FONDS SUEZ ENVIRONNEMENT Initiatives – Institut de France Awards

Winner of the category **"Access to essential services"**

2013 - 2014 Edition

"Biogas plant in Durame Prison"

Structure

Comunità Volontari per il Mondo – CVM is a NGO of Christian inspiration founded in 1977. Since more than 30 years, CVM promotes development projects in the Southern countries and sensitization campaigns in Italy to raise the public awareness on issues related to the imbalance between countries. CVM is currently operating in Ethiopia and Tanzania.

Context

The main health problems in Ethiopia are related to the spread of diseases linked to the poor conditions of sanitation and the difficult supply of potable water.
The Durame prison, in South Ehiopia, Kambata Zone, hosts 550 prisoners on average throughout the year.
The major problems inside the prison, before the implantation of the project, were:

- The waste from latrine was collected in an artificial pond, often overflowing, engendering high sanitation problems involving the surrounding community.
- The drainage line inside the prison was open creating important sanitary issues.
- There was no sufficient water inside the prison for improving hygiene and sanitation.
- The wood needed for cooking was too expensive, reducing the budget for food of the prisoners.
- Fuel wood derived from natural forests, plantations, woodlots and trees around the prison impacted the deforestation.
- There was a high turnover of the women working in the kitchen due to the smoke from fire wood.

CVM had already realized a biogas plant in the prison of Laska (Ethiopia) in 2010.
The good results of that pilot experiment brought local authorities to ask CVM for more interventions.

Aims

General aim

To improve the living condition of the prisoners in the Durame prison and the surrounding community.

Specific aims

- To provide a sustainable **renewable source of energy** for the prison
- To improve the **sanitation condition** of the prisoners and the surrounding community
- To overcome the **environmental pollution** caused by improper disposal of waste from the latrines inside the prison

Description of the project

- **Construction of a biogas system**. The biogas technology is a particularly useful system in a rural economy, and can provide several uses :
  - As a fuel supplying energy for cooking
  - As a waste disposal system preventing environmental contamination and spread of pathogens
  - As an organic fertilizer, as it is in the form of ammonia

The use of biogas also reduces:

  - The amount of work preventing the collection and transportation of wood (mainly women duty).
  - Chronic diseases associated with the indoor combustion of biomass-based fuels

The technical assessment was conducted by CVM staff, who also designed the plant aiming to keep down construction costs and make it last for at least 20 years without significant maintenance.

- The **latrines** in the prison needed **rehabilitation**. Also the system to flush the toilets was not suitable with the production of biogas due to the presence of soap. So a fiberglass reservoir has been provided and the latrines have been consequently connected to the plant.

- The animator and the trainer from CVM staff and from the local Water, Energy and Mines Office trained 7 persons selected among prisoners and guards in operation and maintenance of the plant.

Description of the innovation

This project is the application of an already well-known technology in an unprecedented context. Considering the difficulty and precariousness of the situation, the benefits on the environment, economy and health of the beneficiaries are especially valuable.
The use of this technology is also adapted to the local context and perfectly fits the beneficiaries' needs (energy, health improvement…) and resources (low economic resources, climate…).

Results

<u>Social and health results</u>

- 550 prisoners are aware of the importance of proper hygiene and sanitation practices ;
- One prison administration is aware of the consequences of a mismanagement of waste disposal ;
- The content of the latrines is automatically cleared out and all the prisoners are using toilets ;
- The smoke due to indoor combustion and its indirect impact on the reduction of cardio vascular diseases reduced ;
- The daily workload of women reduced by half ;

<u>Environmental results</u>

- Households living in the area of the prison are protected from the future fluid escaping from the latrines of the prison and from associated epidemic diseases ;
- The biogas is used as an alternative energy source for cooking ;
- There is a positive impact on the reduction of deforestation ;

- The odour emissions in the area of the latrines disappeared ;
- A free and nutritive organic fertilizer is available for the horticulture activities in the prison compound ;
- The organic waste (meal residues) are treated (co-digested) with the latrine waste which decreases the environmental impact of the prison reducing the waste disposal ;

Economic results

- The daily budget for food per prisoner increased ;
- The daily budget used for the purchase of firewood is progressively decreasing - reduction of the expenditures is forecasted to be at least by 70% in one year ;
- The turnover among the kitchen staff decreased ;
- Thanks to the fertilizer, 3800 ETB (145€) per year is saved for the prison administration budget ;

Other

- The implementation of the biogas in Durame and the first results attracted other prisons in the region and 2 of them have already requested CVM to intervene with similar plants.

Reproducibility

Simple technology and low cost materials enable the beneficiaries to replicate, to operate and maintain easily the intervention.
The system can potentially be extended to all the prisons and other institutions (schools...) in the area with an average temperature of at least 27 and can be adapted to lower temperatures.
The biogas production can be promoted in cooperatives for the encouragement of sanitation and income generating activities as long as in the nearby or inside the institution there is a kitchen or a catering service
Small scale biogas plants can also be promoted at household level in rural area where there is a high production of organic wastes (for example in big towns near the vegetable markets).
The biogas can provide also lightening in remote areas unsupplied by electricity through the connection with gas lamps.

Conditions relating to replicability

- **Implication of the beneficiaries**: the beneficiaries, prison administrators and prisoners, must be the protagonists or their developments and participate with money, kind or labour in order to guarantee an immediate ownership of the intervention. It is compulsory that they understand the process and the aim of the intervention. The sensitisation can also be useful to fight the social resistance to the use of a new product made from human waste that might exist.
- **Training**: the operators of the system must have been trained to the functioning, maintenance and security aspects of the system to ensure its proper and autonomous working.
- **Location**: the average temperature should be at least of a 27° Celsius to work without any heating source.

Contact

Marta ROGANTE: cvmprogetti@tiscali.it
Head of project office

Websites

- Prix Initiatives: www.prix-initiatives.com
- CVM: http://www.cvm.an.it/