

# Ex-post evaluation – Peru

**Sector:** Drinking water, water management, waste water/solid waste (1403000)  
**Programme:** Huancavelica water supply/sewage disposal cooperative programme (BMZ no. 2000 66 423)\*  
**Executing agency:** Empresa Municipal de Agua Potable y Alcantarillado de Huancavelica (EMAPA Huancavelica)



## Ex-post evaluation report: 2017

		Project (planned)	Project (actual)
Investment costs (total)	Mil. EUR	9.03	8.08
Counterpart contribution	Mil. EUR	1.10	1.44
Financing	Mil. EUR	7.93	6.64
of which BMZ budget funds	Mil. EUR	7.93	6.64

\*) Project in the 2015 random sample

**Summary:** The city of Huancavelica’s drinking water supply and sewage disposal system was rehabilitated and expanded by means of the project. EMAPA Huancavelica, the local public utilities services provider, was the project-executing agency. The project was realised as a cooperative programme with the GIZ.

**Development objectives:** Overarching goal: reduce the health hazards to Huancavelica residents, and decrease pollution of the urban environment and of the Río Ichu river.

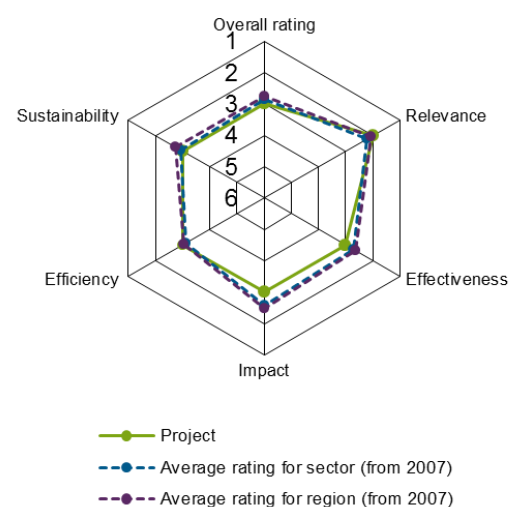
**Project objectives:** a) year-round, continuous supply of an appropriate amount of qualitatively safe drinking water to the connected population of Huancavelica; b) reduction in technical and administrative water loss; c) ensure central collection and treatment of sewage, safe in terms of community hygiene and ecology (construction of a treatment plant is planned to be financed by the Peruvian government).

**Target group:** Population of the city of Huancavelica (presently approx 50,000 residents).

## Overall rating: 3

**Rationale:** As a whole, the project still provides a satisfactory result. The good results from the water supply components and sewage collection (except for the decentralised supply systems that still remain) are weighed against a lack of impact from the unrealised treatment plant construction and serious sector-policy shortcomings.

**Highlights:** Heavy indebtedness is widespread among local water suppliers in Peru. Suppliers there are formally treated as private, profit-maximising companies under tax and debt law. However, in practice, they are often subjected to local political influence and social pressure. This leads to the fundamental problem of the investment risk being allocated entirely to the supply company, without it being able in practice to enforce the mechanisms necessary for a financially viable business (e.g. tariff levels). There is already a precedent case of a water supplier’s insolvency in Peru. However, we consider the risk to sustainability to be acceptable for the EMAPA Huancavelica case.



## Rating according to DAC criteria

### Overall rating: 3

#### Relevance

The project aims to make a contribution to the global development agenda (Millennium Development Goal 7 and Sustainable Development Goal 6) by guaranteeing access to safe drinking water for over 35,000 people (planned). This is also a declared development goal for Peru: the 2021 development plan (Plan Estratégico de Desarrollo Nacional, Peru hacia el 2021) aims for a national drinking water and sewage supply coverage rate of 90% by 2021. The project was part of the Federal Ministry for Economic Cooperation and Development's existing area of focus. In addition, the project's focus on one of the poorest regions in the country made it a suitable and important means of contributing to poverty reduction.

Before the project started, only around half of Huancavelica's inhabitants were connected to the drinking water network. The other half primarily acquired their drinking water from decentralised, off-grid systems whose supply standards were classified as qualitatively and quantitatively inadequate at the project's outset. Only 38% of the population was connected to a rudimentary sewage system. This system's sewage was transferred into the Ichu River via numerous entry points. The remainder of the population primarily used latrines and cesspits, whose contents often ended up on the ground surface or in neighbouring ditches.

The project design is fundamentally suitable for achieving the desired effects. In our current estimation, the project's priorities were defined with too strong a focus on a "conceptual standard", rather than taking account of the local characteristics. In view of this situation, we still consider the planned (not yet implemented) construction of a treatment plant necessary in the medium term, but not (yet) critical within the local context. Moreover, the project sought to introduce a central network to replace the autonomous, small-scale drinking water supply systems that existed in Huancavelica prior to project commencement. From the present perspective, an integrated approach with an advisory role for EMAPA would be more appropriate to the local situation.

The project was realised as a cooperative programme with the GIZ. Similar to other cooperative programmes, the simultaneous project start combined with a shorter preliminary period for the Technical Cooperation (TC) measure meant that the TC measures (professionalisation of administrative structures, process flows and target group information) had already largely been completed once the FC measures were carried through to implementation.

We therefore rate the otherwise very high relevance as "good", due to the conceptual limitations.

#### Relevance sub-rating: 2

#### Effectiveness

The project purposes defined during the appraisal were a) expansion and improvement of the water supply, b) reduction of network losses and c) sewage collection and treatment. A new raw water catchment, including a pipeline and two new drinking water treatment facilities, was built at a higher level above ground. Additionally, the distribution network was extended by 23.3 km. Altogether, 1,039 new household sewage connections were installed, the collection network was extended by 16.1 km and the main collector was rehabilitated. The planned treatment plant could not be built in the absence of a suitable location. The overall maintenance condition of the facilities examined is satisfactory.

Moreover, the project sought to introduce a central network to replace the autonomous, small-scale drinking water supply systems that existed in Huancavelica prior to project commencement. This target was missed: 17 of these systems continue to supply 15% of the city's households and enjoy a high level of social acceptance despite their qualitative limitations.

From today's perspective, the targets defined for the project are incomplete, as only technical indicators were defined and there were no economic-institutional indicators; these would have been able to illustrate the project-executing agency's performance capacity. Given this state of affairs, we propose replacing the

water meter coverage rate indicator envisaged during the appraisal, since it is not meaningful for evaluating economic sustainability and efficiency of supply in the local circumstances. The following indicator is applied in its place: "the operating revenues cover the operating costs."

Furthermore, individual indicators were benchmarked too strictly for the local levels. Consequently, water loss reduction to below 25%, as sought in the appraisal, was unrealistic in the local context; the network was only intended to be partly rehabilitated, but water production and pressure were increased at the same time. Moreover, the continuous water supply desired can be regarded as achieved, despite not being a full 24-hour supply (e.g. water unavailability during night).

The achievement of the project objectives can be summarised as follows:

Indicator	PA status	Ex-post evaluation
(1) There is enough drinking water available for the population: 95 l/c/d	- / -	110 l/c/d, achieved.
(2) The EMAPA network supplies 35,000 residents, giving a connection rate of 75%	48%	85%, achieved.
(3) Continuous water supply: 24 hours	12-18 hours	21.5 hours, can be regarded as achieved
(4) The drinking water quality meets the WHO standard	Not achieved	Achieved, for both physico-chemical and microbiological metrics
(5) Reduction of unaccounted for water (UfW) to < 25%	45% – however, the initial figure was probably higher.	40%, not achieved, but a positive trend.
(6) 30,000 residents are connected to the sewage network, giving a connection rate of 64%	38%	81%, achieved.
(7) 30,000 residents are connected to the lake sewage treatment plant, giving a connection rate of 64%	0%	0%, not achieved
(8) Quality of the lake sewage treatment plant's operation: 60 mg/L BOD5	-	Not achieved
(9) The operating revenues cover the operating costs	N/A	Can be regarded as achieved*

\* Depending on the year in question, and not factoring in the (adjusted) debt service and depreciation (see below)

Rehabilitating the existing water supply and sewage systems, and constructing new components (river extraction, two treatment plants, pipelines, service connections with water meters or sewage system with service connections) contributed significantly towards achieving the targets. However, the sewage is still not purified, as the location of the originally envisaged lake sewage treatment plant was found to be geologically unsuitable, meaning that the river water quality beneath the city has not improved.

Additionally, the water supply's large volumes of unaccounted-for water are currently problematic. These can be attributed to illegal water connections and leakages in the pipe network that has only been partially rehabilitated, as well as to water connections without water meters (23%). It is not possible to separate these losses into technical and commercial categories, due to the data situation. EMAPA Huancavelica has been able to slowly but continuously reduce the losses from 52% to 40-45% in recent years after the project's end. The business administration's management are eager to further reduce the losses to an acceptable level of 30% by means of a special operating unit.

Improving and expanding the sewerage system enabled us to achieve the central sewage collection objective, though not that of sewage treatment. Since EMAPA Huancavelica has since found a new location that is acceptable for the population, prompt implementation of a treatment plant is not impossible in the future. Whether the additional operating costs from sewage treatment can be covered in practice in the local context remains an open question.

The executing agency's liquidity is generally sufficient to maintain operations. However, this is only because EMAPA relinquished its interest and principal repayments on the Financial Cooperation (FC) loan to the Peruvian Ministry of Economy and Finance in 2013. The Ministry of Economy and Finance will now settle the loan with KfW. New and/or replacement investments are difficult, due to the narrow financial scope.

The TC supported the executing agency in professionalising the administrative structures and process flows, which led to certification as per ISO 9001 for a short time. In addition, the TC organised information efforts among the target groups in order to increase acceptance of the new water supply and related costs. Overall, we rate the executing agency's professionalism as positive.

From our current perspective, although 3 out of 9 indicators have not been achieved, we still rate the project's effectiveness as satisfactory based on the positive trends and our view that the lack of a treatment plant in the local context is still tolerable. Servicing of the FC loan will be evaluated in the Sustainability section.

**Effectiveness sub-rating: 3**

## Efficiency

As regards production efficiency, the unit cost for water supply is €176 per resident in terms of the beneficiary population. The unit cost for the sewerage system components is €60. This means that the costs are around 10% below those specifically projected in the programme appraisal (without treatment plant). We consider the unit costs acceptable, considering the particular project implementation conditions in the region (height, topography, relatively small project area).

Three-quarters of the system capacity is currently utilised. This guarantees an almost continuous water supply with a water consumption of 110 litres per resident per day. However, the capacity utilisation (and operating costs thereby incurred) would be significantly lower if the water loss rate could be decreased further. The fact that water meters are not comprehensively installed makes it difficult to charge by usage. In these cases, EMAPA invoices for a notional consumption flat rate.

In terms of the allocation efficiency, at present around 42,000 residents (around 22,000 more than predicted in the programme appraisal) are supplied by means of access to the central water network at the aforementioned cost, as was deemed appropriate. Drinking water in line with the WHO standard is now continuously available there, although interruptions to the supply by the hour are common at night in the local context. More than 40,000 residents (around 25,000 more than in the programme appraisal) have been connected to a functioning sewerage system in the meantime. This significantly reduces the risk of waterborne diseases.

The collection rate is almost 100%. EMAPA's customers evidently value its service.

In summary, we rate the project's efficiency as satisfactory.

**Efficiency sub-rating: 3**

### Overarching development policy impacts

The overarching target was to reduce the health hazards to Huancavelica residents and decrease pollution of the urban environment and of the Río Ichu river. No specific indicators were defined at programme appraisal for the achievement of the overarching goal.

The quality of the drinking water available in the EMAPA network (85% of the water supply) increased considerably as a result of the project's measures, a fact which has also been reflected in user surveys. Laboratory figures confirm that the drinking water quality complies with WHO standards. A lack of data makes it impossible to check whether the improved drinking water quality has caused gastro-intestinal diseases in the urban area to decrease.

DIRESA (Dirección Nacional de Salud – regional health authorities) reportedly inspects the 17 parallel networks that continue to exist (15% of the water supply) once a year. In 2015, 10 of the 17 systems were found to contain elevated levels of coliform germs. The project was unable to substitute these parallel networks, meaning that health risks persist outside the EMAPA network.

Sewage is discharged below Huancavelica's city centre, guaranteeing the positive environmental impacts – when viewing the urban area in isolation. The maximum sewage to river water ratio is around 1:12 during the dry season, while it is 1:800 in the wet season. The next locality, Yauli, is around 19 km downriver. Despite the sewage – which is entirely from households and non-industrial – not being purified, we currently consider the risks for people and the environment to be tolerable, due to the small-scale and remote activities downstream.

**Overarching development policy impacts sub-rating: 3**

### Sustainability

The ecological sustainability of the project is achieved. The water catchment area no longer contains any permanent glaciers, which is locally ascribed to the effects of climate change. EMAPA and ALA (Administración Local de Agua - local water authority) state that the water volumes at the upper reaches have decreased, although they are never less than 230 l/s, even in the dry season. Currently, EMAPA extracts around 90 l/s. Above the extraction station, at an altitude of about 3,960 m, there are only two small, temporary settlements (Astobamba (30 km away) and Puccapampa (50 km away)) with an estimated 50 inhabitants who practise small-scale cattle-herding, which poses no serious pollution hazard to the water quality. Mineral deposits are not mined above the extraction station. As explained above, the outlet channel's sufficient, year-round water volume also ensures that the discharged sewage is adequately diluted. Therefore, considering the distance to the next settlement on the lower reaches, the immediate environmental hazards from discharging the untreated sewage are currently considered to still be tolerable.

There is currently institutional-political sustainability, albeit subject to risks. Indeed, there is presently no alternative to the model of local public water utilities in mid-sized cities such as Huancavelica. However, efforts both to privatise and centralise can be observed among national actors. In 2013, an "insolvency prevention law" was introduced for local water suppliers in Peru, aimed at averting financial imbalances at an early stage. A first application of the law is currently being prepared for six water suppliers. The law provides the option of temporarily placing local water suppliers under national administration. At the same time, by establishing the Programa Nacional de Saneamiento Urbano (PNSU), the line ministry has created an instrument for centralising local water suppliers' previously decentralised investment activity. Since then, it has conducted around 50% of nationwide investment activity in the sector. However, these tendencies of re-centralisation are faced with strong local political interests to keep water suppliers in municipal hands. EMAPA enjoys a high degree of acceptance among the population. The existence of the competing, decentralised parallel systems on the outskirts of the city do not detract from this. EMAPA's roughly 50-person staff is very stable under the politically-appointed Management Board, and gives the

impression of expertise, which is also evident in the satisfactory overall maintenance condition of the systems that have been financed.

There are risks in terms of financial sustainability. EMAPA does generate enough revenue to cover operating costs. However, the financial scope for investments and new acquisitions is too narrow to be able to absorb unexpected shocks in the short term. Due to high write-downs, primarily on the FC-financed infrastructure, EMAPA's annual results are consistently negative on paper. Higher maintenance and expansion investments were largely financed by means of third-party grants, as with the "Expansion and improvement of drinking water and sewage network" project with €2.7 million from Peru's national budget. Consequently, the business risks resulting from this appear to be tolerable. A rate increase of around 19% is intended to safeguard operation of the expanded network once the project has ended. Repayment of the FC loan poses a considerable risk to financial sustainability. The debt service of over €220,000 a year (principal repayment only – around a third of EMAPA's total annual expenditures) was discontinued in 2013. The Peruvian Ministry of Economy and Finance has taken over the repayment to KfW. The method of managing the internal Peruvian relationship has not yet been completely decided. EMAPA is seeking the participation of the local and regional government in servicing the debt via a fund. EMAPA considers the alternative of increasing water rates by over 60% to be politically and socially unacceptable. The Ministry of Economy and Finance is currently categorically refusing a debt reduction and has threatened to take legal action if there is a prolonged default in payment. In an extreme case, EMAPA would be threatened by insolvency.

Despite these significant financial sustainability risks, insolvency or outright cessation of operations is unlikely for political reasons. Experience of insolvencies in Peru's water sector (e.g. EPS Grau in the Piura region) also indicates that insolvencies are not necessarily bound to result in significant limitations to the customer's supply reliability and quality. The new Peruvian government, which has been in office since summer 2016, has announced that it will attend to the water supplier's systemically rooted debt situation. We therefore rate the sustainability of the project as satisfactory, despite these risks.

**Sustainability sub-rating: 3**

### 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).