



HYDROCONSEIL

Consulting Engineer: water supply,
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Field Note Series
Urban Water Supply

Improving water services in the peri-urban areas of Maputo, Mozambique: the role of independent providers

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Table of content

A. Background	3
A.1. A short overview of the history of Maputo	3
A.2. Water resources	4
A.3. The principal actors of water in Maputo	5
A.4. The formal water utility only serves urban dwellers of the Southern part of the city	5
A.5. Who filled the gap? A myriad of small scale independent providers	6
A.6. The context of this study – The Maputo Water Supply Project (MWSP) – Component 3	6
B. The Pequenos Operadores Privados (POPs) of Maputo	7
B.1. Who are the small providers?	7
B.2. How did it start? Growth of a new business	8
B.3. Did you say small scale?	8
B.4. Informal and diverse: a typology of the POPs	9
B.5. A geography of the POPs market	10
B.6. Main features of the service provided by the small scale operators of Maputo	11
B.7. Interaction with the institutions	14
C. POPs, the (second?) best option for expanding water supply services in peri-urban areas?	15
C.1. What has supported the POPs' success in Maputo?	15
C.2. The POPs: best allies to reach the MDG?	16
C.3. How replicable is the Maputo case?	16
D. FIPAG's support to POPs formalisation	17
D.1. The Maputo Water Supply Program	17
D.2. FIPAG strategy vis-a-vis the POPs	17
D.3. Sustainably managing water resources	18
D.4. Regulating POP business	19
E. Upcoming challenges	20
E.1. Corruption and transparency	20
E.2. How to inject public money in an informal business?	20
E.3. Preserving informal business efficiency	21
E.4. How to regulate hundreds of small businesses?	21

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A. Background

A.1. A short overview of the history of Maputo

Located on the Delagoa Bay, the initial city site was known as Catembe and served as a trading post between the Arabic sailors and the native populations. Although Dutch fortifications existed since 1721, the trading post became a city named Lourenço Marques in 1887 after the Portuguese took over the site in 1781. It took its official name, Maputo, in 1976 after independence, in reference to the river, Maputa, that flows in the bay.

The initial development dynamic came from its strategic location regarding South Africa mines at a point that the city was called the ore-wharf of South Africa. The real development of the city started in the 1950's with a very high growth rate that continued until the 1980's. The war (from 1975 to 1992) fed the city with people fleeing the conflict areas in search of security.

The original city concentrated in the "*baixa*", the area surrounding the port with administrative and trading buildings. The city then expanded towards the surrounding elevated grounds for residential purposes. For obvious reasons it was named the "cement" city (*barrio cimento*) and the name remained.

Maputo finally expanded towards Matola, its twin city where most of the large industries (in need of space) were installed. The local labour force settled in disorganised belts around the cement city and Matola centre (see map: 1st and 2nd expansion areas).

The growth of the Maputo + Matola urban complex has been steady over the last 50 years. It is expected that the city will reach a population of 2 million before 2010.

Mozambique in a nutshell

Surface area: 799,380 km²

Population (2007): 20,530,714 inhab.

Rural/urban population: 69/31%

Demographic growth rate: 2,4%/year

Life expectancy: 47,1 years

Capital city: Maputo

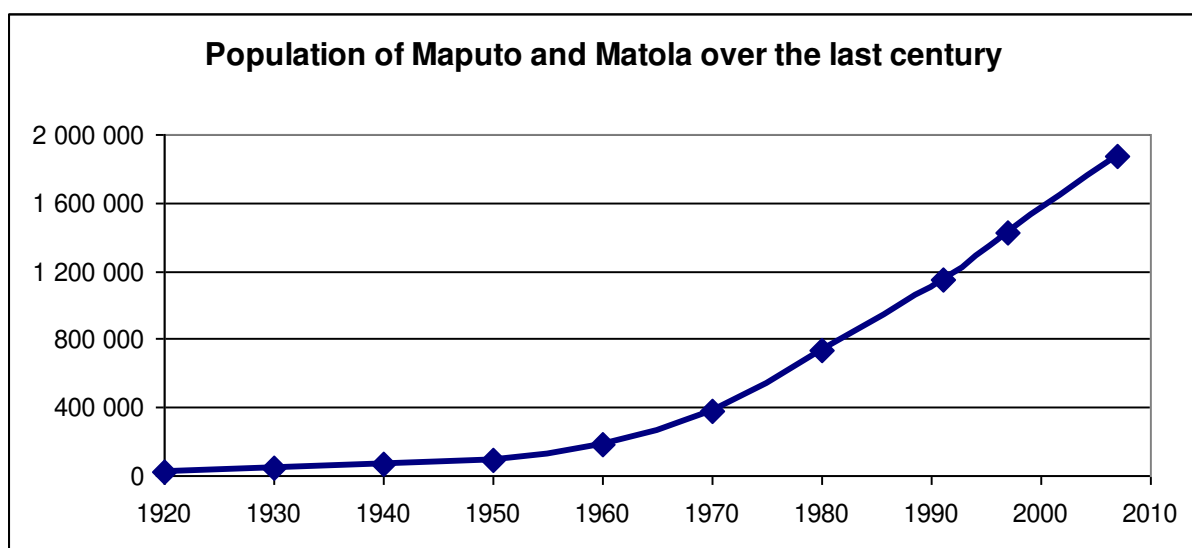
PIB growth rate in 2006: 8,5%

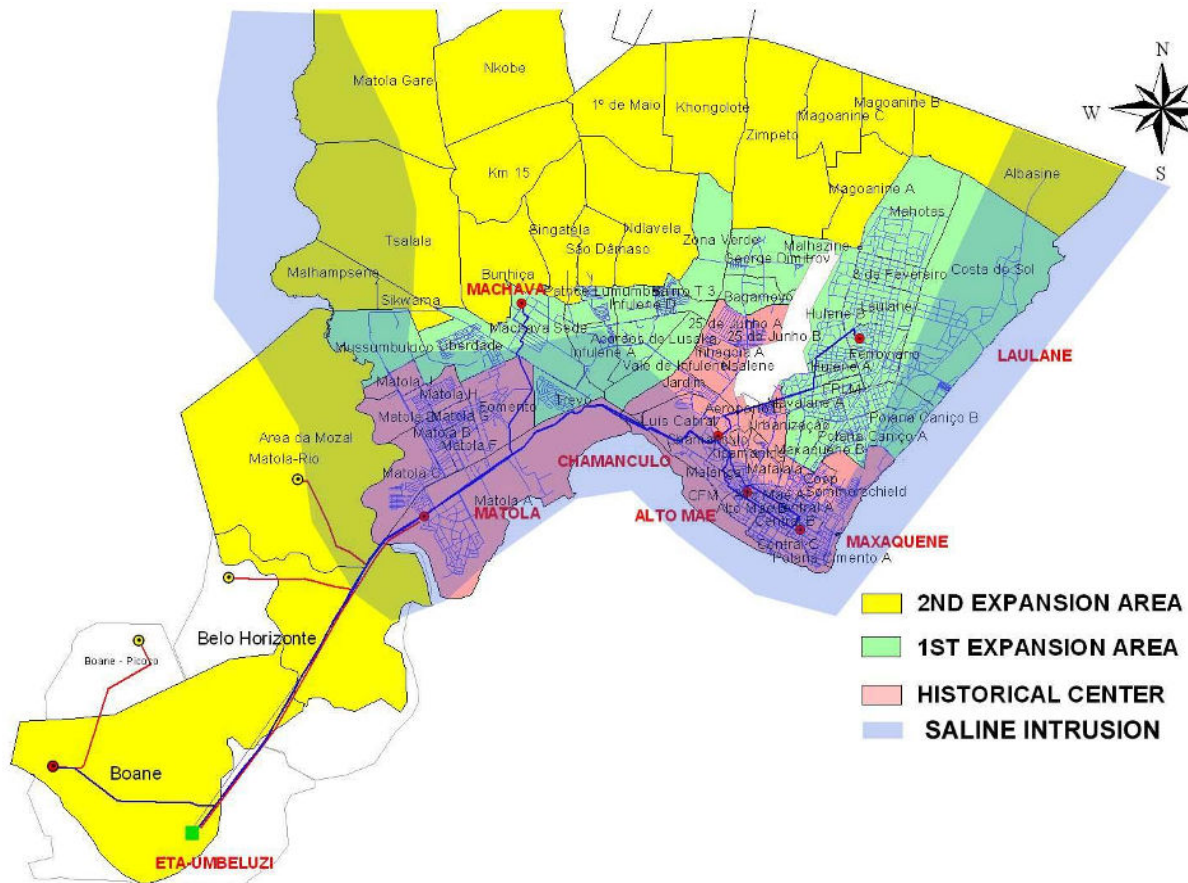
Local currency: Metical (mT)

(25 mT = 1 US\$ as per Sept. 2008)

Access to water: 42%

Access to safe sanitation: 32%





Map 1. Maputo and Matola Bairros with the conventional water distribution system (ETA Umbeluzi being the treatment plant)

A.2. Water resources

The Great Maputo area geologically belongs to the vast sedimentary basin that extends from Port Dunford (Natal – South Africa) to Quelimane (North Central Mozambique), and reaches to the East as far as the Lebombo Mountains.

Groundwater in the area is generally associated with the alluvial aquifer, the water levels being moderately shallow (around 10 to 20 meters). For general purposes of water abstraction the alluvial aquifer are of most interest.

In general, the shallow alluvial aquifer is utilized by the local population. The water is tapped from the sands by open hand dug wells. In most of the area the most productive aquifer will be found at less than 60 meters of depth.

Salt intrusion is high on the coastal area and along the rivers flowing into the bay. Several areas in Maputo and Matola are affected by the saline intrusion phenomenon; reducing alternatives in terms of water access (see blue areas on map 1).

For historical reasons, the main water source for Maputo is surface water. Water is produced through a treatment plant located 30 km from the cities and fed from the Umbeluzi river intake and transported up to the cities (see Map 1).

A.3. The principal actors of water in Maputo

FIPAG, the asset holding company is under the aegis of the Ministry of Public Works and Housing (MOPH) and has an on-lending agreement with the Ministry of Finance for all the public investments to the urban water sector. The authority and responsibilities of FIPAG include (i) investment and financial management for rehabilitation and expansion of water supply assets, (ii) maximisation of efficiency and return on existing assets, and (iii) contract management, monitoring and enforcement of the contractual obligations of the main private service provider. FIPAG is in charge of the 16 main towns in Mozambique, and has delegated the operation to a private operator AdeM in Maputo/Matola. It is currently procuring a management company for the 4 northern cities (Beira, Quelimane, Nampula and Pemba). It operates four other cities with technical assistance from a Dutch private company Vitens.

CRA is an independent regulating body designed to secure equilibrium between service quality, consumer interests, and the economic sustainability of water systems. It mediates the interests of the main private service provider and the leaser (FIPAG) through a tariff setting mechanism.

AdeM (Aguas de Mozambique) is a private company contracted by FIPAG under a lease contract, and is operating the Maputo / Matola water supply. AdeM is a consortium formed of Mozambican companies and Aguas de Portugal, the public Portuguese water utility.

The POPs (Pequenos Operadores Privados) are the main water distributors in the peri-urban areas of Maputo and Matola. They are informal entities distributing water through independent water source (boreholes). The POPs constitute the main focus of this field note.

Municipalities have no active role in the operation nor in the planning activity, however they directly represent the consumer and are part of the FIPAG board. Meanwhile, at the local level, the municipal authorities are regularly in contact with the POPs.

A.4. The formal water utility only serves urban dwellers of the Southern part of the city

The first treatment plant on the Umbeluzi River was constructed in 1920. The water distribution system of Maputo and Matola still consists of a series of distribution centres which receive water from the plant through feeding pipes. The distribution centres have an important storage capacity and a water tower in order to distribute water through gravity.

Major investment plans were carried out between the 50's and the 80's and allowed for coverage of the whole cemented city as well as part of the first expansion area. The last concluded investment concern the construction of Laulane Distribution centre, which was commissioned in 2007. Since 2007 a new investment plan is being implemented in order to increase the water production, reduce the rate of water loss and increase the network expansion.

As a matter of fact, due to lack of funds and implementation delays, investments have not been able to catch up with the urban development of the cities, neither in terms of water production capacity nor in terms of network coverage of the populated area. A striking example is the latest distribution centre in Laulane which was commissioned in 2007, although the area was populated 15 years ago.

Aguas de Mozambique (see above) distributes water through approximately 100,000 private connections and 300 operating standpipes. When considering 5 persons per private connection (average household size) and 500 persons per standpipe, the total served population is 650,000 people – i.e. a 35% coverage rate considering the actual population (1,875,000 inhabitants).

This coverage rate does not take in consideration the water resale practice (reselling to neighbours) through which 26% of the population has access to water supply.

The water production level (177,600 m³/day) and the very high rate of physical loss (56%) shed a bleak light on the effective water access of the population: the production capacity could provide the total population with an average of 95 litres/person.day but in practice Aguas de Mozambique manages to distribute only 42 litres/person.day.

Finally, the network covers only a part of the whole agglomeration and leaves important an area with no access to the “official” water source (approximately 40% of the area is covered by the network), the market of water trucking or water carts being very modest.

A.5. Who filled the gap? A myriad of small scale independent providers

A question rises automatically when examining map 1: how could these areas develop so much without having a proper access to water supply? Although there are alternative water sources in Maputo (hand dug wells) they cannot explain how these areas reached this level of development. The answer to this question is the subject of this field note: **during the last 15 years, informal operators, relying on independent boreholes, have provided the water services to those who are unable to access the “formal” distribution network.** These small operators, known as POPs (*Pequenos Operadores Privados*) in Maputo, operate in the city and total more than 450, serving over 350,000 people through 38,000 private connections and 320 operating standpipes.

A.6. The context of this study – The Maputo Water Supply Project (MWSP) – Component 3

The MWSP is a project implemented by the Mozambican government to improve the water supply of the Maputo-Matola agglomeration. The project is funded by European (European Union and European Investment Bank), French and Dutch cooperation. It has 3 components:

1. Increase the water production capacity (Umbezezi intake and treatment plant);
2. Reduce the Unaccounted for Water (UfW) and extend the distribution network;
3. Supply water to peri-urban areas unreached by the network.

More precisely, component 3 aims at:

- Serving areas outside of the current network and with no network expansion plans in the near future, through construction of new small-scale water supply systems
- The creation of an institutional framework for the participation of local private operators in the management of independent systems
- Improving efficiency in the management of standpipes connected to the AdeM system.

Facilities built during Component 1 & 2 (Umbezezi intake, treatment plant and distribution network) will be run by the international private concessionaire (Aguas de Mozambique).

Facilities built during Component 3 (small independent systems) will be run by local private businesses (POPs) under lease contracts. Hydroconseil is the consulting engineer for Component 3.

B. The Pequenos Operadores Privados (POPs) of Maputo

B.1. Who are the small providers?

The POPs operating in Maputo share four main features:

- Independent water source (no resale of the incumbent water), usually underground;
- Entirely private investment (no public money has been spent on the facilities);
- Strictly private entity (no community-based association);
- Informal business (no official licence to provide public service).

Beyond these common traits, “POP” is actually a generic term that covers an enormous variety of service providers:

- **Size and business strategy:** this ranges from the family borehole that sells part of the water to the neighbours through a standpipe located in the house compound, to the entrepreneur who is managing seven small systems located in various bairros of the city and in other small towns in the country;
- **Infrastructure:** ranges from the modest system with only one borehole and a submersible pump that feeds a water tower and then distributes water through gravity, to more sophisticated systems that produce water from several boreholes using gravity and booster pumps to ensure pressure in the network;
- **Water distribution strategy:** from the operator using only “spaghetti” connections for his domestic water sale, to the business man investing in a structured network that covers a service area and then selling domestic metered connections with the water meter located in the client premises.

These variations in size, level of investment and type of service are frequently correlated: a “small” POP will usually have a low investment and if it provides a domestic connection service, it will be through a “spaghetti” connexion; whereas an “entrepreneur” type POP will have substantial infrastructures and focus on the domestic connection service using a structured network.

However there are several “hybrid” systems that mix all the technologies (see box: *Faquene system in KM 15*): it corresponds to an adaptation to the field context and provides a good illustration of the evolution of the water distribution strategies used by the POPs over the years.

As will be described in the next paragraph, the POPs started operating 15 years ago and since then have carried on developing and improving their water distribution strategy, doing a remarkable job of meeting the demand of the peri-urban customers of Maputo.

“Spaghetti” connexion

Typical of the service provided by the POPs, it is a domestic connection made of a small diameter pipe (3/4” HDPE) that runs from the water tank to the house of the client. If it is metered, the meter is located at the beginning of the pipe. The client provides the connection material (i.e. tube, meter and fittings). The main advantage (for the provider) is that the client supports all the physical losses and is therefore highly motivated to check and protect “his” pipe.



B.2. How did it start? Growth of a new business

Faquene system – “Km 15”

Faquene is one of the oldest POP with a true entrepreneurial strategy. He now manages 7 systems located in several bairros of Maputo and Matola and covering over 2,000 clients. His latest investment has been in Km 15, a semi-rural bairro in Matola with low to medium density but likely to develop rapidly in the future.

Faquene’s strategy to distribute water is to use a primary network to feed connection boxes. From these connections boxes, lie water meters from which “spaghetti” connections goes to the client house. The length of the “spaghetti” can exceed 200 meters. This solution is perfectly adapted to the density with a low to medium density, a “spaghetti” connections strategy is inefficient (too costly for the client and too much head loss with great distances) and the investment cost for a structured network is too high for the operator.

What happens in Maputo is a rather unique phenomenon in Africa: 450 small-scale informal operators serve more than 350,000 people, most of them located in the peri-urban areas.

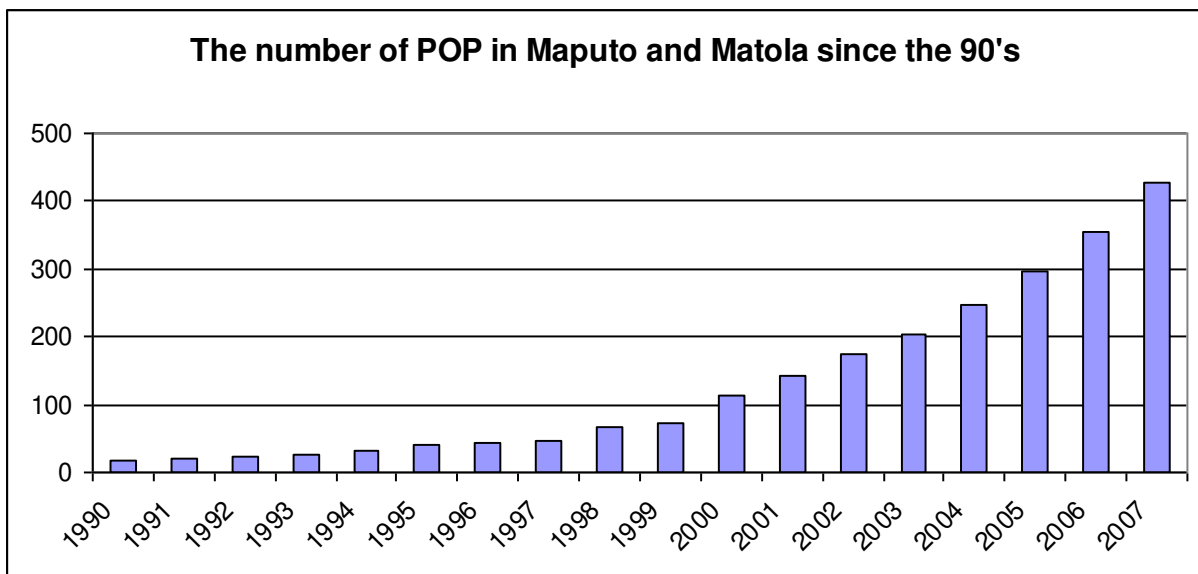
The Maputo case is unique for at least two reasons: the lack of government response to the very high population demand for better service and the existence of potential investors with minimum adequate technical skills.

Interviews with the oldest POPs show a great similarity in their history (*see box about Calmo Mwalane*): many of them were mine workers in South Africa who retired with a significant amount of cash money in order to come back to their home country Mozambique. They then acquired land in the expansion areas of Maputo and provided the basic facilities for their family, in this case water access through a borehole.

The initial investment (borehole and pump) was therefore not business oriented. However a borehole capacity covers much more than a family consumption. Taking into consideration the scarcity of the neighbour alternative and therefore the high water demand, the POP quickly identified a business opportunity (originally in order to support the cost of water production) that some of the most entrepreneurial and technically skilled ones managed to convert into a real business. This approach is quite typical of the POPs of Maputo and Matola.

B.3. Did you say small scale?

Before 1997, the POPs managed to stay under the radar. They became a phenomenon at the beginning of the years 2000, and have seen an extraordinary growth rate during the last four years (the number of POP has more than doubled between 2004 and 2007).

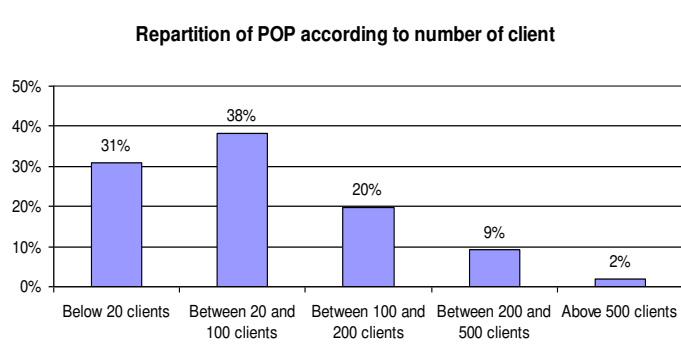


This impressive mushrooming is due to several factors:

- **Scale:** at the end of the 90's, the POP business morphed from a relatively marginal and hidden activity into a visible one, although it is still totally informal; the number of POPs is still increasing rapidly;
- **Business:** the successful POPs replicated their systems and real entrepreneurs entered into the market, the risk being acceptable (no expropriation, no government retaliation has been observed so far);
- **Recognition:** in 2004 the government initiated contacts with the POPs and they became part of the official speeches with positive connotations regarding their contribution to water supply (from 2007 onwards).

B.4. Informal and diverse: a typology of the POPs

Using the number of clients served by the POP as a typology criteria is pertinent because it enables to illustrate the various objectives of the POPs: the ones with a low number of connections are usually POP with no expansion objective (although it could be one that has recently entered the market) whereas the ones with a high number of connections are the entrepreneurs, and are also the ones who will most probably carry on investing in the sector if conditions prevail or improve.



As the graph shows, an important percentage of the POPs serve less than 100 connections (69%). Although no definitive conclusion can be drawn from this graph (a dynamic analysis of the POP population would enable to sort out from this initial ratio which are the ones in expansion and which POP have reached a ceiling and will not grow more) it still gives an indication that the majority of the POP are not likely to thinking of an expansion strategy.

The next pie chart corroborates this analysis by showing that the water market is concentrated in the hands of a few operators who have a true entrepreneurial approach to the water business: 2% of the POPs represent 19% of the market share, 11% represent 48% of the market share (above 200 connections) and 31% (above 100 connections) represent 78% of the market share.

Name: Calmo Mwalane Bairro: Laulane

Mwalane came to Maputo in the 90s during the war and bought a house in Laulane. He worked as a minor in South Africa and came back in 2000 with his retirement package. He invested part of his savings in a borehole and a pump in order to improve his living conditions (procuring water was taking his wife up to three hours per day). Because of the constant water demand of his neighbors, he developed a distribution system (when he was a mine worker he was in charge of the gallery drainage and had thus acquired some plumbing skills).

At the outstart he used "spaghetti" connections in order to reduce the risks. Later and as his business developed he put in place a structure network in order to reach more customers further away. He now manages 1,500 clients, produces water through 3 boreholes, has built a water tower 10 meters high and has a ground storage capacity of 160 m³. His distribution network is a mix of a structured network and "spaghetti" connections. Mwalane has constructed two others small systems in others bairros in Matola serving more than 500 clients.

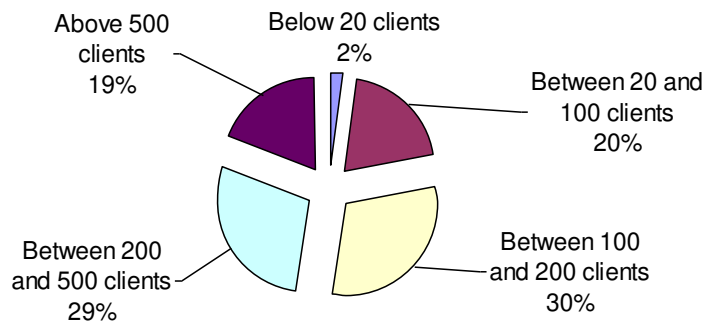
Name: José Alberto Gulele Bairro: Magoanine B

Magoanine B is a bairro in Maputo in the process of land tenure regularization and the dwellers are building sustainable houses (cement block).

Gulele invested in its borehole in 2005 and started selling water through a standpipe using a generator. He then invested in a water tower and a primary network of nearly 3 km. The total amount of investment estimated is near 350,000 MT without having any client.

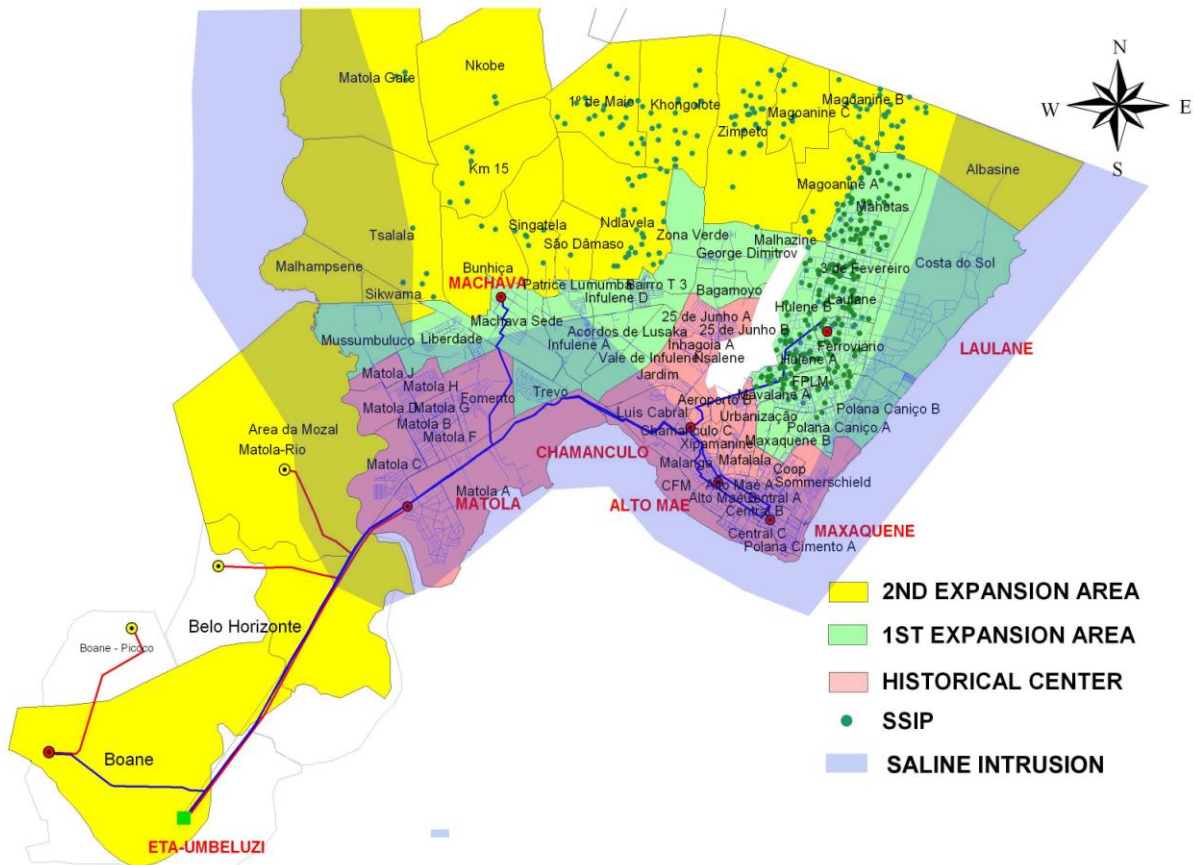
This operator is financially sound thanks to the two systems which cover more than 700 private connections and which thus provide him the necessary cash flow. The operator is confident because he has secured a commercial base which will naturally connect to his network and will start consuming water right from the construction of their house!

% of client served according to POP typology



B.5. A geography of the POPs market

In 2007, Hydroconseil conducted a systematic survey of all the POPs operating in Maputo and Matola. The result of this comprehensive mapping can be seen on the map below. Quite logically, the POPs followed the expansion of the two cities avoiding the areas where water resources are absent (saline intrusion). The map also shows that the POPs complement rather efficiently the conventional network coverage in the second expansion area. In the first expansion area there is a striking overlapping of POPs and official network in the Laulane area: this distribution centre is the last that was constructed and it was commissioned in 2007. Meanwhile it is the area that witnessed the surging of the first POPs during the 90's and beginning of 2000.



Maputo and Matola Bairros with the localisation of the POPs

B.6. Main features of the service provided by the small scale operators of Maputo

B.6.1. Robust, modular and cost-effective technical options

POP's utility are diverse, however they share a few similar technical characteristics listed below.

Water source. Almost all operators obtain their water from a single borehole (diameter 6" to 8"), fitted with classical submersible pumps. There is no protection area for the boreholes.

Water treatment. The water is not treated on a regular basis. However, the water quality is tested by the Ministry of Health and in case of bacteriological contamination the POP will be informed and explained how to clean the tank using chlorine. The Ministry of Health approach definitely has an educational objective. However, there has been no evaluation of the exact impact of this strategy in the field.

Reservoir. In most cases the full storage capacity is installed on elevated towers with plastic tanks which have a capacity ranging from 2 to 10 m³. The super structure can be either in armed concrete (with varying construction quality) or in metallic with recycled elements. A minority of facilities have ground storage, which may take the form of a classical buried armed concrete reservoir or may be composed of several tanks. The water towers range from 5 meters to 15 meters high. If the pressure is not sufficient to serve all the customers in the area, the operator may use a small electric booster pump.



Piped network. The material used is always HDPE of low pressure capacity and with a maximum diameter of 2" going down to ¾" for the house connections. The pipes are buried in public earth streets at a depth of 20 to 40 cm. In order to cross paved or tar roads, the POPs dig horizontally underneath the road using high pressured water. The networks are generally (60%) structured, meaning that there are main pipes fed by the water tower to which the private operator will connect users.

Private connection. These are made of a HDPE ¾" pipe that is fitted in the house compound to a galvanized pipe with a tap. In all the POP operating areas, one can find a "connection kit" in street shops. The meter can be located either in the client's compound, in a connection box (see picture), or in the operator's own compound.

Standpipes. The vast majority (80%) of the POPs have at least one standpipe located at the side of the water tower, there are sometimes additional standpipes on the network. In this case the structure is very simple: a 1½" galvanized pipe with usually two taps.

B.6.2. Level of service and water tariff

The POPs offer a full range of service: from standpipe to house connection. Water is available on average 18 hours per day with reasonable water pressure.

Their local implantation makes them all the more reactive to any client complaints even though there are not necessarily specifically identified procedures for making a claim and for responding to it.

The connection cost charged to a client consists of two elements: the fee charged by the operator and the material that the client must provide (pipe, water meter and fittings). The connection fee varies substantially among the POPs and is the real competition factor among them: there are promotional practices when a POP wants to enter the market or is reaching a new area; some POP will invest in a dense primary network in order to reduce the cost of the material supported by the client (all the potential clients being less than 30 meters from a main pipe). The average connection fee is 1,200 MT, i.e. 48 US\$ and the average cost of the material found in the area street shops (i.e. low quality or second hand) is also 1,200 MT. **The total connection cost which the client has to pay is thus 96 US\$.**



A connection kit for sale in a street shop

There is a certain consistency in terms of water tariff among the POPs. In case of metering, the operator will charge a flat rate per m³, the average is 25 MT, i.e. around **1 US\$/m³**. Some of the operators set a minimum consumption block, but these are a minority (10%). There is no renting of meters since the connection material belongs to the client (even if in the case of a spaghetti connection, the meter is actually located in the operator's compound).

It is interesting to compare the price charged by a POP for a connection to the official tariff of the incumbent operator. Aguas de Mocambique charges a connection fee of 2,300 MT including the material (i.e. 92 US\$) and the water tariff is 12 MT for the first consumption block of 10 m³ with a minimum consumption of 10 m³, the second consumption block is charged at 18 MT/m³. The average tariff is therefore 15 MT/m³ (0.6 US\$).

In a nutshell: in terms of connection cost, the POP competes extremely well with the formal water utility. Regarding the water tariff, POPs charge more than the formal operator; however the POP tariff scale is better adapted to poor consumers who can adapt their consumption to their budget. This stands in contrast to the commonly voiced idea that POPs are charging "an awful lot".

Another interesting comparison between the two types of operators is the coverage rate in terms of private connection against the population poverty quintiles: the performance of the POP or the incumbent operator are strictly equivalent, they both reach the two better-off quintiles only. This is a rather striking conclusion: without any public funds, the POPs manage to offer the same level of service as the main operator, which is heavily subsidized, and they do so for a price that is quite similar: same connection fee, and water tariff only 50% higher than Aguas de Mocambique, with the added advantage of not having a minimum consumption.

Operator	Connection cost	Average water tariff
Pequeno Operador Privado (POP)	98 US\$	1 US\$
Aguas de Mozambique	96 US\$	0,6 US\$

B.6.3. Informal, but truly entrepreneurial operators

In general, POPs have low financial capacities and limited access to bank loans (19% of them managed to formally borrow money from a commercial bank, although most of these loans were micro-credits) given the informal nature of their activity. In order to start their activity a POP will have to invest at least in a borehole, a pump and a water tower (which can be built progressively). This minimum investment is approximately 10,000 US\$ (half of it being the cost of borehole).



Two networks constructed by POPs overlapping: actually, this happens quite rarely considering the number of operators

The investment in the network is mostly based on the cash flow produced by the water sales and the connection fee: a POP will tend to invest in a primary pipe when he has secured a minimum number of customers so that this will provide the necessary cash for buying the pipe. This financial constraint is an enlightening key for understanding the technical choices of the POPs: the “spaghetti” connections enable the POP to produce cash with no further investment than the production and storage; the 2” maximum diameter is an optimisation of the minimum number of new clients needed in order to finance a new main pipe.

All in all, a POP invests between 13,000 US\$ and 20,000 US\$ in a small system depending on the size. The POPs commonly admit that their investment is reimbursed after 2 years of operation, which is a quick return on the investment but a reasonable one when considering the risk factor (their informal activity could be stopped at any time without compensation).

In terms of market organisation, there is no proper intra regulation between POPs. There is a general tendency to share the area between POPs but a field survey clearly showed that some operators are overlapping with others trying to attract the potential non-connected client or even trying to conquer the competitor’s commercial base if the latter is experiencing technical problems (for example related to the quality and quantity of water or the available pressure).

There is no minimum commercial base under which an operator cannot sustain its activity: POPs with only one standpipe or a dozen connections are operating and are numerous. This contributes to explain how the POPs of Maputo managed to occupy every single market niche in some areas. However, commercial/business objectives are different from one POP to the other: the ones with only one standpipe are aiming only for additional revenue whereas the ones which are operating several small systems totalising over than 1,000 clients have a clear business development objective.

B.6.4. The lobbying strategy of the POPs

There are two POP’s associations, both quite recently established: AMATI was created in 2004 and AFORAMO in 2006. These two associations represent approximately 50% of the POPs. Both of them received very limited support at the time of their creation. Being young they lack funds and experience; however they do try to play an active role in the Maputo water sector.

Their main focus as of now is to create a water distribution licence in order to ensure official recognition of the POPs activity. This is a

The creation of AMATI

The creation of the association AMATI was triggered during a workshop organised end of 2003 by the Ministry of Health which invited some of the POPs on an individual basis. During this workshop the POP realised that they were many and decided to organise themselves in an association. AMATI was officially registered in 2005.

clear indication of the POP's risk perception with respect to their activity and of their search for a minimal legal security that would allow them to sustain their activity. The two associations started discussions on this issue with the asset management institution (FIPAG) in 2007. This illustrates how the POPs entering formally into the urban water sector and are seeking to defend their interest as specific operators and as participants in its reform/improvement process.

B.7. Interaction with the institutions

B.7.1. History of the contacts between the POPs and the institutions

Surprisingly, the very first institution that initiated the contacts with the POPs in Maputo and Matola is the Ministry of Health through its various field inspections to check water quality on various water distribution points (the conventional network, hand pumps, schools, clinics and public wells).

The first POPs initially tried to obtain formal licenses by contacting the National Directorate for Water Affairs in the 90's but to no avail as there was no specific regulation for issuing such licences. The POPs were therefore sent back to their institutional vacuum.

The next official contacts started in 2004 in the context of a feasibility study financed by the French Development Agency, managed by FIPAG and carried out by Hydroconseil and Seureca: field surveys clearly highlighted the important role which the POPs play. These interactions gave AMATI which was the principal contact and coordinating media for the POP a considerable boost.

Discussions restarted with the implementation of component 3 of MWSP in 2007. Since then, the dialogue between the POPs and the public authorities has become regular and constructive.

B.7.2. The position of the urban water sector stakeholders

This short historical recap is very illustrative of how the various actors in the sector progressively took positions toward the development of the POPs. Although the National Water Policy clearly mentions the role played by informal operators, the "official" existence of the POPs dates back only to 2007 (*see the Prime Minister's speech box*). Naturally, POPs were known before that time but without a good understanding of their overall importance. The first consolidated information was released in 2005. However, no concrete action was taken due to the lack of a regulatory framework and resources for the institutions. The positions of the main stakeholders in 2008 have changed and these are now showing a more proactive approach.

Official position of the government: dates to March 2007 with an inaugural speech from the prime minister (*see box*) and was reinforced in May 2008 with a declaration from the Minister of Public Works and Housing on the necessity of licensing the POPs which are operating in Maputo and Matola.

The donors' position: the French Development Agency has been very proactive regarding the POPs. Integrated in the Maputo Water Supply Project, they convinced the other donors to finance this component of the project.

Since 2007, **FIPAG** has been the driving force in the water sector for tackling this issue seriously. FIPAG, in particular through its chairman, has been at the forefront of efforts to convince the regulator CRA of the importance of small-scale providers and has led negotiations with the incumbent operator AdeM in order to gradually integrate the POPs.

Aguas de Mocambique: the incumbent operator, after many changes of position, is now considering the POPs as potential partners in order to improve their quality of service at the local level.

The Prime Minister's speech

During the inauguration ceremony in March 2007 of the current investment plan for Maputo/Matola (Maputo Water Supply Project financed by the European Investment Bank, the European Union, the French Development Agency and the Dutch Cooperation) the Prime Minister, Luisa Diogo, in her inaugural speech recognized the existence of the POPs and the role they played and are playing in the water distribution in Maputo and Matola.

The municipalities are frequently in contact with the POPs and have in fact been collaborating with them since the beginning but at a local level. Their role has been varied, including mediating in conflict resolution between POPs and consumers and possibly providing some kind of community regulation (although there is no proven case this does seem logical given the central position of the local authority), and supporting POPs in covering areas which are not yet served by the water service (some POP were given municipal land so that they could drill a borehole and start a water distribution activity). Probably due to lack of means, no specific strategy or position has been developed so far. With FIPAG's assistance they are now tackling this issue.

In practice the **CRA** has limited resources and has always been cautious of the potential impact of integrating the POPs, given the additional workload that this would involve. For this reason the CRA is promoting "decentralized regulation" solutions for dealing with the POPs.

C. POPs, the (second?) best option for expanding water supply services in peri-urban areas?

C.1. What has supported the POPs' success in Maputo?

In 2000, Maputo was not so different from other African capital cities. As is the case in many of these cities, Maputo had poor service coverage by the main water company and large demand for improved services (Dar Es Salam, Nairobi, Bamako and Kinshasa suffer from similar inefficient water services).

Although there are some private operators in other African countries, Maputo is presently unique because of its large number of operators and the exponential business growth rate. Some objective reasons help to understand POPs success in Maputo:

- **A huge demand for water paired with poor service provision:** in the mid-nineties, water service was very poor in Maputo ; the water utility was not in the position to provide water in many districts and was not credible when promising future improvements ; as a result, customer demand (and willingness-to-pay) was huge;
- **A vivid private sector:** there exist in Maputo many small private investors, keen to invest in new economical activities; many workers in South African mines became potential investors after their retirement or retrenchment;
- **Abundant groundwater resources:** in Maputo drilling a borehole costs only 5,000 US\$ with a 90% probability for success (i.e. a borehole with enough water to install a submersible pump); this investment is considered by private investors as a reasonable risk;
- **An enabling institutional and legal environment (pro-customer, pro-poor):** in Mozambique the post-war period (the two mandates of president Chissano from 1994 to 2004) are commonly referred to as "deixa andar"¹ period; a term which illustrates the absence of real government ruling given that the first and foremost priority was to rebuild the country and not necessarily enforce

¹ Literal translation: « let go ».

administrative constraints. Moreover, this government supported all private initiatives which could potentially improve basic public services.

C.2. The POPs: best allies to reach the MDG?

Today the POPs serve 350,000 people, almost 54% of the incumbent operator's direct beneficiaries. If they were included in the official data, the official coverage would increase from 35% to 56%. These figures illustrate an important fact: the POPs are indispensable to reach the MDGs. FIPAG has clearly understood this opportunity.

How can the POP help expand service? Essentially, by filling the gap between the urban expansion and the investment rate of the government: their reactivity and their ability to integrate themselves in the developing urban areas make them adequate forefront operators. They will efficiently complement an incumbent operator that needs more time to implement structural investments (long term production infrastructures, water transportation infrastructures). From this perspective what seems necessary is to create an enabling environment for the POPs to operate by:

- Formalizing their activity: in order to lower the risk which is currently directly carried by the POPs and in this manner boost their investment capacity;
- Improving their financial capacities: by creating better conditions for accessing loans; formalisation of the activity should lower the risk perception by banks, and conditions can be even more improved through a government or donor support (they can guarantee the loans);
- Integrate the POPs in the master plans: provide clear orientation for future investment in order to avoid overlapping and conflicting situations.

C.3. How replicable is the Maputo case?

In Mozambique, FIPAG's long term objective is to replicate the POPs phenomenon in other cities. However, this should take account of variable factors as 1) the hydrogeological situation of Mozambican towns varies; 2) the institutional framework will differ depending on the level of involvement of the Municipality (it might not be FIPAG contracting the POPs but municipalities).

Outside Mozambique there are already some experiences showing that the integration of Independent Providers is becoming a possible "second best option" to improve service coverage, especially for the poor. Some lessons learned from Maputo situation are valid and of interest especially for other African countries:

- **Transparency:** when it comes to contracting private operators, transparency is a key success factor, i.e. to limit political interference; all contracts in Maputo are to be awarded after a very competitive process and due information of existing POPs;
- **Driving force:** any institutional reform needs a champion; FIPAG plays a key role in Maputo when it comes to scaling up and formalizing POP activity;
- **Water availability:** the Maputo private sector model relies on cheap groundwater resources ; such resources are not available everywhere (but they exist in many coastal cities);
- **External financial resources:** an innovative experience such as this one cannot be easily implemented by a public body; institutional constraints have to be addressed and "umbrella" bodies have to be convinced of the interest of the initiative. FIPAG gained support from external financiers (AFD and BEI) to fund large pilot systems, which made the case for such an approach.

D. FIPAG's support to POPs formalisation

D.1. The Maputo Water Supply Program

In the frame of the MWSP (see chapter A), FIPAG has the capacity to work on the POP-related issues. The project is a good starter for FIPAG. In addition, the institution has already embarked on a process for developing its long term strategy.

Licensing: one of the challenges when working with independent operators is to “bring them out of the woods”: in other words finding the right argument to convince them that becoming formal will bring more advantages than being informal. In the Maputo case, this specific challenge should be lower since the POPs are already demanding that they be formalized. It goes without saying that the actual field implementation remains a challenge, nevertheless the licensing of the activity is considered granted and POPs will be licensed in the near future.

Public Private Partnerships: through the MWSP, FIPAG is drafting two types of partnership:

- Lease contracts for new systems: FIPAG is investing in water distribution infrastructure in order to complete the geographic coverage of the current POPs in the peri-urban areas (2nd expansion area). These infrastructures will be leased to some POPs which will be selected through a public competitive process for the development and operation of these infrastructures (production, storage and main transmission pipes). The challenge is to create the right conditions for inciting the POPs to invest their own funds in order to develop the infrastructure.
- Pro-poor water service provision: for the existing POPs, FIPAG will help them increase their commercial base by subsidising the connection fee supported by the consumer through an OBA subsidy paid for each new consumer connected. The objective is to increase the coverage in the served areas, with a focus on poor households by reducing the connection fee.

Long term strategy: the project provides a very good base for further development in the medium/long term: 1) looking for sustainable partners in the expansion of water services; 2) developing national entrepreneurs who will in the future operate and manage the small towns in the whole country. The next 10 years will provide extremely rich material in order to adapt, improve and perfect the partnership between the POPs and the public authorities in general.

D.2. FIPAG strategy vis-a-vis the POPs

D.2.1. Licensing most POPs

None of the 350 existing POPs has a written contract with FIPAG or any other public body entitled to organize the water public service (CRA, ARA-Sul, Municipality, Ministry of Health...). In order to regulate their activity, it is advisable to grant them a minimal level of formalization. FIPAG decided that the minimal level, when dealing with an essential public service (such as drinking water), is a license, issued by a public body, guaranteeing that the owner of the licence provides good quality water.

Bringing together all stakeholders to define the licensing process proved to be a nightmare in Maputo. Every single public body wanted to pilot the process from its own perspective and by mid of 2008, not a single license had been issued. In order to boost the process, most stakeholders agreed that FIPAG take the lead in licensing the POPs. The manner in which the process develops will be informed by the experience gained so far.

To obtain this first licence, an operator must prove that the water he or she sells complies with the regulation of the Ministry of Health. Further steps could include compliance with additional rules (standards for connections, standards for boreholes, water tariffs...). But FIPAG insists the licence

process be progressive. It aims at including all existing POPs in the process, instead of relegating them in the informal sector. Introducing very selective rules at the early stage of the licensing process would hardly be efficient to formalize informal operators.

D.2.2. Investing public money in core facilities

Private investors have built hundreds of small water systems. It is useless to replicate exactly the same kind of facilities with public money (as private investors are most probably very efficient money users). FIPAG aims at investing in new systems, supporting a public service policy which promotes :

- Boreholes (in order to facilitate monitoring and sustainable management of water resources);
- A main network, designed in accordance with urban development planning;
- Pro-poor distribution arrangements (OBA subsidy – see below).

D.2.3. Leasing POPs to run public facilities

FIPAG is an asset-owning company. Its main goal is not direct customer management. It will contract local private businesses (POPs) to run the systems, with the same efficiency they have demonstrated in the management of so many small systems. The main contract features will be:

- A lease arrangement (the operator is due to invest in the distribution network and to connect its customers, in order to gain clients);
- A medium term time frame (5 to 10 years), to provide a minimum of security;
- Using customer tariffs as the competition criteria;
- An OBA subsidy which supports FIPAG's Pro-poor connection policy (connection fee is fixed at 40 US\$, much lower than the market price – see chapter B).

D.2.4. Making it easier for the poor to access the service

POPs are very capable and efficient in providing water to a majority of households in the northern bairros of Maputo and Matola (say 50% of households, including most of the three richest population quintiles). This is already an achievement, as these areas are not supposed to be very profitable (and as a matter of fact, the main water provider – Aguas de Mocambique – has never shown a high interest in serving these areas).

Nevertheless, there is a risk that the poorest households (the two poorest quintiles) cannot afford to pay for the connection fee and will be obliged to rely on standpipes or neighborhood reselling, a lower level of service. The average connection fee (including equipment) is 2,400 MT, i.e. 96 US\$, to be compared to a 300 \$ per capita annual GDP. Obviously, the connection fee is a major constraint for the poor households to access the service.

In order to make it easier for the poor to access house connections, Hydroconseil has developed for FIPAG an OBA-scheme, which aims at encouraging POPs to propose individual connections at a lower rate (1,000 MT, i.e. 40 US\$). The OBA subsidy will be paid directly to the provider, after house connections have been commissioned. This subsidy will not be limited to new systems. It aims at developing coverage for existing water systems, those where most of the unconnected households are also the poorest households.

D.3. Sustainably managing water resources

It is relatively easy and cheap to dig a productive borehole in Maputo & Matola. Because investing in a borehole is not very risky, hundred of individuals did it during the last ten years (probably more than 1,000 boreholes have been dug in Maputo and Matola, for domestic purpose, industry, farming...). All these boreholes draw water from the same aquifers and nobody has established whether they can

support such a high water abstraction yield. Excessive pumping could have a dramatic impact on groundwater resources through:

- Water table depletion below the depth of pumps and borehole screens;
- Sea water intrusion along the seaside and Rio Matola.

In order to reduce this risk, the Mozambican government supports two initiatives:

- ARA-Sul (the river basin authority in Southern Mozambique) has launched a large hydrogeological study, which will (a) to determine aquifer potential, (b) model the impact of the growing number of boreholes and (c) to develop an abstraction rights strategy²;
- FIPAG is studying the possibility of developing well fields, North of Maputo, in areas where the number of boreholes is still very limited.

D.4. Regulating POP business

D.4.1. Competition as a key component of a sound regulation

Regulating 450 small entrepreneurs (including informal businesses) is a huge challenge. Nevertheless, an efficient regulating tool is the market itself and FIPAG uses it whenever possible:

- The licensing process (see below) designed by Hydroconseil does not aim at eliminating most of the POPs, but rather at providing them with incentives to improve service quality and reliability;
- FIPAG will not introduce any local monopoly clause in licences and contracts (even for entrepreneurs with a lease contract); each POP has to attract its customers through competitive tariffs and good quality service; it is thus possible for various providers to supply water in the area³.

D.4.2. Controlling water quality

Competition between POPs is very efficient for tariff regulation, because customers can easily compare tariffs and change their provider for a cheaper one (as do *aguateros* customers in Paraguay). Nevertheless, competition is not so efficient as to regulate all characteristics of the public service. It cannot efficiently regulate water quality, as it is difficult for customers to determine water quality by themselves and to exert sound pressure on the provider. For this reason, an independent water quality control agency is still needed in Maputo and FIPAG supports the Ministry of Health's (MISAU) leading role in this area. All licensed POPs have to accept water quality tests provided by MISAU laboratory.

D.4.3. Supporting POP associations

As there are hundreds of POPs, it is not easy for FIPAG or CRA (the national water regulator) to liaise with every single operator. For this reason, public bodies are looking for representative associations, which can speak on behalf of the operators and organize some level of self-regulation. Two such associations exist in Maputo. FIPAG decided to collaborate with these bodies and to involve them in all phases, including for contracts, tariffs, service quality rules and the licensing process.

² Hydroconseil and WE-Consult. 2008. Sustainable management of the groundwater resources in the Maputo Metropolitan area. Inception Report to ARA-Sul (Maputo). Study funded by the French development Agency.

³ FIPAG keep running a high level of competition "in-the-market" (and not only "for-the-market" as it is the rule with concession contracts awarding). It should be noted that, although competition of this kind is not very common in the water sector, it exists in other regions (e.g. *aguateros* in Asuncion, Paraguay) and it is more common in the energy sector (e.g. in Somalia).

E. Upcoming challenges

Water service provision by POPs in Maputo has proven its efficiency in rapidly increasing service coverage, especially in low-income areas and in peri-urban districts. Nevertheless, such a large involvement of informal operators in the provision of a public service raises some specific issues.

E.1. Corruption and transparency

The majority of African entrepreneurs operate in the informal sector. There are various reasons for them to stay in such a situation. One of the main reasons is that any step to enter into the formal sector is costly. In order to be registered or licensed, private entrepreneurs have to pay fees and taxes. And that is just the tip of the iceberg. More harmful is the need to pay bribes in order to keep the license (truck drivers are very accustomed to this burden in Africa).

Formalizing POPs activity requires a lot of transparency, in particular during the licensing procedure and during the bidding process. Without transparency some competitors will gain access to public subsidies and capture market shares which they would never have obtained through fair competition.

Introducing public money (subsidies) in Maputo's very competitive water market opens the door for corruption. It will therefore need to go hand in hand with very transparent rules and procedures. Professional associations can help address this issue, providing they mobilize a significant percentage of all POPs.

E.2. How to inject public money in an informal business?

Creating Private Public Partnership with informal companies is not an easy task. The use and disbursement of public money is done through a series of strict procedures that are badly adapted to the reality of the POP. Most of them do not have written and certified accountability and will use their personal bank account for any transaction.

However, it is necessary and recommendable to put in place subsidy mechanisms with the POPs. These mechanisms must be adequately targeted and should aim at encouraging POPs to: serve poor households; cover isolated areas; improve the technical specifications of construction to increase the lifespan of the network installed in public domain.

It is therefore necessary to create such financial tools, adapted to this type of operators, their financial and accounting skills, their capacity for self-financing... The OBA subsidy for new private connections which has been set up by FIPAG is a good example. It fulfills two public service objectives:

- Encourage operators to respect the construction specifications established by FIPAG;
- Improve access to services by poor households (by reducing connection cost)

More financial tools will be needed to promote other public service objectives such as the equality of service access in all town districts and the construction of networks that respect urban planning.



E.3. Preserving informal business efficiency

What makes the informal sector so efficient is mainly its... informality. Because these operators are free from any administrative supervision, they can actually concentrate on the provision of service and be very close to the consumer's demand. It is because they do not have a regulatory framework (like employment policies, payment of taxes, coordination with administration, respect of plans) and other technical specifications, that they are more efficient, reactive and profitable.

Once we bring these operators into the formal sector, they will lose part of their efficiency and performance because of these new rules. Even though this may be unavoidable (it is highly improbable that a public administration can manage to establish partnerships which involve public money with an entirely informal entity), the fact that these operators are brought "out of the woods" brings both advantages and the drawbacks and both need to be carefully analysed before embarking on the formalization process. Formalization as such is not an objective. It is simply a means for reaching the main objective: i.e. improving the public service and increasing the coverage.

The importance of such processes is on one side to convince the informal operators to "get out of the woods" and on the other side to adapt the formal framework so that the operators will not be stunned by too many regulations that would put in peril their business and the services they are providing.

E.4. How to regulate hundreds of small businesses?

The Mozambican water sector regulator (CRA) has been established to monitor and regulate the activity of a few formal operators (such as Aguas de Mocambique and Vitens). It has expressed concerns about the burden of POP regulation. How to regulate the activity of hundreds of small businesses, most of which operate in the informal sector, without any written contract and with very little written information regarding their operations and accounting?

Obviously, POP regulation requires different rules and tools than AdeM regulation. CRA wants to implement a simplified regulation framework that would tackle the diversity of the POPs (simplified tariffs, simplified quality services specifications). For field implementation, it estimates that municipalities could play an active role, as they have representatives in all districts (*chefes de Bairro*), who are near customers and service providers. Regulation shall therefore be done through the municipalities that will implement CRA's directives.