

1. Outline of the Project		
Country name: People’s Republic of China		Project name: The Sustainable Agricultural Technology Research and Development Project
Fields: Agriculture		Asisstance type: Technical cooperation project
Supervising office: First Group, Rural Development Department		Monetary amount of cooperation (at time of evaluation): Approx. 800 million yen
Period of cooperation	R/D: February 6, 2002, to February 5, 2007 (5 years) F/U: E/N:	Counterpart organizations: Ministry of Agriculture, Chinese Academy of Agricultural Sciences, Japan-China Research and Development Center for Agriculture Technology
		Cooperating organization in Japan: Ministry of Agriculture, Forestry, and Fisheries
		Other associated cooperation: Grant aid cooperation
1-1 Background and outline of the Project The population of the People’s Republic of China (hereinafter “China”) is expected to reach 1.6 billion by 2030. Meanwhile, approximately 300,000 ha of agricultural land are being lost each year to desertification and other problems. Thus, the Chinese government is being pressed to tackle the issue of food security in response to predicted population increases in the future. Given these circumstances, “development of sustainable agricultural technologies” for the purposes of increasing the production and earnings of agricultural products and of improving the quality of these products—to be achieved through improvements in land productivity, land-use efficiency, labor productivity, and technical contribution—so as to maintain stable food supplies in China is becoming an urgent task. The Chinese government decided to established the “Japan-China Research and Development Center for Agriculture Technology” (hereinafter “the Center”) to serve as a research institute for conversion of basic agricultural test results into forms that can be used by farmers as well as the application of these results. The Chinese government also submitted requests to the Japanese government for grant aid to establish the machinery and equipment needed to develop practical technologies and for technical		

cooperation in the development of practical technologies using the Center.

In response, the Japan International Cooperation Agency (hereinafter “JICA”) dispatched a contact study team (June 1999), a first short-term study team (September 1999), a second short-term study team (May 2000), and a third short-term study team (July 2001) to confirm detailed cooperation content of this plan and the implementation structure, etc., of the Chinese side. These activities resulted in the signing and exchange of a Record of Discussions (R/D) in December 2001, and the commencement of project-type technical cooperation (currently a technical cooperation project) entitled the “Sustainable Agricultural Technology Research and Development Project” from February 6, 2002, to February 5, 2007.

1-2 Description of cooperation

(1) Overall Goal

Sustainable production of wheat, soybeans for food and oil, rice, etc., in response to domestic demand as well as practical technologies to raise farmers’ income are developed.

(2) Project Purpose

Model methods for developing practical technologies for sustainable production of wheat, soybeans for food and oil, rice, etc., are established.

(3) Outputs of the project

- 0) The operational structure of the Center is established.
- 1) Circumstances surrounding onsite production needs, consumption and actual demand needs, etc., are ascertained.
- 2) Breeding methods for sustainable production of wheat, soybeans for food and oil, rice, etc., are developed.
- 3) Environment-friendly cultivation management technologies are developed through efficient use of natural resources.
- 4) An agricultural technology information system for gathering, accumulating, sharing, and utilizing onsite information on sustainable production is developed.
- 5) Linkage among the various relevant fields (breeding methods, soil fertilizer, pests, information, etc.) is reinforced.

(4) Inputs (at time of evaluation)

Japanese side		
Dispatch of long-term experts:	Total of 10 experts	
Dispatch of short-term experts:	35 experts	
Training of C/Ps in Japan:	36 C/Ps	
Provision of machinery and equipment:	Approx. 180 million yen	
Assumption of local costs:	Approx. 70 million yen	
Chinese side		
Allocation of C/Ps:	84 C/Ps	
Provision of land and facilities		
Assumption of local costs:	Approx. 12 million yuan	
2. Outline of the Evaluation Team		
Members	(Field, name, occupational position)	
	Team leader:	Shigenari Koga Managing Director, Rural Development Department, JICA
	Research cooperation:	Tatsuya Mochizuki Research Manager, National Institute of Vegetable and Tea Science, National Agriculture and Food Research Organization
	Planning evaluation:	Taro Izumi Paddy Fields Based Farming Area Team III, First Group, Rural Development Department, JICA
	Evaluation and analysis:	Jun Totsukawa Senior researcher, Sano Planning Co., Ltd.
Evaluation period	July 11, 2006, to July 27, 2006	Evaluation type: Final evaluation
3. Outline of Evaluation Results		
3-1 Confirmation of achievements		
The first indicator for the Project Purpose (i.e., “model methods for developing practical technologies for sustainable production of wheat, soybeans for food and oil, rice, etc., are established”) is “comprehensive research will be implemented through linkage among all fields of the Center in at least one verification field by January 2007.” In order to achieve this indicator, the Project established four comprehensive research bases in Changping (Beijing), Yinchuan (Ningzia Hui Autonomous Region), Harbin		

(Heilongjiang Province), and Shouyang (Shanxi Province), where a total of 17 issues have been studied in comprehensive research covering two or more fields. Accordingly, this indicator is considered to have been achieved already. For the second indicator, which is “the abovementioned research framework will be approved as an operational model of the Center by the Joint Coordination Committee by January 2007,” this indicator is considered to have been satisfied, as the research framework, including budgetary aspects, was approved by the Joint Coordination Committee in September 2004.

Six Outputs were established for the Project: 0) the operational structure of the Center is established; 1) circumstances surrounding onsite production needs, consumption and actual demand needs, etc., are ascertained; 3) breeding methods for sustainable production of wheat, soybeans for food and oil, rice, etc., are developed; 4) environment-friendly cultivation management technologies are developed through efficient use of natural resources; 5) an agricultural technology information system for gathering, accumulating, sharing, and utilizing onsite information on sustainable production is developed; and 6) linkage among the various relevant fields (breeding methods, soil fertilizer, pests, information, etc.) is reinforced. All of these Outputs have been achieved or are expected to be achieved with the exception of Output 4 (i.e., “environment-friendly cultivation management technologies are developed through efficient use of natural resources”). On the other hand, regarding Output 4 (“environment-friendly cultivation management technologies are developed through efficient use of natural resources”), some of the comprehensive research bases had poor communications conditions, and establishment of an observation system using field servers is finally getting started. Accordingly, continuous efforts toward gathering and processing data and then utilizing these data will be required going forward.

3-2 Outline of evaluation results

(1) Relevance

The Chinese government has made securing food supplies for 1.6 billion people in the 21st century and pursuing agricultural production that is friendly to the natural ecology and environment priority agricultural policies. An important pillar of these policies is “research and development of practical technologies that can be accepted by farmers.” At the same time, while China has been engaged in a broad range of agricultural research, it is said to lack systems for applying practical technologies. Given the above, the Project can be described as being in line with these policies and realities in

China. Moreover, Japan's ODA Charter and "medium-term ODA policies" mention "poverty reduction" as a priority aid field, and here emphasis is placed on cooperation in the agricultural sector. And JICA's country program for China lists "support for overcoming poverty" as a priority field in its aid to China, and this field contains such items as "improved farmer income." Although China has reached a high level in terms of basic research in the agricultural sector, it has fallen behind in converting this research into useable practical technologies for farmers and then applying the results, as well as in comprehensive research that links various fields. Thus, the fact that Japan—which possesses experience and achievements in these fields—is providing cooperation in this area is highly significant. Moreover, because Japan has accumulated experience and know-how over long years in breeding methodology, soil and fertilizers, and pest management and information, all of which are technical fields addressed by the Project, the Project was an undertaking having potential for high efficiency.

(2) Effectiveness

As of the present time, the Project's operational framework and inputs from both Japan and China are proceeding favorably for the most part, and the desired outputs are being realized. Moreover, no external conditions that affect Project progress have appeared, and thus the Project Purpose is being achieved.

Although six Outputs were established for the Project, the flow from fundamental aspects (establishment of an operational framework and ascertainment of needs) to technical development in each field and linkage of fields (comprehensive research) was clear. As a result, achievement of these Outputs was considered to be tied to establishment of model methods, which is the Project Purpose.

(3) Efficiency

Looking at the inputs from Japan, the dispatch of long-term and short-term experts, acceptance of C/P trainees, provision of machinery and equipment, assumption of local costs (including contributions to an association fund for comprehensive research), and other inputs are being implemented accordingly to plan and efficiently. However, because there were delays in the manifestation of outputs in the information field, some inefficiency with regard to dispatch of the short-term experts was recognized. As for inputs from China, the C/Ps were allocated in accordance with what was agreed upon in the R/D, and China is working to provide the basic expenses it must assume and to

supply the facilities, etc., necessary for Project implementation. Based on the above, the team has determined that inputs from both Japan and China were appropriate in terms of scale and quality, although there was some inefficiency in terms of timing.

(4) Impact

1) Expectation for achievement of the Overall Goal

Looking at the indicator for the Overall Goal that states “for all research under the jurisdiction of the Center up to January 2011, the conversion rate of practical technologies that are useful in improving sustainable productivity and farmers’ incomes will reach 60%,” insufficient time has passed at the present time to make an evaluation of the conversion rate for practical technology. However, because practical technologies that are useful in improving farmers’ incomes are being developed for wheat, soybeans, and maize, the team finds that the practical technology conversion rate as expressed in numerical form will increase toward the target value of 60%.

2) Financial aspects

a. Connection with the central government and agricultural policy

The Institute of Environment and Sustainable Development in Agriculture (the Center) has been designated an important open laboratory by the Ministry of Agriculture. This designation has raised the name recognition of the laboratory and the Center, and has made it possible for them to receive considerable financial assistance from the government. Moreover, a seminar on technical countermeasures was held to report cold damage that occurred in the wheat-producing district of Henan Province and to propose countermeasures. The results of the seminar were compiled into a report for the Ministry of Agriculture, which in turn led to the ministry’s designation of the “Agricultural Damage Alleviation and Ecological Agriculture Laboratory” of the Center as the domestic office for agricultural information and disaster information experts in the abovementioned countermeasures.

b. Connection with local governments and agricultural policy

In Henan Province, the Project’s introduction of countermeasures against low-temperature wheat damage led the provincial government to increase budgetary funding for these countermeasures and to work to extend the technologies within the province. Moreover, when the Project brought a

wheat-tasting evaluation system into the province, the provincial government moved to secure funding to purchase the machinery, equipment, and materials needed for this system. In this way, examples are emerging in which technologies introduced from the Center are having a significant impact on agricultural policy and budgetary allocation for agricultural development.

3) Economic and rural social aspects

No-tillage cultivation of wheat matched to regional characteristics was introduced into 250,000 *Mu* in Luoyang. Although detailed data from farming household budgets are unavailable, it is thought, based on theoretical figures, that this technique produced an approximately 900 yuan per ha increase in profit. Furthermore, because diffusion of high-quality wheat that was developed through the project has begun, an increase in sales price of between 0.3 and 0.4 yuan/kg is expected. Meanwhile, efforts to extend developed technologies were also confirmed in Yinchuan. Among them is the introduction of technologies that were developed through the Project in the “training plan for one million farming households.”

4) Organizational aspects

The framework for research exchange between the central government’s Chinese Academy of Agricultural Sciences and regional agricultural science institutes was strengthened through research at the comprehensive research bases. Moreover, the relationship between the National Food Institute and Chinese Academy of Agricultural Sciences, which had involved little exchange heretofore, was reinforced to the point that the two organizations now hold seminars and daily opinion exchanges. And the relationship among educational institutions, such as the China Agricultural University and Capital Normal University, has also been enhanced. This relationship is leading to the establishment of a comprehensive activity framework.

(5) Sustainability

1) Future policy pertaining to sustainable agricultural technologies

China’s 11th Five-Year Plan sets specific policies for the agricultural sector and proposes implementation of a national promotion strategy that is based on science and education and a “strategy for a strong nation” that is based on human resources; these strategies are to be achieved through reinforced capacities to

initiate creation and innovation. These policies and strategies are in line with the direction being taken by the Project, and thus there are no problems with the Project's sustainability in terms of policy aspects.

2) Organizational perspectives

The five laboratories of the Chinese Academy of Agricultural Sciences that are participating in the Center have already been positioned as non-profit scientific and research institutes based on national regulations, and they have successfully attained results in terms of staff allocation, acquirement of operating expenses, and establishment of an operational platform. These changes have contributed to the sustainability of the Japan-China Project and are expected to contribute significantly to sustainability in the future.

3) Financial perspectives

Since 2004, an "association fund" of approximately one million yuan (approximately 14.6 million yen) has been established to set up and operate the four comprehensive research and testing bases. This fund has been supported by both Japan and China based on set shares. It should be noted that China has continued to make contributions to the fund that are in excess of its set share, and it is expected to contribute some 970,000 yuan (approximately 14 million yen) in FY2006. The Chinese side also obtained approximately 4 million yuan (approximately 58 million yen) in 2005 and some 5 million yen (approximately 73 million yen) in 2006 for specific expenses from the Ministry of Finance; these funds were invested into Center operation as well as Project operation. Furthermore, the Chinese side continues to provide approximately 4 million yuan (approximately 58 million yen) to the Project as research expenses each year. And the salaries of Chinese C/Ps connected with the Japan-China Project are guaranteed in the management expenditure of the laboratories to which the C/Ps are affiliated. Thus, there are no significant sustainability problems in terms of financial aspects.

4) Personnel perspectives

Competition among researchers in China is growing fiercer, and therefore it has become relatively easy to secure excellent human resources. Moreover, highly qualified research personnel can also be obtained from provincial agricultural science institutes in Heilongjiang Province, Shanxi Province, Ningxia Hui

Autonomous Region, etc. On the other hand, although some fluidity of personnel is recognized, it has not reached serious proportions. Therefore, there are no problems with the Project's sustainability in terms of securing personnel.

5) Technical perspectives

The research capacity of researchers in China is improving markedly, and thus there are virtually no research field-related problems in Project sustainability. In particular, the fact that China has placed priority on expanded food production means that there are almost no problems in technical fields related to increased production.

On the other hand, technical fields related to agricultural environments have received comparatively low priority thus far, and full-scale movements in this area have only started in recent years. Therefore, this is an area that will require further technical support.

6) Management framework for provided machinery and equipment

In order to improve the usage rate of machinery, equipment, and facilities that were provided through grant aid, an open laboratory was established (2002), "regulations for use and management of public laboratory equipment" and a "manual on safety management in use of machinery, equipment, and facilities in public laboratories" were prepared, and a management ledger for equipment operations was prepared. Moreover, three equipment and facilities operators were selected from those of all agricultural science institutes to undergo training for installation as supervisors for large-scale equipment. Plans call for priority in use of the equipment and facilities of the Center to be given first to personnel in the Project. Then, the equipment and facilities will be gradually made available to external personnel, with the open laboratory of the Center eventually becoming a nationally recognized analytical center.

3-3 Factors contributing to emergence of effects

(1) Factors pertaining to planning content

An association fund for comprehensive research was created by the Project in FY2004. The creation of this fund led to the establishment of four comprehensive research bases in China, accelerated scheduled Project activities for these bases, and promoted technical transfer to Chinese C/Ps.

(2) Factors pertaining to the implementation process

1) Enhancement of operational expenses

Due to the Project's active communication of activity and research outputs through the holding of an output presentation meeting, issuance of research reports, etc., Project outputs have received recognition. Among other developments, this is evidenced by the fact that the Center received government designation as an important open laboratory. As a result, the Center's budget has been greatly expanded, as is seen by its securing funds for specific expenses (approximately 5 million yuan/year = approximately 73 million yen). This kind of policy and financial support has enhanced not only the Project's research expenditure but also its operational expenditure, which includes management of machinery and equipment, and therefore it is thought to have contributed greatly to the manifestation of Project outputs.

2) Establishment of a Coordinative Executing office

The Center is comprised of five laboratories of the Chinese Academy of Agricultural Sciences. Given that coordination of the activities of these laboratories and the Center is extremely important, a general coordination office was established within the Center in 2004 to handle coordination duties. The establishment of this office unified coordination duties, which made a significant contribution to the smooth implementation of activities and, by extension, to Project outputs.

3-4 Problem areas and factors leading to problems

(1) Factors pertaining to plan content

Inconsistencies appeared in the cause-and-effect relationship between the PDM targets and outputs and some of the indicators. Also, although development of an "agricultural technology information system" was established as an Output, no consensus among Project personnel on the form this system should take could be gained, and therefore pre-activity confirmation of the communications situation could not be sufficiently confirmed. Moreover, even after these problems were brought to light, no revisions or reviews of the PDM were made, which resulted in a delay and activities in the information field.

(2) Factors pertaining to the implementation process

Researchers in agricultural science institutes are in a results-oriented environment, and therefore they are required to produce even more research outputs and to obtain a greater amount of project funding. As a result, researchers often simultaneously pursue many research topics that are outside the scope of Project activities. This has led to cases in which, despite wishing to concentrate in Project activities, C/Ps that are researchers cannot find enough time to do so.

Meanwhile, although the establishment of the general coordination office greatly improved Center activities, instances of inefficiency have occurred due to continuing distortion in the supervising system among the laboratories. It has been pointed out that this point must be improved if Center activities are to be further advanced.

These issues were not so serious that they negatively impacted on achievement of the Outputs and Project Purpose. However, it is thought that if improvements had been made in these areas, even further outputs could have been expected.

3-5 Conclusion

The Project was implemented for the purpose of establishing model methods for developing practical technologies for sustainable production of wheat, soybeans for food and oil, rice, etc. In the development of practical technologies, approaches involving linkage among multiple fields necessary to resolve problems and research that is matched to onsite conditions—all of which based on sufficient understanding of onsite needs—are required. Thus, through the Project, five laboratories under the Chinese Academy of Agricultural Sciences worked to strengthen collaboration and to build an operational framework to facilitate research on the development of practical technologies using an association fund built with contributions from both Japan and China. Moreover, the Project established comprehensive research bases in four regions, reinforced collaboration with regional agricultural science institutes and other bodies, and developed many technologies needed for sustainable production of important crops in these regions.

The results of these activities have established a framework for management and operation of an open laboratory that is founded on equipment and materials provided through grant-aid cooperation, and can serve as a foundation for comprehensive approaches toward development of practical technologies by China in the future.

Based on the above, the Project is deemed capable of achieving its desired goals, and therefore it will be concluded according to plan on February 5, 2007.

3-6 Recommendations

(1) Activities during the Project Period

Thus far, steady results have been achieved in the Project fields of breeding, pests, and agricultural environments (fertilizers, water saving, and water quality). Activities in these fields should be continued according to schedule during the remainder of the Project Period.

In the information field, where progress has been slow, it will first be necessary to complete the work of building the system using field servers. Then, a post-Project activities plan for utilization of gathered data should be drawn up, and manuals and other materials that make use of gathered data should be prepared.

(2) Activities that should be undertaken by the Chinese side after the end of the Project

1) Continuation of activities in the information field

The Chinese side should continue implementing activities, and evaluating these activities, based on the activities plan prepared during the Project Period.

2) Linkage of fields and sustainability of the comprehensive research framework

The Chinese side should maintain the inter-field linkage and comprehensive research framework that were established during the Project and take further steps in research and development toward practical application. It should also establish a structure for ascertaining everyday onsite production and consumption needs that will contribute to comprehensive research.

3) Reinforced extension of developed technologies to farmers

It has been confirmed that some technologies developed through the Project are being extended to farmers. In the future, the Chinese side should engage in further research and development that keeps extension in mind as well as development of low-input technologies that places more consideration to impoverished farmers.

4) Emphasis on agricultural environments field

Desertification and other concerns that are represented by “yellow sand” are serious problems that have an impact even on Japan. Moreover, overuse of chemical fertilizers, inappropriate use of agrochemicals, and long-term

continuous cropping due to overzealous efforts to expand harvests have worsened agricultural environments by, among other problems, contaminating farmlands and irrigation water. Pollution of rivers, lakes, and marshlands, releases of greenhouse gases, alkalization of farmlands, lower food safety, and other problems are worsening, and long-term continuous cropping and lack of water resources are leading to deteriorating soil fertility. Because all of these problems will have an impact on achievement of the Project's Overall Goal, it will be necessary to pursue research in this field that is hand-in-hand with efforts toward achievement of the Overall Goal.

By engaging in the activities described above, the Center can be expected to continue collaborating with research institutes and other bodies both in China and abroad, and to serve as a core research organization for sustainable agricultural technology.

3-7 Lessons learned

(1) Establishment of a coordinating organization

When a project resembles this Project in that it involves a broad range of organizations, the role of the organization that manages the project as a whole is important. In this Project, the establishment of the general coordination office facilitated Project implementation.

(2) Clarification of activity fields and indicators in the PDM

Even though development of an "agricultural technology information system" was established as an Output for the Project from its beginning, no consensus among Project personnel on the form this system should take was gained. Although a review of this point was conducted in the mid-term evaluation and the content of activities was clarified, the outputs of information-field activities were insufficient in the end due to the late start.

(3) PDM revision

Inconsistencies appeared in the cause-and-effect relationship between the Project's PDM targets and outputs and some of the indicators. Moreover, of the activities that were revised at the time of the mid-term evaluation, there were delays in those that pertained to agricultural information, in part due to fact that the communications situation had not been adequately confirmed beforehand. Thus, the PDM should have been revised and reviewed with regard to these points in accordance with the required

procedures at necessary times.

3-8 Follow-up situation

No comments in particular.