

Country Name	The Project for the Support for the Dissemination of Biogas Technologies
Kyrgyz Republic	

I. Project Outline

Background	<p>In the Kyrgyz Republic, after independence from the Soviet Union, former collective and state farms were destroyed and privatization of farmlands was promoted. Administrative services were no longer provided sufficiently due to shortages of state revenue, and farmers were no longer provided with necessary supports such as technical assistance and distribution of chemical fertilizers and herbicides. Consequently, the quality of agricultural products was deteriorated, and in addition, as farmers did not have enough sales channels, the prices of their products were lowered, in the absence of a purchase of their products from the government. Moreover, while the major fuel sources in rural areas were coals and firewood, the growing price of coals made the living conditions of farmers even more difficult and led to illegal logging of roadside trees and national forests. Under such situation, the Kyrgyz government promoted research and development of biogas technologies with supports from United Nations Development Programme (UNDP) and the World Bank etc. from the year 2000. However, these projects aimed at utilization of individual biogas plants involving NGOs, and central and local governments were not involved in the implementation, and thus their project effects were not disseminated widely. The system and mechanism for providing information and supporting introduction of biogas plants were absent, which was an obstacle to dissemination of biogas technologies in the country.</p>						
Objectives of the Project	<p>Through developing appropriate biogas technologies, strengthening the capacity of government officials in charge of extension of biogas technologies, enabling preferential conditions to be provided by financial institutions for farmers who adopt biogas technologies, and improving the coordination among the relevant organizations for extension of the biogas technologies, the project aimed at establishing the extension system of the improved biogas technologies, thereby contributing to dissemination of biogas technologies in rural areas and improving living conditions of rural people adopting these technologies. The project objectives set forth are as follows:</p> <ol style="list-style-type: none"> 1. Overall Goal: The biogas technologies are disseminated in rural areas and the living condition of the rural people adopting these technologies is improved. 2. Project Purpose: The extension system of the improved biogas technologies is established. 						
Activities of the Project	<ol style="list-style-type: none"> 1. Project site: Chui and Issyk-Kul oblasts 2. Main activities: 1) Improve the design of existing biogas plants, manufacture improved biogas plants, and develop user's manuals on operation and maintenance (O&M) of improved biogas plants and utilization of biogas and liquid fertilizer produced at biogas plants; 2) Develop pamphlets for introducing biogas technologies and conduct seminars on biogas technologies and press tours/study tours to the pilot project sites. 3. Inputs (to carry out above activities) <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;"> <p>Japanese Side</p> <ol style="list-style-type: none"> 1. Experts: 15 persons 2. Trainees received: 11 persons 3. Machinery and equipment (biogas plants and liquid fertilizer spreader etc.) 4. Local operation cost </td> <td style="width: 50%;"> <p>Kyrgyz Side</p> <ol style="list-style-type: none"> 1. Staff allocated: 9 persons 2. Land and facilities: 2 office spaces </td> </tr> </table> 					<p>Japanese Side</p> <ol style="list-style-type: none"> 1. Experts: 15 persons 2. Trainees received: 11 persons 3. Machinery and equipment (biogas plants and liquid fertilizer spreader etc.) 4. Local operation cost 	<p>Kyrgyz Side</p> <ol style="list-style-type: none"> 1. Staff allocated: 9 persons 2. Land and facilities: 2 office spaces
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Ex-Ante Evaluation	2007	Project Period	(Original period) December 2007 to December 2010 (Extension period) December 2010 to May 2011	Project Cost	237 million yen		
Implementing Agency	State Department of Chemicalization and Plants Protection, Ministry of Agriculture						
Cooperation Agency in Japan	Obihiro University of Agriculture and Veterinary Medicine						

II. Result of the Evaluation

I Relevance
<p><Consistency with the Development Policy of Kyrgyz Republic at the time of ex-ante and project completion></p> <p>While Ministry of Agriculture, Water Resources and Processing Industry¹ formulated the National Program on Biogas Production and Natural Fertilizers in 2005, the program was not approved, and there was no national development policy which specifically articulates the needs for 'promotion of biogas' at the time of ex-ante evaluation. On the other hand, the project was consistent with the development policy of Kyrgyz Republic on 'promotion of biogas' as set forth in the "National Energy Program of the Kyrgyz Republic 2008-2010 and Fuel Energy Complex Development until 2025" at the time of project completion.</p> <p><Consistency with the Development Needs of Kyrgyz Republic at the time of ex-ante and project completion></p> <p>The project met the needs for rural development through the enhancement of farmers' access to electricity, warm water, heating and fertilizers by improving the design of and utilizing biogas plants.</p> <p><Consistency with Japan's ODA Policy at the time of ex-ante evaluation></p> <p>The project was consistent with the Japan's ODA policy, as stated in the "ODA Country Data Book" (2006), which placed 'agriculture'</p>

¹ The name of the Ministry was changed to "Ministry of Agriculture" in 2009.

as one of the priority areas in Kyrgyz Republic.

<Evaluation Result> The plan of this project was partially inconsistent with the development policy of Kyrgyz Republic at the time of ex-ante evaluation. Therefore, the relevance of the project is fair.

2 Effectiveness/Impact

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

The Project Purpose partially achieved. By the time of project completion, the improved biogas plants for livestock farmers were developed (Indicator 1) as well as manuals/guidelines on manufacturing and O&M of improved biogas plants. However, a financing system for extension of biogas technologies was not established, as discussions with several financial institutions did not reach a successful conclusion due to a lack of data on plant size and construction cost, high interest rate, and political instability (Indicator 2). In addition, the institutional system, technical skills and budgets of organizations in charge of promoting biogas technologies were not secured, due to a lack of public structure for extension of biogas technologies in agriculture sector or in renewable energy sector, and the weakness of the public-private collaboration to establish an extension system of biogas technologies in the field level² (Indicator 3).

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

At the time of ex-post evaluation, nine of the 11 biogas plants established under the project are not operational due to high electricity consumption for heating reactor, low voltage of electricity in winter time, malfunction of the plants, corrosion of metal parts of the plants, a lack of financial resources for maintenance and repair, a lack of sufficient amount of manure in summer time and a lack of repair service and maintenance in the regions, as well as a lack of motivation and diligence of farmers to operate plants. No. 11 plant, which was developed during the extension period, is operational at the time of Ex-post Evaluation. It was developed based on the operational results of all previous prototype plants after the technical verifications³. A financing system for extension of biogas technologies has not been established yet, nor have the institutional system, technical skills and budgets of organizations in charge of promoting biogas technologies been secured. A few pilot plant owners are contributing to dissemination of the biogas technology through providing individual consultations to visitors interested in establishing biogas plants. However, most of the surveyed pilot farmers demonstrated little motivation and diligence to resume operation of biogas plants although they clearly understood the benefits as described below. This reluctance can be explained by relatively cheap cost of other alternatives sources of energy like electricity, animal dungs in the country.

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

The Overall Goal was partially achieved at the time of ex-post evaluation. Regarding Indicator 1 “Number of relevant projects introducing the improved biogas technologies”, 2 to 13 biogas plants have been established every year in Kyrgyz Republic by Fluid Public Foundation (hereafter, “Fluid”), a leading business entity in biogas plant construction, since project completion. According to Fluid, among the 35 owners in total of these biogas plants, 15 to 20 owners were the participants to the seminars on biogas technologies held under the project, and thus it can be said that this achievement is somehow attributable to this project. In addition, No. 2 plant is utilized as a demonstration plant by Fluid. Regarding Indicator 2 “Number of households whose living conditions is improved by adopting the biogas technologies”, such data is not available. As for 11 pilot plant owners whose biogas plants were established under the project, all of them noted improvements of their living conditions after operation of biogas plants as mentioned in the table. However, only two out of these 11 households continue to utilize the biogas plants at the time of ex-post evaluation.

<Evaluation Result> While the project developed a model of improved biogas plant that was then put into practical use by a public foundation, the project purpose was partially achieved as the biogas technology extension system was not established in the government. The degree of achievement of the overall goal is partial at the time of ex-post evaluation as, although the improvement of living conditions was observed on the farmers who operated the biogas plants developed under this project, the designated indicators were not verified due to unavailability of data. Therefore, effectiveness and impact of the project are fair.

Achievement of Project Purpose and Overall Goal

Aim	Indicators	Results
(Project Purpose) The extension system of the improved biogas technologies is established.	1. Development of the improved biogas plants for livestock farmers (Supplemental information) Manuals/guidelines on manufacturing and O&M of improved biogas plants	<u>Status of achievement: Achieved</u> (Project Completion) 11 biogas plants in total were constructed and/or upgraded under the project based on the improved design of biogas technologies. Manuals on manufacturing and O&M of all types of biogas plants established under the project including utilization methods of biogas and liquid fertilizer produced at biogas plants were prepared. (Ex-post Evaluation) Nine out of 11 biogas plants established under the project are not operational, but the plant (No.11) developed during the extension period is operational.
	2. Review of the present financial institutions and regulations related to extension of the biogas technologies (Interpretation of this indicator) Preferential conditions (preferential low interests and long-term loan scheme etc.) are provided by financial institutions for farmers adopting biogas technologies.	<u>Status of achievement: Not achieved</u> (Project Completion) The Project researched existing agriculture financing system by dispatched short-term expert and made recommendations of financing plans to the Ministry of Agriculture. During the project extension period, the Ministry of Agriculture followed the recommendation of the project and issued a ministerial ordinance stating that a "bio-gas Plant is the agricultural machinery," in order to have financing for biogas plants as financing for agricultural machinery. The Ministry of Agriculture requested the Ministry of Finance to establish financing system for biogas construction based on the

² The planned activities to strengthen capacity of government officials in charge of extension of biogas technologies were not carried out since those officials were not assigned for the project.

³ It should be noted that the biogas plants established under the project are prototype plants, and thus it does not necessary mean that all of these plants need to be operational at the time of ex-post evaluation.

		<p>ministerial ordinance (There is no authority of revising financial regulations in the Ministry of Agriculture.). As described above, the project has completed activities relating to review of the present financial institutions and regulations related to extension of the biogas technologies. However, by the time of the end of the project completion, it did not reach until the establishment of financing plans by the Kyrgyz government. After political turmoil on April 2010, it took one and a half years before inaugurating the formal government. This is major external factors that did not lead to the establish financing system by the Kyrgyz government.</p> <p>(Ex-post Evaluation) Status of achievement: Not achieved The Ministry of Finance has rejected the proposal of the Ministry of Agriculture's official support to the financial institutions that provide preferential loans to farmers to introduce biogas technologies due to a lack of budget. Also, there is no national program for dissemination of biogas technologies.</p>										
	<p>3. Establishment of extension system of the biogas technologies through public-private collaboration for rural areas</p> <p>(Interpretation of this indicator) Securement of the institutional system, technical skills and budgets (of organizations in charge of promoting biogas technologies) that are sufficient to continuously provide dissemination seminars, trainings on O&M and technical support on biogas plants</p>	<p><u>Status of achievement: Not achieved</u> (Project Completion) The counterpart personnel in-charge of extension of biogas technologies was not allocated during the project period. There were several public and private organizations supporting the installation of biogas facilities, however, there were few field level collaboration and few official discussions on coordination mechanism among organizations concerned. (Ex-post Evaluation) After repeated structural changes of the Central Office of Ministry of Agriculture, Division of Science and Innovation, which was determined to be in charge of extension of biogas technologies, was abolished in 2012. No other division assumed its responsibility. Budget has never been allocated for promotion of biogas technologies.</p>										
<p>(Overall Goal) The biogas technologies are disseminated in rural areas and the living condition of the rural people adopting these technologies is improved.</p>	<p>1. Number of relevant projects introducing the improved biogas technologies</p> <p>(Assumed target value: A few plants/year or more)</p>	<p><u>Status of achievement: Achieved</u> (Ex-post Evaluation) 35 biogas plants have been established in Kyrgyz Republic based on the improved biogas technologies by Fluid since project completion. According to Fluid, among the owners of these biogas plants, 15 to 20 owners were the participants to the seminars held under the project.</p> <table border="1"> <thead> <tr> <th>Year</th> <th>2011</th> <th>2012</th> <th>2013</th> <th>2014</th> </tr> </thead> <tbody> <tr> <td>Number of improved biogas plants established</td> <td>8</td> <td>12</td> <td>13</td> <td>2</td> </tr> </tbody> </table>	Year	2011	2012	2013	2014	Number of improved biogas plants established	8	12	13	2
Year	2011	2012	2013	2014								
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	<p>2. Number of households whose living conditions is improved by adopting the biogas technologies</p> <p>(Assumed target value: Majority of households that adopted improved biogas technologies)</p>	<p><u>Status of achievement: Not achieved</u> (Ex-post Evaluation) Data is not available. Among 11 pilot households whose biogas plants were established under the project, all of them noted improvements such as less labor for transporting and unloading of charcoal and firewood, less time for cooking and cleaning utensils, better sanitation and increased harvests and improved soil fertility through applying liquid fertilizer, though only two out of these 11 households utilize the biogas plants currently.</p>										

Source : Terminal evaluation report, Internal documents, Questionnaire survey and interview with Ministry of Agriculture, Interview with pilot farmers.

Notes: 1) Supplemental information was used for Indicator 1 of Project Purpose to correctly assess the degree of achievement. 2) Interpretation of Indicator 2 of Project Purpose followed the one used for the terminal evaluation. 3) As Indicator 3 of Project Purpose was a rephrasing of Project Purpose itself, an interpretation was made based on descriptions of project reports. 4) The target value for the Indicator 1 of Overall Goal (not set in PDM) was assumed to be a realistic level (which is more or less similar to that of Japan) considering the situation of biogas dissemination in Kyrgyz Republic.

3 Efficiency

The project cost was slightly higher than planned (ratio against the plan: 103%) and the project period was longer than planned (ratio against the plan: 117%). The project period was extended because 6 biogas plants established under the project turned out to have problems with digester heating system, it took a long time for the improvement works and operation under severe winter season could not be verified for these plants by the time of original project completion date. Therefore, efficiency of the project is fair.

4 Sustainability

<Policy Aspect>

Ministry of Agriculture formulated a draft national agricultural development strategy valid until 2020 in 2013 with support from Food and Agriculture Organization of the United Nations (FAO). The strategy emphasizes an importance of disseminating biogas and natural fertilizers, however, the strategy has not been approved yet due to a lack of budget for its implementation and currently there is no approved agricultural development strategy.

<Institutional Aspect>

While Division of Science and Innovation, Ministry of Agriculture was determined to be a department in charge of policies and extension of biogas technologies before project completion, the Division had only three staffs and it could not undertake their roles and

responsibilities sufficiently. Ministry of Agriculture was reorganized several times in the last five years and the Division was abolished in 2012 due to budgetary constraints and structural optimization. Establishment of a department or division which will be responsible for management and utilization of biogas facilities in the Ministry is not expected currently due to poor budgetary situation.

<Technical Aspect>

There is neither department/division nor human resources in charge or capable of extension of biogas technologies in Ministry of Agriculture. On the other hand, Fluid provides individual technical instructions and trainings at its own demonstration biogas plant on an everyday basis. The main target groups are farmers and sometimes students from Kyrgyz-Russian Slavic University and National Agrarian University. Regarding technical skills of pilot farmers, biogas plants generally do not require considerable skills.

<Financial Aspect>

While Ministry of Agriculture is seeking donors and investors on a regular basis, currently there is no budget allocated for promotion of biogas technologies in the Ministry.

<Evaluation Result> Major problems have been observed in terms of policy, institutional, technical and financial aspects of the implementing agency. Therefore, sustainability of effects of the project is low.

5 Summary of the Evaluation

The project partially achieved its Project Purpose and Overall Goal. The extension system of the improved biogas technologies was not established as the project originally planned, and while several biogas plants have been established by a public foundation every year, it is not clear how many households have improved their living conditions by adopting biogas technologies. In terms of sustainability, there are major challenges in policy, institutional, technical and financial aspects due to frequent changes in the structure of Ministry of Agriculture, insufficient number of staff, high staff turnover and a lack of budget allocation for promotion of biogas technologies in Kyrgyz in the future. For relevance, consistency with the development policy of Kyrgyz Republic at the time of ex-ante evaluation was not fully confirmed. In terms of efficiency, project cost was slightly higher than planned and project period was longer than planned.

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

III. Recommendations & Lessons Learned

<Recommendations for Implementing Agency>

It is recommended to clearly determine a responsible organization, allocate sufficient number of trained staff, secure budget for activities to promote and disseminate biogas technologies and provide technical and financial support to farmers to the extent possible.

<Lessons Learned for JICA>

1. [Selection of appropriate target households during project planning]

For projects that aim to disseminate new technology to farmers through ‘demonstration farmers’, it is vital to identify appropriate target households as demonstration farmers. When they are selected, their well-motivation and ability in using the modern technologies should be carefully considered. The preference should be given to those farmers who can act as model ones to stimulate neighboring farmers to adopt the biogas facilities. Also, financial burden-sharing through arrangement such as a co-financing mechanism (for example 5% to 20% to be borne by the famers) should be considered in order to exclude beneficiaries with little interest and commitment.

On the other hand, there should be stronger support from the government such as having a firm policy of disseminating new technology that is forward-looking but not evidently recognized or demanded in the planning stage (biogas energy in case of this project) and providing financial incentives to those who use the technology.

2. [Needs for careful consideration on the capacity of implementing agency and analysis of potential risks during project planning]

When designing similar projects in the future, a more careful consideration should be given to the mandate and capacity of the implementing agency. It includes availability and commitment of counterpart staff, appropriate level of knowledge and skills, demonstrated commitment of the management and clear understanding of the expected project outputs, outcomes and impacts. Preferably at early stages of the project design a more active participation of all stakeholders concerned should be ensured with the aim to develop a feasible and understandable PDM. Also a thorough analysis of the potential risks should be conducted during the project preparation.



Photo 1. Inside of operation room of the pilot biogas plant No. 4 in Chon Kyzyl-Suu village, Issyk-Kul Oblast. It shows poor condition of facilities like heating stove, pipes which were seriously damaged last winter when water got inside the room and got frozen as it can be seen from the line on the wall.



Photo 2. Still operating pilot biogas plant No. 2 in Tokmok, Chui Oblast



Photo 3. Cooking with the oven using biogas (house of owner of pilot biogas plant 2)