Ex-Post Project Evaluation 2011:Package II-3

(Bolivia, Indonesia, Nepal, Ethiopia)

December 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

Tekizaitekisho LLC

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Preface

Ex-post evaluation of ODA projects has been in place since 1975 and since then the coverage of evaluation has expanded. Japan's ODA charter revised in 2003 shows Japan's commitment to ODA evaluation, clearly stating under the section "Enhancement of Evaluation" that in order to measure, analyze and objectively evaluate the outcome of ODA, third-party evaluations conducted by experts will be enhanced.

This volume shows the results of the ex-post evaluation of ODA Loan projects that were mainly completed in fiscal year 2009, and Technical Cooperation projects and Grant Aid projects, most of which project cost exceeds 1 billion JPY, that were mainly completed in fiscal year 2008. The ex-post evaluation was entrusted to external evaluators to ensure objective analysis of the projects' effects and to draw lessons and recommendations to be utilized in similar projects.

The lessons and recommendations drawn from these evaluations will be shared with JICA's stakeholders in order to improve the quality of ODA projects.

Lastly, deep appreciation is given to those who have cooperated and supported the creation of this volume of evaluations.

December 2012
Masato Watanabe
Vice President
Japan International Cooperation Agency (JICA)

Disclaimer

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JICA's comments may be added at the end of each report when the views held by the operations departments do not match those of the external evaluator.

Plurinational State of Bolivia

Ex-post Evaluation of Japanese Technical Cooperation Project

"The Improvement of Technical Extensions for Small-Scale Livestock Farmers Project"

External Evaluator: Tsuyoshi Gomi, Tekizai Tekisho Organization

0. Summary

This Project was promoted to produce adequate livestock technique improvements for small-scale livestock farming business in the area targeted in this Project[1] to extend to small-scale livestock farmers the techniques transferred to and accumulated in the Centro Nacional de Mejoramiento de Ganado Bovino (CNMGB) as a result of Japan's cooperation to date. In so doing, the Project was implemented with the aims of establishing a technical extension model for ensuring that the farmers acquire the technique through technical extension workers'[2] capacity improvement and extension system enhancement, and of increasing productivity by spreading the use of the techniques among the small-scale livestock farmers in the Yapacaní region in Santa Cruz.

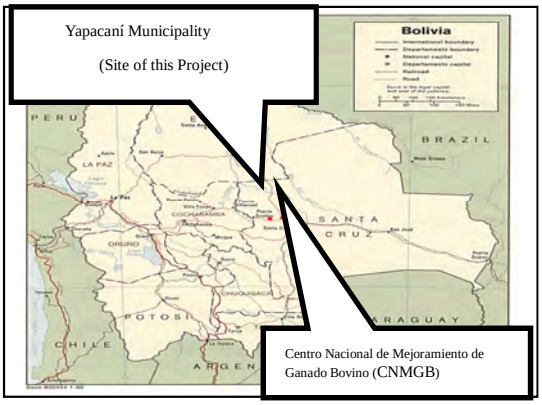
This Project was consistent with the National Development Policy of the Bolivian government, the needs of the Santa Cruz Department and the target areas where the Project was carried out, and Japan's ODA policy. Therefore, the relevance was high. The results aimed to be obtained at the end of the Project, and the Project objectives were all realized. Moreover, in the ex-post evaluation, the Project was considered greatly beneficial to raw milk productivity improvement in the target areas, technical diffusion among farmers, and technological spillover effects spread among villages/communities, ensuring a high degree of effectiveness and significant impact at the level of the farmers. As far as inputs from the Japanese side are concerned, it was considered necessary to partly review and improve the dispatch of relevant Japanese experts; however, the strengthening of a technical extension support system in cooperation with 5 associated organizations allowed the specified results and the Project objectives to be achieved within the term of cooperation. In addition to this, the amount of cooperation funds fell within the planned budget; so the assumption can be made that the Project was very efficient. After the Project, 3 out of the 5 associated organizations suspended their extension activities, while the remaining 2 are still actively developing the activities with the Project results continually produced for farmers. However, the Project executing agency underwent a major change in system and their support for the extension activities has not been maintained. In ensuring the further development of the Yapacaní region through mutual coordination among the agencies, the sustainability of the Project effects can hardly be expected because there are still some challenges in terms of the sustainability of the relevant policy, structure, system,

[1] The southern part of the Yapacaní region in Ichilo County, the site implementing the internal migration policy, which has a large number of small-scale livestock farmers

[2] "Technical extension workers" in this Project means stockbreeders' associations actually in charge of disseminating livestock techniques in Bolivia and specialists independently hired by NGOs, not the so-called "extension workers" belonging to Japanese authorities.

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

1. Project Description



(Project Location)

（Raising Crossbred Cattle as Dairy Stock）

1.1 Background

In Bolivia, the agricultural sector is one of the major industries; it contributes 15.6% to the GDP and its workforce accounts for 44% of the entire working population. This has encouraged the Bolivian government to make an enormous effort increasing the productivity of agriculture and cattle breeding, its major industries, and establishing the sustainable system for developing and diffusing agrotechnology, and especially developing the production chain mainly for the livestock industry including “beef cattle breeding” and “dairy farming.” Under these circumstances, Japan has provided cooperation based on “Livestock Breeding Improvement Project (1987-1994)” and “The Beef Cattle Improvement Project in the Republic of Bolivia (1996-2003)” to transfer various types of livestock techniques to the country. However, the technology and knowledge transferred for technical research institutes has not been improved to be appropriate for small-scale livestock farmers, which have prevented livestock farmers facing financial difficulties from implementing it. In Bolivia, moreover, the necessary techniques have been extended to the farmers by each local stockbreeder’s association or NGO in their own limited way since the country has no official system to support the extension. The technical levels of extension workers belonging to each association are low and the training for them lacks coherence; this has led to the present state of affairs where appropriate techniques are not sufficiently extended to small-scale livestock farmers. As a result, those farmers’ low levels of dairy and beef cattle[3] breeding techniques and hygienic control technology, and lack of information on necessary techniques are a major reason preventing the techniques of farmers in each sector from reaching basic standards. As these problems have seriously

[3] The small-scale livestock farmers raise crossbreds as both dairy and beef cattle and earn regular income from dairy products including raw milk and cheese. (According to the Ex-ante Evaluation)

affected small-scale livestock farmers' milk yields, it has been expected that technical improvements, appropriate for those farmers, can be achieved and the techniques can be introduced to the farmers clearly and accurately. Consequently, with the CNMGB, which has its knowledge of livestock techniques playing a central role, technical improvement for small-scale livestock farmers, extension workers' capacity improvement, and extension system reinforcement were facilitated with Japanese cooperation; and then a request to run this Project to establish a technical extension model, which can also be applied to other regions, was made to start this four-year Project in December 2004.

1.2 Project Outline

Overall Goal		The productivity of small-scale livestock farmers in Yapacaní Municipality is improved.
Project Objective		Extension Model is developed for small-scale livestock farmers in Yapacaní Municipality.
Outputs	Output 1	The system for extension activities is established.
	Output 2	Adequate techniques for small-scale livestock farmers are adapted.
	Output 3	Extension workers are trained and appropriate extension activities are executed.
	Output 4	Livestock technique is extended to Model Groups.
Inputs		Japanese Side: 1. Experts 6 in total (4 for Long-Term, 2 for Short-Term) 2. 8 Trainees received (for Counterpart Training Course in Japan) 3. 14 Trainees for Third-Country Training Programs (total) 4. Equipment 11.98 million yen 5. Local Cost 25.55 million yen 6. Others (incl. dispatch of related missions) Bolivian Side: 1. 13 Counterparts, 1 Secretary, and 1 Driver 2. Land and Facilities: Provided by CNMGB Headquarters Office, Yapacaní Extension Activity Office, Universidad Autónoma Gabriel René Moreno (UAGRM), Unidad Académica de Yapacaní (UNAYA) Agricultural and Stock-farming Experiment Station 3. Local Cost 3.77 million yen
Total Cost		238 million yen
Period of Cooperation		December 2004 – February 2008
Implementing		Centro Nacional de Mejoramiento de Ganado Bovino (CNMGB)

Agency	
Cooperation Agency in Japan	Ministry of Agriculture, Forestry and Fisheries
Related Projects	"Livestock Breeding Improvement Project (1987 – 1994)", and "The Beef Cattle Improvement Project in the Republic of Bolivia (1996 – 2001)"

1.3 Outline of the Terminal Evaluation

1.3.1 Expected Achievement of Overall Goal (incl. Other impacts)

Looking at each Model Farmer (Ganaderos Modelos), some cases are reported where raw milk yield and productivity showed great improvement after the Project. Therefore, it was considered that the goal would be achieved on a long-term basis. For achieving the overall goal, it is necessary for the Technical Extension Committee consisting of the agencies and associations concerned to set up the system and strategy for maintaining the Project outputs or the developed Model.

1.3.2 Expected Achievement of Project Objective

Taking the activities of grouping livestock farmers based in the target area with Model Farmers into account, setting it as the core of this objective, training extension workers in associated organizations, and establishing the extension model based on improvement technology, only one of the expected concrete results, Output 4, has not been achieved. However, it is likely that this will be attained, too[4]. Thus, the probability was judged to be high that the technical extension model would be finished by the end of this Project.

1.3.3 Recommendations

Short-term Suggestions made at the terminal evaluation	The Resulting Status Corresponding to Each Suggestion at the End of the Project
To designate a person in charge of technical extensions in the Project so as to maintain cooperation among organizations	The chief of the Project executing agency was assigned as the person in charge.
To formulate rules and regulations of the Extension Committee where associated organizations gather and discuss extension activities after the Project	Rules that the Extension Committee should be held periodically (once a month), and a proxy has to be selected and he/she must take part in the Committee if the representative of each agency is absent were devised.
To organize the Extension Committee by choosing suitable persons from each associated agency	The representative was selected from each associated agency and the Committee was held once a month.
To incorporate into the Extension Committee the suitable rules to let extension workers conduct stable activities, with the Extension Committee positioned as superior to	The Extension Committee was positioned at the level of the Working Committee. To ensure that extension workers conduct stable activities, rules

[4] The level for the Project objective attainment is about 92%, and the one for each output about 93% (on a percent basis respectively) in post-project evaluation.

the existing Committee	that a budget for each activity should be discussed and technical support organizations[5]are to be the members consisting of the Committee were incorporated into its organizational regulations.
To establish rules and regulations about the revision of the Extension Committee	Rules and regulations, for example, to require the Committee approval, were incorporated into its organizational regulations for extension activities.

Medium- and long-term Suggestions made at the terminal evaluation	The Resulting Status Corresponding to Each Suggestion in ex-post evaluation
To expand the function of the Extension Committee to secure its sustainability	The expansion of the Extension Committee to secure revision of its rules and regulations was not made and regular meetings were not held. One of the main reasons for this is that the executing agency did not continue the expansion activities and failed to take the initiative to make the necessary adjustments.
To ensure that technical teams classify farmers by milk production when selecting Model Farmers	No specific progress can be seen because the executing agency did not continue the extension activities.
To ensure that Ministerio de Desarrollo Rural, Agropecuario y Medio Ambiente (MDRAyMA) perform periodic follow-ups concerning the extension activities while making necessary adjustments in close cooperation with local agencies	A research interview with the executing agency and the Ministry of Agriculture found that MDRAyMA did not conduct periodic follow-ups regarding the extension activities by making the necessary adjustments with local agencies after the Project. The chief factor behind this is the situation where MDRAyMA could not participate in the follow-ups due to a change of the system including the rules and policies of UAGRM. However, MDRAyMA and UAGRM started to foster a harmonious relationship as illustrated in the example where they discussed the plan that the government would buy up cattle sperm to distribute among farmers from 2012. On the basis of such a relationship, monitoring activities will be conducted.
To support the systematization of farmers for allowing them to gain access to agricultural financing and revolving funds so as to strengthen support components for increasing input	It became possible for Asociación de Productores de Leche (ASOPLEA) to obtain access to agricultural financing and involving funds. For further details, please refer to the “Impact” part.

2. Outline of the Evaluation Study

2.1 External Evaluator

Tsuyoshi Gomi (Tekizai Tekisho Organization)

[5] As technical support organizations, Universidad Autónoma Gabriel René Moreno (UAGRM), la Federación de Ganaderos de Santa Cruz (FEGASACRUZ), Federación Departamental de Productores de Leche (FEDEPLE), Asociación de Criadores de Raza Lechero (ASOCRALE), Asociación de Criadores de Cebu (ASOCEBU) participated.

2.2 Duration of Evaluation Study

In performing the ex-post evaluation this time, the study was conducted by following the schedule described below:

Duration of the Study: November 2011 - July 2012

Duration of the Field Study: January 26, 2012 – February 26, 2012, June 30, 2012 – July 8, 2012

2.3 Constrains during the Evaluation Study

CNMGB, the Project executing agency, did not conduct periodic monitoring activities after the Project, resulting in the unavailability of information required for evaluation and judgment concerning the overall goal. Among the producers' associations and authorities worked in concert with in this Project, only Asociacion de Productores de Leche (ASOPLE) managed statistical data related to farmers in the target area; the data was utilized for evaluating and judging the overall goal[6]. Therefore, it should be noted that the data does not cover all the information gained in the entire area targeted in the Project as far as the goal attainment level.

3. Results of the Evaluation (Overall Rating: B[7])

3.1 Relevance (Rating ③[8])

3.1.1 Relevance with the Development Plan of Bolivia

Estrategia Boliviana de Reduccion de la Pobreza (EBRP) and Estrategia de Transformación Productiva Agropecuaria (ETPA) of Plan Bolivia, developed when the Project was planned, continued to be executed as Plan Nacional de Desarrollo (2006-2011) under the administration of Juan Evo Morales Aima. The new Plan regarded the support for small-scale or smallholder farmers and poverty reduction as its major challenges. And in the "Agricultural Sector Development Plan" formulated by MDRAyMA in 2007, programs were promoted to develop farmers and agricultural regions with the improvement of agricultural and cattle-breeding productivity, technical development on the basis of production chains, and the improvement of the nutritional status of smallholder farmers as the pillar of its main policy. Among them, the "Creacionn de Iniciativas Alimentarias Rurales (CRIAR)" program positioned small-scale livestock farmers' production development as a key task in policy matters, making efforts to ensure that high-quality agricultural and livestock products are produced and provided to local markets.

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[6] Although hearing surveys with Santa Cruz Department (Departamento de Santa Cruz) and Yapacaní Municipality (Honorable Alcaldía Municipal de Yapacaní) were also carried out, it turned out that they did not understand the milk yield of Yapacaní Municipality.

[7] A: Highly satisfactory, B: Satisfactory, C; Partially satisfactory, D: Unsatisfactory

[8] ③: High, ②: Fair, ①: Low

As it can be seen from the above, this Project supported livestock technique extension in the field of dairy farming for small-scale farmers. In this regard, the Project was consistent with the farming policy of the Bolivian government.

3.1.2 Relevance with the Development Needs of Bolivia

In the Santa Cruz Department, a district in the target area of this Project, the livestock industry is positioned as one of the major economic activities. According to FEDEPLE, about 6,000 families living in rural areas in the Santa Cruz Department are engaged in livestock raising, 80-90% of which are small-scale livestock farmers. On the other hand, the same areas are suffering from a high poverty rate (64%). This rate is perceived as a problem; adequate techniques have not been extended to small-scale livestock farmers living in the rural areas, which is a major obstacle to productivity improvement. As measures to fight poverty in the Santa Cruz Department, in a word, there is a tremendous need for improving the technical levels of small-scale livestock farmers and their productivity. Given this backdrop, this Project established a necessary livestock technique extension system and training personnel to provide technical support for productivity improvement as the Department's important policy challenge.

In the Yapacaní region, the area targeted in this Project, the farmland of the northern region is used for rice cultivation, and the southern region adopts the farming system mainly for cattle raising because many parts of its land are unfit for dry field farming[9]. The Project selected small-scale livestock farmers in the southern region of Yapacaní as its target group, 60% of which nurture only 10-30 heads of cattle. And 90% or more of the whole livestock farmers raise crosses between dairy cattle and beef cattle as dairy stock; their source of income comes from selling raw milk, dairy products (e.g., cheese) and feeder calves. Most of the small-scale livestock farmers are internal migrants who were encouraged to move from the highlands to lowlands by the Bolivian Government. The problem here is that a milk yield from one cow is extremely low (only 4 liters) according to ASOPLEA since their breeding management technology is insufficient. Therefore, this Project targeted such farmers and planned appropriate technical development aiming at an increase in milk yield in milk production and a business based on support components setting the organization of a technical extension system as its main activity.

A beneficiary survey, covering 127 persons in total from Model Farmer Groups and GTT (Grupos de Transferencia de Tecnología)[10], shows that as for the consistency of small-scale livestock farmers

[9]According to ASOPLEA, 80% or more of livestock farmers in the Yapacaní region carried out their farming activities in districts in the southern region at the time of the ex-post evaluation.

[10] A GTT (Grupos de Transferencia Technologias) method is an extension method in which grouped core farmers consisting of about ten members respectively hold study sessions on their own initiative and conduct study tours for new production methods on a continual basis under the guidance of relevant extension workers.

27 persons with extended techniques developed in the Project, 34% of those surveyed answered "Consistency was very high," and 57% "Consistency was confirmed." A major contributing factor to this positive result is considered to be an effective technical extension; to be more precise, an appropriate technique was extended to the Model Groups or GTT after the technique was developed in the Model Farmers' demonstration farm lands. This led to the high relevance of the Project with the technical needs of small-scale livestock farmers, this Project's beneficiaries.

It is also clear from the above that this Project was consistent in terms of the selection of its target areas and regional needs, and support components set for this Project were also appropriate.

Table 1: Consistency of Beneficiaries' Needs with Extended Technology

Consistency of Beneficiaries' Needs with Extended Technology	
Consistency was very high	34% (43 persons)
Consistency was confirmed	57% (72 persons)
Consistency was confirmed to some extent	9% (11 persons)
Consistency was not confirmed	0% (0 person)

(Source: Beneficiary Survey)

3.1.3 Relevance with Japan's ODA Policy

The country-specific program of the Japan International Cooperation Agency (JICA) points out "the improvement of both agrotechnology and its extension system" as challenges to be addressed in the field of agriculture and rural development in Bolivia. It also espouses "agrotechnology development and the establishment of the extension system in humid tropical regions over which Japan has a comparative advantage" as its cooperation policy for Bolivia, formulating the "Program for Agrotechnology Extension in Humid Tropical Regions" as a programmatic approach in the agricultural sector. Consequently, the relevance of this Project with Japan's ODA policy was high.

3.1.4 Appropriateness of Cooperative Approaches

As regards the establishment of a technical extension support system, CNMGB is the one and only research and educational institution in the field of livestock and dairy farming in the Santa Cruz Department, which has a series of accumulated technical knowledge regarding livestock and dairy farming as a result of Japan's technical cooperation to date. This led CNMGB to act as an agency to implement the Project, and made cooperative approaches for developing appropriate techniques for small-scale livestock farmers, ensuring that core farmers (e.g., Model Farmer Groups and GTT) in the Yapacaní region acquire and make full use of the technique in teamwork with extension workers of associated organizations[11] (2 associations, a farmers' organization, a university, and an authority),

[11] Livestock farming associations (ASOPLEA, Asociación de Ganaderos de Yapacaní (AGAYAP)), a university (Unidad Académica de Yapacaní (UNAYA)), a farmers' organization (Federación Sindical de Colonizadores

and extending the technique to and spreading technological spillover effects to small-scale livestock farmers in the same region. It can be said that these approaches are appropriate in order to solve challenges in popularizing the livestock industry in Bolivia with no official extension support system and insufficient technical extension service for farmers.

With reference to MDRAyMA, CNMGB's superagency, it turned out that it had a policy intention to determine the effectiveness of the system for extending proper techniques to farmers in close cooperation with universities, private associations, and citizens' organizations. A hearing with the relevant personnel at the time of the ex-post evaluation, moreover, found that it aimed to improve the technical competence of extension workers and the productivity of small-scale livestock farmers through this type of extension support system establishment.

In light of the above, 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 Impact[12] (Rating ③)

3.2.1 Effectiveness

3.2.1.1 Project Outputs

1) Output 1

Output 1 aimed for the goal that associated organizations build a system necessary for extension activities. At the time of terminal evaluation, the following activities were conducted: (a) select 5 Model Groups (from associated organizations), (b) choose 11 extension workers, and (c) form the Technical Extension Committee and hold its regular meetings. Likewise, in the ex-post evaluation, extension workers were assigned to selected groups and the regular meetings of the Extension Committee were held smoothly. Given the above, the system for extension activities succeeded in being improved.

Table 2： Change Observed in Extension System Established by Associated Organizations

(Change in Number of Extension Workers)

Name (Initialism) of Associated Organization	Number of Extension Workers at the Time of the Terminal Evaluation	Number of Extension Workers at the Time of Ex-post Evaluation
ASOPLEA	3	5
UNAYA	2	2
AGAYAP	1	0
FSCPAPIY	3	0
HAMY	2	0
Total	11	7

Productores Agropecuarios Provincia Ichilo – Yapacaní (FSCPAPIY)), and a governmental body (Honorable Alcaldía Municipal de Yapacaní (HAMY))

[12] Ratings are assigned by making judgments as to the effectiveness with impacts taken into consideration.

The following are descriptions of the status of associated organizations that also maintain the system at the time of the ex-post evaluation.

In ASOPLEA, extension workers who acquired high livestock techniques through the Project provide livestock farmers with technical support. As it produces milk on a commercial basis, funds for extension activities are secured and the extension system is maintained. And in UNAYA, its extension workers continue extension activities in the form of providing training to GTT. UNAYA realizes technical training in a self-supporting accounting system, by collecting training fees from participants. The other three associated organizations stopped the activities, and AGAYAP, an association for livestock farmers, also suspended the activities because its business objective places more weight on beef production, its financial base is weak, and funds to support the activities cannot be secured. FSCPAPIY, a political pressure group, is strong in favor-based business, but does not continue its extension activities owing to its indifference toward the activities themselves and weak financial base. And HAMY also stopped activities because of a change of leadership even though it continued the activities by creating a budget for an extension until 2010.

From the viewpoint of the continuation of extension activities in organizations, only the organizations that can raise funds to support extension activities on their own continue the activities. The other organizations could not continue the activities because they could not secure funds for the activities; they lost interest in the activities related to the Project after any external support became unavailable because their organizational missions did not include technical extensions, or they, as authorities, could not continue consistent extension activities owing to political factors. Although some organizations had no extension system established and maintained at the time of the ex-post evaluation, the extension system developed through this project has been maintained by ASOPLEA, of which about 40% of farmers producing milk in the Yapacaní region are its members.

2) Output 2[13]

The goal of Output 2 was the development of techniques useful for improving the productivity of small-scale livestock farmers (e.g., for livestock-raising management, breeding, hygiene control, and grassland management); to be more precise, it aimed at the improvement of the average milk yield from dairy cattle of Model Farmers by 50% and a breeding coefficient by 20%. At the time of the terminal evaluation, as a result, the milk yield per dairy cow increased by 60.7% and the breeding coefficient rose by 31%. Viewed in this light, the goal of Output 2 was attained at the time of the terminal evaluation.

[13] Since there is no data on Output 2-4 on completion of the Project, data gained after the Project and at the time of the Ex-post evaluation are compared.

In the ex-post evaluation, moreover, a beneficiary survey of Model Farmer Groups[14] showed that 41% of the farmers experienced a 50% rise in milk yield, and great productivity improvement. On the whole, 89% of the farmers answered that their milk yield per dairy cow increased by 30% or more (For further details, please refer to "Other Impacts" in 3.2.2.1).As for breeding coefficient improvement, relevant data with high accuracy was not obtained because the farmers kept no necessary records or had only vague memories.

In response to the question about techniques that were effective in improving productivity, the most popular reply, at 27%, was the technology for "Paddock Management and Effective Utilization of Electric Fences." Proper paddock management allowed pasture grass to grow in an appropriate manner and enabled cattle to eat more food than ever, contributing to an increase in milk yield, while the implementation of electric fences made it possible to leave more space between the fences, which reduced barbwire fences to realize cost reductions. The interviews with the beneficiaries revealed that other benefits obtained from the implemented technique such as the ease of technical introduction, an increase in milk yield, cost reduction, and the reduction of the workforce also gained the farmers' favor. Such technical introductions consequently increased milk yield per dairy cow.

Table 3：Techniques Evaluated and Implemented by Beneficiary Farmers[15]

Implemented Technique	Ratio of Farmers that Implemented Technique (Number of Persons)
Paddock Management and Effective Utilization of Electric Fences	27.0% (34)
Milking Plant Management	15.0% (19)
Creation of Incubation House and Nursing Calves	15.0% (19)
Anthelmintic Treatment (Repelling Ticks)	14.3% (18)
Twice-a-day Milking	7.7% (10)
Creation of Stand for Cattle to Lick Salt and Effective Utilization of Added Salt (Iodized Salt)	6.0% (8)
Effective Utilization of Green Feed	6.0% (8)
Effective Utilization of Concentrated Feed-stuff for Adult Cattle and Calves	5.5% (7)
Udder Treatment	3.5% (4)
Total	100.0% (127)

（Source: Beneficiary Survey）

3) Output 3

The goal of Output 3 was the training of extended workers, and more specifically, aimed to develop the skills of 140 local extension workers and technical extension experts to conduct extension activities by making use of relevant manuals. The terminal evaluation showed that the training helped develop 127 extension workers and technical extension experts (90.7% of the total)

[14] 60% of those surveyed in the beneficiary survey were members of ASOPLEA.

[15] A beneficiary survey was conducted with model farmer groups and GTT groups; 127 persons from the groups answered one of the introduced technologies that they considered useful for raising livestock and producing relevant products and actively adopted.

who could carry out the activities according to the manuals targeted for extension workers. By the time of Project completion, 11 training sessions in total to develop extension workers were conducted for 165 trainees (exceeding the target number). From this, it can be said that a sufficient number of extension workers were trained and acquired the necessary skills by the time of Project completion.

According to the results of the beneficiary survey with the target farmers in the ex-post evaluation, only 41% of the farmers answered that relevant local extension workers and technical extension experts continued extension activities after the Project. This means that only half of the trained extension staff or less continued their activities; it was mainly the extension staff belonging to ASOPLEA who continued the activities.

Since the extension manuals prepared for the training were thought to cover all the information necessary for the extension with practical content, the ASOPLEA extension workers had continued to use them. After the Project, however, the manuals are available only for the already trained extension workers because no training to develop extension workers is now carried out. As a result, at the time of the ex-post evaluation, a proper environment to develop extension staff was not secured because enough experience for training extension workers had not been accumulated and the staff had not been able to gain the opportunities to promote constant technical improvement.

4) Output 4

Output 4 set the goal to make the technique that was introduced to Model Groups fully established and utilized. The terminal evaluation showed that 46% of farmers (151 persons) of the Model Groups succeeded in utilizing the transferred technique on which the relevant training was provided.

The result of the beneficiary survey conducted at the time of the ex-post evaluation indicates that 114 persons out of 127 (89.8% of the total) of the farmers which promoted the utilization of the transferred technique continue to make use of all of or part of the technique. Among them, the farmers utilizing all of the technique account for 38.6%, the ones utilizing part of them, 51.2%; although each of the rates did not reach the percentage of techniques fully established and utilized that the Project set as its numerical target (60%)[16], it can safely be said that this percentage was comparatively high. Of special note is the large number of types of techniques that farmers greatly need; as much as 38.6% of the farmers utilize all types of the techniques in spite of the fact that they are not provided with all of them as one set for extension. But some of them are put together whenever necessary.

[16] As for this numerical target, 60%, and the definition of the percentage of transferred technique fully established and utilized, there is no description of them in the relevant documents of this Project.

Table 4： Percentage of Transferred Technique Fully Established and Utilized

Utilization of Technique	Utilization Ratio (Number of Persons)
Continuing to Utilize All Types of Techniques	38.6% (49)
Continuing to Utilize Part of Techniques	51.2% (65)
Not Continuing to Utilize Techniques	10.2% (13)
Total	100% (127)

(Source: Beneficiary Survey)

As the technical transfer did not require huge costs and even small-scale farmers could implement it, noticeable improvements in productivity were provided. Therefore, some major factors contributing to technical establishment and utilization can be recognized; for example, the facts that the target farmers could easily see the possible utilization of and the effects and results of the technique implemented by the Project, which was easy to observe the technique.

3.2.1.2 Achievement of Project Objectives

The Project objectives were set for establishing a technical extension model for small-scale livestock farmers in the Yapacaní region in Ichilo County. As indicators for judging the objective attainment, it was required that 5 extension workers continue their extension activities to increase milk yield gained from dairy cattle raised in relevant Model Group Farmers by 30%, and 60% of the farmers continue to utilize the transferred technique.

At the time of terminal evaluation, the rate of increase in milk yield per one dairy cow was 38.7%, the number of extension workers who continued adequate extension activities was 11, and the percentage of the farmers who continued to utilize improved techniques was 46%. Given these numerical values, the ratio of transferred technique utilization was 14% below the target figure. However, it can be said that the proper technical extension model was established since an increase in milk yield was confirmed, the extension workers continued adequate extension activities was as indicators, and relevant associated organizations also conducted extension activities.

Then the ex-post evaluation found that 7 extension workers continued relevant extension activities for the target Model Groups. As described in Output 4 in 3.2.1.1, furthermore, 89.8% of the total people of the Model Group Farmers continued to use the relevant improved technique at the time of the ex-post evaluation, proving that all the criteria as indicators for judging the Project objective achievement are also met at the above-mentioned time. What contributed greatly to the Project objection achievement were the continuous approaches of ASOPLEA extension workers who acquired more appropriate breeding techniques and the extension methods under the guidance of CNMGB or Japanese experts for extending the necessary technique to farmers in the Yapacaní region. Although some of the associated organizations stopped their extension activities, technologies transferred from CNMGB, the project executing agency, were acquired and thoroughly understood by ASOPLEA extension workers. The result is that the system for technical extension in

the Yapacaní region, with the task of technical extension taken over by ASOPLEA of which many target farmers are members, has been maintained even though the relationship between CNMGB and relevant associated organizations was not sustained at the time of the ex-post evaluation.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

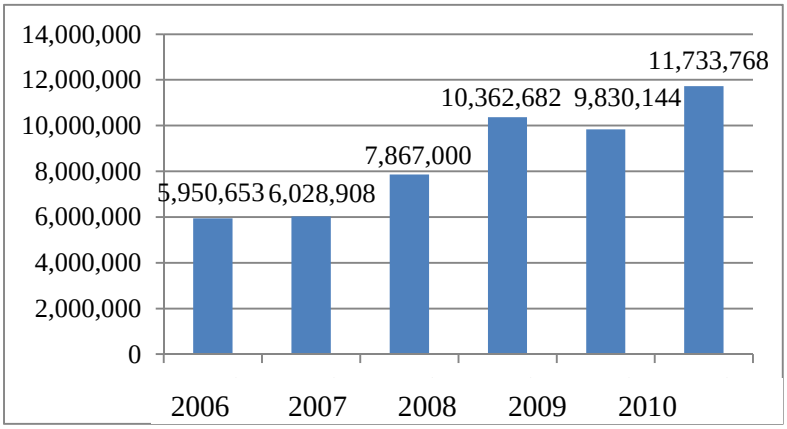
1) Indicator

The indicator for the overall goal is CNMGB and relevant associated organizations were not sustained at the time per dairy cow by 2013.The problem here is that the executing agency did not perform monitoring activities with no data on the actual milk yield; so that no report on the status of the overall goal achievement using this indicator in the Yapacaní region can be presented. According to the data of ASOPLEA, which is active in the area targeted in this Project (shown in Fig. 1 below); however, the annual milk yield of member farmers of ASOPLEA tends to increase. Comparing the yield after the Project in 2008 with the one at the time of the ex-post evaluation in 2011, the yield was increased by 67%. And ASOPLEA reported that its member farmers' average milk yield per dairy cow reached about 9 liters. This is because that it ensured the extension workers who acquired high-level livestock techniques through the Project having provided technical support to relevant livestock farmers. When this figure is compared to the average milk yield per dairy cow in the case of non-member farmers of ASOPLEA, about 4 liters, the ratio stood at around 2-1[17]. In Yapacaní Municipality, about 40% of farmers producing milk are members of ASOPLEA. As this association gives technical support to local farmers and establishes the system to offer consultation to them, a sufficient impact can be recognized in the Yapacaní region. Therefore, at least ASOPLEA member farmers producing milk have achieved the overall goal easily and in a highly efficient manner[18].

[17] At first, ASOPLEA had only an undeveloped conservation technique and could not conduct milk sanitation inspections, failing short of the standards for quality conformance inspection of major dairy companies. In this Project it estimated an increase in milk yield in the Yapacaní region and set up the association's cooling stations by using grant aid. Moreover, the increase in production as a result of support for farmers provided in the Project made its milk treatment capacity increase from 500 liters a day at the start of the Project to about 50,000 liters a day. This enabled it to provide major dairy companies with a stable supply of milk.

[18] According to ASOPLEA, 80% or more of livestock farmers targeted in this Project are concentrated in the southern region of Yapacaní Municipality, where about 750 people are estimated to be mainly engaged in producing milk or cheese. As of July 2012, there were about 300 member farmers of ASOPLEA; they account for about 40% of the total members.

Fig. 1: Change in Annual Milk Yield (liter) of ASOPLEA Member Farmers



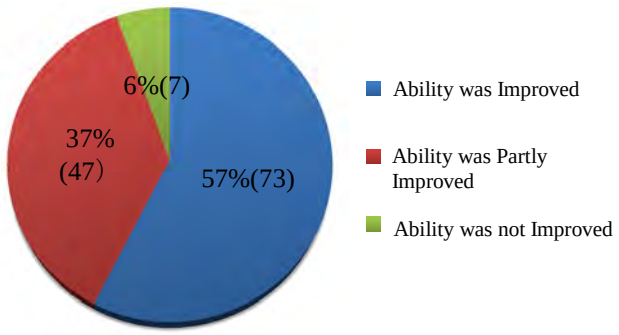
(Source: ASOPLEA)

3.2.2.2 Other Impacts

1) Impacts on Beneficiaries in Terms of Improvement of Technical Ability in Breeding

The beneficiary survey revealed that 57.8% of the target farmers answered that their "Ability Was Improved at 57.8% of the target farmers acquired through the Project (including training and seminars), and 36.7% of them answered their "Ability Was Partly Improved. 94.7% of the respondents recognized that their technical abilities in breeding improved through this Project.

Fig. 2: Contribution to Farmers' Ability Improvement
(Number of Respondents Shown in Parentheses)



(Source: Beneficiary Survey)

2) Impact on Productivity Improvement

In the beneficiary survey conducted at the time of the ex-post evaluation, 89% of the Model Farmer Groups answered that they could increase their milk yield per dairy cow by 30% or more. 41% of them, moreover, saw significant productivity improvement, a 50% increase in milk yield.

Table 5：Status Concerning Increase in Milk Yield of Farmers in Model Groups at the Time of Ex-post Evaluation

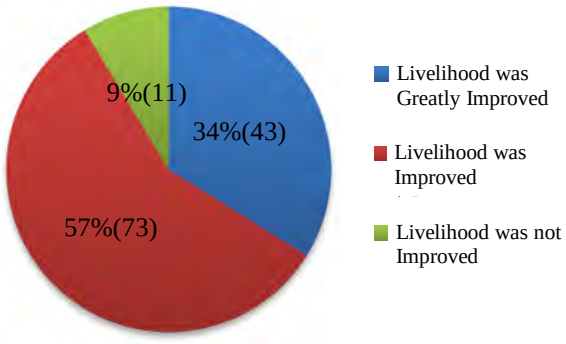
Increase in Milk Yield per Dairy Cow	Percentage of Farmers Whose Milk Yield Increased (Number of Persons)
10%	1.1% (1)
20%	9.5% (12)
30%	21.1% (27)
40%	24.2% (31)
50%	41.1% (52)
50% or more	2.1% (4)
Total	100% (127)

(Source: Beneficiary Survey)

3) Impact on Livelihood Improvement

According to the beneficiary survey, 91% of the target farmers answered that their livelihood was improved by technologies and knowledge acquired through the Project. There is no question in that productivity improvement and technical establishment and utilization were the driving force behind this result. The interview with relevant beneficiaries showed that the livelihood improvement was realized by the factors that raw milk and dairy products are not major products for home use, and that an increase in production tends to be directly linked to an increase in income because distribution routes are secured by the association.

Fig. 3: Improvement in Livelihood of Farmers
(Number of Respondents Shown in Parentheses)



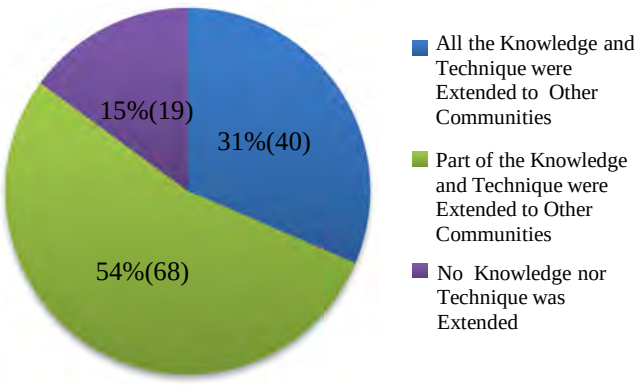
(Source: Beneficiary Survey)

4) Impact on Other Farmers

Great benefits for farmers as a whole can be recognized in view of the current status of the technical extension among farmers with the core farmers such as Model Group Farmers and GTT farmers at the nucleus. The result of the beneficiary survey shows that 83 respondents out of 127 in total (65.6% of the total) of the target farmers introduced the techniques gained through the Project to their friends, acquaintances, and relatives. Consequently, the techniques were transferred from extension workers to core farmers, and from the core farmers to conventional farmers. We could see this kind of technical extension not only among farmers in their villages but also in the communities

around the villages. As shown in Fig. 4 below, an enormous number of respondents (84.8% of the total) answered that they had disseminated their knowledge and information to the communities around their villages in some way. From this data, it can be said that the knowledge and techniques introduced through this Project were extended and became established widely in small-scale farmers. In the area targeted in this Project, ASOPLEA takes the lead in holding regular technical extension workshops. The interview with the relevant beneficiaries showed that in these workshops held by the association many conventional farmers became active participants because they got interested in the technique through word of mouth – that is, by obtaining the information given verbally from the core farmers. They made use of these opportunities to learn new breeding techniques, and appropriate techniques were extended and the resulting technological spillover effects were produced through opportunities for discussions and communication among farmers. One of the factors that contributed to great technological spillover effects was this type of approach in which core farmers provide opportunities to promote communication between them and conventional farmers.

Fig. 4: Dissemination of Knowledge and Information among Villages/Communities (Number of Respondents Shown in Parentheses)



(Source: Beneficiary Survey)

To sum up, from the result of the terminal evaluation, we learned that the Project effectiveness was high since the utilization of transferred techniques was facilitated and the entire milk yield increased through the support for extension activities given by relevant associated organizations. At the time of the ex-post evaluation, moreover, it can safely be said that the Project led to positive results in terms of extension system development through ASOPLEA and the development and establishment of the transferred techniques even though there were some issues concerning extension worker training because the relationship between the executing agency and the relevant associated agencies was not maintained. Although several issues remain to be addressed regarding part of the results gained from the Project, its implementation allowed the Project objectives to be achieved, which proves that the Project was highly effective. Looking at the overall goal attainment, it was observed that ASOPLEA

maintained the proper extension system and technical support for livestock farmers who promoted or produced productivity improvement, which had great benefits for farmers, and technological spillover effects among farmers and villages/communities even though some project executing agencies and part of the associated organizations have not continued extension activities. From the above, effectiveness and impact of the project are high.

3.3 Efficiency (Rating ③)

3.3.1 Inputs

The plan and actual performance concerning inputs for this Project are shown below.

	Plan	Actual Performance
Japanese Side		
Total Cost	350 million yen	283 million yen
Period of Cooperation	December 2004 to December 2008	December 2004 to December 2008
Experts Dispatched （Number of Experts）	Long-term experts：3 Chief Advisor Project Coordinator/Training Experts in the Technical Extension Field (Livestock) Short-term experts: 3 as required every year	Long-term experts：a total of 4 (on a 3-person basis) Chief Advisor Project Coordinator/Training Experts in the Technical Extension Field (Livestock) Short-term Experts: 2 Investigation of Actual Conditions of Farm Economy Hygiene Control
Trainees Received （Number of Trainees）	3 every year	8 in total
Third-country Training Programs	Main fields of training: Unknown	In Panama (on Breeding Techniques) In Chile (on Production of dairy and beef cattle)
Cost of Machinery and Equipment to be Provided	20 million yen	13.38 million yen
Local Operation Cost	40 million yen	25.55 million yen
Others	N/A	N/A

Bolivian Counterpart		
Counterpart Personnel Distribution (Number of Persons)	CNMGB (General Manager, General Director, Technical Director, Technical Extension Experts)	CNMGB Staff: 13, Secretary: 1, Driver: 1
Land and Facilities	Necessary facilities to be provided	CNMGB Headquarters Office, Yapacaní Extension Office, UNAYA Agricultural and Stock-farming Experiment Station
Others	Project operation expenses to be borne	3.77 million yen (Actual performance up to December 2007)

3.3.1.1 Elements of Inputs

With respect to inputs provided from the Japanese side, the progress of the project was interrupted by a bottleneck in the first half of the project term. Because the relevant team leader and project coordinators were stationed at Santa Cruz about 100km from Yapacaní Municipality to direct the necessary operations, there was a lack of communication. In response to this, some improvements were made in the latter half of the project period; for example, by making sure that the project leader and project coordinators were stationed at Yapacaní Municipality to hold weekly meetings or make the necessary preparations. As another issue, the lack of competence in Spanish of the technical extension experts dispatched there in the first half of the project was pointed out; this problem was handled by having them accompanied by their interpreters. The project, as a result, yielded practical results with the inputs appropriately transformed into expected outputs through the above-mentioned improvements or countermeasures.

It is assumed that the resulting desirable outputs and the achieved project objective were derived from several factors; main factors were that cooperation with associated organizations secured the adequate number of extension workers, and unified training content made it possible to perform extension activities targeted for a wider area. Another factor which enhanced the project effectiveness was that cooperation with multiple organizations including universities and NGOs instead of depending only on the executing agency minimized the negative impact caused by the frequent dismissal and new hiring of government employees in Bolivia. The organizations susceptible to political effects (e.g., FSCPAPIY and HAMY) still repeated the dismissal and hiring of extension workers, while in other organizations extension worker changes were few. Even during such continuous extension worker dismissal and hiring by the above organizations, the project activities could be maintained with the extension activities taken over and continued by other extension workers dispatched from other organizations.

The key issue of this Project was how to train extension workers of associated organizations and provide necessary technique to farmers. As there was a big difference in the level of extension workers' techniques at first[19], efforts to train the workers started from standardizing basic knowledge about breeding management to be organized into manuals and providing training using the manuals. As for creating technical manuals and training extension workers, eventually, these activities realized the desired results, utilizing techniques transferred and accumulated in various JICA projects for 10 years or more before the project was launched, on account of 2 major factors. One was that the executing agency already had specialists with the ability to handle professional livestock techniques, and the other was that Japanese experts with a great deal of knowledge of livestock techniques and technical extension worked together in effective ways.

Next, in training in Bolivia, third-country training programs, and providing practical techniques to Model Farmers in technical instruction, the experts and their counterparts advanced the technical levels of extension workers by making use of various methods such as seminars and fieldwork called tDia de campo[20]." Added to this, the experts and counterparts offered consultations through regular visits to solve problems from which farmers suffered. If the problems were not able to be solved, they were left and dealt with later by seeking advice from specialists of the executing agency or Japanese experts and by discussing such problems as the subjects for upcoming seminars or fieldwork to feed the necessary information or solutions back to the farmers. Through this, the approaches were effective in providing extremely systematic and practical extension worker training while ensuring that the executing agency and Japanese experts laid out the framework to give technical backup to extension workers.

The third-country training program in Panama conducted after a wide range of techniques in different categories was acquired through the training in Bolivia; how each technique influenced the entire breeding method was disclosed, fully observing the livestock farming situation of Panama after the introduction and utilization of extended technique. In addition, higher-level techniques, for example, disease prevention for cattle (by making observations of pictures for case studies and symptoms of sick cattle and learning how to take steps to prevent diseases) or prophylactic drug management and application, were also explained. As discussed above, the main driving force for achieving an effective outcome in the project is considered to be the improvements of the extension workers by using a skillful combination of the input of the executing agency and Japanese experts with a high level of technique, training in Bolivia, and third-country training programs.

[19]In the areas targeted in this project, technical support has been provided to livestock farmers by each local stockbreeder's association or NGO on its own. However, the technical levels of extension workers are low and technical guidance was not sufficient; as a result, the contents of the training lacked coherence.

[20] After picking up a subject in each seminar and training extension workers through lectures and discussions while utilizing pictures for case studies and manuals, fieldwork called "Dia de Campo" is conducted. The fieldwork was useful in that the knowledge and technique regarding the subject studied in the seminar deepened and improved, discussing the subject in demonstration farm fields and exchanging ideas.

The function of UNAYA Agricultural and Stock-farming Experiment Station was reinforced through the construction of cattle isolation facilities and other support facilities using grass roots grant aid. It operated as a demonstration farm field and was used for giving technical support to Modes Farmer Groups and GTT to help promote project activities.

3.3.1.2 Project Cost

The project cost was lower than planned.

3.3.1.3 Period of Cooperation

The cooperation period was as originally planned.

In light of the above, the project had some issues to be addressed regarding the dispatch of Japanese experts. However, the relevant improvements were shown during the project period. The inputs were appropriate for producing outputs and achieving the project objective, and both project cost and period of cooperation were as planned. Therefore, efficiency of the project is high.

3.4 Sustainability (Rating ①)

3.4.1 Policy System

In 2011, Bolivia stipulated "production improvement in rural communities" in Article 144 in its new constitution, in which the establishment of the system to promote the agricultural and livestock industries is specified. The preparation to enforce this constitution was started by MDRAyMA and Instituto Nacional de Innovación Agroforestal (INIAF)[21], based on the technical extension support system developed in the project through mutual coordination among organizations; their policy concerning the concrete extension activities to be performed in close liaison with CNMGB, however, has not been set yet. This is almost wholly ascribable to the fact that CNMGB is essentially an institution for research and education in the field of livestock and dairy farming, not an organization that aims to promote technical extension. Given the above situation, INIAF's role as the public extension agency under the constitutional mandate is increasingly important to facilitate technology transfer and other related activities in collaboration with CNMGB and other organizations.

3.4.2 Counterpart Organizational Systems/Structures

From the end of the project through May 2009, CNMGB had maintained the system to provide

[21] INIAF was founded in June 2008, with its organizational goal of (1) maintaining food security in Bolivia and increasing major agricultural product yields through technical development and extension and (2) improving the quality and quantity of agricultural products in the domestic market.

technical support to both training for farmers conducted by HAMY and ASOPLEA and training for GTT given by UNAYA. After personnel changes were made in the administration of UAGRM as a result of the election held in 2009, and the dean of the Department of Veterinary Science at UAGRM was installed as president, CNMGB became an agency subordinate to this Department. Against this backdrop, regulations to position extension activities as the official activities of the executing agency were not approved, which made it impossible for UAGRM and its Department of Veterinary Science to continue extension activities. However, recently it has been expected that the activities would be restarted because the university president during the project period was reappointed in the election in June 2012.

The personnel and organizational systems/structures of CNMGB are as shown below. It should be noted that some functions (e.g., the function of developing techniques depending on the needs of small-scale livestock farmers) have not been maintained.

Table 6: Personnel and Organizational Systems/Structures of CNMGB

Title/Department	Number of Persons	Role
Director of CNMGB	1	Controlling all the departments
Reproductive Technology Department	1	Collecting sperm of cattle, etc.
Technical Extension Department	3	Providing guidance on artificial insemination techniques, etc.
Breed Improvement Department	1	Artificial insemination and promoting mating behavior
Production Department	3	Producing meat and milk

(Source：CNMGB)

As this project was designed to establish proper technical extension models in its target areas, it was expected that CNMGB, the project implementing agency, would carry out extension activities with the models developed in this project in the Yapacaní region in the Santa Cruz Department after the project. However, it stopped its extension activities after the project and no such activity is conducted in the same region now. For this reason, sustainability in terms of systems to maintain and extend technical spillover effects from this project was unlikely, at least at the time of the ex-post evaluation.

3.4.3 Technical Aspects of the Implementing Agency

Since June 2009, CNMGB has not conducted any extension activities, and along with this, UAGRM has allocated no budget for extension activities to CNMGB. Consequently, CNMGB has failed to gain an understanding of the actual state of livestock farmers, respond to technical needs, and hold extension committee meetings since the end of the project. According to CNMGB's account, this situation was caused by two factors: (1) commitments agreed to be observed during the

terms of persons in charge of technical extension were not properly taken over by the next relevant responsible persons because of frequent changes of members involved in the project, and (2) most of the members are not able to participate in extension activities because executives of each project implementing agency have to deal with a lot of their own operational management work, or if proxies are appointed to act for the original project members, they are indifferent to the relevant activities and work on the activities as if they were nothing to do with them. Moreover, we can see another cause for this situation in that there has been no agency taking the initiative in leading the extension activities after CNMGB gave up the continuation of the activities. At present, the result is that technical sustainability in the case of CNMGB as the implementing agency would not be sufficiently secured because it has not continued with the activities.

3.4.4 Financial Aspects of the Implementing Agency

CNMGB has not received any budget for continuing the project implementation because UAGRM as its superior organization abolished the policy to continue extension activities, whereas ASOPLEA, an associated organization, has continued its extension activities. ASOPLEA has allocated funds of 269 thousand boliviano (about 2.98 million yen) to extension activities based on its revenue sources including the sales of milk, veterinary medicines, and livestock feed, and union dues.

Table 7: Annual Budget of ASOPLEA (in Fiscal 2012)

Budget Item	Budget Amount (Unit：Boliviano)
Administrative Costs	14,700
Labor Costs	1,700,000
Technical Extension Activity Costs	269,000
Communication Expenses	45,000
Facility Maintenance Costs	21,000
Gas and Water Bill	350,000
Others (Reserves, etc.)	660,300
Total	3,060,000

(Source: ASOPLEA)

Yapacaní Municipality had budgeted for extension activities from 2008 to 2010 to provide training to a total of about 150 livestock farmers in 6 regions in the northern part of Yapacaní without the opportunity to receive technical extension training during the project implementation period. It conducted the training in teamwork with extension workers of ASOPLEA, using the extension manuals developed in the project. In and after 2011, however, extension activities have been suspended because of political matters in Yapacaní Municipality.

Table 8: Budget for Extension Activities in Yapacaní Municipality

Fiscal Year	Budget for Extension Activities (Unit：Boliviano)
2008	120,000
2009	80,000
2010	Unknown

(Source: HAMY)

Although the Technical Committee[22] was formed for discussing the necessary budgetary measures concerning extension activities among associated organizations in this project, it is confirmed that the organizations in charge of the activities have not acquired and utilized funds for extension system maintenance. After the project, neither the Technical Committee nor the Extension Committee was held because CNMGB stopped its extension activities.

From the above, it can be said that the financial sustainability in the case of Yapacaní Municipality as an associated organization and CNMGB, the executing agency, will not be sufficiently guaranteed, while ASOPLEA has secured the budget for extension activities.

3.4.5 Continuity of Effectiveness/Impact

After the project, it was assumed that the overall goal could be attained by continuing extension activities with the Extension Committee, consisting of CNMGB and associated organizations, playing a central role in the activities as well as through mutual coordination among all the relevant organizations. However, this committee lost its function because the executing agency and part of associated organizations did not continue their extension activities. With this being the situation, the initially proposed policy to secure sustainability in terms of project effectiveness by maintaining and extending technical spillover effects through mutual cooperation among the organizations concerned even after the project has not been followed. Another factor, namely, that any extension policy was not instituted after INIAF was newly founded, also makes the realization of project effectiveness sustainability uncertain. However, in the future, it is expected that INIAF could increase persistence of the project effectiveness in clarifying role as well as policy in cooperation with each institution.

There are 7 extension workers who still continue their extension activities for livestock farmers out of 11 workers trained in the project in total. ASOPLEA now has 5 extension workers; 2 workers at HAMY joined 3 workers already belonging to this association. The reason why it was able to continue its extension activities was that the project goal was consistent with the business purposes of ASOPLEA and the activities were effective as services to association members because milk

[22] The members of the Technical Committee were the same as those of the Extension Committee with one representative selected from each of the executing agency and associated organizations, respectively. This committee had the function of building consensus among all the associated organizations after the representatives selected from each associated organization discussed the necessary subjects in the Extension Committee and fed back the results gained through the discussion to each associated organization. It was the theory of the committee that the two committees had different names – that is, one for discussing technical extension and another for the budget, etc., even though the two committees have exactly the same members.

production became commercially viable. The number of extension workers who still continue the activities other than the ones in ASOPLEA is 2 at UNAYA. They still belong to UAGRM, providing technical support to Model Farmer Groups and GTT through lectures to students or by using the demonstration farm field of UNAYA. In UNAYA, training fees were collected from participants, thereby facilitating continuous extension activities. As for 6 extension workers at AGAYAP and FSCPAPIY, on the other hand, no actual performance concerning their extension activities was reported. Since these organizations do not conduct the activities as a business, they cannot secure funds necessary for continuing the activities.

Since 2009, the association members have been able to obtain agricultural financing at the rate of about 10% per annum from Banco de Desarrollo Productiva (BDP) with ASOPLEA as a guarantee agency[23]. This enables the members in the targeted area in this project to make efficient use of bank financing to introduce milking machines and upgrade facilities, which promotes the implementation of transferred techniques. ASOPLEA also provides incentives to the member farmers to market high-quality milk by rating milk according to quality and graduating the prices to buy up milk. For maintaining the technique and extension system implemented in the project, moreover, it sets the technical support department within its organization to establish a system to give technical support to both the member and non-member farmers and to provide consultation for them. From this aspect, it is likely that ASOPLEA member farmers in particular, would continue to further utilize the project results.

Given the above, the continuity of the project results will be able to be maintained at a high level with the help of the high levels of performance of the relevant associated organizations in the areas targeted in the project. However, the sustainability of the initially assumed project effects that the Extension Committee (consisting of CNMGB and the relevant associated organizations) takes the initiative in maintaining extension activities and extending necessary techniques in the Yapacaní region working hand-in-hand with relevant organizations has not been secured. Moreover, major problems have been observed in the policy background and structural, technical and financial aspects of the executing agency, Therefore, sustainability of the project effects is low.

The project could be more sustainable if it more focused on building institutional consensus on sustainability and make joint efforts to achieve sustainability from the outset. For the sustainability of technology transfer, it also needed a clear strategy to strengthen the technical support system between INIAF and other institutions.

[23] As support generated by this project produced good results, and then the self-help efforts of ASOPLEA bore fruit, a business service from which association members can obtain agricultural financing, with ASOPLEA as a guarantee agency, started.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Project was promoted to produce adequate livestock technique improvements for small-scale livestock farming business in the area targeted in this Project to extend to small-scale livestock farmers the techniques transferred to and accumulated in the CNMGB as a result of Japan's cooperation to date. In so doing, to the Project was implemented with the aims of establishing a technical extension model for ensuring that the farmers acquire the technique through technical extension workers' capacity improvement and extension system enhancement, and of increasing productivity by spreading the use of the techniques among the small-scale livestock farmers in the Yapacaní region in the Santa Cruz Department.

This Project was consistent with the National Development Policy of the Bolivian government, the needs of the Santa Cruz Department and the target areas where the Project was carried out, and Japan's ODA policy. Therefore, the relevance was high. The results aimed to be obtained at the end of the Project and the Project objectives were all realized. Moreover, in the ex-post evaluation, the Project was considered greatly beneficial to raw milk productivity improvement in the target areas, technical diffusion among farmers, and technological spillover effects spread among villages/communities, ensuring a high degree of effectiveness and significant impact at the level of the farmers. As far as inputs from the Japanese side are concerned, it was considered necessary to partly review and improve the dispatch of relevant Japanese experts; however, the strengthening of a technical extension support system in cooperation with 5 associated organizations allowed the specified results and the Project objectives to be achieved within the term of cooperation. In addition to this, the amount of cooperation funds fell within the planned budget; so the assumption can be made that the Project was very efficient. After the Project, 3 out of the 5 associated organizations suspended their extension activities, while the remaining 2 are still actively developing the activities with the Project results continually produced for farmers. However, the Project executing agency underwent a major change in system and their support for the extension activities has not been maintained. In ensuring the further development of the Yapacaní region through mutual coordination among the agencies, the sustainability of the Project effects can hardly be expected because there are still some challenges in terms of the sustainability of the relevant policy, structure, system, technologies, and finances. In light of the above, this project is evaluated to be satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

Recommendations to MDRAyMA, INIAF, CNMGB, and UAGRM are as follows:

- It is recommended that INIAF strengthen the technical support system in collaboration with other institutions in order to enhance the sustainability of the project's effects.

- It is recommended that extension policies be reviewed by MDRAyMA and INIAF to define how to build a collaborative relationship with CNMGB. When setting CNMGB as an organization responsible for extension, it is also to be desired that they make efforts to resume the extension activities in teamwork with the Santa Cruz Department and by making necessary adjustments with UAGRM and the Department of Veterinary Science.
- In resuming extension activities, inter-organizational coordination is important. If CNMGB restarts them, it needs to go through the following steps: to approve the regulations for extension activities, to make positive efforts to hold regular "Comité de Extensión," to make the necessary adjustments with local stockbreeders' associations and associated organizations, to redevelop an extension support system, and to provide technical support to small-scale livestock farmers in collaboration with INIAF

4.2.2 Recommendations to JICA

None in particular

4.3 Lessons Learned

When launching a project in the field of agricultural and livestock-farming technique extension, the planner of the project needs to consider the following points:

- If the executing agency, like CNMGB, sets research and education as its organizational goal, there remain some issues on the establishment of a system or structure to extend relevant extension models to other regions and make the impact affect the regions in the agency and relevant organizations like UAGRM to which it is subordinate in this case. Especially in countries with no official extension support system developed, such as Bolivia, it is necessary to build proper extension models through mutual cooperation with other players, clarifying the roles and functions of authorities and the agency such as MDRAyMA and INIAF.
- Regarding extension models to be established in such countries as Bolivia with no official extension support system developed, it is important to consider that the executing agency with specialists having technical competence to train extension workers (e.g., research institutions, universities) is to be engaged in the establishment and extension together with producers' associations or educational organizations that have extensive knowledge about region-by-region actual conditions and can offer their cooperation to the agency for the extension. If the relevant organizations have highly political missions (e.g., authorities, farmers' pressure groups) or their organizational goals are not consistent with the project objective, however, we should be aware that they tend to be less willing to get involved in the project and the project effect sustainability cannot be sufficiently secured. As in the case of ASOPLEA, on the other hand, when the project objective is consistent with the organizational goals of the relevant organizations or the project

activities can support their businesses and service provision, there is the high possibility that they can cooperate with each other smoothly. Moreover, such a cooperative framework can be strengthened effectively if the extension methods developed in the project (e.g., method for extension through a demonstration farm field system, Model Farmers, and GTT farmers) are put to effective use.

In the selection of partners to work with, it is vital to enhance the effectiveness of support to give, with post-project effect sustainability taken into account, through examining the possibility that the partners can secure funds and their business models and by supporting the business environments providing them with technical support and capital investment in combination at the stage of project implementation.

Column

To formulate and implement farming and livestock extension projects in a country like Bolivia where the public extension system is vulnerable, what issues are necessary is examined. 3 projects implemented in Bolivia – Mejoramiento de la Extensión Técnica para Pequeños Ganaderos (MEXPEGA), Difusión de. Semillas de Arroz de Alta Calidad para Pequeños Productores (DISAPA), and Project for Development of Coffee Culture as Agricultural Alternative (CAFAMA) – were examined from the 3 perspectives, namely; (1) choice of techniques, (2) extension support system and (3) extension method. MEXPEGA aimed at increasing productivity by introducing various cattle-raising/breeding techniques. DISAPA tried to diffuse packaged rice varieties and cultivation techniques. CAFAMA attempted to improve the quality of coffee, targeting the international market.

As for (1) choice of techniques, the study results identify the following vitally important to choose appropriate techniques:

① To understand farmers' (technical and financial) capabilities
② To select the techniques suitable to the technical level of the farmer (MEXPEGA showed various techniques at its demonstration farms, showing both advantages and disadvantages of each technique and explaining in what farming environment each technique can be effective.)
③ To choose techniques through on-farm trial and evaluation by farmers (DISAPA conducted survey with farmers on growth and yield of newly introduced rice varieties and compared the results with conventional cultivation techniques. This helped increase the adoption ratio of new varieties by the farmers.)
④ To choose cost-effective techniques (In the case of MEXPEGA, a great number of farmers were able to increase their milk production because of their selection of cost-effectiveness techniques such as installing electric fence and paddocks.)
⑤ To choose techniques that meet local and natural conditions (CAFAMA carefully selected the techniques and varieties suitable to the target area's soil conditions, the climate and altitude in order to increase benefits to the farmers.)

As for (2), extension support system, it is very important to involve two types of organizations: an executing organization such as research institutes and universities with technical capabilities to train extension workers, and a local partner organization such as NGO and producers' association with good knowledge of local agriculture, and capable of technical extension in close collaboration with the executing organization. It is worth noting that it is sometimes risky to cooperate with organizations with strong political orientations and/or influence (e.g., public

administration and farmer's lobby groups) and when there is a wide gap between the organizational mission and the project's objectives. The partner organization's financial capacity to implement extension activities is another aspect that we should look at. In sum, the following points should be considered in selecting partner organizations:

① The missions and characteristics of the organization (to whom it aims to serve, whether it is interested in the tasks assigned by the project and to what extent the organizational mission meets the project purpose)
② The management capabilities of the organization (whether it can manage fund properly and it has a sufficient financial and human resources to implement extension activities)

When the above points are satisfied, the following issues should be further considered to ensure the sustainability of their extension activities:

① To discuss ways on how the project can be useful to develop the business model of the partner organization. In the case of MEXPEGA, milk producers' association established a technical assistance unit and it introduced the technology and dissemination system learned from the project. Dissemination activities of the association are still maintained as a part of the technical services to its members.
② To discuss the possibility of supporting both technical assistance and facility investment. In the case of MEXPEGA, with the facility investment and technical assistance combined, milk processing capacity of the milk producers' association has drastically increased to the extent that it can provide stable supply of milk to a large dairy company.
③ To discuss To discuss how to build the financial foundation and fund management capabilities. In the case of CAFAMA, the partner NGO actively sought funding from donors and successfully won support from the EU.

As for (3), the promotion of farmer-to-farmer extension, it has been found that it is important to develop key farmers and effectively use the media. For the development of key farmers, the following points are important:

① To develop a mechanism where both the key farmer and ordinary farmers can receive economic benefits. In the case of CAFAMA, key farmers received economic benefits by providing seedling, technical services and transportation services to ordinary farmers. By return, the ordinary farmers received technical assistance from the key farmer and had access to high quality seedlings. To date, the producers' cooperative has been developed

enough to launch collective shipping of coffee from its members targeting the European market.

② To select the key farmers who can influence ordinary farmers as an opinion leader. Forward-looking, risk-taking spirit is another important quality as a key farmer.

③ To study how the local farmers' networks are formed.in order to identify effective extension and technical diffusion channels,

Another interesting finding was that the use of the media is very effective when it is used with the development of farmer-to-farmer extension systems through site visits and technical exchange. In the case of CAFAMA, the project held such events as "coffee sommelier competition", advertising through newspaper, radio and television. The ordinary farmers who learned about the new techniques began to approach the key farmers to seek assistance.

Thus, it is expected that the effects of JICA's technical cooperation in the fields of agriculture and livestock development would be further enhanced by planning and implementing projects, taking the above mentioned points, regarding choice of techniques, extension support system and extension method, into account.

Country Name: Indonesia

Ex-Post Evaluation of Japanese Grant Aid Project

The Project for Improvement of Animal Health Laboratories for Diagnoses of Avian Influenza and Other Major Diseases of Animal

Kaneyasu Ida, Tekizaitekisho Organization

0. Summary

Summary of the study results

This project set up testing facilities able to handle dangerous pathogens such as avian influenza in the three locations of Subang, Medan and Lampung on the island of Java and the island of Sumatra, which are at grave risk of damage due to avian influenza. The objective was to enable the diagnostic facilities to conduct tests rapidly and reduce the risk of infection to inspection staff and residents living in the vicinity of the diagnostic facilities. Reinforcing the diagnostic system is an important pillar of the national strategic plan to eradicate avian influenza and thus its relevance is high. The avian influenza diagnostic facilities and equipment at the three disease investigation centers (DICs) are being utilized and the time until the diagnostic results can be provided has shortened. In addition to these effects, the project objective of improving safety was achieved as they operate as facilities with a biosafety level of three, giving them the clearance needed to diagnose avian influenza virus. This means that the project's effectiveness was high. The Medan and Lampung DIC were completed as planned in terms of both project costs and project duration, but after the Subang DIC's facility was set up there were delays before diagnostic services began. Accordingly, efficiency is assessed as moderate. There are no major problems at present at any of the three facilities that lowered diagnostic services, but DGLAHS has not established standards or a monitoring system for biosafety operations, and dysfunctional equipment is not being repaired, partly due to an inadequate budget for maintenance and management. Accordingly, sustainably is rated as moderate.

Given the above, the project is evaluated to be satisfactory.

1. Project Description

(Image of project site location)

(Subang Disease Investigation Center)

1.1 Background

Avian influenza has caused severe damage in Indonesia, as evidenced by the declaration of a state of emergency when it spread to livestock and humans in 2005, and there are concerns that the damage could reach an even greater scale in the future. Indonesia has a shortage of laboratories for diagnosing avian influenza on the islands of Java and Sumatra, where both the human population and livestock are concentrated, and it takes considerable time to diagnose specimens suspected of infection. As such, Indonesia clearly lacked the systems needed to quickly take steps to prevent contagions from spreading. Moreover, since Indonesia does not have testing facilities with the safety protocol needed to handle dangerous pathogens such as avian influenza, the laboratory staff and residents living near the facility were put into dangerous situations when tests were, for lack of an alternative, conducted in facilities that were not safe enough.

1.2 Project Outline

By setting up disease investigation centers (DICs) in the three locations of Subang (West Java province, the island of Java), Medan (North Sumatra province, island of Sumatra), Lampung (Lampung province, island of Sumatra) and providing them with the necessary equipment and materials, the Centers' ability to diagnose animal diseases such as avian influenza is enhanced, and at the same time testing facilities with the necessary safety protocol to handle dangerous pathogens (A1 laboratory facilities corresponding to a biosafety level 3: laboratories that can handle avian influenza cases) are set up. [1]

The objective of this project is to increase the number of diagnoses and examinations carried out at the three Disease Investigation Centers (DIC) by taking advantage of the newly constructed and upgraded facilities and equipment for Avian Influenza (AI) and other major animal diseases.

Description of the Project

Grant Limit / Actual Grant Amount	178.1 Million Japanese Yen/173.4 Million Japanese Yen
Exchange of Notes Date	September 2007
Implementing Agency	Directorate General of Livestock and Animal Health Services (DGLAHS)
Project Completion Date	March 2009
Main Contractor(s)	Sumitomo Mitsui Construction Co., Ltd. Mitsubishi Corporation

[1] According to the DGLAHS's definition, BSL2 facilities can handle bacteria and viruses with a low risk of potential contagion to people and the environment and that do not have a grave effect on the human body (such as influenza A, hepatitis, salmonella, measles, HIV, etc.). Facilities must have BSL3 to handle dangerous agents that are a serious risk to human life when inhaled (anthrax, tuberculosis germs, highly pathogenic influenza, etc.). BSL2 can handle agents that should be handled in BSL3 facilities with the DIC director's authorization and if the facility has strict limitations on access, uses safety cabinets, has double doors, and can regulate the flow of air with an air conditioning system. Accordingly, the other five DIC currently handle such agents. DGLAHS recognizes the three DICs (Medan, Subang and Lampung) as being BSL2+ overall since the three DICs' AI laboratories are BSL3, but the other testing facilities of these three DICs are BSL2.

Main Consultant(s)	Joint Venture of Nihon Sekkei Inc. and Fujita Planning Co., Ltd.
Basic Design	"The Basic Design Study on Project for Improvement on Animal Health Laboratories for Avian Influenza and Other Strategic Animal Infectious Diseases in the Republic of Indonesia" Joint Venture of Nihon Sekkei Inc. and Fujita Planning Co., Ltd.
Detailed Design	January 2008
Related Projects (if any)	The Project for Improvement on the Vaccination Program for Avian Influenza Control in Indonesia (2007 – 2009) The Project on Capacity Development of Animal Health Laboratory (2011 – 2015)

2. Outline of the Evaluation Study

2.1 External Evaluator

Kaneyasu Ida, Senior Consultant, Tekizaitekisho Organization

Maria Ulfah, National Consultant, Bogor Agricultural University

2.2 Duration of Evaluation Study

Duration of the Study: January – April 2012

Duration of the Field Study: January 10 – 29, 2012. April 14 – 20, 2012

2.3 Constraints during the Evaluation Study (if any)

The Subang DIC does not have information on the users of its diagnostic services, and a questionnaire of private-sector users did not yield an adequate number of responses. As a result, it was not possible to quantitatively ascertain the economic impact on private-sector users.

3. Results of the Evaluation (Overall Rating: B[2])

3.1 Relevance (Rating: 3[3])

3.1.1 Relevance with the Development Plan of Indonesia

(1) In 2005, the Government of Indonesia (GOI) formulated the National Strategic Plan (NSP) to tackle the outbreaks of AI on human as well as poultry. The NSP set ten targets and objectives where the strengthening of diagnostic capacity of national institutions such as the Disease Investigation Centers (DICs) was emphasized. In accordance with the NSP, the Ministry of Agriculture formulated the National Strategic Work Plan (NSWP) and the improvement of relevant facilities and equipment for the control of High Pathogenic Avian Influenza (HPAI) was one of the seven pillars of the NSWP.

[2] A rating of "A" indicates "very high," "B" indicates "high," "C" indicates "there are some issues" and "D" indicates a "low" rating.

[3] A sub-rating of (3) indicates "high," (2) indicates "moderate," and (1) indicates "low."

Therefore, the project's objective of strengthening diagnostic capacity of DICs was in alignment with the NSP/NSWP.

(2) The Directorate General of Livestock and Animal Health Services (DGLAHS) set up the Participatory Disease Surveillance and Response (PDSR) program in local government entities (primarily district animal husbandry offices) and is endeavouring to reinforce it in order to promote the monitoring and reporting of HPAI and the education of the public. The biggest priority of DICs is to provide rapid diagnostic services in collaboration with the PDSR team, and in this sense also strengthening diagnostic capacities is extremely important. Moreover, in a recent development, in 2012 each DIC were designated as reference laboratories specializing in disease diagnosis in ministerial ordinance 89/Kpts/PD.620/1/2012. In this respect, the Subang DIC became the HPAI reference laboratory.[4] In this sense as well, JICA's aid for the Subang DIC can be said to be consistent with the Indonesian government's desire to make this DIC the center for avian influenza diagnosis.

3.1.2 Relevance with the Development Needs of Indonesia

There were a total of 1,461 cases of avian influenza in domestic animals nationwide in 2011, including a high proportion of cases on the island of Java (461 cases, or 45.8%) and the island of Sumatra (311 cases, or 21.3%). Selecting Java and Sumatra as the targets for this project aimed at strengthening diagnostic capacity was appropriate. The choice was also optimal in terms of the human population and number of domestic animals in the provinces with jurisdiction over these three DICs.

Table 1 Provinces over which DICs have jurisdiction, population and number of domestic animals for three DIC

	Subang DIC	Lampung DIC	Medan DIC	Total
Provinces over which it has jurisdiction	Jakarta, East Java, Banten	South Sumara, Lampung	North Sumatra, Aceh	
Target population	63,290,000 (26.6%)	15,060,000(6.3%)	17,470,000 people (7.4%)	95,830,000 (40% of total population)
Number of domestic animals (chickens)	641,440,000 (43.6%)	79,260,000 (5.4%)	76,250,000 (5.2%)	796,950,000 (54.2% of nationwide total)

(Source: DGLAHS)

[4] The Medan DIC was designated as the reference laboratory for swine cholera and the Lampung DIC for Newcastle disease and infectious bursal disease (IBD).

The selection of the targeted DIC was also generally appropriate in the following respects. Subang is the center for the poultry industry, with 60% of Indonesia's poultry industry concentrated here, so building a DIC that can rapidly handle diagnoses of avian influenza in Subang is extremely relevant. Medan and Lampung have been diagnosing avian influenza using polymerase chain reaction (PCR; a virus testing method using polymerase chain reactions) protocols since 2005 and reverse transcription-PCR (RT-PCR) protocols since 2007. For this reason, there was a strong need to upgrade from the BSL2 facility, which has a risk of contagion, to a facility that could take biosafety measures exceeding BSL2 and thus address the risk of contagion.

According to the provincial and district animal husbandry offices in the areas where the three DICs are providing diagnostic services, they carry out active surveillance[5] and passive surveillance[6] (monitoring based on reports from livestock owners after an outbreak of disease) on a daily basis in collaboration with the DIC, and there is a great need for the provincial and district animal husbandry offices to strengthen the diagnostic capacity of the DICs. Moreover, the Food and Agriculture Organization (FAO) is strengthening its monitoring, surveying and research of markets and poultry farmers that are medium-sized or larger, and has requested that the Subang DIC, as a hub for poultry farming, carry out diagnoses as its position makes Subang strategically important in terms of epidemiological studies. In this sense, upgrading DIC facilities as a hub for other donors' activities is an effective form of support.

Before this Project, all eight DICs had a level two biosafety level (BSL). As of the ex-post evaluation, only the three DICs upgraded in this project have avian influenza (AI) laboratory facilities exceeding level 2. International organizations such as the World Organization for Animal Health (OIE) advocate that diagnoses of highly risky diseases such as avian influenza should be carried out in laboratories with high biosafety levels, and DGLAHS plans to set up AI laboratories at all DIC in the future. This project's pioneering aim to set up AI laboratories is another reason that it was relevant.

3.1.3 Relevance with Japan's Aid Policy

At the time of the ex-ante evaluation, the project was part of the social development program in JICA's country-specific plans and was intended to contribute to the stable supply of food and help raise farmers' and fishermen's incomes. As such, its consistency was high.

Given this, implementation of the project is sufficiently consistent with Indonesia's national development policy, development needs and Japan's aid policy, and thus this project is deemed to be highly relevant.

3.2 Effectiveness (Rating: 3[7])

3.2.1 Quantitative effect

[5] Active surveillance refers to epidemiological surveys to ascertain the outbreak of diseases and its movement.
[6] Passive surveillance refers to monitoring based on reports from livestock owners after an outbreak of disease.
[7] 3: "high," 2: "moderate," and 1: "low."

(1) Fluctuations in number of diagnoses

In the past four years, the Medan DIC has diagnosed an average of 15,030 cases of avian influenza a year, the Lampung DIC has diagnosed an average of 8,215 cases a year, while the Subang DIC has diagnosed an average of 3,623 cases in the past two years. The number of highly pathogenic avian influenza cases diagnosed fluctuates depending on outbreaks and the budget allocated by the government for surveillance, so the increase in diagnosed cases does not simply correlate to the DIC's diagnostic skill and capacity. Nevertheless, it does indicate that diagnostic work is continuing at a certain scale in all three DIC. The number of diagnostic cases decreased at the Lampung DIC in 2011 simply reflects the fact that there was only case of human infection in the previous fiscal year and thus there was little surveillance and few examinations.

Table 2 Change in the number of diagnosis conducted by the three DICs for HAPI

	2008	2009	2010	2011
HA-HI test	20,208	2,285	5,861	6,385
Virus isolation	2,014	838	1,421	910
PCR	216	919	1,062	2,970
Medan Total	**22,438**	**4,042**	**8,344**	**10,265**
HA-HI test	4,905	9,421	7,309	5,238
Virus isolation	20	42	81	0
PCR	349	172	3,421	1,903
Lampung Total	**5,274**	**9,635**	**10,811**	**7,141**
HA-HI test	-	-	1,710	3,547
Virus isolation	-	-	716	1253
PCR	-	-	0	20
Subang Total			**2,426**	**4,820**

(Sources: Medan DIC, Lampung DIC and Subang DIC)

Current conditions at the DIC are described below.

The Subang DIC began diagnosing cases in mid-2010, and has endeavored to strengthen its diagnostic capacity with technical support from JICA and FAO.[8] In particular, examination components (1), (4)-(9) and (12) in the table below received technical support from JICA projects aimed at enhancing the capacity of animal health laboratories. As a result of this support, the number of diagnostic cases and the examination components are both on the rise at the Subang DIC, and its diagnostic capacity is improving.

[8] The FAO has provided DICs with technical support related to avian influenza since 2007. The DICs receive the same training on antigenic characterization, and aspects of laboratory operations that are weak are addressed on a case-by-case basis. The FAO also carries out monitoring and surveys of avian influenza in the markets in Jakarta and Bogor (270 markets in which poultry is traded). The samples collected in these activities were primarily sent to nearby diagnostic facilities in Jakarta and Banten province, but began to be sent to the Subang DIC in 2010, resulting in an increase in diagnostic cases (the FAO requested diagnosis using viral isolation rather than PCR).

Table 3 Diagnosis carried out by Subang（2010 – 2011）

No	Items	Diagnostic methods	Number of diagnosis	
			2010	2011
(1)	Anthrax	Isolation/identification		61
		ELISA (serology test)	0	422
(2)	Brucellosis	RBPT	3,120	11,958
		CFT	31	87
		Isolation/identification	0	0
(3)	Salmonella	Rapid Test for Pulorum (serology Test)	1,516	889
		Isolation/identification	0	124
(4)	Rabies	FAT	25	21
		ELISA (serology test)	262	453
(5)	BVD	ELISA (serology test)	370	788
(6)	IBR	ELISA (serology test)	658	750
(7)	HPAI	HA/HI, Isolation, PCR	12,446	5,398
(8)	New Castle Disease	TET Isolation	716	649
		HA/HI (serology Test)	1,153	4,075
(9)	Trypanosoma	Geimsa Staining	1,927	2,439
(10)	FMD	ELISA (serology test)	0	2
(11)	EBL	ELISA (serology test)	430	564
(12)	Food born diseases	Total Plate Count	0	157
		Coliform	0	157
		Salmonella sp	0	157
		Formalin Test	0	115
	Total		22,634	29,346

(Source: Subang DIC)

The Medan and Lampung DIC have diagnosed avian influenza using PCR since 2005 and real-time PCR since 2007 (this project's support for the Medan and Lampung DIC consisted of setting up AI facilities and providing equipment, and did not include PCR and other analytical equipment). As a result, the project cannot be said to have directly led to the increase in the number of diagnostic cases, but the project did contribute multi-purpose sterilizers, and having a BSL3 laboratory not only enhanced safety, but also contributed to overall improvements in the examination capacity as relates to avian influenza. The aid from AUSAID (Australian Agency for International Development) was intended to strengthen the accuracy of avian influenza diagnosis at the Medan and Lampung DIC.[9]

[9] AUSAID implemented projects to strengthen the diagnostic capacity and raise laboratory accuracy of DIC throughout Indonesia in the four-year period from 2006 to 2010. This included training on proficiency tests (total

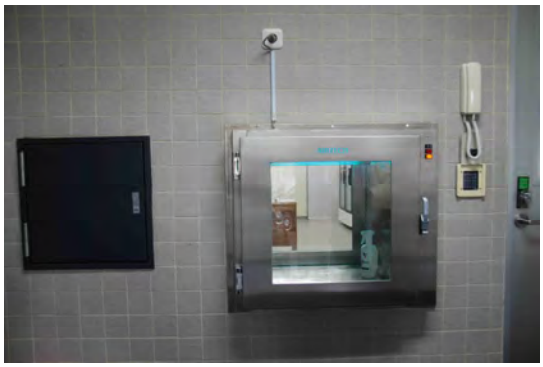
(2) Effect in shortening period needed to obtain diagnostic results

Before the Subang DIC was constructed in this Project, Jogjakarta's diagnostic center had jurisdiction over six provinces on the island of Java (Banten, Jakarta, East Java, Central Java, Jogjakarta and West Java). Currently the Subang DIC has jurisdiction over the provinces of Banten, Jakarta and East Java. Of the three provinces, two certified laboratories were set up in Jakarta and one in West Java, but Banten has no certified laboratories. As a result, there are significant merits to shortening the duration for companies and farmers in the province of Banten and the Subang region in the province of West Java. According to the livestock farmers surveyed here, it previously took over two days to receive a diagnosis of bruceliosis from a diagnostic facility in another province (the sample was delivered and the document with the results was received the following day, so it took two days), but now they can receive results in half a day from the Subang DIC. This demonstrates that the project has helped to shorten the period until results are received and speed up contagious disease measures.

3.3.2 Qualitative Effects

According to DGLAHS's definition, a BSL3 facility is needed to viruses that carry a risk of air-borne contagion (anthrax, tuberculosis bacillus, highly pathogenic influenza, etc.). Enhancing safety for the staff of the three DIC and nearby residents by setting up BSL3 facilities was a primarily important effect.

Each DIC has a different level, but essentially they prepare and use biosafety and equipment use manuals, keep equipment records, and regularly clean the air-conditioning equipment and replace the filter as directed and guided by consultants in charge of the soft component. In evaluations of the three DIC in 2011, the provincial and district animal husbandry offices that had requested diagnoses responded that the safety of the environment and diagnostic facilities were high (in a four-stage assessment, the Subang DIC was rated 2.98, the Medang DIC 3.23 and the Lampung DIC 3.27).



(AI laboratory door and air conditioning at the Medan DIC) (Sample receiving door at the Subang DIC)

of nine sessions) and examination methods for highly pathogenic avian influenza and an accuracy check of DIC by the Australian Animal Health Laboratory. Staff from the Medan and Lampung DIC also participated.

(Sterilizer in changing room at the Lampung DIC)

As such, the anticipated results were generally achieved, given that this project succeeded in ensuring the biosafety level needed to handle highly pathogenic avian influenza, the number of diagnoses is on the rise, and the time needed for diagnosis is falling.

3.3 Impact

3.3.1 Realization of Impacts

The Project's construction of a diagnostic center in Subang, where the poultry industry is concentrated, was an important contribution in strengthening the supervision and monitoring of avian influenza. DGLAHS had previously endeavoured to reinforce its system for monitoring small- and medium-scale poultry farmers and businesses, and plans to focus more on strengthening its monitoring and surveying system for markets and medium-scale and larger poultry farms going forward. This will make the role of the Subang DIC, which oversees the area in which poultry raising is popular, even more important.

In Indonesia, important animal diseases other than avian influenza, including brucellosis, which infects both people and animals, and Newcastle disease, are monitored and reported through active surveillance and passive surveillance. Since farmers are very concerned about the risk of human contagion, the number of cases reported to the province and districts is high and the number of passive surveillance cases is rising in Lampung. The provincial and district governments in Subang are also more aware, leading to a rise in the number of passive surveillance diagnosis requests received at the Subang DIC. In Medan, active surveillance still carried out by the DIC accounts for about 80% of its cases.

In terms of human contagion countermeasures, DGLAHS's PDSR teams assigned to district offices and the Ministry of Health's District Surveillance Officer (DSO) work together and, in the event of human infection, DSO contacts PDSR, PDSR monitors the actual site, provides a diagnosis and carries out surveillance (DGLAHS). The DIC are required to play major roles in terms of preventing human infection.

Table 4 Surveillance conducted by the three DICs[10]

	2009	2010	2011
Medan DIC[11]			
Active surveillance	26%	26%	17%
Passive surveillance	74%	74%	83%
Total	100%	100%	100%
Lampung DIC			
Active surveillance	18.2% (20,791)	16.0% (25,037)	12.9% (25,180)
Passive surveillance	81.8% (93,514)	84.0% (131,442)	87.1% (170,479)
Total	100% (114,305)	100% (156,479)	100% (195,659)
Subang DIC			
Active surveillance	-	93.1% (13,160)	68.1% (22,430)
Passive surveillance	-	6.9% (968)	31.9% (10,486)
合計	-	14,128	32,916

(Sources: Medan DIC, Lampung DIC and Subang DIC)

3.2.2 Other positive and negative impacts

(1) Other indirect benefits to beneficiaries

When some livestock, such as cattle, are moved between islands, they must be diagnosed at the DIC and obtain a medical certificate. Before the Subang DIC was built, Subang's producers had to send samples long distances, but now it can be done locally, which is a significant merit. According to interviews with livestock farmers in Subang, they previously requested diagnoses from a diagnosis facility in Bogor, which took at least two days (the sample was delivered and the document with the results was received the following day, so it took two days), but now they can receive results in half a day depending on the disease being diagnosed. As a result, transportation costs amounted to 21.6 million rupiah a year (600,000 rupiah x about 36 times a year), but now there is little need for transportation costs. About 40 businesses use this service in the Subang area, and a modest decrease in costs for livestock owners can be observed. Unfortunately, the Subang DIC does not have a database on its service users, so it was only possible to contact seven companies in this ex-post evaluation and we were not able to ascertain the magnitude of the cost-cutting effect or the effect in reducing time required for diagnosis.

(2) Impact on surrounding environment

[10] The active surveillance carried out by the DIC is done using the Indonesian government's own budget. The passive surveillance carried out by local governments and other organizations is also almost entirely funded through the government budget. There are cases in which the FAO and other donors provide local governments with funding to carry out surveillance, but although data on percentages could not be provided since the DIC do not identify which samples are tested using donor support, the DHLAHS states that the number of diagnosed cases attributable to surveillance funded by donors is very small.

[11] Only the percentage of active and passive surveillance is available for the Medan DIC; the actual number could not be obtained.

At the Subang DIC, the incinerator's incomplete combustion could affect the surrounding environment, so this must be redressed as soon as possible (refer to 3.5 for details). The discharge is disposed of in accordance with the operational standards for the DIC's treatment facility, with due attention to pH values and other standards.

None of the three DIC carry out activities to explain efforts to prevent contagion to the surrounding environment and safety measures to the local governments and community. The Lampung DIC is located next to the community, while there are homes near the site of the Subang DIC and Medan DIC. Currently, the DGLAHS has not set up a system or guidelines for reporting and warning local governments of the outbreak of a serious virus, so explaining information to residents and educating them is left up to the DIC.

(3) Resident transfers and site acquisition

An AI laboratory was added to the site of the existing facilities of the Medan and Lampung DICs. The Subang DIC was built on a site that was originally owned by the Ministry of Internal Affairs, and there were no problems such as site acquisitions or resident transfers.

As shown earlier, the on-site avian influenza monitoring system run by the PDSR team and set up in the DHLAHS office in Indonesia has been strengthened. Since providing a rapid diagnostic service is essential to reinforcing the monitoring system (expanding surveillance), setting up this system can be recognized as contributing to the overall goal of reinforcing the system to eradicate avian influenza. However, a pronounced impact could not be quantitatively confirmed due to the very nature of the primary project goal, which was to raise the BSL level. Other effects include reductions in traders' costs as a result of the decrease in the number of days required to receive a diagnosis. Given these points, we were able to confirm that the project had an impact to a certain extent.

3.4 Efficiency (Rating: 2)

3.4.1 Output

The table below shows the facility construction for the three DIC and major equipment donated in the project.

Table 5 Comparison of Planned and actual outputs of the project

	Planned		Actual
	Facilities	Main equipment	
Subang	Main building Entrance hall, lecture room, autopsy room, PCR room, molecular virus diagnosis room, general examination room, etc. Annex building Water tank, pump room, electricity room, generator room Others Poultry cage room, small animal room, elevated water tank, incinerator, etc. Total area: 2,965㎡	High pressure autoclave, paraffin embedding station, rotary microtomes, cryostat, binocular microscopes, inverted microscopes, fluorescence microscopes, refrigerated centrifuge, high speed refrigerated centrifuge, CO_2 Incubator, egg Incubators, safety cabinets, real-time PCR, spectrophotometer, ultrasonic cleaning, water purifier, freezers, etc.	Construction work and provision of equipment were completed as scheduled, yet the operation of the IDC was delayed.
Medan	AI laboratory Molecular virus diagnosis room, autopsy room, PCR room, incubation room, fan room Other facilities Water tank, pump room, electricity room, generator room, poultry cage room Total area: 855㎡	High pressure autoclave, inverted microscopes, refrigerated centrifuge, autopsy table, freezers, CO_2 incubator, egg incubator, safety cabinets, clean bench, PCR workstation, etc.	Completed as scheduled.
Lampung	AI laboratory Molecular virus diagnosis room, autopsy room, PCR room, incubation room, fan room Annex building Water tank, pump room, electricity room, generator room, poultry cage room Total area: 735㎡	High pressure autoclave, inverted microscopes, fluorescence microscope, refrigerated centrifuge, CO_2 incubator, egg incubator, safety cabinets, spectrophotometer, freezers, etc.	Completed as scheduled.

Technical assistance	Biosafety: Preparation of Standard Operating Procedures (SOP) and a safety inspection checklist for disinfection and sterilization methods, understanding of emergency response procedures and staff flow within laboratory System management in AI facility: Explanation of system flow for AI-related equipment systems, explanation of functions of AI laboratory-related equipment systems, explanation of specifications for equipment systems for BSL-2, explanation of monitoring and alarm designations, maintenance methods System operation and management: Methods for automation, systemization and back-up operations of equipment systems; method for switching operation in event of emergency or malfunction; determining level of humidity, pressure, differential pressure, and quantity of flow; method for preparing daily operation reports; use of monitoring and alarm board Appropriate maintenance and management of equipment: Explanations of keeping maintenance and management records on equipment, regular updates to records, regular maintenance, replacement of consumables	The Soft component included the dispatch of two Japanese experts for a total of 3.3 months to instruct three DIC staff on biosafety and facility and equipment maintenance and management. The specific details were in line with the plan.

According to the "Completion report of Soft Component Operations," participants in the training provided by the consultant were as follows.

Table 6 Training provided by Japanese experts

	Subang	Medan	Lampung
Veterinarian	13	8	9
Technical staff (laboratory staff)	2	12	4
O&M and other staff	1	5	5
Total	16	25	18

(Source: The completion report of Soft Component Operations)

The Medan and Lampung DIC began operating their AI laboratories immediately after the facilities were completed, but there was a one year and six month time lag between the completion of the facility and the start of the Subang DIC's diagnostic services due to DGLAHS's delay in procedures related to appointing DIC staff (the facility was completed in March 2009, staff assignments were completed in June 2010 and diagnostic services began in October 2010). This was a negative factor for efficiency.

3.4.2 Project Inputs

3.4.2.1 Project Cost

The project budget was 1,781 Million Japanese Yen and the actual project cost was 173.4 Million Japanese Yen, which was within the estimated cost under E/N agreement (approximately 97.36%). The Indonesian side bore the costs for the removal of old facilities on the planned construction site (Medan DIC and Lampung DIC), the construction to put in electricity and sewage lines (all three DIC) and build staff dormitories and cafeteria (Subang DIC).

3.4.2.2 Project Period

The project duration as planned at the time of the ex-ante evaluation was 19.5 months, included the detailed design and bidding process. It actually took 13 months, from February 2008 to March 2009 (68%

of the plan), within plan. However, it took time for staff to be appointed to the Subang DIC after the facility was completed, so it took 18 months until diagnostic services could begin.

Accordingly, although project costs were within plan, efficiency is assessed as moderate given that there were delays in assigning staff to the Subang DIC and it was some time after the project's completion that effects materialized.

3.5 Sustainability (Rating: 2)

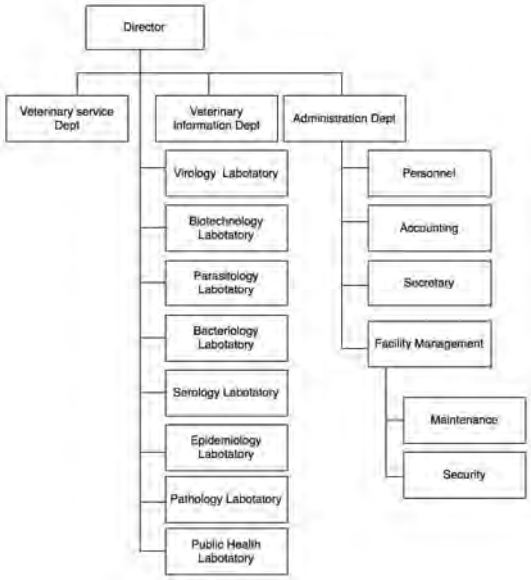
3.5.1 Institutional Aspects of Operation and Maintenance

(Incinerator at the Subang DIC)

(Cracks after repairs at the Subang DIC)

The organizational system of the DICs is basically the same, consisting of the three departments of technical services, which carries out diagnoses, administrative, and epidemiology (in charge of field surveys). The technical service department is made of the serology laboratory, the virology laboratory, the bacteriology laboratory, parasitology laboratory, the pathology laboratory, the biotechnology laboratory, epidemiology laboratory and the public health laboratory. The AI laboratory is primarily used by the employees of the virology office, biotechnology office and pathology office under the responsibility of the AI laboratory coordinator, who is appointed by the DIC director (16 employees in Lampung, 10 in Medan and 15 in Subang). A laboratory staff person at the managerial level was appointed to each AI laboratory as the person responsible for equipment management.

Diagram 1 Organizational chart of the DIC



According to interviews with the DIC, there are enough veterinarians, but the Subang DIC has a shortage of laboratory technicians in multiple examination rooms. Three to four people are assigned to the facility management department (four at the Subang DIC, three at the Medan DIC and three at the Lampung DIC), which is adequate, but there is a relatively high number of new employees. Managers for each field, such as air-conditioning, water, electricity and IT, are assigned.

Table 7 Staff composition of the three DICs

	Medan	Lampung	Subang
Veterinarian	15	16	21
Technical staff (laboratory staff)	21	28	12
Administration (Maintenance)	30 (3)	32 (3)	10 (4)
Others[12]	12		17
Total	78	76	64

(Sources: Medan DIC, Lampung DIC and Subang DIC)

DGLAHS has not devised its own standards and rules on biosafety, such as the handling and disposal of samples and waste liquids that pose a contagion risk or rules on taking out samples and restrictions on certain areas within the facility. Currently, the respective DIC set and administer their own internal rules. There is no monitoring and guidance system to determine whether the standards and rules are being observed. DGLAHS recognizes the importance of this issue, but has not improved the situation yet. The DGLAHS has not established guidelines on contagion countermeasures for residents living near the DIC, and although this was not within the scope of the project's support, the risk management system must be

[12] "Others" includes non-permanent employees such as drivers and security guards.

strengthened.

3.5.2 Technical Aspects of Operation and Maintenance

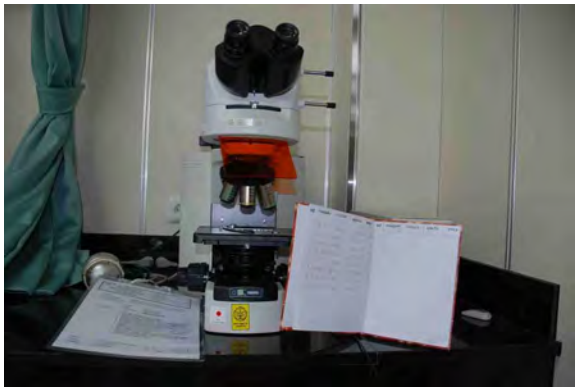
3.5.2.1 Maintenance of AI laboratories

The DIC carry out the necessary maintenance and management following the procedures explained in the soft component training. There are differences in the frequency depending on the DIC, but the cleaning log for the air conditioner filter is filled out once every two weeks and about once a month for the lighting equipment and fixtures. The convex filter in the AI laboratory is regularly replaced with the indicator light flashes. Since the treated water is automatically checked for sulfuric acid, sodium hydroxide, pH and chlorine, it is only checked to see if the necessary chemicals need to be added.

There are two technical issues with maintenance and management. One is that few staff have the full understanding of the AI laboratory's overall maintenance and management. Of the staff who received instruction and training in the soft component, only one staff person at each DIC is currently engaged in maintenance and management. Many staff have already left their jobs or been transferred (there were some training participants who may have not been assigned to the DIC in the first place), and no training on maintenance and management of AI facilities has been provided since the soft component training. The other issue is that there are differences in the AI laboratory maintenance and management methods depending on the DIC. The soft component training gave the participants an understanding of the standard methods for biosafety and facility maintenance and management, but subsequently the three DIC have not taken steps to standardize their procedures and methods. As a result, the DIC staff have spoken up about their concern as to whether they are using appropriate maintenance and management methods.

The Lampung DIC keeps records recording the history of use for all of the equipment in its AI laboratory. The Subang DIC and Medan DIC are inadequate in some respects, but they keep records for the major equipment. All three DIC have all of the operating manuals, but their storage methods and storage places diverge. At the Lampung DIC, usage manuals (1-2 pages of A4 size paper) for equipment written in simple Indonesian were kept. Manuals are kept for the main equipment at the Subang and Medan DIC. The three DIC have SOP conforming to the OIE for all diagnostic methods currently used. Five SOP have been prepared for the diagnosis of highly pathogenic avian influenza and are available in the laboratories.[13]

[13] HA/HI-Test to AI、AI virus isolation Method、Polimerase Chain Reaction (PCR) for testing AI H5N1, Real time PCR (RRT PCR) for AI Type A, Realtime PCR (RRT PCR) for Sub Type H5



(Microscope usage record and manual at the Lampung DIC)

3.5.3 Funding for Operation and Maintenance

As shown in the table below, the budget allocated to the DIC in the past three years is on the rise.

Table 8 Budget allocation to the three DICs

	2009	2010	2011
Subang DIC	-	5,534	13,572
Medan DIC	4,400	4,347	4,949
Lampung DIC	5,493	6,170	7,650

(Unit: Million Rupiah)

(Sources: Medan DIC, Lampung DIC and Subang DIC)

A comparison of the necessary funding for the maintenance and management of the AI laboratory (the Subang DIC has estimates for overall maintenance and management costs) estimated by the consultant dispatched for the soft component training to the actual operating expenditures indicates that the Subang DIC has an adequate budget for its necessary costs. The Medan DIC does not have an adequate budget for maintenance and management, but according to interviews, the maintenance and management budget for the AI laboratory is invariably set at 40 million rupiah a year (excluding consumables and lighting costs), which is inadequate (one replacement filter costs 5 million rupiah). The Lampung DIC was of the opinion that it only has about half of the funding it needs.

Table 9 Estimated costs for O&M by the soft component consultants[14]

		1st year (2010)	2nd year (2011)
Subang	-	227	250
Medan	57	57	71
Lampung	31	115	126

(Unit: Million Rupiah)

(Source: The completion report of Soft Component Operations)

[14] This includes air-conditioner filters, waste water filters, spare parts, service contracts, etc,

Table 10 Actual spending on O&M for the last three years[15]

	2009	2010	2011
Subang	-	243	257
Medan	209	211	239
Lampung	57	64	83

(Unit: Million Rupiah)

(Sources: Medan DIC, Lampung DIC and Subang DIC)

3.5.4 Status of Operation and Maintenance

DGLAHS recognizes that there is a need for regular inspection and monitoring of the AI laboratories, but has not taken specific action yet (such as allocating a budget and introducing visits for instruction). Moreover, there is not a good understanding of the status of operations and the safety system at the respective DICs' AI laboratories. The consultants in charge of the soft component training strongly recommended that the AI laboratories have regular maintenance contracts with external vendors, but the three DIC did not have such contracts with external vendors as of the ex-post evaluation. Moreover, the maintenance and management staff make the repairs themselves due to an inadequate budget. DGLAHS recognizes that the maintenance and management staff's inadequate management capacity is an issue, but does not offer re-training. In addition, several pieces of equipment have malfunctioned, but according to interviews with maintenance and management staff, the warranty period has already expired, so when they directly contact the manufacturer or dealer, they are simply told that there are no spare parts and nothing further is done.

The Medan DC and Lampung DC were waiting on repairs for some equipment, but the equipment was generally operating well. The Subang DIC did not use its equipment for one year due to the delay of operation, and as a result, some equipment was not operational due to breakdowns and other factors (high-speed cooled centrifuges, UPS, etc.).

The Lampung DIC carefully stores its operating manuals and procedure manuals. The Medan DIC and Subang DIC have the manuals for their main equipment. The status of the operation, maintenance and management of the respective DIC facilities is described below.

(1) Subang DIC

Subang has no particular problems using its facilities. The water supply and treatment system, effluent treatment facility, and private power generator operate without any problems. Nevertheless, one of the motors in two places in the incineration system has broken down and the incinerator cannot reach a high enough combustion temperature. According to the Subang DIC's maintenance and management manger, samples are appropriately disposed of in the incinerator, but poisonous gases and smoke pollution from the incinerator's incomplete combustion may have posed risks to health and other impacts. The 2010 earthquake resulted in many cracks in the wall of the offices, so construction workers made repairs. There are still visual signs of cracks, but there are no problems in using the buildings.

[15] Total expenditures for equipment and facilities.

(2) Medan DIC

The AI laboratory facility operates without any problems. The AI laboratory's air conditioning and electricity function without problems, but the alarm frequently malfunctions and there are gaps between the door and the floor at two places. According to the Medan DIC, they had been advised to fix the gaps by using door caulk available in stores. Inspections for the evaluation survey showed that the door had a weather strip, but there was a gap. The alarm continues to malfunction, suggesting that the weather strip is likely inadequate.

(3) Lampung DIC

Lampung DIC has no problems using its facilities and utilizes them smoothly.

Given the above, there are no significant problems with the systems for maintenance and management nor its condition, but there are some problems in terms of the Medan and Lampung DICs' inadequate maintenance and management budget, the lack of standards for biosafety, and lack of progress in repairing malfunctioning equipment. At this point, sustainability is being protected to some extent, but there are risk factors for the future, and accordingly sustainability is assessed as moderate. There are concerns over the maintenance of biosafety levels at the Medan DIC's laboratory.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

In Indonesia, the Ministry of Agriculture and the Ministry of Health work together to eradicate avian influenza in livestock to prevent its spread to people, working in line with the national strategic plan to eradicate avian influenza and protect the public from outbreaks. Setting up diagnostic facilities and providing equipment to the three DIC is consistent both with the need to strengthen the animal disease diagnosis system, including avian influenza, and Japan's aid policy, so the implementation of this project is highly relevant. The avian influenza diagnostic facilities and equipment at the three DIC are utilized in diagnostic work, and the project has not only had the effect of shortening the time until test results are available, but has also achieved the project goal of enhancing safety as a BSL3 facility that can diagnose avian influenza. The Subang DIC was newly established in this project, and as a result of activities in the technical cooperation project titled "Project on Capacity Development of Animal Health Laboratory," both the the number of diagnostic cases and the examination components are on the rise. Some effects can be observed, such as the rapid provision of diagnostic results to regional livestock breeders and local livestock offices, and this indicates that the project's effectiveness is high. Both the project costs and project duration were within plan, but there were delays in starting diagnostic services after the Subang DIC was established, so efficiency was moderate. There are currently no major problems at any of the three DIC that would lower diagnostic services, but DGLAHS has not established standards or set up a monitoring system for biosafety operations, few staff are knowledgeable about the technical aspects of the maintenance and management of diagnostic equipment and facilities, and there has been no progress in repairing malfunctioning equipment, partly due to an inadequate budget for maintenance and management. Given

these issues, sustainability is assessed as moderate.

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

4.2 Recommendations

4.2.1 Recommendation to implementing organization

Maintenance and management of facilities and equipment

- The three DIC have introduced the basic and standard procedures from the soft component. There is no scheme for subsequently checking whether operations and maintenance and management are being carried out according to the procedures. As a result, there are already differences among the procedures taken by the three DIC. DGLAHS should introduce standardized regular instruction and monitoring to ensure safe facility management and consistency of maintenance and management procedures. Moreover, there are few facility management employees and many are new hires. As a result, in order to ensure the aforementioned standardization, DGLHAS should give representatives of the DIC maintenance and management staff training and instruction in biosafety and maintenance and management once a year with the aim of continually enhancing maintenance and management techniques.
- Since the Medan and Lampung DIC in particular have an inadequate budget for facility and equipment maintenance and management, DGLAHS and the DICs should strive to work out the required maintenance and management costs on their actual basis and secure a budget. Since there is no progress at present in repairing the malfunctioning equipment, DGLAHS should follow up on the equipment list, and the DICs should amend its current ineffective method of negotiating on an individual basis with the manufacturers and stores in Jakarta and work with the DGLAHS leadership to consider effective measures. Moreover, since the AI laboratories include sophisticated air conditioning equipment, the DIC should sign maintenance contracts with specialized dealers as recommended by the consultants assigned in the soft component. If this is difficult, the DIC should consider using training opportunities to invite representatives from external facility maintenance companies as instructors for on-site training.
- The air pressure control alarm at the Medan DIC malfunctions and a gap between the door and floor leads to pressure irregularities so that there is a possibility that biosafety levels are not being maintained appropriately. Accordingly, we recommend that an expert promptly inspect these issues. Moreover, there are some problems with the incinerator functions at the Subang DIC, requiring urgent repairs.

Educating and providing information to nearby residents

There are communities near DIC, and some DIC facilities are right next to homes. Thus far, there has been almost no relationship between local governments and communities and the DIC, so we recommend setting up forum for discussions on safety management and risk response.

Others

In this ex-post evaluation, a questionnaire was given to people who had used Subang DIC's diagnostic services, but it was extremely difficult to receive responses since user information is not maintained. We

recommend that information on users be maintained since it is extremely important that DIC be familiar with users' views.

4.2.2 Recommendations to JICA

None.

4.3 Lessons Learned

- In the field of livestock disease diagnosis, fluctuations in the diseases that can be diagnosed and improvements in diagnostic accuracy are suitable performance indicators in measuring diagnostic capacity in projects to strengthen capacity, but fluctuations in the number of diagnosed cases is not necessarily a suitable indicator. In the case of this project, the number of diagnoses fluctuates substantially depending on the outbreak of important livestock diseases and the budget allocated by the government for surveillance. The issue of whether the number of diagnoses and inspections is an appropriate performance indicator should be closely considered in projects that are greatly influenced by the demand side. This is true not only in the case of livestock disease diagnosis, but also in the inspection sector, such as food analysis, quality inspections and water quality inspections run by the Government sector.
- The construction of facilities for the Subang DIC, which was newly established in this project, as well as the installation of equipment, was completed according to plan, but there were delays in the start of facility operations as a result of delays in the Indonesian government's assignment of the necessary personnel. When establishing new facilities (such as centers) within an organization, the substance of the procedures for its approval and the time required should clearly ascertained at the basic design stage and followed through on.

Federal Democratic Republic of Nepal

Ex-Post Evaluation of Japanese Technical Cooperation Project

"Agricultural Training and Extension Improvement Project"

External Evaluator: Saori Fujimoto, Tekizai Tekisho Organization

0. Summary

This Project was implemented with the aim of improving Nepal's agricultural extension service by introducing new extension systems, such as Agricultural Development Committee (ADC) and Training and Demonstrations farms (T/D farms) and working to strengthen the capacity of the Junior Technician/ Junior Technical Assistant (JT/JTA) and District Agricultural Development Office (DADO) officers responsible for agricultural extension so that these systems could be executed smoothly. This Project was consistent with Nepal's development policy, development needs and Japan's aid policy. Therefore, relevance was high. The Project input were provided according to plan, and completed during the Project period, so efficiency was also high. The output and Project objective had been generally achieved when the Project was completed. However, the approaches introduced by the Project were not continued after the Project, and efforts to extend and expand them in other areas have been limited overall, with the exception of some areas. Accordingly, the effectiveness and impact were fair. The Project output is being continued at the level of individual farmers, as indicated by improvements in agricultural extension services. Farmers' activities and agricultural productivity, even after the Project attributable to the approaches introduced, as well as extension activities, were carried out by farmers' groups themselves. However at the level of the implementing agency, the approaches introduced by the Project were not incorporated in the agency, there were no specific implementation strategies, and no budget provisions were taken. Thus, sustainability is low.

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

1. Project Description

(Project Locations)

(Target districts/ Central region)

(Extension model farmer's farm in Dadhing district)

1.1 Background

About 66% of Nepal's actual working-age population (over the age of 10) is engaged in agriculture, and the agriculture sector accounts for about 40% of the country's GDP. This means that revitalizing agriculture is essential if poverty is to be reduced. However, Nepal's diverse topography, ranging from a mountain region encompassing the Himalayan hinterland and lowland plains, or Terai, bordering India, effectively disperses its population, while at the same time infrastructure such as roads and irrigation systems are woefully inadequate. The absolute number of extension workers is also limited, which has restricted support for farmers. Moreover, since the DADO officers that carry out the extension work and the JT/JTA working underneath them are not able to adequately respond to the technical needs of the farmers, it has been reported that farmers' satisfaction with the extension workers is quite low.

Given this background, in the Agricultural Research and Extension Project, conducted with support from the World Bank, the Nepalese government promoted on-site experiments and research incorporating farmers' needs in the Experiment and Research Division, carried out the organizational reforms needed for such experiments and research, and improved systems through decentralization of agricultural extension in the Extension Division. At the same time, the Nepalese government requested technical cooperation from the Japanese government in 2000 with the primary goal of improving the skills of extension workers so that they could meet the needs of local farmers. In response to this request, the Japan International Cooperation Agency (JICA) carried out ex-ante evaluations on three occasions between 2002 and 2003, and in November 2003 Nepal's Ministry of Agriculture and Cooperatives (MOAC) and Department of Agriculture (DOA), as the implementing agencies, signed the Record of Discussion (R/D) for the Agricultural Training and Extension Improvement Project (ATEIP). This technical project was intended to improve agricultural training and extension services in the Project districts so that they were more practical and better met farmers' needs. The project began the following year, on January 9, 2004, for a period of 5 years.

1.2 Project Outline

Overall Goal		・ Farmers' farming activities are improved in the Project districts. ・ Improved agriculture service delivery system is replicated to other areas inside and outside the Project districts.
Project Objective		Agriculture service delivery system is improved in the Project districts through training and extension. (Delivery system involves agriculture technology, group organization, facilitation, M&E, documentation, coordination, etc.)
Outputs	1	Practical training is imparted to extension workers and farmers.
	2	Farmers' need-based extension services are delivered.
	3	Activities of different service providers in agriculture development are coordinated/ facilitated.
Inputs		Japanese Side: 1. Experts 28 in total 4 for long-term, 24 for short-term 2. 16 Trainees received (16 for Counterpart training in Japan) 68 Trainees for Third-Country Training Programs (62 for India, 6 for the Philippines) 3. Equipment 23,000,000 yen 4. Local Cost 405,015 US dollars 5. Others (inc. dispatch of related missions) Mid-term Review Mission in September, 2006 Nepalese Side: 1. 15 Counterparts, DADO officers and JT/JTAs 2. Land and Facilities, Project Office, Utilities Local Cost, Counterpart Salary, Seminars 3. 21,108,000 NRs
Total cost		368,000,000 yen
Period of Cooperation		January, 2004 – January, 2009
Implementing agency		Ministry of Agriculture and Cooperatives (MOAC)[1] Department of Agriculture (DOA)
Cooperation Agency in Japan		Ministry of Agriculture, Forestry and Fisheries
Related Project		Agricultural Research and Extension Project (World Bank)

[1] MOAC was reorganized as the Ministry of Agricultural Development in 2012

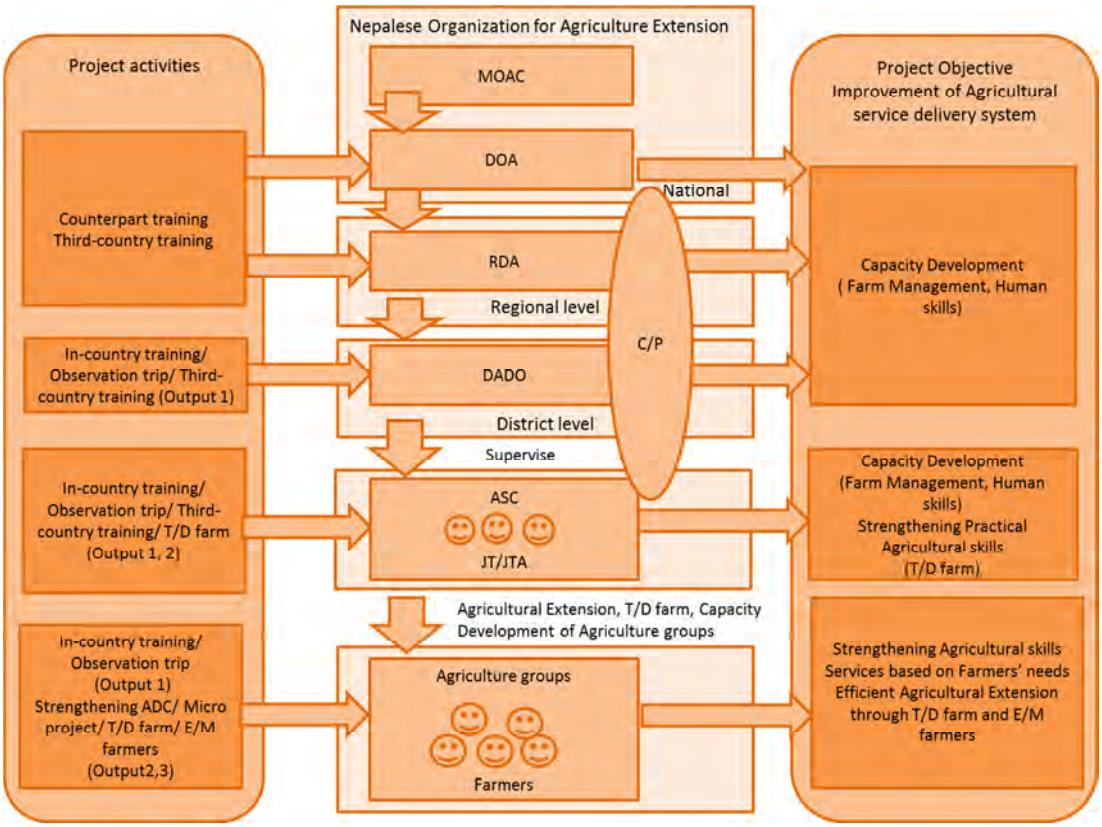


Figure 1: Project activity

Source: Prepared by the evaluator based on JICA-provided materials

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

When the terminal evaluation was carried out, the Project output had not been reflected in agricultural productivity at the district level; only some cases of improvements in farmers' agricultural activities had been confirmed in part in interviews and observations. In addition, a T/D farm internalization committee had been set up on the Nepal side to facilitate the transfer to the new extension system introduced in the Project, including budgetary provisions. Preparations went ahead for the Nepal side to implement and run the T/D Farms, and as of the terminal evaluation, DADO had requested budgets to continue T/D Farm activities in the Project's 5 districts. There were also plans to continue such activities even after the Project was completed. Although a budget had not been provided for the expansion of T/D farm activities to districts other than the 5 target districts as of the terminal evaluation, the 5 districts that had made the request as of the terminal evaluation had received funding, and if the T/D Farm activities continue effectively, there is a good chance that such activities would be incorporated in other districts as well.

1.3.2 Achievement of Project objective

The Project objective had been achieved as of the terminal evaluation. According to the results of interviews[2] conducted at the time of the terminal evaluation, more than 85% of the farmers able to access the Project activities were satisfied with the agriculture training and extension activities provided and recognized improvements. Many farmers were able to exchange information with extension workers in a close relationship through Project activities, and responded that they had received useful information on superior crop varieties, soil improvement, fertilizers and DADO programs. Accordingly, the Project Objective can be deemed to have been generally achieved.

1.3.3 Recommendations

The main recommendations for the Project and the steps taken to address them are described as below.

Short-term issues to be addressed during remaining Project period	
Recommendation	Steps taken to address situation (at Project completion stage)
Achievement of indicators	The output and project objective have generally been achieved (the achievement of the individual indicators is described below in the section on effectiveness).
Activities in which ADCs and Extension Model farmers (E/M farmers) share what they have learned with local farmers should continue to be implemented.	E/M farmers and T/D farmers share information at monthly ADC meetings and monthly meetings at the Agriculture Service Centre (ASC), and also provide technical support at the request of small-scale agricultural groups and neighboring farmers.
DADO should be encouraged to register ADCs officially to ensure the institutional sustainability of ADC activities.	DADO had registered 12 ADC by the time the Project was completed.
Extension workers should retain know-how so that they are able to continually strengthen the capacity of ADCs.	Activities, including ADC guidance, are reported in the JT/JTA monthly reports, but no particular steps were taken to ensure that know-how is retained when providing ADC guidance.
The Project's output should be proactively publicized and deliverables such as texts, educational materials and good practices should be documented and distributed.	Workshops to share Project output were held 3 times during the Project period, and Project deliverables (training manuals and introductions to good practices, among others) were distributed to relevant organizations and publicized.

[2] Interviews using questionnaires and group interviews (targets: Japanese experts, C/P, DADO officers in the 5 districts targeted in the Project, JT/JTA, more than 100 farmers)

Medium- and long-term issues after Project completion	
Recommendation	Steps taken to address situation (as of terminal evaluation)
A budget from the Nepalese government's general account should be secured.	A budget for operating ADCs and T/D Farms and extending them to other areas has not been secured.
Appropriate evaluations of extension workers' activities should be conducted and reflected in human resources, appropriate allowances and travel costs should be paid, mechanisms to improve incentives for extension workers should be considered, and changing the JT/JTA title should be considered.	Evaluations of extension workers are conducted once a year, and evaluation standards are set, but the results are not used except for promotions. Payment of allowances and travel costs has not improved, and allowances and travel costs are not paid for activities in assigned areas. Not only MOAC can make decisions about systems to boost incentives, and there has not been any progress in considering this issue since this would require accommodation from the Ministry of Finance and other government agencies. There has not been any discussion of changing the JT/JTA title.
T/D Farm activities should be continued in the 5 districts and carried out in other districts.	T/D Farm activities have not been continued in the 5 target districts, nor are they implemented in other districts.
JT/JTA should facilitate activities in which farmers take the lead, such as the ADCs' micro projects.	As of the ex-post evaluation, the ADCs were continuing activities by the farmers. Of the 86 JT/JTA who had been assigned to the target districts when the mid-term evaluation and terminal evaluations were carried out, 18 JT/JTA were still working in the districts as of the ex-post evaluation (including JT/JTA who had been moved among the target districts).Of the 90 JT/JTA working in the target districts as of the ex-post evaluation, 18 had experience with Project activities and 72 had been newly appointed. As such, many of the JT/JTA who had supported ADC activities during the Project implementation period had been transferred, and the newly appointed JT/JTA did not have the experience and knowledge needed to promote activities led by farmers.
This Project's output (curriculum, training content, etc.) should be incorporated in regular training of JT/JTA and	There are no cases in which the output has been incorporated in the curriculum for agricultural schools,

the curriculum for agricultural schools, and the Project output should be utilized on an ongoing basis.	but it is used in part. For example, instructors in training targeting JT/JTA and agricultural schools refer to the training reports and curriculum regarding farm management and organization reinforcement prepared by the Project.
Output should be extended to areas other than the target areas utilizing the In-country Training of Agricultural Extension Workers program	In-country training on human skills and farm management was carried out in 2009 and 2010, and 73 people at the officer level, including DADO officers, and 170 JT/JTA participated. As regards extension to areas other than the target districts, after in-country training was held, human skill training was held once at the regional agricultural training center in the eastern region.
Documents prepared and distributed in the Project should be revised and used as regular publications by the Nepalese government.	Deliverables introducing Project activities and progress made (T/D farm activities report, training reports, videos introducing activities, etc.) were distributed to relevant organizations such as MOAC, DOA, DADO and NARC (National Agriculture Research Council), but we were not able to confirm cases in which the Nepalese government used it as a regular publication.

2. Outline of the Evaluation Study

2.1 External Evaluator

Saori Fujimoto (Tekizai Tekisho Organization)

2.2 Duration of Evaluation Study

Duration of the Study: January – July 2012

Duration of the Field Study: March 4-24, 2012, July 1-7, 2012

2.3 Constraints during the Evaluation Study

None in particular

3. Results of the Evaluation (Overall Rating: C[3])

3.1 Relevance (Rating: ③[4])

3 A: "Highly satisfactory," B: "Satisfactory," C: "Partially satisfactory," D: "Unsatisfactory"

4 ③: "High," ②: "Fair," ①: "Low"

3.1.1 Relevance with the Development Plan of Nepal

"The Agriculture Perspective Plan (1995-2015)" and "National Agriculture Policy" were in effect from the Project's start until it was completed, "the Tenth Five-Year Plan (2002-2007)" and "the subsequent Three-Year Interim Plan (July 2006 – October 2009)" and "the Three-Year Plan (October 2009- 2012/2013)" specified the importance of promoting growth in the agricultural sector to improve agricultural productivity, reducing poverty and creating jobs through growth in this sector, and diversifying agriculture with the introduction of high value-added agricultural products. Agricultural technology suited to farmers' needs and effective extension were recommended as one means of achieving these goals. In 2007, "the National Agriculture Extension Strategy" was introduced, and improving the capacity of JT/JTA was deemed essential in improving agricultural capacity. Accordingly, the Project was consistent with the Nepalese government's policies during the Project implementation.

3.1.2 Relevance with the Development Needs of Nepal

This Project helped to improve Nepal's agricultural extension services by introducing new extension systems such as ADC and T/D farms and reinforcing the capacity of the JT/JTA and DADO officers responsible for agricultural extension in order to ensure that these systems were implemented smoothly. This was consistent with the development needs of Nepal, which has issues with the quality and efficiency of extension workers' agricultural extension services as well as inadequate capacity on the part of the extension workers. The Nepalese government's existing policy documents on agricultural extension did not specify the priority strategies and approaches for strengthening agricultural extension and reinforcing extension workers' skills or the specific support measures, and as a result the needs for individual extension approaches (ADC, T/D farms) could not be confirmed. According to the implementing agency, the insufficient skills of the JT/JTA had previously been recognized as a problem, and the farmers' groups do not have sufficient capacity to develop extension activities themselves, so the Project's approach was generally consistent with needs. 3 ex-ante surveys were carried out during the Project. The Project's objective was to improve agricultural training and extension services to make them more practical and more closely tailored to farmers' needs, and activities to achieve these objectives included (1) carrying out technical training of extension workers and model farmers suited to their needs, (2) teaching the extension workers and model farmers who received technical training about participatory planning and extension methods to be used with farmers' groups so that they can carry out effective demonstrations at farms, and (3) giving DADO officers supervising the aforementioned activities in (1) and (2) at the district level training in agricultural development planning, extension planning, and needs assessment, among other areas (Ex-Ante Evaluation). Accordingly, specific activities for (1) were implemented with farm management and human skill training and practical training at T/D farms. Activities for (2) included ADC organization, T/D farm activities, participatory planning through support for E/M

farmers, and extension methods to be used with farmers' groups. Specific activities for (3) consisted of in-country training and training in Japan for DADO officers. The ex-ante study had not included proposals for specific strategies and approaches for the Project from the Nepalese side, and no other donors had similar projects that could have served as a reference. Accordingly, the Japanese side proposed extension approaches (ADC, T/D farms, E/M farmers) after the Project started, with reference to the Project draft prepared based on interviews that local consultants conducted with stakeholders in advance. These approaches were then implemented based on an agreement reached in discussions with the Nepalese side.

Prior to the Project's implementation, interviews with farmers revealed several issues: JT/JTA did not have the knowledge or techniques needed to instruct farmers, itinerant programs were infrequent, and farmers had not received agriculture extension services based on their needs. Moreover, needs for agricultural activities and agricultural extension were identified prior to the Project's implementation as the acquisition of cultivation techniques for more efficient crops with a high profit margin since farmers had grown rice and maize using traditional methods, but profits were low relative to the time and labor involved. In addition, farmers not only needed guidance in cultivation techniques, but support in building connections with markets and building irrigation systems since they relied on rainwater. The Project was consistent with farmers' needs because, by introducing T/D farms and ADC, the Project strengthened the skills of JT/JTA and built trusting relationships with farmers, provided instruction on cultivation techniques for high value-added crops, primarily vegetables, carried out on-site observations to give opportunities to learn about cultivation techniques and building links with markets, and also supported micro projects (such as providing training and improving irrigation systems).

3.1.3 Relevance with Japan's ODA Policy

The approach outlined in Japan's "Economic Growth to Reduce Poverty" formed the basis for Japan's ODA Policy for Nepal in fiscal 2004-2005; agricultural development was specified as one of the 5 priority areas. In fiscal 2006-2008, the Japanese government provided support with an emphasis on reducing poverty in outlying regions, identifying agricultural and rural development, basic education and healthcare as priority issues (Ministry of Foreign Affairs' Data Book). Japan continues to support Nepal with an emphasis on agriculture in order to reduce poverty, and thus this Project can be deemed consistent with Japan's aid policies.

Given the above, 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 Impact (Rating ②)

3.2.1 Project Outputs

In Nepal, the JT/JTA responsible for agricultural extension had no opportunities to learn practical agricultural technology, and few had the agricultural techniques and skills needed to instruct farmers, even mid-level JT/JTA. Moreover, Nepalese government regulations meant that they were not paid benefits, such as reimbursement for the cost of travelling for itinerant activities in the areas for which they were responsible. As a result, few JT/JTA proactively guided farmers, and most JT/JTA simply waited at the ASC to which they were assigned, only working with the farmers who visited. Farmers had no opportunities to acquire new agricultural techniques and knowledge, due in part to the inadequate capacity of JT/JTA, and agricultural extension services did not meet the needs of farmers. In light of these conditions, this Project was started with the primary objective of organizing farmers' groups, promoting independent agricultural activities, and reinforcing the capacity of the JT/JTA supporting these activities.

This Project's goal is to improve the agricultural service delivery system and run trial programs. "Support for agricultural extension based on all farmers' needs (ADC) and "promotion of farm management activities and extension in line with cultivation plans (T/D farms)" were newly introduced (2 in Figure 2 below) as the approaches used to improve the agricultural service delivery system. Moreover, E/M farmers were selected and taught farm management skills, such as preparing farm management record books, in order to pursue extension activities based on farmers' needs (2 in Figure 2 below). Farm management training, human skill training and practical training (T/D farms) were provided since reinforcing the capacity of the extension workers needed to support the implementation of these systems was included as a component (1 in Figure 2 below).

The ADCs were formed as community organizations in units of Village Development Committees (VDC). The Project created these organizations with the aim of identifying, specifying and consolidating farmers' needs through the ADC and using this information to improve the agricultural extension services provided by DADO.

T/D farms were also set up by the Project with the aim of giving JT/JTA the chance to learn practical technology from farmers at the production site and encouraging agricultural activities and extension in line with cultivation plans.

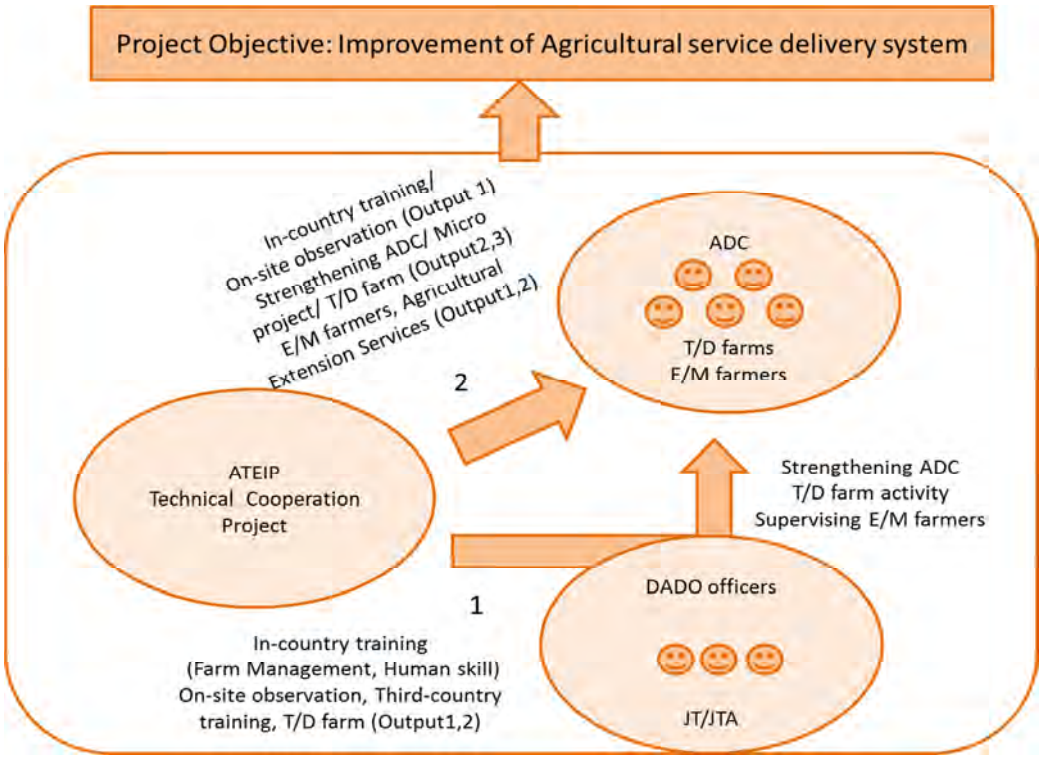


Figure2: Project Approach

Source: Prepared by the evaluator based on JICA-provided materials

3.2.1.1 Project Output

1) Output 1: Practical training is imparted to extension workers and farmers.

As of the Project's completion, almost all DADO officers and JT/JTA had received the farm management training and human skill training offered by the Project, and JT/JTA were learning agricultural techniques in the field through T/D farm activities. In farm management training, DADO officers and JT/JTA primarily acquired knowledge and skills about preparing farm management record books, which were used in instructing farmers. E/M farmers prepared and submitted farm management record books for each crop, and JT/JTA provided the necessary support based on the content of the farm management record books submitted. In human skill training, they learned how to strengthen ADC organizations, facilitation skills and presentation skills, and used these to support ADC. As shown in Table 1, about 89% (16 out of 18) of the JT/JTA assigned to the 5 target districts continued to participate in T/D farm activities during the Project's implementation through the ex-post evaluation, so that almost all of the JT/JTA had practical opportunities to learn about agriculture. The JT/JTA visited the T/D farms set up by farmers one to 2 times a week, and learned about agriculture in a practical setting. Before the Project was implemented, JT/JTA went to work at their assigned ASC and waited for farmers to visit, but once they had participated in T/D farm activities, they visited farmers more frequently and built human relationships, and farmers' trust in the JT/JTA improved. Accordingly, Output 1 was accomplished.

Table 1：Achievement of Output 1

Objectively Verifiable Indicators	Target (2004)	Achievement (2009)	Achievement (%)
1. All DADO officers in the target 5 districts participate in the training courses by the Project	All DADO officers (18-20officers)[5]	99 in total[8] (5-5.5times/person)	-
2. 80% of DADO officers, who received trainings from the Project, agree that their capabilities on planning, providing guidance to JT/JTAs, managing/ monitoring have been improved.	80%	100%	125%
3. All JT/JTAs in the target 5 districts participate in training courses by the Project	All (86-103JT/JTAs)[6]	540 in total[9] (5-6times/person)	-
4. All JT/JTAs in the target 5 districts participate in T/D farm activities	All (86-103JT/JTAs)[7]	89% (16 out of 18)	89%
5. 80% of JT/JTAs, who received trainings from the Project, agree that their capabilities (technical and human skill) have been improved	80%	100%	125%

Source: JICA-provided materials/ Questionnaire survey

2) Output 2: Farmers' need-based extension services are delivered.

During the Project period, 35 ADC were formed in the 5 districts and, as organizations building consensus among farmers, they requested that the Project and relevant organizations (DADO and VDC) provide extension services based on farmers' needs and served their role in managing implementation of these services. Every month 18 ADC representatives, one from each ward, held meetings, and were responsible for coordinating each wards' needs (prioritizing programs), drafting activity plans, making requests for micro projects and carrying out the approved projects. As of the Project's completion, 35 ADC had carried out 126 micro projects, and as shown in Indicator 7 in Table 2, each ADC submitted and received authorization for an average of 3.6 proposals. Most of the micro project proposals were for upgrades to irrigation systems, and projects related to vegetable cultivation (technical training, purchase of equipment needed for vinyl cultivation, etc.), bee keeping, and mushroom cultivation were carried out. The number of proposals prepared and submitted was likely higher than the number approved (126), which indicates that the capacity of the ADC as a player supporting extension services was sufficiently reinforced (ability to acquire resources and draft plans, etc.).

＜Utilization of E/M farmers＞

The Project selected 35 E/M farmers from among the farmers at the T/D farms. Almost all of the E/M farmers were practical farmers, and were very interested in spreading their knowledge to nearby

[5] The number is as of 2004 to 2007 (Source: JICA provided materials)
[6] Same as footnote 5
[7] Same as footnote 5
[8] DADO officers were equally provided training opportunities, it indicates all DADO officers participated in trainings.
[9] Same as footnote 8

farmers. They made substantial contributions to strengthening extension activities, such as introducing activities at ASC and ADC, giving farm management demonstrations for nearby farmers (refer to indicator 4 in Table 2 below) and providing instruction in cultivation techniques. As of the Project's completion, the E/M farmers (35 farms) were continuing their activities, and preparing their farm management record books and activity reports (achievements and problems, etc.), which were submitted to JT/JTA twice a year. In addition, E/M farmers learned how to prepare and utilize farm management record books through Project activities, and they also instructed nearby farmers. Of the farmers with access to the Project, the number answering that they choose to consult with E/M farmers on agricultural activities increased from 9% prior to the Project to 35% after the Project started (refer to Table 6 in 3.2.1.2 Achievement of Project Objectives), which indicates that E/M farmers made a significant contribution to improving extension services.

The indicators for Output 2 were generally achieved, and Output 2 was achieved as of the Project's completion.

Table 2：Achievement of Output 2

Objectively Verifiable Indicators	Target (2004)	Achievement (2009)	Achievement (%)
1. 70% of JT/JTAs, who received trainings from the Project, agree that extension services provided by them to farmers have been improved.	70%	78%	111%
2. About 45 farmers will become E/M farmers.	45	35	77.8%
3. 80% of E/M farmers agree that they receive practical guidance from JT/JTAs.	80%	93%	116%
4. About 200 farmers visit each E/M farmer a year.	200	More than 400	More than 200%
5. 80% of farmers, able to access to Project activities agree that capabilities of JT/JTAs have improved.	80%	88%	110%
6. About 35 ADCs are organized.	35	35	100%
7. 80% of ADCs prepare and apply the project proposal for concerned agencies.	80%	100%[10] 3.6 proposals (implemented) /ADC[11]	125%

Source: JICA-provided materials/ Questionnaire survey

3) Output 3: Activities of different service providers in agriculture development are coordinated and facilitated.

As groups building consensus among farmers, ADCs identified farmers' needs through representatives in the individual wards, and worked on projects whose benefits would accrue equally to all farmers in VDC, such as building irrigation systems and other shared infrastructure, so that the benefits did not go to any one particular group. Moreover, 63% of the ADC recognized that agriculture-related services from other organizations (service providers) were offered in a

[10] All ADC (11) interviewed prepared and applied the project proposal.
[11] Average 3.6 micro projects were implemented by each ADC.

coordinated manner, so that the support activities from the respective organizations were carried out efficiently without duplicating each other. Coordination and monitoring meetings at the district level were held 14 times in 5 districts. Major stakeholders (VDC, DADO and NGOs) participated in the meetings, where ADC introduced their own activities. This led to support for these activities. Moreover, they shared information through daily communication with major stakeholders. Deliverables introducing Project activities and their progress were distributed to agriculture-related organizations such as MOAC, DOA, DADO and NARC (National Agriculture Research Council) as they proactively worked to disseminate information. During the Project's implementation, experts shared information on the status of Project activities by communicating with other donors and related organizations, and coordinated so that there was no overlap with other organizations' activities. As a result, the indicators for Output 3 have been achieved.

Table 3：Achievement of Output 3

Objectively Verifiable Indicators	Target (2004)	Achievement (2009)	Achievement (%)
1. Major stakeholders participate in district level coordination/monitoring meeting.	-	14 times /5 districts	-
2. 40% of ADCs agree that activities related to agriculture development from different service providers are delivered in a coordinated way.	40%	63%	158%
3. Publications introducing project activities and progress are distributed to all major stakeholders.	-	-	-

Source: JICA-provided materials/ Questionnaire survey

3.2.1.2 Achievement of Project Objectives

Project Objective: Agriculture service delivery system is improved in the Project districts through training and extension.

The ADC organized in the Project carried out their own projects with support from related organizations in holding agricultural training based on farmers needs and securing the necessary input (building irrigation systems, etc.). Moreover, the JT/JTA in the 5 target districts learned practical cultivation techniques at the T/D farms, and instructed ADCs in skills such as preparing farm management record books and proposals—skills which they themselves had learned in farm management training and human skill training. This helped to strengthen ADC organizations. As a result, the approaches newly introduced by the Project (ADC and T/D farms) were smoothly implemented with support from DADO officers and JT/JTA, whose skills had been refined in training, and the agriculture service provider system was improved. Accordingly, the each indicator for the Project Objective and therefore the Project Objective itself was achieved.

1) Indicator 1: 70% of the farmers, able to access to the Project activities are satisfied with training and extension services provided.

96% of the farmers interviewed at the Project's completion and 94% as of the ex-post evaluation responded that they were "satisfied" and "satisfied to some extent" with the agriculture training and extension services provided by the extension workers. Thus, the indicator has been achieved. The farmers were satisfied with the organization of ADCs, the ongoing technical guidance provided by JT/JTA, and comprehensive support. The organization of ADCs and support for their activities (support for implementation of micro-projects), which was one of the Project's approaches and the reinforcement of JT/JTA skills through T/D farm activities and training contributed. At the same time, although this was a minority opinion, respondents who were not satisfied gave as their reason their sense that "only ADC members benefitted." This was likely primarily because although each ADC had 2 representatives from each ward (one representative from 12-38 farm households) and carried out activities that benefited the farmers equally, mechanisms had not been established whereby ADC members shifted their knowledge and techniques to other farmers, and thus there were discrepancies in the extension effect in the wards depending on the ADC members. E/M farmers did try to transfer technology to neighboring farmers, but since there was only one in each ADC (one per 430-1,300 farm households), the number of farms that received technology transfer was limited. As regards the level of satisfaction when the ex-post evaluation was carried out, interviews confirmed that farmers were satisfied with the training offered through the ADCs and their support for agricultural activities, as well as support from DADO (subsidies for agricultural equipment). This testifies to the satisfaction in the activities provided by the ADCs, whose role as an organization responsible for agricultural extension services was strengthened through Project activities, and support for the training and agricultural activities provided by DADO officers and JT/JTA, whose agricultural technology and skills were strengthened through the training and T/D farm activities implemented in the Project, and thus can be deemed contributions made by the Project.

Table 4："Are you satisfied with training and extension services?"

(%)

	Satisfied	Satisfied to some extent	Not satisfied	Don't know	Total
After the project (2009)	90	6	3	1	100
Ex-Post Evaluation (2012)	85	9	5	1	100

Source: Beneficiary survey[12]

[12] For the purpose of beneficiary survey, 100 farmers (20 farmers from each district) who belong to the following six categories were targeted to be interviewed, being assumed as "the farmers, able to access to project activities", members of ADC, participants of the training courses on ADC, beneficiaries of micro projects, T/D Farm cooperating Farmers, E/M Farmers, participants of field days organized by T/D Farms and E/M Farmers.

(Reasons for satisfaction)

- The establishment of farmers' groups (ADCs) created links between these organizations and the market, giving them access to the market.
- They received ongoing technical support, such as training and on-site instruction from JT/JTA.
- The farmers were able to independently request and access consolidated support integrating technical guidance, construction of irrigation systems, farm management guidance and subsidies for agricultural materials. A foundation was established that enabled them (ADC) to continue their activities, thanks to an environment (with the construction of irrigation systems, etc.) in which they were able to use the technology learned in training in practical applications and follow-up following training.
- Since the ADC prepare proposals, including budget amounts and manage all stages from the procurement of necessary materials to project implementation, ADC members were able to facilitate projects while confirming the use of project funds and their validity.

(Reasons for dissatisfaction)

- Only farmers who were also ADC members benefitted.

2) Indicator 2: 70% of the farmers, able to access to Project activities, agree that training and extension services provided have been improved.

In interviews, 96% of farmers at project completion and 93% as of the ex-post evaluation responded that the agriculture training and extension services provided had "improved" or "improved to some extent." Accordingly, the indicator has been achieved. The extension services mentioned as having improved include those services provided by DADO officers and JT/JTA, which suggests that the farmers recognize improvements in the agriculture training and extension services provided by DADO officers and JT/JTA.

Table 5: "Have training and extension services provided been improved?"

(%)

	Improved	Improved to some extent	Same as before	Don't know	Total
After the project (2009)	90	6	2	2	100
Ex-Post Evaluation (2012)	86	7	5	2	100

Source: Beneficiary survey

(Areas of Improvement)

- Cultivation technology

- Methods for using fertilizer
- Farm management techniques such as methods for preparing farm management record books
- Organization and strengthening of groups

Given the above, the indicators for the Project Objective have been achieved.

Other factors indicating the extent to which the Project Objective has been achieved include confirmation that farmers' confidence in extension workers (DADO officers and JT/JTA) has risen. Confidence in extension workers has increased compared to the period before the Project's implementation. According to the results of a beneficiaries' survey (Table 6 below), the percentage of farmers responding that they would choose JT/JTA for consultation on agricultural issues increased from 55% (before the Project started) to 77% (after the Project completion). Similarly, those responding that they would consult with DADO officers increased from 3% to 7% and from 9% to 35% for E/M farmers, demonstrating that confidence in the DADO officers, JT/JTA and E/M farmers trained in the Project activities has improved and that the agriculture extension services they provide have improved.

Table 6: "Whom do you choose for consultation on agricultural issues?"

(%)

Whom	Before the project	During the project	After the project
JT/JTA	55	93	77
DADO officers	3	17	7
Neighboring farmers	8	8	10
E/M farmer	9	50	35
Private sector	19	8	7
Others	16	3	28
	NGOs		ADC, Agriculture groups, myself

Source: Beneficiary survey

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal[13]

Overall Goal 1: Improved agriculture service delivery system is replicated to other areas inside and outside the Project districts.[14]

[13] In this Project, indicators for the respective Overall Goals were not set, and instead 3 indicators were set for Overall Goals 1 and 2.

[14] This is defined as "other areas inside and outside the Project districts," which refers to other areas inside the 5 target districts (VDC that did not establish ADC) and other districts.

Overall Goal 2: Farmers' farming activities are improved in the Project districts.

Regarding Overall Goal 1, as of the ex-post evaluation, replication of the system in other areas in the 5 target districts (other VDC) had only been done in 1 district (Makwanpur District). This was partly because the Project had not done enough to encourage MOAC in this direction, and MOAC had not clarified the methods and strategies to be used to extend the system to other areas (other VDC in the target districts and other districts). According to questionnaires and interviews given in the 4 districts other than Makwanpur (Dhading, Rasuwa, Nuwakot, Sindhupalchowk), the system had not been replicated in other areas within the districts (other VDC), and as of this point no measures had been taken, such as extension planning and securing a budget for extension, so there are no prospects that the system will be replicated. Similarly, the system has not been replicated in districts other than the 5 target districts and there are no prospects that it will in the figure. As regards Overall Goal 2, farmers able to access the Project recognize that their own agricultural activities have improved, and improvements in agricultural productivity can be observed. Comparing the period before the Project began and the ex-post evaluation period, we note that growth in agricultural productivity in the districts overall exceeded the national average in 4 districts for maize and 3 districts for vegetables and wheat. However, of the 252 VDC (including one municipality) in the 5 target districts, 35 were areas in which Project activities had been carried out (ADC and T/D farms established), amounting to only 14% of the target districts overall, so we cannot confirm a cause-and-effect relationship between the growth rate in the districts overall and the Project. In sum, the increase in productivity cannot be attributed to the Project's contribution.

1) Indicator 1: 60% of the farmers, able to access to Project activities, agree that their farming activities have been improved.

95% of farmers responded that their own activities had "improved" or "improved to some extent," so this indicator has been achieved. The vegetable cultivation techniques and farm management techniques were introduced with the Project's support. Nearby farmers are aware of the existence of farmers at T/D farms and E/M farmers thanks to PR activities such as bulletin boards put up at T/D farms with Project support and E/M farmers' efforts to publicize their activities at ADC and ASC meetings. As shown in Table 6, more farmers seek instruction and advice. Cooperative relationships with other farmers have strengthened as a result of activities by ADCs and E/M farmers, which is the Project's contribution.

Table 7: "Have your farming activity been improved? (from after the project's completion to date)"

(%)

Improved	Improved to some extent	Same as before	Worse
88	7	5	0

Source: Beneficiary survey

(Areas of Improvement)

Vegetable cultivation, farm management techniques, irrigation systems, market development, measures to counter disease and insect damage, cooperation with other farmers, confidence in farming

<Specific examples of improvements in productivity (according to interviews with farmers able to access the Project)>

- Revenue from cabbage increased. Prior to the Project, revenue amounted to about 35,000 rupee annually, but currently it stands at 100,000 rupee per year. This can be attributed to an increase in the production volume on the same land area, an increase in market prices, and a decrease in costs for fertilizer and other materials (Rasuwa district).
- Rice production increased from 360 kilos to 540 kilos due to better selection of fertilizer and varieties and improvements in spacing and timing when planting rice seedlings (Rasuwa district).
- Prior to the Project, farmers planted potatoes for their own consumption and their annual revenue was 20,000 – 30,000 rupee, but currently they are growing a wide variety of crops such as bitter melon, cucumbers, peppers and potatoes, and their revenue amounts to 150,000 rupee annually. Farm management training by JT/JTA during Project implementation and the establishment of irrigation systems in micro projects were contributing factors (Makwanpur district).

2) Indicator 2: Agricultural productivity of farmers in target 5 districts have been enhanced.

Data on crop productivity and yield in the target districts overall shows that productivity improved for paddy, wheat, maize and vegetables compared to the period prior to the Project's implementation, with the growth in productivity exceeding the national average for maize in 4 districts and vegetables and wheat in 3 districts. However, the cause-and-effect relationship with the Project could not confirm and it is not clear that this was due to the Project's effect (Table 9). Although 98% of farmers able to access the Project stated that productivity had "improved" or "improved to some extent," only 35 of the 252 VDC (including one municipality) in the 5 target districts were areas in which Project activities had been carried out (ADC and T/D farms established), amounting to only 14% of the target districts overall. Accordingly, this should be treated as a reference point. Given the above, improvements in agricultural activities in the target districts overall (Indicator 2) was limited.

Table 8: "Has your agriculture productivity been improved? (after the project's completion to date)"

(%)

Improved	Improved to some extent	Same as before	Worse
94	4	2	0

Source: Beneficiary survey

(Factors contributing to agricultural productivity) *The figures in parentheses indicate the percentage of respondents.

- Use of the appropriate amount of fertilizer (90%)
- Introduction of manure (80%)
- Introduction of high-quality varieties (81%)
- Disease and pest damage management (79%)

Table 9: "Agricultural productivity in 5 target districts (Kg/ha) *The underlined figures indicates the figures exceeding the national average.

(Kg/ha)

	Paddy	Wheat	Maize	Crop	Vegetables
Sindhupalchowk district					
2000/2001	2,200	1,600	1,700	1,600	9,000
2010/2011	2,089	950	2,200	1,000	10,338
Growth rate	95.0%	59.4%	129.4%	62.5%	114.9%
Dhading district					
2000/2001	2,200	1,500	1,700	1,700	12,000
2010/2011	2,452	1,691	2,500	1,003	17,967
Growth rate	111.5%	112.7%	147.1%	59.0%	149.7%
Nuwakot district					
2000/2001	2,400	1,900	1,900	2,000	9,000
2010/2011	3,299	2,750	2,260	1,800	11,797
Growth rate	137.5%	144.7%	118.9%	90%	131.1%
Rasuwa district					
2000/2001	2,000	900	1,500	1,300	9,000
2010/2011	2,200	1,480	1,940	990	9,721
Growth rate	110%	164.4%	129.3%	76.2%	108%
Makwanpur district					
2000/2001	2,600	1,700	2,000	2,100	11,000
2010/2011	3,300	2,800	2,600	1,125	15,143
Growth rate	126.9%	164.7%	130%	53.6%	137.7%
National average					
2000/2001	2,400	1,800	1,800	2,100	10,500
2010/2011	2,981	2,275	2,281	1,122	13,124
Growth rate	124.2%	126.4%	126.7%	53.4%	125%

Source: JICA-provided materials/ Statistical Information on Nepalese Agriculture 2010/2011

3) Indicator 3: Nepalese government allocate program budgets to promote replicating this system.

According to the results of questionnaires and interviews with DOA and DADO, a budget to extent the agricultural service delivery system (ADC, T/D farms) has not been formed. Interviews merely confirmed that Sindhupalchowk district plans to request funding to run a T/D farm, but there are no prospects for the formation of budgets in other districts. It is important that the effects of agriculture extension services be widely recognized by DOA and RDA and that efforts be made on the policy and institution side—the foundation for extension—so that budgets can be formed and executed to

promote extension of this system to other areas. This Project held 3 workshops to share the Project's output, including reports on activities of ADCs and T/D farms, and the output are recognized to some extent by Project stakeholders, but strategies and methods for institutionalizing the system and extending it to other areas have not been clarified.

In the 6 months prior to the Project's completion, a DADO in one of the Project's target districts administered a T/D farm using its own budget, and this was expected to be extended to other districts on the basis of results in target districts. Moreover, a T/D farm internalization committee was set up so that DOA could run the farm as part normal operations, and preparations moved ahead, with Project counterparts submitting Norms[15] on the administration of T/D farms to the DOA Agricultural Extension Directorate. However, after the Project's completion, there were discrepancies between the understanding of the counterparts who had prepared the Norms to clarify the T/D farm's management and the authorizing DOA Agricultural Extension Directorate. The Directorate would only authorize the Norm on T/D farm operations with a limited timeframe, so that it read "DADO will run the T/D farm as part of normal operations during the Project period." As such, there were no decisions on the management system or budget provisions after the Project was completed, and T/D farms in the target districts were not run after the Project and were not extended.

The introduction of the 2 approaches of ADC and T/D farms to the existing extension system and the training of human resources able to carry out extension services was an important output of this Project, but as of the ex-post evaluation, only about half of the 35 ADC who had supported the Project were continuing their activities. The other half did not continue their activities because 1) ADC were not based on Nepal's related laws, and there were no systems or laws supporting DADO's continuation and extension of the systems, 2) ADC members already below to other organizations, such as agricultural unions, so there is not a great need to continue ADCs, and 3) the ADC established in the latter half of the Project had not been strengthened enough so that the farmers could continue activities on their own. 45 T/D farms were established, but the effectiveness of the Norm was limited, and as a result activities at the T/D farms had not been continued as of the ex-post evaluation. Training whose implementation is required (training needed for promotion), the establishment of training center facilities, and efforts to update manuals had greater priority, and the priority of farm management and human skill training was relatively low, with no budget provided for it. Training on farm management and human skills for DADO officials and JT/JTA has not been continued. The training curriculum was used as part of other training programs, but it is not used as a tool for running ADC and T/D farms in an integrated manner.

Given this, although overall goal was somewhat achieved for its target indicator 1, the achievement

[15] In this instance, "Norm" refers to those underlying provisions justifying the implementation process and budget execution for carrying out agricultural extension activities (Project stakeholder).

indicator 2 was lower than the plan because the improved agricultural productivity was limited to farmers able to access the Project and did not extend to other districts. Indicator 3 was also lower than the plan because budgets to run T/D farms and ADCs were not provided. Therefore, the overall goal was partially not achieved.

3.2.2.2 Other Impact

- Formation of Agriculture Forestry and Environment Committee (AFEC)/Village Agriculture Development Committee (VADC)

  The establishment of AFEC/VAD under the leadership of the DADO director in the Makwanpur district and with support from an NGO is noted as a high-priority effort in the Nepalese government's Local Self-Governance Regulation 1999. There are plans to establish a committee in all of the 43 VDC in this district, and 23 committees have already been formed with support from NGOs. The difference with ADCs is that 1) this organization is recognized by the Local Self-Governance Regulation 1999 (ADC is not an organization prescribed in related legislation), 2) people involved in forestry and the environment, not just agriculture, are members and the scope of activities is broad, and 3) gender balance and balance between ethnic minorities is considered when selecting representatives and coordinating the needs of a diverse group is one of the objectives. Accordingly, farmer organizations are being strengthened and efforts made to provide support based on farmers' needs at all of the VDC in this district. ADC guidelines and experiences in setting up ADC are utilized in establishing AFEC/VADC.

- Synergistic effect with other donors

  Support for the input (agricultural materials) needed for the vinyl cultivation techniques introduced in this Project in Rasuwa district has been continued after the Project ended by other donors and NGOs. This project has synergistic effects with other supporting organizations in that other donors and NGO provide support with the input needed to continue utilizing the vinyl cultivation techniques learned through the Project's support and to improve agricultural activities.

<Factors that Impeded Achievement of the Overall Goal>

- Factors impeding extension of ADC (factors impeding the new formation and extension of ADCs by DADO)

  Agricultural groups continue to be organized under the policies of the Nepalese government, such as the National Agricultural Extension Strategy, but ADC are not organizations based on Nepalese laws and regulations, and there were no Nepalese government strategies or plans that would encourage DADO's new establishment of ADC.

The indicators for the Project objective were achieved. Efforts to continue the approaches introduced in the Project (T/D farms and ADC) and to extend the approaches to other areas were limited, but improvements in the agricultural activities of farmers with access to Project activities and gains in agricultural productivity are recognized, and the benefits to farmers through the strengthening of ADC are high. This project has somewhat achieved its objectives. Therefore, its effectiveness is fair.

3.3 Efficiency (Rating: ③)

3.3.1 Inputs

Inputs	Plan	Actual Performance
(1) Experts	Long-Term in 3 positions Short-Term as required	4 for Long-Term in 3 positions (Chief Advisor, Agricultural Extension, Project Coordinator/ Agricultural Training) 24 for Short-Term in 5positions (Agriculture General, Chief Advisor/ Agricultural Extension, Farm Management, Capacity Development of Agriculture Association, Extension Strategy)
(2) Trainees received	Fields of training: Undecided	Total of 16 persons Fields of training: Agricultural Training and Extension, Agricultural Extension, Agricultural Extension Planning and Management Course, Rural Development for Small Scale Farmers though the Agriculture Cooperatives Activities
(3) Third-Country Training Programs	Fields of training: Undecided	Total of 86 persons Fields of training: Agricultural Extension, Human skills[16]
(4) Equipment	Decided through discussion with the Nepalese side	78,571.76 US dollars
Total Project Cost	Total 390,000,000 yen	Total 368,000,000 yen
Total Local Cost	Provision of local operation cost	Total 35,000,000 yen[17] (21,108,000NPRs)

[16] Human skills includes facilitation skills, presentation skills and team building skills for organization strengthening and capacity development

[17] From the terminal evaluation report

3.3.1.1 Elements of Inputs

According to the review of the mid-term evaluation study report and the results of interviews with people involved in the Project, a lack of communication among the Project team members in the first 2 years of the Project meant that the Project's detailed activity plans were not sufficiently shared with counterparts, and Project activities were not carried out as planned. Experts with good communication skills and knowledge of Nepal were sent in the second half of the Project, at which point the Project content was shared with the implementing organizations and the activities conducted smoothly. Ultimately, the output and indicators for the Project objective were achieved. The number of extension workers was decreased in the 2005 organizational reforms, and the agricultural extension offices at which JT/JTA had been stationed were disbanded and consolidated with ASC. As a result, the overall number of agricultural centers decreased, which made it difficult for farmers to access JT/JTA, but it did not have a particularly significant impact in implementing Project activities.

3.3.1.2 Project Cost

The Project input was in line with the plan, and the project cost was lower than planned (94%).

3.3.1.3 Period of Cooperation

The cooperation period was as planned, and ended in 5 years.

Given the above, the inputs were appropriate for producing outputs and achieving the project objectives, and both project cost and period of cooperation were within the plan, therefore efficiency of the project is high.

3.4 Sustainability (Rating: ①)

3.4.1 Related Policy towards the Project

The Nepalese government's Three-Year Plan (October 2009 - 2012/2013) set goals to improve standards of living for the Nepalese, reduce poverty and achieve the Millennium Development Goals, and identifies agriculture as an important sector, stating that "by giving greater priority to the development of sectors that generate employment, the economic growth rate will sustainably contribute to the reduction of poverty." Moreover, the National Agriculture Policy, established in 2004, points to the importance of promoting farmers' groups to efficiently extend agriculture and strengthening human resource training to extend agriculture. The National Agriculture Extension Strategy (2007) states the goals of agricultural extension are to energize front-line extension workers and continually update their knowledge and skills, pointing to the encouragement of farmers' groups as one strategy. Given this, the Nepalese government will likely continue measures and systems that prioritize the continued reinforcement of the agricultural extension system and strengthening of

extension workers' skills. However, the steps required to ensure the sustainability of the management of the T/D farms and ADC introduced in this Project have not been taken. The output of agricultural extension achieved in Project activities are acknowledged by Project participants, such as DOA and DADO, but ADC is not an organization in line with Nepal's related laws and a decision over DADO's management of T/D farms after the Project's completion was not made during the Project period. As such, they were not incorporated in policies and institutions as implementing organizations, and sustainability is low. There are several factors behind this failure to address policy and institutional aspects. First, Project activities did not include approaches at the policy level, such as efforts to incorporate ADC and T/D farms at the policy and institutional level. Second, Project activities were not carried out as planned in the first half of the Project, so in the second half the focus was on implementing activities and achieving the indicators, which meant that was limited time to carry out activities ensuring sustainability. Third, strategies and methods aimed at institutionalizing the output and extending it to other areas were not clarified.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

DADO responsible for agricultural development at the district level and the ASC under DADO to which the JT/JTA carrying out extension activities together with the farmers belong played a role as institutions extending agricultural technology to farmers during the Project's implementation. There has been no change in their responsibilities or structures as an organization, and the organizational system has been sustained. Organizational diagrams for DADO and ASC are shown in Figure 3 below.

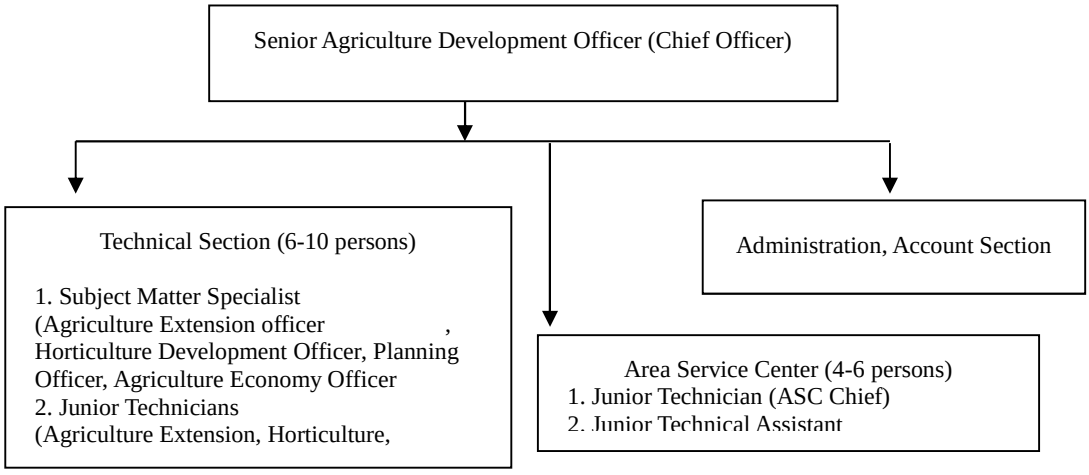


Figure3: DADO Organogram

Since Nepalese regulations do not require the reimbursement of expenses for travel within the JT/JTA's VDC for the itinerant programs necessary for the formation of new ADC and their

extension, the JT/JTA use their own bikes and pay for petrol themselves. Accordingly, a system for compensation and travel expenses for itinerant programs has not been established. Moreover, both the mid-term evaluation and the terminal evaluation pointed to the need to develop mechanisms to raise incentive, such as employee evaluations based on performance and opportunities for training and further studies, and although performance evaluations are carried out, evaluation results are not used for purposes other than promotions, and MOAC does not have decision-making authority over extension worker systems, including incentives. This requires coordination with the Ministry of Finance and related government agencies and ministries, so no particular steps have been taken. Given this, a system support JT/JTAs' itinerant activities needed for the establishment of new ADC and their extension has not been established.

Regarding the continuation and extension of T/D farms, the validity of the Norms on the management of T/D farms was limited to the Project period, and there is no system for their management and extension after the Project's completion.

As regards the implementation of training to strengthen the capacity of JT/JTA and DADO officers needed to extend ADC and T/D farms, DOA, which is responsible for training DADO officers, trained instructors for farm management training and human skill training. In addition, RATC (Regional Agriculture Training Centre), responsible for training JT/JTA, trained instructors for farm management training. DOA provided farm management training as part of other donors' programs, and instructors were also utilized. Nevertheless, farm management training and human skill training are carried out when the necessary budget provisions and support for training programs are available. Therefore, there are remaining issues with the independent implementation of training by the implementing organizations.

3.4.3 Technical Aspects of the Implementing Agency

The DADO officers and JT/JTA engaged in the Project activities acquired the technology and knowhow needed for the continuation of the agricultural service delivery system and its extension to other areas through Project activities to form and strengthen ADC and support the administration of T/D farms. 18 out of the 86 JT/JTAs assigned to the target districts at the time of the mid-term evaluation and the terminal evaluation, were still active in target districts as of the ex-post evaluation (including JT/JTA who had moved to another target district). 72 of the 90 JT/JTA working in target districts as of the ex-post evaluation had been appointed after the Project's completion. Even after the Project, farmers remained satisfied with the support provided based on cooperative relationships with related organizations such as ADC and DADO that had been built during the Project implementation period, and confidence in the DADO officers and JT/JTA whose skills had been reinforced in Project activities had increased. However, farmers pointed to a lack of agricultural

technique and insufficient knowledge among the JT/JTA newly appointed after the Project, indicating that the knowhow acquired by DADO officers and JT/JTA through Project activities had not become a storehouse of institutional knowledge for DADO. Mechanisms were not developed to use knowledge in an organized manner so that the capacity acquired in training could be used in instructing newly appointed JT/JTA.

Although training institutions train instructors, the farm management training and human skill training so essential to the sustainability and extension of the agricultural service delivery system has lower priority than mandatory training, the establishment of a training center and manual updates. Moreover, farm management training and human skill training is not implemented as an independent training program. It continues to be implemented as part of other programs, but it is not implemented as a training tool used in an integrated manner with ADC and T/D farms. Moreover, T/D farms have not continued, and there are no opportunities for practical training, so DADO officers and JT/JTA have limited opportunities to learn and reinforce their farm management knowledge and skills in organizational reinforcement. Accordingly, the technical sustainability needed to maintain and expand on the Project output is low.

3.4.4 Financial Aspects of the Implementing Agency

The budget for agricultural extension activities is recorded and executed as one of the budget items for DADO's "agricultural extension program." Although the budget needed for this Project's activities are included in the "agricultural extension program," ACD support is not listed as a separate budget item, so budget provisions are not guaranteed. Moreover, it is not clearly stipulated that DADO is the organization responsible for running T/D farms and not included in its normal operations, so a budget is not provided. In interviews with DADO, it was confirmed that only Sindhupalchowk district plans to include the administration of T/D farms in next fiscal year's budget, but the other 4 districts do not seem to be taking any such initiative. Interviews with the DOA Agricultural Training Directorate indicated that high priority is given to budget provisions for training related to personnel promotion, the establishment of a training center, and updates to training materials, and that there were no prospects for a budget to carry out farm management training and human skill training as Nepal's own program. Accordingly, there are grave concerns over the financial sustainability needed to sustain and expand on the Project's output.

3.4.5 Continuity of Effectiveness/ Impacts

As noted above, the ADC that continued to be run by farmers as of the ex-post evaluation have a high likelihood of continuing going forward since the farmers themselves recognize the effectiveness of ADC and they are run primarily be members with support from related organizations. Moreover, agricultural training provided through ADC during the Project period led to improvements in agricultural production among farmers able to access the Project, as well as gains in agricultural

productivity, and the techniques and skills learned in the Project were still being utilized in farm management as of the ex-post evaluation. However, lacking policies on extension to other areas, a system and a budget, T/D farm activities have not been continued, meaning that JT/JTA do not have opportunities to acquire and improve their agricultural techniques in a practical setting. Moreover, there is no prospect that the implementing organizations will take a leading role in carrying out farm management training and human skill training for DADO officers and JT/JTA. Given these factors, the effect of farmers' own activities, such as higher agricultural productivity and the continuation of ADC activities, have been sustained, but there are issues with the sustainability of T/D farm activities and training implementation, and the sustainability of their effect is limited.

Given the above, major problems have been observed in the policy background, structural aspects, technical aspects and financial aspects of the executing agency. Therefore, sustainability of the project effects is low.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

This Project was implemented with the aim of improving Nepal's agricultural extension service by introducing new extension systems, such as ADC and T/D farms and working to strengthen the capacity of the JT/JTA and DADO officers responsible for agricultural extension so that these systems could be executed smoothly. This Project was consistent with Nepal's development policy, development needs and Japan's aid policy. Therefore, relevance was high. The Project input were provided according to plan, and completed during the Project period, so efficiency was also high. The output and Project objective had been generally achieved when the Project was completed. However, the approaches introduced by the Project were not continued after the Project and efforts to extend and expand them in other areas have been limited overall, with the exception of some areas. Accordingly, the effectiveness and impact were fair. The Project output is being continued at the level of individual farmers, as indicated by improvements in agricultural extension services. Farmers' activities and agricultural productivity even after the Project attributable to the approaches introduced as well as extension activities, were carried out by farmers' groups themselves. However at the level of the implementing agency, the approaches introduced by the Project were not incorporated in the agency, there were no specific implementation strategies, and no budget provisions were taken. Thus, sustainability is low. In light of the above, this project is evaluated to be partially satisfactory.

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

4.2.1.1 Recommendations for DOA and RDA

1) Clarifying role of T/D farms in agricultural extension activities and consider possibility of using T/D farms

During the Project period, the T/D farm internalization committee examined the effectiveness of T/D farms and submitted Norms to govern DADO's management of T/D farms, but the Norm was approved with a validity limited to the Project period, so that T/D farms were not continued after the Project was completed. Interviews conducted in the ex-post evaluation confirmed that project participants at the district level such as DADO and related organizations at the central level (MOAC, DOA, RDA) believe that the T/D farms contributed to improvements in JT/JTAs' agricultural technique and the development of trusting relationships with farmers, and improvements in agricultural extension services. DOA and RDA should consider the ways in which T/D farms could be utilized in conjunction with ADC and training as part of Nepal's extension activities, taking into account discussions with the T/D farm internalization committee.

2) Implementing farm management and human skill training to JT/JTA through RATC

The farm management training and human skill training developed by the Project provide the knowledge and skills that are indispensable in enhancing farm management knowledge and forming farmers' groups. However, currently farm management training and human skill training are not being carried out. As with examples in which farm management training has been incorporated in other donors' programs (UNDP's MEDEP[18]), DOA should distribute the training module prepared by the Project to the individual RATC and donors, and encourage RATC to include farm management training and human skill training in the training programs they administer.

3) Utilizing initiatives in Makwanpur district

The AFEC/VADC organized in Makwanpur district, were organized based on the "Local Self Governance Regulation 1999", and the committees take into account balance between genders and ethnic minorities so that they are essentially a higher level of ADC. The VDC allocated 15% of their budgets to agriculture from 2063 in the Nepalese calendar (2006/2007 in the western calendar), and is required to allocate more than 15% from 2012/2013. The VDC also show interest in utilizing budgets through the committees. The AFEC/VADC in this district are formed based on Nepal's related laws, are officially recognized by the Nepalese government, and will also receive financial support from VDC, so they will likely be a highly sustainable organization. Accordingly, RDA and DOA should consider what role AFEC/VADC will have in Nepal's extension activities, and consider effective extension activities that could be carried out through these organizations.

[18] Micro-Enterprises Development Programme

4.2.1.2 Recommendations to DADO in 5 target districts
(Dhading, Rasuwa, Makwanpur, Nuwakot, and Sindhupalchowk districts)

1) Providing JT/JTA with opportunities for practical training through T/D farms

T/D farms played an important role as a place in which extension workers, who have extremely limited opportunities for training, to learn agricultural technology in a practical setting, but they were not continued after the Project was over. During the Project period, almost all JT/JTA acquired agricultural technology at T/D farms, but the JT/JTA appointed after the Project was over had no opportunity to learn practical agricultural technology, and lacked technology at a level at which they could guide farmers. DADO ran T/D farms with their own budget for about 6 months prior to the Project's completion. DADO should consider resuming the T/D farm initiative to utilize this experience and provide a place for practical training. Sindhupalchowk districts plans to include T/D farm management in its budget for the next fiscal year. DADO in the other 4 districts should also secure budgets for the administration of T/D farms in the next fiscal year budget and make preparations to resume this initiative. When doing so, tools for agricultural extension prepared in the project such as the video introducing T/D farms, the Norm prepared by the T/D farm internalization committee, and transfer knowhow could be utilized.

2) Utilizing E/M farmers' extension activities

E/M farmers' technology and knowledge was strengthened through Project support, such as training of E/M farmers and on-site observation. Even now, E/M farmers contribute to agricultural extension by giving advice to the farmers they visit and visiting neighboring farmers on their own to transfer agricultural technology. E/M farmers play a very important role as they are able to carry out agricultural extension activities on a continuous basis, unlike extension workers who are transferred every 2 to 3 years. Since interviews showed that they are extremely motivated to help other farmers, DADO should continue to proactively utilize E/M farmers as training instructors and places to send other farmers for on-site visits. Moreover, 35 farmers were chosen to be E/M farmers and improved their capacity in the Project, but this is a low figure compared to the number of farmers in the ADC (one per 430-1,300 households), and thus an increase in the number of E/M farmers should be considered.

4.2.2 Recommendations to JICA

None in particular

4.3 Lessons Learned

1) Ensuring that new concepts are well established and sustainable

3 ex-ante surveys were carried out in this Project, but Nepal's specific strategies and approaches were not clarified, and after the Project began, new concepts such as ADC and T/D farms were

introduced on the Japan side's recommendation. However, continuity after the Project had ended was low due to weak efforts to institutionalize these approaches. When new extension systems and methods are introduced, the project should confirm that the systems and methods are consistent with the partner country's laws and regulations, clarify the organization responsible for implementation and the management system, and provide support for the institutionalization of the foundational budget provisions. It is also important to put together clear output for the project's foundation, and attempt to incorporate this output in the policy and institutional framework.

2) Improving existing systems for extension of Project output

The ADC and T/D farms that were one output of the Project's were not extended after the Project was completed because a system and incentive mechanisms for the itinerant activities of JT/JTA responsible for extension activities had not been developed. The mid-term evaluation and terminal evaluation also pointed to the importance of considering a system to appropriately evaluate extension workers' activities and reflect this in promotion and positions, provide appropriate benefits and travel costs, and improve extension workers' incentives. However, no specific measures have been considered, and the Project also took no steps to address this. It is important to form projects with a medium- to long-term perspective so that prior to the project's implementation, the sustainability of project output and the possibility of extending them to other regions within the existing framework is confirmed with the implementing organization, improvements to the existing framework are included as one of the project components as necessary. If this is not possible, activities that can be sustained and extended within the existing framework should be carried out.

3) Promoting ties between farmers and related organizations

By organizing ADC, this Project made it possible for farmers' groups to access related organizations (DADO, VDC, NGOs, etc.) on their own and obtain resources and input. Specifically, farmers' groups were not only the recipients of extension programs run by related organizations and donors, but requested the support they needed through ADCs. There were also cases of farmers carrying out programs on their own. Interviews with ADC revealed other output by farmers' groups, such as "we asked DADO for cooperation, and as a result we receive technical support from DADO even after the Project's completion" and "ADC requested allocation of 15% of the VDC's budget, allocated for agriculture, and we received this funding." In countries such as Nepal in which agricultural extension is being expanded through support for farmers' groups, one effective strategy is to give farmers' groups support for independent activities so that they can obtain the resources and input they need for extension by proactively appealing to related organizations.

At the same time, as important as initiatives led by farmers are, support such as technology and financial resources from public organizations is an important element, and thus establishing the systems and policies underlying ongoing support are crucial.

Federal Democratic Republic of Ethiopia

Ex-Post Evaluation of Japanese Technical Cooperation Project

"Project for Irrigation Farming Improvement"

External Evaluator: Riai Yamashita, JIN Cooperation

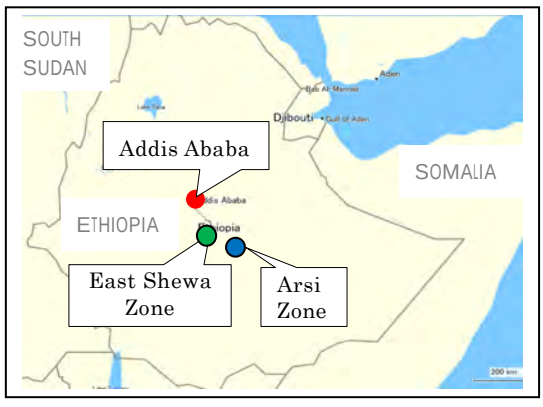
0. Summary

The project has helped improve water utilization technology in the target area in Ethiopia, where the people were dependent on traditional farming technology and rain-fed agriculture.

To summarize the evaluation results, the project was highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore its relevance was high. Its effectiveness was also high, since the project outputs and objective were achieved. Despite concern that the level of groundwater would decline in areas where the massive introduction of small-scale pumps was encouraged, several positive impacts have been identified such as the diversification of crops and increase in double or triple cropping, including the dry season. As far as the project inputs are concerned, the schedule for the dispatch of Japanese experts should have been improved following the activity on the ground. In addition, the shortage and frequent turnover of counterpart personnel adversely affected the activity schedule. However, in general, its efficiency was high since the project cost and cooperation period were as planned. Its sustainability was also fair, because the irrigation farming was continued by the Water Users' Cooperatives (WUC) and farmers, despite concern over the sustainability of the implementation structure due to the possibility of structural reform of the government.

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

1. Project Description



(Project Locations)

(Gravity force irrigation at Ketar II)

1.1 Background

In Ethiopia, 85% of the population is engaged in agriculture, and agricultural production accounts for more than 50% of its GDP[1]. Agriculture is thus crucial to its economy and industry. The Agriculture Development-Led Industrialization (ALDI) strategy has been promoted under the Sustainable Development and Poverty Reduction Program (SDPRP), which started in 2002.

Conversely, the country has been suffering from food shortages caused by droughts since late 2002, which imposed a dreadfully adverse effect upon its economy and industry. The government of Ethiopia considered the issue of ensuring food security its top priority and has been striving to increase agricultural productivity and diversification. However, it lacked both human resources and capacity to translate such efforts into specific measures.

Under such circumstances, JICA conducted a study on Meki Irrigation and Rural Development (September 2000-January 2002) and formulated a master plan for agricultural and rural development, focusing on irrigation development. Furthermore, JICA dispatched a fact-finding study team on agricultural development twice in March and August 2002, and proposed the necessity of its cooperation for (1) the development of agricultural research and a dissemination system and (2) the development of small-scale irrigation systems.

Against the above backdrop, JICA implemented a study on Capacity Building Programs for Community-based Irrigation Development in the Central Oromia Region (April 2003-October 2004). It was confirmed that the participatory approach would be effective for planning, construction / rehabilitation work, human resource development and the organizing of a Water Users' Association (WUA). In response to the results, the government of Ethiopia concluded that the further dissemination and promotion of small-scale irrigation agriculture would significantly help increase agricultural productivity and ease food insecurity. The government of Ethiopia requested that the government of Japan further implement a technical cooperation project. Subsequently, the Project for Irrigation Farming Improvement was started in September 2005.

1.2 Project Outline

Overall Goal		The agricultural production in the project target area is increased.
Project Objective		Water utilization technology is improved by the farmers in the project target area.
Output(s)	Output 1	Rehabilitation of existing irrigation schemes (gravity force) is

[1] Central Statistical Agency, 2000/2001

		standardized.
	Output 2	Management of small scale irrigation scheme (pump) is improved.
	Output 3	Water harvesting technology for agriculture is standardized.
	Output 4	Irrigation farming technology is improved.
Inputs		Japanese Side: 1. Experts 21 in total 4 long-term, 17 short-term 2. 9 trainees received (9 for Counterpart training in Japan) 3. 3 trainees for Third-Country Training Programs (Morocco) 4. Equipment 25,010,000 yen 5. Local Cost 38,350,000 yen 6. Others (inc. dispatch of related missions) Progress Review Mission in March, 2007 Ethiopian Side: 1. 39 counterparts in total 2. No financial support. 3. Land and Facilities, Project Office, Utilities 4. Local Cost, Counterpart Salary, Seminars
Total cost		295,835,000 yen
Period of Cooperation		September 2005-September 2008
Implementing Agency		OARDB: Oromia Agriculture and Rural Development Bureau (September-December, 2005) OIDA: Oromia Irrigation Development Authority (December 2005-January 2008) OWRB: Oromia Water Resource Bureau (January 2008-September 2008) OWMEB: Oromia Water, Mineral and Energy Bureau (After the project termination)
Cooperation Agency in Japan		Ministry of Agriculture, Forestry and Fisheries
Related Projects (if any)		The Study on Meki Irrigation and Rural Development in Oromia Region (September 2000-January 2002) The study on capacity building programs for community-based irrigation development in central Oromia Region (April 2003-October 2004)

	The Project for Capacity Building in Irrigation Development (June 2004-May 2014: ongoing)

1.3 Outline of the Terminal Evaluation

1.3.1 Achievement of Overall Goal

The overall goal of the project was not evaluated due to the difficulty in collecting data on the surrounding area. However, interviews with farmers in the project area and the results of the questionnaires to counterparts revealed that most farmers in the project area could harvest twice or three times a year, including dry season. Adverse impacts included the concern that the level of underground water would decline in future. It was also pointed out that farmers who lived downstream of the irrigated area might suffer from water shortage, hence water management problems were possible among WUC/WUA.

1.3.2 Achievement of Project Objective

Achievements of the project objective were confirmed with its three indicators, (1) the guideline authorization by OWRB, (2) understanding of the guideline by OWRB staff, (3) application of the guideline to other projects implemented by OWRB after April 2008. All three indicators were expected to be achieved upon project completion.

1.3.3 Recommendations

1) Short-term issues: before the project completion

The guidelines should be finalized, authorized and printed by the end of August 2008. Subsequently, a workshop should be held to introduce the guidelines. Regarding the survey on spate irrigation, further problem analysis should be held. Experiments on useful water-saving technology should be performed during rainy season.

2) Medium- and long-term issues: upon completion of the Project

To adapt and disseminate the guidelines to all stakeholders, OWRB should have responsibility as the executive body. It is essential for OWRB to stabilize its budget and staff allocation for irrigation development. A monitoring system should be established in the project area, and regular monitoring activities and meetings should be conducted. Also, it would be better to provide support to maintain and renovate the irrigation systems through WUC/WUA's funds. Continuous training programs for WUC/WUA and farmers should be organized by OWRB in collaboration with the Oromia Bureau of Agriculture and Rural Development (OBARD). To secure water resources and prevent conflicts relating to water distribution, it is necessary to survey and prepare a water management master plan and establish a legal system for water distribution.

2. Outline of the Evaluation Study

2.1 External Evaluator

Riai Yamashita, JIN Cooperation

2.2 Duration of Evaluation Study

Duration of the Study: November 20, 2011-July 31, 2012

Duration of the Field Study: January 15-February 3, 2012, May 27-June 2, 2012

2.3 Constraints during the Evaluation Study

During the field study, only twelve of a total thirty-nine counterparts continued to work at OWMEB. There has been frequent transfer of staff due to the structural reform of the implementing agency as part of the Business Process and Re-engineering (BPR). In addition, only six counterparts engaged in the project from beginning to end, hence some questions could not be answered by any staff and some data could not be collected.

3. Results of the Evaluation (Overall Rating: A[2])

3.1 Relevance (Rating: ③[3])

3.1.1 Relevance with the Development Plan of Ethiopia

When the project was planned, the government of Ethiopia had implemented the Second Five-Year National Development Plan (2000-2005) which promoted the agricultural extension program. This program aimed to increase agricultural productivity and production as well as improving agricultural technology and development.

At the end of the project period, the Third Five-Year National Development Plan (2006-2010) had been implemented. One of the strategies of the plan was to accelerate agricultural development and ensure food security to reduce poverty through economic development. In addition, the plan emphasized support for small-scale irrigation and water harvesting technology (WHT) as a means of increasing agricultural production and food security.

Furthermore, the Water Sector Development Program (WSDP) was formulated in 2002 by the Ministry of Water Resources (MoWR), which promoted the Irrigation Development Program. In the program, the development of small-scale irrigation and capacity development of government staff were prioritized. Also, as shown in Table 1, the WSDP has promoted small-scale irrigation over the program period (2002-2016). Conversely, it promoted medium- and large-scale irrigation in the medium and long terms.

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[2] A: Highly satisfactory, B: Satisfactory, C: Partially satisfactory, D: Unsatisfactory

[3] ③: High, ② Fair, ① Low

Table 1: Planned Area for Irrigation Development and Number of Projects in WSDP

	Small-Scale Irrigation		Medium- and Large-Scale Irrigation	
	Newly Developed Area (ha)	No. of projects	Newly Developed Area (ha)	No. of projects
Short-Term (2002-2006)	40,319	546	13,044	2
Medium-Term (2007- 2011)	40,348	511	39,701	6
Long-Term (2012-2016)	46,471	549	94,729	9

Source: Water Sector Development Program (2002–2016)

Therefore, the assistance for small-scale irrigation under the project, including gravity-forced irrigation, small-scale pump irrigation and WHT was consistent with the development plans of the country.

3.1.2 Relevance with the Development Needs of Ethiopia

When the project started, Oromia was the biggest region in the country, where 80% of the population lived in rural areas engaging in traditional and rain-fed agriculture. The region faced problems of low agricultural production and productivity, which led to low food security. This was caused by unstable rainfall, soil erosion in hilly areas during the rainy season as well as the low development of local markets. In addition, the region had an actual irrigated area covering only 12% (206,337ha) of the huge potential area of 1.7 million ha, which means the people were unable to utilize abundant water resources. Accordingly, food security in the region was crucial to increase agricultural production by improving irrigation farming.

Table 2 shows the result of the beneficiary survey during the evaluation study on the relevance between the needs of WUC members and the project outputs such as gravity force irrigation (output 1) and small-scale pump irrigation (output 2). Consequently, all members answered “highly relevant” or “relevant”.

Table 2: Relevance to Beneficiaries’ Needs

	Gravity Force Irrigation (Output 1)		Small-Scale Pump Irrigation (Output 2)	
	No. of persons	%	No. of persons	%
(1) Highly relevant	67	93.1	24	85.7
(2) Relevant	5	6.9	4	14.3
(3) Less relevant	0	0	0	0
(4) Not relevant at all	0	0	0	0
Total	72	100	28	100

Source: Beneficiary Survey

In addition, the farmers’ needs for WHT such as pond, tank and shallow well (output 3)

were very high in areas where there was no water source nearby or in dry areas. Before the project started, the regional government had constructed many ponds, tanks and shallow wells. However, according to the report by JICA and an interview with OWMEB, the farmers in the area were unable to utilize the facilities due to a lack of training on maintenance and farming technology, hence the project put more emphasis on the maintenance and extension of WHT to other farmers.

In short, the project was highly relevant with the development needs of the country.

3.1.3 Relevance with Japan's ODA Policy

In the Country Assistance Implementation Plan of JICA in 2002, agricultural development (food security) was one of the four priority areas. The project was initially proposed by the fact-finding study on agricultural development conducted by JICA in 2000 and the development study on Meki Irrigation and Rural Development in 2002. Subsequently, the country assistance program for Ethiopia was formulated by the Ministry of Foreign Affairs in 2008, citing agricultural development as the top priority. The program promoted research and development into agricultural technology, extension and input support for improved technology, and the construction of irrigation facilities, including WHT, as well as support for soil conservation, hence the project was consistent with Japan's ODA policy.

3.1.4 Appropriateness of Means

The target areas of the project were selected as East Shewa and Arsi zones of five zones which had been supported by the development study on capacity building programs for community-based irrigation development in the central Oromia region. When selecting a more specific area for gravity force irrigation (output 1), OIDA's irrigation database was utilized to analyze 37 areas[4] in the central Oromia region. Consequently, Ketar I, II, III[5] were selected due to the deterioration in the facilities and Arata Chufa[6] was selected due to its good location as a pilot and the inactive situation of WUA. For small-scale pump irrigation (output 2), two out of nine areas were selected with potential water resources such as underground water or lakes. The two areas had problems in maintenance of pumps, management of WUA and water utilization. For WHT (output 3), 27 model farmers were selected in areas where there were many family-based ponds, tanks and shallow wells constructed by the regional government. Table 3 shows the target areas and the reasons for selection.

[4] Planned irrigated area: 4,903ha, Actual irrigated area: 3,008ha, Planned beneficiaries: 13,484, Actual beneficiaries: 8,063

[5] Actual irrigation rate: 50%, Actual irrigated area: 200ha, Actual beneficiaries: 320

[6] Actual irrigation rate: 80%, Actual irrigated area: 80ha, Actual beneficiaries: 250

Table 3: Target Areas and Reasons for Selection

	Output 4: Irrigation farming technology						
	Output1: Gravity force		Output 2: Small-scale pumps		Output 3: WHT		
District	Tiyo	Ziway Duguda	Duguda	Bora	Adami Tulu	Dodota Shire	Merti
Area (WUA/WUC)	Ketar I, II, III	Arata Chufa	Badegosa	Kanteri Michael	Model farmers	Model farmers	Model farmers
Reasons for Selection	Old facilities, low irrigation rate	Inactive WUA, good location as a pilot	Problems in maintenance of pump and management of WUA	Problems in maintenance of pump and management of WUA	Existing facilities were not utilized. Farmers had willingness for WHT.		

Source: Based on the JICA report

Therefore, the selection of the target area was consistent with the issues and conditions in the target area, and appropriate to show the direction of the project, which aimed to improve water utilization technology.

In summary, 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 Impact (Rating: ③)

3.2.1 Project Outputs

3.2.1.1 Project Output

1) Output 1

Through the implementation of the project, the following results were achieved for output 1:

a) Rehabilitation of gravity force irrigation schemes was standardized through the consensus of WUC/UWA and the guideline including the rehabilitation process was prepared.
b) Gravity force irrigation schemes were rehabilitated by the participation of WUC/WUA in the standardized way.

As shown in Table 4, there were seven steps to the rehabilitation work in the guideline for rehabilitation of gravity-forced irrigation scheme.

Table 4: Standardized Rehabilitation Process of the Gravity Force Irrigation Scheme

	Process	Outline of Work
Step 1	Request and Proposal	・ Consensus among beneficiaries of WUC/WUA on request for rehabilitation ・ Baseline survey and inventory survey on irrigation scheme by WUC/WUA

		・ Preparation and submission of the proposal and request to Zone/Woreda office
Step 2	Problem Analysis	・ Problem Analysis workshop facilitated by Zone/Woreda office
Step 3	Basic Plan and Design	・ Field survey on the topography, geology and soil by Zone/Woreda office ・ Preparation of basic plan (layout map) ・ Strengthen capacity of WUC/WUA ・ Preparation of design ・ Cost and benefit estimation ・ Preparation of an action plan
Step 4	Agreement	・ Signing of an agreement between the Zone/District and WUC/WUA ・ Clarification of responsibility of WUC/WUA on rehabilitation work
Step 5	Implementation	・ Confirmation of design by Zone/Woreda office ・ Cost Revision by Zone/Woreda office ・ Rehabilitation work featuring WUC/WUA involvement ・ Supervision and inspection by Zone/Woreda office
Step 6	Management	・ Formulation of a water distribution plan ・ Maintenance of facilities by beneficiaries ・ Data management by WUC/WUA ・ Training for WUC/WUA by OWRB
Step 7	Monitoring and Evaluation	・ Periodical monitoring by Zone/District and WUC/WUA ・ Mid-term evaluation during the five-year regional development plan ・ Training and technical support for WUC/WUA by OWRB

Source: Guideline for Rehabilitation Works of the Small-Scale Gravity-Forced Irrigation Scheme, OWMEB

During the project implementation, the counterparts of OWMEB developed the above process in Ketar I, II, II and Arata Chufa by trial and error, supported by Japanese experts. They went to the field many times to try the process with the WUC/WUA committee members. The interview with OWMEB revealed that through this experience, the counterparts could develop their capacity and gain basic knowledge for the guideline preparation. In addition, the counterparts improved their understanding of the whole process of rehabilitation and how to utilize the documentation package by preparing formats for the request form, action plan, agreement, layout map, design, cost estimate, monitoring sheet, and so on.

Similarly, according to the interview with OWMEB, the counterparts in the headquarters, Zone and Woreda offices came to appreciate collaborating with WUC/WUA through the above process. In response, WUC/WUA became active participants in the process from the planning stage, with a sense of ownership, rights and responsibility. This is because, for example, during the Problem Analysis Workshop and Action Plan making

at the initial stage, WUC/WUA members identified their own problems in facility management and prepared an action plan to solve the same. Another example is that in step 4, the agreement between Zone/District and WUC/WUA was signed to clarify the responsibility of WUC/WUA on rehabilitation work. This process made the members of WUC/WUA more aware of their roles and responsibilities and more active in rehabilitation work.

Table 5 shows the level of participation of WUC/WUA members in the rehabilitation work based on the result of the beneficiary survey[7] conducted during the evaluation study. It shows that 100% of members in Ketar I, II, II and 96.4% in Arata Chufa answered "participated" or "actively participated"[8].

Table 5: Participation of WUC/WUA in Rehabilitation of Gravity Force Irrigation (%)

	Ketar I, II, III			Arata Chufa		
	Not participated	Participated	Actively participated	Not participated	Participated	Actively participated
Rehabilitation work	0.0	23.8	76.2	3.6	17.9	78.6

Source: Beneficiary Survey

2) Output 2

Through the implementation of the project, the following results were achieved for output 2:

a) Management of small-scale irrigation schemes was improved in Badegosa and Kentri Michael through organizational strengthening of WUC/WUA.
b) The guideline, including WUC/WUA management and maintenance of pumps, was revised.

In Badegosa, irrigation water was pumped up from Lake Ziway, and in Kentri Michael, it was pumped up from underground. According to the beneficiary survey[9], all beneficiaries answered that their understanding of water rights and their awareness as a member of WUC/WUA as well as their ability to manage the organization had improved thanks to the project. Three reasons were given for this: 1) a clear by-law of WUC/WUA was established through training on organizational management, 2) the members developed a sense of ownership of operation and maintenance of the scheme by learning how to periodically inspect the pump as part of training on operation and maintenance, 3)

[7] A beneficiary survey was conducted for 42 of 857 members in Ketar I, II and III and 30 of 317 members in Arata Chufa.
[8] "Participated" means the person was physically there and conducted activity as necessary. "Actively participated" means the person took the initiative in discussion or activity.
[9] The beneficiary survey targeted all members of the WUC (14 in Badegosa and 14 in Kentri Michael).

periodical meetings were held once or twice a month by WUC/WUA members to share information.

Tables 6 and 7 show the evaluation results by the WUC on the management of irrigation schemes, before, during and after the project.

Table 6: Evaluation by Badegosa WUC on the Management of Irrigation Schemes (%)

List of activities	Level of satisfaction	Before the project	During the project	After the project
Distributions of water in area	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	78.6	0.0
	Satisfactory	0.0	21.4	85.7
	Highly satisfactory	0.0	0.0	14.3
Maintenance of canals	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	71.4	0.0
	Satisfactory	0.0	21.4	78.6
	Highly satisfactory	0.0	7.2	21.4
Status of infrastructures in the schemes	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	78.6	0.0
	Satisfactory	0.0	21.4	92.9
	Highly satisfactory	0.0	0.0	7.1
Safety structures	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	78.6	14.3
	Satisfactory	0.0	21.4	85.7
	Highly satisfactory	0.0	0.0	0.0

Source: Beneficiary Survey

Table 7: Evaluation by Kentri Michael WUC on the Management of Irrigation Schemes (%)

List of activities	Level of satisfaction	Before IFI project	During IFI project	After IFI project
Distributions of water in area	Unsatisfactory	100.0	0.0	14.3
	Fairly satisfactory	0.0	42.9	57.1
	Satisfactory	0.0	57.1	28.6
	Highly satisfactory	0.0	0.0	0.0
Maintenance of canals	Unsatisfactory	100.0	0.0	7.1
	Fairly satisfactory	0.0	21.4	57.2
	Satisfactory	0.0	78.6	35.7
	Highly satisfactory	0.0	0.0	0.0
Status of infrastructures in the schemes	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	28.6	71.4
	Satisfactory	0.0	71.4	28.6
	Highly satisfactory	0.0	0.0	0.0
Safety structures	Unsatisfactory	100.0	0.0	14.3
	Fairly satisfactory	0.0	64.3	78.6
	Satisfactory	0.0	35.8	7.1
	Highly satisfactory	0.0	0.0	0.0

Source: Beneficiary Survey

According to the results above, before the project, not all members were satisfied with the management of the scheme due to unfair distribution of water among the beneficiaries. This was also because they did not work collectively to manage the facilities. During the project, the situation improved, hence all members answered “fairly satisfactory”, “satisfactory” or “highly satisfactory”. After the project, the members in Badegosa were far more satisfied, with an increase of 57.2% for those who answered “satisfactory” and 8.9% for those who answered “highly satisfactory” on average. In Kentri Michael, the figure for those who answered “highly satisfactory” declined by 8.9% on average due to the reduced irrigated area caused by a pump engine problem. However, the pump was fixed using the WUC’s own funds and some members later jointly purchased a new pump, which reflects their new awareness of their roles in operation and maintenance.

(A newly purchased pump)

(Water is pumped up from underground)

To operate and manage the WUC/WUA, including fixing and renewing pumps, membership fees must be continuously collected. In both Badegosa and Kentri Michael, the collection of membership fees such as water fees and maintenance fees increased during the project and their financial management was improved. This was because the members understood the importance of collecting membership fees to maintain the scheme. Consequently, the collection of fees created a virtuous cycle in which the WUC/WUA could fix or purchase a pump quickly when it was broken down.

Tables 8 and 9 show the evaluation results by the WUC on the membership fees and financial management, before, during and after the project.

Table 8: Evaluation by Badegosa WUC on Membership Fees and Financial Management (%)

List of activities	Level of satisfaction	Before the project	During the project	After the project
Collection of water fee	Unsatisfactory	100.0	57.2	57.2
	Fairly satisfactory	0.0	21.4	14.3
	Satisfactory	0.0	21.4	21.4
	Highly satisfactory	0.0	0.0	7.1
Collection of maintenance fee	Unsatisfactory	100.0	7.2	0.0
	Fairly satisfactory	0.0	71.4	21.4
	Satisfactory	0.0	21.4	71.4
	Highly satisfactory	0.0	0.0	7.2
Collection of other fees (fines levied)	Unsatisfactory	100.0	21.4	7.2
	Fairly satisfactory	0.0	42.9	21.4
	Satisfactory	0.0	35.7	71.4
	Highly satisfactory	0.0	0.0	0.0
Financial management	Unsatisfactory	100.0	7.2	0.0
	Fairly satisfactory	0.0	71.4	35.7
	Satisfactory	0.0	21.4	57.1
	Highly satisfactory	0.0	0.0	7.2

Source: Beneficiary Survey

Table 9: Evaluation by Kentri Michael WUC on Membership Fees and Financial Management (%)

List of activities	Level of satisfaction	Before the project	During the project	After the project
Collection of water fee	Unsatisfactory	100.0	0.0	21.4
	Fairly satisfactory	0.0	78.6	7.1
	Satisfactory	0.0	21.4	71.4
	Highly satisfactory	0.0	0.0	0.0
Collection of maintenance fee	Unsatisfactory	100.0	0.0	35.7
	Fairly satisfactory	0.0	28.6	28.6
	Satisfactory	0.0	71.4	35.7
	Highly satisfactory	0.0	0.0	0.0
Collection of other fees (fines levied)	Unsatisfactory	100.0	0.0	42.9
	Fairly satisfactory	0.0	50.0	35.7
	Satisfactory	0.0	50.0	21.4
	Highly satisfactory	0.0	0.0	0.0
Financial management	Unsatisfactory	100.0	0.0	0.0
	Fairly satisfactory	0.0	28.6	57.1
	Satisfactory	0.0	71.4	42.9
	Highly satisfactory	0.0	0.0	0.0

Source: Beneficiary Survey

In addition, both WUAs of Badegosa and Kentri Michael were upgraded to WUCs and

became able to access external funding. They opened bank accounts and invested in the Water Users' Union (WUU) collectively.

3) Output 3

Through the implementation of the project, the following results were achieved for output 3:

a) WHT, including a pond, tank and shallow well, was standardized as an appropriate technology in the project area and they were constructed at the model farms.
b) The guideline, technical manual and Q&A on WHT were prepared.
c) WHT was extended from the model farmers to other farmers in the vicinity through exhibition events and daily practice.

Details of WHT by type, location and activity are shown in Table 10.

Table 10: Water Harvesting Technology at Model Farms (No. of households)

Type	Location (Woreda)			Activity		Total
	Adami Tulu	Dodota Shire	Merti	Construction	Rehabilitation	
Pond	4	5	6	1	14	15
Tank	2	4	4	4	6	10
Shallow well	2	0	0	2	0	2
Total	8	9	10	7	20	27

Source: Prepared by the evaluator based on JICA-provided materials

To prepare the guideline, technical manual and Q&A, the Japanese experts and counterparts developed drafts through on-the-job training (OJT), reflecting their experience, opinions as well as technical conditions in the field. They validated the utility of the drafts in the field as a trial. To finalize the guideline, all stakeholders were invited to a workshop in Addis Ababa to give comments and suggestions. Through this OJT process, the counterparts, who had been passive initially due to their limited experience in guideline preparation, participated actively in the work and acquired the capacity to develop practical contents of the guideline based on practice in the field. The guideline, technical manual and Q&A on WHT were finalized before the project completion.

During the project, model farmers were provided with a treadle pump, drip irrigation kits, plastic sheets and vegetable seeds as well as technical training on how to use them. Periodical monitoring by the implementing agency was also conducted. Table 11 shows the monitoring results for 23 of 27 model farmers during the project. The results show that although (1) 21 farmers irrigated their farms using WHT in both January 2007 and 2008, there were several problems in 2007 such as (2) drip irrigation kits were hardly used, and (4) half of them did not remove litter and mud from WH. The scope of the

project thus included the training on operation and maintenance of WH. This training convinced more farmers of the importance of operation and maintenance and the monitoring results in 2008 were improved as shown in Table 11.

Table 11: Application, Operation and Maintenance of WHT (No. of farmers)

Item	January 2007		January 2008	
	Yes	No	Yes	No
(1) Did you irrigate your farm using WHT?	21	1	21	0
(2) Did you use drip irrigation kits?	8	14	14	7
(3) Did you use a lifting device (treadle pump)?	16	4	15	3
(4) Did you remove litter and mud from WH?	10	11	10	10
(5) Did you remove litter and mud from the silt trap and waterway?	14	7	18	2

Source: Prepared by the evaluator based on JICA-provided materials

Table 12 shows the result of the beneficiary survey conducted for 24 model farmers on the extension of WHT to other farmers in the project area. All model farmers accepted the visitors from the neighborhood, who expressed high interests in WHT. In addition, 22 of 24 farmers answered that they had disseminated the knowledge obtained from the project to others. According to the interview with the counterpart in Merti district, it emerged that eight farmers in the project area had newly introduced WHT.

Table 12: Extension of WHT from Model Farmers to Other Farmers (No. of farmers)

Item	Yes	No
(1) Did you have a visitor to your farm?	24	0
(2) Did the person who came to see the WH facility want WH?	24	0
(3) Did the person who visited the WH facility want to receive training?	24	0
(4) Have you disseminated the knowledge obtained from the project to others?	22	2

Source: Beneficiary Survey

During the initial stage of the project, the objective was to utilize WHT for small-scale irrigation farming, particularly vegetable production. However, according to the interview with the beneficiaries and field observation, it was clear that the objective of WHT had changed to include the multi-purpose utilization of water in their daily activities, such as fruit production, nursery preparation, drinking water for livestock, and supplementary irrigation for crops.

4) Output 4

The project has helped improve farming technology by agricultural training for WUC/WUA and model farmers and experiments in water-saving technology in the project area where outputs 1 to 3 had been achieved.

The experiment on water-saving technology in Adami Tulu demonstrated the effects on the growth of crops and an appropriate amount of water in soil by crop and irrigation type and space. In addition, the experiment verified the effectiveness of evaporation control technology using plastic sheets, foam polystyrene, and furrow irrigation. Based on these experiments, crop calendars and leaflets on the necessary amount of water per crop such as onion and tomato were prepared and utilized in the farmers' training. In Arata Chufa WUC, the crop calendar and other information/data on farming were displayed on the wall at the WUC office, visible to all members at any time.

Training on gravity force irrigation related to output 1 included five areas such as organizational management, irrigation water management, irrigation facility management, irrigation farming technology and financial management for WUC. According to the beneficiary survey of 30 members in the Ketar WUC and 42 members in the Arata Chufa WUC, 89.0% of Ketar and 58.6% of Arata Chufa members participated in the training in all five areas. Table 13 shows the extent to which the knowledge and techniques acquired from the training were effective in managing the irrigation scheme.

Table 13: Extent of Utilization of Training on Gravity Force Irrigation

Training Area	Extent of Utilization	Ketar I, II, III (%)	Arata Chufa (%)	Example of Utilization
Organizational Management	(1) Less	15.0	0.0	・Increased number of members
	(2) To some extent	37.5	31.2	・Improved awareness of the WUC rules
	(3) Very much	47.5	68.8	・Compliance with regulation
Irrigation Water Management	(1) Less	19.5	0.0	・Water sharing (by shift), fair distribution of water
	(2) To some extent	46.3	36.8	・Irrigation scheduling
	(3) Very much	34.2	63.2	・Saving water
Irrigation Facility Management	(1) Less	14.6	0.0	・Preventing structural damage
	(2) To some extent	53.7	16.7	・Periodical maintenance of canal
	(3) Very much	31.7	83.3	・Sense of ownership is existing
Irrigation Farming Technology	(1) Less	39.0	0.0	・Control of excess irrigation water
	(2) To some extent	29.3	27.8	・Use of the furrow irrigation method
	(3) Very much	31.7	72.2	

Financial Management	(1) Less	10.0	0.0	・Auditing the income of WUC
	(2) To some extent	47.5	31.2	・Savings in bank and buying shares from union
	(3) Very much	42.5	68.8	・Wise use of income generated from irrigation

Source: Beneficiary Survey

The above result shows that despite the variability in Ketar, on average, more than 80% answered that they had utilized the training “to some extent” or “very much”. In Arata Chufa, all members answered that they had utilized all training “to some extent” or “very much”. Examples of utilization included increased number of WUC members, improved awareness of the WUC rules, fair distribution of irrigation water, preparation of an irrigation schedule, preventing structural damage, periodical maintenance of the canal, control of excess irrigation water, auditing the income of WUC, savings in the bank and wise use of income generated from irrigation.

In relation to output 2, a series of training for WUC was one of the factors contributing to strengthen the organization and improve the management of small-scale irrigation schemes in Badegosa and Kentri Michael. The contents of the training included the same five areas as for gravity force irrigation. According to the beneficiary survey for 14 members in Badegosa WUC and Kentri Michael WUC respectively, all of them participated in the training in all five areas. Table 14 shows the extent to which the knowledge and techniques acquired from the training were effective in managing the irrigation scheme.

Table 14: Extent of Utilization of Training on Small-Scale Pump Irrigation

Training Area	Extent of Utilization	Badegosa (%)	Kentri Michael (%)	Example of Utilization
Organizational Management	(1) Less	0.0	0.0	・Improved awareness of the WUC rules
	(2) To some extent	40.0	21.4	・Compliance with regulation
	(3) Very much	60.0	78.6	
Irrigation Water Management	(1) Less	10.0	0.0	・Irrigation scheduling
	(2) To some extent	20.0	14.3	・Improvement of water distribution
	(3) Very much	70.0	85.7	・Saving water
Irrigation Facility Management	(1) Less	0.0	0.0	・Periodical maintenance of canal
	(2) To some extent	55.6	21.4	・Collaborating with committee for maintenance work
	(3) Very much	44.4	78.6	・Sense of ownership is existing
Irrigation	(1) Less	0.0	0.0	・Control of excess irrigation water

Farming Technology	(2) To some extent	44.4	21.4	・Use of the furrow irrigation method
	(3) Very much	55.6	78.6	・Use of improved agricultural inputs
Financial Management	(1) Less	0.0	0.0	・Auditing the income of WUC
	(2) To some extent	57.1	21.4	・Savings in bank
	(3) Very much	42.9	78.6	・Collective investment in Union

Source: Beneficiary Survey

The above result shows that in Badegosa, except for training on irrigation water management, all members answered that they had utilized the training "to some extent" or "very much". In Kentri Michael, all members answered that they utilized all training "to some extent" or "very much". The examples of utilization were almost the same as for gravity force irrigation, but they also included collaboration with the WUC committee for maintenance work, the use of improved agricultural inputs and collective investment in the union.

In relation to output 3, the project conducted training on WHT such as facilities, materials and equipment, operation and maintenance of the drip irrigation system, nursery preparation, nursery growing, prevention of crop diseases, water-saving technology and marketing. According to the monitoring for model farmers in January 2007 and 2008, all farmers answered that they had utilized the knowledge and techniques acquired through the training.

In summary, outputs 1, 2, 3 and 4 were generally achieved.

3.2.1.2 Achievement of Project Objectives

Three indicators were set during the Progress Review Mission in March 2007 for the Project Objective of "water utilization technology is improved by the farmers in the project target area".

1) Indicator 1: The guidelines were authorized by OWRB.

According to the interview with the OWMEB headquarters and JICA-provided materials, the guidelines (in English) were authorized by OWRB and distributed to all stakeholders such as the Zone and Woreda office. The guidelines in Oromo were also prepared, but not finalized and authorized even at the time of this evaluation.

2) Indicator 2: OWRB staff understand the guidelines.

According to the interview with OWMEB headquarters and JICA-provided materials, not only the counterpart of OWRB but also high level officials understood the guidelines. They discussed the contents of the guidelines and revised them many times before the authorization procedure.

3) Indicator 3: The guidelines were applied to other projects implemented by OWRB. (After April 2008)

According to the JICA-provided materials, the guidelines were applied to other projects by OWRB staff. In addition, the results of the beneficiary survey on improvement of irrigation water utilization are shown in Table 15. The survey focused on the changes in improvement from 2004 and 2008 to 2012.

Table 15: Improvement in Irrigation Water Utilization by Beneficiaries (%)

Item	Evaluation	Gravity Forced Irrigation		Small scale pump irrigation		WHT		average
		during IFI	After IFI	during IFI	After IFI	during IFI	After IFI	
Change in availability of water	Decreased	0.0	0.0	0.0	0.0	0.0	3.7	20.5
	No Change	12.6	15.5	32.1	7.1	16.7	42.6	
	Increase less than by 100%	66.8	32.7	64.3	85.7	79.6	37.0	79.5
	Double or more than 100%	20.6	51.8	3.6	7.1	3.7	16.7	
Change in adequacy of water to meet the demand	Decreased	0.0	0.0	0.0	0.0	0.0	5.6	25.6
	No Change	11.5	28.6	32.1	17.9	33.3	51.8	
	Increase less than by 100%	73.4	25.6	64.3	67.9	53.7	38.9	74.3
	Double or more than 100%	15.1	45.8	3.6	14.3	13.0	3.7	
Change in multiple use of water	Decreased	0.0	0.0	0.0	0.0	0.0	5.6	29.8
	No Change	13.4	0.0	50.0	32.1	25.9	37.0	
	Increase less than by 100%	83.0	50.1	39.3	60.7	70.4	42.6	70.2
	Double or more than 100%	3.7	49.9	10.7	7.1	3.7	14.8	

Source: Beneficiary Survey

The above result shows that more than 70% of farmers on average increased 1) the available amount of irrigation water, 2) the adequacy of the irrigation of water to meet demand, and 3) the multiple use of irrigation water.

For gravity force irrigation, more than 80% of farmers on average answered that all three items “increased by less than 100%” or “by double or more than 100%” during the project.

For small-scale irrigation, approximately 68% answered that they increased the available water and adequacy of water during the project. After the project, they increased further due to the expansion of the irrigated area by extending the waterway.

For WHT, it is noted that the available amount of water increased approximately 83%

and the multiple use of water increased approximately 74% during the project. After the project, the results differed by location since the model farmers had differing levels of techniques, economic conditions as well as geological conditions. In the farms where the results worsened after the project, there were some problems. For example, the tank had cracks due to the soil condition; wild animals drunk water from the facilities and damaged the plastic sheets due to the lack of a fence; and litter and mud had accumulated in the silt trap and waterway.

In summary, the project has largely achieved its objectives; therefore its effectiveness is high.

3.2.2 Impact

3.2.2.1 Achievement of Overall Goal

Two indicators were set during the Progress Review Mission in March 2007 for the Overall Goal of “the agricultural production in the project target area is increased” despite no numerical target.

1) Indicator 1: Production of major products is increased in the project area.

Tables 16 and 17 show that the production of major crops increased by 33.0% for cereals and 20.27% for pulses in the East Shewa Zone and 24.46% for cereals and 46.06% for pulses in the Arsi Zone. Vegetable production decreased by 16.37% in the East Shewa Zone, but tomato production increased by 34.28%. In the Arsi Zone, the only existing data on vegetable production was for cabbage, which increased by 200.23%.

2) Indicator 2: Productivity of major products increased in the project area.

Tables 16 and 17 also show that the productivity of major crops increased by 37.87% for cereals and 48.31% for pulses in the East Shewa Zone and 21.97% for cereals and 20.66% for pulses in the Arsi Zone. Vegetable production increased by 10.64% in the East Shewa Zone, and tomato’s productivity in particular increased by 25%. In the Arsi Zone, the productivity of cabbage increased by 269.82%.

Table 16: Production and Productivity of Major Products in the East Shewa Zone

	Production (Quintals)			Yield (Qts/Ha)		
	2004/2005 (Before)	2010/2011 (After)	% Change	2004/2005 (Before)	2010/2011 (After)	% Change
Cereals	*4,832,714.00*	*6,430,929.92*	*33.07*	*13.25*	*18.26*	*37.87*
Teff	1,478,455.00	2,705,783.74	83.01	10.89	13.95	28.10
Barley	230,022.00	132,926.51	-42.21	12.69	12.47	-1.73
Wheat	1,173,242.00	978,164.14	-16.63	15.84	17.77	12.18
Maize	1,786,387.00	2,123,351.55	18.86	15.95	23.90	49.84
Sorghum	136,903.00	489,115.77	257.27	10.86	23.22	113.81
Pulses	*928,580.00*	*1,116,800.30*	*20.27*	*11.42*	*16.94*	*48.31*
Faba Beans	118,919.00	163,673.43	37.63	16.53	16.83	1.81
Field Peas	109,945.00	47,714.69	-56.60	13.44	16.85	25.37
Haricot beans	463,307.00	366,297.37	-20.94	10.45	17.07	63.35
Chick-Peas	153,482.00	340,707.34	121.99	10.11	19.73	95.15
Lentils	18,779.00	145,073.38	672.53	8.31	14.53	74.85
Grass Peas	55,660.00	51,340.10	-7.76	9.69	16.63	71.62
Vegetable	*217,232.00*	*181,673.36*	*-16.37*	*92.13*	*101.92*	*10.64*
Cabbage	101,226.00	72,147.92	-28.73	104.84	99.75	-4.86
Tomato	54,408.57	73,058.84	34.28	89.2	111.50	25.00
Green pepper	39,137.00	6,338.38	-83.80	105.86	92.01	-13.08
Garlic	14,363.00	5,643.10	-60.71	123.63	124.38	0.61

Source: Central Statistical Agency

Table 17: Production and Productivity of Major Products in the Arsi Zone

	Production (Quintals)			Yield (Qts/Ha)		
	2004/2005 (Before)	2010/2011 (After)	% Change	2004/2005 (Before)	2010/2011 (After)	% Change
Cereals	*8,518,016.00*	*10,601,811.61*	*24.46*	*16.66*	*20.33*	*21.97*
Teff	659,018.00	1,046,917.05	58.86	8.96	12.71	41.85
Barley	2,178,664.00	2,450,044.91	12.46	18.81	23.75	26.26
Wheat	3,805,387.00	4,385,515.72	15.24	20.63	21.94	6.35
Maize	1,505,615.00	1,772,403.78	17.72	20.03	24.69	23.27
Sorghum	329,975.00	931,068.98	182.16	15.94	27.46	72.27
Oats	39,357.00	15,861.17	-59.70	15.61	11.40	-26.97
Pulses	*674,639.00*	*985,351.22*	*46.06*	*12.41*	*14.97*	*20.66*
Faba Beans	384,604.00	632,778.12	64.53	17.72	18.77	5.93
Field Peas	125,194.00	186,550.88	49.01	13.96	12.95	-7.23
Haricot beans	117,651.00	125,645.09	6.79	9.48	14.72	55.27
Lentils	13,491.00	12,864.52	-4.64	8.46	9.98	17.97
Vegetable	*333,806.18*	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*
Cabbage	22,374.58	67,174.53	200.23	28.00	103.55	269.82
Tomato	211,329.63	N/A	N/A	78.00	N/A	N/A
Red pepper	75,836.98	N/A	N/A	17.70	N/A	N/A

Source: Central Statistical Agency

It is noted that existing data concerning the production and productivity of major products covered only the Zone levels and no specific data was available at Woreda or village levels, making it difficult to analyze the causal relationship between the project contributions to the existing data. Considering the numbers of project beneficiaries, the data at Zone levels were excessive.

It emerged that the majority of farmers in the project area became able to harvest twice or three times a year, including dry seasons. For example, according to the interview with Badegosa and Kentri Michael, the WUC members who produced only maize during rainy seasons before the introduction of the small-scale pump, they could produce various products such as onions and tomatoes after its introduction, hence it can be assumed that the production of major products increased in the project area.

In addition, the results of the beneficiary survey on the change in production of major crops by irrigation scheme at the time of this evaluation were shown in Table 18. The survey compared the production of crops and vegetable produced in 2004 and 2011, since the beneficiaries grow various products.

Table 18: Change in Production in the Project Area (before and after comparison) (%)

	Gravity Force Irrigation		Small Pump Irrigation		WHT		
	KetarI,II,III	Arata Chufa	Badegosa	Kentri Michael	Adami Tulu	Dodota Shire	Merti
Decreased	4.8	0.0	0.0	0.0	0.0	0.0	0.0
No Change	2.4	0.0	0.0	14.3	33.3	33.3	33.3
Increase less than by 100%	19.0	48.1	78.6	78.6	33.3	50.0	33.3
Double or more than 100%	73.8	51.9	21.4	7.1	33.3	16.7	33.3

Source: Beneficiary Survey

Consequently, the production by beneficiaries increased by more than 90% for gravity force irrigation, more than 85% for small-scale pump irrigation and more than 65% for WHT on average. In particular, 73.8% in Ketar I, II, III and 51.9% in Arata Chufa answered that their production had more than doubled (100%), which was much higher than the average increase in 47.1% at the Zone level. The reasons for this high increase were: the irrigated area was expanded by rehabilitation work of the project; and more products could be produced by irrigation during dry seasons and supplementary irrigation during rainy seasons. In addition, as shown by Table 15, the use of irrigation water was continued and established by the beneficiaries after the project.

In summary, the overall goal was largely achieved for its target indicators, therefore its impact is high.

3.2.2.2 Other Impacts

The interview with OWMEB headquarters revealed that the guideline on gravity force irrigation was used by its staff for other rehabilitation projects such as Sara Weyba and Sogido. According to OWMEB Zone office, several international organizations such as IFAD, FAO, and NGO also recognized that the guideline was useful.

Regarding the impact on the natural environment, the terminal evaluation report pointed out concern that the level of groundwater would decline in areas where the massive introduction of small-scale pumps was encouraged. According to OWMEB at the time of this evaluation, there was no accurate data on the level of groundwater and the concern remained. In the near future, a boring survey will be conducted at dozens of sites around Meki.

In addition, during the terminal evaluation it was also pointed out that the farmers who lived downstream of the irrigated area might suffer from water shortages. However, there has been no conflict between the WUC/WUA, since no one lived immediately downstream of Ketar and Arata Chufa.

Another indirect impact includes the diversification of crops in the project area. According to the beneficiary survey, all answered that they had increased the type of products by two or more, which means that the introduction and improvement of irrigation technology and irrigation farming training under the project enabled the farmers to produce cash crops such as tomato and onions as well as major crops such as maize and teff.

In short, the evaluation results of the effectiveness and impact indicate that the project has largely achieved its objectives by preparing guidelines on small-scale irrigation, and has achieved its overall goal; therefore its effectiveness is high.

3.3 Efficiency (Rating: ③)

3.3.1 Inputs

The planned and actual inputs of the project are shown in the table below.

Japanese side	Planned	Actual
Total cost	350,000,000 Japanese Yen	295, 840,000 Japanese Yen
Duration	September 2005 to September 2008 (3 years)	September 2005 to September 2008 (3 years)
Dispatch of Japanese Experts	Long-term Expert: 2 positions (Chief Advisor/Irrigation Facilities, and Coordinator/Farmer Organization)	Long-term Expert: total of 4 persons in three positions (Chief Advisor/Irrigation Facilities, Coordinator/Farmer Organization, and Design/Construction Management)

	Short-term Expert: 2 to 3 persons per year as required	Short-term Expert: total of 17 persons
Counterpart training in Japan	3 persons per year Fields of training: undecided	Total of 12 persons Fields of training: small-scale irrigation management, sustainable water resource development in terms of agricultural and rural development
Counterpart training in third countries	Fields of training: undecided	Fields of training: small-scale irrigation management (Morocco)
Equipment	Decided through discussion with the Ethiopian side	25,010,000 Japanese Yen
Local operation cost	Provision of local operation cost	38,350,000 Japanese Yen
Others	Rehabilitation of existing irrigation schemes	None
Ethiopian side	Planned	Actual
Assignment of counterparts	Project Director, Project Manager, staff of Irrigation, Agricultural Production, and Cooperative Department in OWRB and staff of Agricultural and Rural Development Department in East Shewa and Arsi Zone offices	Total of 39 persons
Land and facilities	Provision of the necessary facilities	Project office space
Others	Provision of local operation cost	None

3.3.1.1 Elements of Inputs

Regarding the inputs from the Japanese side, a long-term expert (Design/Construction Management) and some short-term experts were additionally dispatched for the following reasons, which were relevant: 1) At the project planning stage, the level of targets for the project objective and outputs were unclear, 2) The scale of the project (e.g. the number of target areas, cooperatives, and farmers) were undecided initially; 3) Two long-term experts were insufficient to cover four outputs of the project with a wider scope; and 4) New activities, such as flood irrigation, were added to the project during the project review mission.

However, due to the delay in dispatching short-term experts, the project activities, which were closely linked with a seasonal cropping calendar at the field level, were also delayed. During this evaluation, counterparts of OWMEB pointed out that some of the activities had not been efficiently implemented due to the delay in dispatching short-term experts.

Regarding the inputs from the Ethiopian side, only six of thirty-nine counterparts (one at the headquarters and five at Woreda offices) had been engaged in the project activities throughout the project period. This was due to frequent personnel transfers due to continuous organizational changes, hence the project could not effectively materialize the

technical transfer to counterparts or be smoothly facilitated. In addition, the delay in the project activities was significant due to the limited number of counterparts. The Japanese side consulted with the Ethiopian side to improve the situations but the situation did not improve significantly. Some of the activities in the Project Design Matrix (PDM), such as support for the Water Users' Association (WUA) for cooperative registration, were deleted since the responsible department was transferred to another organization due to organizational changes.

Details of the frequent organizational changes were as follows. Initially, the former Oromia Irrigation Development Authority (OIDA) was established as an institution to develop irrigation schemes at a state level in 1999. Subsequently, in December 2004, OIDA was merged into the Oromia Agricultural and Rural Development Bureau (OARDB); a project which started after the merger. Then, OIDA was re-established as an independent authority in October 2005. Through this process, the department of construction was separated from the authority and became a private company. OIDA focused on strategy formulation, research and planning. In December 2007, however, OIDA was re-merged into the Oromia Water Resource Bureau (OWRB). In this process, the agricultural department of OIDA was merged into OARDB. Several organizational changes were implemented even after the project completion. The irrigation section is now under the Oromia Water and Mineral, Energy Bureau (OWMEB) and the agricultural section is under the Oromia Agricultural Bureau (OAB).

As inputs to rehabilitate existing irrigation schemes, the Ethiopian side provided labor, sand and gravel and the Japanese side provided other materials.

3.3.1.2 Project Cost

The total cost of the project was lower than planned. Although the Ethiopian side could not fund the local operation cost, they could provide a project office space, utility cost for the office, and salaries of counterparts.

3.3.1.3 Period of Cooperation

The duration of the project was three years as planned.

In short, the efficiency of the project is high since the inputs were appropriate for producing outputs and achieving the project objective, and both project cost and period of cooperation were as planned. However, there were some issues such as the delay in dispatching short-term experts and the delay in activities caused by frequent transfers and shortage of Ethiopian counterparts due to frequent organizational changes.

3.4 Sustainability (Rating: ②)

3.4.1 Related Policy towards the Project

According to interviews at the headquarters of OWMEB, the Oromia regional government is planning to prioritize rehabilitation of gravity irrigation schemes, small-scale pump irrigations, and large-, medium-, and small-scale irrigation development, including WHT, to a greater extent. The Fourth National Five-year Development Plan (Growth and Transformation Plan 2010/2011-2014/2015) stated the following challenges: 1) agricultural development is one of the main measures to achieve economic development, 2) the government will further prioritize the expansion of small-scale irrigation to improve food security and materialize crop diversification, 3) the government should also prioritize medium- and large-scale development to the same extent, and 4) the government will strive to improve productivity and increase cash crop production by disseminating successful cases of model farmers to neighboring farmers. It was assumed that the government would continue to further prioritize policies and institutional arrangements for food security, improvement of agricultural productivities, and irrigation development.

3.4.2 Institutional and Operational Aspects of the Implementing Agency

After the project completion, the irrigation section of OWRB was merged into the department of Irrigation Water Supply and Land Drainage of OWMEB and the agricultural section of OWRB was also merged into OAB. The organogram of OWMEB at the time of this evaluation was shown as figure 1.

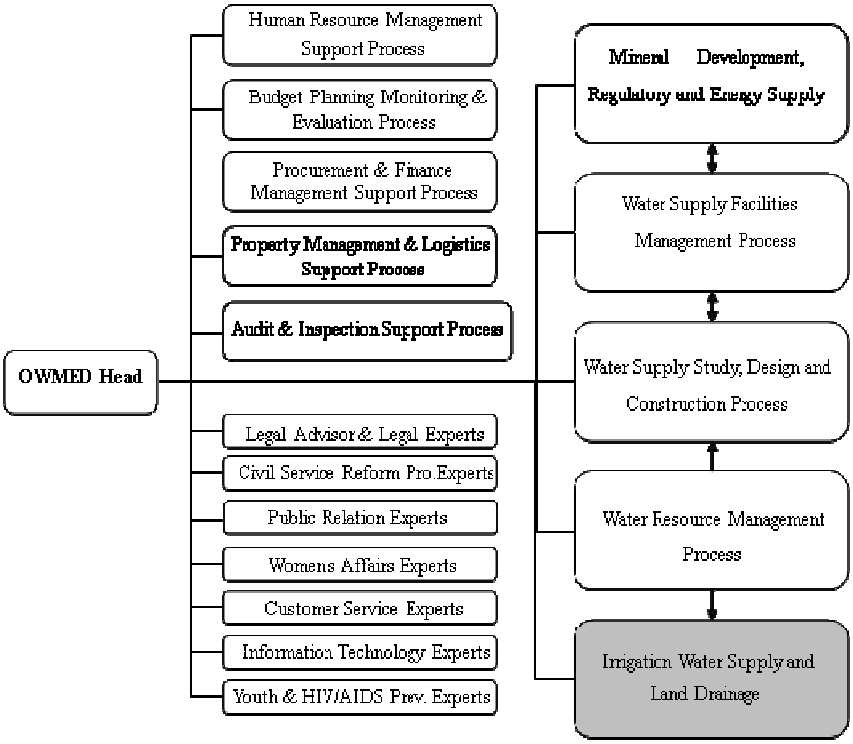

Figure 1: Organogram of OWMEB

Source: OWMEB

During the evaluation, it was identified that under the collaboration system between OWMEB and OAB in terms of extension activities for irrigated agriculture and planning, implementation and evaluation of farmer training had been maintained since after the project completion. Woreda staff and extension officers were closely collaborating to implement activities on the ground. A collaboration system has been maintained for the following reasons: 1) The staff of OWMEB and OAB could easily share information and hold meetings because the two organizations were in the same compound and 2) many staff of OWMEB and OAB could understand the roles of both organizations since they had been frequently transferred among these organizations. It was relatively easy for them to collaborate based on their roles and responsibilities.

The headquarters of OWMEB and Zone offices, however, rarely conducted regular monitoring after the project and could not determine the real situations on the ground. This is because there was no responsible section for monitoring in the organizations. In addition, daily and accommodation allowances set by the government were too small (i.e. 70 and 90 Birr, respectively) to cover the necessary expenses for field trips. Many of the headquarters staff were unwilling to visit fields because they had to cover their own costs even though they stayed in ordinary (not luxurious) accommodation near the fields.

Conversely, Woreda staff were well aware of the circumstances at field level since they had more opportunities to meet and discuss with the WUA/WUC and farmers during the daily field visits.

Table 19 shows the number of OWMEB staff members (plan and current status). The ratios of occupied to planned posts at the headquarters and East Shewa and Arsi zones were 59, 63, and 29%, respectively. The main reason for the low occupancy rates might be the low salary of public servants. Persons working in the private sector may obtain more than ten times the salary compared to that of public servants with equivalent capacities and experience. Accordingly, public servants frequently make job transfers, which may adversely affect the sustainability of staff (counterpart) assignment.

Table 19: Number of OWMEB Staff Members (Plan and Current Status)

No	Qualification	Bureau level		Zone level		
		Plan	Current Status	Plan	Current Status	
					East Shewa	Arsi
1	Process Owner	1	1	1	1	0
2	Engineer	10	5	7	7	4
3	Hydro geologist	2	0	1	0	0
4	Geologist	2	1	1	0	0
5	Agronomist	2	2	1	2	1
6	Environmentalist	2	2	1	0	1
7	Soil Expert	2	0	1	0	0
8	Soil Laboratory Technician	2	0	0	0	0
9	Socio Economist	2	1	1	1	0
10	Sociologist	2	1	1	1	0
11	Surveyor	4	3	3	1	1
12	Mechanical Engineer	1	0	0	0	0
13	Mechanic	0	0	1	0	0
14	CAD Expert	3	3	1	1	0
15	GIS Expert	1	0	1	0	0
16	Process Assistant	1	1	1	0	0
17	Irrigation Planning Expert	1	2	1	0	0
18	Documentation &Information Center Expert	1	1	1	1	0
	Total	39	23	24	15	7
	% from the plan	-	59%	-	63%	29%

Source: OWMEB

As pointed out in the recommendations of the terminal evaluation of the project, the institutional sustainability of OWMEB was crucial. Several organizational changes had been carried out since the project completion and there are some possibilities that

OWMEB might be changed to an independent authority in the near future like the former OIDA. The institutional sustainability of the headquarters should be considered very carefully.

3.4.3 Technical Aspects of the Implementing Agency

At the beginning of the project, there were no appropriate technical guidelines for the rehabilitation of gravity irrigation schemes and WHT, hence these were developed as part of the project by developing the capacity of counterparts. During this process, basic knowledge and skills to develop the irrigation of the region were accumulated and utilized by the counterparts.

According to interviews with Zone and Woreda offices during this evaluation, the guideline for rehabilitation of gravity irrigation schemes was utilized by the counterparts at Zone and Woreda levels rather than those at OWMEB headquarters. The fourteen-page guideline described the general flow of the rehabilitation process and had been utilized as a basic reference document. The guideline is suitable for determining the overall rehabilitation process and was not intended to be used by each process.

In addition, during the interviews, the counterparts of OWMEB mentioned the need to review and revise the WHT guideline based on the present conditions on the ground. For example, they were examining the feasibility of adding a new technology to flood diversion apart from existing technologies such as water ponds, tanks and shallow wells.

It was also identified that the number of guidelines distributed was limited and those already distributed were taken away by some staff who were transferred and resigned, leaving many staff unable to access the guidelines. Since new staff were unaware of the background to the project, they could not understand the contents of the guidelines very well if they only read them without lectures. Thus, new staff needed periodic training to understand the contents of the guidelines precisely.

The Project for Capacity Building in Irrigation Development, the successor to this project, includes plans to develop a design and construction manual for irrigation schemes, which describes the detailed methodologies and procedures for irrigation development from technical perspectives with references to existing guidelines.

3.4.4 Financial Aspects of the Implementing Agency

Even after the project completion, the Oromia regional government has been allocating funds for irrigation development. Table 20 shows the total budget of OWMEB from the project completion (2008) to the year in which the evaluation was conducted (2011). The total budget has tended to increase from 10 to 30% per year except 2010, so there seems to be no serious issue in terms of the financial sustainability of OWMEB.

Table 20: Total Budget of OWMEB

Unit: Ethiopian Birr

	2008	2009	2010	2011
Total budget	180,440,000.00	200,500,000.00	174,996,512.20	231,797,570.00

Source: OWMEB

Table 21 indicates the Oromia regional irrigation development plan (construction/ development) and its budget prepared by OWMEB. OWMEB gives balanced focuses and budget allocations for small-, medium- and large-scale irrigation development over the next three years, hence the level of financial sustainability for small-scale irrigation development seems high.

Table 21: Irrigation Development Plan in Oromia State (Construction/Development)

Scale	Details	Year			Sub-total
		2012	2013	2014	
Small	Number of projects	27	31	36	94
	Planned irrigated areas (ha)	3,240	3,740	4,320	11,300
	Number of beneficiaries	9,720	11,220	12,960	33,900
	Budget (sub-total, unit Birr)	97,200,000	112,200,000	129,600,000	339,000,000
Medi-um	Number of projects	8	10	4	22
	Planned irrigated areas (ha)	8,562	8,350	6,755	23,666
	Number of beneficiaries	25,686	25,049	20,264	70,998
	Budget (sub-total, unit Birr)	287,132,500	264,872,500	248,200,000	800,205,000
Large	Number of projects	2	2	1	5
	Planned irrigated areas (ha)	8,884	8,409	8,409	25,702
	Number of beneficiaries	26,652	25,227	25,227	77,106
	Budget (sub-total, unit Birr)	222,472,500	208,203,000	208,203,000	638,878,500
Total	Number of projects	37	43	41	121
	Planned irrigated areas (ha)	20,686	20,499	19,484	90,118
	Number of beneficiaries	62,058	61,496	58,451	270,354
	Budget (sub-total, unit Birr)	606,805,000	585,275,500	586,003,000	2,710,928,500

Source: OWMEB

3.4.5 Continuity of Effectiveness / Impact

The activities for gravity irrigation rehabilitation, pump irrigation, WHT, and farm operation training have continued but the sustainability of their impacts varies as shown in the evaluation results displayed in Tables 6, 7, 8, 9, and 15.

Based on the results of field observation and interviews with the WUA/WUC, the

impacts of gravity irrigation rehabilitation and pump irrigation are relatively high since cash crop productions in dry season have been expanding at the target areas of both activities. The positive factor boosting the sustainability of both activities is the fact that the operation, management, and rehabilitation of gravity irrigation scheme and pump irrigation have been performed using the in-house funds of the WUA/WUC. A small pump owned by the Badegosa WUA was not functioning when this evaluation was conducted, but repair of the pump had just finished at the workshop near the association. The repair charge was covered by the own funds of the association. During the repair of the pump, pump irrigation was continued by utilizing a personal pump owned by a member of the association.

(The pump provided by the project was repaired) (A pump owned by members was used while the pump was being repaired)

The Arata Chufa WUA became a successful model case in the Arsi Zone and was awarded “Best of UWC” from IFAD in December 2011. The association enhances the awareness of its membership through monthly meeting and the preparation of meeting minutes, preparation of data display for presentation (e.g. data on membership and irrigation farming plans), and active information sharing when participating in training activities. To disseminate the activities of the Arata Chufa WUA as a model case of Oromia state, OMWEB conducted a study visit to the association; aiming to exchange views and observe situations, as one of the activities of The Project for Capacity Building in Irrigation Development in February 2012.

It was very difficult to measure the success and failure of WHT activities. This was because 1) the continuation of activities varies from farmer to farmer based on their level of operation and management skills and financial status and 2) no continuous training and monitoring was performed by OWMEB.

Regarding the use of the guidelines developed under the project, the guideline for gravity irrigation schemes was widely used, even in other areas. The guidelines could be

used to an even greater extent if more copies were distributed among all government staff, including new ones and periodical training was conducted for the staff.

In summary, the sustainability of the project effects was fair since there was a slight problem with the institutional arrangements of OWMEB and the deployment of the counterpart staff.

4. Conclusion, Lessons Learned and Recommendations

4.1 Conclusion

The project has helped improve water utilization technology in the target area in Ethiopia, where the people were dependent on traditional farming technology and rain-fed agriculture.

To summarize the evaluation results, the project was highly relevant with the country's development plan, development needs, as well as Japan's ODA policy, therefore, its relevance was high. Its effectiveness was also high, since the project outputs and objective were achieved. Despite concern that the level of groundwater would decline in areas where the massive introduction of small-scale pumps was encouraged, several positive impacts have been identified such as the diversification of crops and increase in double or triple cropping, including dry season. As far as the project inputs are concerned, the schedule for the dispatch of the Japanese experts should have been improved following the activity on the ground. In addition, the shortage and frequent turnover of counterpart personnel have adversely affected the activity schedule. However, in general, its efficiency was high since the project cost and cooperation period were as planned. Its sustainability was also fair, because the irrigation farming was continued by the Water Users' Cooperatives (WUC) and farmers, despite concern over the sustainability of the implementation structure due to the possibility of government structural reform.

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

4.2 Recommendations

4.2.1 Recommendations to the Executing Agency

1) Recommendation 1: Establishment of a Website for Sharing References and Information

It is expected that an official website will be established by OWWEB for stakeholders to download results and products, including guidelines and related data. The guidelines, leaflets, and crop calendars were highly evaluated by Woreda officials. However, they are likely to have suffered from substandard distribution and vanished with the change of personnel. Henceforth, to revise and append for various purposes, it is expected that stakeholders will obtain digitalized versions as required.

2) Recommendation 2: Institutionalization of OWMEB Staff Training Using Guidelines

Since not only OWMEB head office but the zone and Woreda officials also change personnel frequently, training on the operation and maintenance of small-scale irrigation must be institutionalized, using guidelines for the new staff. There are fewer opportunities for Woreda staff to have training than the head office. It is expected to consider adding training budget to Woreda staff.

3) Recommendation 3: Measures for the multipurpose utilization of Irrigation facilities

During the initial stage of the project, the facilities were solely for irrigation. However, they are now often used for multiple purposes (drinking water for domestic animals, everyday water for cooking and washing).

Domestic animals and wildlife often break water channels and plastic sheets. It is necessary to create more water drinking outlets for domestic animals and set up a fence to avoid wildlife intrusion. These measures are also expected to be considered when revising guidelines.

4.3 Lessons Learned

1) Lessons Learned 1: Measures for Organizational Change

It is noted that frequent personnel transfer due to continuous organizational changes hampered and delayed project activities. Although the organizational changes could not be controlled by the project, it is expected that both the Japanese and Ethiopian sides will start preparation in advance when there is the potential for change, and quickly take over the duties when such change happens. For example, the present and new counterparts can organize a “transitional team” for a short period to collaborate and hand over all key items through OJT, field observation and compiling the required data and materials for project management, so that the new counterpart would be able to get up to speed efficiently.

2) Lessons Learned 2: Organizational Strengthening through awareness raising among WUC/WUA members

The project revealed that the WUC/WUA, which had high sustainability, had raised the awareness of members, including on their water rights via periodical meetings, sharing information and data on irrigation farming at their office and active participation in training. As a result, the rate of membership fees such as water and maintenance fees increased gradually and members could spend their own funds on repairing and purchasing pumps. Furthermore, all WUAs were upgraded to WUCs and they gained

access to external funding. They opened bank accounts and collectively invested in the Water Users' Union (WUU). In Ethiopia, where group activities have been encouraged through farmers' cooperatives, supported by the Bureau of Agriculture, it is essential to strengthen the organization via awareness raising activities and establish financial stability to sustain the project.

3) Lessons Learned 3: Clarification of Project Objective

At the project planning stage, the appropriate number of long-term experts was not dispatched since the level of targets for the project objective and outputs remained unclear. In addition, although the indicators of the project objective were revised during the Progress Review Mission, a gap remained between the project objective and indicators and it was difficult to measure the achievement of the objective via the indicators.

It is necessary to establish a project objective with a clear target and indicators which are objectively verifiable to manage the project efficiently and evaluate its performance appropriately.