

Assessment of a cost-covering sanitation tariff for Alexandria/Egypt

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Abstract – Alexandria faces major inefficiencies regarding financial sustainability of sanitation services. Wastewater tariffs in Alexandria are only covering around 20% of the total cost and 60% of operation and management costs. The aim of this study is to assess the possibility of introducing a cost-covering sanitation tariff. For this purpose the overall influences are examined, starting with a situation analysis of Egypt and Alexandria and ending with a financial analysis of the sanitation utility in Alexandria. The assessment also includes review of "best practices" from Morocco and Germany and the development of scenarios for implementing a cost-covering sanitation tariff. Results showed that complexities of constraints and also optimistic policies are influencing sanitation tariff adjustments in Egypt. Financial analysis and affordability to pay showed that people can easily afford to pay the costs of operation and management but not the total cost. One of the developed scenarios, showed how cost could be covered within two to three years by complying with the current policy discussion.

Keywords – Alexandria, wastewater, tariff, cost, operation, management.

1. Introduction

Financial sustainability of Egypt's sanitation utilities is a main problem because of low tariffs on one side and low efficiency on the other side. The current legal framework and the overall economical and political situation are major reasons for low tariffs. Alexandria's or more generally Egypt's water and wastewater tariffs are among the lowest in developing countries [1]. Sanitation tariffs are a surcharge of 35% to the water bill, which finally is a price of only 0.085 L.E./m³ [2]. Water and wastewater services are therefore highly subsidized which represents a high burden on the national budget [3]. It should be noted that However around

40% of Egypt's population are urban and rank among the poor [4].

Another problem is the fact that sanitation is counted to public goods, where no one can be excluded from using them. Public goods could lead to market failure if their prices do not reflect their real value. In this case people start to be wasteful because finally this "good" do not belong to anyone. For this reason people do not have an incentive to consume less water and indirectly wastewater. The domestic per capita water (and wastewater) consumption in Egypt is around 237 l/c/d [5], a very high figure, which needs to be reduced drastically. Average domestic consumption in Germany, a considered water rich country, consumption is only 122 l/c/d [6].

A cost-covering sanitation tariff, which at least covers operation and management cost is a first step for an efficiently working sanitation company, as it will reduce the high burden on national budget and moreover give the right signal to consumers in order to save resources. The objective of this work is to assess the possibility of introducing a sanitation cost covering tariff for Alexandria/Egypt.

2. Methodology

This work was designed to assess the current situation and later to develop strategies to improve the current situation. The situation analysis and the assessment of income statement gave information on the current situation. They included an overview on the framework, which has an influence on sanitation tariffs. The situation analysis was based on literature review and on consultation of branch specialists in Egypt. The financial part of the current situation was based on estimations of the revenues and expenditures. It also included a calculation of a cost-covering sanitation tariff. The third and fourth steps

of the assessment examined the possibility of introducing a cost covering tariff. This included the review of the best practices from Morocco and Germany, and the development of scenarios, which simulated alternatives to the current cost covering tariff. The "best practices" or country reviews gave finally useful information to improve the financial sustainability of sanitation in Alexandria and Egypt. The cost covering scenarios were based on actual policy discussions on the financial sustainability of water and wastewater in Egypt.

4. Results and Discussion

Alexandria and Egypt – Alexandria is a Mediterranean city with 4.2 million inhabitants [7]. The city is facing some challenges, which are the huge population growth, unemployment, informal settlements, infrastructural weaknesses and the degradation of environment. It is expected that population will reach 5 million by 2029 [7].

The city of Alexandria has 100% coverage of water supply but still lacks wastewater coverage. The number of residents in 2004, which were connected to the wastewater collection network, was 3.35 million. This figure represents about 670 thousand households, which are 85% of the population. Two years before the coverage was only 73%. Remaining population has either a septic tank or discharges their wastewater directly into open water bodies. Moreover, there is an annual growth of 3% for sanitation connections [8].

Policy of Water and Wastewater – The high financial burden on the nation's budget represents another important challenge. Nowadays the water and wastewater sector has to face more and more competition from other sectors like health care, education, transportation and telecommunication [9]. The deficit, which was generated from the water supply and sanitation sector, was \$ 1.3 billion up to the year 2003 [5].

The vision of the government is to ensure a fiscal sustainability of water supply and sanitation, which includes the exploration of alternative cost sharing arrangements [3]. Moreover it aims to implement a progressive turnover of O&M costs.

In the year 2009, a policy dialogue on the financing strategy for water and wastewater was conducted in Egypt [4]. Participants agreed on reducing average domestic water consumption from 237 l/c/d to 150

l/c/d by 2026 [5], and increasing cost coverage block tariff gradually by almost 300%.

Other policies with influence on sanitation tariffs

– The overall political, economical and social situation is considered to have a great influence and constraint on decision making in Egypt towards sanitation tariffs. In general, Egypt faces a huge price distortion for many basic products. Main products like bread, sugar, oil, gas and petrol are highly subsidized. The same is with public goods or services like water supply, sanitation or transportation. This means that the prices of main products do not reflect their real value. This issue leads to a market failure [10]. When prices do not reflect the real value of a good than people start to be wasteful.

On the other side subsidies are needed because of the very low wages especially in the public sector. People cannot afford to pay the real prices of goods, that issue leads consequently to the low productivity. These factors lead to social pressure and result in keeping tariffs low.

Therefore the Egyptian government started to implement a new macro economical policy where it shifts its responsibility as the main provider of jobs, goods and subsidies to the population [1]. The aim is to reduce subsidies, increase wages and cover costs through tariffs.

Institutional setup and legal framework – Before 2004, water and wastewater utilities were public authorities [5]. At that time the utility had to report to the governor. The governors had the authority to set water tariffs, which includes sanitation tariffs up to a benchmark of LE 0.23 (around 2 \$ cent) per cubic meter.

In 2004, a presidential decree changed the institutional framework of water and wastewater sector in Egypt by converting the public authorities into public companies and by integrating them into the newly established HCWW-Holding Company for water and wastewater [5]. The holding company and its affiliated companies are completely self-sufficiency when it comes to operation and management. This includes also financial responsibility. Nevertheless tariff adjustment decisions still need the agreement of the Cabinet High Committee on Policy and Economic Affairs.

Services of water supply and sanitation in Alexandria are provided by two different companies, which are

finally affiliated to HCWW. ASDCO-Alexandria Sanitary and Drainage Company is responsible for the collection, treatment and disposal of wastewater in Alexandria. AWCO - Alexandria Water Company is responsible for drinking water treatment and supply. There is a strong linkage between both companies because billing and collection of water and wastewater is done by AWCO. Nowadays ASDCO employs 5066 employees and it serves an area of 2679 km² [11].

The new policies show that there is a political will to change the situation. The political will is the basis for any further action. However reforms seem to be implemented with great cautiousness. First the government wants to have a strong control on water and wastewater management in Egypt, which means that it won't be able to handover the operation and management of water and wastewater to private companies [9].

Sanitation tariffs in Alexandria – As mentioned before tariff rates are mostly the same in all governorates as set by the Cabinet High Committee on Policy and Economic Affairs [12]. Water and Sanitation tariffs can not be separated from each other because sanitation tariffs are a surcharge of the water bill. Sanitation tariffs are 35% of the water bill.

Egypt applies a progressive block tariff system for charging domestic water and wastewater. Industrial users are charged according to the consumed quantity. User charges are divided into three main groups: domestic, commercial/industrial, and non-profit organizations. The different governorates seem to be free in designing their block tariffs but for the first 10 m³ the tariff is L.E. 0.23/m³ (US \$ 0.04) and second block shall have a tariff of L.E. 0.30/m³ (US \$ 0.05). ASDCO applies a three block system. It charges L.E. 0.23/m³ (US \$ 0.04) for the first block, which consists of 10 m³ per household, L.E. 0.30/m³ (US \$ 0.05) for the second block, which is between 10 m³ and 30 m³, and L.E. 0.40/m³ (US \$ 0.07) for the third block, which is above 30 m³ per household.

The wastewater tariffs are too low and therefore do not cover O&M costs. Otherwise Alexandria is one of three Egyptian cities, which covers its O&M cost, depreciation and debt service of water service [12].

A precondition for adequate tariff is the availability of water meters. The majority of buildings is equipped with water meters [8], but not all-flat or housing units are equipped with water meters. In

many cases one meter is connected to many households where the bill is equally divided [4]. As a result, the estimated number of household accounts in Alexandria is 776,434 but the number of housing units is 1,766,918 [13]. It means that all flats of a multi-storey house often share a bill and each flat pays the average amount. This situation could never provide incentives for users in order to reduce their wastage of water and (wastewater). Therefore there should be a policy for individual apartments to install meters.

Collection efficiency is estimated to be between 65% and 70% [5]. Water and sanitation bills are distributed to the user every two months.

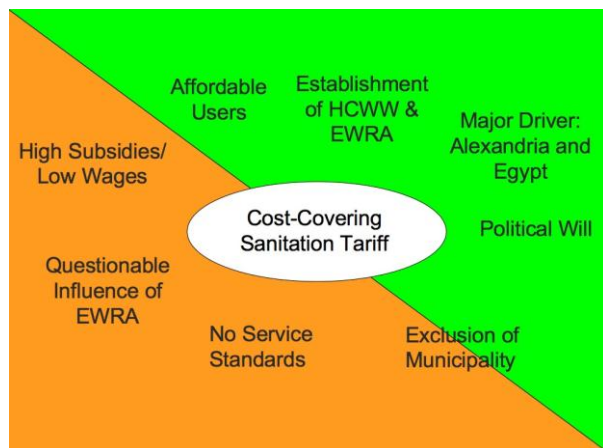
Affordability to pay – The affordability to pay is the upper limit a household can pay without undermining the ability to pay for other vital goods and services. A general rule indicates that a household shall spend between 2% and 5% for water supply and sanitation [4]. The affordability assessment report, which was prepared by the Mediterranean Component of the EU Water Initiative, indicates that Egyptian households spent in average 0.81 % of their expenditure on water supply and sanitation bills [5]. Moreover it states, that the poorer the population the more they spend as a share of total expenditure. Finally it was found that 11% of the population spends between 1% and 1.45% on water supply and sanitation.

Discussion – Two noticeable major outcomes of the current situation must be addressed. First is the very strong relation between water supply and sanitation. Both sectors are naturally related but it seems that they are never discussed separately. It is important to recognize that sanitation services are more costly than water and their aim is to protect the environment and thus also water resources.

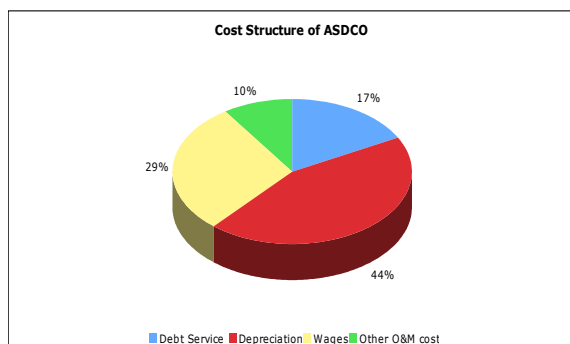
The second is that it is not possible to discuss sanitation tariffs in Alexandria and leave out Egypt. It seems like it will not be possible to implement different water and wastewater tariffs throughout the country, as it would be politically and perhaps also constitutionally unacceptable [4].

As a result, an increase or a cost-covering sanitation tariff is dependant on a diversity of complex issues. There have been already several riots because the government increased the price of bread in the past years [14]. On the other hand, the implementation of cost covering tariffs, which reflect the real costs of goods and services, are unavoidable in order to cope

with future challenges. The following figure shows the drivers, constraints and the optimistic achievements towards a cost covering sanitation tariff for Alexandria.



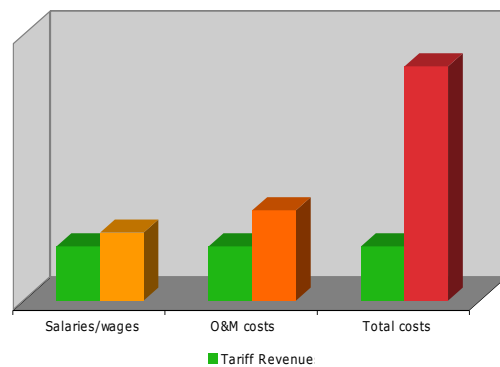
Financial analysis – Wastewater tariffs are the main income source of ASDCO. They represent more than 95% of the total income, which shows the great dependency on tariffs. The cost structure of ASDCO is mainly dominated by depreciation costs which consist of 44%. The depreciation costs are followed by wages (29%), dept service (17%) and other O&M costs (10%).



Operation and maintenance costs are dominated by salaries and wages, which are around 75%. These costs are accounted to fix costs because they are paid to permanent staff. Remaining O&M costs are variable and their share is around 25% of total O&M costs.

Results of the income statement showed that revenues cover only 23% of total cost and 61% of O&M costs. Moreover, they showed that the salaries are higher than the revenues. That shows the huge inefficiency and the need for urgent action to increase efficiency of the company, which includes among others the reduction of expenses for wages

and to increase tariffs.



Comparing the cost structure of a German utility to that of ASDCO shows the great inefficiency. In Germany the share of wages is only 14% of total cost compared to 29% in Egypt.

Cost covering tariffs – At present time, the average household spends L.E. 3.6 each month and an industrial/commercial user spends L.E. 58 for wastewater per month. If tariffs were set at O&M costs, then a household would spend L.E. 9 each month and industrial/commercial user would spend L.E. 63.3 per month. If tariffs were set in order to generate total cost, then household would spend L.E. 23.3 and industrial/commercial user would spend L.E. 164 per month. In order to cover O&M cost, an increase of 150% is needed on household tariff and 9% on industrial tariff.

	Household	Industries etc.
Est. actual average tariff in L.E./month	3.6	58
Average tariff covering O&M cost in L.E./month	9	63.3
Average tariff covering total cost in L.E./month	23.3	164

The comparison of cost covering tariffs and affordability to pay showed finally that people in Egypt and Alexandria afford to pay higher tariffs for water and wastewater. An increase of sanitation tariffs to an income share of 2.03% would cover the O&M costs. In order to cover total cost, the income share on sanitation has to be more than 5%. This indicates that it is possible to increase a tariff in order to cover O&M costs but it won't be possible to cover the total costs. It must be noted that these figures are

representing averages, and that they do not reflect the impact on income for poorer population.

Expenditure on sanitation from Income	Sanitation Tariff (in L.E.)	Sanitation Cost Coverage
0.81 %	3.6	
2 %	8.88	
2.03%	9	O&M
3 %	13.3	
4 %	17.8	
5 %	22.2	
5.25%	23.3	Total Cost

The assessment on affordability to pay was only based on domestic users therefore industrial and commercial users are exempted.

Best Practices - Kingdom of Morocco – The Kingdom of Morocco and Egypt are similar in their water supply and sanitation practices. The majority of the population (82%) has access to improved water resources, with a major part connected to improved piped water in their house, public stand pipes or protected wells [15]. The overall rate of connection to the sewerage system is currently estimated at about 70% [16]. The sanitation situation is also similar to the Egyptian situation as the connection rate of large cities is 76%, of medium cities is 67% and small cities is 40%. Generally one can state that the poorest has no access to improved sanitation facilities.

Water and wastewater tariffs differ according to locality, consumed quantity, type of service provider and the type of user [16]. Water and wastewater tariffs in cities are higher than those of other MENA countries, although they do not cover full cost of service. In Morocco the tariff system is based on the principle of covering the cost of operation and maintenance [16], but this target is not achieved in many cases. The tariffs often are too high for the poor population, although the country has a very cost intensive sanitation program which needs to be financed. The impression is that it will be impossible to cover the total investments by tariff, but it is decided that they shall bear the bigger share. The

other share will be the contribution of the state.

Best practices – Germany – Germany is one of the most advanced countries in Europe, where 100% coverage of water supply and sanitation is achieved [15]. The majority of the whole population is connected to wastewater treatment plants with secondary or even tertiary treatment facilities and sludge treatment works. Water supply and sanitation in Germany is owned by the public sector, and municipalities are responsible for service [17]. It is a primary responsibility of the municipality to provide sanitation service and therefore a private company cannot directly provide the service. Most municipalities provide the sanitation service directly, but they can contract a private company for the operation. Another interesting issue is that sanitation services are not subject to corporate taxes. There are many cities in Germany, which organize water supply and sanitation with other services like electricity, public transportation or gas supply. This gives them the possibility to cross subsidize each other and to make use of economies of scale.

Germany is one of the countries with the highest water and wastewater tariffs among the developed countries. Also there are arguments that the country wants to demonstrate its national commitment for the preservation of natural resources [17]. In this context the country applies the polluter pays principle where industries are charged according to their polluted effluent. The average German water and wastewater tariff and annual bills are shown below [18].

	Water	Wastewater	Total
Average Tariff (2004)	€ 1.81	€ 2.14	€ 3.95
Annual Bill (2006)	€ 85	€ 111	€196

Service providers and municipal councilors determine water and wastewater tariffs [17]. This practice takes into account different interests. Tariffs are subject to the municipal law for charges “Kommunenabgabengesetz”, which implies that tariffs have to cover the full cost of operation and management as well as capital replacement and debt service. In many cases the wastewater charge consists of two components one, which is related to the infrastructure provision cost, and the other one, which is related to the running costs. The component, which is related to the infrastructure, is generally a fixed amount; the other part is variable according to

the consumption. It is not allowed that the fixed part exceeds 50% of the water bill [19], the reason for that regulation is to give incentives for consumers to save water and (wastewater).

Scenario Development – The developed scenarios are based on ideas, which were presented during the MED EUWI Consultation Event on “Financing Strategy for the Water Supply and Sanitation Sector in Egypt” [4 and 5]. The report, which was prepared on the Affordability assessment, included several scenarios, where one scenario "Scenario 2" seemed to be the most ambitious because it recognizes the affordability to pay up to a certain level and above this level tariffs increase rapidly. The most important figures of "Scenario 2" will be summed up in the following table; which shows the important indicator for scenario development [4].

Indicator	Value
Lifeline Consumption	100 L/c/d 15m ³ per household/ months
Total Expenses of first 10m ³	2% of Household income (according to 4 th rural income stratum)
Water tariff / m ³ (<15m ³)	L.E. 0.75
Wastewater tariff / m ³ (<15m ³)	L.E. 0.26
Water tariff per m ³ (>15m ³)	L.E. 2.30
Wastewater tariff / m ³ (>15m ³)	L.E. 0.80

If this scenario is implemented then it should take place gradually over the next ten years in order to reach a benchmark. Moreover, the scenario indicates that domestic water consumption has to be reduced from an average of 237 lcd in 2006 to an average of 150 lcd in 2026 [4].

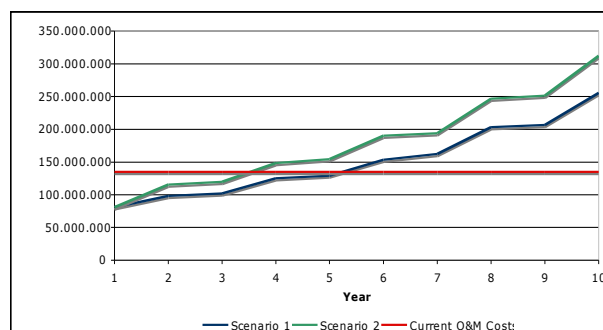
Both of the following scenarios are based on the above mentioned figures and the possibly implemented policy. The first one is a strict implementation of the above mentioned figures and it is based only on a rising block tariff which is applied to each household account. The second scenario combines a minimum charge with the rising block tariff. The approach depends on both the number of household accounts and the number of housing units. However a housing unit can differ from an account because an account could be a multi-storey house

with many housing units. This means that accounts do not represent the real number of housing units. The number of housing units in Alexandria is 1,766,918 [13]. The approach is that each housing unit has to pay the minimum charge, which will include the first 15 m³ (lifeline consumption) at an affordability rate of 2% (gradually rising till L.E. 0.75 per m³ for the next 10 years). The remaining consumed water (wastewater) will be charged to an account (only the registered accounts have meters).

Both scenarios showed an improvement to the current situation. In the first scenario the current O&M cost would be covered at the beginning of the 5th year and in the second scenario they would be covered at the beginning of the 3rd year. The average sanitation tariff of both scenarios will rise gradually from L.E. 4.92 (in 2010) to L.E. 13.82 (in 2018). After 2018 it will decrease gradually because it is assumed that people will consume less, which will have an impact on the average household bill. The following table shows the development of consumption and tariffs for both scenarios.

Year		2010	2018	2026
W&WW consumption (l/c/d)		237	183	150
Average household tariff (L.E.)		4.92	13.82	9.9

The second scenario is more profitable as it generates higher revenues within a shorter period. It is modified in a way that each housing unit has to pay a minimum charge. The application of a minimum charge is common practice in Egypt. The following figure shows a comparison of revenues for scenario one and two.



This type of tariff could be very attractive especially for Alexandria because many flats are only occupied during summer time. It is assumed that these flats, which are occupied during summer, are free of

charge for the rest of the year as they only pay for the consumed water (wastewater). A minimum charge could be a solution of charging these flats. But of course this minimum charge would be adapted for all flats in Alexandria and not only for tourist flats. The weakness of this scenario is that it needs additional efforts in order to register each housing unit in Alexandria if there is no information given on them.

Conclusions – The assessment showed that there is no cost coverage in Alexandria at present time. Revenues, which are mainly tariffs, are covering only 23% of total cost and 61% of the O&M costs. Reasons are on the one hand side inefficiency and very high expenditures on wages, which are even higher than the generated revenues. Moreover water and wastewater tariffs are very low and they have not been adjusted since 1992.

There positive signs for implementing a cost-covering tariff. Most important signs are the political will, provision of financially sustainable sanitation service, and incorporating the concept of affordability to pay.

One of the two developed scenarios (namely the second one) could be a good solution for Alexandria in order to cover O&M costs. This tariff scenario would include major components of future national policies and it would also recognize the specific situation on Alexandria. Finally the assessment showed that it is possible to introduce a cost-covering sanitation tariff under the precondition that a tariff increase would occur gradually and that affordability to pay has to be respected.

Recommendations – It is recommended to emphasize the importance of sanitation financial sustainability. Other stakeholders should be involved in tariff adjustment process so that decisions are strengthened and the whole process becomes more transparent. It is recommended to register all housing units in Alexandria so that the level of accountability and responsibility of users towards sanitation tariffs is increased. It is strongly recommended to start awareness campaigns and to inform the population on the sanitation and its difficult processes. This would also give sanitation services a higher value. Industrial users should be priced properly according to their pollution load. The polluter pays principle is already implemented in Germany, Morocco and in other Arabic countries.

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