

Project Evaluation Summary Sheet

Project Number and Name: <i>062-04VIE-Intensive In-pond Raceway Production of Marine Finfish</i>																																
Vietnamese Institution(s): Nha Trang University (the former University of Fisheries), Vietnam																																
Australian Partner Institution(s): Queensland Department of Primary Industries & Fisheries, Australia																																
Date Approved: 15 April 2005	Date Commenced: 01 Aug. 2005	Date Completed: December 2007																														
Project Budget (A\$):	Total: 292,520	From: AusAID: 176,220 Vietnamese institution: 42,600 Australian institution: 73,700																														
<p>Project Abstract (from Proposal):</p> <p>This project aimed to develop the larval rearing and nursery capacity of marine finfish production in Vietnam through the use of accessible, cost effective and environmentally sustainable technologies. Through the development and use of in pond floating raceways (FR) this project has assisted farmers to develop their own intensive but durable and manageable larval rearing capacity. This capacity will be used to improve fingerling supply to the industry which is currently both costly and limited. In addition, advanced nursery capacity was developed using the same principles. Grow-out of finfish in raceways to market size was investigated in the Australian component of the research where researchers from the Queensland DPI&F provided expertise in systems management, water quality management and waste remediation. Species selected for study included cobia, barramundi, mulloway and whiting. All activities were mindful of environmental sustainability issues and strategies were investigated to limit water discharge. Information from these activities was used to train staff from the UoF, its students, industry and other relevant stakeholders. This project encouraged active involvement and contribution of different stakeholders to make this research highly relevant and applicable to the local aquaculture industries.</p>																																
<p>Specific objectives:</p> <ol style="list-style-type: none"> 1. Trial a cost effective larval rearing system for small to medium scale hatchery operations and fingerling producers in Vietnam 2. Demonstrate capacity for fingerling and on-growing production in FR's Vietnam and Australia. 3. Demonstrate possibility to develop a zero-discharged system with additional yield of by-products 4. Deliver benefit to stakeholders and beneficiaries (local farmers, mariculture industries, disadvantaged groups, feed producers, students, staff of UoF and DPI&F) and capacity building for both sides. 																																
<p>Reports Produced (Scheduled and completed Date):</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Milestone</th> <th style="width: 20%;">Scheduled</th> <th style="width: 20%;">Completed</th> </tr> </thead> <tbody> <tr> <td>MS2: In-pond raceway technology for larval rearing of marine finfish developed and tested (Outputs: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4)</td> <td style="text-align: center;">Aug 2006</td> <td style="text-align: center;">March 2007</td> </tr> <tr> <td>MS3: First six-month report</td> <td style="text-align: center;">Sep 2005</td> <td style="text-align: center;">July 2006</td> </tr> <tr> <td>MS4: In-pond raceway technology for marine finfish nursery production and grow-out developed / tested (Outputs: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4)</td> <td style="text-align: center;">Aug 2006</td> <td style="text-align: center;">March 2007</td> </tr> <tr> <td>MS5: Demonstration of zero-discharge system using Floating Raceways (Outputs: 4.1, 4.2,)</td> <td style="text-align: center;">Feb 2007</td> <td style="text-align: center;">March 2008</td> </tr> <tr> <td>MS6: 2nd six-month report</td> <td style="text-align: center;">Sep 2006</td> <td style="text-align: center;">Jan 2007</td> </tr> <tr> <td>MS7: 3rd six-month report</td> <td style="text-align: center;">Feb 2007</td> <td style="text-align: center;">Dec 2007</td> </tr> <tr> <td>MS8: Analysis of benefits to local farmers and mariculture industries (2.1, 2.2, 2.3, 2.4)</td> <td style="text-align: center;">Jun 2006</td> <td style="text-align: center;">Jan 2007</td> </tr> <tr> <td>MS9: Analysis Improvement of competence of Nha Trang University' staff in research and analytical techniques as an direct impact of the CARD VIE 062/04 Project (Outputs: 7.1)</td> <td style="text-align: center;">March 2007</td> <td style="text-align: center;">June 2008</td> </tr> <tr> <td>MS10: Research/technical reports</td> <td style="text-align: center;">March 2007</td> <td style="text-align: center;">June 2008</td> </tr> </tbody> </table>			Milestone	Scheduled	Completed	MS2: In-pond raceway technology for larval rearing of marine finfish developed and tested (Outputs: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4)	Aug 2006	March 2007	MS3: First six-month report	Sep 2005	July 2006	MS4: In-pond raceway technology for marine finfish nursery production and grow-out developed / tested (Outputs: 1.1, 1.2, 1.3, 2.1, 2.2, 2.3, 2.4)	Aug 2006	March 2007	MS5: Demonstration of zero-discharge system using Floating Raceways (Outputs: 4.1, 4.2,)	Feb 2007	March 2008	MS6: 2 nd six-month report	Sep 2006	Jan 2007	MS7: 3 rd six-month report	Feb 2007	Dec 2007	MS8: Analysis of benefits to local farmers and mariculture industries (2.1, 2.2, 2.3, 2.4)	Jun 2006	Jan 2007	MS9: Analysis Improvement of competence of Nha Trang University' staff in research and analytical techniques as an direct impact of the CARD VIE 062/04 Project (Outputs: 7.1)	March 2007	June 2008	MS10: Research/technical reports	March 2007	June 2008
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Evaluation Team: <i>Mr. Truong Duc Toan</i> (Team Leader): Inst. for Water Resource Economics and Management <i>Mr. Nguyen Quoc Nghi</i> : Science Technology and Environment Department <i>Mr. Nguyen Duc Cuong</i> : Science Technology and Environment Department <i>Mr. Nguyen Ha Hue</i> : National Inst.of Agricultural Planning and Projection <i>Mr. Nguyen Van Kien</i> : CARD M&E Coordinator		Date of Evaluation: 4-6, June 2009	Project Completion Evaluation (PCIE)
Evaluation Summary	Score a/	Comments	
Relevance	4.5	<ul style="list-style-type: none"> The project objectives were and still remain highly relevant to Vietnam in the context of development of fisheries sectors as Vietnam is still one of the leading fish exporting countries of the world, and it has a competitive advantage in producing marine fish. The design of the project, which focused on the development of the technology and testing at site with larval rearing and then in combination with training and information dissemination activities, is evaluated being as a good approach to achievement of its objectives. The floating raceway technology is considered appropriate in the testing area as well as other regions of Vietnam. However, the technology is most appropriate for rearing fingerlings but not as appropriate for fish production since it requires FRs of a very large scale. It can be used for rearing both marine fish and brackish fish. The model is appropriate for individuals or companies that have the financial capacity and initial investment ability. Poor farmers/ producers can only benefit from the technology if the price of fingerling decreases and higher quality of fingerlings increase fish yield for farmers. There may be a need to extend the research with smaller scale of floating raceway to be suitable with small farmer households and bigger scale for marine-aquaculture. The technology can use HDPE for rearing fingerlings in brackish waters. The approach of the project was good but in the context of an un-identified plan for marine fish production, it does not seem fit with highly required quantity of fingerlings since Vietnam does not have a master plan for producing marine fish. However, the technology can be applied for areas where producers are producing brackish fish. At the current time, the demand for fingerlings has decreased sharply therefore the technology of floating raceways faces difficulties into scaling up or being further extended. 	
Effectiveness	4.5	<ul style="list-style-type: none"> The project has succeeded in achieving its objectives. Two versions of floating raceway for rearing fingerlings have been developed and tested successfully. The floating raceway can produce fingerlings and market-fish with a very competitive cost and good quality in both Vietnam and Australia. The environmental issues in producing fish are improved significantly when the floating raceways are used in comparison to rearing/growing in ponds. The evaluation found that this project can be considered to be very effective. The implementation of the project was delayed about 5 months as the delay of signing contract caused a delay of equipment investment and testing. During the trials of fingerling rearing, there were two failures as a consequence of improper design of the air pumping system. However, the final versions of floating raceways have fixed the problems. In general, the technology has been developed successfully in the pilot area (at Brackish Water Research Station) however it could prove the effectiveness more and its reliability if it was piloted and tested in another area. The beneficiaries from the technology would be most suitable for companies that invest in production and fish farmers are considered to benefit less from the technology. At this time all stakeholders applying the technology have interrupted their production as the result of a low demand for fingerlings. The demand is largely depended on the market but also a strategy plan of the government to boost the 	

		industry.
Efficiency	4.5	<ul style="list-style-type: none"> The project team is considered to be very successful in organizing and cooperating with relevant stakeholders during the implementation of the project. The team leader is assessed a good planner and organizer to promote activities of the project. Resources used in the project are appropriate with respect to equipment/ technology as well as human resources. The floating raceways made from fiberglass composite material (life could last for over 50 years) is considered the best in terms of efficiency although initial investment of this material is relatively high compared to other materials such as HDPE plastic. However, for poor fish farmers, their investments often imply for a short term; therefore, it may need to find other options with cheaper material. The cost of investment would be very competitive if we make an assumption of the floating raceways life lasting for “at least” 20 years. In the future the technology could be widely applied and scaled up depending on the market demand for fish fingerlings. The timeliness of the implementation of the project was considered good at the beginning stage of the project, even now although it is in the context of global economic crisis. Beneficiaries from the project include: commercial fingerling producing companies, farmers, fisheries extension staff, technicians from commercial companies, students who are trained, with direct benefits from good fingerlings at a low cost.
Sustainability	4.5	<ul style="list-style-type: none"> As the evaluation mentioned above, the project has produced positive outcomes which are likely to be maintained and replicated. The indicators that were identified during the field trip include: <ol style="list-style-type: none"> 1) There are many units/companies that have applied the technology of in-pond floating raceways for over a year since the project was finished. For example: Australis (USA) in Khanh Hoa Province, Minh Thuan Co. in Ninh Thuan and Ben Tre Provinces, Viet Seabass Co. in Vung Tau Province, Truong Thanh Co. in Phu Yen City, Brackish Water Fisheries Station of Phu Yen Fisheries Extension Center, and others. However, over the last six months the production of fingerlings using floating raceways has been interrupted as a consequence of global economic crises as the export of fish has decreased significantly and the demand for fingerlings has gone down since then and not yet recovered; 2) The survival rate of fish rearing from floating raceways is assessed much higher than that from using traditional methods (about 80% in comparison with about 50%, respectively); fish are much easier to treat for diseases than rearing in ponds; productivity is higher in one square metre of water surface, cost-effectiveness is higher; and, less environmental impact is expected. Fish reared in floating raceways can be fed with industrial feeds therefore fingerlings will continue to be fed with the feeds in the grow-out stage of fish production. In traditional rearing, fish is fed with flake food. . Therefore, using FR technology can limit or prevent the exhaustion of natural fish sources; 3) Most people asked who know the technology believes that the technology is more practical and profitable than traditional methods and could be scaled up/ extended. Many people/companies are interested in applying the technology; 4) The information on floating raceway technology is circulated through training workshops, exhibition and training MSc student and technicians from participating organizations (Khanh Hoa Fisheries Extension Center, Fisheries Division of Phu Yen Agriculture and Rural Development, and technicians from companies).
Impact	4	<ul style="list-style-type: none"> In this stage of project completion, it has a significant impact of the project in relation to stakeholders and beneficiaries (local farmers, marine-culture industries, feed producers, aquaculture students, staff of UoF and DPI&F, and partly for disadvantageous groups). In terms of capacity building (research

		<p>activities and training), there are about 60 people taking part in training workshops on with the floating raceway technology. In addition, 2 presentations at the Ministry and exhibition about the technology have disseminated the information to potential users in Vietnam as well as international partners.</p> <ul style="list-style-type: none"> • The number of people/producers using the technology is evaluated to have increased since the quality of seed and the level of cost-effectiveness of the technology is considered higher compared with that from traditional methods. • In the future, if the market for marine fish increases and export fisheries processing units are promoted, the impact of the technology will be very high, in terms of creating jobs for local people, providing cheaper and better fingerlings for fish producers/ including poor farmers, and especially ensuring the mitigation of environmental impact caused from rearing fish. The technology could promote the development of fish feed production industry as fish production from the FR technology uses feeds made from industrial production. • Greater awareness of fish farmers with regard to the importance of using good fingerlings will boost the development of FR technology since it can produce fingerlings with high quality. Therefore, the impact of FR will have a chance to be extended. The impact of the project could be re-evaluated in several years.
Average Score	4.4	<ul style="list-style-type: none"> • Overall, the PCIE team found that this project is highly successful in relation to its relevance, efficiency and effectiveness. The impact and sustainability of the project have with positive initial signs expected to be very successful since there are many companies that have being adapting/ uptaking the technology in different provinces. However, at this time, some companies have been interrupted their production as a result of global economic crisis as well as low demand for fish seeds. The longer-term impact of the technology can be proved within about three year time. It may need more circulation of information about the technology, more coordination from relevant stakeholders as well as a specified strategy plan for development of marine finfish in Vietnam.

Overall Assessment b/: Highly Satisfactory

Major Problems Identified:

Some major problems identified regarding the in-pond floating raceway technology include: 1) the using of FR technology imposes a risk of failure in the operation of air-blowers and electricity system. Because fingerlings are reared with a very high density of fish, if the air pumping system does not work for about 5 minutes, fish may die. Therefore, it requires a very strict control with regard to technical issues. 2) The technology also imposes a risk of failure in some situations of weather extremes, such as floods or strong winds, etc.; 3) the cost of FR is high so that not many small farmers can invest meanwhile they have to learn/ care much about technical aspects to use the technology.

The field investigation shows that the main beneficiaries currently include companies who have a good capital for investing in production systems. Small farmers or disadvantaged groups receive lower benefits indirectly from high quality and uniformity of fingerlings. This implies that the main objective of the project to benefit those stakeholders does is not fully met. A risk is that in the case of a monopoly of one or some seed producers in one area, the price of fingerlings can be still high meanwhile the price of output (market fish) from fish farmers remains at lower prices.

Lessons Learned:

The project team has made good coordination with relevant stakeholders and made the link between university research and practical delivery. Experiments are well organized in Australia and Vietnam especially with support from Australian experts. The combination with provincial staff (from the Brackish Fisheries Center, Khanh Hoa Fisheries Extension Center) is important to reduce costs of experiments as well as to increase the possibility of more technicians/ staff of practical units who can apply project's results. Some activities of the project such as organizing workshops (three extension workshops and four presentations to potential users in Vietnam and overseas) to demonstrate not only efforts of the project staff but are also due to increasing interests of the local aquaculture industry. The national extension workshops and exhibition organized in Hanoi is also to bring more chances for potential investors/ producers to apply the technology.

The delay of the project compared with the anticipated start (as the result of contract negotiations) caused some difficulties with pond water quality as funds were not available in time to build the system in its complete form before it was stocked with fish and this affected the access ability to provide larvae and fingerlings of particular species in both countries.

Recommendations:

The information about the technology should be circulated or disseminated across the whole sector for potential producers/ investors to know and apply in practice. The manuals of the technology could be published for investors to apply it for fingerling/fish production. However, technical guidelines and manuals should be modified to be more simple to facilitate the technical transfer process. More presentations on the technology should be integrated in workshops at sector level, the ministerial or provincial.

Further impact would depend on further support from decision makers at provincial level and even MARD in terms of strategy planning and related policies for sustainable development.

The CARD PMU and the project proponent should come to agreement on Intellectual Property rights of FR technology. It's recommended that IP right is not applied in this case. Khanh Hoa Fisheries Extension Center is an appropriate unit to be responsible for transferring the FR technology and they may charge some consultancy fee for the technical transfer.

CARD or Vietnam Government should support for small scale marine aquaculture in Vietnam because there is no research for this field. If marine fish is produced with large scale and exported, it will boost the development of the fishery sector (include rearing fingerlings, distributing, marketing, etc.).

In terms of CARD project management, it needs to process procedures as well as finish contract negotiations at scheduled time since projects with experiments, especially with fisheries trials, they largely depend on seasons with available larvae as well as weather conditions.

a/ 1 = worst 5 = best

b/ Highly Satisfactory, Satisfactory, Moderately Satisfactory, Un-satisfactory