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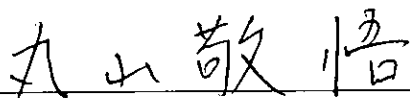
THE MINUTES OF MEETING
BETWEEN
JAPANESE MANAGEMENT CONSULTATION TEAM
AND THE AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE
REPUBLIC OF INDONESIA
ON JAPANESE TECHNICAL COOPERATION
FOR
RESEARCH AND DEVELOPMENT FOR THE MULTISPECIES HATCHERY
PROJECT

The Japanese Management Consultation Team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA") headed by Mr. Keigo Maruyama visited Indonesia for the purpose of evaluating the Project for Research and Development for The Multispecies Hatchery (hereinafter referred to as "the Project") from November 12 to November 22 in 2000.

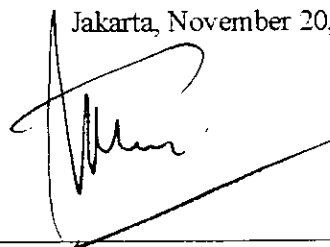
During its stay, the Team has carried out a field survey and held a series of meetings with the Indonesia authorities concerned.

As a result of survey and meetings, both sides agreed to report to their respective Governments the matters referred to the documents attached hereto.

Jakarta, November 20, 2000



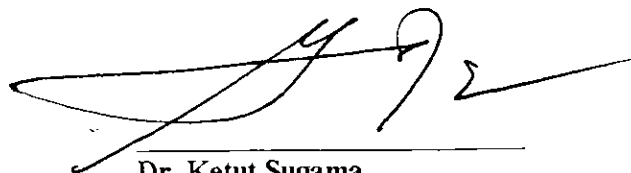
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**Follow-up Program
of
the Research and Development for
the Multispecies Hatchery Project
(ATA-379)**

Evaluation Report

**Japanese Management Consultation Team
Organized by
Japan International Cooperation Agency
And
Central Research Institute for Sea Exploration and Fisheries
Ministry of Marine Affairs and Fisheries, Indonesia**

20 November 2000

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**Evaluation Report
on
the Follow-up Program
of
the Research and Development for the Multispecies Hatchery
Project**

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**Evaluation Report
on
the Follow-up Program
of
the Research and Development for the Multispecies Hatchery Project**

1. INTRODUCTION

Japan International Cooperation Agency (JICA) dispatched the Management Consultation Team to Indonesia to evaluate the follow-up program, an extension program (April 1999 - March 2001) to refine some unsolved technical issues of the Multispecies Hatchery Project (April 1994 - March 1999) (see Appendix 1). Objectives of the evaluation are as follows:

- (1) To evaluate the achievement of the technical cooperation and give advice on the implementation of the follow-up program for the remaining period
- (2) To recommend and suggest necessary measures to be taken after the termination of the follow-up program to the authorities of the respective Governments.

2. RESULTS OF EVALUATION

2-1. Accomplishment of the follow-up program

2-1-1. Accomplishment of inputs

All inputs made by both Indonesian and Japanese sides during the follow-up program are summarized in Appendix 2.

2-1-2. Accomplishment of technical cooperation

Progress of each research and development item mentioned in Detailed Work Plan (prepared in April 1999) are shown in Appendix 3. The major technical achievements are summarized as follows:

(1) Fish seed production

The remarkable achievement is the success in mass seed production of humpback grouper, which is the target species of the follow-up program. Up to now a total of 90,000 seeds have been produced at Gondol Research Station. This achievement is made through technical improvement, such as the stabilization of quality fertilized-egg production and the rise of survival rate from hatching to juvenile stages.

After the start of the follow-up program, viral nervous necrosis (VNN disease) has occurred and caused serious damages in grouper seed production at Gondol Research Station. However,

improvement of the seed production technique in the follow-up program has contributed to reduce the occurrence of this disease.

(2) Disease control

Field surveys have revealed that two viral diseases, white spotted syndrome (WSS) in shrimp and VNN disease in groupers have rapidly spread and caused extensive damages in both hatcheries and fishculture farms throughout Indonesia.

In terms of monitoring fish diseases, the comprehensive diagnosis techniques have been acquired. The extermination technique and prevention system for parasites has been established. Based on research results, a pamphlet "Practical treatments against external parasites in *C. altivelis* broodstock" was printed in English and Indonesian for technology dissemination. The diagnosis technique for VNN virus is practicable, however, the prevention system of the disease has not been well-established yet.

(3) Extension planning

For technology dissemination, publishing a pamphlet and booklets, issuing newsletters, holding training courses, seminars and a workshop, and conducting consultative visits have been successfully conducted.

Dissemination of the seed production technique of humpback grouper to milkfish backyard hatcheries has been conducted. Through consultative visits to the backyard hatcheries, problems in the seed production at the hatcheries have been identified. At present, some of the hatcheries are on good progress in the seed production of humpback grouper by the technical guidance of the project.

2-2. Analysis on evaluation issues

2-2-1. Effectiveness

The Project succeeded in mass seed production of humpback grouper. Since groupers are regarded as one of the most difficult fish in seed production, the achievement indicates that the seed production technique of Gondol Research Station has reached to a fairly high level.

Diagnosis, preventive measures and treatment methods for fish diseases occurring in Gondol Research Station have been upgraded. Resultantly, the mortality of broodstock and the frequency of disease occurrence at the Station have significantly reduced. Accurate and prompt diagnosis of VNN disease has contributed to the development of humpback grouper seed production.

The function of Gondol Research Station to disseminate seed production technology to government and private sectors has been strengthened by the activities related to extension planning. The activities also have built up the stronger relation between the Station and extension agencies, such as DGF mariculture development centers.

In conclusion, the implementation of the follow-up program obviously improved the ability of Gondol Research Station as a research and development center of marine fish seed production.

2-2-2. Impact

The impact of the follow-up program is satisfactory. The details of the impact are mentioned as follows:

(1) Impact to Gondol Research Station

Through the implementation of the follow-up program, facilities, equipment and ability of researchers at Gondol Research Station have been further upgraded. These have strengthened research and development capability of the Station. In the 1999-year's work achievement competition of AARD, the Station was ranked at the top of 48 AARD research institutes.

Technically, the noticeable impact to Gondol Research Station is the success in egg production of various fish species. This has been achieved by the application of the broodstock management and disease control technology developed for humpback grouper by the project. The existence of eggs enables researchers to carry out several kinds of researches on seed production. As a result, research activities at the Station have been promoted.

Through seminars, a workshop, newsletters and distribution of humpback grouper seed produced by the project, Gondol Research Station has become very famous among the people concerned in aquaculture industry in Indonesia. Resultantly, the requests of eggs and seed supply, consultative visits, diagnosis of fish diseases, and training at the Station have rapidly increased.

(2) Impact to coastal aquaculture industry

Grouper seeds can be sold at much higher prices of 3,000-10,000 rupiah/fish than other fish seeds. Therefore, the success in mass seed production of humpback grouper at Gondol Research Station has stirred up not only milkfish backyard hatcheries in Gondol area (the number of the hatcheries; about 2000 units in October 2000) but also many private hatcheries throughout Indonesia to enter the business of grouper seed production. In addition, many new hatcheries targeting groupers have been constructed in Indonesia.

The demand of grouper as food fish is very high in the world. Due to the shortage of seed, however, grouper culture has not been popularized yet in Indonesia. By the supply of humpback grouper seed from Gondol Research Station, many fishculture farms started its culture during the follow-up program. Thus, the project result has been stimulating the development of aquaculture in Indonesia.

2-2-3. Efficiency

The efficiency of the follow-up program is evaluated to be relatively high, in view of the satisfactory progress attained by the limited number of Japanese experts.

Both the governments of Indonesia and Japan have sincerely supported the follow-up program. Almost all inputs by both sides have been effectively provided in accordance with the annual work plan approved by the Indonesia-Japan Joint Committee.

Regarding the input of the facilities, it is observed that some problems have produced effects on the implementation of the follow-up program. Those are as follows:

- ① Securing tanks for broodstock culture and juveniles nursery culture were delayed.
- ② Floating net cage facilities are located near the seawater intake, which causes the spread of diseases in Gondol Research Station.
- ③ Lighting for security at night stopped humpback grouper from spawning of for 2 months.

2-2-4. Rationale

The rationale of the follow-up program plan is high in general, because the overall goal of the project and project purpose meet the present development policy of the Indonesian government, such as The Second Long-term Plan for National Development 1994-2018. During the follow-up program, the need of mariculture development has been further raised by the Mid-term Fisheries Promotion Program (PROTEKAN2003, 1999-2003) prepared by the DGF.

2-2-5. Sustainability

Over all sustainability of the project appears to be high.

(1) Organizational aspect

The Central Research Institute for Fisheries, affiliating Gondol Research Station, was organizationally moved on September 22, 2000 from the Ministry of Agriculture to the Ministry of Marine Affairs and Fisheries, which was newly established in October 1999. Although the organizational constitution of the Ministry of Marine Affairs and Fisheries has not been formulated yet, the Ministry has put much importance on mariculture development. Gondol Research Station that has been strengthened its research and development capability through the previous shrimp culture project and the present project will play an important role as the center of mariculture development. At present, the government of Indonesia is considering to upgrade Gondol Research Station to an Institute from a Station. From these points, it can be said that the Station has organizational sustainability as a research and development center.

(2) Financial aspect

The budget of Gondol Research Station is composed of two components, namely, routine budget, which covers recurrent costs including wages, electricity, maintenance, etc., and development budget, which covers costs for research activities. Although both budgets have not been reduced in amount, the actual value of the budget has been affected due to price increases during the economic crisis.

Gondol Research Station has made efforts to acquire government-income by means of selling milkfish and humpback grouper eggs and seeds as well as stocks of phytoplanktons and rotifers. In addition, the disease diagnosis of fish/shrimp samples brought from private hatcheries and farms has become a source of government-income.

Taking into consideration the present financial condition of the government of Indonesia, financial sustainability of Gondol Research Station may not be strong enough to carry out deeper and broader research.

(3) Technical aspect

Through the technical cooperation, the research and development ability of counterpart researchers has been considerably improved. Even after the project, all the researchers will remain at Gondol Research Station to continue their research. Furthermore, the number of researchers who hold doctor and master degrees has increased and will increase further in the future.

It appears that Gondol Research Station has acquired technical sustainability to some extent. The technical package for humpback grouper seed production including disease control developed by the project will support the dissemination of the technology and the development of other grouper seed production technology. However, it cannot be deniable that the development of technology will be decelerated without the technical cooperation.

3. RECOMMENDATIONS

(1) Recommendations for short-term activities

In order to secure the project achievement more successful, following activities are to be conducted in the remaining period (up to March 31st, 2001).

- ① The project should make further efforts to standardize the seed production technique of humpback grouper.
- ② The project should continue to disseminate the seed production technique to the milkfish backyard hatcheries.
- ③ The project should complete publishing manuals and holding a seminar.
- ④ Gondol Research Station should take countermeasures against voltage change, which causes the serious damages of electric appliances.
- ⑤ Gondol Research Station should change the position of floating net cages or the seawater intake for the prevention of spreading diseases in the Station.

- ⑥ Gondol Research Station should construct a fence for the security around the Station.

(2) Recommendations for long-term activities

In order to sustain the project achievements, following activities are to be conducted even after the termination of the follow-up program.

- ① The government of Indonesian should take necessary measures to support strongly, especially financially, the Gondol Research Station as a center of mariculture research and development.
- ② Gondol Research Station should make efforts to enhance its ability of research and development for mariculture based on the achievement of the multispecies hatchery project.
- ③ It is desirable that Gondol Research Station regularly publishes technical reports and scientific papers to disseminate the results of research activities by the support of CRIFI.
- ④ Each researcher at Gondol Research Station is expected to sustain a relation to the Japanese researchers who already have a connection with the Station.
- ⑤ The machinery and equipment including those provided by the Government of Japan should be maintained in a good condition.
- ⑦ It is expected that the environment to support the mariculture such as distribution and marketing system of mariculture products is improved.

(3) Necessity of the continuous technical assistance from Japan

The government of Indonesia is keen on the development of mariculture for earning foreign currencies, for creating job opportunities, and for protecting marine resources and environment from illegal fishing, such as dynamite and cyanide fisheries, by introducing a new industry. This is proved by the Mid-term Fisheries Promotion Program (PROTEKAN2003, 1999-2003) prepared by the DGF.

The multispecies hatchery project is appeared to be on good progress and to be terminated with considerable achievements. However, the development of multispecies hatchery technology is one of the necessary requirement for the development of sustainable mariculture system. Further research and development in various subjects are required to ensure the sustainability of mariculture. Japan is the most advanced country in mariculture technology, therefore, her technical assistance will be able to promote the development of sustainable mariculture system in Indonesia.

From these points, it is recommended to continue the technical cooperation from Japan at Gondol Research Station that plays an important role in mariculture development. Since the present project has given strong impacts to mariculture development in Indonesia, the cooperation should not have a long interruption after the planned termination of the follow-up program on 31 March 2001.

APPENDIX 1. Background of the follow-up program

The Research and Development for the Multispecies Hatchery Project was commenced in April 1994 as a five-year technical cooperation project based on the Record of Discussion (R/D) signed by representatives of Agency for Agricultural Research and Development (AARD) and JICA Indonesia Office on 19 February 1994. The R/D defines the overall goal and purpose of the project as follows:

Overall goal

Seed production techniques for several species that can be made to suit different areas and conditions are to be initiated and disseminated by the Indonesian people and thus seed production and the supply of valuable species are to be stabilized.

Project purpose

To strengthen the capability of the Gondol Research Station.

During the planned project period of five years, the project gained several achievements and rather improved the research and development capability of the Gondol Research Station. However, some technical issues to be solved remained. As a result of the discussions between Indonesian and Japanese sides in accordance with the recommendation of the Final Evaluation Team of the project, both sides agreed to implement the two years follow-up program of the project. The follow-up program was started on 2 April 1999 based on the R/D signed by both sides on 22 February 1999 to be terminated by 31 March 2001.

The purposes and activities of technical cooperation during the follow-up program, mentioned in the Attached Document of the R/D, are as follows:

- 1) To establish the technical package of fish seed production applicable to private hatcheries through the following activities:
 - a. improving production technique of fertilized egg;
 - b. improving production techniques of juveniles from hatching; and
 - c. optimizing seed production techniques.
- 2) To upgrade monitoring and prevention system of fish disease at the Gondol Research Station through the following activities:
 - a. conducting field surveys; and
 - b. monitoring and preventing fish diseases.
- 3) To strengthen the function to disseminate knowledge and information regarding seed production techniques through the following activities:
 - a. conducting technical guidance and consultative visits to extension agents and private hatcheries ; and
 - b. holding training courses, seminars and workshops.

APPENDIX 2. Inputs of the follow-up program

1. Japanese side

1) Dispatch of experts

(1) Long-term experts

- ① Team leader / Fish seed production
Mr. Shogo KAWAHARA 27 March 1999 - 31 March 2001
- ② Coordinator / Extension planning
Mr. Yoshio ISHIYAMA 11 March 1997 - 31 March 2001
- ③ Diseases control
Dr. Kei YUASA 11 March 1997 - 31 March 2001

(2) Short-term experts

- ① Diseases control
Dr. Kishio HATAI 24 July 1999 - 21 August 1999
- ② Broodstock management
Mr. Hirokazu MATSUDA 21 August 1999 - 20 November 1999
- ③ Aquaculture extension
Mr. Hiromu IKENOUE 28 September 1999 - 12 December 1999
- ④ Viral detection technology
Dr. Toshihiro NAKAI 5 May 2000 - 21 May 2000
- ⑤ Hatchery operation and management technology
Mr. Hirokazu MATSUDA 6 June 2000 - 29 August 2000
- ⑥ Research technique for fish reproduction
Dr. Kiyoshi SEYANO 7 August 2000 - 29 August 2000

2) Dispatch of mission

- Consultative mission 12 November 2000 - 22 November 2000
(Mr. Keigo MARUYAMA and Mr. Yoshihiro SATO)

3) Counterpart training

- ① Mr. Fris Johnny 11 May 1999 - 17 August 1999
(Immuno-stimulation study)
- ② Mr. Irwan Setyadi 11 May 1999 - 22 September 1999
(Multispecies seed production technique)
- ③ Mr. Kasprijo 1 June 1999 - 15 September 1999
(Fish seed production technique)
- ④ Mr. Darmansyah 13 June 2000 - 19 September 2000
(Fish seed production and marketing techniques)

APPENDIX 3. Progress of Each Research and Development Item

Stage A: Completed

Stage B: Progressed but not completed

(* Items which was not included in the original plan)

Progress of Each Research and Development Item	Stage
1. Fish Seed Production	
1-1 Improving production techniques of fertilized eggs	
1-1-1 Stabilization of <i>Cromileptes altivelis</i> egg production <ul style="list-style-type: none"> • The broodstock culture technique to produce more than 2 million fertilized eggs at each new moon period was established. • It was clarified that lighting for security in night had exerted a bad influence upon spawning. 	A
1-1-2 Improvement of <i>C. altivelis</i> egg quality <ul style="list-style-type: none"> • Through the enhancement of food quality and the control of parasitic diseases, egg quality was improved and eventually hatching rate and survival rate of early stage larvae raised. • For the prevention of viral nervous necrosis (VNN disease), broodstock carrying VNN virus were removed from broodstock tanks, and the method of egg treatment by iodine bath was developed. 	A
1-2 Improving production techniques of juveniles from hatching	
1-2-1 Development of <i>C. altivelis</i> larval rearing techniques <ul style="list-style-type: none"> • A total of 120,000 juveniles at the size of 25mm were produced in several larval rearing trials. • The survival rate from hatching to juvenile stages was improved from less than 5% to 10-50%. • The rearing technique to prevent the total mortality of larvae caused by VNN disease was developed. 	A
1-2-2 Development of <i>C. altivelis</i> nursery culture techniques <ul style="list-style-type: none"> • A total of 90,000 seeds at the size of 40-70mm were produced in practical nursery cultures. • It was known that the nutrition unit of Gondol Research Station might prepare proper compound foods for juveniles. • Further research is required to minimize the mortality caused by VNN disease during this stage. 	B
1-3 Optimizing seed production techniques to be applicable to private hatcheries	
1-3-1 Standardization of <i>C. altivelis</i> seed production techniques <ul style="list-style-type: none"> • Based on the results of several larval rearing trials, juvenile production procedures have been standardized. 	B

1-3-2	Preparation of <i>C. altivelis</i> seed production manual <ul style="list-style-type: none"> • Prior to prepare the manual book, a booklet “ Successful mass fry production of humpback grouper, <i>Cromileptes altivelis</i>” was prepared for technology dissemination. • Writing the manuscript of the manual book is on progress. 	B
2. Disease Control		
2-1 Conducting field survey		
2-1-1	Field survey on epizootic in hatcheries and mariculture farms <ul style="list-style-type: none"> • It was clarified that two viral diseases, white spotted syndrome (WSS) in shrimp and VNN disease in groupers had rapidly spread and caused extensive damages in hatcheries and fishculture farms throughout Indonesia. • The survey results including the cause of mortality and recommended treatment measures were reported to the farmers. 	A
2-1-2	Preparation of report of the field survey <ul style="list-style-type: none"> • All information collected by the survey are being compiled. 	B
2-2 Monitoring and preventing fish diseases		
2-2-1	VNN virus detection in larvae and broodstock of groupers <ul style="list-style-type: none"> • The technique of VNN virus detection by PCR test from broodstock and larvae/juveniles was established. • PCR test revealed that the main problem at grouper hatcheries was mass mortality caused by VNN disease. • The technique for cell culture method was transferred to the counterparts. 	A
2-2-2	Establishment of treatment methods for parasitic diseases <ul style="list-style-type: none"> • Based on basic researches, treatment methods against 7 kinds of external parasites observed in the broodstock at Gondol Research Station were established. • These methods were practically applied to broodstock infected with parasites, and resultantly almost all parasites could be eradicated from the Station. 	A
2-2-3	Monitoring of the bacteria in larval rearing water <ul style="list-style-type: none"> • It was clarified that presumptive pathogenic bacteria, vibrio spp. in the water of <i>C. altivelis</i> larval rearing including 4 kinds of species. • Only <i>V. alginolyticus</i>, was found to be pathogenic against <i>C. altivelis</i> larvae/juvenile. 	A
2-2-4	Development of vaccine against <i>Vibriosis</i> in grouper <ul style="list-style-type: none"> • A vaccine against <i>Vibrio alginolyticus</i> was practically prepared. • Through the practical work, techniques necessary for vaccine preparation were transferred to the counterparts. 	A
2-2-5	Publishing of manuals and pamphlets on fish disease control <ul style="list-style-type: none"> • A pamphlet “Practical treatments against external parasites in <i>C. altivelis</i> broodstock” was published in English and Indonesian. • Two manual books “Manual for fish disease diagnosis (Volume 2)” and “PCR technique for VNN virus detection” are under preparation. 	B

<p>*2-2-6 Control of VNN disease</p> <ul style="list-style-type: none"> • It was discovered that the increase of water temperature could reduce mortality from VNN disease on an experimental scale. • Studies on the source of VNN virus have been conducted. • The technique to prepare vaccine has been developed. • VNN control measures experimentally proved have been optimized for practical seed production. 	B
<p>3. Extension Planning</p>	
<p>3-1 Conducting technical guidance and consultative visit to extension agents and private hatcheries</p>	
<p>3-1-1 Dissemination of <i>C. altivelis</i> seed production techniques</p> <ul style="list-style-type: none"> • Fertilized eggs have been distributed to more than 20 milkfish backyard hatcheries in Gondol area from Gondol Research Station. • It was identified that the breakout of VNN disease had hindered the seed production of <i>C. altivelis</i> at the backyard hatcheries. • Through consultative visits to the backyard hatcheries, problems in the seed production of <i>C. altivelis</i> at the hatcheries have been identified. • Some of the hatcheries installed a sand filtration system and a continuous water supply system by the advice of the project are carrying out the seed production with a favorable condition. 	B
<p>3-1-2 Consultative visit to extension agents</p> <ul style="list-style-type: none"> • Through this activity, the current condition of mariculture including seed production in Indonesia has been clarified. • The relation between Gondol Research Station and extension agencies, such as DGF mariculture development centers has been strengthened. 	B
<p>3-2 Holding training courses, seminars and workshop</p>	
<p>3-2-1 Organizing training courses</p> <ul style="list-style-type: none"> • The following training courses were held at Gondol Research Station for technology dissemination. <ol style="list-style-type: none"> 1) Training course on fish seed production for the staffs of BPTP/LPTP (6 participants, 5 September to 2 October 1999) 2) Training course on disease control for the staffs of DGF mariculture development centers (6 participants, 5 to 9 June 2000) 3) Training course on grouper seed production for the staffs of DGF mariculture development centers (8 participants, 24 October to 10 November 2000). 	A
<p>3-2-2 Holding seminars</p> <ul style="list-style-type: none"> • National Seminar on Research and Dissemination of the Technology of Mariculture was held in Jakarta (over 200 participants, 2 December 1999). The participants obtained common understanding on the present situation and problems of mariculture development. 	B

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<ul style="list-style-type: none"> • A seminar on mariculture will be organized in February 2001. 	
<p>3-2-3 Holding workshop</p> <ul style="list-style-type: none"> • One-day workshop on multispecies hatchery production was held at Gondol Research Station, inviting the owners and technicians of milkfish backyard hatcheries in Gondol area. The participants understood the concept of multispecies hatchery system (35 participants, 6 August 1999). 	A
<p>3-2-4 Issuing LOLITKANTA newsletter</p> <ul style="list-style-type: none"> • Newsletter was issued every three months both in Indonesian and English (LOLITKANTA No. 11 to 16). Through the newspaper, activities and achievement at Gondol Research Station might be widely known. • LOLITKANTA No. 17 and 18 will be issued by the end of the project. 	B
<p>*3-2-5 Other activities</p> <ul style="list-style-type: none"> • A coordination meeting on dissemination of mariculture techniques between CRIFI (research agency) and BPTP/LPTP/IPPTP (extension agencies) was organized in Bali inviting 12 local extension agencies from throughout the country (10-12 May 1999). • Many posters of research activities at Gondol Research Station were prepared and exhibited at the seminar organized by DGF, namely "Seminar and exhibition on mariculture development in Indonesia for supporting PROTEKAN 2003" (August 1999) 	A

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