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## ANNEXES

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**Annex 1: Project Design Matrix (PDM)**

**Annex 2: Plan of Operation (PO)**

**Annex 3: Evaluation Grid**

**Annex 4: Assignment of C/P**

**Annex 5: List of the Japanese Experts**

**Annex 6: List of the Trainees in Japan**

**Annex 7: List of the Provided Machinery and Equipment**

**Annex 8: Local Cost of Implementation (the Japanese Side and the Kyrgyz side)**

## Annex1:

## PROJECT DESIGN MATRIX (PDM)

Project Name: The Project for the Support for the Dissemination of Biogas Technology in the Kyrgyz Republic  
 Project Period: Dec.19, 2007 —Dec. 18, 2010  
 Target Area: Chui and Issyk-Kul oblasts  
 Target Group: (1) Officers in the Ministry of Agriculture, Water Resources and Processing Industry, Center for Renewable Energy Application, Targeted oblasts  
 (2) Farmers in the target area

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
<p><b>Overall Goal</b>            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            2 Number of households whose living conditions is improved by adopting the biogas technologies</p>	Report on extension of the biogas technologies	
<p><b>Project Purpose</b>            The extension system of the improved biogas technologies is established.</p>	<p>1 Development of the improved biogas plants for livestock farmers            2 Review of the present financial institutions and regulations related to extension of the biogas technologies            3 Establishment of extension system of the biogas technologies through public-private collaboration for rural areas</p>	Report on final survey of the Project	Status of the Project in the policy on extension of the biogas technologies is maintained.
<p><b>Outputs</b>            1 The appropriate biogas technologies are developed.             2 The capacity of personnel related to extension of the biogas technologies is strengthened.             3 The existing financial institutions and regulations related to extension of the biogas technologies are reviewed.             4 The coordination among the relevant organizations for extension of the biogas technologies is improved.</p>	<p>1-1 Improvement of biogas plants for livestock farmers            1-2 User's manual on operation and maintenance of the improved biogas plants            1-3 User's manual on utilization of biogas and liquid fertilizer produced at biogas plants            2-1 Number of personnel and their degree of technical capacity for extension work of the biogas technologies            2-2 Number of technical training for personnel in charge of extension work of the biogas technologies            2-3 Development of teaching materials/textbooks for extension of the biogas technologies            3-1 Improved services of the existing financial institutions and regulations related to extension of the biogas technologies            4-1 Number of various joint meetings on extension of the biogas technologies            4-2 Development of guideline on linkage/networking of</p>	<p>1 Report on development of the biogas technologies             2 Report on extension of the biogas technologies             3 Report on institution and regulation related to extension of the biogas technologies             4 Report on the Pilot Projects</p>	<p>The number of domestic animals is kept or increased (without suffering from diseases or so).            The temperature in winter is normal (not getting extremely low).</p>

<p>5 The biogas technologies are widely known.</p>	<p>the organizations concerned for extension of the biogas technologies</p> <p>5-1 Number of seminar on the biogas technologies for users</p> <p>5-2 Development of pamphlet/leaflet for introducing the biogas technologies (including videos)</p> <p>5-3 Number of press tours/ study tours to the pilot project sites</p>	<p>5 Report on extension of the biogas technologies</p>	
<p><b>Activities</b></p> <p>1-1 To extract lessons learnt on existing biogas technologies and to clarify the needs through the review of relevant projects</p> <p>1-2 To survey on the organizations concerned of the biogas technology development including manufacturing organizations</p> <p>1-3 To improve the design of existing biogas technologies based on the findings of 1-1 and 1-2 and manufacture improved ones</p> <p>1-4 To verify the improved biogas technologies from technical and financial aspects through its application to the Pilot Projects</p> <p>1-5 To develop user's manual on operation and maintenance for the improved biogas plants</p> <p>1-6 To develop user's manual on utilization of biogas and liquid fertilizer produced at biogas plants</p> <p>1-7 To develop the capacity of the organizations concerned on the biogas technology development through the above activities</p> <p>2-1 To extract lessons learnt on the existing extension system of the central and the local administrations and to clarify the needs through the review of the relevant projects</p> <p>2-2 To recognize technical capacity of personnel in charge of extension work of the biogas technologies by baseline and terminal surveys</p> <p>2-3 To develop teaching materials/textbooks for personnel in charge of extension work of the biogas technologies</p> <p>2-4 To conduct technical training for personnel in charge of extension work of the biogas technologies</p>	<p><b>Inputs</b> (Japanese side)</p> <p>1 Dispatch of (1) Chief Advisor / Rural Development (Long-term) (2) Coordinator / Extension (Long-term) (3) Biogas technology (Short-term) (4) Agricultural Fertilizer (Short-term) (5) Financing Facility (Short-term) *Other experts in the specific fields may be dispatched if necessary.</p> <p>2 Trainings for counterpart personnel in Japan or in third countries (training themes to be decided)</p> <p>3 Necessary machinery and equipment</p> <p>4 Necessary expenses for the Project activities</p>	<p>(Kyrgyz side)</p> <p>1 Assignment of full time C/P</p> <p>2 Provision of office for JICA experts</p> <p>3 Provision of information on relevant projects</p> <p>4 Necessary expenses for the Project activities</p>	<p>Trained personnel continue to work in the post.</p> <p>Necessary materials/parts for biogas plant are available and the prices are kept reasonable.</p>

<p>3-1 To extract lessons learnt on the existing financial institutions and regulations related to extension of the biogas technologies and to clarify the needs through the review of the relevant projects</p> <p>3-2 To review the existing financial institutions and regulations in rural area</p> <p>3-3 To conduct necessary revisions of the existing financial institutions and regulations based on the findings of 3-1 and 3-2</p> <p>4-1 To share information about the project among the organizations concerned</p> <p>4-2 To select the sites and farmer groups for the Pilot Projects through competition of proposals</p> <p>4-3 To build implementation system of the Pilot Projects</p> <p>4-4 To hold the Open Forum on the Pilot Projects</p> <p>4-5 To conduct baseline and terminal surveys on targeted farmers of the Pilot Projects</p> <p>4-6 To conduct planning, implementation and monitoring of the Pilot Projects through participatory method</p> <p>4-7 To develop guideline on linkage/networking of the organizations concerned based on the review of the Pilot Projects</p> <p>5-1 To hold seminar for introduction of the biogas technologies for users</p> <p>5-2 To develop pamphlet/leaflet for introducing the biogas technologies</p> <p>5-3 To conduct press tours/study tours to the Pilot Project sites</p>			<p><b>Pre condition</b> Security condition of the Kyrgyz Republic is maintained</p>
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Annex 2:

1. Record of Project Performances

(1) Plan of Operation (Plan and Actual)

Project Outputs and Activities		Schedule											
		2008				2009				2010			
		1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12
Output 1: The appropriate biogas technologies are developed for extension.													
1-1. Extraction of lessons learnt on existing biogas system and recognition of field needs through the review of relevant projects	Planned	■	■	■									
	Actual								■	■			
	Revised Plan								■	■	■		
1-2. Survey on system of the authorities concerned of the biogas technology development including industrial organizations	Planned	■	■	■									
	Actual								■	■			
	Revised Plan			■	■	■							
1-3. Improvement of existing biogas system based on the above activities	Planned		■	■	■	■	■	■	■	■	■	■	■
	Actual				■	■	■	■	■	■	■	■	■
	Revised Plan		■	■	■	■	■	■	■	■	■	■	■
1-4. Verification of the above improved biogas system in terms of technical and financial feasibility and necessary additional improvement through its application to pilot projects	Planned				■	■	■	■	■	■	■	■	■
	Actual								■	■	■	■	■
	Revised Plan				■	■	■	■	■	■	■	■	■
1-5. Development of user's manual on operation and maintenance of the improved biogas plant	Planned				■	■	■	■	■	■	■	■	■
	Actual					■	■	■	■	■	■	■	■
	Revised Plan				■	■	■	■	■	■	■	■	■
1-6. Development of user's manual on utilization of biogas and fertilizer	Planned				■	■	■	■	■	■	■	■	■
	Actual								■	■	■	■	■
	Revised Plan								■	■	■	■	■
1-7. Capacity development of the authorities concerned of the biogas technology development based on the above activities	Planned	■	■	■	■	■	■	■	■	■	■	■	■
	Actual								■	■	■	■	■
	Revised Plan	■	■	■	■	■	■	■	■	■	■	■	■
Output 2: The extension system is strengthened in the central and the local administration for better technical service delivery.													







## 1. Achievement of the Project

Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/information	Result of the Evaluation	
	Heading	Questions				
Performance of Inputs	Is the input of the Project on schedule	Whether the input of the project on schedule	Comparison to the plan	Timing of input (plan and actual)	<p>&lt;JICA Experts&gt; In the first half of the Project saw some delays in the biogas plant installation to the start of operation. Out of 11 short term experts dispatched, 9 were on related to biogas plant construction and monitoring.</p> <p>&lt;Machinery and Equipment&gt; Provision of most of machinery and equipment went smooth except for a short-term Expert on plant monitoring, Mr. Kimura's one. For the procurement of materials for biogas plants, there were a few minor delays also. It was because the procurement were made locally in the later half of the Project so that it was necessary to carefully check the quality and specifications before purchase. Also an amendment to a technical problem of heating equipment, replacing PVC pipes with steel pipes due to low heat conductivity, caused restriction of constructed plants: 6 out of 10 plants.</p> <p>&lt;Training in Japan&gt; The training in Japan was organized 2 times in 2008.9 and in 2009.6 without any delay. The 3rd training was planned, but it was cancelled due to the recent political turmoil.</p>	
		If not, was there any problem incurred by such delays			The delays in the dispatch of some JICA short-term Experts and some minor delays in procurement in the 1st and 2nd year of the Project caused some delays in the construction work and the achievement of expected outputs (Output 1). The amendments to the already constructed biogas plants, due to the above mentioned problem in heating equipment, resulted in delays in the completion of plant construction.	
Achievement of the expected Outputs	Is the expected Outputs achieved according to the plan	Output 1 The appropriate biogas technologies are developed.	1-1 Improvement of biogas plants for livestock farmers	Achievement level of the indicators	The BG design, of which farmers can afford and good for extension, appropriate technical level	The indicator is not achieved yet. The prospect of achieving this indicator by the end of the Project is low. The Project constructed 10 biogas plants and 3 new types of plant designs and its design drawings were prepared. But 6 plants need the experimental proof of severe winter season operation. Also the cost of biogas plants should be available.
			1-2 User's manual on operation and maintenance of the improved biogas plants	Achievement level of the indicators	Completed manuals on plant operation and maintenance	The indicator is achieved already. The operation and maintenance manual including the topics of utilization of biogas is prepared. - User's manual on operation and maintenance: 'Manual on a biogas plant production - For small-sized biogas plant in cold regions'
			1-3 User's manual on utilization of biogas and liquied fertilizer produced at biogas plants	Achievement level of the indicators	Completed manuals on the fertilizer use	The indicator is not achieved yet at the time of Terminal Evaluation in Jul 2010. But it would be completed around the beginning of Dec 2010 before the Project termination. This is because the application standard of liquid fertilizer is currently examined in Kyrgyz National Agrarian university under the contract with the Project. Both of the manual on the utilization of biogas and liquid fertilizer will be included in the operation and maintenance manual. - User's manual on utilization of biogas and liquid fertilizer
		Output 2 The capacity of personnel related to extension of the biogas technologies is strengthened.	2-1 No of personnel and their degree of technical capacity for extension work of the biogas technologies	Achievement level of the indicators	- Number of extension workers - Extension workers' activities and evaluation of technical level by Experts	The indicator is not achieved and would not be achieved by the end of the Project. There are factors inhibiting the achievement of Output 2. There is the absence of technical extension system in the field level both in agriculture sector nor in renewable energy sector. Thus the C/P in-charge of technical extension of biogas technologies was not identified during the Project period.
			2-2 No of technical training for personnel in charge of extension work of the biogas technologies	Achievement level of the indicators	- Number of technical training on biogas extension - Appropriateness of the training course / Training materials	This indicator is not achieved and would not be achieved by the end of the Project. Due to the above mentioned reasons, technical training for extension personnel was not conducted.
			2-3 Development of teaching materials/textbooks for extension of the biogas technologies	Achievement level of the indicators		This indicator is not achieved but would be achieved by the end of the Project. Due to the above mentioned reasons, technical training for extension personnel was not conducted. Thus the teaching materials were not developed. But the 1st draft of teaching materials is ready and will be finalized by the end of the Project.



Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/information	Result of the Evaluation	
	Heading	Questions				
Achievement of the expected Outputs	Is the expected Outputs achieved according to the plan	Output 3 The existing financial institutions and regulations related to extension of the biogas technologies	3-1 Improved services of the existing financial institutions and regulations related to extension of the biogas technologies	Achievement level of the Indicators	- Number of financial institutions that can provide loans to biogas plant construction - Changes in the service menu	The indicator is not achieved and would not be achieved by the end of the Project. A short-term Expert on finance sector, in Mar 2010, reviewed the financial institutions and service menu and analyzed the possibility of providing loan scheme to livestock farmers who want biogas plant. However, it was limited to analysis so that it does not reach to the improvement of financial services.
		Output 4 The coordination among the relevant organizations for extension of the biogas technologies is improved.	4-1 No of various joint meetings on extension of the biogas technologies	Achievement level of the indicators	Number of joint meetings for extension of biogas technologies and its contents	This indicator is not achieved and would not be achieved by the end of the Project. There are several public and private organizations supporting the installation of biogas facilities, however, there is few field level collaboration found. This Project invited those organizations working on biogas technologies when it organized seminars and opening ceremony of biogas facilities. But it is mostly limited to introduction of biogas facilities and information exchange.
			4-2 Development of guideline on linkage/networking of the organizations concerned for extension of the biogas technologies	Achievement level of the indicators	Guideline for networking and for coordination among organizations involved in extension structure	This indicator is not achieved yet. Judging from the situation it would be difficult to achieve fulfill this indicator by the end of the Project. The Project planned the preparation of the draft guideline in the early 2010. However, the political turmoil brought to a halt of such a plan.
		Output 5 The biogas technologies are widely known.	5-1 No of seminar on the biogas technologies for users	Achievement level of the indicators	Number of seminars for biogas users, number of participants and contents etc.	It is hard to judge the level of achievement for this is not quantitative indicator. Judging from the situation, it is understood that this indicator will be achieved by the end of the Project termination. By the time of Terminal Evaluation, 4 seminars were organized inviting users and villagers in target areas, and were attended by the total of 88 participants.
			5-2 Development of pamphlet/leaflet for introducing the biogas technologies (incl videos)	Achievement level of the indicators	Produced pamphlets and leaflets	This indicator was achieved already. 2 kinds of leaflet and 1 video introducing the biogas technologies were produced: - Project introduction leaflet (Eng/Rus) 500 pieces in 2008 and the other one in Rus/Kyrgyz 500 pieces - Project introduction video 1 piece
			5-3 No of press tours/study tours to the plot project sites	Achievement level of the indicators	Number of study tours for press and the number of participants	It is hard to judge the level of achievement for this is not quantitative indicator. Judging from the situation, it is understood that this indicator will be achieved by the end of the Project termination. By the time of Terminal Evaluation, 3 study tours inviting press were organized. 1 more opening ceremony was planned in Jun 2010 but came to a halt due to the recent turmoil. 1 Opening ceremony of a plant in Chui Oblast (2009) 2 Study Tour to plants in Chui Oblast (2009) 3 Study tour to plants in Chui Oblast (2009) * 1 Study tour was organized by JICA Office (2009)

Achievement of Project Purpose	Achievement level of the Project Purpose Project purpose: The extension osystem of the improved biogas technologies is established.	1 Development of the improved biogas plants for livestock farmers	Achievement level of the indicators	- Biogas plant designs which livestock farmers can operate - Planning, Identification of funding source, & operation that farmers can manage	The Indicator is not achieved yet. The prospect of achieving this indicator by the end of the Project is low. The Project constructed 10 biogas plants and 3 new types of plant designs and its design drawings were prepared. But 6 plants need the experimental proof of severe winter season operation. Also the cost of biogas plants should be available.
		If the achievement level is insufficient, the reasons for such delay			The delays in the dispatch of JICA short-term Experts in the 1st and 2nd year of the Project caused some delays in the construction work and the achievement of expected outputs (Output 1). The amendments to the already constructed biogas plants, due to the above mentioned problem in heating equipment, resulted in delays in the completion of plant construction. This resulted in the Project missed the opportunity to verify severe winter season operation of 6 plants.
		2 Review of the present financial institutions and regulations related to extension of the biogas technologies	Achievement level of the indicators	- Number of financial Institutions that can provide loans to biogas plant - Changes in the service menu	This indicator is already achieved. A short-term Expert on finance sector, in Mar 2010, reviewed the financial institutions and service menu and analyzed the possibility of providing loan scheme to livestock farmers who want biogas plant.
		If the achievement level is insufficient, the reasons for such delay			Not applicable
		3 Establishment of extension system of the biogas technologies through public-private collaboration for rural areas	Achievement level of the indicators	- Frequency of coordinated activities on biogas - Changes in the scope of work of public extension staff	This indicator is not achieved yet and would not be achieved by the end of Project termination.
		If the achievement level is insufficient, the reasons for such delay			It is due to the absence of public structure of extension in agriculture sector nor in renewable energy sector, then secondly, the weakness of the public-private collaboration to establish extension system of biogas technologies in the field level. There are several public and private organizations supporting the installation of biogas facilities, however, there is few field level collaboration found and few official discussions on coordination mechanism among organizations concerned.
Achievement of Overall Goal	Achievement level of Overall Goal: The biogas technologies are disseminated in rural areas and the living condition of the rural people adopting these technologies is improved.	1 No of relevant projects introducing the improved biogas technologies	Achievement level of the indicators	Promotional goods to diffuse biogas technologies	It is hard to judge the level of achievement of this indicator for this is not quantitative. But it is understood that the achievement level is appropriate. 2 Individuals planned the installation of biogas plants after the visit to the Project's pilot plants. There are several other projects and organizations having approached to the Project for technical assistance and advises on the biogas plant.
		2 No of household whose living conditions is improved by adopting the biogas technologies	Achievement level of the indicators	Number of households that increased income and/or sanitation and livelihood in general	This indicator is not achieved for it is too early to judge the level of livelihood improvement of livestock farmers who installed pilot biogas plant. Among 145 visitors (Bishkek office only) requesting the information of JICA's biogas technologies, 2 cases of replications were identified at the time of Terminal Evaluation.
		Possibility to achieve the Overall Goal	Effects of the project found in other than indicators		It is hard to judge the prospect of achieving this indicator for this is not quantitative. It is not possible to achieve this indicator within the Project period. However, it is speculated that more number of individuals and organizations would replicate the improved biogas design of this Project using their own capacity and other resources. Therefore there is positive prospect of achieving the Overall Goal.

## 2.Implementation Process

Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/information	Result of the Evaluation
	Heading	Questions			
Progress of Implementation	Where the activities were taken as planned	Activities which were not taken as planned	Changes in PO in particular delays	- Project Implementation reports - Completion Reports by Experts	There are several activities in delay at the time of Terminal Evaluation: Output 1: 1) Baseline study of the problems in the existing plants was conducted after 3 new plant designs became ready, 2) Development of the manuals Output 2: 1) Development of teaching materials/text books for technical training for extension staff, 2) Training for technical extension staff Output 3: 1) conduct necessary revisions of the existing financial institutions and regulations based on the findings of 3-1 and 3-2 Output 4: 1) Organizing Open Forum for facilitate the public-private collaboration, 2) Planning, implementation and monitoring of the Pilot Projects through participatory method, 3) guideline on linkage/networking of the organizations concerned based on the review of the Pilot Projects Output 5: 1) One more ceremony inviting press
		Negative effect caused by delays, actions taken etc.	Problem solving measures to problems occurred	- Project Implementation reports - Interviews with C/P agencies	Output 2: Absense of technical extension personnel (public) in the field level made the Project unable to produce expected outputs. The Experts requested more committerment from the Ministry of Agriculture, according to the bi-annual reports issued by the Project. Output 4: Absence of public-private collaboration made the Project unable to produce expected outputs. The Experts contacted with a private company, Fluid, and CPREU requesting advises on manual production
Situation of Monitoring Activities	Whether the regular monitoring is conducted	Progress of monitoring activities such as JCC	No of JCCs and the appropriateness of the contents	JCC reports	3 JCC meetings were organized: 1st in Jun 2008, 2nd in Dec 2009, and 3rd in Mar 2010. JCC meetings discussed the progress so far and plans. But it was organized only once during the first 2 years.
		Other regular internal meetings for monitoring purpose	No of Project Meetings and discussions	- Project Meeting memo - Meeting memo with C/P agencies	The monitoring of activities was mostly done by JICA Experts only. Then it was reported to Project Director and Project Manager. Although there was no record of meeting, there has been frequent information sharing between JICA Experts and C/Ps.
Relationship between the JICA Experts and C/P personnel	Whether the technical transfer to C/Ps going smoothly	Degree of capacity development in C/Ps	Changes in C/Ps awareness; in training contents, & extension of biogas	- Interviews with C/Ps and with concerned agencies - Interviews with experts	The C/Ps, both in central and State level, involvement in this Project is limited mostly to monitoring of activities and trouble shootings. Since there is no technical level officers closely working with the Project, the C/Ps were not in a position to take technical transfer from the JICA Experts. The State level assigned several officers in charge of livestock and agriculture, but their involvement in this Project is little.
		Whether C/Ps have enough time for technical transfer	Time to work for the Project	- Interviews with C/Ps - Interviews with experts	As explained above, the C/P allocation was limited to administrative level and their involvement in the Project is mostly in monitoring and trouble shooting. Each of them are not in a position to take technical transfer.
	Whether the communication between Experts and C/Ps appropriate	Whether communication between JICA Experts and C/Ps have been secured	Frequency and time for communication	- Interviews with C/Ps and with concerned agencies - Interviews with experts	The communication between JICA Experts and the C/Ps were frequent.
		Whether C/Ps' recognition toward this Project high enough	Overall understanding on the Project, Vision for the future of biogas	- Interviews with C/Ps - Interviews with private sector companies of BG extension	The C/Ps' recognition toward the Project is high. So do other related personnel concerned in Ministry of Agriculture and in State administration in Issyk-Kul Oblast for biogas technologies attracted a lot of attentions in general.

Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/information	Result of the Evaluation
	Heading	Questions			
C/Ps' Sense of Ownership	Whether the C/Ps are taking initiatives in Project operation and implementation	Whether C/Ps take initiative in implementation (PD and PM level)	Activities that C/Ps conduct independently, its importance	- Interviews with C/Ps - Interviews with experts	The C/Ps have not conduct activities in their own initiatives.
		- Extension staff in central or State level	Activities that C/Ps conduct independently, its importance	- Interviews with C/Ps - Interviews with experts	Not applicable for the technical extension staff is unidentified in this Project.
		Whether the participants of the training maximise the outcome of the training	Activities that the trainees do by themselves after the training	- Interviews with trainees - Interviews with colleagues etc	The training in Japan and introduction seminar of biogas technologies promoted the understanding of the participants toward the Project. The owners of the pilot plants are mostly aware of safety in operation of biogas plant and operate it along with what the safety training taught.
		Whether the C/Ps have sense of responsibility toward the Project implementation, if not taking initiative in it	Activities that the trainees do by themselves after the training	- Interviews with C/Ps - Interviews with trainees - Interviews with colleagues - Interviews with Experts	Since the involvement of PD and PM is limited to the monitoring and information sharing, and also most of the Project activities are beyond the scope of their work, the C/Ps sense of responsibility toward the Project is limited to what they can deal with.
	Whether C/P agencies have ownership (in budget allocation and continuation of training etc)	- Number of C/P allocation and budget allocation - Efforts to increase budget	No of C/Ps, Amount of budget allocated or efforts to increase the budget allocation	- List of C/Ps - Interviews with PD and PM	<Number of C/P allocation> 9 persons <Budget allocation to the Project> None. Efforts to increase the budget is none.
	Whether C/Ps take initiatives in promotion of biogas technologies	Whether C/P agencies are taking initiatives in establishment of mechanism for promotion of biogas technologies	Strategy and measures to promote biogas	- Interviews with MAWR, PD, PM, CPREU	Very few initiatives were taken by the C/Ps. But there was a promotional fund that farmers can apply for loan in the former State administration.
Implementation system	Appropriateness of JICA side implementation system	Whether JICA provided assistance as deemed necessary	Frequency of consultation by JICA	- Interviews with C/Ps - Interviews with experts	JICA Office closely had meetings with the Project and monitored the progress of activities.
		Whether JICA provided assistance in monitoring	Monitoring by JICA office and Head Office	- Interviews with experts	JICA Head Office sent 2 Consultation Missions to this Project in order to provide technical and administrative supports.
	Appropriateness of Kyrgyz side implementation system	- Frequency of monitoring and monitoring contents by Ministry of Agriculture	Monitoring by C/P Department in MoA / State level	- Interviews with C/Ps, State level C/P agency	The C/P organization had regular monitoring through the discussions with JICA Experts. If necessary, senior level discussed with JICA Experts. But the involvement of Kyrgyz side is limited to monitoring.



### 3.Evaluation by 5 Evaluation Criteria

Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/Information	Result of the Evaluation
	Heading	Questions			
Relevance	Alignment with the policies of GoKR	Whether there is any policy changes in the biogas sector	Changes in related strategy and policy	- Interviews with C/P agencies in Central and State level - Interviews with experts	This Project is consistent with 'National Energy Programme Of the Kyrgyz Republic 2008-2010 and Fuel energy complex development until 2025', which was in approval process of the former government. It is also along with the Law on Renewable Energy Sources which was signed by the former President Kurmanbek Bakyev in January 2010. In the Ministry of Agriculture, the new policies and strategies are under preparation at the time of Terminal Evaluation.
	Alignment with the needs of target groups	Relevance to C/P agencies and officers	Relevance to the needs of the C/P Department	- Interviews with C/P agencies in Central and State level	Extension of biogas facilities is beyond the State Department of Chemicalization and Plant Protection. Liquid fertilizer is relevant to the C/P agencies. Since the Ministry of Agriculture is under restructuring its departments that might be relevant to biogas is yet to be known.
		Relevance to farmers' needs	Relevance to the needs of interested farmers on BG	- Interviews with C/P agencies in State level and farmers	The biogas facilities meet the needs of livestock farmers in various ways: utilization of animal manure for producing gas, gas for cooking and heating facilities, liquid fertilizers for better agriculture production, etc. In particular, the biogas plant of 10 -20 cubic meters is thought to be relevant to average farm households.
	Alignment with the policies of GoJ	Whether the Project is meeting the Rolling Plan of JICA	Relevance to the Development Plan	Development Plan for GoJ	Under Rolling Plan for the Kyrgyz Republic 2009-2013, the assistance to this project is referred in the Rural Development Program under Agriculture Development/Local Development issue, which is one of 6 development issues of cooperation.
		If there is any change in the policy	Relevance to the Development Plan	GoJ's Development Plan for Kyrgyz Republic	Not applicable
Comparative advantage of Japan's technology	Japan's know-how in the sector	comparative advantage of Japan	- Interviews with experts - Other related reports	Japan has an advantage in biogas technology. As a country giving particular focus upon the production of renewable energy sources, Japan has rich human resources of researchers and private sectors.	
Effectiveness	Achievement level of Project Purpose	1 Development of the improved biogas plants for livestock farmers		Same as above	
		2 Review of the present financial institutions and regulations related to extension of the biogas technologies		Same as above	
	Facilitating / obstructing factors	Obstructing factors in achieving Project Purpose	Obstructing factors to achieving the Project Purpose	- Interviews with C/Ps - Interviews with experts	The absence of public extension system neither in Ministry of Agriculture nor in Ministry of Energy and therefore the absence of extension in the field level, as well as the weakness of the public-private collaboration to establish extension system for biogas technologies.
		Is the Important Assumption regarding climate assured	Extreme low temperature or not	- Interviews with C/Ps	There has been no extreme climate occurred during winter in these years.
		Is the Important Assumption regarding decreased of livestock assured	Decrease of livestock	- Interviews with C/P of State level	There is no decrease of livestock in the target areas.



Evaluation Item	Evaluation Questions		Criteria/Method of Assessment	Necessary data/information	Result of the Evaluation
	Heading	Questions			
Efficiency	Adequacy of the input of Japanese side	Whether the dispatch of Experts appropriate in number and timing	Comparison to the plan	- Completion Reports by Experts	The number of JICA Experts and their expertise were appropriate. The input of short-term Experts in the first half of the Project seems to be slow comparing the activities which the Project needed to
		Whether the construction of biogas plants implemented appropriately	Comparison to the plan	- Completion Reports by Experts	A few plants took more than 3 months from the start to the end of the construction. 4 - 5 plants needed the replacement of PCV pipe with steel ones after the completion of the construction to improve heat-retention rate. This replacement caused delay in the start of plant operation.
		Whether the training conducted appropriately in number and timing	Comparison to the plan in training	- Completion Report by Experts - Interviews with C/P In State	There was no technical training on extension of biogas, but introduction seminars for administrative officers from various oblasts. The Project conducted 7 seminars. For farmer-pilot plant owners, safety training was conducted for certificate of being operator.
		Whether the materials and equipment provided appropriately in type, number and timing	Comparison to the plan in provision of machinery & equipment	- Project Implementation Reports - Assignment Completion Report by Experts - Interviews with Experts	The number of provided materials and equipment was appropriate. Most of the short-term experts' equipment were provided on time except for Mr. Kimura whose equipment from Japan saw a few weeks of delay. Local procurement of biogas plant was sometimes delayed.
		Whether the materials and equipment provided used appropriately	Frequency of the use of provided items	- Project Implementation Reports - Field visits	Provided equipment are used everyday by plant owners and monitored by Project staff and JICA Experts
	Adequacy of the input of Kyrgyz side	Whether the C/P personnel provided appropriately in number, capacity and timing of allocation	Comparison to the plan	- Completion Report by Experts - Interviews with Experts,	The number of C/P should be more considering the field level. The timing of allocation and capability of C/Ps was appropriate, but the one to be a permanent contact person in Ministry of Agriculture.
		Whether the C/P organizations provide local cost and maintenance fee of the provided equipment	Budget allocation, and its amount	- Interviews with C/Ps - Interviews with experts	No particular problem was found so far. There is no local cost allocation by the Kyrgyz side.
		If there is any problem caused by the lack of local cost provided by Kyrgyz side.	Problems caused by the lack of Kyrgyz side budget	- Interviews with C/Ps - Interviews with experts	No during the Project period so far.
		Is the office building and Experts' office space appropriate	Appropriateness of space and building	- Interviews with C/Ps - Interviews with experts	Yes, the provided offices and office space were appropriate.
	Impact	Prospect of achieving Overall Goal	1 No of relevant projects introducing the improved biogas technologies	Achievement level of the indicator	Same as above
Impact on economic aspect		If there is any positive/negative impact caused by the expansion of biogas technologies	Occurrence of economic effects of biogas extension	- Interviews with C/P agencies and experts	Not yet observed at the time of Terminal Evaluation
Impact on social aspect		Impact on gender relationship	Ratio of female in recipients and extension	- Interviews with C/Ps - Interviews with experts	Technical extension staff does not exist in the public extension system so that the questions asking ratio of female participant is not applicable. The plant owners' family saw some decrease in women's work.
Others		If there is any big gap between Overall Goal and Project Purpose	Important assumptions between Project Purpose and Overall Goal	- Interviews with C/Ps and experts - Interviews with JICA Office	Not identified.
		Important Assumptions between Project Purpose and Overall Goal	Possibility of the Important Assumption to be fulfilled	- Interviews with C/Ps and experts - Interviews with JICA Office	The prospect of fulfilling the Important Assumptions between Project Purpose and Overall Goal is unknown.

Sustainability	Policy Aspect	Status of the Project in the policy on extension of the biogas technologies is maintained	Changes in policy on biogas	Same as above	
	Institutional Aspect	(Central level ) Whether any plan or policies are formulated to promote the extension of biogas technology	Implementation Plan for BG related strategy	- Interviews with C/Ps - Interviews with experts	It is hard to judge at the time of Terminal Evaluation.
		(State level) Whether allocation of technical officers for extension activities and training continues after the Project termination	Availability of human resources after the Project termination	- Interviews with C/Ps - Interviews with experts	Not applicable for there is no extension staff. Apart from extension staff, there is no clear plan for the allocation of staff after the Project termination in State level. State Department of Chemicalization and Plant Protection would allocate 1 person to be in-charge of this Project after the termination of the Project.
		Central Level ( Department of Chemicalization and Plant Protection ) Whether the central level has management capacity in decision making and overall management of the Project	Swiftness of the actions taken to the problems	- Interviews with C/P agencies and C/Ps - Interviews with JICA and experts	Since the extension of biogas plants is out of the scope of central level nor of the State level.
		Whether the motivation of C/Ps high	Motivation of C/Ps	- Interviews with C/P agencies and C/Ps - Interviews with JICA and experts	It is understood mixed: The C/Ps commitment toward this Project is low but necessary actions were taken within the scope of their assignment.
	Financial Aspect	Whether the C/P organization can secure necessary budget to continue the activities	Measures to obtain necessary budget	- Interviews with C/Ps - Interviews with experts	Judging from the current situation, it would be impossible.
		(Since no budget was not allocated) What kind of measures were taken to secure budget		Same as above	No actions were taken.
	Technical Aspect	Whether the C/P organization can organize training and seminars and refine their expertise in biogas issues in collaboration with public-private sectors	Measures to improve technical knowledge after the Project termination	- Interviews with C/P agencies and C/Ps - Interviews with private sector	No technical training was conducted on biogas technologies among the C/Ps so that technical extension training would not be conducted. The accumulation of technical knowledge and capacity is among 5 Project-hired technicians.
		Whether the C/P organization can arrange curriculum and training materials for human resource development (for trainers)	Working experience in preparing texts & curriculum	- Interviews with C/Ps, particularly trainer level C/P personnel	Not possible for there is no trainers, curriculum and text book.

ANNEX 4 Assignment of C/P

No	Name of Counterpart	Position / Organization	Field in charge	Term of Assignment		2007												2008												2009												2010												Remarks			
				From	To	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9		10	11	12
1	Mr. Vladimir Afanasovich Pak	Deputy Director of State Department of chemicalization and Plant Protection	Project Director	2007.12.19	2010.12.16	-----																																																			
2	Mr. Mambetor Omurbek Japarovich	Head of the Unit of Chemicalization and Plant Protection, State Department of Chemicalization and Plant Protection	Project Manager	2007.12.19	2010.12.16	-----																																																			
3	Mr. Jybkeev Alybek	Deputy Governor of Chui Oblast	Agriculture Chui Oblast counterpart	2008.06.19	2010.12.16	-----																																																			
4	Mr. Isaliev Sultan	Main Specialist, Agri-industrial development and nature management division, Chui Oblast Administration	Livestock Chui Oblast counterpart	2008.06.19	2010.12.16	-----																																																			
5	Mr. Alybekov Kubuyohbek	Senior Specialist, Agri-industrial development and nature management division	Agriculture and Machinery Chui Oblast counterpart	2008.06.19	2010.12.16	-----																																																			
6	Mr. Alyshbaev K. K.	First Deputy Governor of Issyk-Kul Oblast	Agriculture Issyk-Kul Oblast counterpart	2008.05.22	2010.12.16	-----																																																			
7	Mr. Dunganov Maksat	Leading Specialist, Agri-industrial development and nature management division, Issyk-Kul State Oblast Administration	Agriculture Issyk-Kul Oblast counterpart	2008.05.22	2010.12.16	-----																																																			
8	Mr. Bikirov Meirambek	Senior specialist, Agri-industrial development and nature management division, Issyk-Kul State Oblast Administration	Agriculture and Machinery Issyk-Kul Oblast counterpart	2008.05.22	2010.12.16	-----																																																			
9	Mr. Usubakunov Omurbek	The top manager of chemical and defensive agriculture in Issyk-Kul oblast	Agriculture Issyk-Kul Oblast counterpart	2008.05.22	2010.12.16	-----																																																			







Annex 7 List of the Provided Machinery and Equipment

1. Equipment provided by JICA

No.	Date(Y/M/D)	Type	Maker	Quantity(m <sup>3</sup> )	Currency	Price	Place	Order
BGP-1	15-Dec-08	Stal tank Type	Public fund 'Fluid'	25	USD	28,334	Chui	Local purchase
BGP-2	21-Nov-08	Stal tank Type	Public fund 'Fluid'	25	USD	15,346	Chui	Local purchase
BGP-3	15-Dec-08	Stal tank Type	Public fund 'Fluid'	10	USD	14,050	Chui	Local purchase
BGP-4	26-May-09	Stal tank Type	Constructed by the JICA Project	25	USD	5,160	Issyk-Kul	Local purchase
BGP-5	07-Jun-09	Stal tank Type	Constructed by the JICA Project	11	USD	2,700	Issyk-Kul	Local purchase
BGP-6	07-Jun-09	Square Type	Constructed by the JICA Project	10	USD	2,350	Issyk-Kul	Local purchase
BGP-7	07-Jun-09	Canal Type	Constructed by the JICA Project	10	USD	3,695	Issyk-Kul	Local purchase
BGP-8	07-Jun-09	Dome Type	Constructed by the JICA Project	10	USD	3,235	Issyk-Kul	Local purchase
BGP-9	07-Jun-09	Dome Type	Constructed by the JICA Project	10	USD	1,760	Issyk-Kul	Local purchase
BGP-10	12-Sep-09	Stal tank Type	Constructed by the JICA Project	11	USD	4,589	Issyk-Kul	Local purchase
Sub Total					USD	81,219		

2. Equipment Carried by Experts

No.	Date(Y/M/D)	Type	Maker	Quantity	Currency	Price	Place	Order
KGBGP-001	01-Feb-08	Desktop PC	Hewlett Packard dx 7400	1	USD	1,175	Project Office	Local purchase
KGBGP-002	01-Feb-08	Desktop PC	Hewlett Packard dx 7400	1	USD	1,175	Project Office	Local purchase
KGBGP-003	01-Feb-08	PC software	MS Office Pro Rus	1	USD	385	Project Office	Local purchase
KGBGP-004	01-Feb-08	PC Software	MS Office Pro 2007 Rus	1	USD	385	Project Office	Local purchase
KGBGP-005	01-Feb-08	TFT display for PC	Hewlett Packard L1740	1	USD	345	Project Office	Local purchase
KGBGP-006	01-Feb-08	TFT display for PC	Hewlett Packard L1740	1	USD	345	Project Office	Local purchase
KGBGP-007	01-Feb-08	Laser Printer Network typed monochrome	Hewlett Packard Laser Jet 5200	1	USD	2,450	Project Office	Local purchase
KGBGP-008	01-Feb-08	Temp meter	Sato DT-80	3	USD	350	Project Office	from Japan
KGBGP-009	01-Feb-08	Sensor of the Temp merter	Sato TPK-01	3	USD	37	Project Office	from Japan
KGBGP-010	01-Feb-08	Methane concentration merter	Cosomos Erectoric XP3110	3	USD	2430	Project Office	from Japan
KGBGP-011	01-Feb-08	Gas pressure merter	Nagano GA11-241-2140	3	USD	515	Project Office	from Japan
KGBGP-012	10-Mar-10	Gas Detector Tube	Komyo Rikagaku 126SF	10	USD	230	Project Office	from Japan
KGBGP-013	10-Mar-10	Gas Detector Tube	Komyo Rikagaku 120SB	10	USD	230	Project Office	from Japan
KGBGP-014	10-Mar-10	Gas Aspirator	Komyo Rikagaku AP20	3	USD	690	Project Office	from Japan
					USD	10,742		

ANNEX 8 Local Cost Implementation (Japanese side and Kyrgyztan side)

**JICA**

Unit: KGS

Budget Item	2007	2008	2009	2010 (Plan)	Total Amount
Project Implementation Cost	320,000	2,252,000	5,980,000	7,500,000	16,052,000
Provision of Equipment	0	1,689,000	1,080,000	0	2,769,000
Expert carried Equipment (included shipping & Insurance Charge)	0	173,000	51,000	100,000	324,000
Total	320,000	4,114,000	7,111,000	7,600,000	19,145,000

**Kyrgyz Republic**

Unit: KGS

Budget Item	2007	2008	2009	2010 (Plan)	Total Amount
Project Implementation Cost	0	0	0	0	0
Provision of Equipment	0	0	0	0	0
Expert carried Equipment (included shipping & Insurance Charge)	0	0	0	0	0
Total	0	0	0	0	0

キルギス「バイオガス技術普及支援計画」プロジェクト バイオガスプラント比較表 終了時評価前現状把握用

		チュイ州		
		No.01	No.02	No.03
パイロットサイト 基礎情報	プラントタイプ	鉄製タンク型	鉄製タンク型	鉄製タンク型
	オペラスト	チュイ州	チュイ州	チュイ州
	ライオン	イシクアタ ライオン	トクモク市	ケミン ライオン
	アイルオクモト	イシクアタ		コクオイロク
	アイル	アルマル村		カロールドボ
	主要都市からの距離	ビシュケクより45km	ビシュケクより60km	ビシュケクより150km
	ガスプラントオーナー	クルマノフ・ジャンシユ氏	カルチェンコ・ジェナディ・ペトロビッチ氏	ジャケシヨフ・ベルディバック氏
	その他事項	サンジャル農場	「自然の贈物」農場	
パイロット農家 経営状況	耕作地	自己所有2.5ha 借地15ha	自己所有2.5ha 借地30ha	自己所有3ha
	家畜種・頭数	乳牛30頭、肉牛50頭、羊300頭、馬16頭	牛54頭、豚1,000頭以上、家禽	乳牛4頭、羊30頭
	家畜小屋の大きさ	2,500平方M	2,000平方M	150平方M
	主要作付け品目	大麦、牧草、野菜	果樹(リンゴ、ベリー類)、野菜、樹木	じゃがいも、リンゴ、牧草
パイロットプラント バイオガス 利用計画	ガスの利用目的 1	家畜飼料処理 家屋暖房	畜舎暖房	調理
	ガスの利用目的 2	調理	家畜飼料調理	家屋暖房(部分)
	ガスの利用目的 3	(将来は酪農工場の熱源)		
	肥料利用の対象作物	牧草地	果樹・野菜	果樹・野菜
プラント 諸表	概算工事費			
	ダイジェスチャーのサイズ	25立方M	25立方M (自前で25立方M増設)	10立方M
	ミキシングタンクのサイズ	2立方M	2立方M	1立方M
	ローディングタンクのサイズ	2立方M	2立方M	
	ガスホルダーのサイズ	8立方M	8立方M	3.5立方M
	液肥タンクのサイズ	10立方M	50立方M	6立方M
	利用する糞尿の家畜	牛糞尿	豚糞尿、牛糞尿、人糞尿	牛糞尿、人糞
	糞尿残渣/日	最大3,470kg	最大5,000kg	最大180kg
	操作担当	オペレーター(家族・親族)	オペレーター(家族・親族・使用人) 主人の弟が主担当	家族(主人・息子)
	発酵温度	中温発酵	中温発酵	中温発酵
	設置タイプ	地下埋設型	地上型+家屋	半地下型
	作業室等	鉄筋コンクリート構造の地下作業室	地上型の家屋	鉄筋コンクリート構造の半地下作業室
	ミキシング タンク	ミキシングタンクへの糞尿収集方法	畜舎ピット改修工事予定(傾斜つき) 重力式	一輪車利用(?)
ミキシングタンクの機能		加温装置無し ガス攪拌	加温装置無し ガス攪拌無し	加温装置無し ガス攪拌無し(手動攪拌装置を設置予定)
ロー ディング タンク	工事進捗状況			
	設置の有			
ロー ディング タンク	ローディングタンクへの糞尿移	重力式	コンプレッサー吸引	
	ローディングタンクの機能	セラミックヒーターによる加温(発生バイオガス利用) 攪拌無し	セラミックヒーターによる加温(発生バイオガス利用) 攪拌無し Level gauge有り Thermometer有り	

製造プラント計画	ダイジェスチャーへの糞尿移動方法	コンプレッサー加圧/Mixing Tankからの直接投入(重力式)可	コンプレッサー加圧	重力式(コンプレッサーによるパイプ詰まり解除機構盛込み)
	ダイジェスチャーの機能	セラミックヒーターによる加温(ガス利用)コンプレッサー加圧によるガス攪拌	セラミックヒーターによる加温(ガス利用)コンプレッサー加圧によるガス攪拌 Thermometer有り	セラミックヒーターによる加温(ガス利用)コンプレッサー加圧によるガス攪拌 手動攪拌可
	ダイジェスチャー 工事進捗状況			
計測器類	圧力計	有り	有り	有り
	安全バルブ	有り(0.4bar)	有り(0.4bar)	有り(0.4bar)
	バルーン	有り	無し	有り
	水トラップ	有り	有り	有り
	脱硫装置	有り(乾式脱硫法、酸化鉄)	有り(乾式脱硫法、酸化鉄)	有り(乾式脱硫法、酸化鉄)
ガスホルダー	ガスホルダーへのガス移動方法	コンプレッサー吸引、加圧による	コンプレッサー吸引、加圧による	コンプレッサー吸引、加圧による
	ガスホルダー	Pressure gauge有り	Pressure gauge有り Control valve有り	Pressure gauge有り
	ガスホルダーの設置	Gas Holder出口に設置(増設予定)	Gas Holder出口に設置	作業室、台所に設置
	コンプレッサー	200L Receiver Tank (460L)	200L Receiver Tank(20L)	150L
液肥タンク	液肥タンク	設置	設置	設置
	設置箇所	装置の横の土地にラグーンを設置	装置の横に貯留タンクを設置(25立方MX2)	装置の横の土地にラグーンを設置
	液肥タンク 工事進捗状況			貯留槽に変更
図面等	敷地等のレイアウト	添付	添付	添付
	装置図面	添付	添付	添付
稼働/利用状況				
課題/改善項目				
財務妥当性の検証結果				
運用マニュアルの作成有無				
液肥の利用状況		有	有	有
オープンフォーラムの開催有無				
農家向けセミナーの開催有無		有	有	有
特記事項				液肥試験区設置(供試作物:ジャガイモ)

		イシククリ州						
		No.4	No.5	No.6	No.7	No.8	No.9	No.10
パイロットサイト 基礎情報	大型鉄製タンク型	鉄製タンク型	スクウェア型	カナル型	ドーム型	ドーム型		
	イシククリ州	イシククリ州	イシククリ州	イシククリ州	イシククリ州	イシククリ州	イシククリ州	イシククリ州
	チョンクズルス ライオン	ジェティオグス ライオン	ジェティオグス ライオン	ジェティオグス ライオン	ジェティオグス ライオン	ジェティオグス ライオン	ジェティオグス ライオン	ジェティオグス ライオン
	Yasunayapariana	Jele-Dobo	Jele-Dobo	Saru	Saru	Ak-Dobo	Ak-Dobo	
	チョンクズルス	Sooronbaev (str.18)	Sooronbaev (str.6)	Jeerenbai aji (str.93)	Attokurov (str.18)	Kyshtoobaev (str.43)	Samak str., 13	
	ビシュケクより (375 km) カラコルより (50 km)	ビシュケクより (400 km) カラコルより (20 km)	ビシュケクより (400 km) カラコルより (20 km)	ビシュケクより (370 km) カラコルより (50 km)	ビシュケクより (373 km) カラコルより (47 km)	ビシュケクより (390 km) カラコルより (40 km)	ビシュケクより (390 km) カラコルより (40 km)	
	Mr. Totubaev Kubat (村長)	Mr. Sooronbaev Kadyrbek	Mr. Bapaev Arstanbek	Mr. Ryskulov Taalaibek	Mr. Abdraev Jyrgal	Mr. Karakgalchaev Zaiyrbek	Mr. Ashirov Taalai	
パイロット農家 経営状況	ドナー資金提供でプラントを建設したが稼働不能の状態であり、共同浴場の熱源確保が難しく閉鎖された状況であった	自己所有:3 ha 借地:0 ha	自己所有:3.5 ha 借地:0 ha	自己所有:1.7 ha 借地:0 ha	自己所有:2.7 ha 借地:0 ha	自己所有:5 ha 借地:5 ha	自己所有:13 ha 借地:2ha	
		乳牛4頭、肉牛?頭、羊80頭、馬5頭	乳牛6頭、肉牛4頭、羊30頭、馬0頭	乳牛4頭、肉牛6頭、羊30頭、馬0頭	乳牛3頭、肉牛3頭、羊15頭、馬0頭	乳牛7頭、肉牛13頭、羊20頭、馬5頭	乳牛2頭、肉牛1頭、羊30頭、馬1頭	
		130平方M	130平方M	135平方M	44平方M	213平方M	112平方M	
		果樹-0.3 ha(リンゴ、アプリコット、羊ナス)、ジャガイモ	果樹-0.5 ha(リンゴ、アプリコット、羊ナス)、野菜、ジャガイモ	果樹-0.25 ha(リンゴ)	大麦、小麦	大麦、小麦、牧草、ベリー類:イチゴ	大麦、小麦、牧草	
パイロットプラント バイオガス 利用計画	共同浴場用	調理	調理	調理	調理	調理	調理	
	村ジャム工場の熱源	バーニャ	シャワー	ビニールハウス熱源	家屋暖房	家畜飼料処理	シャワー	
				家畜飼料処理	シャワー			
	販売による運営費補充	果樹・野菜	果樹・野菜	果樹・野菜	果樹・野菜	果樹・野菜	果樹・野菜	
プラント 諸表	25立方M	11立方M	10立方M	10立方M	10立方M	10立方M	11立方M	
	0.7立方M	0.1立方M	0.3立方M	1.4 → 0.45 立方M	0.5	0.5	0.2立方M	
	11→12立方M	3→5立方M	2→5立方M×2	6立方M 0.8立方M	2.5立方M×2 2.5立方M	2.5立方M×2 4立方M	3立方M	
	75立方M	8→12立方M	2.5立方M	2立方M	7立方M	7立方M	8→7立方M	
	牛糞尿							
	コバツ村長 プラント管理者選任予定	家族(主人・息子)	家族(主人)	家族(主人・息子)	家族(主人・息子)	家族(主人)	家族(主人・息子)	
	中温発酵	中温発酵	中温発酵	中温発酵	中温発酵	中温発酵	中温発酵	
	地下型	埋設型	コンクリート正方形地下型	カナル型	埋設型	埋設型	埋設型	
	地下作業室型	地下作業室型	地下作業室型	地下作業室型	地下作業室型	地下作業室型	半地下作業室	
	一輪車利用	一輪車利用	一輪車利用	一輪車利用	一輪車利用	一輪車利用	一輪車利用	
ミキシング タンク	加温装置無し 作業室上部に設置(凍結防止) ガス攪拌予定	加温装置無し 攪拌装置無し	加温装置無し 手動攪拌装置	加温装置無し 攪拌装置無し	加温装置無し ガス攪拌	加温装置無し ガス攪拌	加温装置無し ガス攪拌	
	未着工	工事終了	工事終了	工事終了	ガスライン設置予定	ガスライン設置予定	ガスライン設置予定	
ロー デイン グタンク								



製造プラント計画		重力式による	重力式による	重力式による	重力式による	重力式による	重力式による	重力式による
	ダイジェスター	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌 手動攪拌可	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌 手動攪拌可	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌 ビニールハウス方式の保温	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌	セラミックヒーターによる加温(ガス利用) コンプレッサー加圧によるガス攪拌
		・既存タンクの加工と塗装。 ・タンク基礎の掘り下げ。 ・グラスウールによる保温加工。 ・タンク再据付。 ・加温装置及び配置変更に伴う工事中	・タンクの塗装および保温加工。 ・掘削箇所にタンクを据付。 ・加温装置及び配置変更に伴う工事中 再投入・稼働点検中	・ジャガイモ地下倉庫床にコンクリート打設。 ・便槽コンクリート打設。 ・ペチカ設置場所の掘削。 ・レンガ製間仕切り工事開始。 ・配管孔の作成。 ・加温装置変更に伴う工事中 再投入・稼働点検中	・ヒーティングパイプ設置。 ・カナル壁のコンクリート打設。 ・攪拌装置変更工事・加温装置及び配置変更に伴う工事中 再投入・稼働点検中	・ドーム内壁のコンクリート打設およびモルタル加工。 ・ドーム手直し工事・加温装置及び配置変更に伴う工事中 再投入・稼働点検中	・ドーム内壁のコンクリート打設。 ・加温装置及び配置変更に伴う工事中 再投入	投入・稼働点検中
計測器類		有り	有り	有り	有り	有り	有り	有り
		有り(0.3bar)	有り(0.3bar)	有り(0.3bar)	有り(0.3bar)	有り(0.3bar)	有り(0.3bar)	有り(0.3bar)
		無し	有り	有り	有り	有り	有り	無し
		有り	有り	有り	有り	有り	有り	有り
		有り(乾式脱硫法)	(乾式脱硫法)	(乾式脱硫法)	(乾式脱硫法)	(乾式脱硫法)	(乾式脱硫法)	有り(乾式脱硫法)
ガスホルダー		コンプレッサーを利用	発生圧	発生圧	発生圧・コンプレッサーを利用	発生圧・コンプレッサーを利用	発生圧・コンプレッサーを利用	コンプレッサーを利用
		有り(スチール)	有り(バルーン)	有り(バルーン)	有り(バルーン・スチール)	有り(バルーン・スチール)	有り(バルーン・スチール)	有り
		有り	有り	有り	有り	有り	有り	有り
		50L	50L	50L	800L 50L	50L	50L	50L
液肥タンク		既存排水貯留槽を利用	設置	設置	設置	設置	設置	設置
		装置近くの既存排水貯留槽を利用	装置横に貯留槽を設置	ダイジェスタ併設	ダイジェスタ併設	装置横に貯留槽を設置	装置横に貯留槽を設置	装置横に貯留槽を設置
	加温装置及び配置変更に伴う工事後、屋根工事予定	転落防止として壁を設置予定(オーナー施工)	工事終了	工事終了	工事終了	工事終了	工事終了	工事終了
図面等		無し	無し	無し	無し	無し	無し	無し
		添付	添付	添付	添付	添付	添付	添付
稼働/利用状況		土日浴場使用 使用人数 30~40名 入浴料20ソム 変更工事期間中のため、熱源として石炭・太陽熱温水器を使用	再投入・初期稼働点検中 調理に利用	再投入・初期稼働点検中 調理に利用	再投入・初期稼働点検中 調理に利用	再投入・初期稼働点検中 調理に利用	再投入・初期稼働点検中 調理に利用	初期稼働点検中 調理・シャワーに利用
課題/改善項目		早期工事終了 浴場運営管理の指導 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) ビニールハウス式保温室の改良 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集	保安・付帯手直し工事の早期終了 加温装置変更での性能確認(厳寒期でのペチカ能力) 余剰ガスの燃焼処理 安定稼働に関するデータの収集
財務妥当性の検証結果		妥当	妥当	妥当	妥当	妥当	妥当	妥当
運用マニュアルの作成有無		ドラフト版完成	ドラフト版完成	ドラフト版完成	ドラフト版完成	ドラフト版完成	ドラフト版完成	ドラフト版完成
液肥の利用状況					有			
特記事項		既存プラントの修繕(共同浴場利用)						

**List of International Organizations which are working  
in renewable energy sources (RES) from 2002 in the Kyrgyz Republic**

No	Name of Project	Starting of project	End of project	Project Support	Aim	Main Activities
1	“Advancement of RES for remote regions”	2008	2010	UNDP	Reduction of poverty and improvement of living conditions of rural population by promotion of RES use, micro and small HPS, solar and biogas plants (BGP).	<ul style="list-style-type: none"> <li>Improvement of RES normative and legal basis (Law on RES, Customs and Tax Code, tariff setting methodology etc.)</li> <li>Conducting of training workshops and meetings on RES</li> </ul>
2	“Improvement of potential on application of biogas facilities in Kyrgyzstan”.	2006	2011	UNDP Project “Institutional strengthening and capacity building for sustainable development” Small Grants Programme of GEF	The help to the population of KR in expansion of possibilities in usage of an energy potential of a biomass, reduction of issue of hotbed gases and improvement of agricultural grounds quality.	Design and publication of a guide on application of biogas technologies in Kyrgyzstan.
3	“Project on development of small hydro energy and biogas technologies in Kyrgyzstan”.	Dec., 2008	May, 2010	European Commission	Promotion among the local communities micro-HPS and BGP.	Teaching of local citizens on how to construct and exploit new sources of energy, unification of own resources for a joint construction and use.
4	<b>Program of Global Ecology Fund and LIFE UNDP</b>				Financing of projects related to mini hydro power plants and solar collectors.	
4.1	<b>Introduction of Autonomous RES in Djuuku settlement</b>	4/2002	10/2003	Program of Global Ecology Fund and LIFE UNDP	To give to local people in village Saruu and Djuuku alternative energy source instead of wood and preservation.	Installation of 3 autonomous, small hydroelectric power stations on Juuku River, and also planting 15 000 willows and poplars.

4.2	<b>Reconstruction of village bath-house and transfer its heating system to biogas in Nurmanbet village</b>	8/2002	6/2005	Program of Global Ecology Fund and LIFE UNDP	To give to local people alternative energy source instead of wood and preservation.	Reconstruction of village bath-house and transfer its heating system to biogas
4.3	<b>Establishment of combined Biogas-Units and Small Hydroelectric Station in Kyzyl-Charba village on Urmaral river</b>	4/2002	12/2003	Program of Global Ecology Fund and LIFE UNDP	To give to local people alternative energy source instead of wood and preservation.	Construction of 3 BGP and 1 mini-hydropower station for heating and preparing food
4.4	<b>Introduction of individual household biogas-units in Issyk-Kul region.</b>	6/2003	6/2004	Program of Global Ecology Fund and LIFE UNDP	To give to local people alternative energy source instead of wood and preservation.	Demonstration of ecological and economic advantages of using the small volume BGP (5-10m3)
4.5	<b>Increasing of efficiency of heating houses by implementation energy and heat saving technologies</b>	8/2003	12/2006	Program of Global Ecology Fund and LIFE UNDP	Propagation and introduction of asset of energy and heat technologies	Propagation and introduction of asset of energy and heat technologies in At-Bashy district, the most high mountainous administrative district in Kyrgyzstan.
4.6	<b>Training and manufacture Center for introduction of climate-friendly technologies in rural areas</b>	9/2003	9/2006	Program of Global Ecology Fund and LIFE UNDP	Propagation and introduction of asset of energy and heat technologies	Demonstration of climate-friendly technologies using RES
4.7	<b>Promoting the adoption of RES (BGP) by reduction their production costs, increasing awareness about construction types, implementation of loan schemes among rural population of adyr zone in the Osh oblast.</b>	12/2004	6/2006	Program of Global Ecology Fund and LIFE UNDP	Propagation and introduction of asset of energy and heat technologies	Introduction of BGP by removing barriers as insufficient awareness and high cost of production of individual BGP.
4.8	<b>Demonstration of environment and economy benefits</b>	12/2004	6/2006	Program of Global Ecology Fund and LIFE UNDP	Demonstration of economic and ecological benefits of applying of BGT and composting.	

	<b>originated by processing of abscised leaves and rests of agriculture plants in compost pit and BGP in the Chonjargylchak village-center of Issyk-Kul biosphere territory.</b>					
4.9	<b>Demonstration of environment and economy benefits of combination of RESA and EST in the Novopavlovka village</b>	1/2005	6/2006	Program of Global Ecology Fund and LIFE UNDP	To eliminate shortcomings and limitations of separate devices by combining them in one energy saving complex by the example of average farm and give wide propagation of experiment results that will raise public awareness about these technologies.	
4.10	<b>Demonstration of environment and economy benefits of using organic fertilizers originated by composting and anaerobic fermentation of plant, animal waste in Kalba village of Talas oblast</b>	4/2005	12/2007	Program of Global Ecology Fund and LIFE UNDP	Demonstration of opportunities of organic fertilizers application for natural soil fertility preservation	Demonstration of opportunities of organic fertilizers application for natural soil fertility preservation
4.11	<b>Promotion and facilitation of BGT dissemination by overcoming of information, economy, technical barriers through distribution of reference book on BGT, conducting on site training seminars and presentations in each oblast of Kyrgyzstan.</b>	1/2006	6/2007	Program of Global Ecology Fund and LIFE UNDP	The project is proposing to use up the manure by implementing the BGT.	
4.12	<b>Reduction of manmade pressure on coniferous</b>	1/2006	6/2007	Program of Global Ecology Fund and	To promote of alternative types of energy resources	Promotion of alternative types of energy resources:

	<b>forest and river plane forest plots, containing species included into Red Book of Kyrgyzstan by ensuring energy need of inhabitants of Juuku tract through installation of RES and plantation of fast growing trees in the forest and steppe belt of southern slope of Teskey Alatau.</b>			LIFE UNDP		solar collector, mini hydro electric stations and BGP
4.13	<b>Conservation of biodiversity by organizing forest nursery of species that are in the Kyrgyz Red Book to produce saplings in briquettes in buffer zone of Sary-Chelek reserve and establishing BGP for fertilizer production.</b>	6/2006	11/2007	Program of Global Ecology Fund and LIFE UNDP	To rehabilitate the forest the nursery of endemic and rare types	
4.14	<b>Planning grant research on introducing BGP in Batken oblast by analyzing diverse types and constructing demonstrative devices</b>	6/2006	11/2007	Program of Global Ecology Fund and LIFE UNDP	To introduce the biogas devices in the Batken area	To introduce the biogas devices in the Batken area
5.	<b>Use power efficient technologies and application of RES for preservation of natural resources and improvement of life conditions of rural population of mountain regions</b>	2008	2009	Federal ministry of environment spent, preservation of the nature and nuclear safety of Federal Republic of Germany The government of Liechtenstein Princedom	Improvement of life conditions of rural population of mountain regions of the Central Asia by application of energy efficient technologies and facilities on the basis of RES	Monitoring and evaluation of situation by use of accessible energy sources, conduction of training seminars and round tables, conducting of market researches on identification of most acceptable energy efficient technologies for rural population.



				PF CAMP Ala- Too		
6	<b>The project for the support for the dissemination of biogas technology in the Kyrgyz Republic</b>	12/2007	12/2010	JICA	Dissemination of biogas technologies in rural areas and improvement of living condition of the rural people adopting these technologies	<ul style="list-style-type: none"> <li>• To improve the design of existing biogas technologies</li> <li>• To develop user's manual on operation and maintenance for the improved BGP</li> <li>• To develop user's manual on utilization of biogas and liquid fertilizer produced at the BGP</li> <li>• Conducting of technical training for personnel in charge of extension work of the BGT</li> <li>• Conducting of necessary revisions of the existing financial institutions and regulations</li> </ul>

