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Baseline study

WATER VENDORS AND CLIENTS

Val Saroca, Municipality of Sambizanga, Luanda, Angola

Sustainable Community Services Project

LUANDA URBAN POVERTY PROGRAMME

by

DEVELOPMENT WORKSHOP

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INTRODUCTION

The Sustainable Community Services Programme (SCSP) is a three year project within the Luanda Urban Poverty Programme (LUPP) funded by DfID. The aim of the programme is to develop and test sustainable basic service models that contribute to poverty alleviation in Luanda's overcrowded peri-urban bairros. The first phase of the project began in July 1999 and will terminate in December 2002. A second phase of the programme from January 2003 will focus on scaling up, replication and drawing lessons for future urban policy development.

Overall, 17 per cent of households in Luanda report a water connection but only 10 per cent have an inside water supply. Peri-urban residents, in the absence of a public water supply, are paying high prices for often-contaminated water from private suppliers who distribute water by tanker truck[1].

One of the main objectives of SCSP is to improve access to basic water supply in a sustainable way for peri-urban populations of Luanda. To this end it was programmed to rehabilitate and/or construct forty-five stand posts in bairro Val Saroca. All of these stand posts were in service by the end of May 2002.

Elected water committees manage the stand posts and a certain portion of the income generated is used to cross subsidize the parallel solid waste removal component of the project. Testing of this system will be carried out between June and December 2002.

The present base-line study focuses on the private water market that existed before the new public (community managed) water system came on-line. One of the research questions addressed relates to the attitudes of existing water vendors who's market may be undercut by the new system. The study attempts to assess the risks to the project from potentially hostile vendors. The study further will help measure the benefits to the community that may balance these risks.

The SCSP project is being carried out in three Comuna (urban districts) of the peri-urban Luanda. The present study focus on one bairro; Val Saroca in the Comuna of Ngola Kiluanje, which is part of Sambizanga Municipality.

A baseline study on water pricing and consumption levels in the bairro of Val Saroca was carried out on the 23 and 24th of May 2002. At the same time a preliminary study was also carried out of residents of this bairro who have water tanks in their yards from which they sell water. The result of this survey will be used as a baseline for future impact assessment following the opening of the system of standposts in the area, as well as to help in identifying issues that may arise from the improvement of water supply. The area was selected because the majority of the forty-five stand-posts being constructed and/or rehabilitated are located here.

To this end a questionnaire was prepared and the interviewers[2] were given detailed explanation on how to complete the questionnaire. The interviewers selected a total of one hundred families randomly and the interview was carried out on an individual level with an adult household member. Research team members also carried out inspections of water storage tanks and made visual observations on the hygiene, condition and use of these tanks.

[1] Cain, A., Daly, M., Robson, P., (2002). *Basic Service Provision for the Urban Poor; The Experience of Development Workshop in Angola*, IIED Working Paper 8 on Poverty Reduction in Urban Areas, London

[2] See Annex 1

In this document water tank owners are sometimes described as “Project stakeholders”. While they have not been given a stake in the project, they are a group of people who might be affected by the project, so it is necessary to understand more their behaviour and attitudes, and try to monitor the impact of the project on them.

This paper is based on the analyses of the questionnaires and pertinent observations made by the interviewers.

FINDINGS

I GENERAL

Socio-economic aspects

The number of people in a household varied from a low of 2 to a high of 22, with an average of 9. As is general in Luanda, the majority of the household members were less than 15 years old.

Table 1. Age group of family members

Age group (years)	<5	6-10	11-15	>15
Percentage	22.6	15.7	14.7	46.9

At present private water tanks are the only source of water. Water thus needs to be collected and transported by members of the families. This work is basically assigned to the female members of the household (Table 2 below). Those under 10 rarely collect and transport water (Table 3).

Table 2. Water collection & transport responsibility based on gender

Grouping	Women	Men	Young girls	Young boys	Children
Percentage	51.5	4.0	28.3	13.1	3.0

Table 3. Water collection responsibility on the basis of age group

Age group (years)	<5	6-10	11-15	>15
Percentage	0	1.3	22.7	76.0

The containers used for transporting water (Table 8) are too large for children under 10. Other reasons why their role in the collection and transport of water is low could be:

- To avoid as much as possible spilling of the precious liquid
- In some instances the distances are too long for them.

It is possible that the role of children as water collectors could increase with the start of the stand posts operation due to:

- Expected long queues at the stand posts (older people will have gone to work)
- Rise in the use of smaller containers to fetch water.

The age group of water collectors in the stand posts should be one of the parameters to be monitored.

The general living condition of the majority of the families interviewed during this survey can be characterized as dismal. Their houses were disorderly. Dirty household items and clothes were lying about. The presence of sweat and urine smell was very noticeable. Many of the children had skin infections and extended stomachs. Because of the precarious economic situation the vast majority of the respondents do not boil and/or treat their drinking water.

Source, type and primary treatment of water supply

Almost 95% of the families depend, for their daily water supply, on water from tanks filled by river-water, and the remaining 5% depend on water from tanks filled by pipeline-water. Raw water is directly pumped from the Bengo River as it flows past the Kifangondo Water Treatment Plant. Tanker drivers, on their way to the city, are obliged to pass through a “chlorination” station, where a concentration of 10mg/litre of chlorine is added to the tankers. Even though all tankers are

supposed to stop at this station there are few that ignore it. A few kilometres away there is another control station were the residual chlorine is measured. Out of the hundreds of tankers that transport water daily, the chlorine residual test is done on only forty randomly selected tankers. Here also, according to the person following this operation, about 4-5 tankers evade stopping for the check up and just continue their trip to sell water. This could possibly be due to the fact that they might not have stopped for chlorination and/or wanted to save some minutes. The penalty for not chlorinating is to force them go back and chlorinate the water, which is a loss of time and therefore a loss in income to them. The residual chlorine allowable varies from a maximum of 3 to a minimum of 0.6mg/liter.

Normally it takes 25 to 30 minutes for the chlorine to completely react with whatever is present in the water before the measurement of residual chlorine could be a reliable indicator of the acceptability of the water for human consumption. The fact that the residual chlorine measurements are being taken in less than the accepted norm of time, as well as the low concentrations reported at that time possibly indicate that the concentration of 10mg/liter is not sufficient. Checking of residual chlorine of the tanker waters at clients tanks need to be undertaken to verify the effectiveness of chlorination of water in tanker-lorries and the control of this chlorination.

Water in tanks

On average it takes more than a week to sell and/or use the water delivered to a tank. There is a continuous opening of the cover and introduction of buckets to draw out water. Thus the possibility of contamination during this process is quite high. The water tanks are built of commercially available and/or locally produced blocks whose quality is questionable. To economize people usually use less than the needed amount of cement. Water could possibly leak in to or out of the tank. The majority of the tanks do not have properly constructed and appropriate covers and some of them have none. Many of the covers are made of old corrugated iron sheets, wood and at times even heavy cardboard. Spilled water has been observed to flow back in to the tank. Aerial as well as rain-induced contamination could very easily affect the majority of the tankers surveyed. It is also possible that vermin could easily enter in to the tanks and they could also act as another source of contamination.

Thus the water from tanks, being susceptible to the above possible routes of contamination as well as possibly a low initial dose of chlorine, may be of a very questionable quality at this stage.

Water inside families' homes

Based on the questionaire a low percentage of the families state that they leave their water containers open (Table 4). However, visual observation indicates a more significant portion of families do this. This is a possible route for contamination, which could easily be avoided.

Table 4. Protection of drinking water inside the house

Condition	Closed	Open	Sometimes
Percentage	87.7	7.7	4.6

In 57.4 per cent of households, children are allowed access to the water container in the household. This could be also a route for potential contamination.

Families who are relatively wealthier can afford to buy more water and tend to keep their water in closed containers and keep them in specific and secure areas of their houses. On the other hand

the majority who buy lesser amounts of water leave their water in open small basins, thus leaving the water open to contamination.

Another important aspect that needs to be addressed is how families draw out their water from the water containers inside their homes. Except for 5.4% of the families, who pour the water directly out of the containers, the majority uses a specific cup and/or other means (see Table 5 below).

Table 5. Ways of taking out water from the container in the house

Means	Specific cup	Direct from container	Others
Percentage	83.8	10.8	5.4

The possibility of introducing contamination at this stage seems to be quite high with 89.2% of the families introducing a foreign body to fetch water.

Distance to water point

Distance to water could be a big factor in the quantity of water consumed. It has been shown that usage drops from 40 litres per day (litres per day) per person when water is supplied in the yard down to 15 litres per day for sources 200 m away; this rate holds fairly constant for distances up to 1,000 meters. Only when water wells are located more than 1 km from home does the water consumption rate drop again, often declining to less than 7 litres per day[3].

On average in the survey area the distance from a family's residence to the nearest tanker is 89m and a family spends about forty-five minutes a day in water collection. The average number of trips for collection of water is three.

In many cases it was observed that those families who use larger sized water collectors (greater than 20 litres) transport the water in to their houses in smaller sized containers. This action results in many more back and forth travels.

Normally families buy their water at least twice a day, that is, in the morning and later in the afternoon. The main reasons for this are to prevent "unnecessary squandering of water" and thus keep the water consumption (and costs) down, and because the majority of the population does not have big containers for storing water.

Cost of water

Families have reported that they are paying on the average the following amounts per container:

Table 6. Average Price of water for different sized containers

Container size (litres)	15	20	25	30	40
Cost (Kzs)	9	11	12	14	16

This works out at about 0.41Kzs/litre. EPAL is charging 15Kzs/m3 for a monthly consumption level of 1-10m3, which is equivalent to 0.015Kzs/litre. The people of the survey area are paying about 27 times that of what EPAL is charging for the higher quality piped water. Since many of the surveyed families have low incomes, this is a big burden on the household economy. Those who buy smaller amounts, or use smaller containers, pay the most.

[3] Cairncross.

Almost without exception, families are paying for water each time they collect it. This is a reflection of the short economic planning horizon and of the extremely precarious living condition of the families.

Table 7. Form of payment for water

Form of payment	Per trip	Daily	Monthly
Percentage	99	1	0

When consumers were asked as to why this kind of payment is preferred, the replies were:

- Owners don't have confidence on clients
- This is a more secure form of payment for them
- Tank owners do not buy their water on a credit basis and thus do not want to offer that kind of service to clients.

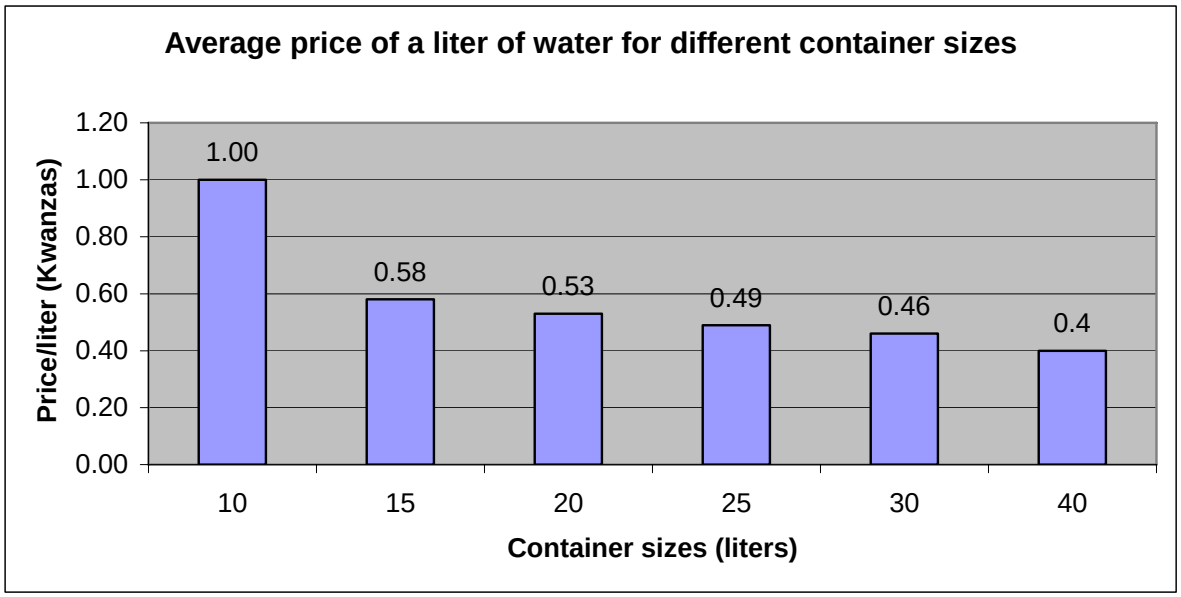
Water containers

The most common containers for collecting water included the following:

Table 8. Types of containers used for water collection

Size (litres)	10	15	20	25	30	40	>40
Percentage	2.4	6.0	45.2	6.0	9.5	26.2	4.8

Smaller containers are probably not used due to problems associated with calculating the exact amount sold (a 10 litre bucket is used for drawing out of water from the containers and this also the standard measuring device- all sales are multiples of it) as well as it being time consuming to the tank owner. At the same time buying water in bigger containers is cheaper than using smaller ones, as the data from the survey indicated (see figure below).



When the project stand posts start to be operational it is expected that the use of smaller sized containers will increase. This will imply that the number of children involved in the collection &

transport of water will increase. This will then be an indicator that needs to be tracked in the project stand posts.

Uses of purchased water

Water that is bought presently from water tanks is used for the activities shown in the following table. (Table 9 below). All respondents use this water for drinking and cooking, almost all use it for bathing and washing clothes and the majority use it for washing dishes and cleaning the house. Only a minority use it for toilet cleaning.

Table 9. Type of use of water bought from tanks

Activity	Drink	Cooking	Bath	Wash cloth	House cleaning	Dish	Toilet cleaning
Percentage	100.0	100.0	92.8	91.3	79.7	78.3	29.0

The people in the family who use most water are mothers and children (Table 10).

Table 10. Water consumption by family members

Member	Father	Mother	Young boys	Young girls	Children
Percentage	10.7	36.0	6.7	12.0	34.7

It was stated that the reason for this was that mothers and young girls are responsible for all the household chores and they use water for these household duties. Children were found to use large amounts of water because they often play outside and come back dirty: quite a lot of the precious little water that the families have is used in keeping children clean.

Families generally use small cups when drawing out water from the containers. At the same time they use small water basins. The use of these small utensils is meant to help minimize the use of water. Re-use of water for the same as well as different activities is very common. This further helps the families in minimizing their water bill. In very many cases families wash their clothes only twice a month.

Water-related Diseases

To have an idea of the incidence of water-related diseases, families were asked to indicate all the diseases that affected any member of their family during the last six months. The findings showed that water related diseases are at the top of the list (Table 11 below). The availability of more water via the stand posts should lead to a decline in the incidences of diarrhoea, scabies and typhoid fever. This will be one of the indicators for the impact assessment.

Table 11. Types of diseases among family members (last six month)

Type of disease	Diarrhoea	Malaria	Typhoid Fever	Scabies
Percentage	39.1	39.1	6.5	4.3

It appears, from observation, that scabies and other skin-related diseases are under-reported.

Generally it seems that diarrhoea is more common among children and malaria among the adults.

Per capita daily water consumption

On the basis of this survey it was found out that the average daily per capita consumption of water is 7.6 litres, or an average family consumption of 67 litres per day, for drinking, cooking, washing clothes as well as personal washing. This rate of consumption is extremely low even compared to the WHO minimum (20 litres/person/day). The WHO figure does not even envisage some of the uses mentioned above. The project's envisaged supply of 15 litres/person/day, even though it is 100% more than the present consumption, it is still below the WHO minimum standard.

Such low water consumption level suggests that the prevalence of water related diseases will be high and that the high rates in Table11 above are not unexpected.

The available water in the tanks surveyed indicates, assuming that all of them serve only the targeted families, that on the average more than 50 litres per capita per day is available[4]. Based on this it appears that the main cause of the low consumption reported above is the economic situation of the population. Thus with the coming of the stand posts in to operation, with a lower priced water, it is expected that the consumption level will increase.

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[4] This assumes that each water tank can potentially get filled up by a lorry every day.

II WATER VENDORS

A total of thirty-six tank owners/renters were interviewed during this survey and the results obtained are discussed below. The exact number of tank owners in Val Saroca is not known. It is suspected that what have been surveyed form just a small fraction of the overall number of tanks that exist.

Type of Tanks

All the tanks are rectangular in shape and are constructed of blocks and are generally not more than two meters high. The covers are generally made of Corrugated iron sheets on top of wooden and/or rusty iron crossbars[5]; some even do not have any cover at all. Some tanks have many visible cracks on the outer parts and algal growth is visible in some of them. As mentioned above, most tanks are not well constructed and need lots of improvements.

Means of drawing water

All the water sellers use rope and bucket system for taking out water from the tank. In most cases a 10 litre bucket is used. The person responsible stands on one of the top edges of the tank and draws water using a 10liter bucket with the rope attached to it. The client's container is also on the edge and it was observed in many cases that spilled water was flowing back to the tank itself. The survey found out that the majority of the owners and/or family members draw out water for the clients themselves (Table 12). The reason for this is to make sure that water is not unnecessarily wasted during filling customers' containers.

Table 12. Water drawers at tank

Responsible	Owner/family member	Client
Percentage	89	17

Some owners allow clients to draw water from the tanks, which could increase the possibility of contamination. It shows that in these cases, quality control is questionable.

Source of water

Thirty-six water tank owners were interviewed in this survey all from the Val Saroca area. When asked as to the source of the water they are selling the majority indicated that it was from Kifangondo. The summary is shown below as Table 13.

Table 13. Source of water to tanks

Source	Kifangondo	EPAL	Refinery	Don't know
Percentage	76	5	5	14

[5] It was observed, in some tanks, that cardboard sheets are used as tank covers.

Volume of water bought per month

The total volume of the tanks surveyed was almost 399,250 litres and the average tank volume was a little less than 12,500 litres. On the average each tank was refilled about 3.9 times every month. Thus in a month a combined amount of 1,468,750 litres is bought by the water tank owners.

Cost of water

On average, the tank owners are buying their water at a price of 0.14Kzs/liter. The cost of water is variable and basically depends on the water supply situation within the “concrete city”. When there is water shortage in the piped water system of the “concrete city”, the demand for tanker water goes up. Operators of water tankers prefer to go to the “concrete city” where they can make good profit, and the price of water in the surveyed area increases. With the availability of more water in the “concrete city”, tanker operators come to the survey area and look around for clients themselves. Thus the supply goes up and prices are lower. Owners of water tanks are very conscious of this and thus adjust their prices promptly.

It should also be noted that during the rainy season a large number of the family practice rainwater collection (from roof s). Because of the lack of big water containers the rainwater collected will not last more than a day and thus will not be of a great effect. Since the roads in the project area are small and become slippery and dangerous, the number of water tankers coming will decrease. This situation helps the tank owners living close to the main roads to exploit the situation and make a higher profit.

Based on the data collected during this survey the combined monthly total expenditure on water, for all the owners, is 208,650Kzs.

Treatment of water at tank

Asked on whether some kind of treatment is carried out on site, the owners responded that it is done. Table 14 shows the results in a tabulated form.

Table 14. Water treatment at tank level

Treatment	Yes	No
Percentage	89	11

Even though some complained about the physical characteristics of the water (muddiness etc.) quite a small proportion of them are not concerned about the quality of the water that they are selling.

Those who said that they are treating the water in their own tank were further asked as to what kind of treatment they carry out and their responses are shown below as Table 15.

Table 15. Kinds of water treatment at tank level

Kind of treatment	Chlorine	Al. Sulphate	Lixivia
Percentage	38	45	17

It was found out that a large percentage of the water tank owners clean their tanks before every fill. Furthermore there is a widespread use of Aluminium Sulphate as a means of treatment (Table 15

above). These indicate that there is a problem of suspended materials in the water. Because of the presence of suspended materials an increase in the amount of chlorine concentration put in to the tankers will be an area that will need to be examined further. The residual chlorine is being measured a short distance away from where the chlorine is added to the tankers. So the reaction time is very short. A check of residual chlorine at greater distances (more reaction time) will give more accurate results.

The dirty water from the cleaning of the tank is collected and the dirt is allowed to settle out. The water is then scooped and stored for use by the tank owner family. It is too precious to be thrown out.

Sale of water

The average selling price per litre of water was found out to be 0.41Kwanzas. Thus if it is assumed that they are selling all the water (no family use, no leakage loss and no loss due to spilling during filling of tank and selling to clients) the combined monthly income will be 928,250Kzs. A lot of the owners seem not to know how much income they get out of the water sale business. At the same time they don't know how much water they consume themselves. These added to the fact that the other parameters (spillage, leakage etc.) are also unknown, makes it difficult to calculate the exact contribution that water selling makes to the family income.

Based on some different assumptions, calculations have been made for two scenarios (see Tables 20 and 21). These scenarios indicate that in the majority of cases this activity is a good source of income to the families involved in the operation.

If this is true then the project needs to make something to this group, so that they will become part of the beneficiary groups.

Water-related Diseases

Since the water is being drawn out from the tankers by bucket and rope system the issues of the presence of any water-related disease need to be addressed. Furthermore the fact that there could possibly be spilled water around the tanks might also provoke other water-related diseases like malaria. To this end owners were asked to indicate the type of diseases that any member of their immediate family (residing there) has been suffering from. The findings are tabulated in Table 16 below.

Table 16. Types of diseases that occurred among tank owners' family members

Type of disease	Malaria	Diarrhoea	Typhoid fever	Scabies
Percentage	47.1	23.5	8.8	8.8

When comparing Tables 10 and 16 one can see that malaria is relatively speaking more prevalent among the water containers than among the clients (47.1 versus 39.1%). This could possibly be to the fact that there are stagnant water and mosquito breeding around the water tank owners. The fact that 19% of the owners are envisaging to repair the tank covers (Table 19 below) indicates that these can act as mosquito entry in to the tank water. On the other hand diarrhoea is more prevalent among the clients compared to the tank owners (39.1 versus 23.5%) that could possibly be attributed to increased contamination mechanisms (during transport) as well as the lack of enough water for washing hands before meals etc.

Why construct a Tank?

To understand the motives behind the construction of water tanks, some questions on this were included in the survey. Financial gain seems to be the main motive behind the construction. This is followed closely by the reason: to solve the water shortage problems and resulting waste of time and energy that their families were facing every day. The results are tabulated as Table 17 below.

Table 17. Reasons for constructing tank

Reason	Financial gains	Solve family water crisis
Percentage	78	64

The fact that financial gain was the main reason has some crucial implications on the project. As mentioned previously a means has to be found out where this group could feel some of the benefits accruing from the implementation of the project.

Tank owners' opinions regarding the project Stand Posts

The tank owners are one of the important stakeholders in the project[6]. Their views are considered important in the assessment of risks to the project and may affect the acceptance of the technology by beneficiaries. Asked whether the construction of the new stand posts will affect them or not they answered, as is tabulated below (Table 18).

Table 18. Tank owners' opinion about project stand posts

Opinion	Will be affect	Will not affect
Percentage	16.7	75

The majority believes that they will not be affected. Some believe that the stand posts will not meet the demands and that there will be long queues. Because of this, they believe there will still be some who would not like to waste their time waiting in queue and thus will buy water from them. However there are some owners of water tanks who say that they will be affected and they could cause problems because they see the project as a competitor that will affect their livelihood. One of the respondent said that, "All people will flock to the project stand posts, and we will loose business". Some kind of activity need to be developed within the project to make them feel as beneficiaries also.

Suggestions for improving tanks

Owners were asked if they see any improvements made to their tanks. Eighty-three percent of the owners responded to the question and Table. 19 show the replies obtained.

Table 19. Tank owners' suggestions for improvements on tanks

Response	Cover	Inside plaster	Outside plaster	Pumping device	Elevate tank	Increase vol.	None
Percentage	19	6	6	8	3	8	33

From the above table it is clear that helping the owners in the construction of an appropriate tank cover will be a good entry for buying in a significant number of the tank owners in to the project beneficiary list.

[6] In this document water tank owners are often described as "Project stakeholders". While they have not been given a stake in the project, they are a group of people who might be affected by the project, so it is necessary to understand more their behaviour and attitudes, and try to monitor the impact of the project on them.

The project could possibly be involved in helping the water tank owners improve the quality of their tanks. This will help improve the quality of water and will finally possibly reduce the high incidences of water related diseases tabulated above.

Cost-benefit analysis of water tank business

A cost benefit analysis of the sale of water from the tanks was made. Several assumptions have been required in the calculations because tank-owners are unable to estimate how much they have invested in the construction of a water tank, how long they last and what the loss rate might be.

Construction of a tank[7]	1000 USD
Beneficial lifetime of a tank	10 years
Interest rate	10%
Loss due to leakage	15% of the tank volume
Loss due to spillage	5% of the tank volume

The calculated average buying and selling prices/litre of water were found out to be 0.14 and 0.41Kzs.respectively.

In the cost price the following costs have also been included:

Tank depreciation cost/litre
Tank maintenance cost at 30% of the depreciation cost/litre
Supervision (at 100USD/month) calculated per/litre

So the final cost price of a litre of water to the tank owner comes out to be 0.17Kzs. Therefore the cost and selling prices used in the calculation are 0.17 and 0.41Kzs/liter.

For the two calculation scenarios a change in the amount of daily water consumption of the owner's family was the only parameter changed. For Scenario I the consumption was taken as double as that of the clients, which is 7.6 x 2= 15 litres, and for Scenario II quadruple the amount (7.6 x 2= 15.2 litres).

The result for Scenario I is shown as Table 20 below.

Table 20. Calculated results for Scenario I (per month)

Amount bought (Litres)	Amount paid (Kzs)	Personal use (Litres)	Leakage (Litres)	Spillage (Litres)	Amount sold (Litres)	Income generated (Kzs)	Profit (Kzs)
1468750	208650	165879	220316	73438	1022792	456867	248218

From the above table it is quite clear, that overall this business is making a significant profit, as more than 100% of the buying price. The percentage of profit varies from tank to tank and there are three tank owners who will end up making a loss based on the assumptions inherent in the calculation.

Since the assumptions regarding family water consumption, leakage, spillage and supervision were conservative the assumed loss by the three families could be easily turned around by small adjustments in the above.

[7] This is an estimate based on the number of blocks, the cost of digging similar size pits

The result of Scenario II indicates that the hypothetical number of families ending making a loss. increases to eight and the profit margin decreases by about 24%(Table 21). As previously mentioned even tank owners are very cautious on the consumption of water (even decanting the dirty water from the tanks for reuse) and therefore the quadrupling of the consumption assumed in Scenario II is not going to be realized.

Table 21Calculated results for Scenario II (per month)

Amount bought (Litres)	Amount paid (Kzs)	Personal use (Litres)	Leakage (Litres)	Spillage (Litres)	Amount sold (Litres)	Income generated (Kzs)	Profit (Kzs)
1468750	208650	304415	220316	73438	870585	396586	187936

Still with these kinds of extreme assumptions the general picture is that it is still making about 90% profit margin, which is quite good.

So it can be concluded that the generally the operation is a good income generating activity.

Impact of project on water tank business

When the project's standposts start operating they will be serving an estimated population of 45,000 people. Each is expected to receive 15 litres per day and this means that there will be a daily consumption of 675,000 litres. To satisfy this demand via water tanks a minimum number of 54 tanks of an average capacity of 12,500 litres are required[8]. The present survey included 36 tanks only and the total number of tanks in the project area is not known.

A good knowledge of the number of tanks in service in the project area is essential for assessing the impact that the stand posts will have on the tank owners. It is recommended that a rapid assessment of this be done as soon as possible. Until this is done it will be difficult to have a clear idea of the project impact on these particular stakeholders.

Overall Conclusions:

1) Water consumption is low in the area studied.
2) People pay high prices for water, relative to their income level.
3) People minimise water consumption because of the cost.
4) The minimilisation of consumption appears to lead to high morbidity.
5) People get water from private tanks, where water quality is low and costs are high.
6) Water tank owners think that standposts will have little effect on them.
7) There is apparently room in the market for both standposts and private water tanks. This conclusion will need to be monitored.
8) Because some people will continue to get water from private tanks (and drink water from tanks), and because the interests of tank owners should be taken into account, some activity to support them should be investigated that helps the tank owners and improves the quality of water from the tanks.
9) Improvements to tank covers should be investigated ?

[8] This assumes that each tank gets completely emptied and filled each day.

ANNEX I- QUESTIONNAIRE

INFORMAÇAO GERAL

Nome do entrevistador _____

No do questionário _____ Data: _____Hora:_____

LOCALIZAÇÃO

Municipio _____ Comuna _____ Bairro_____ Sector _____

No da casa:_____ Rua _____ Ref. Localização _____

Proprietário _____ Inclino _____

AGREGADO FAMILIAR

1) Nome do chefe da família _____
2) Quantas pessoas vivem na sua casa?_____
3) Menos de 5 anos ____ 6-10 anos ____ 11-15 anos ___ Mais de 15 anos____

Parte I do questionário: Famílias que compram água nos tanques
Parte II do questionário: Famílias que têm tanques

PARTE I - PARA AS FAMÍLIAS QUE COMPRAM AGUA NOS REVENDEDORES

4) Onde é que a família vai buscar água? _____
5) Sabe de onde vem esta água? _____

_____

Obs: Se a família a família não sabe pede para descrever o paladar e cor

6) Existe outra fonte de abastecimento?___, Caso sim, qual ?

_____

7) De onde vem esta água? _____

Obs: Se a família a família não sabe pede para descrever o paladar e cor

8) Quantas vezes a família vai buscar água por dia? _____

_____

_____

a) Quantos vezes 1 2 3 4 5 mais de _____

_____

_____

b) Capacidade do recipiente/litros: 2 5 10 15 20 25 30 40 mais de 40 _____

9) Quem é responsável para o transporte de água?

a) idade: menos de 5 anos 6-10 anos 11-15 anos Mais de 15 anos

b) sexo: homem ____ mulher ____ rapazes ____ raparigas ____ crianças ___

10) Quanto tempo a família gasta para transportar água por uma viagem/minutos?

5 10 15 20 25 30 35 40 45 50 55 60 mais de um hora_____

11) Qual é a distancia de sua casa/metros?_____

12) Quanto custa (confirmar recipiente)?

Valor em kwanza:

Volume do recipiente: 2 5 10 20 25 30 40 mais de 40 _____

Valor do cambio do dia (mobilizadores):

13) Existe outras formas de pagamento? _____ caso sim, qual? _____

14) Qual é a quantidade de água armazenada pela família/dia (confirmar a capacidade dos recipientes)?

15) Os recipientes para armazenar água são tapados? Sim _____ Não _____

_____

_____

16) Como tiram a água do recipiente para utilizar?

Torneira _____com uma jarra especifica _____ outras _____

_____

_____

17) As crianças tiram água do recipiente armazenados Sim ___ Não _____. Caso sim, como

_____

_____

18) Qual é a quantidade de água que a família gasta por dia (ter em conta a pergunta 8 e 13)_

_____

_____

_____

19) Sistema de pagamento: Por recipiente: ___ Diário ___ Mensal ____, porquê ___

_____

_____

20) Existe outros sistemas de pagamento? _____, qual? _____,

Porquê _____

21) Quem na familia gasta mais água?

a) Mae_____ Pai _____ rapazes _____ raparigas_____ crianças _____ outras

(especificar) _____

b)Porquê _____

22) O que é que vocês fazem com a água comprado?

a)Lavar a louca____ b) lavar roupa____ c)tomar banho____ d)limpeza de casa ___

e)cozer os alimentos _____ f)lavar a latrina _____

_____

_____

23) Quando foi a ultima vez que um membro da sua família ficou doente? _____, que doença

_____

_____, em que período chuvoso ou seco?

_____

PARTE II – PARA AS FAMILIAS DE POSSUEM TANQUES ÁGUA E PARA VENDA

24) Qual e a capacidade do tanque? ___litros ___metros cúbicos ___(L __ C__ A __)

25) Quanta custa para encher o tanque? _____

_____

26) Tem uma ideia da quantidade de água utilizada para venda? _____

_____

_____

27) A água que consume em casa onde tira? _____

_____

_____

28) Quanta vezes por mês abastece o tanque?_____

_____

29) De onde vem a água que consume em casa? _____

30) Quando foi a ultima vez que um membro da sua família ficou doente? _____, que doença

_____

_____, em que período chuvoso ou seco?

_____

31) Como é que vende a agua

Volume do recipiente: 2 5 10 15 20 25 30 40 mais de _____

Valor em kwanza:

Valor do cambio (mobilizadores):

32) Utiliza alguma produto para desinfetar a água, _____, caso sim, qual _____

_____

33) Quando e que limpou o seu tanque pela ultima vez? _____

_____

34) Como è que tira a água do tanque para vender? _____

_____

35) Quem tira a água do tanque? _____

_____

36) Porquê que construiu o tanque? _____

_____

37) Tem alguma ideia para melhorar o seu tanque? _____

_____

38) Pensa que a presença dos chafarizes irá afetar a sua vida, ____ caso sim, como __

_____

_____

_____

39) Tem alguma opinião para ultrapassar a situação?

_____

_____

_____