

SUEZ ENVIRONNEMENT Initiatives – Institut de France Awards

Distinction in the class **Access to essential services**
2011-2012 Edition

"Support for semi-collective sanitation in the underprivileged neighbourhoods of 9 cities in French-speaking Africa"

Structure

Enda Europe is a member-association of the Enda Tiers Monde (ENvironmental Development Action) international network, which was founded in 1977. It is a French non-profit organisation, which is involved in the fight against poverty in third world countries; it works in support of Enda Rup, which ensures implementation in the field.

Context

Urbanisation is on the increase in Africa, but infrastructures are failing to keep up. Therefore, spontaneous settlements are springing up on the outskirts of urban areas or sometimes even in city centres. These settlements, which are characterised by high levels of population density, have poor basic services, if any at all.

The inhabitants are constructing latrines to dispose waste water (shower, WC, etc.). However, these latrines must be emptied regularly, which is both complicated (the restricted width of the alleys means that vehicles are unable to circulate) and costly. Furthermore, the lack of space means that each household is not able to dig a latrine in their home or yard, which entails significant risks in relation to contamination of the groundwater table. Therefore, individual sanitation is not in place. Western-style collective sanitation (sewerage system with a modern purification plant) is out of the price range and it is not viable under the local conditions in place.

Aims of the project

1. **To improve** access to sanitation in the cities involved in the project: Rufisque, Bignona, Dagana, Saint-Louis, Dakar (Senegal), Ouagadougou (Burkina Faso), Bertoua, Edéa, Douala (Cameroon).
2. **To increase public awareness** of the ways in which illnesses are spread relating to water, a lack of hygiene, insufficient sanitation and suitable prophylactic barriers.
3. **To promote** an integrated water resources management (IWRM) system.

Description of the project

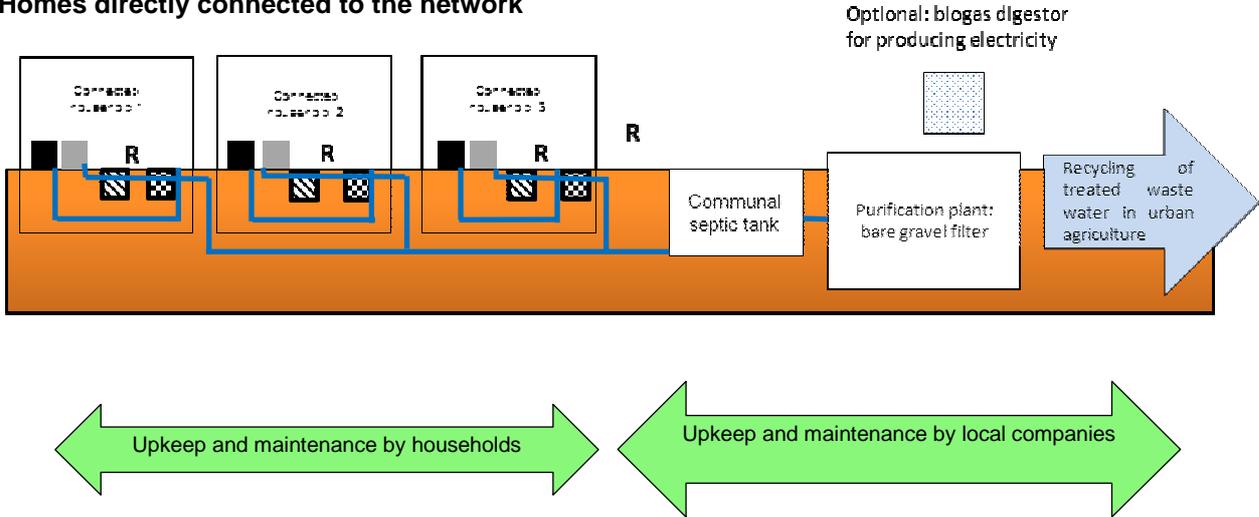
1. **The construction** of showers/WCs and a sink for dishwashing in homes.
2. For homes that are too small, **the construction** of public waste sinks.
3. **The connection** of settling tanks and grease skimming tanks to filter out solid matter and grease.
4. **The disposal** of waste water using small diameter hoses (mini-sewers) connected to septic tanks that are shared by several homes.
5. Final **filtering** of waste water in purification plants operating in a fully-natural manner by means of constructed wetlands (water lettuce) or gravel filtration.
6. **The re-use** of treated waste water for local agriculture, for watering public green spaces or its release into the environment, with zero negative impact, and for the production of biogas.

The semi-collective network organises a linking of households in the unsanitary neighbourhoods making it possible to dispose of waste water (WCs/showers, dishwashing, laundry, etc.) using buried small diameter PVC hoses. Waste water is stored in a communal septic tank (shared between several households) and then, following collection, it is processed in a purification plant, prior to release into the environment or recycling.

Description of the innovation

The innovation is linked to the promoted technology (semi-collective sanitation network), the method of financing (*revolving fund* making it possible to reinvest the funds in new neighbourhoods, thereby creating a strong level of solidarity between the inhabitants of marginalised neighbourhoods), and to the practical application of the principles of the IWRM through the re-use of the purified water in urban agriculture.

Homes directly connected to the network



Key	
■	WC/shower
■	Waste sink for dishwashing and laundry water
▨	Grease skimming tank (2 grease tanks)
▣	Settling tank
R	Manholes
—	Small diameter PVC hoses

As part of their connection, homes connected to the network have 1 WC/shower and 1 waste sink for dishwashing and laundry water.

After the washing area, the water from the waste sinks passes through the grease skimming tank, which has two tanks, then the private settling tank and then it enters the network, passing through a junction manhole on the central network line.

The water from the WC/shower does not pass through the grease skimming tank, it goes directly to the settling tank, where it is mixed with the dishwashing and laundry water, before entering the network.

Results

- Access to sanitation for 8,750 people: 4,270 people connected to the network, consisting of 420 households (2,940 people), 7 mosques (560 people) and 2 schools (1,050 people) + 4,480 people with access to 16 public waste sinks
- 429 individual operational structures, 152 of which have been rehabilitated, whilst 277 have been newly constructed

- 16 public waste sinks
- 80 squat toilets
- 25 communal septic tanks
- 16 networks
- 16 purification plants, 1 of which has a biogas digester and solar-powered pump, 1 of which has a submerged discharge pump and 1 of which has 2 storage tanks for treated waste water.
- Water that is free from fecal germs upon leaving the purification plants, for use in urban agriculture or by small builders and private individuals for the preparation of cement; the generation of biogas for public lighting in Saint-Louis and Rufisque.
- 31,885 people have attended education sessions on hygiene (hand washing, etc.).
- 145 elected persons and local technicians, together with national bodies, have been trained in Integrated Water Resources Management and the operation of a semi-collective sanitation network.
- 13 local companies have been trained in responding to invitations to tender, reading technical plans and carrying out and monitoring work for the construction of a semi-collective sanitation network.
- Households that are connected to the residential network are in the process of repaying the microcredit of around 200 euros and they are contributing to the maintenance costs. Households using the public waste sinks are paying a symbolic sum to the managers of the public waste sinks, who themselves come from these marginalised neighbourhoods.

Reproducibility

The costs are modest, 100% of the materials used are available on location and the plans can be adapted for use by local entrepreneurs in Senegal, Burkina Faso and Cameroon. The purification plants operate without electricity and are even capable of producing electricity. The network does not require a great deal of space. The level of technical knowledge required is reasonable.

Conditions relating to replicability

The following conditions are particularly well-suited to widespread use of the invention:

- Urban and suburban settings and small towns.
- Poor households that already have access to drinking water.

The selection of the area in which to use the equipment should be carried out in accordance with the grading of various criteria (listed below).

- **Housing density:** as housing density increases, the disposal of waste water becomes more relevant. An increase in housing density leads to an increase in waste, with the resulting growth in the requirement of sanitation facilities.
- **Sloping land:** in order to avoid the excessive loads inherent in the maintenance and operation of a small diameter semi-collective sanitation network, gravity-assisted waste water disposal must be favoured. Areas in which the networks may be used without any need for a lift station are preferable.
- **The permeability of the soil:** in soil that is too hard for digging, it is difficult to achieve the usual dimensions of the waste storage pits in the connected households. Under such conditions, the filtration pits do not function properly. However, an excessively-high level of porosity may lead to ground water pollution, in the event that the structures are not water-tight, such as when using filtration pits. There is greater justification for a network for the disposal of waste water in areas in which the permeability and malleability of the soil require the use of relatively-deep individual pits.

- **The availability of land:** the rating increases in accordance with the availability of land that can be used for waste water purification plants. This available land is also an advantage for re-using purified waste water, in particular in agriculture in the vicinity of the purification plants.
- **The lack of individual sanitation facilities:** the highest rating is awarded to areas with the fewest structures for the collection and disposal of waste water and excreta.
- **The lack of public sanitation facilities:** the lack of individual structures is one aspect that favours the selection of areas that would benefit from a semi-collection network for the disposal of waste water.
- **The presence of an outlet:** the presence of an outlet is an essential condition for the use of a semi-collective network. Following purification, waste water is re-used and/or released using a nearby natural or artificial outlet. The rating granted will be high for areas with a permanent, accessible outlet.
- **A drinking water supply:** an increase in the availability of water generally leads to an increase in the quantities of water used and released. There would be little sense in constructing a sanitation network in an area that does not have a supply of drinking water. Therefore, areas with such supplies will have preference.
- **Unplanned housing:** the creation of a large diameter sewer network is not suitable for areas in which housing is unplanned. The semi-collective small diameter network provides greater flexibility in relation to the available space through which hoses may pass. Therefore, when it comes to selecting the areas, a higher rating is given to neighbourhoods in which the housing layout is less structured and in which only a small diameter network could be used.
- **The stability of the level of land occupation:** inhabitants' commitment to the project will be greater if their occupation of the land is secure. In areas in which there are plans for the people living there to be moved as part of public operations for the regulation and restructuring of land occupation, long-term investments are less relevant and such areas will therefore be at the bottom of the pile when it comes to the selection of areas for intervention.
- **The type of housing:** the better the housing, the greater the desire of the inhabitants for decent sanitation and the more committed they will be to the project. The rating will increase or decrease as the housing improves or becomes more at risk.
- **The willingness of the municipal authorities:** the willingness shown by the municipal authorities shows their level of motivation with regard to the project and their subsequent support.
- **Interest for the National Departments of Sanitation:** the project must fit in well with the general sanitation plan. Therefore, proposals put forward by national technicians will be taken into consideration during any analysis on the selection of areas for intervention.

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