

Country Name	Project of Capacity Development for Agriculture with Irrigation
Plurinational State of Bolivia	

## I. Project Outline

Background	<p>Bolivia had the largest income gap among Latin American countries. In rural areas with 34% of the population, 66% of the rural population were in poverty, and 45% were in extreme poverty (2009). 76% (2009) of the rural population was engaged in agricultural activities, and most of them were poor farmers, being mainly engaged in crop production for their own consumption. Lack of water was considered as the most problematic among difficulties facing subsistence farmers, such as lack of farming technologies, seeds, and fertilizers. In areas where farmers did not count on irrigation, they suffered from low productivity, instability of production, and limited options of crops. Also, one of the bottlenecks was the lack of technical capacity of human resources in irrigation. Both municipalities which were in charge of identification and implementation of irrigation projects and departments which should give technical assistance to municipalities suffered from a shortage of competent human resources in irrigation.</p>												
Objectives of the Project	<p>Through the analysis of technical issues in agriculture with irrigation, consideration of countermeasures, development of the mid-term master plan on capacity development activities of the National School of Irrigation (ENR), and follow-up of training in seven departments, the project aimed at utilization of knowledge and technologies acquired from ENR by irrigation engineers/technicians and irrigation farmers, thereby contributing to promotion of agriculture with irrigation.</p> <p>1. Overall Goal: Agriculture with irrigation will be promoted in 7 departments of Bolivia.  2. Project Purpose: Irrigation engineers/technicians and irrigation farmers utilize knowledge and technologies acquired in the capacity development activities implemented by National Irrigation School.</p>												
Activities of the project	<p>1. Project site: Departments of La Paz, Oruro, Potosí, Chuquisaca, Cochabamba, Tarija and Santa Cruz.  2. Main activities: Analysis of technical issues in agriculture with irrigation, consideration of countermeasures, development of the mid-term master plan on capacity development activities of ENR, follow-up of training, etc.  3. Inputs (to carry out above activities)</p> <table border="0"> <tr> <td>Japanese Side</td> <td>Bolivian Side</td> </tr> <tr> <td>1) Experts from Japan: 7 persons</td> <td>1) Staff allocated: 31 persons</td> </tr> <tr> <td>2) Training in Japan: 29 persons</td> <td>2) Land and facilities: Office space, training facility, etc.</td> </tr> <tr> <td>3) Equipment: PC, portable weather meter, irrigation equipment, soil analysis kit, etc.</td> <td>3) Local cost: travel cost, assignment of office personnel, electricity charge, communication cost, etc.</td> </tr> <tr> <td>4) Local cost: hiring local consultants, travel cost, etc.</td> <td></td> </tr> </table>			Japanese Side	Bolivian Side	1) Experts from Japan: 7 persons	1) Staff allocated: 31 persons	2) Training in Japan: 29 persons	2) Land and facilities: Office space, training facility, etc.	3) Equipment: PC, portable weather meter, irrigation equipment, soil analysis kit, etc.	3) Local cost: travel cost, assignment of office personnel, electricity charge, communication cost, etc.	4) Local cost: hiring local consultants, travel cost, etc.	
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Project Period	November 2012 to November 2016	Project Cost	(ex-ante) 367 million yen, (actual) 265 million yen										
Implementing Agency	National Service of Irrigation (SENARI)												
Cooperation Agency in Japan	None.												

## II. Result of the Evaluation

### <Special Perspectives Considered in the Ex-Post Evaluation>

- The indicators of the Project Purpose were to verify the use of knowledge and skills acquired by irrigation technicians and farmers in the capacity development activities by ENR. The Overall Goal was to promote agriculture with irrigation in the target 7 departments. In the ex-post evaluation, for verification of the continuation status of the project effects to contribute to the achievement of the Overall Goal, it was decided to confirm ENR's monitoring of the trained farmers and reflection of in the annual plan and other qualitative information regarding the of irrigation technicians and farmers who have continued to use the knowledge and skills acquired.
- Because of the outbreak of COVID-19, information was collected through a questionnaire survey and phone interviews to make evaluation judgement in the ex-post evaluation. Site visits were not conducted.

### 1 Relevance

#### <Consistency with the Development Policy of Bolivia at the time of Ex-ante Evaluation>

The "National Irrigation Development Plan" (2007-2011) set the policy objectives of improving and expanding technical support, training, research, and technology development for irrigation, which were to be addressed through ENR. Thus, the project was consistent with the development policy of Bolivia at the time of ex-ante evaluation.

#### <Consistency with the Development Needs of Bolivia at the time of Ex-ante Evaluation>

The irrigated area in Bolivia was only 226,500ha or 11% of the total agricultural land area, and agricultural productivity was low in under-irrigated areas, resulting in unstable production and limited cropping, which directly led to instability in food security for poor farmers. On the other hand, lack of technical capacity of human resources in irrigation was a bottleneck. In many cases, irrigation facilities did not function effectively due to design errors and inadequate construction management. In this sense, the project was consistent with the development needs of Bolivia.

#### <Consistency with Japan's ODA Policy at the time of Ex-ante Evaluation >

In the "Country Assistance Policy for Bolivia" (2012), two pillars of the assistance were "social development with a focus on human resource development" and "improving productivity through community development and other means. In the agricultural sector, the program for poverty reduction among small-scale farmers was planned to contribute to improving productivity through community

development and other means.

<Evaluation Result>

In light of the above, the relevance of the project is high.

2 Effectiveness/Impact

<Status of Achievement for the Project Purpose at the time of Project Completion>

The Project Purpose was achieved by the time of project completion. In the project, among the technicians who were trained in seven departments (La Paz, Oruro, Potosí, Chuquisaca, Cochabamba, Santa Cruz, and Tarija), 402 of them actually used the knowledge and skills (Indicator 1). In addition to the technicians, training was provided to 2,455 farmers and 1,102 promoters. Promoters had a role in disseminating irrigation technologies to neighboring farmers and community members after the training. According to the promoters of 28 model irrigation systems, the training participants used the knowledge and skills acquired and used various irrigation systems, including sprinkler irrigation systems (Indicator 2). Also, in 399 other irrigation systems, farmers used the knowledge and technology acquired.

<Continuation Status of Project Effects at the time of Ex-post Evaluation>

The project effects have partially continued. According to SENARI, ENR has monitored irrigation users after the training and incorporated the results into its annual plan. According to questionnaire responses from several Department Services of Irrigation (SEDERI), one of them has supported farmers after the training including monitoring as agreed with ENR (Oruro), and another department has organized groups to continue training and promoted farmer-to-farmer training (Potosí). On the other hand, some have not been able to fully support farmers due to a lack of budget and staff allocations from the department government (Chuquisaca and Cochabamba). In all the five responding departments (La Paz, Oruro, Potosí, Chuquisaca, and Cochabamba), farmers who received training under the project have continued to use the technology they acquired to practice agriculture with irrigation.

<Status of Achievement for Overall Goal at the time of Ex-post Evaluation>

It is judged that the Overall Goal has been partially achieved. In the seven target departments, irrigated areas with appropriate irrigation systems that meet the standards of survey and design determined by the Ministry of Environment and Water (MMAyA) have increased (Indicator 1), according to SENARI, although exact data did not exist. According to SEDERIs and SENARI, 130 irrigation system have been utilized, but in some systems farmers have not properly implemented water management and maintenance systems (Indicator 2). In some systems, water management has not been carried out, due to lack of waterway rehabilitation and technical training. Water quality management has been implemented under SEDERI supervision in four of the five responding departments. However, SEDERI operations have been suspended in Chuquisaca Department since 2015. Since the project completion, promoters in the majority of the departments have provided training to farmers and community members to diffuse irrigation techniques to other irrigation systems model systems. On the other hand, in one department (Chuquisaca), the promoters have not provided training but SENARI has provided training directly through the municipalities.

<Other Impacts at the time of Ex-post Evaluation>

Firstly, there have been positive impacts related to gender. The irrigation technologies introduced by the project have been easy to use and women who had not previously participated in agriculture have become actively involved in irrigation management works. They have participated in general and ad hoc meetings of irrigation groups. These changes have been probably brought by the project's intention to invite the same number of women as men to training. According to SEDERI of Potosí, while men's sources of income have become diversified, women have often remained engaged in agriculture, and thus the inclusion of women in training was important to improve their productivity, and women were also interested in training. Secondly, the project worked together with other projects. In Oruro, due to the "Project for the Development of the Training Facility for Irrigation in Challapata" (2017) which developed a training facility, 1,200 households became able to receive hands-on training in water-saving irrigation technologies. Thirdly, various training events have been conducted by irrigation technicians of SENARI and SEDRI through ENR at the national level to replicate the knowledge and technologies acquired in this project.

There has been no negative impact on the natural environment.

<Evaluation Result>

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

Achievement of the Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) Irrigation engineers/ technicians and irrigation farmers utilize knowledge and technologies acquired in the capacity development activities implemented by National Irrigation School.	1. Among irrigation technicians who have participated in capacity development activities, 350 technicians utilize knowledge and technologies acquired.	<u>Status of achievement: Achieved (Partially continued)</u> (Project Completion) - Of the 2,269 training participants (2,165 general technicians and 104 postgraduate level technicians), 402 reported that they were actually using the knowledge and skills acquired. (Ex-post evaluation) - ENR has monitored irrigation users after the training and incorporated the results into its annual plan. - According to SEDERI, some departments have supported farmers but others have not.
	2. In 28 model irrigation systems, irrigation farmers who have participated in capacity development activities utilize knowledge and technologies acquired.	<u>Status of achievement: Achieved (Continued)</u> (Project Completion) - Training participants utilized knowledge and technologies acquired, according to the promoters of 28 model irrigation systems. They used a variety of irrigation systems, including sprinkler irrigation systems. - 399 irrigation systems reported that they were actually using the knowledge and skills acquired. - More than 90% of training participants reported that they were satisfied with the training and more than 80% were satisfied with the instructor's lectures. (Ex-post evaluation)

		- In all the five responding departments, farmers who received training under the project have continued to use the technology they acquired to practice agriculture with irrigation.
(Overall goal) Agriculture with irrigation will be promoted in 7 departments of Bolivia.	1. Increase 7,200ha of irrigated areas with appropriate irrigation systems that meet survey and design and standards determined by MMAyA.	<u>Status of achievement: Achieved.</u> (Ex-post Evaluation) - Irrigated areas with appropriate irrigation systems that meet the standards of survey and design determined by MMAyA have increased, although data was not available.
	2. In 130 irrigation systems, irrigation farmers implement water management and maintenance system in the proper manner.	<u>Status of achievement: Not verified.</u> (Ex-post Evaluation) - 130 irrigation systems have been utilized, but in some systems farmers have not properly implemented water management and maintenance system. - Irrigation water quality management has been conducted under SEDERI supervision in 4 out of 5 surveyed departments.

Source: Project Completion Report and information provided by SENARI and SEDERI.

### 3 Efficiency

Both the project cost and period were within the plan (ratio against the plan: 72% and 100% respectively). Outputs were produced as planned. Therefore, the project efficiency is high.

### 4 Sustainability

#### <Policy Aspect>

Promotion and diffusion of agriculture with irrigation have been prioritized in the "National Food Security Policy". The law "Irrigation Decade: 2015-2025" (2015) has aimed to revitalize irrigation systems and increase productivity for increasing the irrigated area to one million ha by 2025. ENR has been considered as one of the means for agriculture with irrigation, which has been also aligned with the Law No. 786 "Comprehensive Socio-Economic Development Plan" (2016-2020). Besides, in SENARI's "Organizational Strategic Plan" (2016-2020), capacity development of stakeholders was one of the strategic objectives.

#### <Institutional/Organizational Aspect>

According to SENARI, there has been no change in the organizational structure of SENARI to promote human resource development activities and farmers' agriculture with irrigation, including ENR strengthened by the project. However, sufficient staff has not been assigned due to a lack of budgets. At the department level, SEDERI in three of the five surveyed departments has had sufficient personnel to provide technical assistance to irrigated farmers (Oruro, Potosí and La Paz). In Oruro, technicians have also been assigned to the facility developed by the "Project for the Development of the Training Facility for Irrigation in Challapata" (2017). On the other hand, there has been a lack of monitoring support to farmers (Chuquisaca), insufficient field experiments and technology dissemination to farmers (La Paz). In Chuquisaca, SEDERI has not functioned since 2015 due to a lack of budget and staff allocation. SEDERI in four of the surveyed departments has worked with ENR to conduct training for irrigation technicians and farmers per its medium-term and annual plan (Oruro, La Paz, Potosí and Cochabamba). It is noteworthy that SENARI and the Ministry of Education have worked together to issue formal certificates to training participants, which has increased their motivation.

#### <Technical Aspect>

According to SENARI, SENARI including ENR has established training methods and has sustained the knowledge and skills necessary to continue its capacity development activities. Among the five surveyed departments, three responded with specific examples of how SEDERI has maintained skills to promote agriculture with irrigation. For example, in Oruro, capacity building of staff has been carried out, including training on fundraising methods as well as technical matters. In La Paz, there has been staff with up-to-date knowledge and the training environment has been well-developed. In Potosí, not only farmers but also its staff members have participated in the training, with instructions from the governor. Not only full-time staff but also the fixed-term staff have participated in the training. Training manuals (PDCA, gender, etc.) prepared by the project have been utilized.

#### <Financial Aspect>

Budget data of SENARI and ENR were not available, but SENARI answered that the budget has not been sufficient to continue capacity development activities. Similarly, in the five surveyed departments, the budget has not been sufficient to promote agriculture with irrigation, according to SEDERI. In SEDERI of Potosí, the training unit has been funded separately from the general budget, while others have not been able to provide adequate training.

#### <Evaluation Result>

In the light above, there have been issues in the institutional/organizational and financial aspects. Therefore, the sustainability of the effects is fair.

### 5 Summary of the Evaluation

The Project Purpose was achieved. Irrigation technicians and farmers in the seven target departments attended the training and have used the knowledge and skills acquired from the project. After the project completion, the irrigated area in the seven target departments has increased. Also, ENR has monitored the training participants and reflected the result in the annual plan. On the other hand, although farmers have conducted water management and facility maintenance, SEDERI's support to farmers has not been sufficient in some departments. Regarding sustainability, SENARI has faced lack of staff and budget. At the department level, although structures have varied, staff and budget shortages have been common. However, SENARI including ENR has established the training system, collaborated with the Ministry of Education for increasing training participants' motivation, and sustained necessary knowledge and skills to sustain capacity development activities.

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

### III. Recommendations & Lessons Learned

#### Recommendations for Implementing agency:

- It is recommended to SENARI to work with the department governments to follow up on the role of SEDERI and related agencies, so

that SEDERIs could continue training irrigation technicians and farmers per ENR's plan and that irrigation facilities would be properly maintained.

- One of the reasons of the insufficient waterway rehabilitation is that the water fees have not been properly collected. As a result, water management has not been carried out in some irrigation systems. SENARI should train the staff of the department governments and municipalities on the importance of the facility operation and maintenance.
- Some farmers have acquired advanced technologies and acted as promoters. It is recommended to ENR to ask their opinions to revise the training curriculum for further development.
- The organizational setting for supporting agriculture with irrigation depends on each department, and some have made efforts that could be a model for others and produced better results. SENARI would need to share and disseminate their experiences.
- It motivated the participants that SENARI implemented the training collaborated with ministry of education and issued the certificates to them. It is recommended that such collaboration should be replicated in the other future activities.
- SENARI should continually prepare and approve the mid-term plan of ENR, and it should be authorized by MMAyA, and it is expected that the feasibility of the plan would be enhanced. It is necessary to strengthen the coordination with SEDERI for planning ERN and conduct training for irrigation technicians and farmers.
- It is recommended to SENARI to monitor the data of the number and surface of the irrigation systems and analyze their contribution to the increase in the agricultural production. Based on these results, SENARI would request the personnel and financial allocation and increase the farmers' motivation.

#### Lessons Learned:

- In some departments, SEDERI has not functioned as it was initially expected to. In Bolivia, the individualistic connection of the heads of organizations may change decisions or make it difficult to communicate with other organizations. It should be borne in mind that targeting multiple organizations, as in the case of the project, might pose risks related to coordination and also make it difficult to achieve and sustain the project effects. In such cases, it should be necessary to have policy support for minimizing the impact of personnel, by involving the responsible authorities not only the implementing agency from the project's inception stage.
- The project concentrated on capacity building of farmers and irrigation technicians, and the project achieved its objectives in this regard. However, in some areas, irrigation facilities have not been properly maintained because user fees have not been collected. In projects for agriculture with irrigation, support should be provided not only in the technical aspect but also in the organizational aspect such as improvement of the fee collection system, in parallel. Also, coordination of the various actors involved in the facility operation and maintenance should be conducted.
- The project succeeded in increasing the training participants' motivation by issuing the certificate in collaboration with the Ministry of Education. Even for informal training outside the education sector, it can motivate training participants by providing certificates issued by the Ministry of Education, which will also help to sustain the training effects.