DRINKING WATER SUPPLY
AND SANITATION IN URBAN OUTSKIRT DISTRICTS AND RURAL AREAS
WATER IS LIFE. SANITATION IS DIGNITY!

BASIC FACTS

Funding:
- Belgium
- European Commission
- DFID
- Agence Française pour le Développement AFD (French Development Agency)

Delegated Project Manager:
- BTC

Prime contractor:
- ADIR Action pour le Développement des Infrastructures en milieu Rural (Action for the Development of Facilities in Rural areas) in Kinshasa and in Bas-Congo
- FDMI (Fondation Miba) at Mbuji Mayi
- Local NGOs in Maniema and South-Kivu

Institutional partnership: CNAEA Comité National d’Action de l’Eau et d’Assainissement (National Committee of Action for Water and Sanitation) – Interdepartmental Coordination body on water and sanitation

Duration: 2007–2012

Budget: 28,400,000 €
- Belgium contribution: 9,222,009 €
- EC contribution: 6,000,000 €
- DFID contribution: 5,177,991 €
- AFD contribution: 8,000,000 €
CONTEXT

In DRC, only one inhabitant out of five have access to drinking water. There are many reasons to that: poor financial means of that sector, disrepair of the existing facilities, bad management of the networks, uncontrolled demographic explosion of the cities and their outskirts. The REGIDESO, public structure managing the drinking water network in urban areas, is unable to follow that uncontrolled growth. The zone is too broad to serve while financial resources small. In rural areas, the SNHR, Service National d’Hydraulique Rurale, (Rural Hydraulic National Service) doesn’t have the necessary means to fulfill its mission.

In peri-urban districts and in rural areas, distance from water points is also a problem regarding the supply to population that doesn’t have access to a network or to an individual water point. In some areas, women and children must walk more than 4 kilometers to fetch the necessary water for the family. Lastly, the price of the water is much higher in the outskirts than in urban areas, because of the many intermediaries in the distribution chain, and because of water scarcity.

All of this has a negative impact not only on the health of the population because of the increase of the prevalence of waterborne diseases but also on the schooling of the children due to the weight of the water chore.

AIMS

The aim of the project is to place alternative sustainable supply of drinking water for the population of peri urban districts, secondary centers and densely populated rural areas un-served by REGIDESO. By giving them sustainable access to drinking water, the project gives its contribution to the development of their well-being. Indeed, the availability of this water allows, firstly, significant reduction of waterborne diseases and, secondly, help to improve sanitation and hygiene conditions. Women and children are the primary beneficiaries for access to water points ; the first ones having then more time for other activities and the second one having more chances to be educated.

As from the start, the project has taken in to involve the local populations in the process of implementation and execution of the networks. The users organized in ASUREP associations are solely responsible for the management of the existing networks. This appropriation goes through different mechanisms such as being in charge of the financial cost of the water service, self management by community based structures democratically elected, and their true implication in the whole process of the installation of the network. Supporting a professional management of mini networks, the project ensures not only of the appropriation of the action but also of self responsibility and the structuring of the users.
Depending on the environment, the mini network draws water from (deep drilling) groundwater pumping or by gravity (sources uptake).

A mini network is also composed of:
- a pipe which discharges water from the source uptake/drilling to a water tank,
- a storage tank located high, whose volume depends on the number of users to supply in water (between 30 and 300 m³),
- a distribution network (pipeline 5 to 25 kilometers long),
- standpipes spread throughout the neighborhood so as the population has less than 250 meters to walk to fetch water,
- on motorized networks, machine shelter for the generator that powers the pump drill (the intervention areas are often not covered by the SNEL electrical network),
- the ASUREP operating management unit office,
- a small warehouse that stores spare-parts and current tools.

Each network is dimensioned according to main 3 criteria:
- geographical distribution of the standpipes,
- the population of today and its development with a 10 to 20 years horizon,
- daily staffing of 20 liters per person.

**INTERVENTION AREAS**

- Bas-Congo (Kwilu-Ngongo, Madimba and Sona Bata)
- Kinshasa (Districts of Kimbasa, N’Sele, Ksenso and Maluku)
- Oriental Kasaï / Mbuji Mayi (Districts of Dibindi, Bipemba and Kanshi)
- Maniema / Kindu (Districts of Mikelenge, Kasuku and Alunguili, City of Kiallo)
- Sud-Kivu (North Idjwi, Kabare and Walungu Territories)
COMMUNITY MANAGEMENT

Each mini-network is managed by an ASUREP, Association d’Usagers de Réseau d’Eau Potable, (Association of Drinking Water Network Users), democratically elected by the inhabitants of the covered district(s). The Program has overlaid network areas with the administrative division of the district. To integrate with existing legislations, the ASUREPs have an ASBL status. This allows them to sell water services and to reinvest dividends to the neighborhood.

Each ASUREP is structured as follows:
- a General Assembly, whose delegates were elected by local residents,
- a Board of Directors elected by the General Assembly,
- a Management Unit, composed of ASUREP employees (technician, accountant, waterman,...), responsible for the daily management of the network. It’s employees are selected and hired on the basis of a call for applications in the neighborhood, with specific criteria for the posts.

Besides integrity and the required technical qualities, living in the district is one of the main criteria to be part of one of those three bodies.

Through these, the role of ASUREP is:
- to participate in the studies and work,
- negotiate provision of plots on which would be constructed various structures that make up the network (drilling, water tank, standpipes...),
- ensure cost recovery of water services, maintain facilities.

BTC and their partners, sensitize the population, implement and train the ASUREP team. Once the network is launched, they follow them in their daily work.

LONG TERM VIABILITY

In most cases, and so to adapt to the lifestyle of the population, payment of the water service is at the water intake and depends on the volume. For example, on the Kinshasa network, the current price charged is 1.5 Congolese Francs per liter. A person who picks up 20 liters then pays 30 Congolese Francs.

This cost includes:
- the cost of the staff,
- the fixed costs of depreciation,
- the fixed costs of operation and maintenance,
- operating expenses of the office.

And also
- network performance influenced by loses (leaks, spills, waste ...),
- social cost (daily staffing for indigents).

With this type of management, a 20,000 people serving network in Kinshasa allows ASUREP to have an average monthly turnover of 8,000 USD. This not only allows it to cover all the expenses, but also to have at the end of each year, a substantial reserve it can reinvest in activities for the benefit of the district.

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1 | Exchange rate of March 2010: 1 USD = +/- 910 Congolese Francs.
WATER IS LIFE. SANITATION IS DIGNITY!

THE PROGRAM IN FACTS

- Population of 62 million inhabitants DRC.
- Population with access to drinking water: 13 million inhabitants.
- The program will install 60 mini-networks each including several standpipes.
- The standpipes installed by the Program have 1 to 4 taps.
- Each tap serves 250 people.
- Each network serves 5,000 to 35,000 people.
- At the end, the Program will have served the water needs of 1.3 million people.
- It provides sustainable employment for 1,600 people.
- The cost per capita of the Program is 22 € per served person.
- Infrastructure is depreciated after 30 years. Electro-mechanical equipment (pump, generator) are depreciated in 4-5 years.
- On all networks, the cost of producing one liter of water is consistently below 1 Congolese Franc.
- By selling the water service between 1 and 1.5 Congolese francs per liter (depending on exhaust system), the networks are thus a long term profit and sustainable.
**WATER RESOURCES**

The DRC is crossed by the second largest river in the world, the Congo river, because of its speed (average flow: 40,000 m³/sec). Astride the Equator, the country is well watered, with an average rainfall at 1,500 mm per year. Just to compare, 900 mm falls per year in Brussels. The heavy rainfalls permanently recharges the groundwater supplies. Surface water (river, pond, lake, ...) is easier to capture, but requires heavy systematic drinking water treatment and therefore is expensive.

The project has decided to draw water from the groundwater supply networks through catchment source or deep drilling, allowing no necessary further processing. Before launching the system, however, the project ensures of the physic-chemical and especially bacteriological quality of the water to be distributed.

**SOURCE CAPTURE**

A source is an emergence of the groundwater supply. The technique used is to capture as many of its streams, and bring them together in a departure point. Depending on the topology of the land, this water feeds the network by gravity or by pumping the distribution network. To keep good water quality and source flow, a protection perimeter is installed around the capture area (re-vegetation...).

**DEEP DRILLING**

The drilling technique allows to fetch drinking water directly into the groundwater supplies, sometimes more than 100 meters deep. An electrical pump is submerged and discharges the water into a water tank, which in turn distributes the water by gravity across the network.

By capturing water ready to be drunk, these two systems can do without treatment techniques simplifying their operations and thus minimizing the operating costs of the network.
HYGIENE AND SANITATION

The program’s objective is to increase the availability of drinking water by setting up new networks managed by beneficiary communities, but also to improve the hygiene conditions of people through sanitation community facilities in schools and health centers. Hygiene and sanitation are therefore transversal activities on the program.

It has been proven that it is the combination of four factors that can reduce the incidence of diarrheal diseases:

- the increase of the amount of water available,
- the improvement of the water quality,
- the provision of sanitation facilities,
- improved hygiene.

Combining them, the program will maximize its impact in the areas worked on.

The four major sanitation facilities built by the program are:

- latrines / showers,
- incinerators for medical waste,
- placenta pits for bio-medical waste,
- rainwater collectors.

Collecting rainwater has many advantages:

- protect the building from scouring,
- avoid standing water that are mosquito nests,
- reduce the risk of erosion,
- store water to be used for washing floors, laundry, showers...2

Between each rain, a layer of dust covers the roof. It is therefore important to have quality stored water, provide a bypass of the first rainwater which are not directed to the tank.

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2 | Only 20% of the water we consume daily should be potable. The remaining 80% should simply be clean.
WATER NETWORK IN THE OUTSKIRT DISTRICTS OF KINSHASA

The water project in Kinshasa has programmed the installation of 33 mini drinking water networks in four municipalities (Kimbanseke, Kisenso, N’Sele and Maluku), covering 750,000 people with no access to the REGIDESO network and who draws their water from springs and rivers.

NEIGHBORHOOD OF MANGANA AND MABINDA / DISTRICT OF KIMBANSEKE

Kimbanseke is the most populated and high density district of the country (1.2 million inhabitants). The Mangana Mabinda mini-network (2 of the 46 neighborhoods of the district) currently serves 23,700 people.

The mini-network pumps water from a deep drilling and provides a flow of 36 m³/h. It also has a water tower, whose ground floor was transformed into office space for the operating of the ASUREP Unit Management. The water distribution is done through a pipeline network 4,200 meters long and 20 - 4 taps standpipes. The network is managed by the ASBL ASUREP Mangana-Mabinda: the General Assembly has 32 delegates, its Board of Directors six members and the Management Unit 29 permanent employees... with an increase responsibility of women in the management.

During the first year of operation, the ASUREP made with the sale of water services, a turnover of over 78,000 USD. With these good results they have bought a generator and an emergency power engine for the pump drilling. They also bought the land on which the facilities were constructed. And still paying the costs of maintaining and operating fees of the network (staff salary, group maintenance, purchase of fuel, ...). During the same period, the daily water allocated per person increased from 4 liters (before launching the network) to over 10 liters. Which demonstrates the affordability of the water service.

EVOLUTION OF THE WATER SERVICE SALES REVENUE FOR THE YEAR 2009

NGINA NEIGHBOURHOOD – MPASA

BUSINESS TURNOVER (IN $)

NEIGHBORHOOD OF NGINA AND MPASA – DISTRICT OF N’SELE

N’Sele is an urban and rural district much more recent than Kimbanseke, and where housing is more dispersed. When conceptualizing the network, the project had to take into account a population growth higher than Kimbanseke. He growth is such that after a full year of the network operating, people and neighborhoods Ngina Mpasa increased from 17,000 to 21,000 inhabitants.

The chart below shows the normal evolution regarding the sale of water from a network in its first year of service. From January to May, the quantities sold have increased significantly as the population discovers and appreciates this new service. Gradually the population turns away from surface water and preferring buying the water from the standpipes.

The declining demand in May is due to the heavy rains that restricts movements, and allow them to collect rain water for household needs (dishes, laundry, ...). From June to October, the request for water is constant because of the dry season. From October to December, the production remained high even though this was a heavy rain period. This shows that the inhabitants of these neighborhoods have developed a pattern of consuming water from the network, and became used to the relative comfort of having clean water close to home.

3) 1/10th of the total population of Kinshasa estimated at 8,000,000 inhabitants.
WATER IS LIFE. SANITATION IS DIGNITY!

The village of Bakwanga had 30,000 inhabitants. Following the diamond rush, it expanded to become the city of Mbuji-Mayi, who is now the second largest city in terms of population with nearly 3 million inhabitants. It is unfortunately very poorly served with water as both formal networks (REGIDESO and MIBA) supply together less than 300,000 people. The city having very few water sources, people who don’t have access to these networks have to travel very long distances to rivers. Likewise in all large cities of developing countries, the population living in the outskirts districts pay the water service more than those who are in town. In Mbuji-Mayi, the rate is +/- 1 to 8.

Likewise to what is done in Kinshasa, the project is implemented in areas not served by formal networks. It has targeted 23 neighborhood in the districts of Kanshi, Bipemba and Dibindi. Upon completion, the 11 installed networks will cover 310,000 people.

Each network gets its water from a deep drilling depth ranging from 55 to 200 meters with an average flow of 35 m³/h. From a water tower, water is distributed through a network of pipes and 4 taps standpipes. The average length of a network is about 10 kilometers. Despite the relatively high price of fuel (between 2.5 and 3 USD per liter), the liter of water is sold at the standpipes at 1.5 Congolese Francs. This allows to cover all the expenses of depreciation, operation and maintenance of the network, and even generates an additional margin that allows ASUREP to conduct activities within the district.

The 11 networks has enabled the creation of 420 permanent and 3,500 temporary jobs. The modus operandi of the project and the organization of the ASUREP is identical to that of Kinshasa.

WATER NETWORKS IN THE OUTSKIRT DISTRICTS OF MBUJI - MAYI

Upon independence, the village of Bakwanga had 30,000 inhabitants. Following the diamond rush, it expanded to nearby villages to become the city of Mbuji-Mayi, who is now the second largest city in terms of population with nearly 3 million inhabitants. It is unfortunately very poorly served with water as both formal networks (REGIDESO and MIBA) supply together less than 300,000 people. The city having very few water sources, people who don’t have access to these networks have to travel very long distances to rivers. Likewise in all large cities of developing countries, the population living in the outskirts districts pay the water service more than those who are in town. In Mbuji-Mayi, the rate is +/- 1 to 8.

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WATER NETWORKS IN SOUTH KIVU

South Kivu being a mountainous region and the sources high above the villages to serve, gravity is being used to water the networks. The systems is very simple. The technique used is to capture as many of the streams and bring them together in a departure point. You can then direct them to a tank that will water directly the network. The cost of the water service is thus very much reduced. When the difference of height between the source and standpipe areas is too great, breakers are designed to reduce the water pressure.

Four small networks have been made on the island of Idjwi in the middle of Lake Kivu. Six other networks, more important are constructed in the Kabare and Walungu Territories. 102,000 people has been supplied by these 10 networks.

4 | The industrial diamond mining company of Bakwanga (MIBA) has been in the region since 1930.
AUTONOMOUS WATER NETWORKS IN MANIEMA

The project is mainly located in Kindu, the capital of the Maniema province, as well as in the city of Kailo (70 km from Kindu). Kindu, 200,000 inhabitants, is crossed by the River Congo. Part of the left bank of the city is served by REGIDESO. The project is a supply complement serving the neighborhoods of Tokolote-Brazza-Lumbulu, Basoko and RVA. The first network uses the source capture method, pumping to a water tower and distribution to standpipes serving 38,000 people. The Basoko network is the only gravity network and allows to water 9,000 people. RVA will be powered both by a rehabilitated deep drilling system and REGIDESO.

On the right bank, the district of Alunguli (66,000 people) will also be served through a collection of source capture and pumping to a water tower. The City of Kailo (17,000 residents) will have a similar system. On a whole, in the Province of Maniema, the project will thus feed 152,000 people.

WATER NETWORKS IN BAS-CONGO

All the projects done in Bas-Congo have the great advantage of being served by the SNEL. The 7 networks are made on the same pattern as those of Kinshasa-Mubji-Mayi but without generator. This reduces the cost of water production, and therefore enhances the sustainability of the networks. The regions concerned are:

- Lemba and Patu located in the territory of Lower River (south of the province),
- the city of Tumba (90,000 inhabitants) midway between Kinshasa and Matadi, which will benefit from three independent networks,
- the Cities of Sona Bata and Madimba north of Bas-Congo (+/- 10,000 people each).

The total population served by these 7 networks is 145,000 inhabitants.