

and provided necessary support if it required.

(7) Stakeholders' ownership

The project C/Ps as well as the TUGEM staff have recognized the issues that the Project tries to solve and worked hard. Strong intention of continuing the study for further improvement of the Kalkan production was observed.

6. Five Evaluation Criteria

The current situation is evaluated by Five evaluation criteria; Relevance, Effectiveness, Efficiency, Impact and Sustainability. The followings are the results according to the evaluation criteria.

6-1. Relevance

The Relevance of the Project is judged **high**.

The project indicates high relevance to the national development policy of the Republic of Turkey, JICA Country Program for Turkey, and the needs of CFRI and the private sector. It is also remarkable that Japan has a technological superiority and experience in VHSV study as well as the aquaculture of similar species of Kalkan.

6-2. Effectiveness

The effectiveness of the project is judged **high**.

The project with good performance to achieve its purpose is highly recognized. Through the project activities, the outputs shown in the PDMe have been obtained, and the outputs have effectively contributed to the project purpose although there is a limitation in countermeasures development against dropsy due to a short period of the Project. However, the issues related to VHS were cleared and scientific article about VHSV was published and distributed to relevant organizations.

In order to solve the issue of the mass mortality happened in 2004, the VHS and dropsy studies are judged an appropriate entry point. C/Ps started recognizing other causes of mass mortality as the result of VHSV and dropsy studies. They are now clear-sighted about what they will do for the next step to terminate mass mortality.

6-3. Efficiency

The Efficiency of the Project is judged **very high**.

Relatively small scale input generates great outputs of identification of VHSV. One long-term Japanese expert and 2 short-term experts were dispatched as scheduled. According to the questionnaire and interview, most of C/Ps indicated that the expertise of Japanese experts is adequate.

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Total number of 16 C/Ps have worked in the project and among them 5 C/Ps have worked partly (See ANNEX V). The remarkable feature of this project is that a half of C/Ps were trained in the previous project could contribute so much to the project outcomes.

Provision of equipment has been done as planned. Those facilities and equipment are well maintained by a mechanical engineer in CFRI with sufficient operational cost.

6-4. Impact

The project has generated very high impacts.

Much stable seed production is expected since virus related issues have been solved and the causes of dropsy have been studied. Most of C/Ps answered in the interview that as the result of pathogenicity tests, VHSV which was isolated from wild fish in the Black Sea and did not induce mortality in turbot larvae and rainbow trout, sea bass and sea bream, and that these findings had so much impact to the private sector. The impact in technical aspect is considered extremely positive. Some private companies which are interested in Kalkan culture have re-started demanding fry from CFRI. It might need more time to measure the impact in socio-economic and environmental aspects, however, regarding negative impacts are not assumed from this project.

6-5. Sustainability

The Sustainability of the Project is considered very high.

Due to information dissemination activities in the past, Kalkan culture projects have already recognized by the fisheries and aquaculture sector. Some fish firms have been provided fry and 2 out of them are planning to establish a commercial-base production. There is a high demand for Kalkan fry. MARA also confirmed that the budget allocation to the future continuous project on Kalkan culture.

C/Ps' skills were improved including virus detection test and technology transfer was completed in this aspect. Activities related to dropsy counter-action are continuously studied by the end of the project period. Visual materials with photos are being prepared and C/Ps will manage to take countermeasures with the material if a new issue happens. However, a system for prevention against viral diseases including VHS should be established and maintained in the future.

Facilities and equipment inputs in the past are appropriately maintained. Facility maintenance is conducted with Turkish budget every year.

7. Conclusions, Recommendations and Lessons Learned from the Project

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7-1. Conclusions

Based on the series of discussions with officials concerned and C/Ps as well as field survey, the Team has concluded;

- (1) The Project activities have been successfully conducted under efforts by the Turkish C/Ps and the Japanese experts.
- (2) As of main activities in the Project, VHSV and dropsy are studied. For VHSV, it is completely cleared, and there is big impact in several aspects. For dropsy, several researches were made but the causes of dropsy are not cleared completely in the project period. However, objectively verifiable indicators for dropsy study, "The courses of dropsy are studied" are achieved. There are remaining activities which are requested to continue study, however, it is expected that Turkish side could deal such studies. It is confirmed that the result of the Project within 2 years and 3 months by the minimum input is reasonable.
- (3) In addition to the result of the Project, Kalkan seed production has been studied for 10 years. In these 10 years, several things are implemented, not only technical transfer of seed production but also trial growing and ecological studies on Kalkan. These results are big step for future Kalkan culture. It is expected that Kalkan culture could be possible near future.
- (4) It is appropriate that the Project terminates as planned in the M/M since the Project has achieved and/or will achieve the project purpose by the end of the project period its objectives set by the M/M.

7-2. Recommendations

For further sustainable seed production of Kalkan, the Team has made the following recommendations

<For the activities within the remaining project period>

- (1) The Team appreciated that the impact of the Project, especially technical aspect is quite huge. And it is certain that several Turkish aquaculture companies have an interest in Kalkan culture and they expect establishment of its culture techniques. The CFRI provided with Kalkan fry to some private companies until 2004, and also shared their experience with them. In addition to these activities, it is requested that CFRI disseminates information of the study results among related sector, not only the private sector but also universities, authorities and related institutions in Turkey through technical seminars or

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workshops.

- (2) C/Ps should have more opportunities of presentation in order to confirm the result of technical transfer from the Japanese experts to them. The Team recommends that the representatives of C/Ps who are in charge of main project activities should present the result of the Project at the final JCC meeting which will be held in coming January.

<For the activities after the Project period (in view of achieving the Overall Goal)>

- (1) In the Project, mainly VHSV and dropsy which were considered causes of mass mortality were studied. However, there are other diseases which involve the risk of mass mortality, and some of project members mention the necessity of continuing of dropsy study. To realize an achievement of Overall Goal, the sustainable seed production of Kalkan studies on dropsy, other fish disease and growing techniques are required to continue. And it is requested to make a guideline for prevention methods for VHS and dropsy by Turkish side.
- (2) Many C/Ps have been received trainings in Japan continual 10 years cooperation and it is identified that the result of trainings in Japan gives big technical impact to the Project. After termination of the Project, direct technical assistance in the field of fish disease also will be terminated, however, if there is any chance to take part in trainings which deals fish disease in Japan, such as group type trainings, JICA Turkey office is requested to make the biggest effort to disseminate of information among adequate Turkish organizations including CFRI.

7-3. Lessons Learned from the Project

- (1) It is mentioned that weak linkage among sections in the Project inhibits adequate information sharing and then it makes depression of teamwork. For smooth implementation of projects, it is useful to introduce a system of information sharing, such as regular meetings; circulation of papers which keep a record of activities and its result from the beginning.
- (2) The Project had not made a Project Design Matrix (PDM). Project members have vague image of project activities because they have common understandings based on previous project activities, but concrete purpose of the Project was unclear. Therefore, there is big difference of recognition for project activities among the members, and this working structure brought distraction. It is requested that every project has design of the project, expected result and responsible activities for every project member (TOR, Terms of Reference), and sharing it within project members in the beginning of the projects.

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Project Title: Technical Development of Sustainable Seed Production for
 Target Group: Central Fisheries Research Institute (CFRI)
 Duration: November 2004 - January 2007
 Implementing Agencies: TUGEM, MARA

Narrative Summary		Objectively Verifiable Indicators	Means of Verification	Important Assumption
Overall Goal	Sustainable seed production of Black Sea turbot is developed	Useful data and technology of seed production are available for private sector	• Progress report	
Project Purposes	Quality of produced seeds of Black Sea turbot is improved at CFRI	• VHSV-free seeds are produced, • Dropsy rate is decreased	• Interviews • Questionnaire survey • Progress report	
Outputs	1 Preventive measures against VHS are developed	• VHSV is identified • Prevention technique of horizontal and vertical transmission is established • Pathogenicity and susceptibility are clarified	• Interviews • Questionnaire survey • Progress report	
	2 Countermeasures against dropsy are developed	• The courses of dropsy are studied		
Activities	1-1 Equipping necessary facilities and equipment	Input		
	1-2 Conducting the training of PCR method to detect VHSV	(Turkish Side) 1. Counterpart personnel 2. Necessary facilities and equipment other than Japanese inputs 3. Spare parts for existing facilities and equipment 4. Counter budget to manage and maintain CFRI	(Japanese Side) 1. Long-term expert 2. Short-term Expert 3. Necessary facilities and equipment for VHS prevention 4. Necessary facilities and equipment for waste water treatment system	
	1-3 Examining problems of current seed production method for Black Sea turbot against VHS			
	1-4 Developing and introducing the preventive measures against VHSV into the seed production method for Black Sea turbot			
	2-1 Developing the criteria of quality eggs/larvae			
	2-2 Examining problems of current seed production method for Black Sea turbot against dropsy			
	2-3 Developing and introducing the countermeasures against dropsy into the seed production method for Black Sea turbot			

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ANNEX II Achievement Grid

PDM Narrative Summary	Verifiable Indicators and Results
<p>Overall Goal</p> <p>"Sustainable seed production of Kalkan is developed"</p>	<p>Useful data and technology of seed production is available for private sector</p> <p>(Performance)</p> <ul style="list-style-type: none"> • Since the duration of the Project is only two years and three months, more time is required to judge if the overall goal is fully achieved or not. • The project and CFRI have disseminated information to academics and the private sector in the forms of news letters and magazines and web site (www.kalkan.sumea.gov.tr) and CFRI staff frequently visited those stakeholders in the purpose of information sharing and extension of techniques. • Private companies which are interested in Kalkan production and researchers also visited CFRI to get knowledge and techniques of seed production. • In order to achieve the overall goal, following issues are suggested to continuous study of eggs and larvae quality by CFRI; <ol style="list-style-type: none"> (1) The causes of dropsy (2) Mal-pigmentation and deformation (3) Bacteria and parasite diseases (4) Broodstock rearing
<p>Project Purpose</p> <p>"Quality of produced seeds of Kalkan is improved at CFRI"</p>	<p>1. VHSV-free seeds are produced</p> <p>(Performance)</p> <ul style="list-style-type: none"> • All larvae in tank were checked and VHSV-free seeds were in acceptable percentage. • The problems of current seed production method for Kalkan against VHS was addressed in journals. <p>2. Dropsy rate is decreased</p> <p>(Performance)</p> <ul style="list-style-type: none"> • Dropsy rate was decreased in both spawning season of 2005 and 2006, but the decrease ratio is under the examination. • The causal relationship between the decrease and the project activities was not verified. The reason of this is that the project duration was too short to identify dropsy and its countermeasures.

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PDM Narrative Summary	Verifiable Indicators and Results
<p>Output1</p> <p>"Preventive measures against VHS are developed"</p> <p>Activities</p> <p>1.1. Equipping necessary facilities and equipment</p> <p>1.2. Conducting the training of PCR method to detect VHSV</p> <p>1.3. Examining problems of current seed production method for Black Sea Turbot against VHS</p> <p>1.4. Developing and introducing the preventive measures against VHSV into the seed production method for Black Sea Turbot</p> <p>1.5. Developing the criteria of quality eggs/larvae</p>	<p>1. VHSV is identified</p> <p>(Performance)</p> <ul style="list-style-type: none"> • Necessary facilities and equipment were input. (See Annex VI) • PCR training was conducted by a short-term expert • Distribution/pattern of VHSV was clarified • Detection and VHS identification and diagnosis techniques were transferred to C/Ps. • Genetic relatedness analysis methodology of VHSV were transferred • VHSV carrier status among hatchery-bred broodstock was studied. <p>2. Prevention technique of horizontal and vertical transmission is established</p> <p>(Performance)</p> <ul style="list-style-type: none"> • VHSV transmission route was identified and the tracking method was studied. • VHSV transmission to other species such as sea bass and sea bream was studied. • Vertical transmission from broodstock to larvae and horizontal transmission among larvae were not identified. • Iodine disinfection method was studied. <p>3. Pathogenicity and susceptibility are clarified</p> <p>(Performance)</p> <ul style="list-style-type: none"> • Pathogenicity were examined. • Susceptibility examination of VHSV to Kalkan and other species was conducted. • In Pathogenicity tests, it is clarified that VHSV is isolated from wild fish in the Black Sea and does not induce mortality in turbot larvae and rainbow trout fingerlings, and causal relationship between VHSV and mass mortality was proved as negative. • VHSV preventive measures were identified
<p>Output2</p> <p>"Countermeasures against dropsy are developed"</p> <p>Activities</p> <p>2.1 Developing the criteria of quality eggs/larvae</p> <p>2.2 Examining problems of current seed production method for Kalkan against dropsy</p> <p>2.2 Developing and introducing the countermeasures against dropsy into the seed production method for Kalkan</p>	<p>1. The causes of dropsy is studied</p> <p>(Performance)</p> <ul style="list-style-type: none"> • Effective criteria for quality eggs and larvae were examined in terms of (1) survival activity index, (2) blastomere morphology, (3) dropsy and (4) deformation. • Proximity of adjacent cell membrane and discreteness of cell margins observed in blastomere morphology could be one of criteria for quality eggs and larvae as well as dropsy observed in larvae body. • Examinations to find out the causal relationship between dropsy and assumable factors such as seed density, salinity and temperature. • As the result of the examinations, some factors were confirmed as direct causes of dropsy; handling, high density and salinity • Temperature, iodine treatment, broodstock condition, pesticide and heavy metals were assumed not to be the direct causes of dropsy through the examinations. • The causes of dropsy and the countermeasures are still under examination. <p>2. Dropsy occurrence is identified</p> <p>(Performance)</p> <ul style="list-style-type: none"> • It is assumed as the result of examinations that dropsy is not transmitted from broodstocks but occurred within about 10 days after hatched.

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PDM Narrative Summary	Verifiable Indicators and Results
Inputs	<p>Japanese side:</p> <ul style="list-style-type: none"> • One long-term expert (seed production/fish disease) was dispatched. (total assignment period :24.3 MM) • Two short-term experts (waste water treatment system, VHS counter measurement) were dispatched (total assignment period is 4.5 MM) • One counterpart was trained in Japan (Training scheme: Group Training) • Machinery: YTL 223,864 (JPY 17,7 mil) (See Equipment list) • Administration cost: YTL99,645 =JPY 7,9 mil. (as of 9 Aug. 2006) <p>Turkish side:</p> <ul style="list-style-type: none"> • Project operation cost: YTL 364,562=JPY28,8 mil. (as of 9 Aug. 2006) • See Equipment list (Annex VI)

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