in the water sector.

The final presentation in this session by Dr. Nadim Farajalla presented water governance and integrity in Lebanon. The primary and secondary stakeholders related to water governance in the sector were discussed (detailed in the background section). Integrity was defined as 'the adherence of stakeholders and institutions to governance principles of transparency, accountability and participation in water resources management, based on core values of honesty, equity and professionalism' (Farajalla, 2016). The presentation centered on the findings of a study (Farajalla, et al. 2015) aimed to assess the understanding and perception of the concept of integrity and its incorporation in current legislations, the main causes of corruption, the challenges to achieving water integrity and the way forward through interviews with over 60 primary and secondary stakeholders. The study revealed the following:

- The main causes for corruption are lack of awareness of corruption and its consequences, absence of anti-corruption agencies, weak legal framework and lack of monitoring, and the post-war structure of Lebanon which led to the competition for state resources. This has placed Lebanon at the bottom of the list of National Integrity Processes (#127 out of 177);
- Existing water initiatives that include integrity components are only limited to the NWSS, Law 444/2002 and the ENPI (European Neighborhood and Partnership Instrument) Report (Towards a Shared Environmental System);
- Lebanon's fragmented legislation and weak enforcement mechanisms are major challenges to achieving water integrity. This has been apparent through to the lack of operational decrees for the existing laws, the poor coordination between relevant ministries, the weak legal prosecution, the political deadlock, the long processes or delays in the ratifications of laws by the Parliament and the Cabinet, the lack of accountability mechanisms and the corruption within monitoring agencies and others;

- Issues pertaining to the resource itself have further aggravated the corruption within the water sector, due to uncontrolled access to groundwater, illegal connections and over-abstraction. These issues have been caused partly due to the lack of monitoring and enforcement mechanisms;
- The lack of water data and information has also been a challenge to achieving water integrity, due to information hoarding by institutes and the lack of collaboration between academic institutions, policy-makers and other relevant stakeholders;
- Absence of budgeting (mentioned in section three of the report) and human resources issues (discrimination, nepotism, payments for promotion etc.) were also identified as obstacles;
- Finally, other obstacles included the public procurement services (lacking transparency), the inequitable distribution of resources (political favoritism) and the parallel water market.

The study recommends the development of a national anti-corruption strategy through the revival of the existing draft law. This strategy tackles four main areas:

- Political corruption; developing an online portal for whistleblowers and reviewing and updating corruption related laws;
- Petty and bureaucratic corruption, minimizing the bureaucratic procedures through the development of online procedures and platforms, while ensuring public access to relevant information;
- Grand corruption; ensuring transparency in procurement and public works, through an online public tracking system and the development of a monitoring committee;
- Employment aspects; which targets an improved salary of employees in the public sector.



5. SYNTHESIS OF ROUNDTABLE DISCUSSION AND AUTHORS' RECOMMENDATIONS

The final section outlines a summary of recommendations proposed throughout the forum. While most of the recommendations were presented during the roundtable discussion, additional cross-cutting recommendations are compiled from individual presentations.

1. Implementation of a new Tariff Strategy

In light of the mentioned challenges, the proposed overarching solution is to introduce and implement a new tariff system for all sectors (drinking water, irrigation and wastewater) which promotes volumetric charges. Given the focus of the forum, solutions pertained to drinking water only. Based on prevailing socio-economic conditions, the water tariff strategy should take into consideration the following principles (Melki, 2016):

- Economic efficiency: water resources should be used at the lowest social cost, from a financial, resource and environmental perspective;
- Cost-recovery: revenues should be sufficient to meet the comprehensive financial needs of RWEs;
- Fairness: tariffs should treat all subscribers equally; cross subsidization should be used as a last resort;
- Financial stability: risks should be minimized in the face of unexpected fluctuations.

The new water tariff strategy should be driven by demand management; its main components should be metering, billing and collecting. One of the first conditions of introducing a consumption based tariff is knowing how much is being produced, distributed and consumed. This would be primarily achieved through the installation of water meters, which have been proved to increase profit, decrease NRW, increase water conservation and improve efficiency of the RWEs' performance, globally. Furthermore, according to recent pilot projects, the installation of water meters would not increase water fees for customers; the average consumer would pay the same annual consumption fee (in some cases lower fees) and only a small proportion of consumers will be paying higher fees. The billing and collecting components are equally essential, in order to properly enforce and monitor the new water tariff strategy. In this context, a smooth transition towards water meter installations could be achieved through the implementation of an enterprise resource planning system. This system would enable RWEs to adequately manage water meter data, while also ensuring the provision of an adequate service and monitoring customer satisfaction. RWEs will also be required to develop a customer database (preferably a computerized database), to properly document customer compliance and collection of bills. Private sector participation could also facilitate this process, and improve customer service relations through the development of money-transfer services and online payments.

Before setting the new tariff system, some preliminary actions should be taken into consideration (Melki, 2016; Saliba, 2016):

- Promote awareness about tariff changes, water meters and the socio-economic benefits of this transition;
- Conduct preliminary studies to assess the impact of tariff changes on different types consumption (through the use of the elasticity of demand);

- Once identified, the impact of these tariff changes will be reflected in demand patterns;
- Identify public willingness to pay a consumption fee through customer satisfaction and perception surveys;
- Ensure a transitional phase between the current and future water tariff (introduce semiannual payments);
- Temporarily maintain the current lump-sum tariff for unmetered customers;
- Allocate tariffs equally to all citizens, without resorting to cross-subsidy;
- Any tariff increase should be subject to a cost-benefit analysis, ensuring the coverage of O&M costs.

The impact of the system on the revenue of the establishments was considered central when trying to identify the structure and components of the new tariff system. There was a general consensus during the forum about the division of the water tariff into two components one blocked and one progressive. Various approaches to the development of the volumetric tariff structure were suggested, they included the following components:

- Set a minimal tariff, which should be paid whether water is being consumed or not;
- In the first phase, tariffs should be set to cover only O&M costs, while governmental investment should be set for infrastructural costs and subsidizes;
- After having crossed the transitional phase, RWEs can move towards proper cost recovery and can cover depreciation costs of existing assets, debt service or financing costs, replacement and expansion costs, profit margins and even include environmental rates;
- Consider increasing block-rate (IBR) tariffs, which are tariff structures in which the rate per unit of water increases as the volume of consumption increases as represented in the figure below;

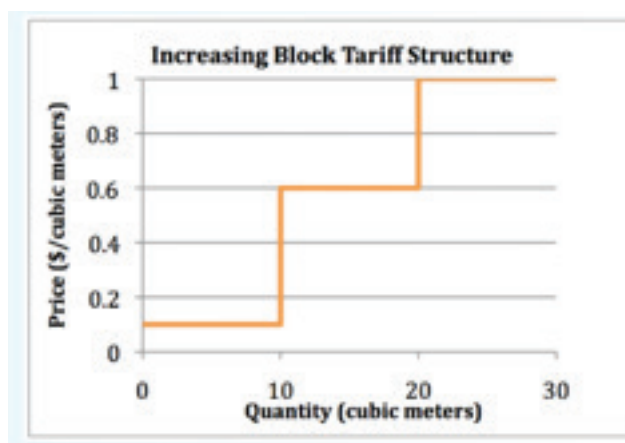


Figure 1. Increasing Block Tariff Structure (WHITTINGTON, 2006)

- Revenues from fixed components should cover fixed costs, such as staff and recurrent maintenance costs, since they are independent of the volume of water supplied to the system, and revenues from variable components should cover variable costs such as energy and chemicals used.

RWEs should also develop performance indicators, to evaluate the efficiency of this strategy such as total NRW, cost recovery, service coverage (served population over total population) and hours of supply.

2. Legislative reforms in the water sector

There is an eminent need to update Law 221, in order to overcome the wide discrepancies set by its implementation. Reforms should be directed towards setting a clear delineation of the roles and responsibilities of water authorities and promoting proper coordination amongst them to improve the performance of RWEs. Reforms should also address the restructuring of functions of both RWEs and the MoEW in order to enhance their specific duties, in line with NWSS. RWEs should benefit from enforced planning and capital spending responsibilities, whereas MoEW should be allocated decisive power for policy-making. Furthermore, the NWSS issued in 2010 does not reflect the current situation in Lebanon (not even accounting for the impact of the Syrian crisis on water resources). Thus there is a need to revise this strategy and update its goals, in light of recent changes. The legislative gaps inherent to Law 221 could also be amended through the implementation of the 'Water Code', which requires finalization.

3. Empower RWEs towards achieving administrative autonomy

Providing RWEs with the adequate resources to achieve financial and managerial autonomy is imperative. This can be achieved through an improved organization for technical and managerial functions of RWEs (in which establishments are mostly lacking). The current staff of RWEs are mostly hired as contractors for temporary periods, for O&M. Thus it is crucial to improve policies and procedures of human resourcing at these public institutions. The improvement of these functions should then be reflected in the provision of manpower, having adequate capabilities and maintaining such levels through continuous training.

4. Introduce a monitoring mechanism

RWEs should enforce a monitoring mechanism, in order to overcome unaccounted for water and unpaid bills. The installment of water meters will facilitate this mechanism, but should also be complemented by the development of a customer database, and providing an online payment system option. These monitoring systems will measure water consumption and subsequently help rationalize its consumption, while also singling out law-breakers. RWEs should also disconnect water when bills are not being paid.

5. Private sector participation

Enabling private sector participation on various levels could support the reinforcement of certain functions at RWEs in terms of customer relations, customer database management, communication, and water meters reading. Other forms of private sector participation such as leases, concessions or divestiture arrangements could be considered. The private sector could greatly help RWEs in overcoming financial deficiencies.

6. Water data and information

Enhance accessibility and availability of data and information through the formation of a national water projects' database through coordination amongst RWEs, MoEW, and other stakeholders in the water sector. To enable better access to information, this database should be backed up by the passage of a law to enable data access and availability.

7. Public Awareness

Public awareness is clearly needed, both in rural and urban areas on issues such as regarding water conservation, the importance of cost recovery, the benefits of water metering and the entitled civil duties and responsibilities of the public.

6. CONCLUSION

The Lebanon Water Forum was the first annual event to successfully bring together a diverse water set of stakeholder from governmental authorities and their institutions, service providers, academics, experts and practitioners to discuss pertinent water related issues and provide cross-cutting recommendation to RWEs, which were capitalized on from field experience. A major emphasis from stakeholders was made on the need to implement a new tariff system which would help them overcome financial deficits and achieve greater levels of cost recovery.

Although the agricultural sector is the major consumer of water resources, little attention was drawn to water used for irrigation, mainly because RWEs have been facing internal issues which they need to overcome in order to extend their services to the other sectors of irrigation water and wastewater service provision. Other types of water consumption (wastewater and irrigation) thus need to be incorporated in future forum meetings. Furthermore, discussions pertaining to the management of the informal sector were also lacking in the forum. Although there is a general consensus that water metering and enhanced monitoring mechanisms would decrease illegal provision and uses of water resources, there is no guarantee that the informal sector will not compete against the public sector, once the new tariff system has been implemented. As such, there is a need to consider the issue of the informal sector in future meetings.



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