

# Ex post evaluation – Bolivia

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**Sector:** Water supply, water management, wastewater/solid waste (1403000)  
**Programme/Project:** Water Supply and Sewerage Small Towns II Chaco (KV) (BMZ no. 2001 65 613)\*  
**Implementing agency:** Entidad Prestadora de Servicio de Agua y Saneamiento (EPSA) Manchaco Social



## Ex post evaluation report: 2019

All figures in EUR million	(Planned)	(Actual)
Investment costs (total)	18.0	21.3
Counterpart contribution	3.2	3.3
Funding	14.8	18.0
of which BMZ budget funds	14.8	18.0

\*) Random sample 2018

**Summary:** The FC measure included the rehabilitation and expansion of water supply and waste water disposal services in six small towns in the Bolivian region of Chaco. The programme was a cooperation with TC, which supported the establishment of a local special purpose association as a regional utilities services provider. This special purpose association was the implementing agency and took over operations of the financed water supply and waste water disposal systems as planned. The costs for the FC measure amounted to EUR 21.3 million in total, EUR 18.0 million of which were financed by an FC grant.

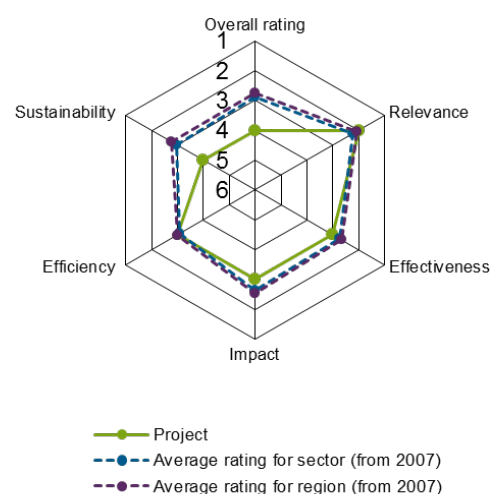
**Development objectives:** 1) Use of the continuous supply of need-based and hygienic water provided, 2) hygienic and ecologically friendly collection and (pre)-treatment of the population's waste water in the project region's six locations. 3) Furthermore, services should be provided on the basis of cost-covering tariffs by the mentioned special purpose association (project objectives/ outcome). With this goal, the programme was designed to contribute to improving health standards among the project region's population and to protect over- and underground water resources (developmental objective/ impact).

**Target group:** The target group is the current 95,000 residents of the project locations, the majority of whom are from poorer population groups.

## Overall rating: 4

**Rationale:** The construction and operation of the water supply and waste water disposal infrastructure and its impacts as a result are satisfactory – apart from a few exceptions – as most of the technical indicators were attained. However, there are considerable risks relating to economic sustainability, which could also put the technical, institutional and ecological sustainability at risk. The operating costs are only covered in one of six locations; the situation cannot be improved because it is politically not possible to raise tariffs.

**Highlights:** The model of a special purpose association for operating the plants with centralised responsibilities and incentives for professional management introduced with TC's support was changed into a decentralised operating structure with an exclusively social focus by the central government in 2007. This change was implemented without adjusting the statutes accordingly. Nevertheless, the implementing agency currently guarantees operations and, in principle, has the potential to contribute to an improvement in the economic sustainability over the long term. However, politicians must make a similar commitment.



## Rating according to DAC criteria

### Overall rating: 4

#### Ratings:

Relevance	2
Effectiveness	3
Efficiency	3
Impact	3
Sustainability	4

#### Relevance

The core problems at the locations taking part in the programme in the field of water supply were mainly the lack of capacity to procure water from the surface water and the lack of proper water treatment, defective main pipes, high net losses and operating problems. Furthermore, the waste water discharge infrastructure was only very rudimentary (connection rate between 25 and 50% in four locations; no sewage systems in the remaining locations) and no sewage treatment took place in five of the six locations. The decentralised discharge pipes in place in some locations (cesspits/septic tanks or dry latrines) were not maintained to an adequate extent; most of the waste water was discharged into the receiving water without being cleaned and washing water was disposed of directly on the streets. This inadequate disposal situation resulted in risks related to the transfer of water-based illnesses and the contamination of drinking water by untreated waste water.

Improvements to the described problems in the areas of water supply and waste water were intended to lead to increased water quantity and quality among consumers and to reduce health and environmental risks. By tapping into additional water resources and improving the treatment and distribution of drinking water, the aim was to increase the quality and quantity of the available drinking water and reduce potential hazards as a result. A collection grid and pond treatment plants were due to be financed to collect and treat the waste water before it was discharged into the receiving water. This was designed to ensure that waste water was discharged safely in order to avoid contact between the population and pathogens and also increase the quality of water in the receiving water. The results chain is coherent on the whole. The project's design was fundamentally suitable for addressing the core problems. With regard to the establishment of a regional special purpose association, it is important to question whether it may have made more sense to divide the project area up differently in view of the distances between the towns in Chaco, their allocation to three administrative districts and the locations' different levels of development.

The project is consistent with the Federal Ministry for Economic Cooperation and Development's (BMZ) water sector concept; the focus on small and medium-sized towns also corresponds to the intervention level prioritised in the focus area paper on water/waste water in Bolivia. Having improved water supply and waste water disposal services is also a declared development goal for Bolivia (e.g. Agenda Patriótica).

From today's perspective, cooperation with TC generally made sense with the aim of strengthening the implementing agency. However, changes to the underlying political conditions during the project implementation period had a negative impact on the timing between the TC and FC measures, which meant that the terms of both projects ultimately did not prove to be ideal because the TC project was over when adjustments to the legal and organisational principles were still required. These adjustments were then initiated during a later stage of the Technical Cooperation measure through a legally required change to EPSA's legal form while EPSA was in the middle of rolling out the operation of the FC-financed infrastructure.

We rate the relevance as good overall.

#### Relevance rating: 2

## Effectiveness

From a technical perspective, the programme results were mainly fulfilled. The achievement of the programme objectives (outcome) can be summarised as follows:

Indicator	Status PA	Ex post evaluation
<p>(1) Three years after completion of the FC measures</p> <p>a) Drinking water is available for 20 h per day in all locations</p> <p>b) At least 90% of the population is connected to the central water supply</p> <p>c) The quality of drinking water complies with the thresholds agreed with the Bolivian regulatory authorities<sup>1</sup>.</p>	<p>a) n/a</p> <p>b) 87%</p> <p>c) Not achieved</p>	<p>a) Achieved: 24 hours per day, exception: Lagunillas where water is only available for 20 hours a day for a period of 4 months every year.</p> <p>b) 100% (achieved)</p> <p>c) Achieved; exception: a period of 3 months a year in the town of Villa Vaca Guzman due to weather conditions;</p> <p><b>Overall, just about achieved</b></p>
<p>(2) Three years after completion of the FC measures</p> <p>a) The waste water of a total of 60% of the population is disposed of and treated in all locations</p> <p>b) The quality of the treated waste water complies with the thresholds agreed with the regulatory authorities<sup>2</sup>.</p>	<p>a) 0–53%</p> <p>b) Not achieved</p>	<p>a) 67% achieved (Villa Montes, Monteagudo, Camiri (one of two systems), Boyuibe); achieved on the whole.</p> <p>b) Achieved in four towns, achieved (Villa Montes, Monteagudo, Boyuibe, Camiri (partially));</p> <p><b>Just about achieved on the whole (see below)</b></p>
<p>(3) EPSA Manchaco covers its operating costs with income from water tariffs.</p>	No	No (exception: Monteagudo) <b>Not achieved</b>
<p>(4) EPSA Manchaco performs its duties on the basis of its legal foundations.</p>	-	<b>Not achieved</b>

Overall, water extraction plants, wells, main pipes, treatment plants, storage tanks, distribution networks, pressure pipes, pumping stations and house-branch connections were built from scratch, refurbished or expanded. In the waste water sector, waste water networks and cesspits or small sewage treatment plants were built from scratch, refurbished or expanded.

An improved water supply of an adequate quality and quantity is now secured for 24 hours in five of the six towns. In the smallest town Lagunillas (1,200 users), a lack of availability means that water is only available for 20 hours for four months of the year, though this corresponds to the target value. Restrictions can be observed in the town of Villa Vaca Guzman (3,600 users), where natural turbidity that is not haz-

<sup>1</sup> The Bolivian drinking water standards correspond to the WHO standard in terms of drinking water quality.

<sup>2</sup> The Bolivian discharge standards for grey water also comply with WHO standards.

ardous to health but does not look particularly appealing remains in the potable water for three months of the year (rainy season) despite treatment.

The waste water in the towns of Villa Montes, Boyuibe, Monteagudo and the lower part of Camiri is collected in a sufficient quantity and treated to an adequate standard. This is not the case in Lagunillas as a result of deficient operations. The treatment plants in Villa Vaca Guzman and the upper section of Camiri could not be built due to a lack of land. Nevertheless, the treatment pond in Villa Vaca Guzman was completed after the FC project was over, using financing from the Swiss organisation Helvetas. Since Lagunillas and Villa Vaca Guzman are both smaller towns, the indicator is regarded as being just about achieved.

The indicator on the covering of costs has not been achieved in the programme towns over the last three years. Only the town of Villa Vaca Guzman is able to balance operating costs with income from tariffs, though this is also due to the lack of a treatment plant. The other towns regularly record an operating loss.

The long-term intensive support to the implementing agency EPSA Manchaco SAM by TC had a positive impact on its professionalism on the whole. The newly defined indicator “EPSA Manchaco performs its duties on the basis of its legal foundations” was not achieved despite the significant success in setting up and structuring the water supply. Nevertheless, the programme has produced some considerable results in this area. These relate particularly to the relatively professional accounting, the good standard of qualifications in EPSA’s management team, and reliable technical monitoring. However, a lack of clarity arose as a result of the change in government in 2006. From this point onwards, any form of private sector involvement in the water supply – even on just a superficial level – was declared as undesirable, so EPSA Manchaco’s legal form was consequently changed from a “Sociedad Anónima Mixta, SAM” into a “Mancomunidad Social” in 2007 by law. However, the statutes and structures of the former “SAM” and current “EPSA” were not formally adjusted as a result. This led to misunderstandings among politicians and civil society as the legal form diverged from the organisation’s actions, and municipalities and users, for example, did not feel sufficiently informed. As a result, some parties were extremely dissatisfied with EPSA Manchaco Social’s performance even though the actual operation of the plants was largely correct as described above. These unclear governance structures pose a major risk to the installations’ sustainable operation.

Overall, we rate the project’s effectiveness as just about satisfactory.

**Effectiveness rating: 3**

### Efficiency

Overall, the specific costs of the investment of EUR 225 per inhabitant for water supply and sewage disposal seem appropriate. This is particularly true in view of the fact that these costs cover both aspects (drinking water and waste water) and the extraction of natural water in the project region requires a relatively large amount of effort.

The planned programme term extended from the original 95 months to 170 months, which is a significant delay but one that did not result in large cost increases. This was mainly caused by 1) the length of time it took the local authorities to actually provide the required land, 2) extensions that were not added until after the main measures were complete, e.g. network expansions to connect other parts of fast-growing neighbourhoods, and 3) administrative delays, particularly related to invitations to tender.

We rate the production efficiency as satisfactory overall.

The development policy effects achieved in the field of health would not have been attainable for less money using alternative approaches. A governmental programme in many communities for improving local water supply that goes by the name of “Mi-Agua” cannot, for example, be used as an alternative approach because the funds of BOB 300,000 (approx. EUR 36,000) available to each individual town would have been too low, meaning that structural measures on a scale of those in the FC programme would not have been possible. In view of the structure of the town of Lagunillas, financing for decentralised waste water disposal solutions could have been a feasible alternative to the pond treatment plant here. However, this approach would only result in negligible financial savings, if any at all. The collection rate is also considered an additional aspect of allocation efficiency. This is very low on the whole (between 70 and

80% in four of the six towns). This demonstrates the users' low level of appreciation and willingness to pay. We rate the project's allocation efficiency, and thus its overall efficiency too, as just about satisfactory on the whole.

### Efficiency rating: 3

### Impact

The development policy goal was to improve the population's health standards in the locations of the special purpose association while also improving the sustainable use of water.

Indicators were not defined for the development objective at programme level. At the level of the DC programme "Drinking water and waste water disposal in Bolivia", there was a link to Bolivia's development in the area of MDG 4 (mortality rates of children under 5) and MDG 5 (maternal mortality rates).

On the basis of surveys and the statistics presented, the health effects are deemed to be positive. The evaluation team was provided with an excerpt of figures from the Bolivian Ministry of Health for the Department Tarija and for the town of Villa Montes in particular. These figures revealed a 41% decrease in the number of water-related illnesses between 2014 and 2018. The mortality rate for children under five (MDG 5) improved during the MDGs' implementation period. This fell from 123 children per 1,000 live births for the whole of Bolivia (2005) to 39 in 2016, meaning that the country achieved this MDG. Maternal mortality rates also improved significantly from 510 per 100,000 live births to 200, even though this can be traced back to a number of different factors and not just water supply and waste water disposal.

In summary, all of the information collated indicates an improvement in water quality (primarily the quality of drinking water) and the health situation in the project area. It can be assumed that the programme reduced the risk of water-borne illnesses and therefore contributed to Bolivia's progress in MDG 4 and MGD 5, even though the programme's effects cannot be isolated from other influencing factors.

Environmental effects, i.e. the protection of water resources, have clearly been achieved with the collection and treatment of waste water in the towns, except for the three towns where waste water is not treated at all or to a satisfactory extent (Lagunillas, part of Camiri, Villa Vaca Guzman, see Effectiveness).

In summary, we continue to rate the impact as good.

### Impact rating: 2

### Sustainability

We regard the programme's ecological sustainability as good. While the quantity of available raw water from bodies of surface water appears to have fallen slightly in recent years, it is still adequate and can be supplemented by additional drilled wells. There is very little risk of deforestation for cattle farming or agriculture in the project area as either surface water or higher spring intakes serve as a source of drinking water.

We also regard the technical sustainability as good. There are technical challenges to the sustainability of the plants. However, the staff at EPSA Manchaco, particularly the operations managers in the individual towns, have strong technical qualifications and are obviously capable of dealing with the plants' technology. Staff have generally been working at the plants since operations began and fluctuation levels appear low, meaning that the risk of a loss of knowledge due to staff moving on is deemed to be low.

Due to the slightly positive prospects for the future, we regard the institutional sustainability as just about satisfactory. EPSA is confronted with significant risks as an institution in light of its economic situation (see Economic sustainability below) and in relation to the institutional structures and its establishment and acceptance in the various towns. EPSA Manchaco's legal foundations are still unclear due to the change in legal form in 2007. There is a "de-facto structure" that currently produces satisfactory results technically speaking, but it can be called into question by any stakeholder at any time, something which often occurs. This may lead to the disintegration of the special purpose association. In contrast, prospects for the short-term and medium-term future are positive as EPSA is currently actively addressing this problem with support from the Swiss organisation Helvetas. The project, which is already running, has set out to critically assess the structures at EPSA Manchaco (including issues of ownership), to clarify areas of responsibility

and to make the necessary structural adjustments in a transparent manner. An analysis and plan of action are already in place, covering the organisational restructuring through to measures for raising awareness among water users. Helvetas has a budget of SFR 4.5 million for the period from 2019 to 2022 to cover work including restructuring support.

We believe the risk to economical sustainability is extensive.

The financial reports and statistics presented to us cover the period from 2014 to 2017 and show that the individual systems do not cover their costs. The only exception is the system in Monteagudo, where costs are balanced out by income from tariffs. The necessary cash flow is only secured by the central government releasing EPSA (so far, as of mid-2018) from its tax liabilities and some EPSA employees only receiving net salaries (meaning that social security contributions are not deducted). Furthermore, payment plans for the power supply have been agreed with the energy supplier, which means that payment obligations have been shifted into the future. The main reasons for the poor cost coverage are: 1) water tariffs are too low, 2) collection rates are low in some areas, particularly because public institutions do not pay their water bills, and 3) technical and commercial unaccounted for water, though in some cases this is at an acceptable level of 30%.

The very low water and waste water tariffs in particular pose a major risk to economic sustainability: the different water tariffs introduced in the various towns have not been adjusted at least since the plants were commissioned in 2009. They range from BOB 0.7/m<sup>3</sup> in Villa Montes to 2.3 in Camiri (EUR 0.09 to 0.28). In some cases, the period since the last adjustment is significantly longer (e.g. at least 20 years in Boyuibe) because the prices in place in 2009 were adopted unchanged from the “cooperatives” that operated the drinking water supply systems in the region at the time. By contrast, the energy costs needed for operating the pumps alone, for example, have increased significantly since 2009. Staff costs have also increased significantly in recent years, particularly because the central government legally requires employers to increase salaries every year and some of these increases have been high (2017: 8%). Furthermore, the “human right to water” – which the current Bolivian government is also promoting heavily on an international scale – is interpreted by the population to be a basic right to free water. In contrast, according to the international interpretation of human rights, the right to water means the right to water at socially affordable prices. For reasons of resource efficiency, prices for water are a sensible incentive for encouraging the economical use of a sparse resource. The current government is not addressing the local population’s understanding from a political perspective. In view of this situation, tariff adjustments are extremely unpopular politically speaking and cannot be enforced. Reliable subsidies from the central government or local authorities to compensate for this are not expected in the foreseeable future.

EPSA Manchaco, on the other hand, understands the need to change tariffs and is receiving active support from Helvetas. For instance, tariff studies were prepared at the end of 2018 for all project towns apart from Camiri (because this town is not a de facto member of EPSA anymore and the town has reassumed responsibility for operations). Helvetas is also applying a consistent and methodologically sound approach to all other formal steps needed to change tariffs and support increased collection rates in order to increase EPSA’s income as much as possible without raising tariffs. This even includes an extensive and locally customised awareness campaign for the populations in the towns of Villa Montes and Villa Vaca Guzman. However, tariffs have yet to be adjusted, despite the tariff studies.

Nevertheless, the evaluation team is sceptical that these elements are sufficient to form a positive perspective in view of economic sustainability: the risks of further tariff stagnation remain high. Even though the support from the Helvetas project could convince local authorities and local populations that higher tariffs are positive, we believe it is very likely that the regulatory authorities at national level will not approve any changes for political reasons. The belief that tariff increases cannot be politically enforced was confirmed by everyone that the evaluation team spoke to.

This lack of economic sustainability also has medium and long-term effects on all other sustainability aspects (including an indirect impact): ecological sustainability, e.g. if the waste water pumps need replacing, technical sustainability if payment arrears increase significantly in the payment of salaries, and institutional sustainability as a result of burgeoning conflicts if EPSA is unable to maintain the current quality of its performance due to its difficult financial situation.

In view of the high economic sustainability risk and lack of positive prospects, we rate the programme's sustainability as unsatisfactory overall.

**Sustainability 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:

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

Rating levels 1-3 denote a positive assessment or successful project while rating levels 4-6 denote a negative 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. Rating levels 1-3 of the overall rating denote a "successful" project while rating levels 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" (level 3).