

Country Name	<b>The Project for Strengthening Research and Development on Fisheries and Aquaculture</b>
Lao People's Democratic Republic	

**I. Project Outline**

Background	In Laos, fishery production was on the rise, with aquaculture accounting for about 74% of the total volume. However, juvenile production was insufficient, and the country was unable to produce juveniles of major fish species (all-male tilapia), relying on imports from neighboring countries for 30-40% of its production. Therefore, it was necessary to increase juvenile production within Laos, develop its technologies including basic research, and disseminate the technologies to aquaculture farmers.					
Objectives of the Project	To increase seed production for aquaculture and establish a research and examination system by installation of aquaculture facilities, training facilities and equipment in Namxouang Aquaculture Development Center (NADC) as well as installation of research equipment and materials in the Living Aquatic Resources Research Centre's (LARReC) located in Vientiane Capital, and thereby contributing to enhancing cultured fish production in Laos.					
Contents of the Project	<ol style="list-style-type: none"> <li>Project Site: NADC and LARReC, Vientiane Capital</li> <li>Japanese side Construction of NADC: New office/training building, New dormitory building, Elevated water tank, New hatchery, Moina culture tank, Tilapia larval rearing tank, Brood stock/nursery pond, Sedimentation pond, and Sedimentation pond for hatchery. Procurement of equipment: Egg incubation system for tilapia egg, Water supply system, Recirculating aquaculture system for tilapia egg incubation, Egg incubation system for buoyant egg, Spawning unit, and others. Technical assistance (soft component): Establishment of all-male tilapia seeding production techniques, feed analysis techniques, basic fish disease diagnosis techniques, and equipment maintenance techniques.</li> <li>Lao side: Removal of obstacles and ground leveling at the project site, Landscape maintenance for the perimeter of the building, and Relocation of existing equipment and furniture.</li> </ol>					
Project Period	E/N Date	May 26, 2015	Completion Date (ex-ante)	February, 2017	Completion Date (actual)	October 17, 2018 (Completion of soft component)
	G/A Date	June 5, 2015				
	Revised G/A Date	June 6, 2018				
Project Cost	E/N Grant Limit / G/A Grant Limit: : 714 million yen Actual Grant Amount: 691 million yen					
Executing Agency	Department of Livestock and Fisheries (DLF), National Agriculture and Forestry Research Institute (NAFRI)					
Contracted Agencies	Main Contractor(s): Kumagai Gumi Co., Ltd. Main Consultant(s): INTEM Consulting, Inc., Azusa Sekkei Co., Ltd.					

**II. Result of the Evaluation**

I Relevance/Coherence
<p>[Relevance]</p> <p>&lt;Consistency with the Development Policy of Laos at the Time of Ex-Ante Evaluation &gt;</p> <p>The project was consistent with the development policy of Laos at the time of ex-ante evaluation such as “the 7th National Development Plan” (2011-2015) aiming at food security, production increase, and the value addition of commercial crops. Based on the plan, DLF made the “Lao National Water Resource Strategy and Action Plan” (2011-2015) for fisheries resource management and fisheries development.</p> <p>&lt;Consistency with the Development Needs of Laos at the Time of Ex-Ante Evaluation &gt;</p> <p>The project was consistent with the development needs of Laos at the time of ex-ante evaluation to increase fish species for juvenile production and produce juveniles of major fish species (all-male tilapia) for reducing the dependence on imports from neighboring countries.</p> <p>&lt;Appropriateness of Project Design/Approach&gt;</p> <p>The project design/approach was appropriate. No problem attributed to the project design/approach was confirmed.</p> <p>&lt;Evaluation Result&gt;</p> <p>In light of the above, the relevance of the project is ③<sup>1</sup>.</p>
<p>[Coherence]</p> <p>&lt;Consistency with Japan's ODA Policy at the Time of Ex-Ante Evaluation&gt;</p> <p>The project was consistent with “Country Assistance Policy for Lao People's Democratic Republic” (2012) at the time of ex-post evaluation prioritizing “Agricultural development and forest conservation” covering “Increase in the productivity in agriculture and fisheries, and step-by-step development from self-sufficiency to market-oriented agriculture” as one of the priority areas.</p> <p>&lt;Collaboration/Coordination with other JICA's interventions&gt;</p> <p>No collaboration/coordination between the project and other JICA interventions was clearly planned at the time of ex-ante evaluation.</p> <p>&lt;Cooperation with other institutions/ Coordination with international framework&gt;</p> <p>No cooperation/coordination with other partners was clearly planned at the time of the ex-ante evaluation.</p>

<sup>1</sup> ④: very high, ③: high, ②: moderately low, ①: low \*To be the same afterwards.

<Evaluation Result>

In light of the above, the coherence of the project is ②.

[Evaluation Result of Relevance/Coherence]

In the light above, the relevance/coherence of the project is ③.

2 Effectiveness/Impact

<Effectiveness>

The project objectives were partially achieved. The number of fish species for juvenile production by NADC has been 7 species which was less than the target value of 8 (Indicator 1). As for the number of juvenile productions by NADC, it has been below the baseline and far from the target value (Indicator2). The trainees' dormitory occupation rate has been low, but it has recovered from the lowest value in 2020 due to the resumption of training (Indicator 3). The number of research of LARReC (the number of papers published or the number of presentations at an academic conference) has been stagnant (Indicator 4). Each indicator has been affected by COVID-19 and did not achieve the target, but some indicators such as the number of fish species for juvenile production by NADC and the trainees' dormitory occupation rate have a trend toward improved values. For conditions of facilities and equipment procured by the project, everything provided to NADC has been fully used. On the other hand, LARReC has used equipment provided by the project but has not been used very often for some of them. As a matter of fact, Crude Lipid analysis system and Fiber Analyzing Equipment have been occasionally utilized. The reason for these is that the current staff member does not know how to use Crude Protein Tester because they did not fully attend to the soft component provided by the project.

As for qualitative effects, the director of NADC mentioned that the staff members of NADC were able to improve skills such as all-male tilapia seed production and feed analysis through the project, leading to enhance the aquaculture extension system. The staff members of NADC have been more confident in conducting the training for farmers, central and local government officers, and higher education students.

<Impact>

Positive impacts on improved aquaculture production volume in Laos have been observed. Compared to the production of cultured Tilapia at the time of the project completion, not all of them continue to increase. However, some have increased noticeably and have grown from 5,114,000 tons to 6,823,000 tons in terms of the overall production of cultured Tilapia at the ex-post evaluation. According to the annual report issued by DLF and MAF (Ministry of Agriculture and Forestry), the volume of juvenile production has increased from 1,530,000 inds. in 2016 to 2,340,000 inds in 2021, despite a temporary decline due to COVID-19. It can be said to be growing steadily. For the aquaculture production volume, it has increased since the project completion. In 2019, it was recorded at 122,000 tons, and in 2020 at 135,000 tons. In 2022, it is expected that 140,000 tons will be produced; therefore, there is a growing trend in it.

No negative impact on the natural environment was observed and no land acquisition and resettlement of people was implemented.

<Evaluation Result>

In light of the above, the effectiveness/impact of the project is ②.

●Quantitative Effect

Indicator	Ex-ante Year 2013 (Baseline)	Target Year 2020 3 Year(s) after Completion	Year 2019 1 year after project completion	Year 2020 2 years after project completion	Year 2021 3 years after project completion	Ex-post Year 2022 (as of May)	Source
1: Number of fish species for juvenile production by NADC	5	8	4	4	7	7	NADC Annual Report
2: Number of Juvenile production by NADC (1 million inds.)	3.8	10	4.5	5.7	1.5	N/A	
3: Trainees' dormitory occupation rate (%)	18.1	27.4	8.6	5.1	5.8	10.2	
4: Number of research of LARReC (No. of paper published or No. of presentations at an academic conference)	10	12	4	4	4	4	LARReC Annual Report

3 Efficiency

The project cost was within the plan (the ratio against the plan: 96.7%) and the project period slightly exceeded the plan (the ratio against the plan: 113.8%). This is because office building and dormitory construction approvals took time, and the tax exemption of necessary equipment took time, resulting in a delay of more than 3 months behind the planned period. The planned outputs were changed to reduce the size of a sedimentation tank for a brood stock/ nursery tank, cancel a tilapia brood stock rearing tank, and so on for some reasons.

Outputs were partially produced. In the light above, the efficiency of the project is ③.

4 Sustainability

< Institutional/Organizational Aspect>

NADC has 1 director, 2 deputy directors, 14 permanent employees, and 4 temporary employees. These members have been assigned to (1) Information and training Unit, (2) Fisheries development techniques Unit, (3) Disease Analysis Unit, (4) Water Quality Analysis Unit. In LARReC, there are 27 permanent employees and 2 temporary employees, including 1 acting director and 1 deputy director. A director will be appointed in the near future. Employees are allocated to the following four units: (1) Administration, (2) Research Unit, (3) Feed Unit, (4) Capture Fish Unit. According to NADC and LARReC, although both have maintained the number of personnel, it can at least be said that the number of technical staff has not been fulfilled in order to perform high quality work from the beginning of the project. With respect to LARReC, there were only a few research staff on aquaculture and only one maintenance staff, who cannot handle all of the tasks. However,

the government changed the operation regarding temporary employees in government offices, so that the government office will no longer be able to hire temporary employees. These situations do not indicate sufficient numbers of people to carry out the work and activities are secured.

<Technical Aspect>

Both NADC and LARReC have room for technical improvement to conduct proper O&M, repair facilities and equipment, and so on. According to the director of NADC, although the staff members maintain adequate skills with regard to all-male tilapia seed production, other skills such as feed analysis need to be improved. Though the staff members assigned to maintain the facilities and equipment have not received special trainings, NADC maintain the equipment utilizing the outsource in case of serious problems. For LARReC, there is no specialist who researches aquaculture and only one maintenance staff or facilities and equipment. However, both NADC and LARReC have been striving to improve the skills of their staff members through short and long-term training programs. Some of the NADC and LARReC staff have been in the process of attending master programs at graduate schools abroad, and it is hoped that returning staff will be able to carry out their duties effectively. In addition, at this moment, the staff members in each unit are not satisfied with the level of their skills and consider that they need more training on O&M, especially bacteria diagnosis, and training for the development of subject specialists for research work. They are highly motivated to improve themselves. When it comes to the sustainment of skills and knowledge for the proper O&M, the manuals provided by the project are written in Japanese and English, so they have not been utilized effectively due to language barriers.

<Financial Aspect>

There is no specific budget for O&M for both NADC and LARReC, the government allocates the budget for the whole activities of each center. The budget has been allocated to NADC and LARReC for different activities such as conducting training courses for local authorities, and training courses for farmers. However, the trend of budget allocation found that it is sharply reduced. The Government cuts down on budget due to the COVID-19 pandemic. The budget for NADC significantly reduced from 100 million Laos Kip (LAK) in 2018 to 45 million LAK in 2022. Also, the budget for LARReC considerably decreased to 60 million LAK from 130 million LAK for the same period.

<Environmental and Social Aspect>

The wastewater from the tank and the reservoir has been properly treated in accordance with the Laos environmental standards. The wastewater from nursery, bloodstock and hatchery ponds are stored at the sedimentation ponds before discharging into natural streams.

<Current Status of Operation and Maintenance>

So far, no major problems have been found at both NADC and LARReC. Minor routine maintenance activities have been regularly conducted but no large-scale routine work has been done due to the trend of shrinking budgets. and maintenance activities have been carried out only when problems occur. Also, LARReC has not been able to purchase and store spare items.

<Evaluation Result>

In light of the above, some problems have been observed in terms of the institutional/organizational, technical, and financial aspects of the implementing agency. Therefore, the sustainability of the project effects is ②.

5 Summary of the Evaluation

The project was partially achieved. For the quantitative effects, the project has been considerably affected by COVID-19 and all numerical indicators have been lower than planned. However, the number of fish species for juvenile production by NADC and the trainees' dormitory occupation rate have been improving. Regarding the qualitative effects, the improvement of skills of the NADC staff members can help to strengthen the aquaculture extension system and enable extension staff to have more confidence in conducting the training for farmers, central and local government officers, and higher education students.

In terms of sustainability, some minor problems have been observed in terms of the institutional/organizational, technical and financial aspects of the implementing agency due to a shortage of staff members and a limited budget for their activities. Although the staff members in both centers are highly motivated to engage in works and research, a shortage of resources prevents them from developing their activities.

Considering all of the above points, this project is evaluated to be partially satisfactory.

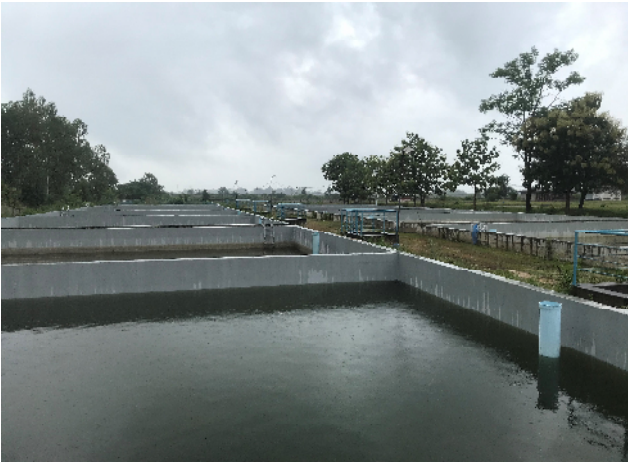
### III. Recommendations & Lessons Learned

Recommendations to Executing Agency:

- In order to sustain the research and development activities in fisheries and aquaculture, it is requested both NADC and LARReC secure the budget for the O&M and replacement of the facility and equipment which may not be available in the future.
- It is suggested that NADC and LARReC take immediate action in providing training courses to improve the knowledge and skills of their technical staff. Also, the manuals provided in Japanese and English should be translated into the Lao language so that many people will be able to refer to them. Otherwise, it would be better to prepare a manual with many illustrations and/or photographs.
- There are only one or two qualified staff members who are capable of O&M of the facilities and equipment in each center. Therefore, more permanent staff members need to be hired in order to engage in activities or that appropriate training programs should be provided in order to increase productivity.

Lessons Learned for JICA:

- Looking at the number of facilities and facilities provided, they have generally been utilized on an ongoing basis. However, the O&M system was not well established by both NADC and LARReC. It's hard to say that both centers are competent enough to deal with O&M now; hence, JICA apparently had to confirm it before handing it over. In a soft component of a grant aid project, adding to the technical training for O&M, it is recommended to include a planning of specific O&M plans implementable.
- The manuals are available only in English and Japanese now and most staff is not fluent in both languages. Therefore, JICA should have confirmed whether local language translation was necessary for staffs and trainees. for their usability.



Fishponds in NADC



Insemination tank in NADC