1. Outline of the Project

<table>
<thead>
<tr>
<th>Country: Republic of Indonesia</th>
<th>Project title: The Freshwater Aquaculture Development Project in Indonesia</th>
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<tbody>
<tr>
<td>Issue/Sector: Fishery</td>
<td>Cooperation scheme: Technical cooperation project</td>
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<tr>
<td>Division in charge: Fisheries Cooperation Division, the 3rd Group, Rural Development Department</td>
<td>Total cost (at the time of evaluation) (actual value):</td>
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<tr>
<td>Period of Cooperation Related Cooperation:</td>
<td>Partner Country’s Implementing Organization: Ministry of Marine Affairs and Fisheries (MOMAF), Directorate General of Aquaculture (DGA), Jambi Freshwater Aquaculture Development Center (BBAT Jambi)</td>
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<td>August 28, 2000 – August 27, 2005 (R/D) March 29, 2000</td>
<td>Supporting Organization in Japan: Ministry of Agriculture, Forestry and Fisheries of Japan (MAFF), Tokyo University for Fishery, Prefectural Fishery Laboratory</td>
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1-1 Background of the Project

The production of inland water fisheries and aquaculture industry in Indonesia accounts for around one quarter of the total fishery production in the country. The industry has provided the population with important sources of protein supplied as well as employment opportunities for approximately 3 million people who have been engaged with the industry. However, its supply level has remained around 60% of the national target of the production, where the current fishery methods have limited species of fishes caught and its productivity also has remained at a low level. Therefore, the promotion of this freshwater aquaculture industry is expected to create a stable supply of foods and employment opportunities, even under the recent economic crises and food shortages.

Ministry of Agriculture in Indonesia issued a comprehensive plan, entitled with “Technical Implementation Agency Plan (LOKA Plan)”, which is regarding the fishery promotion based on the Decree of Minister of Agriculture in 1995. Following this Plan, the Directorate General of Aquaculture (hereinafter referred to as ‘DGA’) has embarked a plan of consolidating the facilities of Jambi Freshwater Aquaculture Development Center (hereinafter referred to as ‘BBAT Jambi’) as a development and dissemination center of the freshwater aquaculture in western Indonesia, through its own financial sources as well as financial support by JBIC (SPL: Sector Program Loan). Together with this effort, DGA has requested the Government of Japan for technical cooperation to promote the freshwater aquaculture which is required for proceeding LOKA Plan. In response to this request, JICA has conducted a series of surveys including Preliminary Survey in August 1999 and Short-term Survey in November 1999, which formed a basis of cooperation plan. After the Preliminary Evaluation Survey was conducted in March 2000, this technical cooperation project (hereinafter referred to as ‘the Project’) for the period of 5 years has commenced in August 2000.

1-2 Project Overview (based on PDM introduced in this evaluation study)

(1) Overall Goal

Sustainability of freshwater aquaculture of small-scale fish farmers is improved.

(2) Project Purpose

Dissemination activities for appropriate applied freshwater aquaculture technologies available to small-scale fish farmers are developed and strengthened.
(3) Outputs
1. High quality brood stock of existing freshwater fish culture species is supplied to seed production units.
2. Quality of aquaculture products (seed and growout fish) of existing freshwater fish culture species is improved.
3. Fish breeding technologies for new fish culture species are developed.
4. Effective extension models adjusted to the local conditions are established.
5. The stakeholders in the project area are more interested in freshwater aquaculture.

(4) Inputs (at the time of evaluation)
1) Japanese side:
   - Long-term Expert: 6 persons
   - Short-term Expert: 19 persons
   - Trainees received: 20 persons (including 2 long-term trainees)
   - Equipment: 152 million yen
   - Local cost: 85 million yen
2) Indonesian side:
   - Counterpart: 30 persons
   - Land and Facilities: Provided
   - Local cost: 254 million yen

II. Evaluation Team

<table>
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<tr>
<th>Members of Evaluation Team</th>
<th>(Specialized field: name, title)</th>
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<tbody>
<tr>
<td>(1) Team Leader/Aquaculture Technologies, Dr. Kunihiko FUKUSHO, Director, Breeding Department, Port of Nagoya Public Aquarium</td>
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<td>(2) Fish Disease Measures, Dr. Kishio HATAI, Professor, Division of Fish Diseases, Nippon Veterinary and Animal Science University</td>
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<td>(3) Evaluation Analysis, Mr. Shohei NATSUDA, Consultant, Project Operation Division, International Department, Sanyu Consultants Inc.</td>
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<td>(4) Planning Evaluation, Mr. Ryutaro KOBAYASHI, Project Officer, Fisheries Cooperation Division, Rural Development Department, Japan International Cooperation Agency (JICA)</td>
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| Period of Evaluation | April 12, 2005 - April 30, 2005 | Type of Evaluation: Terminal |

III. Results of Evaluation

1 Confirmation of Results

(1) Inputs
As for the inputs from Japanese side, it is observed that they were appropriate both in quantity and quality. For inputs from Indonesian side, a construction delay of BBAT Jambi at the time of commencement of the Project caused some delays in the Project’s activities. Other inputs from Indonesian side were considered appropriate both in quantity and quality.

(2) Activities
Out of 46 of all the detailed items in the Activity Plan, 3 activities were already completed, with 26 items that are expected to finish before the completion of the Project and 17 items that are expected not to finish before the completion of the Project. Behind the delays in activities, there are some reasons such as construction delay, an emergence of a land problem, unexpected fish disease and changes in dissemination system due to the national decentralization process, which require some measures taken in the coming period.

(3) Outputs
As for Output 1, good parent fishes, including 2,217 carps, 2,400kg of tilapia, 200kg of patin fish, that have gone through the verification tests by the Project, were distributed and sold to private breeders in
model districts and other states and breeder centers in local governments. Those breeders have found it quite promising to cultivate the second generation parent fishes with superior quality, and the current situations seem proceeding smoothly. However, the dissemination activities have just begun and further attentions might be needed, taken into account some situations such as halted supply of carps due to the occurrence of KHV and some delays in supplying nilotica fish, a superior kind of tilapia, due to a long-lasting procedure for environment assessment in Indonesian side.

For Output 2, marine culture production is considered to have been improved in quality, since seeds and farmed fishes with high quality have been steadily produced in 4 dissemination model districts. However, in order to maintain the marine culture production in a stable manner, further dissemination activities need to continue in the coming period as the activity period in a model district in Western Sumatra State and the degree of achievement of Output 2 has remained at a low level.

Regarding Output 3, the current rate of survival of sand gobi fish has reached at more than 50% and there is a prospect of cultivating more than 1,000 before the completion of the Project. Therefore, relevant technologies in marine culture and cultivation at the laboratory level could be considered already completed.

In reference to Output 4, it will take another 2 or 3 years to achieve the level A (breeder groups are acquired and implement the standard techniques) in the degree of attainment of technologies in all the model districts. Yet, a dissemination model for the training and technical instruction has been established and the technical levels of breeders are observed to have improved steadily along with the progress of dissemination activities, as seen in the increase of recording rates of fishery cultivation diary to have reached at around 60% in 2004. In order to achieve further independent activities in the coming period, in addition to dissemination activities by staff members of BBAT Jambi, local governments are requested to make more active commitments to disseminate the technologies.

In terms of Output 5, a series of dissemination activities have raised awareness and collected wider attentions on the freshwater aquaculture. Those activities included organizing Dissemination Network Seminars (3 times on a national level), Open Seminars (3 times at local level), General Meetings at the time of monitoring, Information Sharing Sessions with stakeholders of State Authority for Marine Culture (1 to 2 times/month), and preparing newsletters (2 times/year), promoting Fish Farming Diary, distributing advertisement calendars. Many participants attended in seminars and gatherings, which enabled more information to be shared. In the coming period, local governments are requested to further participate in the dissemination activities in each model district.

(4) Project purposes

As these dissemination activities were implemented more actively by the Project, it was observed that the number of small-scale fish farmers has increased and the production and income levels improved among the farmers who have implemented fish farming. These might underpin the smooth achievement of the project purposes. However, it needs to be mentioned that due to some delays in the Project’s activities the number of examples showing the increase in the production and income is not yet sufficient.

(5) Upper goal

The production quantity has increased in 6 Sumatra States every year, witnessing the increase of more than double from the produced amount 47,192 Ton in 2000 to 100,404 Ton in 2003. This leads to a high expectation for the future increase in freshwater aquaculture in the Project target areas.

2. Summary of Evaluation Results

Relevance:

Relevance of the Project is considered high. The project purposes are in line with the strategic plans of MOMAF, aiming at the improvement of aqua cultivation technologies and relevant facilities as well as expanding the markets for aqua cultured products. In addition, an approach adopted here to develop relevant technologies and disseminate the results simultaneously could tie up with the discovery of
technical problems at the production sites and the technical development to deal with those problems.

Beneficiary-wide, although 2 States out of 6 Sumatra States as target dissemination areas did not set dissemination model districts, the benefit of the Project has been evenly distributed with an arrangement to invite counterparts from these 2 States to any seminars and training sessions for technical transfer.

Effectiveness:

Through the dissemination activities based on the standardized technologies by the Project, though it is not sufficient yet, the number of the fish farmers has increased by approximately 1.9 to 3 times in the Project target areas and the production level has improved among 56 to 90% of the farmers in the Project’s model districts. In addition, annually around 25 times of training sessions were conducted and 46 to 88% of the farmers in 5 model districts answered that their income levels have improved (excluding a model district where all the farmers answered that their income did not change). These examples would lead to an assumption that the degree of achievement of the project purposes was not necessarily low and the Project’s effectiveness has reached a certain level. All the endeavors exerted by Indonesian counterparts and Japanese experts contributed to fostering the motivations of the fish farmers and leading to the results. However, the decentralization implemented in Indonesia has forced the dissemination system in the country to be reconstructed, which is considered an external condition. Even so, under this severe condition, the Project has achieved a certain level of results in dissemination activities and the project purposes could be realized when the local governments could fully participate in these dissemination activities in the coming period.

Efficiency:

As for the inputs from Japanese side, they are regarded as appropriate in quantity and quality. However, for the inputs from Indonesian side, the construction work to build up the Jambi Freshwater Aquaculture Development Center got delayed at the time of starting the Project, resulting in the delay in all the Project’s activities. Therefore, the efficiency of the Project is difficult to be assessed as high.

Impact:

Considerable impacts were observed in both fields of technical development and dissemination activities. First, the Project has enabled the research development to be implemented in a professional term on the freshwater aquaculture in the Sumatra area. Second, the dissemination activities initiated by the Project have developed into an active relation between local farmers and Jambi Center; i.e. Jambi Center’s instruction started to be conducted according to real conditions fish farmers were in, while the farmers started to receive detailed answers from Jambi to their own questions for the first time. Introduced technologies are observed to have been spread to other neighboring farmers beyond the model districts, which underpins the future prospects in promoting the marine cultivation in Sumatra.

Sustainability:

It is difficult to conclude that the Project’s sustainability is high at this moment. Due to the delay in the Project’s activities, sufficient technical support could not be provided for the counterparts to strengthen their capabilities in project management, equipment maintenance and control, and dealing with emergency matters such as fish disease. Dissemination system has not been yet established either, because of some chaotic situations by the transformation of the national system into the decentralized system. Further improvement of these points need to be considered.

3. Factors that Promoted Realization of Effects

(1) Factors Concerning Planning

- The formulation of the Project Plan in line with the national policy has resulted in contributing to the development of the freshwater aquaculture all of the parts of Sumatra Islands.
- A Japanese expert and his counterpart researchers who attended in the training course in Japan
were able to provide technical support for cases of unexpectedly occurred KHV and individual consultations requested by fish farmers.

(2) Factors Concerning the Implementation Process
- An approach linking technical development and dissemination activities has tied up the technical problems and technical development in the field.
- An approach that the Project directly contacted fish farming associations and setting model districts had effects in collecting their technical needs.

4. Factors that Impeded Realization of Effects
(1) Factors Concerning Planning
- A delay in the construction work of Jambi Freshwater Aquaculture Center led to another delay in the Project’s activities planned. During this blank period, a baseline survey was focused for dissemination activities instead.
- The emergence of the land trouble over Jambi Freshwater Aquaculture Center at the initial stage of the Project, despite all the efforts by the Project in collaboration with states and local governments, resulted in the delay of the activities in the aftermath.

(2) Factors Concerning the Implementation Process
- The occurrence of KHV disease in Western Indonesia forced the Project to change its directions in terms of the methods in production and distribution of the carp which was a main target of the Project. However, in response to this trouble, a short-term expert was dispatched to provide technical support to his counterpart researchers and they conducted technical instructions on the fish diseases to the fish farmers.
- Changes in dissemination system at local governments due to the national decentralization process, the Project was obliged to change its target of technical transfer, while dissemination staff members were targeted at first. Those who were expected to play a role in disseminating the transferred technologies to their areas, after all, disappeared. Therefore, the Project was required to contact the fish farmers and groups directly to disseminate the relevant technologies. Yet, currently there are allocated dissemination staff members for the aquaculture in some local governments.

5. Conclusion

Taken into account that many activities were conducted by the Project and the numerical indicators reached at some certain levels, the degree of achievement of the Project is not considered to be low. However, some important parts of the project purposes are not estimated to be achievable for the following reasons.

1) A delay in the construction work of Jambi Freshwater Aquaculture Development Center
2) An emergence of the land problems of Jambi Freshwater Aquaculture Development Center (the problem of residents’ evacuation from the state-owned land appropriated for the Center)
3) An occurrence of KHV disease in Western Indonesia
4) Changes in dissemination system of the local governments due to the national decentralization process

It was concluded that the aforementioned external conditions undermined the Project’s efficiency and resulted in the delay in the activities, which disabled the sustainability to be ensured in sufficient manners. Meanwhile, Project was assessed positively in its relevance and effectiveness which reached at some certain levels with considerable active impacts by the activities.
6. Recommendations

(1) Recommendation for the extension of the Project period

The Evaluation Team considered it necessary to extend the project period even after its completion in order to achieve the project purposes by continuing the activities. However, the Evaluation Team has recommended that the some activities should be implemented by Jambi Freshwater Aquaculture Development Center for encouraging the initiatives by counterpart researchers.

The Evaluation Team considered that it is desirable for the project period to be extended for 2 years with 2 long-term experts, including 1 expert in freshwater aquaculture and fish farming dissemination, and 1 short-term expert in fish diseases to be dispatched. Counterpart training course(s) in Japan will be conducted within the planning framework during the extended period of the Project, in case both sides of Indonesia and Japan agree to its necessity. It is desirable for the local costs to be disbursed by both sides as well. In terms of equipment and materials, sufficient inputs were already conducted during the 5 years and there is no need for new purchase of any equipment, presumably.

It is desirable that, during the extended period of the Project, the counterparts from Jambi Freshwater Aquaculture Development Center as well as counterparts from local governments are to actively participate in the Project’s activities. Their continuous commitments are requested in ensuring the facilities, equipment items and necessary budget.

The Evaluation Team concluded to propose to the Governments of Indonesia and Japan to initiate necessary procedures to extend the Project.

(2) Recommendation for developing aquaculture technologies

Possibility of the technical transfer inside Indonesia: It is desirable that Jambi Freshwater Aquaculture Development Center is to effectively utilize the technologies of Java that has had a long history in the freshwater aquaculture inside Indonesia.

Relationship between Jambi Freshwater Aquaculture Development Center and other organizations: Jambi Freshwater Aquaculture Development Center, through the arrangement of Directorate General of Aquaculture (DGA), is requested to promote further collaborative activities with other organizations such as local governments.

(3) Recommendation for measures taken against fish diseases

Measures toward KHV disease: It was observed that there were some individual fishes which could survive even after having been infected by KHV. It is likely, however, that they are KHV carriers. Therefore, these fishes should not be moved from the fish farms where KHV disease occurred to any other fish farms. It is vital for the Project to maintain non-KHV carrier fishes. In case of distributing those non-KHV carrier fishes, together with their seeds, leaflets on the prevention of KHV disease need to be distributed. When KHV disease occurs in fish farms, the water temperature should be maintained at higher than 28 degree Celsius. In addition, further appropriate approaches need to be explored through collecting relevant information from both inside and outside the country.

Lessons learnt from KHV disease: KHV disease might be a good alarming to fish farmers. As the aquaculture industry has developed, various fish diseases started to occur. In order to make this industry to sustainably develop in the future, relevant measures need to be taken and its importance needs to be shared with fish farmers. In this regard, it is important to continue the water quality control and seed cultivation in a stable manner.

7. Lessons Learned

(1) Dissemination methods of on-farm

The aforementioned dissemination strategies targeting practical farmers and fish farmer groups and setting model districts have contributed to achieving the project purposes in considerable ways. In
addition, continuous monitoring and consultation activities and information sharing occasions have consolidated the mutual dependent relations between the fish farmer groups and the Project. Following these positive interactions, some activities initiated by fish farmers have spread the technologies developed by the Project.

(2) Other effective dissemination methods

Since technical levels in fish farming have varied according to individual fish farmers and areas, standardized technical development might misread the needs in the field. In the Project, the approach conducting technical development and dissemination activities at the same time has enabled the technical development to benefit from the findings in the dissemination activities on the ground.

Furthermore, it was quite effective to include the activities to prevent fish diseases in the dissemination activities of the freshwater aquaculture.

(3) Land issues

At the initial stage of the Project, it faced some troubles such as a delay in the construction work of the center facility which was one of the inputs from Indonesian side and the residents’ evaluation matters from the center’s land which was a state owned land. It required a long time to solve these troubles, which resulted in the delay in the progress of the Project. Therefore, at the time of preliminary evaluation, it is necessary to confirm whether or not any similar troubles to this might exist as well as to pay adequate attention in deciding a timing to start the Project.