

1 Objective

The overall objective of the project was to reduce the risks of water-induced diseases for a population of 34,000 in 11 municipalities with a total of 45 rural villages. The approach includes improved drinking water supply and improved sanitation.



2 Context

BMZ ID: 1995 65185

Planning and implementation 1997 – 2003; construction 1998 – 2002, start of operation 1998 – 2002, sensitisation, training 1998 – 2004; final evaluation 2006

	Project area	Brazil
Target group / population	34,000 (rural; 2002)	192 million (2008)
Under 5 mortality rate (per 1,000)	38 (Bahia, 2002)*	27 (2008)**
Population below poverty line		31% (2005)**
Population growth p.a.		1% (2008)**
GDP per capita at official exchange rate	EUR 2,712 (2002)***	EUR 5,007 (2007)***
N° of on-site systems implemented	1,035	
N° of sewer connections implemented	7,819	
% improved sanitation	3% (before project) 100% (after project)	
% sewage treated	100% (after project)	

* UNICEF: Situação da Infância Brasileira 2006, http://www.unicef.org/brazil/pt/resources_10167.htm

*** CIA The World Fact Book, July 2008

*** World Bank

Prior to the project, institutions in the sanitation sector were rather weak. Cost recovery for water supply and sanitation was largely insufficient. Sanitation services were more or less inexistent in the region. The risk of failure was estimated to be high at the start of the project.

3 Project approach

Investments / technology

All houses in the 45 villages have been connected to water supply and have been provided with sewage disposal. Depending on local conditions (housing density, topography and soil conditions), the approach included central or on-site wastewater management concepts. Sewers were constructed as condominial systems (smaller pipe diameters, fewer manholes, low depth, backyard connection). The options for wastewater treatment were ponds where sufficient space was available. In case of limited space, anaerobic Imhoff tanks were followed by gravel-sand filters.

The on-site sanitation facilities are septic tanks with a sludge settling chamber and infiltration pits of the treated sewage. In some cases, a multi-chamber septic tank serves several households jointly. The initial project design included latrines, but this feature was generally rejected by users.

In the different systems, the residual pollution of the treated effluent is below 100 mg BSB₅/l.

Institutional concept / support activities

As a special-purpose company the Companhia de Engenharia Rural da Bahia (CERB) executes drinking water programmes in the Federal State of Bahia. CERB was responsible for the implementation of the entire programme including the sanitation component.

A core feature of the project was the establishment of user groups on the community level and a joint service council CENTRAL on the regional level. CENTRAL is an association of several municipalities and their user groups created for the technical and administrative management of water supply and sanitation facilities. The overall sector regulation is the task of the government of Bahia.

As an accompanying measure, the project supported sensitisation campaigns for hygiene and the correct utilisation of the sanitation facilities. Condominials have smaller diameters (equal or less 100 mm) and the gradient is not very high. This increases the risk of blockages and it is very important that people do not flush solid waste or other objects in their toilets. Therefore the accompanying measure is very important to make people aware about these issues.



1 Training session

Operation and maintenance concept

The user groups take charge of the everyday operation and service of the facilities. They maintain the facilities, do small repairs, build new connections and collect the fees. Wastewater fees are collected together with the drinking water fees.

The regional joint service council CENTRAL is responsible for greater repairs, emptying collective septic tanks, the treatment ponds and Imhoff tanks. They have the overall responsibility for financial management and accounting.

4 Costs and financing

The specific investment amount varied according to local conditions. Average per capita investment for on-site systems was EUR 130 (with infiltration) and around EUR 30 (without infiltration). The total investment for condominial systems varied between EUR 100 and EUR 190 per capita. Major variations were related to the size of the village, local conditions and length of network (3 to 7 meters per inhabitant served). The investment cost of the treatment facilities was around EUR 24 per capita for ponds and EUR 17 for Imhoff tanks.

The project executing agency received a 100% grant for the project from the Federal State of Bahia. German Financial Cooperation (through KfW) contributed with a EUR 0.75 million grant and a EUR 2.26 million loan at preferential interest rate to the State of Bahia for sanitation purposes.

The waste water tariff structure of CENTRAL is a progressive block tariff system based on drinking water consumption. The lowest block is a fixed block of 10m³, which is charged to all customers. Most residential customers do not consume water beyond the first block, the average water consumption being 48 l/pcd. The tariff progression for residential customers is limited (25% progression for 20m³ and 40% progression for 25m³ per month). The structure furthermore provides for a cross-subsidy from other customers, such as commercial, public and industrial customers. However, the number of other customers is very limited in this rural area. The main revenues of CENTRAL come from private households.

	Project (sanitation component)	per capita
Infrastructure investment	EUR 4.6 million	EUR 145
Hygiene awareness, training of operation staff	EUR 1.3 million	EUR 39
Subsidy (for beneficiaries)	EUR 5.9 million of which EUR 0.8 million German FC	EUR 184
Investment contribution of beneficiaries	None	None
Operation cost p.a. (2002 prices)	EUR 0.147 million	EUR 4.33
LRMC p.a. (2002 prices)		EUR 16*
LRMC as % of local per capita GDP		0.6%
Annual HH user fees for CENTRAL services		EUR 1.50
Collection efficiency	90%	
Coverage of operation cost	95% (2005)	
Annual HH user fees for local services		0 – 2,00 EUR
Operation cost borne by municipalities	In some cases	2.00 EUR
Annual HH user fees for CENTRAL and local services (combined) as % of local GDP		0.1 – 0.2%

* Population growth estimate 1.5% p.a.; weighted average of useful lifetime 25 years; discount rate 5%

In most villages the users also pay the costs for local technicians and energy. In some villages, the community covers the local operation costs out of the general community budget. At the time of final project evaluation (2006), very poor households had to use up to 3% of their income for the combined water and wastewater fees, which can be seen as an affordable charge.

5 Experiences / lessons learnt / critical aspects

For CENTRAL it is important to generate sufficient income to cover operation and maintenance cost. As long as the service quality is good (especially for water supply), people are willing to pay for the services. Blockage of the sewer systems occurs quite often because people dump solid waste into the toilet. Blockages and other problems are generally repaired quickly. Two villages with technical problems showed low collection efficiency (40%) compared with an average of 90% for the other villages. At the time of final evaluation (2006) the project implementing agency CERB was working on these technical problems and expected to solve them.

In the first years of operation it has not yet been necessary to remove sludge from ponds or Imhoff tanks, but CENTRAL has adequate equipment for the sludge removal. The sludge will be used in agriculture. For septic tanks, the users remove the sludge and use it directly in agriculture. This is already common practice.

Meanwhile, two municipalities left the joint service council CENTRAL. In one case the water is supplied by another provider (EMBASA) from a reservoir. EMBASA operates the systems properly. In the other municipality water supply was discontinuous and pumping costs were high. Prior to a local election the future mayor promised to take over the water supply system and to reduce fees. Now the municipality runs the system with untreated water from a nearby lake. This poses high health risks for the inhabitants because of upstream chrome mining.

The States of Bahia, Piauí and Ceará have extended the joint service council approach to other areas. The concept is generally very successful and has received further support from other donors (e.g. World Bank).