

Country Name	Project for Procurement of Drinking Water in Rural Areas in the Departments of Beni and Pando
Plurinational State of Bolivia	

I. Project Outline

Background	The water supply coverage ratio in the Departments of Beni and Pando were 9.1% and 13.5% (2005), respectively, lower than the national average (51.4%). Residents who had no access to safe water had to use water sources such as rivers, lakes, ponds and shallow wells, where water was polluted because of domestic wastewater or animal waste in some places. These caused prevalence of water-borne diseases and high child mortality ratios. “Five-year Water Supply Plan” was developed in the both departments with support of JICA, but the plan was not appropriately implemented, because they lacked equipment for borewell digging and groundwater surveys and human resources who were able to utilize this equipment.			
Objectives of the Project	To increase the water supply coverage in the rural areas in the Departments of Beni and Pando, by procurement of the equipment for drilling wells and conducting technical training on borewell drilling and construction of water supply facilities, thereby contributing to improvement of hygienic environments.			
Contents of the Project	1. Project Site: Departments of Beni and Pando 2. Japanese side: Equipment procurement (i) 1 machine with truck for 200m drilling for Beni, 1 machine with truck for 100m drilling for Pando, and spare parts, ii) support vehicles, iii) tests and measurements apparatus, iv) equipment for borewell construction, etc.), technical training (i) borewell drilling, construction of water facilities, ii) hydrological an geological surveys, surveys necessary for groundwater development including geophysical exploration, iii) operation and maintenance and hygiene education) 3. Bolivian Side: Construction of borewells and water facilities, assignment of technicians, etc.			
Project Period	E/N Date	June 18, 2012	Completion Date	October 14, 2015
	G/A Date	October 11, 2012 April 5, 2013 (First amendment) July 6, 2015 (Second amendment)		
Project Cost	E/N /Grant Limit: 566 million yen		Actual Grant Amount: 457 million yen	
Implementing Agency	Ministry of Environment and Water, Unit of Water, Basic Sanitary and Housing (UNASBVI) of Beni and Pando			
Contracted Agencies	Main Contractor: Ogawa Seiki Co., Ltd. Main Consultant: Kyowa Engineering Consultants Co., Ltd.			

II. Result of the Evaluation

<Special Perspectives Considered in the Ex-Post Evaluation>

- At the ex-ante evaluation, the prevalence ratio of water-borne diseases and hours required for fetching water were set as indicators of qualitative effects of “effectiveness.” However, as the project objectives indicate, these are results of water supply, and therefore they were verified as impacts.
- At the ex-ante evaluation, it was expected that indicators of the quantitative effects would be achieved by 2016, two years after the project completion. However, the project was completed in 2015, achievement in 2017 was compared with the plan.

1 Relevance
<Consistency with the Development Policy of Bolivia at the Time of Ex-Ante and Ex-Post Evaluation> Increasing the water supply coverage ratio in the rural areas to 80% was targeted in the “National Plan of Basic Hygiene” (2008-2015) and “Economic and Social Development Plan” (2016-2020). <Consistency with the Development Needs of Bolivia at the Time of Ex-Ante and Ex-Post Evaluation > The water supply coverage ratio in the Departments of Beni and Pando were lower than the national average, which were 61% and 67%, respectively at the time of the ex-post evaluation, while the national average was 85%. In the rural areas, the ratios were even lower, 45% and 53%, respectively. <Consistency with Japan’s ODA Policy at the Time of Ex-Ante Evaluation> In the “Country Assistance Program for Bolivia” (2009), one of the priority areas was social development including water and sanitation among others. Related to this, it aimed to “increase the number of target prefectures with assistance for water source development, to continue assisting local governments' efforts to enhance technology, and give consideration to the improvement of conditions for drinking water supply and sanitation in the outskirts of cities”. <Evaluation Result> In light of the above, the relevance of the project is high.
2 Effectiveness/Impact
<Effectiveness> The project objectives were achieved by the ex-post evaluation, the year after the target year ¹ . The planned number of borewells could

¹ While it had been expected that 10 borewells would have been drilled annually in each department in the preparatory study, the number planned at the ex-ante evaluation was 10 in each department two years later the project completion, without any exact description of a number per year or a total number over the two-year period. Under this circumstance, the evaluation team understood that the planned number would not have been on an annual basis but over the period, mainly based on the following viewpoints: (1) Even in the preparatory study, the local staff to be trained by the technical assistance would be expected just to obtain the basic operation skill for securely working, not to drill best quality borewells in an efficient manner. (2) Even though it might be feasible for the trained local staff to drill 10 borewells annually under the assumption that it takes 10 days to drill a borewell, it is certainly difficult in reality to do due to the pre-works and additional works, equipment transportation and maintenance, unsettled weather and other unexpected events. (3) Considering the above-mentioned items, it is reasonable to understand that the 10 borewells per year set in the preparatory study are something like a

not be drilled by 2017, two years after the project completion as targeted, but it was completed by the time of the ex-post evaluation (2018). The water supply coverage ratio in the rural areas much exceeded the target. This is attributed to achievement of programs for water facility construction programs. Besides drilling works with the procured equipment conducted by the Unit of Water, Basic Sanitary and Housing (UNASBVI) of Beni and the Department Services of Rural Water and Electrification (SEDAE) of Pando, many borewells were drilled by the Ministry of Environment and Water and the Ministry of Rural Development and Land under the programs, “Mi Agua” and “Mi Pozo,” respectively².

As qualitative effects, it is judged that the implementation system for providing water supply services of Beni and Pando has been partially strengthened. It is judged that technical personnel of UNASBVI of Beni and SEDA E of Pando have improved capacity for water supply programs through the project training. This is based on the facts that both departments could develop their five-year plan with prioritization after considering requests from the communities, they conducted surveys before drilling, and they have continued activities for formation of Water and Sanitation Committees (CAPyS), hygiene education and pump installation regardless the personnel turnover. It is worth mentioning that, although it was expected that 10 drills would have been drilled annually under the “Five-year Water Supply Plan” as a result of the institutional development of each department, only 1-8 borewells were annually drilled from 2015 to 2018. Reasons in Beni include turnover of the top management personnel after decentralization and gubernatorial election, turnover of the personnel trained by the project, and maintenance of water supply facilities constructed by the national programs. Reasons in Pando are resignation and dismissal of the personnel due to the pay cut after the heavy fall of the oil price in 2016, much time required for budget application for drilling equipment, retardation of the joint drilling programs with the municipalities³, and so on. In addition, the limited access in the rainy season⁴ was common reason for both departments. Another reason is that it has taken time to conduct geophysical surveys for identifying a suitable area for drilling a borewell.

<Impact>

As expected impacts, firstly, the prevalence ratio of acute diarrhea decreased in most of the municipalities and departments from which data were available at the ex-post evaluation (Table 1). The reason which the ratio increased in Trinidad of Beni is that reported cases of acute diarrhea increased, according to the staff of the health section of Beni. This happened because the data coverage was expanded, many serious patients were referred to the department capital Trinidad, hospitals in Trinidad were good in access, and more people were encouraged to go to hospital after diffused sanitation education. The difference between the male and female prevalence ratio of Pando was bigger than that of Beni. According to SEDA E staff in charge of community development, women have more possibilities of infection because they fetch water or work with water. Secondly, time for fetching water has been reduced. In seven interviewed communities, it used to take 20-40 minutes to reach sources for fetching water, but it decreased.

As unexpected impacts, firstly, there has been an impact on gender. According to interviewed community members of staff in charge of community development of both departments, after the water facility was constructed nearby, women have needed less time for washing clothes in the river or lake and had less burden for carrying heavy and wet clothes after washing. And, due to available clean water, it has not been necessary any more for water storage and sterilization (boiling and adding chlorine). And, training for organizing CAPyS has made community members more conscious of gender and some communities have selected women as members for the first time. Secondly, after clean water became available for bathing, community members have come to keep their body and hair clean. Hygiene habits have been tangibly improved. Thirdly, the population has increased in some communities, because more people immigrated for available clean water. For example, in a community in San Andres City, there had been 40 households, which increased to 87 households as of the time of the ex-post evaluation. However, it was pointed out that there might be water shortage in the future.

<Evaluation Result>

Therefore, the effectiveness/impact of the project is high.

Quantitative Effects:

		Baseline 2009	Target 2016 2 years after the project completion	Actual 2015	Actual 2016	Actual 2017 2 years after the project completion	Actual 2018	Total
No. of drilled borewells	Beni	0	10	0	1	2	8	11
	Pando	0	10	0	3	2	5	10
Water supply coverage ratio in the rural area (%)	Beni	9.1	15.4	N/A	61.4	N/A	N/A	
	Pando	13.5	47.9	N/A	54.9	N/A	N/A	

Table 1 Prevalence ratio of acute diarrhea (%)

			2015	2018
Beni	Loreto	Male	10.3	5.8
		Female	9.1	6.1
		Total	9.7	6.0
	Sand Andres	Male	5.5	4.7
		Female	5.2	5.5
		Total	5.4	5.1
	Trinidad	Male	6.1	7.3
		Female	6.3	7.6
		Total	6.2	7.5
Pando	Department Total	Male	7.2	6.5
		Female	7.0	6.4
		Total	7.1	6.5
	Bella Flor	Male	8.6	5.8
		Female	12.0	6.7
		Total	10.0	6.2
	Department Total	Male	9.8	7.5
		Female	10.5	8.2
		Total	10.1	7.8

Source: Data provided by the Department Service of Health of Beni, National Information System of Health.

benchmark for capacity improvement through the technical assistance under the project.

² While 132 and 63 borewells were drilled in Beni and Pando, respectively, after July 2015 as of the time of the ex-post evaluation under the program of the Ministry of Environment and Water, the numbers of borewells drilled with the procured equipment under this project were just 11 in Beni and 10 in Pando, much less than those under the Ministry program. However, as the planned number under this project had been completed by the time of the ex-post evaluation, the project contributed to the improvement of water supply coverage ratio in the rural areas as planned at the ex-ante evaluation.

³ In Pando, SEDA E receive a request for drilling borewells from a municipality, they exchange agreement. After the municipality pays 50% as its contribution, SEDA E starts drilling.

⁴ The rainy season lasts for six months in Beni and Pando, during this period, it is not accessible to the sites in the rural areas.

3 Efficiency

Although the project cost within the plan (Ratio against the plan: 81%), the project period exceed the plan (Ratio against the plan: 154%). The reason of excess is that the equipment, after procurement, was being withheld in the bond storeroom in the target departments, because they were not be carried to the project sites due to flooding. However, the application procedure for storage extension was not conducted appropriately, the ownership was transferred to the president office. Then, after going through JICA Bolivia's negotiation and procedures, they were returned and carried to the sites. Also, technical training activities were delayed, being affected by the gubernatorial election in March 2015. These took time. There was some changes in the procured equipment. Therefore, the efficiency of the project is fair.

4 Sustainability

<Institutional Aspect>

In Beni and Pando, UNASBVI and SEDAE, respectively, take responsibilities for drilling borewells, and municipalities outsource and supervise construction of water supply facilities to private companies. Communities through CAPyS operate and maintenance constructed facilities. When problems arise with borewells or water supply facilities which cannot be dealt with by CAPyS, they report to municipalities or UNASBVI/SEDAE. UNASBVI and SEDAE have 14 and seven personnel, respectively, among which six and seven are in charge of borewell drilling. According to SEDAE, the number of personnel for drilling borewells is not sufficient, because they have to take other duties. Personnel in charge of construction of water supply facilities also cover other public works such as roads and schools, and interviewed municipalities answered that the number is not sufficient. In communities where the water supply facility was constructed, CAPyS was organized, for which the president, secretary, accountant, responsible for hygiene, and audit have been assigned. For the borewells drilled in the land of the government office of Beni and municipality of Loreto, each personnel take responsibilities of CAPyS.

<Technical Aspect>

In both departments, UNASBVI/SEDAE have sustained necessary knowledge for developing plans for drilling borewells and constructing water supply facilities, surveys for groundwater development, organization of CAPyS and hygiene education, as explained earlier. In Beni, although personnel trained by the project were dismissed, those who were trained as assistants during the project period would be employed after training. In Pando, personnel trained by the project have continued working. In many municipalities, personnel responsible for construction of water supply facilities are young technicians without experience, whose skills are not sufficient, according to UNASBVI/SEDAE and municipalities.

<Financial Aspect>

According to UNASBVI of Beni, they have had sufficient budgets for maintenance of the procured equipment, groundwater survey, drilling and cleaning of drills, and so on (Table 2), while budgets for water supply facilities, installation of water pipes and water distribution are borne by municipalities. In Pando, UNASBVI was reorganized as the Department of Water Supply Services in 2015, and then as SEDAE in 2017, which has its own budgets. They drill borewells in collaboration with municipalities by receiving their 50% contribution, but their budgets can cover about drilling of six borewells per year, not reaching the planned 10. In six interviewed communities, CAPyS collect funds necessary for operation and maintenance of the water supply facility (monthly 20-50 Bolivianos per household).

<Current Status of Operation and Maintenance>

It can be judged that the condition of the equipment procured by the project has been mostly appropriate. In Beni, the borehole logging equipment and the compressor for borewell drilling have not been functioning partially, and the generator has been broken. Other equipment except these have been utilized in a good condition. As maintenance of the procured equipment, before and after drilling, they check up casing sheet valves and change oils for the drilling machine, change oil of the support vehicle after they are run for 5,000 km and change clutch disks as necessary. The equipment for groundwater survey is cleaned after it is used. In the target communities, the water tank and borewell are regularly cleaned by CAPyS and UNASBVI/SEDAE, respectively. When it is necessary to update the water supply facility in the future, CAPyS request it to the municipality, which will then include it in the following year budget. It is possible to purchase most of consumables and spare parts of the procured equipment nearby, but it is necessary to procure gravel and pipes in Santa Cruz. In Beni and Pando, because bulk purchase is not allowed, it takes more time and costs to purchase them individually.

<Evaluation Result>

There have been slight problems in the institutional, technical and financial aspect of the implementing agency. Therefore, the sustainability of the project effect is fair.

5 Summary of the Evaluation

It can be judged that the project objectives have been achieved. Borewell drilling did not reach the plan by the target year, but it exceeded the plan by the time of the ex-post evaluation. The ratio of water supply coverage exceeded the target very much, also attributed to the disseminated national water supply programs. Although it is judged that technical personnel in charge of borewell drilling and groundwater survey have improved their capacity for water supply, water supply programs of the two departments have not been conducted as planned. The prevalence ratio of water-borne diseases decreased in both departments. Regarding sustainability, although there are personnel, technical and financial shortages at the municipal level, there have been no major problem for sustaining maintenance of the procured equipment, groundwater survey and drilling at UNASBVI/SEDAE. As for the project efficiency, the project period exceeded the plan.

Considering all of the above points, this project is evaluated to be satisfactory.

III. Recommendations & Lessons Learned**Recommendations to Implementing Agency:**

Table 2 Budgets for Water Supply Programs of Beni (Bs.)

	2017	2018	2019
Budgeted	5,778,884	3,679,524	3,679,524
Disbursed	4,068,881	3,281,604	565,051

Source: UNASBVI of Beni.

Note: Disbursement of 2019 was that as of April 2019.

Table 3 Budgets for Water Supply Programs of Pando (Bs.)

	2016	2017	2018	2019
Budgeted	1,761,537	1,528,097	1,618,224	1,646,113
Disbursed	1,638,038	1,260,706	1,459,285	680,114

Source: SEDAE of Pando.

Note: Disbursement of 2019 was that as of April 2019.

- It is recommended to UNASBVI of Beni and SEDAE of Pando to strengthen diffusion of water supply programs in collaboration with the national programs. In other words, it is recommended to discuss with the National Fund for Productive and Social Investment which implements the national water supply programs by the inception of the next phase of “Mi Agua” so that all of borewell drilling should be conducted by UNASBVI/SEDAE in order to make maintenance easy after the project completion. And, it is necessary to discuss work demarcation with the Department Service of Health since some works including the test and monitoring of water quality of borewells and hygiene education are overlapped.
- It is recommended to UNASBVI of Beni and SEDAE of Pando to discuss with the Public Works Department and Planning Department of each department so that they could purchase necessary equipment for drilling borewells in bulk to save time and cost of procurement. Time and cost for borewell drilling activities could be reduced.

Lessons Learned for JICA:

- Some of the indicators set at the ex-ante evaluation should have been more precise. There was no explanation on the number of borewells to be drilled at the target year, which had been set at the ex-ante evaluation; a number per year or till the target year. This caused some difficulty in the process of evaluation.



Interview at Peloto, Beni



Workshop on “Sustainable Groundwater Development” organized by the Ministry of Environment and SEDAE of Pando from 8th to 9th April 2019.