

Ex Post-Evaluation Brief Bolivia: Oruro Wastewater Disposal



Programme/Client	Oruro Wastewater Disposal, BMZ: Ref. 1995 65 037	
Programme executing agency	Gobernación Autónoma Departamental de Oruro / GADOR (formerly: CORDEOR)	
Year of sample/ex post evaluation report: 2011*/2011		
	Appraisal (planned)	Ex post-evaluation (actual)
Investment costs (total)	EUR 18.20 million	EUR 21.75 million
Counterpart contribution (company)	EUR 2.90 million	EUR 4.75 million
Funding, of which budget funds (BMZ)	EUR 15.30 million	EUR 17.00 million

* random sample

Project description: This project was appraised in 1995 and was linked to the 'Oruro water supply' project (BMZ No. 1988 66 352). It aimed to improve wastewater disposal and (in part) storm water drainage in the city of Oruro, through a system of separate sewers. The main components that were implemented comprised the rehabilitation of 3,712 wastewater connections, the installation of 8,051 new connections; the laying of wastewater pipes, storm water drains, a bypass channel as well as the construction of a pond wastewater treatment plant, designed to serve a population of approx. 190,000.

Objective: The overall developmental objective (the targeted *impact*) of the project was to contribute to reducing wastewater-related health risks to the urban population and to an improved environmental situation for the city and Lake Uru Uru to the south. The project objectives were: (i) the orderly disposal of wastewater, managed according to priority criteria (sewage flow; condition of the existing facilities etc.) in selected parts of the city; (ii) the hygienic and ecologically sound transfer and treatment of the sewage collected; and (iii) a reduced flooding frequency caused by heavy rainfall in those parts of the city that were particularly affected.

Target group: The inhabitants of the area of the city connected to the wastewater disposal and storm water drainage systems.

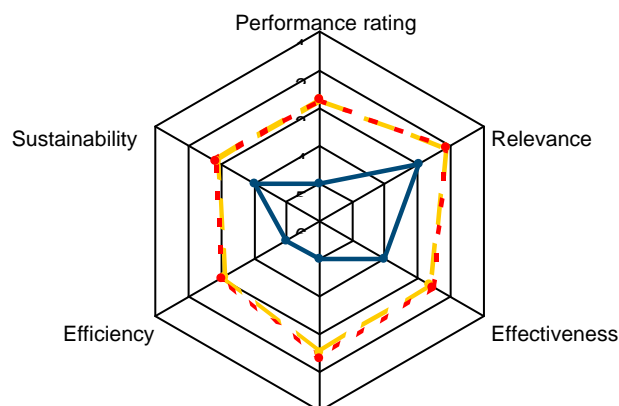
Overall assessment: Rating: 5

Some elements of the design and operation of the wastewater disposal facilities are inadequate, and the sewage treatment plant barely functions. Most sewage flows untreated into receiving effluents. Very limited progress has been made against project objectives, and the expected impact on the environment has not materialised.

Of note:

Greater consideration should have been given to involving the target group. In the light of the failure to transfer the plant to a professional operator (SeLA), the basic and advanced training measures were clearly insufficient.

Rating by DAC criteria



Overarching development impact

—●—	Project
- - -	Average rating for sector (starting 2007)
- - -	Average rating for region (starting 2007)

EVALUATION SUMMARY

With environmental protection effects not having been realised, project results not having been achieved and treatment facilities not having been operated in a professional manner, the project has been assessed as clearly inadequate. **Rating: 5**

Relevance: In its basic orientation, the project conforms with the objectives of the relevant Bolivian sector policies. This also applies to German development cooperation priorities, for which the residential water management and environmental protection is a priority sector in Latin America and Bolivia. From a conceptual standpoint, this wastewater disposal and storm water drainage project complemented the previous drinking water supply project well. Prior to the start of the project, regular long-term flooding occurred, particularly during the rainy season. Rainwater blended with contaminated wastewater, with health consequences for the urban population affected. Expanding the wastewater disposal and storm water drainage facilities was intended to support an improved water supply. Above all, the managed drainage and treatment of wastewater aimed at reducing health risks and improving the environmental situation in the urban area and the receiving waters. Given that plausible intervention logic, the wastewater project was appropriately designed to achieve its intended environmental and health impact. The local population is circumventing the system of separate sewers by continuing to dispose of storm water through the sewage system. This causes periodic flooding to continue. Small investment projects, mainly carried out under the United Nations Development Programme (UNDP¹) ran complementary to the project measures. For effective cooperation, they were coordinated with KfW during implementation. Coordination took place with the EU project '*Programa de Gestión Sostenible de los Recursos Naturales de la Cuenca del Lago Poopó*', a programme that was set up after the project was finished, over planned rehabilitation measures for the sewage treatment plant. This was handled by the KfW office in La Paz and the GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) water sector programme PROAPAC². Overall, relevance is judged to be satisfactory (Sub-rating: 3).

Effectiveness: Given the problems with wastewater disposal that existed, the project objective was defined appropriately. Wastewater from mining was not seen as the most urgent problem and was therefore not treated as a priority. This assessment cannot be challenged today without a respective in-depth ecological study. In any case, project objectives should have been more precisely defined. In particular, a distinction should have been made between the targets for the wastewater disposal system and the storm water drainage system. The formulation of the objective did not specifically refer to a functioning system of separate sewers.

¹ In Spanish: *Programa de las Naciones Unidas para el Desarrollo* (PNUD).

² *Programa de Agua Potable y Alcantarillado Sanitario en Pequeñas y Medianas Ciudades*

The objective of centrally collecting wastewater from at least 106,000 people (55% of the projected population in the catchment area in 2002) and transferring it to the pond treatment plant has not been achieved. Nevertheless, around 46% of the population (approx. 100,000 people) are connected to the wastewater system. But recurrent overflowing³ of the sewage network means that wastewater cannot be disposed of properly. There is no register of commercial and industrial connections to the system. In addition, effluent values at the wastewater treatment plant of 30 mg/L BOD₅ were not attained in the 24-hour composite sample taken between September 2008 and December 2010.

Considering the storm water network alone, the indicator could be considered to have been achieved, with exceptions. However, there are no reliable statistics to support this; the assessment is based on residents' statements. At the same time, other factors, including the widespread illegal discharge of storm water into the sewage system, result in more frequent floodings in those locations, with consequent health hazards.

As the project has, for the most part, distinctly failed to meet its objectives, its effectiveness has been assessed as clearly inadequate (Sub-rating: 5).

Efficiency: Given the project's poor effectiveness and its resulting low efficiency, it is not possible to award a satisfactory rating to its use of resources.

In terms of production efficiency, the resources invested in the sewer system and sewage treatment plant are seen, from today's perspective, as basically appropriate. However, the following qualifications apply to individual parts of the facilities:

- As regards the pond wastewater treatment plant, it must be questioned whether investing in sand filters really made sense. The rationale was to protect the inlet pumping station from sand, which is drawn into the open part of the inlet channel. However, compared with the amount of sand that already finds its way into the sewer system, this load can be regarded as negligible. Sand entering the treatment ponds was unlikely to impede operations and, from today's perspective, would still not present any appreciable problem. On the contrary, the sand filters increase the susceptibility of the plant to breakdowns, as several flood incidents have already demonstrated.
- The planned bypass channel (*Canal de Trasvase Cauchi*) that was to transfer the *copagira* drain's highly contaminated mining wastewater was not completed as part of the project. It was agreed that this would be completed by the Oruro city administration (*Gobierno Autónomo Municipal de Oruro – GAMO*); this, however, has not happened. Hence, at the time of this evaluation, the completed section of the bypass channel (1.3 km in length) represents an investment made with no effect gained. This is also

³ This means that sewage escapes from the system.

true of pipecleaning equipment purchased under the project. After it was handed over to GAMO, it was partially dismantled and has never been used for its specified purpose.

With regard to allocative efficiency, the following deficiencies must be noted:

- In order to cover the **wastewater sewer system's operating costs**, GAMO (the municipal body responsible for operating the system) raised the annual fee to about BOB 80 (approx. EUR 8) per household. Although the revenue from these charges (a form of property tax) roughly covers the costs of operation and routine servicing - which does not in itself allow any conclusions on sustainability in terms of system maintenance - no account has been taken of depreciation. It follows that GAMO does not have the means to renew the sewer system.
- The **operating costs of the pond wastewater treatment plant** are entirely funded from the provincial administration's budget, GADOR, which is responsible for plant operation. Funding is however still only provided from generic 'project funds'. A dedicated budget for the treatment plant's running expenses (excluding energy costs, which for the time being are funded by GAMO), is not envisaged. Fees were not collected from users. Since the administrative budget procedures are extremely costly and time-consuming, only limited funds are available for the inputs necessary; which negatively impacts on the plant's operation.
- Annual charges for wastewater (BOB 80, see above) are very low compared to the actual operating costs (including depreciation) of the wastewater sewer network, and operating costs of the wastewater treatment plant are, as a result, not remotely covered; this sends misleading pricing signals to the consumer, who is not in a position to become aware of the real costs of the service. Both during and after project implementation KfW continually stressed the need for GAMO to increase wastewater disposal and treatment charges (even involving the sector Ministry), without GAMO taking the necessary steps.
- Neither GAMO nor GADOR have indicators in place to measure operating efficiency of the wastewater disposal system or the treatment plant. As a result, no statements can be made in this respect.

The wastewater disposal and storm water drainage systems, including the network pumping stations, are operated by GAMO, while the treatment plant is operated by GADOR. From an operational point of view, this is an inefficient model that can be blamed on an outmoded division of responsibilities between Department and Municipality; besides, it is not in accordance with the concept agreed at project appraisal: it was agreed at national, district and municipal level that SeLA as water utility should also be responsible for the sewers and wastewater treatment. Because of the divergent political interests of the parties involved and resistance from within SeLA, this transfer has not yet taken place and is not

becoming any more likely. The situation is further aggravated by the fact that the wastewater disposal and storm water drainage systems are once again being operated by GAMO – at least in part – as a combined sewer system, which represents a return to the situation before the project started. Overall project efficiency is assessed as inadequate (Sub-rating: 5).

Overarching developmental impact: To date, the project has made no contribution to the overall objective ‘protection of Lake Uru Uru’. Nearly all the inflow is fed directly into the lake through the sewage treatment plant *bypass*. Only a very small proportion, approx. 60 L/s (from a total of around 250 L/s) flows into the treatment plant. The wastewater fed into the lake through the *bypass* contains nutrients and organic substances, which adversely affect oxygen levels in the lake and encourage siltation. However, sewage no longer just seeps away on the spot in an uncontrolled fashion in the newly connected urban areas. In view of the more hygienic environmental conditions this has produced, it is reasonable to assume that a contribution has been made toward improving health conditions for the local population. This is being offset, however, by the regular occurrence of sewage system overflows. A survey of residents showed a marked lack of acceptance of the project. Those interviewed reported an increase in sewer system overloading and odour problems. The local population do not seem to be aware about themselves contributing significantly to the problem by incorrectly connecting their storm water drainage to the sewage system. This suggests a lack of community involvement and outreach in both planning and execution. Consequently, the overall developmental impact of the project has been assessed as inadequate (Sub-rating: 5).

Sustainability: The sewage treatment plant is in very poor working order, with only the laboratory operating properly. The plant is untidy, and even minor repairs are not done as prescribed. GADOR has no operating budget available to carry out servicing and repairs as needed. Some of the problems stem from the fact that operational responsibility was not transferred to *Servicio Local de Acueductos y Alcantarillado* (SeLA): SeLA did not want to take over the operation of the new plant without prior assurance that it would be allowed to levy appropriate wastewater charges. Despite continuing commitment of KfW and recently the EU⁴, the transfer of operational responsibilities to SeLA has so far not been possible to achieve. The prospects of success in this are declining still further; SeLA’s interest in the transfer is waning, due to perceived risks associated with the facilities’ prolonged neglect.

To ensure operational reliability in the wastewater disposal and storm water drainage systems, the pumping station would have to be rehabilitated and the capacity of some of the sewage pumps expanded. As for the treatment plant, considerable investment is required to restore it to proper working order. It is uncertain whether the necessary resources will be forthcoming. Moreover, it is not expected that tariffs will reach cost recovery level in the

⁴ The project ‘Programa de Gestión Sostenible de los Recursos Naturales de la Cuenca del Lago Poopó’ also includes Lake Uru Uru.

foreseeable future; furthermore, an appropriate level of government subsidy cannot currently be relied on. Given those shortcomings, the sustainability of the project has been assessed as no longer satisfactory (Sub-rating: 4).

Notes on the methods used to evaluate project success (project rating)

Projects (and programmes) are evaluated on a six-point scale, the criteria being relevance, effectiveness, efficiency and overarching developmental impact. The ratings are also used to arrive at a final assessment of a project's overall developmental efficacy. The scale is as follows:

1	Very good result that clearly exceeds expectations
2	Good result, fully in line with expectations and without any significant shortcomings
3	Satisfactory result – project falls short of expectations but the positive results dominate
4	Unsatisfactory result – significantly below expectations, with negative results dominating despite discernible positive results
5	Clearly inadequate result – despite some positive partial results, the negative results clearly dominate
6	The project has no impact or the situation has actually deteriorated

Ratings 1-3 denote a positive or successful assessment while ratings 4-6 denote a not positive or unsuccessful assessment

Sustainability is evaluated according to the following four-point scale:

Sustainability level 1 (very good sustainability) The developmental efficacy of the project (positive to date) is very likely to continue undiminished or even increase.

Sustainability level 2 (good sustainability): The developmental efficacy of the project (positive to date) is very likely to decline only minimally but remain positive overall. (This is what can normally be expected).

Sustainability level 3 (satisfactory sustainability): The developmental efficacy of the project (positive to date) is very likely to decline significantly but remain positive overall. This rating is also assigned if the sustainability of a project is considered inadequate up to the time of the ex post evaluation but is very likely to evolve positively so that the project will ultimately achieve positive developmental efficacy.

Sustainability level 4 (inadequate sustainability): The developmental efficacy of the project is inadequate up to the time of the ex post evaluation and is very unlikely to improve. This rating is also assigned if the sustainability that has been positively evaluated to date is very likely to deteriorate severely and no longer meet the level 3 criteria.

The overall rating on the six-point scale is compiled from a weighting of all five individual criteria as appropriate to the project in question. Ratings 1-3 of the overall rating denote a "successful" project while ratings 4-6 denote an "unsuccessful" project. It should be noted that a project can generally be considered developmentally "successful" only if the achievement of the project objective ("effectiveness"), the impact on the overall objective ("overarching developmental impact") and the sustainability are rated at least "satisfactory" (rating 3).