

Plurinational State of Bolivia

Ex-Post Evaluation of Japanese Technical Cooperation Project

“The Technological Center on Agriculture and Livestock in the Republic of Bolivia
(CETABOL) Phase II Project”

External Evaluator: Masafumi Ikeno, KRI International Corp.

0. Summary

This project was implemented with the objective of strengthening the functions and enhancing the operation and management system for agriculture and livestock technology in order to facilitate self-reliant operations development by the Technological Center on Agriculture and Livestock in Bolivia (CETABOL).

Promotion of agriculture through the dissemination of sustainable technology matches the development policies in Bolivia aimed at promoting the development of agricultural communities by strengthening competitiveness, and the ODA policy of Japan which has a primary focus on regional economic development centered around agriculture and enabling farmers of Japanese descent to put down stable roots, and therefore has a high level of relevance.

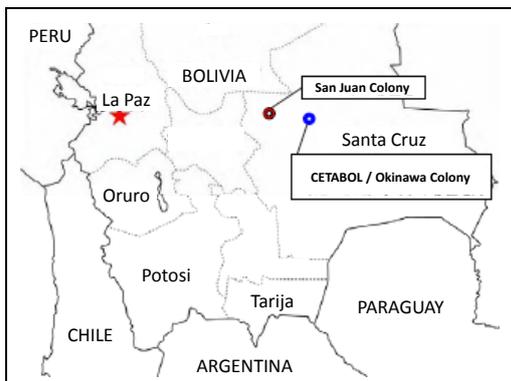
The desired original objectives concerning the strengthening of functions related to agriculture and livestock technology at CETABOL and upgrading its operations and management system were achieved. Regarding overall objectives, it was also verified that dissemination of technology by CETABOL helped stabilize agricultural and livestock production in the region, and contributed to boosting production capabilities by persons involved in agriculture, meaning that the project had a high level of effectiveness and impact.

The elements input for manifestation of the output were appropriate, and the period of cooperation was within the plan, but the provision of supplied equipment with the aim of enabling the organization to make a profit after the transfer of operation and management resulted in the amount of cooperation funds actually expended substantially exceeding the planned amount. Therefore, efficiency was fair.

There were no problems with the policy system, counterpart system, and the sustainability of the technology. The financial status of CETABOL was not particularly good for two years after transfer due to investments made to enable it to make a profit. However once the business started, the effects of investments have been manifested. Therefore, sustainability was fair.

In light of the above, this project is evaluated to be satisfactory.

1. Project Description



(Project Location)



(CETABOL Headquarters)

1.1 Background

The Technological Center on Agriculture and Livestock in Bolivia (Centro Tecnológico Agropecuario en Bolivia: CETABOL) is located in Santa Cruz Department which accounts for 80% of agricultural production in the Plurinational State of Bolivia (hereinafter referred to as “Bolivia”). CETABOL was an agricultural and livestock research and experiment facility created in 1985 to provide support for the stabilization of farming by farmers of Japanese descent (Nikkei farmers) that reorganized and integrated the San Juan Demonstration Farm (established in 1961) and Livestock Demonstration Farm (established in 1970, renamed Okinawa Livestock Demonstration Center in 1971). It was directly managed by the Japan International Cooperation Agency (JICA).

As of the beginning of the 21st century, in addition to helping stabilize farming by Nikkei farmers for 50 years since they migrated to Bolivia, CETABOL has also contributed to the development of farming technology used by Bolivian farmers. Judging from this track record, after discussions with the relevant authorities in Bolivia, JICA made the decision to transfer operations and management of CETABOL to Nikkei cooperatives which had been the target of technical support from JICA, with the objective of facilitating sustainable growth of agriculture in Santa Cruz Department and stimulate economic activity in the region.

Upon receiving the results of these discussions, JICA set an objective of the smooth transfer of operations and management of CETABOL from JICA to Nikkei cooperatives by 2010, and reached an agreement with the relevant authorities in Bolivia to implement the “Project of the Technological Center on Agriculture and Livestock in the Republic of Bolivia (CETABOL)” from fiscal 2001 to fiscal 2009 with the objective of the development of human resources at CETABOL and the upgrading of its organization.

The first phase of this technical cooperation project was implemented from fiscal

2001 to fiscal 2004, and the second phase of the project was implemented from fiscal 2005 to fiscal 2009. In the second phase which is the target of this evaluation in particular, the objective was to develop the system for operation and management to facilitate self-reliant business operation of CETABOL after transfer from JICA to CETABOL which was planned for 2010, as well as strengthening the functions related to agriculture and livestock technology.

1.2 Project Outline

| | | |
|-----------------------|----------|---|
| Overall Goal | | Dissemination of sustainable agriculture technology in the tropical humid area in Santa Cruz Department. |
| Project Objective | | Development of the Technological Center on Agriculture and Livestock in Bolivia that serves as base for improvement and dissemination of farming technology in the tropical humid area in Santa Cruz Department in Bolivia. |
| Output(s) | Output 1 | System developed for collection and review of agricultural technology/information. |
| | Output 2 | System developed for actual dissemination of reviewed agricultural technology. |
| | Output 3 | System developed that can perform review / analysis at the same level as official certified organization and foster development of human resources. |
| Inputs | | <p>Japanese Side:</p> <ol style="list-style-type: none"> 1. Total of 8 experts dispatched (4 long term experts, 4 short term experts) 2. Total of 6 persons trained in third country 3. Equipment supplied: 81.18 million yen 4. Expenses for field operations: 184.46 million yen <p>Bolivian Side:</p> <ol style="list-style-type: none"> 1. Counterpart allocation 2. Loaning of land free of charge |
| Total cost | | 456.83 million yen |
| Period of Cooperation | | April 2005 – March 2010 |
| Implementing Agency | | Ministry of Agriculture, Livestock and Rural Development (Current Ministry of Rural and Land Development), Santa Cruz Department, Agricultural and Livestock Cooperative of Okinawa Colony, Agricultural and Livestock Cooperative of San Juan |

| | |
|-----------------------------|--|
| Cooperation Agency in Japan | None |
| Related Projects | <p>JICA Technical Cooperation</p> <ol style="list-style-type: none"> 1. “The Beef Cattle Improvement Project” (July 1, 1996 – June 30, 2001) 2. “Project for the Dissemination of High-Quality Rice Seeds for Small-Scale Farmers in Bolivia” (August 1, 2000 – July 31, 2005) 3. “The Improvement of Technical Extension for Small-Scale Livestock Farmers Project” (December 6, 2004 – December 5, 2008) 4. “Project of the Technological Center on Agriculture and Livestock in the Republic of Bolivia (CETABOL) (Phase 1)” (2001 – 2004) <p>Other International Agencies, Aid Agencies, etc.</p> <ol style="list-style-type: none"> 1. Project of the Technological Center on Agriculture and Livestock in the Republic of Bolivia (2011 – 2012), Japan International Cooperation Foundation |

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

Regarding the overall objective of “Boosting agricultural production (volume, amount) in the tropical humid area in Santa Cruz Department in 2010 and after so that it exceeds 2005 (base year) every year and maintaining stable production”, it was determined by checking the transition in indicators in 2005 and after that dry-field crop production increased in spite of droughts, floods, economic slump, disease and insect damage epidemics and other such risks, and the number of head and amount of beef cattle production increased every year.

1.3.2 Achievement of Project Objective

Regarding the project objective of “Development of the Technological Center on Agriculture and Livestock in Bolivia that serves as base for improvement and dissemination of farming technology in the tropical humid area in Santa Cruz Department”, a CETABOL operation and management plan after transfer was prepared by the time of ex-post evaluation, and it was determined that development of infrastructure that will serve as a base for dissemination of agricultural technology for Nikkei cooperatives as well as various other people involved in agriculture in Santa Cruz Department has nearly been completed.

1.3.3 Recommendations

The following four proposals were made during the thermal evaluation.

(1) Self-reliant growth of CETABOL after transfer

The organization should establish a solid position as a testing station that can respond to the overall needs of Santa Cruz Department after the project ends and make a contribution to the entire department.

(2) Acquisition of domestic certification concerning pesticide analysis and frozen semen production

Procedures for the acquisition of official certification from SENASAG (National Service for Agricultural and Livestock Sanitation) should be implemented at an early date for pesticide analysis and frozen semen production.

(3) Promotion of usage of various reviews concerning certification of service “Quality”

In order to acquire and maintain a high level of trust in the “Quality” of the service provided by CETABOL, the organization should implement an ongoing program of reviews of “quality” by domestic and international third party organizations.

(4) Considerations to secure and maintain effective human resources

A working environment that is as stable as possible should be provided, information on personnel relations should be promptly provided, and other considerations should be implemented that are focused on the convenience of employees to create a good relationship with employees.

2. Outline of the Evaluation Study

2.1 External Evaluator

Masafumi Ikeno (KRI International Corp.)

2.2 Duration of Evaluation Study

The following survey was conducted for this ex-post evaluation.

Study Period: December 2012 – December 2013

Field Study: February 19 – March 9, 2013, June 4 – June 13, 2013

3. Results of the Evaluation (Overall Rating: B¹)

3.1 Relevance (Rating: ③²)

3.1.1 Relevance with the Development Plan of Bolivia

Bolivian agriculture development policy has positioned the following policies as

¹ A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

² ①: High, ②: Fair, ③: Low

priority issues: “National Agriculture, Livestock and Rural Development Plan” (January 2000) and “Promoting Rural Development by Strengthening Competitiveness” that was designated in the “Bolivian Strategy to Reduce Poverty” (July 2001), which were part of a national plan of the Bolivian central government when the project started, and “Boosting Productivity and Strengthening Competitiveness” that was part of a short- and mid-term agriculture policy by the Santa Cruz Departmental government. During and after the period of cooperation under the project, “Making Bolivia a Productive Country” was positioned as a core task in the “2006–2010 National Development Plan”, reflecting the focus the country is placing on promoting agriculture.

There was no change in the importance of promoting agriculture as a policy in the development policy of Bolivia from the start to the end of the project, with it always being positioned as a priority issue. Accordingly, the judgment can be made that the promotion of agriculture with the objective of facilitating the dissemination of sustainable agricultural technology implemented under this project matches the Bolivian side development policy needs.

3.1.2 Relevance with the Development Needs of Bolivia

Promoting the agricultural and livestock industries in Santa Cruz Department which account for approximately 80% of overall agricultural and livestock production was positioned as an important policy for the Bolivian government. In addition, the promotion of agriculture and livestock which are major industries in Santa Cruz Department contributes to the livelihood of farmers in Santa Cruz. Above all, Nikkei cooperatives that have succeeded in the stabilization of farming which are now striving to build an agricultural and livestock system capable of self-reliant growth voiced a strong desire for the functions of CETABOL to be strengthened in view of the fact that operation and management will be fully transferred from JICA in 2010.

Dissemination of agricultural technology and farming information that is provided by CETABOL under this project is contributing to Nikkei society as well as the promotion of agriculture in Santa Cruz Department as a whole, and can be judged to be relevant to the Bolivian side development needs.

3.1.3 Relevance with Japan’s ODA Policy

In the JICA operations implementation plan for various countries, assistance to facilitate the growth of the agricultural and livestock industries on a regional society level in Bolivia, and the reduction of poverty by increasing production/income (regional economic development centered around agriculture) have been positioned as

important issues. In addition, operations were also implemented to provide support to stabilize the livelihood for farmers of Japanese descent (Nikkei farmers).

Therefore, this project can be judged to be in line with the assistance policy of Japan.

This project has been highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance is high.

3.2 Effectiveness and Impact³ (Rating: ③)

3.2.1 Project Outputs⁴

3.2.1.1 Project Output

1) Output 1 "System Developed for Collection and Review of Agricultural Technology/Information"

The track record of activities outlined below allows the judgment to be made that a system for the collection and review of agricultural technology/information was developed at CETABOL as a result of implementing this project.

- By the time this project ended, approximately 70% of the farmers in the Okinawa colony and approximately 10% of the farmers in the San Juan colony that are members of the Nikkei agricultural cooperatives had prepared soil maps. Preparation of these soil maps upgraded the technical capabilities of CETABOL and the Nikkei cooperatives, enhanced the knowledge of soil improvement among ordinary Nikkei farms and their ability to deal with issues, and also strengthened the coordination system at CETABOL and Nikkei cooperatives and farmers in regard to sharing of agricultural technology/information.
- A joint implementation system between Nikkei cooperatives and CETABOL was established for the testing of pesticide effects by the time the project ended. Although the joint system with Nikkei cooperatives was suspended after the project ended/following transfer, CETABOL is independently formulating a system that is being implemented. This has resulted in certification being received from SENASAG September 2010 as an organization that is certified to perform pesticide effect tests.
- Fertilizer application contours were prepared for 70% of rice cultivation, 40% of soy bean cultivation and 50% of wheat cultivation by Nikkei farms by the time

³ Sub-rating for Effectiveness is to be put with consideration of Impact.

⁴ In this evaluation Effectiveness is evaluated on the achievement as of the time the project completed. However, some of the information after the project completion is mentioned for convenience in the section of Effectiveness.

the project ended, and this resulted in an implementation methodology for soil diagnosis and fertilizer application guidance in accordance with soil analysis by CETABOL being established for the most part. Data collection after the project ended has been sluggish, but work is continuing after the transfer of operation under a test plan following the receipt of guidance from a Brazilian expert in 2009.

2) Output 2 “System Developed for Actual Dissemination of Reviewed Agricultural Technology”

The track record of activities outlined below allows the judgment to be made that a system for the actual dissemination of agricultural technology reviewed by CETABOL was developed as a result of implementing this project.

- Reports on technology dissemination from CETABOL to Nikkei cooperative farmers were made in CETABOL correspondence and farming cooperative newspapers until fiscal 2007, and were made at Nikkei cooperative workshops in the summer and winter, at monthly cultivation committee meetings and at other meetings in fiscal 2008 and after. In addition, in recent years, improvements in the communication infrastructure consisting of mobile phones, internet and e-mail have led to a shift to these means of communication to provide information, creating a system under which information can be obtained from CETABOL and farming cooperative dissemination members in a timely manner when it is needed.
- The following reports on technology dissemination from CETABOL to Nikkei cooperatives, agricultural and livestock related organizations and agricultural equipment suppliers has been made: (1) Pesticide effect test reports submitted 40 times or more per year, (2) Technical manuals on disease and insects, weed control and soil fertilizer related to main cultivated crops (soy beans, wheat, sugar cane, rice, corn, macadamia) distributed/sold (updated every two years), (3) Soil fertilizer guidance reports submitted, as well as other reports.
- The following reports on technology dissemination from CETABOL to livestock farmers are being made: (1) Provision of service to introduce grade AA beef genetic improvement techniques to Nikkei cooperative farmers (loaning of grade AA lineage bulls, artificial insemination service, etc.), (2) Distribution of beef cattle technology manuals (beef breeding management, fattening cattle rearing management, calf rearing methods) and other materials are being distributed.
- The following reports on technology dissemination from CETABOL has been made: (1) Announcement of studies/test results at CETABOL open house that is

held every year between February and March, (2) Over 30 various workshops and other agricultural events such as “National Soy Bean Day”, “National Rice Day” and “National Wheat Day”.

3) Output 3 “System Developed That Enables Inspection/Review to be Performed as Official Certified Organization”

The track record of activities outlined below allows the judgment to be made that a system that enables inspection/analysis to be performed as an official certified organization was developed as a result of implementing this project.

- Due to the fact that it was judged more effective to have certification as an official certified organization in accordance with Bolivian domestic regulations or international criteria rather than an internal audit based on self-defined regulations in order to obtain technical trust from external involved parties. The original plan was changed so that the organization would be reviewed by a third party certification organization inside or outside Bolivia.
- Under the system that was developed by the time the project ended, the following certifications were obtained: Management of laboratory for soil/pesticide/fertilizer/organism tests after transfer (Bolivia SENASAG: 2010-), Pesticides (AAPCO⁵ in United States: 2010-), Feed analysis/mineral analysis (Brazil EMBRAPA⁶: 2011-) Soil (PROINSA⁷ in Argentina: 2012-). It is now widely recognized in Santa Cruz and surrounding regions as an official certified organization, and is contributing to its service business which is the core of operations to earn a profit.
- In order to improve and introduce the technology required as an official certified organization for various agricultural services, opportunities were provided to participate in technical training. While opportunities for technical workshops and training within Bolivia are limited, technical training was conducted by resident short term experts for this project (Experts from Brazil, Argentina and Paraguay), CETABOL staff were dispatched to a third country (Brazil) for training, and other training opportunities were provided such as a “National Soy Bean Day” held by a Santa Cruz agricultural related organization and “Tropical Agricultural Test Station (CIAT) Field Exhibition”.
- The above types of training opportunities has been provided on an ongoing basis after the project ended, for example the CETABOL engineers were dispatched to

⁵ Association of American Pesticide Control Officials

⁶ Empresa Brasileira de Pesquisa Agropecuária

⁷ Programa de Interlaboratorios para Suelos Agropecuarios

the neighboring countries of Brazil and Argentina with the support of other donors, a self-financed Brazilian agricultural resident consultant, and other technical training opportunities has been being provided.

- Since a system to enable requests for inspection/analysis to be accepted as a certified organization was developed, the project objective of receiving 2,000 requests or more per year was achieved by the time the project ended.
- The number of requests received dropped somewhat temporarily due to some of the technicians quitting after the project ended/when operation was transferred, but there has been a tendency for the number of requests for analysis to increase in fiscal 2012 and after as a result of an expansion in the capability to accept requests brought about by increasing the number of analysis technicians, and spreading of recognition as a certified organization among people involved in agriculture in Santa Cruz.

Table 1 Number of Certified Analysis Results

| Year | 2008 | 2009 | 2010 | 2011 | 2012 |
|--------------------------|-------|-------|-------|-------|-------|
| No. of Requests Received | 2,012 | 2,075 | 1,133 | 1,314 | 3,033 |

Source: CETABOL

4) Output 4 “Implementation System Developed for Provision of Technical Support Services to Facilitate Stable Agricultural Production”

The track record of activities outlined below allows the judgment to be made that an implementation system has been developed at CETABOL that enables the provision of technical support services to facilitate stable agricultural production as a result of implementing this project.

- Technical support services are available under which improved breed bulls and grade AA breeding cows are loaned to Nikkei cooperative farmers in order to facilitate stable livestock production. This has resulted in achieving the provision of service that is generally consistent during the project period and after the project ended.

Table 2 Breeding Cattle Loan Results

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------|------|------|------|------|------|------|------|------|
| Bulls | 68 | 60 | 66 | 32 | 57 | 35 | 63 | 78 |
| Cows | 13 | 26 | 13 | 49 | 15 | 0 | 0 | 0 |
| Total | 81 | 86 | 79 | 81 | 72 | 35 | 63 | 78 |

Note: In 2010 and after, cows were not loaned since almost all Nikkei farms have grade AA breeding cows.

Source: CETABOL

- Various Nikkei colony auction places have been set up in order to secure sales

channels for cattle raised by Nikkei livestock farms and in order to provide support for operation and management of these farms.

- After the project ended, the respective auction places were taken over by Nikkei cooperatives, and CETABOL provides technical support as appropriate. As of June 2013, auctions are held at the Okinawa Nikkei cooperative (CAICO) every three months, and unscheduled auctions are held at the San Juan Nikkei cooperative once a year. Furthermore, due to the fact that a competing auction place was constructed after the project ended on the outskirts of Santa Cruz which is a large center of consumption, the number of sales brokers that wish to participate in the San Juan Cooperative (CAISY) auction place has decreased mainly due to the distance from Santa Cruz (approximately two hours by vehicle) which results in the expenditure of fuel costs and time.

Table 3 Number of Auctions Held

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|-------|------|------|------|------|------|------|------|------|
| CAICO | 2 | 7 | 7 | 10 | 5 | 1 | 4 | 4 |
| CAISY | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 |
| Total | 2 | 7 | 8 | 12 | 6 | 2 | 5 | 5 |

Source: CETABOL

- In order to facilitate the stable production of livestock, a system for the subcontracting of work involved with dairy and beef cattle has been established. Subcontracted work related to breeding and hygiene for dairy cattle was centered around the Okinawa 2nd colony. However the number of subcontracting of artificial insemination started from 2009 in San Juan colony increased because the Bolivian policy to lower the price of rice after the end of the project, then the need for livestock raising as a substitute product in the San Juan colony which had focused on rice production until now increased.

Table 4 Livestock Raising Related Subcontracted Service Results

| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|--------------------------|------|------|------|------|------|-------|-------|------|
| No. of Requests Received | 193 | 182 | 301 | 433 | 256 | 1,299 | 1,168 | 862 |

Source: CETABOL

- By the time the project ended, an implementation system to provide technical support services in both the dry-field crop and livestock raising sectors, and in particular soil/pesticide certification analysis services and grade AA breed beef cattle breeding services to Nikkei farmers had nearly been established. This resulted in the planned objective value of subcontracting work for 500 hectares

or more being achieved every year during the project period.

Table 5 Work Subcontracted Area Results

| Year | 2005 | 2006 | 2007 | 2008 | 2009 (as of August) |
|------------------------------------|------|------|------|-------|---------------------|
| Work Subcontracted Area (Hectares) | 905 | 569 | 922 | 3,579 | 430 |

Source: CETABOL

3.2.1.2 Achievement of Project Objectives

Project Objective: “Development of the Technological Center on Agriculture and Livestock in Bolivia that serves as base for improvement and dissemination of farming technology in the tropical humid area in Santa Cruz Department in Bolivia”

By the time the project ended, upgrading of testing station facilities/equipment, development/demonstration of farming technology and development of human resources were completed, and work implementation regulations related to operation and management of CETABOL after transfer and an operation and management plan was formulated/approved, creating an implementation system that will serve as a base for technology dissemination in Santa Cruz Department.

A fiscal plan and other actions will be taken every year to confirm the status of progress after transfer, and efforts will be made to implement improvements as appropriate.

1) Indicator 1 “Formulate Work Implementation Regulations and an Operation and Management Plan (Organization diagram, personnel deployment plan, budget, income and expenditure account statement, etc.) for the Technological Center on Agriculture and Livestock in Bolivia”

Participation of Nikkei cooperatives and Nikkei farmers that will be involved with operations and management support after the transfer was obtained, and an organization operations system was formulated by the time the project ends that took into consideration the direction the testing station will take after transfer. This consisted of formulating work implementation regulations that included an organization diagram, personnel deployment plan, budget and income/expenditure account statement, as well as formulating a management and operation plan.

Furthermore, the “Early usage of elite bull frozen semen by CETABOL” and “Speeding up of soil analysis services” which were expected to contribute to the self-reliant profitability of CETABOL and incorporated in the operation and management plan after the transfer has become a central source of income for

CETABOL.

2) Indicator 2 “Above Regulations and Plan Approved by Transferee Organization”

Approval of the above work implementation regulations and operation and management plan by the Nikkei cooperatives and CETABOL foundation board of directors was obtained with the participation of the Nikkei cooperatives and Nikkei farmers that will be involved in operation and management support after transfer of operation.

As stated above, the expected effects resulting from implementation of this project for the most part achieved the level of objectives by the time the projected ended, and contributed to achievement of the project objectives. Therefore, the project can be judged to have had a high level of effectiveness as of the time the project ended.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

Overall Objective: Dissemination of Sustainable Agricultural Technology in the Tropical Humid Area of Santa Cruz Department”

1) Indicator 1 “Boosting Agricultural Production (volume, amount) in the Tropical Humid Area in Santa Cruz Department in 2010 and After So That It Exceeds 2005 (Base Year) Every Year and Maintaining Stable Production”

The scale of dry-field farming in Santa Cruz Department which mainly consists of grain production has increased in spite of drought and flood damage brought about by El Niño and La Niña, the impact of the global economic slump of 2008, epidemic of soybean “rust” and other such diseases, as well as other risk factors.

According to data from the Ministry of Rural and Land Development, the production volume of the main grains in Santa Cruz Department had grown dramatically in 2012 compared to 2005, and nearly stable grain production is being maintained.

Table 6 Main Crop Production Volume in Santa Cruz Department (Tons)

| Crop | 2005 | 2012 | Increase |
|----------|-----------|-----------|----------|
| Soybeans | 1,670,000 | 2,310,000 | 38% |
| Rice | 400,000 | 480,000 | 20% |
| Corn | 580,000 | 710,000 | 22% |
| Wheat | 50,000 | 180,000 | 260% |

Source: Ministry of Rural and Land Development

3.2.2.2 Manifestation of Effects after Project Ended

After the project ended and operations were transferred, within the limitations of not serving the role of being an official testing station in Santa Cruz Department, dissemination of technology by CETABOL itself has not grown into a structure that covers the entire region of Santa Cruz Department. However, the farming technology and farming information contained in the technical manuals and other materials created under this project that originated from CETABOL extends to remote areas in Santa Cruz Department, with two Nikkei colonies at its center. In addition, as stated in the section on Effectiveness, CETABOL is selectively expanding its soil/pesticide analysis and cow artificial insemination service business, these services are being used on an ongoing basis, and the certified analysis results have grown considerably as of the ex-post evaluation. It has been determined that these services provided by CETABOL (test results and agricultural technology) are being utilized by and disseminated to Bolivian farmers inside and outside Santa Cruz Department through the companies involved in agriculture that subcontract work to CETABOL. These Bolivian farmers are the customers of these companies.

The judgment can be made that dissemination of agricultural technology by CETABOL is helping to maintain stable production of the main grains in Santa Cruz Department.

3.2.2.3 Other Impacts

(1) Changeover to / dissemination of high class beef cattle breeds

Before this project, there were quite a few livestock farms in the Nikkei colonies that selected beef cattle breeds that were based on a judgment of breeding productivity, strategic marketing or other such factors. As a result, cross breeding took place among multiple breeds, resulting in a structure that did not produce high quality beef.

However, the outputs of this project were also disseminated to livestock farms in Nikkei colonies, and this resulted in the focused selection of the Nellore breed (a high class breed of cattle) by almost all farms breeding cattle in the Nikkei colony by the time the project ended. This contributed to an increase in income for livestock farms.

(2) Dissemination of agricultural technology through training of students

More than 100 students have been accepted from the School of Agriculture at René Moreno University in Santa Cruz Department for help in preparing dissertations and training while this project was being implemented, after the

project ended and after the transfer. This has resulted in increased recognition of CETABOL, and dissemination of the technology and information that is available from CETABOL by the trainees to farms inside and outside Santa Cruz Department.

(3) Dissemination to Santa Cruz Department farmers

According to the results of a beneficiary survey (100 farmers in Santa Cruz Department) that was conducted in February 2013, although the farmers in Santa Cruz Department have a high level of desire to upgrade their level of agricultural technology, there are limited opportunities to receive training in Bolivia that does not currently have a system in place to facilitate the dissemination of agricultural technology.

Under these circumstances, at least two thirds of the farmers in Santa Cruz Department are utilizing the farming technology and farming information that has been received from CETABOL or Nikkei cooperatives, and they have high expectations for CETABOL in the future.

Table 7 Beneficiary survey of Santa Cruz Department farmers

| | | |
|---|--|--|
| (a) Desire to Boost Level of Agricultural Technology 1. High (75%) 2. Low (20%) 3. Not Needed (5%) | (b) Opportunities to Receive Training in Agriculture 1. Adequate (6%) 2. Minimal (54%) 3. Almost none (40%) | (c) Utilization of CETABOL / Nikkei Cooperative Technology 1. Use extensively (28%) 2. Use a portion (35%) 3. Hardly use at all (11%) 4. Do not know (26%) |
| (d) Future Expectations for CETABOL 1. None in particular (6%) 2. Do not know (6%) 3. More seminars and other events (31%) 4. Increase amount of information provided (39%) 5. Increase services provided (17%) 6. Other (1%) | | |

Source: Beneficiary survey conducted in February 2013 (Questionnaire of 100 Bolivian farmers randomly selected in areas surrounding Nikkei colonies in Santa Cruz Department)

(4) Negative Impact

This project has not had a negative impact on the natural environment, cause resettlement of residents or any problems involved with site acquisition during the project period or after the project ended.

As stated above, implementation of this project achieved development of an infrastructure that serves as a base for the improvement and dissemination of farming technology by CETABOL in Santa Cruz Department which was set as the project objective. In addition, it was verified that dissemination of sustainable agricultural technology by CETABOL in Santa Cruz Department which is an

overall objective is being performed. Therefore, this project has largely achieved its objectives, therefore its effectiveness and impact is high.

3.3 Efficiency (Rating: ②)

3.3.1 Inputs

| Inputs | Plan | Actual Performance |
|-------------------------------------|--|---|
| (1) Experts | <ul style="list-style-type: none"> ● Long term experts: 3 ● Short term experts: 2 – 3 per every year | <ul style="list-style-type: none"> ● Long term experts: 4 ● Short term experts: 4 |
| (2) Trainees received | 1–3 trainees every year (training in Japan and third country) | Total: 8 trainees |
| (3) Third-Country Training Programs | None | None |
| (4) Equipment | 3 mil. yen/year (Total 15 mil. yen) | 81.18 mil. yen |
| Total Project Cost | Total: 406 mil. yen | Total: 456.83 mil. yen |
| Total Local Cost | None | None |

3.3.1.1 Elements of Inputs

(1) Japan side input

1) Dispatch of experts

The quality, quantity and timing of long-term and short-term experts dispatches were appropriate for the most part.

Work was handed over to a chief advisor (station manager) and assistant manager/coordinator which were dispatched as long term experts in two fields (two experts in each field), and these experts were in charge of operation and management of the overall project. During the hand-over process, the station manager was absent for 4 months, and the assistant manager was absent for 5 months. However these absences did not interfere with operation and management of the project in particular, since either the station manager or assistant manager was at the project site nearly all the time.

Four short-term experts (high-speed liquid chromatography maintenance and management, pesticide quality management, soil analysis, and plant nutrition science) were dispatched effectively. In particular, the short-term experts dispatched from the neighboring countries of Brazil and Argentina provided transfer of technology from similar farming environments, and this made it easy for

the counterparts to accept them, and resulted in a high level of utilization.

2) Acceptance of trainees

The content, period and timing were appropriate; the results of training were utilized in work after training, making this an effective input.

3) Provision of equipment

The types of equipment, quantity, quality and timing of provision were appropriate. Most part of the equipment provided was effectively utilized for project activities, contributing to the obtaining of approval as a certified organization for soil diagnosis, pesticides and other matters. Furthermore, due to the fact that a more advanced level of equipment was requested than the plan as the required environment to obtain approval as a certified organization, the actual cost of the equipment exceeded the budget allocated in the plan. The equipment related to certification work that was procured just before the project ended is a required input for CETABOL to continue self-reliant activities, and was being effectively used as of the ex-post evaluation.

In addition, JICA provided facilities and equipment to CETABOL when the project ended. However, regarding the vehicles (total of 13), although JICA and CETABOL completed the various procedures, changing of the title/registration were not completed due to various complicated internal procedures in Bolivia. This resulted in a situation in which these vehicles cannot be utilized for the subcontracting service business, dissemination business, test farm visits, and participation in periodic meetings/workshops after the transfer.

(2) Bolivia Side Input

1) Counterpart allocation

The respective Nikkei cooperatives deployed an appropriate number and quality of counterparts during the project period, and these counterparts made a large contribution to project activities as well as project operation and management.

2) Covering of local costs

The loaning of the land for the CETABOL facility and test station farmland which were to be covered by the Bolivian side was not a problem during the project period. CETABOL has obtained a 10-year free-of-charge lease until 2020 after the project ended/transfer was performed. Regarding the conditions for the loaning of land after 2020, plans call for coordination between the Okinawa 2nd colony which

is the land owner and CETABOL to be conducted from around 2015.

3.3.1.2 Project Cost

The actual cooperation sum was 456.83 million yen with respect to a planned cooperation sum of 406 million yen, slightly exceeding the planned amount (113% of planned amount).

The reason that the actual cooperation sum exceeded the planned cooperation sum consisted of upgrading the equipment provided with the goal of facilitating operation and management based on self-reliant profitability after the transfer (upgrading of experiment/testing related materials/equipment required to obtain approval as certified organization for various services from external organization).

3.3.1.3 Period of Cooperation

The actual cooperation period was 60 months with respect to planned cooperation period of 60 months (100% of plan).

As stated above, while this project was completed within the planned period, the cooperation sum exceeded the planned sum. Therefore, efficiency of the project was high.

3.4 Sustainability (Rating: ②)

3.4.1 Related Policy towards the Project

The agricultural policy of the Bolivian government and government of Santa Cruz Department did not change while this project was being planned, during the project period and at the time of the ex-post evaluation. The central government continues to consider promoting the expansion of agricultural and livestock production in Santa Cruz Department which accounts for approximately 80% of all agricultural and livestock production in Bolivia as an important issue. The government of Santa Cruz also continues to place priority on efforts to facilitate regional development of Santa Cruz Department centered on agriculture and livestock.

Although the need to strengthen the capability for learning agricultural technology with a focus on small-scale farms in other regions of Bolivia is high, the official agricultural dissemination system did not function during the project period and is currently not functioning.

Under this type of policy system, the sustainability of the farming technology/farming information provided by CETABOL and the sustainability of the project effects are guaranteed. In addition, the existence of CETABOL as a

semi-official agricultural technology dissemination organization is further increasing in importance.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

Based on the implementation system that was planned/developed during this project, CETABOL received certification as a corporate entity in Bolivia in March 2009, and operation and management were formally transferred to CETABOL from JICA in April 2010. CETABOL is collaboratively operated and managed by the following two Nikkei cooperatives located in the Nikkei colonies in Santa Cruz Department under the CETABOL Foundation: Agricultural and Livestock Cooperative of Okinawa Colony (CAICO) and Agricultural and Livestock Cooperative of San Juan (CAISY).

As of June 2013, the CETABOL consisted of the following 14 regular staff members: 1 station manager, 3 staff in clerical department, 7 staff in agriculture department and 3 staff in livestock department (the number of regular staff when the project ended was 9). In addition, 13 staff have been hired that work on farms to supplement efforts by the regular staff. Although some of the staff trained during the period of this project quit after the project ended, since technical personnel with suitable technical skills have been newly hired, there has not been a problem with the implementation system for the provision of testing and services.

As stated above, efforts are proceeding to keep and expand staff under a suitable operation and management system. Therefore, the judgment can be made that the sustainability of the counterpart implementation system is high.

3.4.3 Technical Aspects of the Implementing Agency

As described in the output for effectiveness, the various services which mainly consist of soil/pesticide analysis and cow artificial insemination services which were acquired during this project are continuing to be provided since the project ended. The required technological level as a certified organization has been secured through the acquisition/renewal of certification by an external certification organization.

The provision of high quality subcontracting services and technology has been recognized by Nikkei farms, as well as official organizations related to agriculture, agricultural materials/equipment suppliers, farmers and other people involved in agriculture inside and outside Santa Cruz Department. Simultaneously, in order to maintain and upgrade its technological level, experts are being sent after the project ended from Brazil, Argentina and other neighboring countries that are being self-financed or paid for by support from other donors, and CETABOL engineers are

undergoing unscheduled overseas training etc. on an ongoing basis. However, the funds for this type of opportunity to boost technical capabilities are limited, and securing these funds is an issue.

As stated above, the judgment can be made that CETABOL is adequately using the technology that was transferred during project implementation. Therefore, the technical sustainability is high.

3.4.4 Financial Aspects of the Implementing Agency

The important investigative research that has been accumulated over many years and significant social contribution to regional society made by the Nikkei immigrants are being utilized to perform operation and management as a private sector company with the objective of self-reliant profitability, although there remain some issues as a testing organization that make it difficult to become profitable after the transfer of operation.

The CETABOL incurred losses for the main following reasons for two years after operation was transferred. As a result, there is the issue of not being able to prepare adequate funds to update and newly procure facilities/equipment that are projected in the future.

- Continued work such as basic investigative research as a testing organization from which no income is derived
- Investment for the procurement of new vehicles, and repair/updating of equipment/machinery with the objective of self-reliant profitability
- Delay in expansion of subcontracting services due to delay in registration of vehicles received during transfer, temporary stoppage of subcontracting service work while equipment was being repaired, drop in expected income due to slump in subcontracting service orders from Nikkei farms as a result of charges being levied for services

On the other hand, from the third year after operation was transferred, prospects for securing profitability began to emerge for the following main reasons, and it is expected that organization will remain in the black in the future.

- Increase in requests to provide testing/services for which there is a high level of need locally that consist of soil/pesticide diagnosis and cow artificial insemination services
- Increase in service requests from large customers such as agricultural materials/equipment suppliers that have hubs in Santa Cruz
- Decrease in expenditures due to choices made by departments that do not bring in income

As stated above, the organization had issues with its financial viability for two years after transfer upon ending of the project, but it has independently improved its business with the objective of achieving self-reliant profitability. Therefore, the judgment can be made that the certainty of sustainability is increasing.

Table 8 CETABOL Operating budget/Operating results (unit: bolivianos)

| Year | Operating Budget | | | Operating Results | | |
|------|------------------|--------------|-----------|-------------------|--------------|-----------|
| | Income | Expenditures | (Balance) | Income | Expenditures | (Balance) |
| 2010 | 343,135 | 474,025 | -130,890 | 238,994 | 239,602 | -608 |
| 2011 | 436,650 | 486,751 | -50,101 | 393,517 | 405,684 | -12,167 |
| 2012 | 598,347 | 561,408 | 36,939 | 539,920 | 527,246 | 12,674 |

Source: CETABOL

Since there have been moderate problems with the financial viability of this project, therefore sustainability of the project effect is fair.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This project was implemented with the objective of strengthening the functions and enhancing the operation and management system for agriculture and livestock technology in order to facilitate self-reliant operations development by the Technological Center on Agriculture and Livestock in Bolivia (CETABOL).

Promotion of agriculture through the dissemination of sustainable technology matches the development policies in Bolivia aimed at promoting the development of agricultural communities by strengthening competitiveness, and the ODA policy of Japan which has a primary focus on regional economic development centered around agriculture and enabling farmers of Japanese descent to put down stable roots, and therefore has a high level of relevance.

The desired original objectives concerning the strengthening of functions related to agriculture and livestock technology at CETABOL and upgrading its operations and management system were achieved. Regarding overall objectives, it was also verified that dissemination of technology by CETABOL helped stabilize agricultural and livestock production in the region, and contributed to boosting production capabilities by persons involved in agriculture, meaning that the project had a high level of effectiveness and impact.

The elements input for manifestation of the output were appropriate, and the period of cooperation was within the plan, but the provision of supplied equipment with the aim of enabling the organization to make a profit after the transfer of operation and management resulted in the amount of cooperation funds actually expended substantially exceeding the

planned amount. Therefore, efficiency was fair.

There were no problems with the policy system, counterpart system, and the sustainability of the technology. The financial status of CETABOL was not particularly good for two years after transfer due to investments made to enable it to make a profit. However once the business started, the effects of investments have been manifested. Therefore, sustainability was fair.

In conclusion, this project was given a high evaluation due to the above factors.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

(1) Handling of short-term issues

- In order to further expand various service operations in a stable manner that are the core of business that earns income, securing the ability to move throughout the extensive area of Santa Cruz is indispensable. Regarding the transfer procedures for the vehicles (13) for which applications have been completed on the Bolivia side, these procedures should be closely supervised on an ongoing basis while receiving the support of the JICA Bolivia Office.

(2) Handling of mid- to long-term issues

- Taking the track record/transition of test station operation and service business after transfer into consideration, a mid- to long-term business strategy should be formulated and reviewed that has a future vision for CETABOL, with a focus on the future policy for the testing station non-profit work, as well as the profitability as a private sector organization that results from the scale of its service business in the future, staff plans and other such details. In addition, discussions should be held with the Okinawa 2nd colony from around 2015 on the continued usage of the CETABOL site and farm for which a free-of-charge lease agreement that lasts until 2020.
- In order for CETABOL to continue to maintain a high level of trust from external customers as a certified organization that can provide various agricultural services, securing and nurturing good quality personnel are indispensable. Providing good employment conditions for technicians and opportunities for enhancing their technical capabilities are important, and the required expenses for these should be allocated.

4.2.2 Recommendations to JICA

(1) Handling of short-term issues

- Regarding the transfer procedures for the vehicles (13) provided to CETABOL for

which applications have already been made in Bolivia, continuing cooperation / support should be provided to CETABOL as necessary to facilitate the completion of transfer procedures at the earliest point possible.

(2) Handling of mid- to long-term issues

- The level of trust in CETABOL from external parties as a certified organization that provides various services has increased based on the technology transferred during the project. However the opportunities for the staff to upgrade their technical capabilities after the transfer of operations are limited. Opportunities to upgrade technical capabilities that cannot be obtained in Bolivia, and in particular the dispatch of experts (including experts from third countries) in new fields (agriculture production technology utilizing GNSS/GPS, etc.), as well as supplemental support through training in Japan and other such activities should be considered.
- The high level of agricultural and livestock technology as well as the study/testing experience over many years should be utilized for agriculture promotion projects implemented by JICA inside and outside Santa Cruz Department in Bolivia, drawing upon the CETABOL staff and human resources that have been nurtured in the CETABOL project.

4.3 Lessons Learned

Before this project started, CETABOL had the base of being directly operated by JICA for a period of over 15 years as an agriculture and livestock testing station that provided support for the promotion of agriculture and livestock for Nikkei farmers. This technical cooperation project was aimed to formulate a system enabling self-reliant growth of CETABOL with a view to the full transfer of operations from JICA that was scheduled ten years after the project started, based on the accumulated technologies and existing organization.

For a technical cooperation project where the counterpart is an agricultural testing organization that has a relatively high level of technical capability before the project is implemented, it is important to clearly position the operation and management plan that includes the implementation system after the project ends, dissemination system and financial structure as one output, rather than only providing technical cooperation in specialized fields. In addition, when it is difficult to secure a stable official budget from the government or other source after the project ends, the formulation of an income structure that heightens sustainability and/or business plan is important for the creation of a self-reliant organization structure after the project ends.