Summary of the Terminal Evaluation

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<tr><td colspan="2">Country: People's Republic of China</td><td>Project title: Japan China Forest Tree Breeding Science and Technology Center Project</td></tr>
<tr><td colspan="2">Issue/Sector: Natural Environment Conservation - Forest Resource Management/Conservation</td><td>Cooperation scheme: Technical Cooperation</td></tr>
<tr><td colspan="2">Division in charge: Forestry and Nature Conservation Division I, Global Environment Department</td><td>Total cost (at the time of evaluation): 827 million</td></tr>
<tr><td rowspan="2">Period of Cooperation</td><td>(R/D): 18/10/2001-17/10/2006</td><td>Partner Country's Implementing Organization: State Forestry Administration; Comprehensive Station of State-Owned Forest Farms and Forest Tree Breeding Projects of the State Forestry Administration; Hubei Province Forest Tree Breeding Center; Anhui Province Resistance Breeding Center of Pine Wood Nematode; Hubei Province Forestry Administration; Anhui Province Forestry Department</td></tr>
<tr><td></td><td>Supporting Organization in Japan: Forest Tree Breeding Center; Ministry of Agriculture, Forestry, and Fisheries; Forestry Agency; Forestry and Forest Products Research Institute</td></tr>
<tr><td colspan="3">1-1 Background of the Project

Forest coverage in China remained low. For example, it was 7.7% in 1949. Since the late 1970s, however, afforestation has been promoted on a national scale: conservation of natural forests and enlargement of plantations have been implemented based on the revised forest law and the forest policies set after the 1998 floods. As a result, forest coverage recovered to 14.8% in 1999. In order to obtain better afforestation results in a large country with diversified environments, it is essential to conduct efficient afforestation by using seeds and saplings with traits and functions suitable for the soil and meteorological conditions of each forest, as well as preserving genetic resources of the forest.
Under such circumstances, for the purpose of improving the forest environment in southern China by preserving genes and developing varieties suitable to conserve the ecological environment of the region, the Chinese government requested the Japanese Government in September 1999 to give technical cooperation to further develop technologies to create new varieties and preserve forest genes and to promote such technologies in the provinces of southern China, based on the achievements and experience in the "Hubei Province Forest Tree Breeding Plan" which had been implemented from January 1996 to January 2001 with the cooperation of JICA. After that, both sides signed an R/D of technical cooperation, and five-year cooperation was started in October 17, 2001. Now that there is only six months remaining till the end of the project, a terminal evaluation survey is being conducted.</td></tr>
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1-2 Project Overview

(1) Overall Goal
Establish a foundation for forest tree breeding operations in provinces of southern China through the dissemination of project results.

(2) Project Purpose
The Japan-China Cooperative Forest Tree Breeding Technology Center obtains technical capabilities needed for sustainable forest tree breeding operations.

(3) Outputs
1) Development of breeding technologies concerning recurrent selection
2) Development of breeding technologies to enhance disease/pest resistance
3) Development of breeding technologies concerning introduction of new varieties
4) Development of technologies to preserve genetic resources
5) Development of technologies to produce improved nurseries
6) Transfer of forest tree breeding technologies to the technical staff of each southern province through training programs

(4) Inputs (at the time of evaluation)

Japanese side:

Long-term Expert	11 people in total
Short-term Expert	25 people in total
Trainees received	29 people in total
Equipment	107 million yen in total
Local cost	137 million yen

Chinese side

Counterpart	18 people (at the time of terminal evaluation)
Local cost	17 million Yuan in total (about 250 million yen)
Land and Facilities	Project office and laboratories, nursery gardens, experimental forests, seed orchards, resource conservation forests

II. Evaluation Team

Members of Evaluation Team	Team Leader/Supervisor:	
	Yukihide Katsuta	Chief of Division I, Global Environment Department, Japan International Cooperation Agency
	Genetic Resources:	
	Hiroshi Nakata	Overseas Cooperation Manager of Overseas Cooperation Department, Forest Tree Breeding Center
	Breeding:	
	Masatoshi Ubukata	Preservation Evaluation Manager of Genetic Resources Department, Forest Tree Breeding Center
	Cooperation Planning:	
	Yoshiyuki Miyake	Forestry and Nature Conservation Team I, Group I, Global Environment Department, Japan International Cooperation Agency

	Person in Charge of Evaluation and Analysis: Isao Dojun Manager of Agricultural Development Group, Overseas Project Department, Chuo Kaihatsu Corporation	
Period of Evaluation	9/4/2006-29/4/2006	Type of Evaluation: Terminal

III. Results of Evaluation

3-1 Confirmation of Results

(1) Achievement of the Project Purpose

The counterparts have surely improved their knowledge, experience, and technical capabilities concerning forest tree breeding and have obtained abilities to proceed with research tasks in their respective assigned areas. In addition, implementation of the Hubei Province Forest Tree Breeding Scheme was determined after Hubei Province Forestry Administration approved the plan. The counterparts have also obtained skills sufficient enough to set up and implement training programs and to serve as a lecturer. Considering that they have obtained technical capabilities that are the targets of this project and are addressing remaining tasks such as the development of manuals toward the end of the project, it is expected that the project purpose will be achieved by the end of the project.

(2) Achievement of the Outputs

Some of the following six outputs have already been achieved, while others are expected to be achieved by the end of the project. With respect to some outputs, the levels of achievement are higher than expected. Generally speaking
, the level of achievement is considered to be high.

① Development of breeding technologies concerning recurrent selection,
② Development of breeding technologies to enhance disease/pest resistance,
③ Development of breeding technologies concerning introduction of new varieties,
④ Development of technologies to preserve genetic resources,
⑤ Development of technologies to produce improved nurseries,
⑥ Transfer of forest tree breeding technologies to the technical staff of each southern province through training programs.

3-2 Summary of Evaluation Results

(1) Relevance: High

"Seed Law of the People's Republic of China" declares that the country will support the selection and promotion of superior forest tree varieties. Also, the State Forestry Administration puts greater emphasis on the improvement of afforestation quality in the 11th five-year plan (2006-2010) for the forestry sector, which is now being developed, and plans to create a national forest tree breeding plan. Therefore, the project is highly consistent with China's national policies. Further, because one of the prioritized areas in Japan's economic cooperation philosophy is "cooperation to tackle global issues including environmental problems," the project is also highly consistent with Japanese aid policies.

In Hubei and other southern provinces, afforestation operations concerning the nation's six prioritized forestry projects are now underway, while the emphasis is being shifted from the quantity of afforestation and nurseries to the quality of them. This means that there is a greater demand than ever for forest tree breeding to develop superior nurseries. The approach of the project, which was to divide the six tasks into smaller tasks, to make activity plans for respective tasks, and to implement the plans, is said to be appropriate as a means to achieve the project purpose.

(2) Effectiveness: High

Through the implementation of the project, the levels of the knowledge, experience and technical capabilities of each counterpart have surely been improved with respect to each individual technique of forest tree breeding. In addition, the Hubei Province Forest Tree Breeding Scheme was made, which was then approved by Hubei Province Forestry Administration toward its implementation. Thus, it was determined that forest tree breeding operations would be promoted in Hubei Province. As for training for persons in charge of breeding operations and mid-level technicians in southern provinces, a total of 576 people, which exceeded the target number of 510, participated in 12 training sessions.

In the training, the number of counterparts who served as lecturers has increased since the 9th session. They have acquired sufficient skills to be a lecturer and obtained the know-how on a series of administrative operations including preparation, implementation, and evaluation of training programs. The achievement levels of the outputs are high, and it is expected that the project purpose will be surely achieved by the end of the project.

(3) Efficiency: High

The quantity and quality of the inputs from both Japan and China, as well as their timing, were generally appropriate. There were, however, minor problems as described below, though they did not have great impacts on the efficiency of the project.

- As Japanese proficiency of more than half of the counterparts was of a high level, Japanese experts and the counterparts could communicate directly. However it is thought that, if interpreters had been deployed in both Hubei and Anhui Provinces, more efficient communication would be possible.
- Insufficiencies concerning facilities are as follows: ① In Anhui Province the area of the nursery garden is small. ② In Hubei Province, as the nursery garden and the plantation where plants for breeding are grown are 70 km away from the Forest Tree Breeding Center, the staff suffered some inconveniences when conducting management or when frequent observation was needed.
- The project budget expenditures of the Chinese side were mostly appropriate. There was a plan to gradually increase the percentage of the training program costs paid by the Chinese side, and the percentage was increased mostly according to the plan until the third year. Since the fourth year, however, the percentage has been below the targets set under the plan, though the input from the Chinese side has increased.

(4) Impact: Many positive impacts have been made.

1) Prospect for the achievement of the overall goal: "Establish the foundation for forest tree breeding operations in provinces of southern China through the dissemination of the project results"
The State Forestry Administration has an idea of establishing a forest tree breeding center in each region and is trying to promote a national forest tree breeding project based on the experience at the Hubei Province Forest Tree Breeding Center. They do not have a specific plan yet, as it will be made by the end of 2006, but it is thought that at least the development of infrastructure will be implemented in a five-year period between 2006 and 2010. In parallel with the development of infrastructure, they need to cultivate human resources. Therefore, in order to achieve the overall goal, the State Forestry Administration is required to play a leading role not only in developing infrastructure but also in utilizing technologies, human resources, and training know-how concerning forest tree breeding possessed by the Hubei Province Forest Tree Breeding Center and the Anhui Province Resistance Breeding Center of Pine Wood Nematode. Also, as it was decided that the definition of the overall goal was not necessarily clear, the overall goal is revised and a super goal is additionally set.

2) Other impacts
Many positive impacts have been made by the implementation of the project. Major impacts are as follows. No negative impacts are expected at the moment. .
   1) Afforestation using superior poplar varieties
   2) Implementation of training concerning tissue culture technology (instruction on the building of laboratories for tissue culture, training for university students)
   3) PC training for the staff of the Hubei Province Forestry Administration
   4) Presentation of papers on the study results
   5) Winning of prizes such as Hubei Province Prize for Advancements in Science and Technology
   6) Participation in the development of the project plan for Hubei Province's base for breeding superior varieties of forest trees
   7) Utilization of the results of the development of breeding technologies to enhance resistance to pine wood nematode
   8) Joint hosting of a workshop for people involved in the JBIC Financing Project

(5) Sustainability

1) Policy
   ① Policies at the government level
   The State Forestry Administration has shifted their emphasis on afforestation from quantity to quality. From this point of view, they give more priority to forest tree breeding to develop superior nurseries. As they highly appreciate the results of the project, they also plan to promote forest tree breeding operations throughout the country. Further, they have a plan to establish and develop bases for forest tree breeding operations across the country in the future, and will make investments for this plan.

② Policies concerning forestry in Hubei Province
The 11th five-year forestry plan (2006-2010) of Hubei Province states that the province will construct the bases for forest tree breeding and the production of superior nurseries, which will "focus on the implementation of basic operations, including surveys on genetic resources of forest trees, selective breeding, examination of nurseries' quality and supervision over the enforcement of policies and laws."
The Hubei Province Forestry Administration approved the "Hubei Province Forest Tree Breeding Plan" proposed by the Comprehensive Station for Forest Tree Nursery Management of the Administration, and gave instructions to advance the process to implement the plan (April 2006). Therefore, it can be said that the government policy will secure the implementation of the "Hubei Province Forest Tree Breeding Scheme" that has been developed by this project.

③ Policies concerning forestry in Anhui Province
The 11th five-year forestry development plan (2006-2010) of Anhui Province states a policy of thoroughly improving the province's level of raising superior varieties by lifting the utilization rate of superior varieties of major tree species in afforestation to 80% from the current 65% and by making drastic progress in fields such as breeding to enhance resistance to pine wood nematode. The Anhui Province Forestry Department has a plan to continue the research studies that have been conducted in this project and has repeatedly demonstrated its policies on the securing of organizations, human resources, and funds necessary for the plan. As Anhui Province gives very high priority to breeding to enhance resistance to pine wood nematode, it can be decided that political support is secured.

Considering the above-mentioned points, it can be concluded that political sustainability is secured.

2) Organization:
Both the Hubei Province Forest Tree Breeding Center and the Anhui Province Resistance Breeding Center of Pine Wood Nematode were established for the implementation of this project. The Hubei Province Forestry Administration and the Anhui Province Forestry Department announced that they will continue running the current organizations even after the project. When discussing the administration/management ability of an organization, its stability of the organization and that of its personnel distribution are the essential requirements.
Hubei Province will also promote its forest tree breeding operations systematically based on the Hubei Province Forest Tree Breeding Scheme. Unlike the previous approach of separately addressing respective research tasks, the staff will need to have abilities and qualities to take an overall view when running operations (administration/management ability).
Although the counterparts have sufficient skills to serve as a training lecturer and to implement operations, there is concern about whether the Chinese side will be able to continue implementing similar training programs by themselves even after the termination of JICA's cooperation. This is because a workshop for the staffs of other provinces must be held and arranged by the State Forestry Administration, including setting of policies and securing of budgets concerning its implementation.

3) Finance:
Generally, the Chinese side has prepared appropriate budgets for this project. Besides, the Hubei Province Forestry Administration and Anhui Province Forestry Department announced that they would continue preparing budgets for forest tree breeding operations in the future. In particular, because the Hubei Province Forestry Administration approved the "Hubei Province Forest Tree Breeding Scheme," it is expected that budgets necessary for the implementation of the scheme will be secured. Therefore, it is highly probable that budgets concerning forest tree breeding will also be secured in the future in both Hubei and Anhui Provinces. In this project, however, the budget for the training program prepared by the Chinese side was not sufficient. Therefore, the Chinese side is required to secure the budgets that will be needed in the future.

4) Technology:
Each counterpart has great ability in his/her particular technical field. Their abilities in research and technology and abilities to transfer technology to other technicians have achieved a sustainable level. In addition, as many of the counterparts have served as lecturers in the training program, they have obtained sufficient skills as a lecturer. They also have know-how to implement training programs and have technological abilities to transfer and disseminate in southern provinces through training programs. However, they need to further enhance their abilities to address research issues and to formulate and implement research plans independently in consideration of the promotion of both breeding operations throughout Hubei Province and the breeding operations to enhance resistance to pine wood nematode in Anhui Province.

3-3 Factors that promoted realization of effects

(1) Factors concerning to Planning
Nothing in particular

(2) Factors concerning to the Implementation Process
① "Technological development/training planning card (2001.10-2006.10)" was created in an early stage of this project. The card shows activities stipulated in the PDM, which are further divided into smaller items. It also shows the distribution of personnel, technologies to be transferred, and schedules for them with respect to each item. Annual plans were made and activities were conducted according to the card, which is considered to be one of the factors of the significant achievements of this project.

② The staff of the Hubei Province Forestry Administration participated in the process of developing the "Hubei Province Forest Tree Breeding Scheme" and received training in Japan, which made them recognize the importance of forest tree breeding and increase their awareness of this project. This also led the province to put greater importance on forest tree breeding, which affected their forestry policies and resulted in the approval of the forest tree breeding scheme. Similarly, the staff of the forestry department of Anhui Province shares the awareness of the importance of forest tree breeding. Their participation in the training in Japan is one of the factors of this awareness, which resulted in Anhui Province's greater emphasis on forest tree breeding and breeding to enhance resistance to pine wood nematode in their forestry policies.

3-4 Factors that impeded realization of effects

(1) Factors concerning to Planning
The Hubei Province Forest Tree Breeding Scheme, which was approved by the forestry administration of the province, will be implemented in the future. On this occasion, the staff is required to utilize the research results obtained in this project in a meaningful way to execute the planned operations. In this process, they should have the know-how to formulate, administrate and manage a project from a macroscopic standpoint. However, as fostering of staff with such know-how was not included in the plan of this project, it is required to cultivate such staff in the future.

(2) Factors concerning to the Implementation Process
The PDM included inappropriate indexes and activities, but necessary changes were not made before the terminal evaluation finally pointed out the problems. Among them, the overall goal, its definition was not clear, is modified in this terminal evaluation. Though the project has a monitoring system, it is considered that there is room for improvement in its operation. Also, JICA should provide assistance and instructions as necessary so that long-term experts and counterparts can monitor the project appropriately based on the PDM and PO.

3-5 Conclusion

The project is highly consistent with Chinese forestry policies, needs in the forestry sectors of both Hubei and Anhui Provinces, and Japanese aid policies. There has been a steady increase in the level of forest tree breeding technology, and the counterparts have acquired abilities as lecturers and the know-how to run training programs through the provision of training for the staffs in charge of breeding operations in southern provinces. Considering the achievements of the project including that the Hubei Province Forestry Administration approved the Hubei Province Forest Tree Breeding Scheme that has been developed with the support of the project, the effectiveness of the project is also high. Inputs from both the Japanese and Chinese sides were mostly appropriate. As for the implementation of activities, the project has promoted technological development and research by setting goals and activity schedules for respective tasks. This approach was effective in facilitating technological transfer, resulting in efficient implementation of activities. As the project has produced various impacts, it can be decided that the project's political sustainability is high. It is considered that further improvements in matters concerning organizational structures, finance, and technology will strengthen the sustainability of the project.

3-6 Recommendations (Specific measures, proposals and advice concerning the project)

3-6-1 Recommended activities to be implemented for the rest of the project period

(1) Complete remaining tasks (activities)
(2) Summarize the results of technological transfer
(3) Establish a system to implement the Hubei Province Forest Tree Breeding Scheme
(4) Establish a system to implement training programs in southern provinces after the termination of the project
(5) Determine a future plan for the Japan-China Cooperative Forest Tree Breeding Technology Center

(6) Revise the overall goal of the project and set a super goal

Overall Goal: "Both Hubei and Anhui Provinces implement systematic and well-planned forest tree breeding operations, while a plurality of southern provinces work on the formulation of forest tree breeding schemes."

Super Goal: "Provinces of southern China complete the formulation of forest tree breeding schemes and promote operations."
(Setting of the overall goal and the super goal was approved by the joint coordination committee.)

3-6-2 Recommended activities to be implemented after the termination of the project

(1) Continue activities for technological development
(2) Implementation of the Hubei Province Forest Tree Breeding Scheme(3) Expand breeding operations to enhance resistance to pine wood nematode in Anhui Province
(4) Expand forest tree breeding operations in southern provinces
(5) Develop organizational structures to promote breeding operations
(6) Support the Chinese side after the termination of the project

3-7 Lessons Learned (Instructions that were drawn on from the project and would apply to the processes of discovery, formation, implementation, and administration/management of similar projects)

Importance of thorough implementation of project management using PDM and PO was reconfirmed. Some activities included in the plan were not implemented in this project. In some cases it was not clear whether the plan was modified, and in other cases reasons for modification were unknown. In addition, although some of indexes in the PDM and descriptions in the PO were clearly inappropriate, procedures to change/modify them were not taken in some of these cases. JICA should provide instructions on appropriate operation methods of PDM and PO for Japanese experts and counterpart organizations.