

## Summary of Terminal Evaluation

I. Outline of the Project	
Country: People's Republic of China	Project title: Model Project for Water-saving Irrigation of the Environmental Conservation Type in Grassland Areas
Issue/Sector: Agriculture/Forestry/Fisheries-Agriculture-Agriculture/General	Cooperation scheme: Technical Cooperation Project
Division in charge:	Total cost (estimated at completion of the Project): 320 million yen
Period of Cooperation	(R/D): From June 1, 2007 to May 31, 2011
	Partner Country's Implementing Organization: Ministry of Water Resources and China Irrigation and Drainage Development Center  Supporting Organization in Japan: Ministry of Agriculture, Forestry and Fisheries
<p>1 Background of the Project</p> <p>In the arid/semiarid land of northwest China, the devastation of grassland and its desertification is in progress due to human factors, such as over cultivation and overgrazing, and due to natural factors, such as climate change. Due to such conditions, it is presently estimated that 2 million ha of grassland are turning into wasteland every year. In other words, 65% of all grasslands in China are in danger of devastation. Presently, only 10% of the grasslands are unaffected by desertification, etc. Because of the devastation of grassland, the natural environment is also deteriorating, and the decline of vegetation percentage is causing dust damage, such as yellow sand, soil erosion and heavy sediment influx into near by rivers.</p> <p>The Chinese Government is attempting to recover the vegetation of grassland and to improve the ecology by such activities as stopping farming and grazing, based on the reality that deterioration of the ecology is due to grassland devastation and desertification. The Government has also established a grazing management system (grazing prohibition, grazing cessation, circular grazing, etc.) combined with stall-feed. At the same time and as part of this system the Government is carrying out activities to realize long-term forage production, including creating artificial grasslands.</p> <p>It is necessary to supply water with irrigation facilities to improve the productivity of forage in artificial grasslands. However, the technical level of in-situ existing irrigation facilities is low; requires improvement in terms of designing, construction and maintenance. For this reason, the Ministry of Water Resources has come to recognized that the installation of irrigation facilities in the artificial grasslands areas is an important activity for a certain period of time into the future. For example the "Ecosystem and water resources security plan for grazing grasslands in the national livestock grazing areas" in China plans to install irrigation facilities and spread water-saving irrigation technology. However, in most of target areas, grazing has been the main activity for centuries, with slight experience in the installation of irrigation facilities that are based on the natural conditions, such as the amount of water resource available. Further, a water-saving irrigation method in the artificial grasslands that can be used as a model does not exist; herders do not have experience with irrigation farming, nor is there a system to use water effectively, for example.</p> <p>Considering this background, in order to establish a reasonable, planned water-saving irrigation system within the grazing grasslands, the Chinese Government requested the technical cooperation project, namely, the "Model project of water-saving irrigation of the environmental conservation type in grassland areas" to the Japanese Government.</p>	

## 2 Project Overview

### (1) Long-term Goal

The livelihood of farmers and herders, and the ecology is improved through sustainable farming/grazing in the arid/semi-arid area of China, where the ecology is deteriorating heavily due to such factors as desertification.

### (2) Overall Goal

In the important target sector of the plan, namely, “Ecosystem and water resources security plan for grazing grasslands in the national livestock grazing areas” in China (abbreviated as ‘Security Plan’ hereinafter), which is based on the ‘Water-saving Irrigation Facility Installation Plan in Artificial Grasslands (distribution and selection of facilities, selection of water-saving irrigation methods and the facility operation plan)’ (abbreviated as ‘Installation Plan’ hereinafter), the best farming (stock-farming) practices are carried out and the grazing pressure on the natural grassland is subsequently reduced.

### (3) Project Purpose

Planning method of the Installation Plan is established as the model to spread the Security Plan into important target areas.

### (4) Outputs

- 1) The planning manual of the Installation Plan is drawn-up.
- 2) The impact of the Installation Plan is examined in the model sites.
- 3) Training contents aimed at spreading the planning method of the Installation Plan is drawn up, and subsequently training of engineers is carried out in the main target area of the Security Plan.

### (5) Inputs

#### Japanese side:

Long-term Expert: Total 6 persons; Short-term Expert: Total 4 persons

Trainees dispatched to Japan: 26 trainees, Provision of equipment: Total 5.34 million Yuan (67 million yen)

Japan’s cost expenditure: 116 million yen

#### China side:

Counterpart: Total 72 persons; Local Cost: Total 5.58 million Yuan (70 million yen)

Provision of land and facilities: Office space for Japanese experts (in Beijing)

## II. Evaluation Team

Members of Evaluation Team	1) Team Leader: Mr. Shiro Akamatus, Senior Advisor (Rural Development), Japan International Cooperation Agency (JICA) 2) Irrigation Technique: Mr. Mansaku Nomura, Deputy Director, Overseas Land Improvement Cooperation Office, Design Division, Rural Development Bureau, Ministry of Agriculture, Forestry and Fisheries 3) Project Management: Ms. Satomi Sato, Paddy Field Based Area Team I, Rural Development Department, JICA 4) Evaluation Analysis: Mr. Isao Dojun, Chuo Kaihatsu Corporation	
Period of Evaluation	From Oct. 17, 2010 to Nov. 3, 2010	Type of Evaluation: Terminal

### III. Results of Evaluation

#### 1 Achievement

(1) Output 1: The planning manual of the Installation Plan is drawn-up

Achievement: In December 2010, a committee designated to complete the manual's composition will be held. At the same time, the final planning manual of the Installation Plan will be reviewed. Also, the installation plan (final draft) of the model sites and the effect of installation on the area will be organized as examples. According to the result of the questionnaire completed by the engineers in the project area, the content of the plan is very favorably evaluated. Therefore, Output 1 will be achieved by the end of project period.

(2) Output 2: The impact of the Installation Plan is examined in the model sites.

Achievement: Demonstration test in the model sites was carried out as scheduled, and the target herder's awareness on water-conservation is improving. Also, the consumption volume of irrigation water is nearly reduced to the target value (reduction by about 20%). In addition, the goal of forage production volume/productivity per unit area has been attained. Therefore, Output 2 is almost achieved at the present stage.

(3) Output 3: Training contents aimed at spreading the planning method of the Installation Plan are drawn up, and subsequently training of engineers is carried out in the main target area of the Security Plan.

Achievement: The contents of the Training program are almost completed. According to the results of the questionnaire completed by the engineers, the training contents are very favorably evaluated; the trainees are very satisfied with the training program overall. Therefore, Output 3 will be achieved by the end of project period.

(4) Project Purpose: Planning method of the Installation Plan is established as the model to spread the Security Plan into important target areas.

Achievement:

1) The fourth draft manual of the Installation Plan is drawn-up. The manual composition committee, which will be held in December 2010, will check the contents of final draft and confirm its publication (under the name of Farm Water-use Section, Ministry of Water Resources, China Irrigation and Drainage Development Center).

2) In the model sites of Hangjinqi, the Inner Mongolia Autonomous Region, and in the model site of Murei Prefecture, the Xinjiang Uygur Autonomous Region, the degree of dependency on forage produced in artificial grasslands were recorded as 35.8 % and 28.9%, respectively; the established goal (35% and 25%) was achieved.

3) In December 2010 (or in 2011, depending on the state of implementation of the training plan in the future), a meeting will be held regarding the contents of the training program, which will include a section for the Ministry of Water Resources. The contents of this manual will be checked and approved for use as the training material (under the name of Farm Water-use section, Ministry of Water Resources, 'China Irrigation and Drainage Development Center').

Thus, the project purpose is expected to be met.

## 2 Summary of Evaluation Results

### (1) Relevance: High

The target area of the Project is located in an arid/semi-arid climate, and due to overgrazing with increased number of livestock and insufficient installation of water-use facilities required for forage growing, grasslands are increasingly becoming deteriorated and so livestock raising has become negatively affected. Regarding the water-use facilities, a significant amount of irrigation water has been lost within the farmland itself, as well as while flowing the distance from the water source to the farmland. Moreover, herders have a significant demand on the installation of water-saving irrigation facilities, while the administrative engineers in charge of the water-use facility construction, drastically need to improve their ability to draw-up a water-saving installation plan. Also, both the areas selected as model sites of this Project are of the typical nature of grasslands and pastoral lands in China; validated the model sites selection.

The aim of this Project corresponds to the guideline, 'Outline of the Eleventh 5-year plan (2006 – 2010) for National and Social Development of People's Republic of China', of the government and the basic policy of "Ecosystem and water resources security plan for grazing grasslands in the national livestock grazing areas" in China prepared by the Ministry of Water Resources.

Through manuals being drawn-up, demonstration tests being carried out and the enhanced ability of the staff, the project content can be used to establish a model method in order to develop/carry out the Installation Plan of artificial grasslands in the pastoral area. The approach of this Project is thereby validated.

### (2) Effectiveness: High

The three achievements of this Project are: 1) Prepare a planning manual for the Installation Plan, 2) Examine the model sites impact of the Installation Plan; and 3) Prepare the training contents aimed at spreading the planning method of the Installation Plan" method, and subsequently training of the engineers is carried out in the main target area of the Security Plan. All three of these objectives were nearly attained at the present stage or will be certainly attained by the end of the Project period. In addition, the Project Purpose, namely, the planning method of the Installation Plan is established as the model to spread the Security Plan into important target areas, is almost attained at the present stage, and will be sufficiently attained by the end of the Project period. Certain results have been achieved based on the plan of operation, and therefore this Project will have a very recognizable degree of effectiveness.

### (3) Efficiency: High

The input of Japan and China are suitable in terms of quantity, quality and timing, and in general the Project activity was carried out on schedule. Corresponding to one of the proposal at the mid-term review, namely, "quick input by short-term experts for effective timing and for effective field instructions", 4 short-term Japanese experts were dispatched and effective technical transfer was carried out. Due to the civil disturbance in the Xinjiang Uygur Autonomous Region, since July 2009 for about 1 year, the Japanese experts could not visit that model site. However, the counterpart of the district has been in contact with the Beijing office for discussion, and major issues in the progress of activity have not been occurred. Since the input and activity of this Project was suitable, and because the three achievements mentioned above are almost attained even at the present stage, the efficiency of this Project is evaluated as being high.

#### (4) Impact

##### 1) Prospect of achieving the Overall Goal

The Chinese Government aims to expand the water-saving irrigation area of the artificial grasslands, and the index is to be based on the Installation Plan carried out by the Ministry of Water Resources. The area of irrigated artificial grasslands (including re-developed area) will then expand to 30,000ha (450,000 mu)” and is estimated to be basically achieved within 5 years. Additionally, during demonstration test it was evidenced that within the 2 model sites of this Project, dependence on the forage produced in the artificial grassland amounted to 35.8% and 28.9%, respectively. The simple average is 32.4%. If dependency rate on forage produced in artificial grassland reaches the same level in other grasslands in the future, grazing pressure to other natural grasslands will be reduced. Thus, the Overall Goal is assumed to be sufficiently achieved.

##### 2) Other Impact

a) In the model sites of Hangjinqi, the Inner Mongolia Autonomous Region, there were visitors from other districts to inspect the management conditions of the model herder (herder Mr. Suto and others). Herders in the model sites accepted the intention of the Ministry of Water Resources, and they were instructed and then they constructed their own water-saving irrigation facilities, while underlining that eventually experts should carried out construction works.

b) In the Murei prefecture of the Xinjiang Uygur Autonomous Region, the same type of water-saving irrigation facilities as in the model site is being introduced. For example, under the government’s support (subsidy), water-saving irrigation facilities have been introduced to the land area of about 5,000mu (about 333ha), which coincide with about 200 herder homes, where crops such as alfalfa, wheat and green peas are also grown. In addition, herders around the model site have become influenced by the efficient crop farming in the nearby water-saving irrigation facility model site, and as such they started to introduce on a voluntary basis the same type of facility as well as to grow forage crops too.

#### (5) Sustainability

It is very likely that policy, organization, finance and technology aimed at independent future growth will be secured.

##### 1) Policy aspect

As written in the section of “(1)Relevance”, the Chinese Government continues to recognize clearly as important the following policy activities: i) implementation of a grassland and grazing balance system, ii) promotion of grazing prohibition/cessation and iii) circular grazing, development of stall-feed, grassland cultivation and water-use facility construction in the pastoral area. In line with this, the Ministry of Water Resources maintains a policy to promote the actively of the irrigation project in the pastoral area focusing on creating artificial grasslands with water-saving irrigation.

##### 2) Organizational and Financial aspects

The China Irrigation and Drainage Development Center, one of the counterpart organizations of this Project, was organized and established in 1993 to develop/spread irrigation and drainage technology throughout the country and to develop human resources under the cooperation of Japan. The

Center is under the direct control of the Ministry of Water Resources. Also, the Center takes responsibility of such activities as the examination/promotion of the Ministry of Water Resources's policy. Thus, after the Project ends, the counterpart will be fully capable to carry out continually the improvement of the ability of the engineers in the area where important pastoral districts are included, while giving due regards to both organization and finances of the area. Further, the related organizations within the Inner Mongolia Autonomous Region and in the Xinjiang Uygur Autonomous Region, in charge of the activity in the model sites, have improved their organizations to instruct/manage the introduction of suitable water-saving irrigation to artificial grasslands based on the Installation Plan through this Project. Both Regions will continue to develop irrigation activities in the pastoral area well into the future; budget to this end is expected to be secured.

### 3) Technical sustainability

The counterpart of the Ministry of Water Resources and 'China Irrigation and Drainage Development Center', after receiving various opinions on the project from related engineers and thereby making necessary preparations, the final version of the planning manual of the Installation Plan and its related training contents is to be prepared. In addition to the Manual, based on the results of the activity in the model sites, examples will be collected. The counterpart of this Project has been carrying out this activity including the drawing up of the installation plan in model sites, instruction of demonstration test, etc. as well as monitoring. It is assumed that the counterpart has acquired sufficient know-how to promote water-saving irrigation installation in pastoral area. After the Project, it will be possible to establish water-saving irrigation technology methodology through the instruction/introduction received from the achievements of this Project (Manual, demonstration and training contents) through meetings or in training of engineers who engage in water-use activities in pastoral area.

### 3. Factors that promoted the realization of effects

The model sites are very far from Beijing, in terms of time and distance, where experts are staying. Also, since July 2009 for about 1 year, the Japanese experts could not traveled to or stay in the model site of the Xinjiang Uygur Autonomous Region. However, as the result of detailed adjustment and discussion carried out with the Chinese counterpart organization, without any major influence even given such restrictions as distance, the project activities were carried out almost on schedule. The line of direction/command of the Chinese organization is correctly functioning, and this would be one of the factors to identify time-line implementation.

### 4. Factors that impeded the realization of effects

None

### 5. Conclusion

The three results of this Project are: 1) Prepare a manual, 2) Verify the water-saving irrigation effects in model sites, and 3) Complete the training contents and commence engineer training. Each of these goals is expected to be achieved by the end of the Project period. Besides, the Project Purpose, namely, 'Planning method of the Installation Plan is established as the model to spread to important target areas of the Security Plan' is also expected to be achieved. Relevance, effectiveness and efficiency of this Project are showing significant results, and a positive impact is confirmed by the spreading to these results to other areas around the model sites. It is very possible that policy,

organization and technology will independently grow in the future. Using the achievements of this Project, this project is expected to contribute to the eco-system conservation of the grasslands through the introduction of suitable water-saving irrigation to pastoral area.

From the above, the Project Purpose is expected to be achieved by the end of the Project period, and thus it is appropriate to closeout this project on May 31st, 2011 as initially scheduled.

## 6. Recommendations

### 6-1 Recommendation on the activities to be carried out during the remaining period of the Project

- (1) Complete the draft Installation Plan Manual based on the plan of operation.
- (2) Collect the results of the demonstrations that were carried out in the model sites.
- (3) Complete the training contents based on the results of the training of about 70 staffs as scheduled in the future and carry out a survey questionnaire at that time as well.
- (4) At the end of the Project period, make a presentation using the verified data obtained from the model sites wherever possible, presenting the results to those who are related but represent a wide variety of fields, and to introduce and briefly explain the completed Manual.
- (5) Develop a training plan for irrigation engineers of the pastoral areas that have been carried out by the 'China Irrigation and Drainage Development Center', etc. (The training plan should be spread throughout an entire year of activity, and include a number of trainees, provide the location of target trainees and training contents.)

### 6-2 Recommendations after the termination of the Project

(1) The engagement of central government is very important when promoting water-use activities of the local government. Thus, it is desirable that the central government be continually involved in the Project for the foreseeable future.

#### (2) Continual monitoring

The Chinese counterpart are required to monitor continually the condition on water-saving irrigation activity achievements of the project in the artificial grasslands, which are going to be carried out as well as to improve the condition as the need arises.

## 7. Lessons Learned

In general, the project was smoothly carried out as planned. This is due to the close cooperation system between the 'China Irrigation and Drainage Development Center' and Japanese experts, even though the demonstration project sites are located a significant distance from Beijing where the experts resided.