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Annex I Tentative Project Design Matrix (PDM)

Project title: Aquaculture Improvement and Extension Project, Phase II (AQIP-2)
Duration: From 2005 to 2010 (5 years) **Implementing Agency: DLF, Ministry of Agriculture and Forestry**
Target group: Small-scale farmers who have water areas for aquaculture, and relevant government personnel
Target areas: Four provinces of Oudomxay, Xayabury, Savannakhet and Saravan

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
Overall Goal Living of rural farmers involved in the Project is improved through dissemination of aquaculture activities in the target provinces.	1. Satisfactory level of farmers	1. Project impact survey report	・The policy of agriculture and rural development is not changed drastically.
Project Purpose Aquaculture suitable for local conditions is enabled to expand in the target provinces.	1. Number of farmers who apply improved technologies (focal districts) 2. Number of seed production farmers grown-out by the Project	1. Project monitoring report 2. Project monitoring report	・Necessary budget is secured ・Socio-economic situation of rural areas is not changed largely
Output 1. Adequate aquaculture methods are verified according to the local conditions of pilot sites	1-1 Survival rate of fish seeds in pilot programs 1-2 Productivity of fish in ponds in pilot programs	1-1 Technical reports 1-2 Technical reports	・Epidemic fish diseases are not elaborated widely. ・Extra-ordinary natural calamities such as drought and flood do not occur
2. Capacity of relevant persons such as government staff and farmers about aquaculture technology and extension is improved.	2-1 Number of extension staff who can train farmers 2-2 Number of farmers who acquired knowledge on aquaculture	2-1 Placement tests 2-2 Records of farmer's training and monitoring	
3. Farmers of the focal districts introduce improved aquaculture methods	3-1 Number of farmers supported by the Project (expansion sites) 3-2 Number of farmers who apply improved technologies (expansion sites)	3-1 Monitoring reports of each pilot program 3-2 Monitoring reports of each pilot program	
4. The role of relevant organizations and their collaboration framework are clarified regarding the aquaculture extension matched with the local conditions.	4-1 A table showing the role of stakeholders is agreed. 4-2 Budget for aquaculture extension is secured.	4-1 Provincial aquaculture development program 4-2 Budget of DLF	

Activities

1-1 Identify villages as pilot sites (10-15 villages)
1-2 Im[illegible]at each pi
1-3 In[illegible]e and gr[illegible]e
1-4 C[illegible]ment of th[illegible]

Please refer to Annex II

2-1 Pr[illegible] te[illegible]nee.
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2-4 E[illegible]k for ex[illegible]

3-1 Se[illegible] ac[illegible] al[illegible] sites:
3-2 Pr[illegible]
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4-1 M[illegible] A[illegible]
4-2 E[illegible]n sy[illegible]cies ar[illegible]
4-3 D[illegible] in[illegible]
4-4 Pr[illegible]

Inputs

〔Japan side〕

1. Long-term experts
   1) Chief advisor
   2) Aquaculture technologies
   3) Extension and training
   4) Project coordinator
2. Short-term experts (as per required)
3. Training of counterparts in Japan and third countries
4. Provision of equipment
   1) Vehicles for training and monitoring
   2) Equipment for seed production, facility improvement, etc.
5. A part of project management cost

〔Laos side〕

1. Counterparts
   1) Project director
   2) Project managers
   3) Project coordinator
   4) Other counterparts
2. Allocation of extension staff at provincial and district level
3. Budget allocation
4. Provision of office space

- Situations that hinder project participation of villagers are not happened.
- Counterparts and extension staff are not transferred to other organizations.

Pre-conditions

- Security of pilot sites is confirmed

Annex II Tentative Plan of Operation (TPO)

Outputs and Activities	Schedule of implementation					Responsible organization in charge		Collaborative organizations
	1st Year	2nd Year	3rd Year	4th Year	5th Year	Central level	Local level	
Output 1. Adequate aquaculture methods are verified according to the local conditions of pilot sites								
1-1 Identify villages as pilot sites (10-15 villages in total)						DLF	5 PLFSs and 5 DLFUs	PAFO
1-2 Prepare operation and management plan of the pilot sites						DLF	5 PLFSs and 5 DLFUs	PAFO
1-3 Strengthen extension activities of provincial aquaculture stations (including improvement of facilities when justified from the aspect of necessity of the Project and their sustainability)						Technical division of DLF	Provincial hatchery stations of the 4 target provinces	
1-4 Improve methods on seed production and grow-out culture for and by the pilot programs						Technical Unit of NADC	5 PLFSs and 5 DLFUs	Technical division of DLF
Output 2. Capacity of relevant persons such as government staff and core farmers about aquaculture technology and extension is improved.								
2-1 Prepare training programs and materials (aquaculture technology and extension) considering provincial localities.						ITSU of NADC	5 PLFSs and 9 DLFUs	Technical division of DLF/NAFRI/NAFES
2-2 Conduct trainings for extension staff and core farmers at NADC and provincial aquaculture stations.						ITSU of NADC	5 PLFSs and 9 DLFUs	PAFO/DAFO
2-3 Conduct on-farm training for extension staff and core farmers utilizing the pilot programs						Technical division of DLF	5 PLFSs and 9 DLFUs	NAFRI/NAFES
Output 3. Farmers of the focal districts introduce improved aquaculture methods								
3-1 Select villages and farmer groups for which outputs of pilot programs are to be introduced (expansion sites: about 80 villages in total)						DLF	4 PLFSs and 8 DLFUs	PAFO/DAFO
3-2 Prepare visual extension materials on practical aquaculture for farmers						ITSU of NADC	4 PLFSs and 8 DLFUs	Technical division of DLF/NAFES
3-3 Hold seminars and on-farm trainings for selected farmer groups on the outputs of pilot programs						ITSU of NADC	4 PLFSs and 8 DLFUs	Technical division of DLF/NAFES
3-4 Provide field extension services and monitor aquaculture activities						DLF	4 PLFSs and 8 DLFUs	PAFO
Output 4. The role of relevant organizations and their collaboration framework are clarified regarding the aquaculture extension matched with the local conditions.								
4-1 Collect and consolidate information on the aquaculture activities of target provinces (except for Vientiane Capital)						ITSU of NADC	4 PLFSs and 8 DLFUs	PAFO/DLF/NAFES
4-2 Assist preparation of aquaculture development strategies of the target provinces (except for Vientiane Capital)						NADC/DLF	4 PLFSs and 8 DLFUs	PAFO/NAFES
4-3 Make an action plan of the Project after its cooperation period						NADC/DLF	4 PLFSs and 8 DLFUs	PAFO/NAFES
4-4 Hold seminars on the action plan of the relevant organizations for further aquaculture extension						Project coordinator	4 PLFSs and 8 DLFUs	PAFO/DLF/NADC/NAFES/NAFRI

Remarks;

1) PLFS: Provincial Livestock and Fishery Section, DLFU: District Livestock and Fishery Unit, ITSU: Information and Technical Support Unit.

2) Five (5) PLFSs mean those in the four (4) target provinces and Vientiane Capital. Five (5) DLFUs mean those in the four (4) pilot program districts of the four (4) target provinces and one (1) pilot program district of Vientiane Capital. Nine (9) DLFUs involve the eight (8) expansion program districts of the four (4) target provinces and one (1) pilot program district of Vientiane Capital. Four (4) PLFSs and eight (8) DLFUs means PLFSs of the four (4) target provinces and eight (8) focal districts, respectively.

Annex III

Tentative Schedule of Project Intervention to 8 Focal Districts and 1 Leading District

	Province	District	Village	1st year	2nd year	3rd year	4th year	5th year
Pilot program	Vientiane Capital	Naxaythong	2-3 villages	→	→	⇢	⇢	⇢
	Oudomxay	Xay	2-3 villages	→	→	→	⇢	⇢
	Xayabury	Phian	2-3 villages	→	→	→	⇢	⇢
	Savannakhet	Phine	2-3 villages	→	→	→	⇢	⇢
	Saravan	Laongam	2-3 villages	→	→	→	⇢	⇢
Expansion program	Oudomxay	Xay and Beng	about 20 villages			▭	▭	▭
	Xayabury	Xayabury and Phian	about 20 villages			▭	▭	▭
	Savannakhet	Phine and Xepong	about 20 villages			▭	▭	▭
	Saravan	Saravan and Laongam	about 20 villages			▭	▭	▭

Regends

→ : Positive intervention of the Project for improvement and verification of technologies suitable for local conditions

⇢ : Utilization of the site for demonstration to fish farmers

▭ : Intensive training of fish farmers

Remarks: Expansion program will be conducted mainly in the districts described on the table above, but the Project does not exclude the districts in the four target provinces as far as those are designated as poverty district by NGPES.

Annex IV

Selection Criteria of Target Provinces and Focal Districts

The selection process of the four target provinces, eight focal districts and four pilot districts is as follows:

1. Selection of four target provinces (Oudomxay, Xayabury, Savannakhet and Saravan)
The DLF has selected the four provinces as target areas of the Project based on the following criteria:
(1) Good security
(2) Existence of the NGPES 47 poorest districts
(3) Strong leadership for aquaculture development
(4) Potential of aquaculture development
(5) Existence of a state-run hatchery station
(6) Budget allocation of PAFO for livestock and fisheries sector

Beside the above, additional criteria are taken into consideration as follows:
(7) Strategic location to expand aquaculture technology to other neighbor provinces
(In the case of Oudomxay, Savannakhet and Saravan)
(8) High dependence on fish seeds from other countries
(In the case of Oudomxay and Xayabury)
(9) East-west linkage
(In the case of Savannakhet)

2. Selection of eight focal districts
(Oudomxay province: Xay and Beng, Xayabury province: Xayabury and Phian, Savannakhet province: Phine and Xepong, Saravan province: Saravan and Laongam)

The following criteria have been used for the selection of the eight focal districts (two districts in each province).
(1) Degree of poverty in terms of NGPES designation (10 points)
(2) Security clearance (10 points)
(3) Accessibility for extension activities (10 points)
(4) Potential of aquaculture development (10 points)
(5) Access to the state-run hatchery (10 points)
(6) Number of staff for aquaculture technical support services (10 points)

(7) Number of fisheries staff (10 points)
(8) Conformity to the type of aquaculture recommended (10 points)
(9) Experience of fisheries staff (10 points)
(10) Strong leadership for aquaculture development (10 points)

The result of the scoring according to the above criteria is shown in the following tables.

Table 1: Scoring result for selection of focal districts, Oudomxay province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Xay	C	A	A	B	A	A	A	A	C	A	75
Beng	A	A	A	C	C	A	A	A	B	A	75
Houn	A	B	A	B	C	B	B	B	B	A	50
Namo	A	B	A	B	C	C	C	C	C	A	40
Nga	A	C	A	B	C	C	C	C	C	B	30
Pakbeng	A	B	A	C	C	C	C	C	C	B	30
La	C	A	A	B	C	C	C	C	C	B	30

Note: A: 100%, B: 50%, C: 0%
The higher the total score is, the more suitable for the first site the district is.

Table 2: Scoring result for selection of focal districts, Xayabury province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Xayabury	A	A	A	A	C	B	A	B	A	A	80
Phian	C	A	A	A	A	B	B	A	A	A	80
Paklay	C	B	A	A	C	B	B	B	B	A	55
Kenthao	C	B	A	B	C	B	B	B	B	A	50
Kob	B	C	A	B	C	B	B	B	B	B	45
Xienhone	A	C	A	B	C	B	B	B	C	B	45
Honsa	B	C	A	B	C	B	B	B	C	B	40
Boten	C	B	A	B	C	C	C	C	C	A	30
Ngeun	B	C	A	B	C	C	C	C	C	B	25
Thonmixay	B	C	A	B	C	C	C	C	C	B	25

Table 3: Scoring result for selection of focal districts, Savannakhet province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Phine	A	A	A	A	C	B	C	A	B	A	70
Xepong	A	A	A	B	B	B	B	A	C	A	70
Virabury	A	A	A	B	C	B	B	B	B	B	55
Nong	A	B	A	C	C	C	B	B	B	B	45
Thepauthong	B	B	A	B	C	B	B	B	A	A	45

Note: There exist 15 districts in Savannakhet and five districts belong to the 47 NGPES priority districts. This table compares only those five priority districts to select two focal districts among them.

Table 4: Scoring result for selection of focal districts, Saravan province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Laongam	C	A	A	C	A	A	A	A	C	A	70
Saravan	C	A	A	C	C	B	C	B	C	B	45
Vapy	C	A	A	C	C	B	C	B	C	B	35
Kongsedone	C	A	A	C	C	B	C	B	C	B	35
Lakhonpheng	C	B	A	C	C	B	C	B	C	A	35
Tumlane	B	A	A	C	C	B	C	C	C	B	35
Samouy	A	C	A	C	C	C	C	C	C	B	25
Taoy	B	C	A	C	C	C	C	C	C	B	20

3. Selection of four pilot districts

The joint preparatory study team has selected four pilot districts as shown below:

Table 4: Rationale for the Selection of the First District

Criterion	Oudomxay		Xayabury		Savannakhet		Saravan	
	Xay	**Beng**	**Xayabury**	**Phian**	**Phine**	**Xepong**	**Saravan**	**Laongam**
Accessibility (10)	A	A	A	A	A	A	A	A
Potential of aquaculture (20)	B	C	A	A	B	C	C	C
Available resources capacitated by other projects (10)	A	A	A	A	A	B	B	B
Conformity to the type of aqua-culture recommended (20)	A	A	B	A	A	A	B	A
Number of DLFU staff (10)	A	A	B	B	A	A	B	A
Number of fisheries staff (10)	A	A	A	B	C	B	C	A
Experience of fisheries staff (10)	C	B	A	A	B	B	C	C
Fisheries extension activities (10)	B	B	B	B	B	B	B	B
Aquaculture development plan (10)	C	C	C	C	C	C	C	C
Total Score (110)	**75**	**70**	**80**	**85**	**70**	**60**	**35**	**60**

Note: For Oudomxay province, Xay district and Beng district resulted in the same score of 85 points.
The joint preparatory study team has agreed to select Xay district for all the offices of DAFO, PAFO and provincial fisheries station are located in Xay district, and therefore collaborative extension activities can be more effectively undertaken among them.

Annex V

List of the Counterparts and Extension Workers at Local Level

Province	District	Name and Position of Responsible Personnel	Name of Extension Worker in Charge
Vientiane Capital	Naxaythong		
Oudomxay	Xay		
	Beng		
Xayabury	Xayabury		
	Phian		
Savannakhet	Phine		
	Xepong		
Saravan	Saravan		
	Laongam		

Annex VI

Joint Coordinating Committee (JCC)

JCC meeting will be held at least once a year and whenever necessity arises, and works:

(1) To approve the plan of operation and the annual plan of operation of the Project.
(2) To review the overall progress of the Project activities as well as the achievements of the above mentioned annual plan.
(3) To review and exchange of views on major issues arising from or in connection with the Project and recommend corrective measures.

Members	Main Role
Dr. Phouang Parisak PRAVONGVIENGKHAM, Permanent Secretary, MAF (Chairperson)	1. To set up and take the chair of JCC
	2. To take a responsibility for C/P budget and personnel assignment of the Project
	3. To approve and coordinate the annual plan of operation
	4. To approve the annual progress and monitoring report
	5. To coordinate effectively with other Ministries and donor
Mr. Xaypladeth CHOULAMANY Deputy Permanent Secretary, MAF (Vice Chairperson)	1. To assist the Chairperson
Mr. Mahanakhon SOULIYA Acting Director General of DLF (Project Director)	1. Overall responsibility for the administration and implementation of the Project as Project Director
	2. To coordinate the Project implementation with Program Managers
	3. To execute C/P budget
	4. To report the Project progress to MAF
	5. To finalize the annual progress and monitoring report and submit to the JCC
	6. To finalize the annual plan of operation and submit it to the JCC
	7. To provide office space and office facilities to the Project (DLF, NADC)
Mr. Chanthaboun SIRIMANOTHAM National Project Director of NADC (Project Manager)	1. Overall responsibility for the managerial and technical matters (mainly technology improvement and training in central level) of the Project as Project Manager
	2. To assist the Project Director
	3. To make the annual plan of operation
	4. To make the annual progress and monitoring report
Mr. Bounthong SAPHAKDY Head of Technical Division, DLF (Project Manager)	1. Overall responsibility for the managerial and technical matters (mainly extension and training in local level) of the Project as Project Manager
	2. To assist the Project Director
	3. To make the annual plan of operation
	4. To make the annual progress and monitoring report
Mr. Somphanh CHANPHENGXAY Head of Planning and Cooperation Division, DLF (Project Coordinator)	1. To coordinate for the Project with relevant organizations
	2. To assist the Project Director
	3. To Support the Project Managers

Representative of International Division, MAF	1. To coordinate, negotiate and mobilize for the Project
	2. To monitor JCC with proper action
	3. To provide appropriate bilateral aid procedures
Representative of Department of Planning , MAF	1. To allocate budget to contribute to the Project
	2. To supervise, monitor and evaluate the activities of the Project
Representative of NAFRI	1. To coordinate and assist the Project activities especially in the field of research
Representative of NAFES	1. To coordinate and assist the Project activities especially in the field of extension
NWGL	1. To coordinate and assist the Project activities especially in the issue of gender
5 Directors of PAFO (Vientiane Capital, Oudomxay, Xayabury, Savannakhet, Saravan)	1. To allocate budget and personnel for local activities of the Project
	2. To support and coordinate local activities of the Project
	3. To finalize provincial aquaculture development program
	4. To monitor local activities of the Project in the province, and report the Project progress to Project Managers
Representative of Department of International Cooperation, MOFA	1. To make proper arrangement to obtain Government approval for commencing and implementation of the Project
	2. To monitor JCC with proper action
	3. To provide appropriate bilateral aid procedures
Japanese Experts of AQIP2	1. To advise on the Project implementation
Program Coordinator of Rural Development Program, JICA	1. To advise on the Project implementation in line with the Rural Development
Representative of JICA Lao Office	1. To monitor JCC with proper action
	2. To provide appropriate bilateral aid procedures

MAF: Ministry of Agriculture and Forestry
DLF: Department of Livestock and Fisheries, MAF
NADC: Namxouang Aquaculture Development Center, DLF
NAFES: National Agriculture and Forestry Extension Service, MAF
NAFRI: National Agriculture and Forestry Research Institute, MAF
NWGL: Network of Women and Gender in Livestock and Fishery Development, DLF
PAFO: Province Agriculture and Forestry Office
MOFA: Ministry of Foreign Affaires
JICA: Japan International Cooperation Agency

Note: Official of the Embassy of Japan may attend the JCC as observer.
Other relevant personnel mutually agreed upon may attend the JCC as observer.

Annex VII

(Draft)

RECORD OF DISCUSSIONS BETWEEN JAPANESE INTERNATIONAL COOPERATION AGENCY AND AUTHORITIES CONCERNED OF THE GOVERNMENT OF THE LAO PEOPLE'S DEMOCRATIC REPUBLIC ON JAPANESE TECHNICAL COOPERATION FOR THE AQUACULTURE IMPLOVEMENT AND EXTENSION PROJECT, PHASE II

Pursuant to the Minutes of Meeting signed between Japan International Cooperation Agency (hereinafter referred to as "JICA") and Ministry of Agriculture and Forestry (hereafter referred to as MAF) dated XXXX, JICA had a series of discussions with the Lao authorities concerned with respect to desirable measures to be taken by JICA and the Government of Lao People's Democratic Republic for the successful implementation of the above-mentioned Project.

As a result of the discussions, and in accordance with the provisions of the Agreement in Technical Cooperation between the Government of Japan and the Government of Lao People's Democratic Republic, signed in Tokyo on XXXX (hereafter referred to as the Agreement), JICA and the Lao authorities concerned agreed to recommended to their respective Government the matters referred to in the document attached hereto.

Vientiane, January, 2005

Resident Representative JICA Laos Office Japan International Cooperation Agency Japan	Permanent Secretary Ministry of Agriculture and Forestry Lao People's Democratic Republic

ATTACHED DOCUMENT

I. COOPERATION BETWEEN JICA AND THE GOVERNMENT OF LAO PEOPLE'S DEMOCRATIC REPUBLIC

1. The Government of Lao People's Democratic Republic will implement the Aquaculture Improvement and Extension Project, Phase II (hereinafter referred to as "the Project") in cooperation with JICA.

2. The Project will be implemented in accordance with the Master Plan which is given in Annex I.

II. MEASURES TO BE TAKEN BY JICA

In accordance with the laws and regulations in force in Japan and the provisions of Article of III the Agreement, JICA, as the executing agency for technical cooperation by the Government of JAPAN, will take, at its own expense, the following measures according to the normal procedures of its technical cooperation scheme.

1. DISPATCH OF JAPANESE EXPERTS
   JICA will provide the services of the Japanese experts as listed in Annex II. The provision of Article III of the Agreement will be applied to the above-mentioned experts.

2. PROVISION OF MACHINERY AND EQUIPMENT
   JICA will provide such machinery, equipment and other materials (hereinafter referred to as "the Equipment") necessary for the implementation of the Project as listed in Annex III. The provision of Article III of the Agreement will be applied to the Equipment.

3. TRAINING OF LAO PERSONNEL IN JAPAN
   JICA will receive the Lao personnel connected with the Project for technical training in Japan.

III. MEASURES TO BE TAKEN BY THE GOVERNMENT OF LAO PEOPLE'S DEMOCRATIC REPUBLIC

1. The Government of Lao People's Democratic Republic will take necessary measures to ensure that the self-reliant operation of the Project will be sustained during and after the period of Japanese technical cooperation, through full and active involvement in the Project

by all related authorities, beneficiary groups and institutions.

2. The Government of Lao People's Democratic Republic will ensure that the technologies and knowledge acquired by the Lao nationals as a result of the Japanese technical cooperation will contribute to the economic and social development of Lao People's Democratic Republic.

3. In accordance with the provisions of Article V of the Agreement, the Government of Lao People's Democratic Republic will grant in Lao People's Democratic Republic privileges, exemptions and benefits to the Japanese experts referred to in II-1 above and their families.

4. In accordance with the provisions of Article VII of the Agreement, the Government of Lao People's Democratic Republic will take the measures necessary to receive and use the Equipment provided by JICA under II-2 above and equipment, machinery and materials carried in by the Japanese experts referred to in II-1 above.

5. The Government Lao People's Democratic Republic will take necessary measures to ensure that the knowledge and experience acquired by the Lao personnel from technical training in Japan will be utilized effectively in the implementation of the Project.

6. In accordance with the provision of Article V of the Agreement, the Government of Lao People's Democratic Republic will provide the services of Lao counterpart personnel and administrative personnel as listed in Annex IV.

7. In accordance with the provision of Article V of the Agreement, the Government of Lao People's Democratic Republic will provide the buildings and facilities as listed in Annex V.

8. In accordance with the laws and regulations in force in Lao People's Democratic Republic, the Government of Lao People's Democratic Republic will take necessary measures to supply or replace at its own expense machinery, equipment, instruments, vehicles, tools, spare parts and any other materials necessary for the implementation of the Project other than the Equipment provided by JICA under II-2 above.

9. In accordance with the laws and regulations in force in Lao People's Democratic Republic, the Government of Lao People's Democratic Republic will take necessary measures to meet the running expenses necessary for the implementation of the Project.

IV. ADMINISTRATION OF THE PROJECT

1. Director General of Department of Livestock and Fishery, Ministry of Agriculture and Forestry, as the Project Director, will bear overall responsibility for the administration and implementation of the Project.

2. National Project Director of Namxouang Aquaculture Development Center, Department of Livestock and Fishery, Ministry of Agriculture and Forestry, and Head of Technical Division, Department of Livestock and Fishery, Ministry of Agriculture and Forestry, as the Project Managers will be responsible for the managerial and technical matters of the Project.

3. The Japanese Chief Advisor will provide necessary recommendations and advice to the Project Director and the Project Managers on any matters pertaining to the implementation of the Project.

4. The Japanese experts will give necessary technical guidance and advice to Lao counterpart personnel on technical matters pertaining to the implementation of the Project.

5. For the effective and successful implementation of technical cooperation for the Project, a Joint Coordinating Committee will be established whose functions and composition are described in Annex VI.

V. JOINT EVALUATION

Evaluation of the Project will be conducted jointly by JICA and the Lao authorities concerned, at the middle and during the last six months of the cooperation term in order to examine the level of achievement and make recommendations for future actions. Complementary annual reviews can be conducted.

VI. CLAIMS AGAINST JAPANESE EXPERTS

In accordance with the provision of Article VI of the Agreement, the Government of Lao People's Democratic Republic undertakes to bear claims, if any arises, against the Japanese experts engaged in technical cooperation for the Project resulting from, occurring in the course of, or otherwise connected with the discharge of their official functions in Lao People's Democratic Republic except for those arising from the willful misconduct or gross negligence of the Japanese experts.

VII. MUTUAL CONSULTATION

There will be mutual consultation between JICA and the Government of Lao People's Democratic Republic on any major issues arising from, or in connection with this Attached Document.

VIII. MESURES TO PROMOTE UNDERSTANDING OF AND SUPPORT FOR THE PROJECT

For the purpose of promoting support for the Project among the people of Lao People's Democratic Republic, the Government of Lao People's Democratic Republic will take appropriate measures to make the Project widely known to the people of Lao People's Democratic Republic.

IX. TERM OF COOPERATION

The duration of the technical cooperation for the Project under this Attached Document will be five (5) years from the arrival date of the first JICA Expert for the Project.

Annex I	MASTER PLAN
Annex II	LIST OF JAPANESE EXPERTS
Annex III	LIST OF MACHINERY AND EQUIPMENT
Annex IV	LIST OF LAO COUNTERPART AND ADMINISTRATIVE PERSONNEL
Annex V	LIST OF BUILDINGS AND FACILITIES
Annex VI	JOINT COORDINATING COMMITTEE

Note: The Annex listed above are not attached to the Draft R/D.

Annex VIII

Member of Joint Preparatory Study Team

Lao side

1. Mr. Mahanakhon SOULIYA	Acting Director General of DLF
2. Mr. Chanthaboun SIRIMANOTHAM	National Project Director of NADC
3. Mr. Bounthong SAPHAKDY	Head of Technical Division, DLF
4. Mr. Somphanh Chanphengxay	Head of Planning Division, DLF
5. Ms. Nouhak LIEPVISAY	Deputy National Project Director of NADC
6. Mr. Osamu YAMADA	JICA Expert (Seedlings Production)

Japanese side

1. Kaoru IWASAKI (Leader)	Group Director, Arid and Semi-Arid Farming Area / Fisheries Group (Group 3), Rural Development Department, JICA
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6. Hajime YAMAZAKI (Cooperation Planning 2)	Officer, Fisheries Cooperation Team, Arid and Semi-Arid Farming Area / Fisheries Group (Group 3), Rural Development Department, JICA

資料２　事前評価表

１．案件名
ラオス国「養殖改善・普及計画」フェーズ2

２．協力概要
（１）プロジェクト目標とアウトプットを中心とした概要の記述：
ラオス人民民主共和国（以下「ラオス」）では、国家政策として、全国民の食料の確保と生計の向上を最重要課題としている。また、農林業分野では、養殖普及を最優先の開発事業として位置づけている。
本プロジェクトは、全国規模の養殖普及の展開を睨んで、ラオス全18県から地域普及の中核県として選定された4県を協力対象としている。これら4県で立地条件に適した養殖手法を実証し、普及することにより、小規模養殖農家の栄養改善と生計向上に資することを目的としている。本プロジェクトの前フェーズ（フェーズ1）の協力では、中央養殖開発センターを整備し、養殖に係る技術の開発と人材の育成を行い、養殖普及に着手する基盤を築いた。フェーズ2の協力では、フェーズ1の協力成果を最大限に活用し、養殖普及の地方展開に着手する。
（２）協力期間：2005年3月～2010年3月（5年間）
（３）協力総額（日本側）：約5.5億円
（４）協力相手先機関：ラオス農林省畜水産局
（５）国内協力機関：埼玉県農林総合研究センター他
（６）裨益対象者及び規模：
(a) 対象地域
4県（北部：ウドムサイ県、サヤブリ県　中部：サバナケット県、南部：サラワン県）
(b) 対象者
既存の小規模養殖農家920戸（農家間の普及により間接的に裨益する養殖農家は、2,080戸）
行政側関係者（郡普及員、県養殖ステーション技術員、県・郡農林事務所職員他）約70名

３．協力の必要性・位置づけ
（１）現状及び問題点
ラオスは、国民の85%が農村部に居住する内陸国であり、農業生産がGDPの51%を占めている。国民一人当たりのGDPは331US$（2002年）と低く、後発開発途上国である。62万戸の農家のうち50万戸（80%）は、米作を主体とし、家畜（水牛、豚、ヤギ、鶏等）も飼育する自給的な営農を行っている。また、営農に養殖を取り入れている農家は約5.5万戸（全農家数の8%）とされ、その9割は、生産性の低い粗放的な養殖手法によって、主に自家消費用の養殖を行っている。
ラオスでは、魚を好んで消費する食文化があるが、国民一人当たりの年間魚供給量は14kg（2001年FAO統計）であり、近隣諸国の魚供給量と比べると少ない（タイ59kg、ベトナム25kg、カンボジア30kg）。魚は、ラオス国民の動物性タンパク摂取量の34%を占める重要な栄養源である。近年は、天然の水産資源が減少傾向にあるため、水産物の供給は、内水面の養殖生産に依存せざるを得ない。しかし、地方レベルにおいて、養殖関係者の能力不足、適正種苗の供給量不足、普及活動の不足等の問題を抱えており、これらに起因して、不適正な養殖手法が蔓延しているため、生産性が低い。そのため、ラオス政府から、地方の養殖普及関係者の人材育成と農家レベルの養殖の生産性の向上が、強く要望されている。

（２）相手国政府国家政策上の位置づけ
ラオス政府による第5次国家社会経済開発計画（2001～2005年）で掲げられた8つの主目標のうち、本プロジェクトは、「貧困層の半減」と「食料安全保障の達成」に寄与する。ま

た、ラオスの PRSP に相当する「国家成長・貧困撲滅戦略」（NGPES）においては、農林業分野の開発が最優先とされ、同分野の 11 優先開発事業の中で、本プロジェクトは、最優先事業として位置づけられている。

【貧困層の半減】

ラオス政府は、2020 年までに後開発途上国から脱却することを国家長期目標と定めている。NGPES では、ラオス全 142 郡のうち、72 郡が貧困郡と位置づけられている。本プロジェクトにおける協力対象 4 県は、これら貧困郡の約 30%に相当する 20 郡を含んでいる。

【食料安全保障の達成】

2002 年にラオス農林省が発表した「Fisheries Development in Lao PDR」では、動物性タンパク摂取の向上のための課題として、国民一人当たりの年間魚類供給量を 2020 年までに 23kg に増加させることを目標としている。

（3）我が国援助政策との関連、JICA 国別事業実施計画上の位置づけ

対ラオス JICA 国別事業実施計画では、 人造り、 BHN 支援、 農林業、 インフラ・エネルギー開発を援助重点分野とし、農林業分野では、「自然環境と調和した持続的農業・農村開発」を援助重点課題としている。本協力は、当該重点課題の下で取り組んでいる２つの協力プログラム（「食料の安全保障」と「村落振興」）を構成するプロジェクトであり、援助方針と合致している。

４．協力の枠組み

本プロジェクトは、貧困や食料確保の問題を抱える農村地域を対象に、立地条件に適合した養殖手法の普及を図ることを目標としており、小規模農民の営農改善に寄与することが期待される。

プロジェクト目標を達成するため、段階的な養殖普及のアプローチをとる。協力前期（1～3年次）では、フェーズ 1 協力の成果である中央養殖開発センターの施設と人材を活用し、親魚育成と種苗生産の技術や普及手法の研修を行うことによって、地方レベルで養殖技術を指導する県技術員と普及に携わる郡普及員を育成する。更に、立地条件に適合した養殖手法の改善を農家レベルで実証するパイロット事業を実施し、中核養殖農家を育てる（4 郡×3 村×10 農家＝120 中核養殖農家）。協力後期（3～5 年次）では、一般養殖農家への普及展開事業（8 郡×10 村×10 農家＝800 養殖農家）に重点を置き、パイロット事業の成功事例を基に、郡普及員や中核養殖農家が中心となって普及活動を行う。このプロジェクト協力活動と並行して、パイロット事業や普及展開事業の現場が、改良養殖手法の展示拠点となることにより、本プロジェクトの直接的な協力対象となっていない 8 協力重点郡の既存養殖農家（約 2080 戸）に、農家間の普及が進むことが期待される。

なお、後述のFAO/UNDPによる県養殖開発プロジェクト（1997年～2000年）の教訓から、本プロジェクトでは、協力対象を絞り込み、農家レベルの養殖の成功事例を確実に定着させた後に、周囲への普及活動を本格化させる方針である。

また、指標に含まれる養殖農家の養殖生産量、魚自給量及び養殖生産魚販売収入は、プロジェクト開始後及び中間評価時に実施する基礎調査の結果を踏まえ、具体的な数値を決定する。

〔主な項目〕

（1）協力の目標（アウトカム）

協力終了時の達成目標（プロジェクト目標）と指標・目標値

目標：協力対象4県で、立地条件に適合した養殖手法が普及する。

指標・目標値：改善された技術を適用する養殖農家数（920戸）

協力終了後に達成が期待される目標（上位目標）と指標・目標値

目標：協力対象 4 県で、立地条件に適合した改良養殖手法の普及を通じて、小規模養殖農家の生活が向上する。

指標・目標値：養殖農家の養殖生産量、魚自給量、養殖生産魚の販売収入

（2）成果（アウトプット）と活動

成果１：パイロットサイトの立地条件に適合した養殖手法が実証される。

1-1　パイロットサイトとなる農村を確定する（12～15 村）。

1-2　パイロット事業の活動運営計画を策定する。

1-3　パイロット事業を実施する。

1-4　中央養殖開発センターが中心となって、農家レベルの養殖実用技術の改良と開発を行う。

（指標）パイロット事業の実施養殖農家における養殖生産量、魚自給量、養殖生産魚の販売収入

農家レベルで改良又は開発が行われた養殖実用技術の数と有効性

成果２：関係者（養殖農家、郡普及員及び県技術員）の養殖技術とその普及に関する能力が改善される。

2-1　各県の立地条件に適合した養殖技術と普及に関する研修プログラム及び教材を作成する。

2-2　中央養殖開発センター及び県養殖ステーションにおいて、県技術員、郡普及員及び中核養殖農家の研修を行う。

2-3　パイロット事業の成果を活用し、中央養殖開発センターが主体となって、県技術員、郡普及員及び中核養殖農家に対して実地研修を行う。

（指標）郡普及員を指導できる県技術員の数（6ヶ所×3人＝18人）

農民を指導できる郡普及員の数（8郡×3人＝24人）

養殖普及のために育成された中核養殖農家の数（4郡×3村×10農家＝120中核養殖農家）

成果３：協力重点郡の養殖農家が改良された養殖手法を導入する。

3-1　県養殖ステーションの養殖普及活動のための機能（種苗生産、技術指導の訓練等）を強化する。

3-2　パイロット事業の成果を導入する農村と農民グループを選定する（普及展開事業サイト：8 郡×10 村＝80 村)。

3-3　養殖農家が行う養殖実務について、普及用の視聴覚教材を作成する。

3-4　選定した農民グループに対し、パイロット事業の成果に係るセミナーを開催し、実地研修を行う。

3-5　協力重点郡の養殖農家に対し技術指導と訓練を行うとともに、養殖経営を監理する。

（指標）改善された技術を適用する養殖農家数（普及展開事業サイト：8郡×10村×10農家＝800養殖農家）

普及展開事業を実施する養殖農家における養殖生産量、魚自給量及び養殖生産魚の販売収入

成果４：立地条件に適合した養殖手法の普及に際し、関係機関の役割と連携が強化される。

4-1　対象県の養殖活動に関する情報の収集及び整理を行う。

4-2　対象県の養殖普及戦略の策定を支援する。

4-3　協力期間終了後の養殖普及に係る行動計画を策定する。

4-4　養殖普及の促進のため、関係機関を対象とする行動計画に関するセミナーを開催する。

（指標）関係者の役割分担の合意書

行動計画を実行するために執られた予算措置

（3）投入（インプット）

日本側（総額　約 5.5 億円）

a) 専門家派遣

（滞在型 3 名）チーフアドバイザー／養殖技術、普及・訓練、村落開発／業務調整

（短期）親魚育成、種苗生産、参加型開発、ジェンダー主流化、営農改善他（第三国専門

家を含む。）

b) 供与機材
車両（研修・モニタリング用）、種苗生産用機材、各種養殖資機材他

c) 研修員の受入れ
本邦研修及びタイ国等での第三国研修

d) 運営経費の補填

ラオス側

a) カウンターパート
農林省畜水産局長、中央養殖開発センター所長、畜水産局技術課長、畜水産局計画協力課長、その他カウンターパート

b) 県・郡レベルのプロジェクト担当職員、県技術員及び郡普及員の配置

c) 予算措置

d) プロジェクト用施設の提供

（4）外部要因（満たされるべき外部条件）

上位目標及びプロジェクト目標を達成していくための外部条件は、下記のとおりである。

- 養殖魚の価格が大きく下がらない。
- 深刻な魚病が発生しない。
- 極度の旱魃や洪水などの自然災害が影響を及ぼさない。

5．評価5項目による評価結果

（1）妥当性

本プロジェクトは、以下の理由から妥当性が高いと判断される。

・ラオスにおける国民一人当たりの年間魚供給量は、約14kgとインドシナ諸国で最も低い水準にあり、農村部で行われる養殖は、自家消費を主な目的としている。農村部においては、低コストの養殖開発に対する基本的なニーズが存在している。

・本プロジェクトは、最優先国家計画であるNGPESにおける農林業分野での開発優先11プロジェクトの中で最優先とされている。また、NGPESで定められている貧困72郡のうち、本プロジェクトの協力対象県には貧困20郡を含んでおり、国家戦略のニーズに合致している。

・対ラオスJICA国別事業実施計画においては、4つの援助重点分野を掲げており、本プロジェクトは、人的資源開発、BHN、農業の3つの援助重点分野に合致する。

（2）有効性

本プロジェクトは、以下の理由から高い有効性が認められる。

・プロジェクト目標を達成するため、本プロジェクトでは段階的な普及アプローチを採用している。特に、協力の初期段階で、養殖農家に養殖の成功事例を身近に紹介することにより、農村部の技術普及の困難性を克服しやすくしている。

・本プロジェクトの実施責任機関である畜水産局は、フェーズ1、FAO/UNDPによるPADP（Provincial Aquaculture Development Project）、アジア工科大学（AIT）による養殖アウトリーチ・プログラムなど、本プロジェクトと類似又は関連した養殖プロジェクトの運営管理に関して十分な経験を蓄積しており、これらの経験を活用できる。

（3）効率性

本プロジェクトは、以下の理由から効率的な実施が見込める。

・本プロジェクトは、フェーズ1協力によって整備された中央養殖開発センターの施設及び同協力や他ドナーによる養殖プロジェクトで育成された人材を活用することができる。

・日本は、東南アジア諸国で粗放的かつ持続的な内水面養殖の技術開発プロジェクトを実施し、人材を育成してきている。本プロジェクトの専門家の投入及び研修について、周辺国の人的資源を活用することを計画しており、効率的な事業の実施が見込まれる。

・協力対象県のウドムサイ県及びサラワン県の県農林事務所に青年海外協力隊の養殖隊員の

配置が計画されている。これら協力隊員との相互補完活動と情報の共有によって、協力効果を高め得る。また、サヤブリ県では、JICA 森林管理・村落振興計画（技術協力プロジェクト）との連携が計画されており、協力の相乗効果が期待できる。

（4）インパクト

本プロジェクトの実施によるインパクトは、以下のとおり期待される。

・本プロジェクトの普及活動を通じて、地方政府職員だけではなく、中核養殖農家や一般養殖農家の能力開発に取り組む。養殖農家が直接プロジェクトに参画することにより、協力対象養殖農家の周辺地域、ひいては協力対象 4 県全域において、養殖普及に対する正のインパクトを発現させ得る。また、養殖農家がパイロット事業やその普及展開事業の現場を訪れる機会などを通じて、農家間の普及を促進し、上位目標の達成に貢献する。
・農村女性は、しばしば給餌のような日常の養殖作業を担っている。女性グループの組織化は、フェーズ 1 協力で、既に試行されている。本プロジェクトでは、対象地域におけるジェンダーに配慮し、これらの女性活動を積極的に支援する。

（5）自立発展性

本プロジェクトの自立発展性は、以下のとおり期待される。

・ラオス政府の厳しい財政状況から、プロジェクトの完全な自立発展性を確保することは困難である。しかし、その制約条件を最小限にする手段を取り入れたプロジェクトの設計を行っている。
・県レベルでの畜水産部門への政府予算実績を協力対象県の選定基準に組み入れ、財政面の問題の惹起を抑えている。
・本プロジェクトにより採用されている農家間の普及を促進させる活動は、政府投入を最小とする普及手法であり、プロジェクトの自立発展性を高める。
・本プロジェクトで普及される養殖方法は、営農による副産物（鶏糞や米ぬか・屑米）を最大限に利用した低投入型又はやや集約型の養殖を総合的営農の中で実現するものであり、養殖農家に受け入れられやすい。
・本プロジェクトは、ラオス側のオーナーシップの醸成を促進する活動を組み込んでいる。これらの活動としては、主に成果 4 の活動に含まれており、県養殖普及戦略の策定や、協力期間終了後の養殖普及行動計画の策定などがある。なお、本プロジェクトの先方オーナーシップは、本プロジェクトの事前調査における合同調査を通じて、既に発揮されている。

6．貧困・ジェンダー・環境等への配慮

（1）貧困：本プロジェクトは、貧困 20 郡を協力対象県に含み、極めて粗放的な養殖手法によって、主に自家消費用の魚生産を行っている小規模養殖農家の栄養改善と生計向上に寄与するものである。

（2）ジェンダー：小規模養殖農家における養殖は、家屋に隣接した小規模なため池を利用し、世帯単位で行っており、女性も養殖作業を分担している。本プロジェクトでは、合同調整委員に、ラオスにおける国家レベルのジェンダー機関の代表者を配置するなど、プロジェクトの実施に際し、常にジェンダーに配慮することとしている。

（3）環境：ラオスの魚生産は、メコン川での漁獲によるところが大きいが、近年はメコン川の魚資源が枯渇している。本プロジェクトでは養殖を振興させ、漁獲に頼らずに魚生産量を増加させることから、天然資源への負のインパクトが抑えられる。

7．過去の類似案件からの教訓の活用

（1）「養殖改善・普及計画」フェーズ 1（2001 年～2004 年）

フェーズ 1 協力の終了時評価の教訓として、第三国研修の一層の活用と南南協力の促進が挙げられている。隣国のタイは、アセアン諸国の中でも特に養殖の潜在能力が高く、フェーズ 1 協力ではタイの第三国研修にカウンターパートが参加した。自然条件と使用言語が似ていることから研修効果が高く、参加者の評価も高かった。そのため、フェーズ 1 協力でも、タイの第三国研修の活用を計画している。また、時期を同じくして、カンボジアで JICA によ

る「淡水養殖改善・普及計画」が実施されることから、技術交換事業等の連携を計画している。

（2）FAO/UNDP による県養殖開発プロジェクト（1997 年～2000 年）

全国5県（シエンクワン、ウドムサイ、サヤブリ、サバナケット、セコン）で98の養殖グループが設立され、1,055戸の農家が技術訓練に参加した。しかし、プロジェクト終了後のグループ活動は停滞している。同プロジェクトが自立発展性に欠けた原因は、3年の協力期間の目標が広範過ぎたこと、成果を急ぎ過ぎたことと分析されている。本プロジェクトでは、協力対象を絞り込み、農家レベルの養殖の成功事例を確実に示した後に、周囲への普及活動を本格化させる方針である。また、農家自身が問題点を把握できない場合には、協力後の成果の定着が弱くなることから、農家自身のオーナーシップを最優先とする参加型開発を行う。

（3）JICA のインドネシア淡水養殖振興計画（2000 年～2005 年）

当該計画においては、小規模農家に養殖技術を普及していくためには、農家レベルでの実証試験や、他の先進農家の視察が有効であるとしている。本プロジェクトでは、同教訓を受け、農家間の研修や交流を重視し、行政の支援に過度に依存しない農家間の養殖普及を図っていく計画である。

8．今後の評価計画

（1）プロジェクト開始後 2.5 年経過時点（2007 年）：中間評価

（2）プロジェクト終了の半年前（2009 年：終了時評価）

（3）プロジェクト終了の 3 年後（2013 年：事後評価）

資料 3　　PDM（和文）

プロジェクトタイトル：　養殖改善・普及計画　フェーズ 2 (AQIP-2)
期間:　2005年から2010年（5年間）　　実施機関：　農林省畜水産局
ターゲットグループ：対象地域の既存養殖農家
対象地域：　ウドムサイ、サヤブリ、サバナケット、サラワンの 4 県

プロジェクト要約	指標	指標入手手段	外部条件
上位目標 協力対象4県で、立地条件に適合した改良養殖手法の普及を通じて、小規模養殖農家の生活が向上する	養殖農家の養殖生産量、魚自給量及び養殖生産魚の販売収入	1. ﾌﾟﾛｼﾞｪｸﾄｲﾝﾊﾟｸﾄ調査報告書 2. ﾌﾟﾛｼﾞｪｸﾄｲﾝﾊﾟｸﾄ調査報告書	・農業・農村開発にかかる大きな政策変更がない。 ・養殖魚の価格が大きく下がらない
プロジェクト目標 協力対象4県で、立地条件に適合した養殖手法が普及する。	協力対象4県において改善された技術を適用する養殖農家数	1. ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書 2. ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書	・必要な予算が確保される ・農村の社会経済事情が大きく変化しない。
成果 1. パイロットサイトの立地条件に適合した養殖手法が実証される	1-1 パイロット事業の実施養殖農家における養殖生産量、魚自給量及び養殖生産魚の販売収入 1-2 農家レベルで改良又は開発が行われた養殖実用技術の数と有効性	1 ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書 1-1 2 ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書 2-1 技術報告書	・深刻な魚病が発生しない ・極度の旱魃や洪水等の自然災害が影響を及ぼさない
2. 関係者（養殖農家、県・郡普及員及び県技術員）の養殖技術とその普及に関する能力が改善される	2-1 県･郡普及員を指導できる県技術員の数 2-2 農民を指導できる県･郡普及員の数 2-3 養殖普及のために育成された中核養殖農家の数	2-1 理解度テスト 2-2 理解度テスト 2-3 農民の研修・ﾓﾆﾀﾘﾝｸﾞ記録	
3. 協力重点郡の養殖農家が改良された養殖を導入する	3-1 改善された技術を適用する養殖農家数並びに普及展開事業を実施する養殖農家における養殖生産量 3-2 魚自給量及び養殖生産魚の販売収入	3-1 ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書 3-2 ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書 3-3 ﾌﾟﾛｼﾞｪｸﾄﾓﾆﾀﾘﾝｸﾞ報告書	
4. 立地条件に適合した養殖手法の普及に際し、関係機関の機能と連携が強化される	4-1 作成された関係者の役割分担の合意書 4-2 行動計画を実行するために執られた予算措置	4-1 県養殖開発ﾌﾟﾛｸﾞﾗﾑ 4-2 畜水産局予算書	

活動	投入		前提条件
1-1 パイロットサイトとなる農村を確定する（12-15 農村）。 1-2 パイロット事業の活動運営計画を策定する。 1-3 パイロット事業を実施する。 1-4 中央養殖開発センターが中心となって、農家レベルの養殖実用技術の改良と開発を行う。 2-1 各県の立地条件に適合した養殖技術と普及に関する研修プログラム及び教材を作成する。 2-2 NADC 及び県養殖ステーションにおいて、県技術員、県・郡普及員及び中核養殖農家の研修を行う。 2-3 パイロット事業の成果を活用し、中央養殖開発センターが主体となって、県技術員、県・郡普及員及び中核養殖農家に対して実地研修を行う。 3-1 県養殖ステーションの養殖普及活動のための機能（種苗生産、技術指導の訓練等）を強化する 3-2 パイロット事業の成果を導入する農村と養殖農家を選定する（普及展開事業サイト：8 郡×10 村＝80 村） 3-3 養殖農家を対象とした、養殖手法の視聴覚教材を作成する 3-4 選定した養殖農家に対し、パイロット事業の成果に係るセミナーを開催し、実地研修を行う 3-5 協力重点郡の養殖農家に対し技術指導と訓練を行うとともに、養殖経営を監理する。 4-1 対象県の養殖活動に関する情報の収集及び整理を行う 4-2 対象県の養殖普及戦略の策定を支援する 4-3 協力期間終了後の養殖普及に係る行動計画を策定する 4-4 養殖普及の促進のため、関係機関を対象とする行動計画に関するセミナーを開催する。	〔日本側〕 1. 専門家 1）チーフ・アドバイザー/養殖技術 2）普及・訓練 3）村落開発/業務調整 4）その他の関連する専門家（必要に応じて派遣する） 2. ｶｳﾝﾀｰﾊﾟｰﾄの日本及び第三国での研修 3. 資機材供与 4. 運営経費補填	〔ラオス側〕 1. カウンターパート設置 1）ﾌﾟﾛｼﾞｪｸﾄﾃﾞｨﾚｸﾀｰ 2）ﾌﾟﾛｼﾞｪｸﾄﾏﾈｰｼﾞｬｰ 3）ﾌﾟﾛｼﾞｪｸﾄｺｰｼﾞﾈｰﾀｰ 4）その他ｶｳﾝﾀｰﾊﾟｰﾄ 2. 県・郡レベルの普及員の配置 3. 予算措置 4. オフィス・スペースの提供	・住民のプロジェクトへの参加を阻害する要因が発生しない ・プロジェクトに参加したC/P、県・郡普及員及び県技術員が他の組織に大量に流出しない 対象地域の安全性が確認される。

資料４　プロジェクト・ドキュメント

Lao People's Democratic Republic

Aquaculture Improvement and Extension Project, Phase II

<Project Document>

January 2005

The Aquaculture Improvement and Extension Project, Phase 2 in the Lao PDR

Abbreviations

Abbreviation/Acronym（略語表）

ACIAR	Australian Center International Agriculture Research
ADB	Asian Development Bank
AIT	Asian Institute of Technology
AOP	Aqua Outreach Program
AQIP	Aquaculture Improvement and Ex tension Project
C/P	Counterpart
DAFO	District Agriculture and Forestry Of f ice
DLF	Department of Livestock and Fisheries, MAF
DLFU	District Livestock and Fisheries Unit
FAO	Food and Agriculture Organiz ation of the United Nations
FORCOM	Project f or Forest Management and Community Support
GAA	German Agro Action
GOJ	Government of Japan
GOL	Government of the Lao PDR
IFAD	International Fund Agricultural Development
JCC	Joint Coordinating Committee
JICA	Japan International Cooperation Agency
Lao PDR	The Lao People' s Democratic Republic
LARReC	Living Aquatic Resources Research Center
LEAP	Lao Ex tension f or Agriculture Project
LECS-II	Lao Ex penditure and Consumption Survey 1997/98
MAF	Ministry of Agriculture and Forestry
MOFA	Ministry of Foreign Af f airs
MRC	Mekong River Commission
NADC	Namx ouang Aquaculture Development Center
NAFES	National Agriculture and Forestry Ex tension Service
NAFRI	National Agriculture and Forestry Research Institute
NAHC	National Animal Health Center
NPEP	National Poverty Eradication Program
NTFP	Non-timber Forest Products
NUOL	National University of Lao
NWGL	Network of Women and Gender in Livestock and Fishery Development
PADP	Provincial Aquaculture Development Project
PAFES	Provincial Agriculture and Forestry Ex tension Service
PAFO	Provincial Agriculture and Forestry Of f ice
PFS	Provincial Fishery Station
PLFS	Provincial Livestock and Fisheries Section
RDC	Research Development Center
SEAFDEC	Southeast Asian Fisheries Development Center
SIDA	Swedish International Development Agency
UN	United Nations
UNDP	United Nations Development Program
USAID	U.S. Agency f or International Development
UXO	Unex ploded ordnance
VFW	Village f orestry (f ishery) worker
VPC	Vacccine Production Center
VVW	Village veterinarian worker

1. Introduction

The Government of Lao Peoples Democratic Republic (hereinafter referred to as "GOL") raised its long-term development objective to exit the group of least-developed country (hereinafter referred to as "LDC") by 2020, and launched the National Growth and Poverty Eradication Strategy (hereinafter referred to as "NGPES") in January 2004. A top priority of NGPES is to modernize the agriculture sector and to achieve food security and better livelihoods for all Lao citizens.

Fish is one of the most important animal protein sources in the Lao Peoples Democratic Republic (hereinafter referred to as "Lao PDR") and the promotion of fish production activities and stabilization of fish catches are in line with the principal policy of the NGPES. Aquaculture is expected to be developed because fish catches are declining especially in Mekong River. The Department of Livestock and Fisheries, Ministry of Agriculture and Forestry (hereinafter referred to as "DLF") proclaimed a target per capita fish requirement by 2020 as 23 kg/person/year, or about 1.5 times the present amount, which is the lowest among the neighboring countries, and emphasized the prospect that aquaculture would produce the required amount of fish.[1]

However, at present appropriate aquaculture technologies have not been extended in rural areas, where extensive aquaculture methods are common and productivity is low. There are a number of problems and issues such as a deficit of fish seeds, insufficient technical knowledge of governmental extension staff, etc. In order to cope with those problems, the "Aquaculture Improvement and Extension Project" Phase I (hereinafter referred to as AQIP-1), was implemented with the Government of Japan (hereinafter referred to as "GOJ"). In AQIP-1, the Namxouang Aquaculture Development Center (hereinafter referred to as "NADC") was promoted, and technical training was conducted. In addition, there are some foregoing projects on aquaculture development that were carried out by various donor agencies including the Food and Agriculture Organization (hereinafter referred to as "FAO") and the Asian Institute of Technology (hereinafter referred to as "AIT"), and aquaculture extension projects have been implemented for some localities. They found that Laotian localities have the least interest in planned fish production, and that an aquaculture extension system with stronger leadership is required to promote fish culture at a local level.

For the above reasons, the GOL requested that GOJ provides technical cooperation for the "Aquaculture Improvement and Extension Project" Phase II (hereinafter referred to as "AQIP-2"). Based on the request, the GOJ dispatched a preparatory study team from September to December 2004 and conducted a joint study in cooperation with the GOL (hereinafter referred to as Joint preparatory study team). The joint study team clarified problems and issues regarding aquaculture extension in rural areas through a participatory workshop as well as field survey, and discussed in detail the scope of AQIP-2. This project document compiles the results of the study and the project design agreed upon by both parties.

[1] Fisheries Development in Lao PDR – Towards integrated water resource management (25/03/02)

2. Background of Project Implementation

2.1 Outline of the Lao PDR

2.1.1 Natural Environment

Lao PDR is an inland country surrounded by 5 neighboring countries, China, Vietnam, Cambodia, Thailand and My anmar. The land has an area of 236,800km^2, approx imately the same siz e as the main island of Japan. The national territory stretches f or 1,700 km north to south with an east-west width of over 500 km at its widest and 140 km at narrowest point.

Mountains and plateaus occupy three-quarters of the national territory . The northern part is dominated by mountains over 1,500 m in height. On the other hand, the basin of the Mekong River f lowing along the boarder with Thailand f rom north to south f orms the nation' s main grain crop production area. Water areas that are ef f ectively used as f ishing and aquaculture grounds are estimated at 946,596 ha (Annex 1 Sub-table 1).

Climate is the tropics or subtropics with high seasonal dif f erences in precipitation, namely 75-90% of the precipitation is recorded in the rainy season f rom May to October. There is a signif icant dif f erence in rainf all among regions, being f rom 1,000 to 3,000 mm. Generally , the temperature is higher in the North and lower in the South according to the stretched land shape (Annex 1 Sub-table 2).

2.1.2 Socio-economic Context

The population was around 5.7 million as of 2002. The average population growth rate in 2000-2002 was 2.8%, which is high when compared with neighboring countries. The population is predicted to reach 6.4 million in 2010 and 8.2 million in 2020.

GDP per capita of Lao PDR is US$331 (2003; World Bank), which means the state belongs to the group of LDC classif ied by the United Nations. The GOL introduced the market economy by the New Economic Mechanism Decree in 1986, and the economy in the urban areas is gradually being promoted. However, the economy of the country is still highly dependent on the agricultural sector, mainly rice f arming, in which more than 80% of the work population is engaged.

2.1.3 Nation's Nutrition

According to FAO statistics, the average animal protein intake per capita in Lao PDR was 7.6 kg per y ear in 2001. Compared with neighboring countries, 16.7 kg in Thailand, 10.5 kg in Vietnam and 8.9 kg in Cambodia, the animal protein intake in Lao PDR is much lower.

The DLF stated at the 2nd National Aquaculture Development Meeting in September, 2003 that the amount of f ishery products supply per capita in Lao PDR is 14 kg, which corresponds to 34% of the total animal protein supply , and similarly , 30 kg (39%) in Thailand, 20 Kg (32%) in Vietnam and 20 kg (48%) in Cambodia. Based on this relative insuf f iciency in Lao PDR, the government plans to increase the f ish supply in the state up to 23 kg per capita by 2020.

2.2 Description of the Sector: Fishery and Aquaculture

2.2.1 Fishery and Aquaculture Production

Fishery and aquaculture production in 2003 is estimated to be 93,165 tons of which 57,307 tons (61.5%) were produced in inland fishery and 35,858 tons (38.5%) in aquaculture (Table 2.1). Although fishery statistics are not well established in Lao PDR, aquaculture production has tended to increase gradually, while inland fishery production has recently stagnated or decreased. The aquaculture production is mainly derived from the pond culture in rural areas. In recent years, fish production from net cages along the Mekong River has increased rapidly.

Table 2.1 Fish production of Lao PDR

Unit: ton, %

	2001	2002	2003	% in 2003
Capture Fisheries				
Mekong River and its 14 tributaries	17,790	19,060	19,061	20.5%
Large reservoirs	3,421	4,562	4,847	5.2%
Sallow irrigation and weirs	5,169	5,513	1,240	1.3%
Wetlands and swamps	2,870	4,784	5,741	6.2%
Natural ponds and ox bows	7,441	7,441	2,560	2.7%
Rain-fed rice paddy fields	23,850	23,850	23,858	25.6%
Sub-total	60,541	65,210	57,307	61.5%
Aquaculture				
Fishponds	12,081	15,759	28,458	30.5%
Rice-cum-fish	513	534	900	1.0%
Cage culture	N.A.	1,952	6,500	7.0%
Sub-total	12,594	18,245	35,858	38.5%
Total	73,135	83,455	93,165	100.0%

Source: DLF

2.2.2 Current Aquaculture Situation

(1) Fish farmers and the objectives of aquaculture

According to an agriculture census in Lao PDR in 1999, there are 667,900 farmer's households. Among these, 55,200 households (8.3%) are engaged in aquaculture activities (Annex 1 Sub-table 3). The most common type of aquaculture is pond culture, which is practiced by 51,500 households or 93 % of all fish farmers.

Aquaculture produces fish primarily for self-consumption, secondly for ceremonial occasions, and surplus fish are sold.

(2) Aquaculture methods and productivity

Fish farmers in rural areas start to fill the ponds with water and release seeds in their ponds around June or the beginning of the rainy season. Extensive and low input aquaculture methods are currently being conducted, i.e., farmers supplementary feed fish on rice bran, vegetable refuse, etc. Farmers depend on rainwater and partly water for irrigation for fish culture. For this reason, they fail to breed fish in many area, because ponds run dry in the dry season.

Cultured fish for self-consumption are caught by cast net and gill net regardless of the size of the fish, and all fish are consumed. In addition, fish of different ages live together in reservoir-type ponds that maintain their water levels all through the year and so the fish harvest is not maximized.

It is difficult to calculate the productivity of the extensive culture ponds. Although the DLF estimates the average productivity of a pond as 1,000-1,500 kg/ha in the fishery statistics, there are many farmers whose productivity is actually around 200-300 kg/ha.

(3) Target species

The most popular species widely cultured in the Lao PDR are tilapia, carp, 3 species of Chinese carp (silver carp, bighead carp, and grass carp), 2 species of Indian carp (rohu and mrigal), common carp, African catfish, snakehead and silver barb (so-called Puntius) (Annex 1 Sub-table 4).

(4) Seed production and demand for seeds

The seed production provincial fishery stations and private enterprise are estimated to reach around 100 million in 2002 (Annex 1 Sub-table 5). However, there are no statistical data on seed production by small fish farmers.

According to the survey by AQIP-1, demand for seeds is estimated to be 200 million for pond culture and 3.5 million for paddy-field culture (Annex 1 Sub-table 6).

The supply and demand balance of fish seeds depends upon the size of seeds, their stocking density, expected survival rate in the pond, and so on. Currently, the domestic need for seeds is much larger than the supply. Thus, high quantities of seeds are imported from neighboring countries, such as Thailand, Vietnam, etc.

2.2.3 Fish Marketing

Fish is sold in fresh state or live in the agriculture markets. Little ice is utilized in the market. The unit price of fish is almost the same between 11,000 to 15,000 kip/kg, except for some high-value natural catfishes like Wallago. The price of cultured fish is often lower than that of natural fish by around 10% (Annex 1 Sub-table 7).

In rural areas, villagers often cannot access permanent and periodical markets due to the long distance (Annex 1 Sub-table 8). This is a common issue for marketing agricultural products, and is a major obstacle to the activation of rural economies.

2.3 National Strategy

2.3.1 Long-term Development Objective

The overall goal set by the GOL is freeing the country from the status of LDC by 2020 through sustainable development. This long-term development objective was decided by the 6th Party Congress in 1996.

2.3.2 The National Growth and Poverty Eradication Strategy (NGPES)

The GOL has examined a general development plan and sector plans that correspond to the above long-term development objective, and the results were compiled in the National Poverty Eradication Program (hereafter referred to as "NPEP") published in 2003. Then, the NPEP was additionally examined by the National Assembly and stakeholders, and it was renamed and published again as the National Growth and Poverty Eradication Strategy (NGPES) in January 2004.

The NGPES is a comprehensive framework for growth and development, and is composed of the following 6 parts.

Part I: NGPES: An Overview
Part II: Poverty Assessment of the Lao PDR
Part III: Strengthening the Overall Environment for Sustainable Growth and Development
Part IV: National Sector Plans to Promote Sustainable Growth and Poverty Eradication
Part V: Mobilizing and Allocating Resources – Reconciling Development Priorities with the Budgetary Resource Envelope
Part VI: Participation, Monitoring, Evaluation

The NGPES has a particular focus on the improvement of the poverty situation in the poorest districts, and 72 districts are identified as poor according to the percentage of poor households. Among the 72 districts, 47 districts are the poorest and further prioritized for investment over the period to 2005 (Annex 1 Sub-figure 1). Basic demographic and agriculture activity data of the 47 provinces are shown in Annex 1 Sub-table 9.

A top priority of the GOL described in the NGPES is to modernize the agriculture and forestry sector in a manner that fully meets sustainable practices and that achieves food security and better livelihoods for all citizens.

The GOL has clear development objectives for the agriculture and forestry sector to 2020, designed to contribute to the overarching goal of poverty reduction:

1) Ensure food security for all Lao people
2) Maintain a growth rate in agricultural output of 4-5 percent annually
3) Promote commodity production, especially for export
4) Stabilize shifting cultivation and eradicate poppy cultivation
5) Diversify and modernize the agriculture and forestry sector
6) Conserve the natural environment and protect threatened species and habitats
7) Maintain a healthy and productive forest cover as an integral part of the rural livelihood
8) Improve rural livelihoods

As for the development strategy of the agriculture sector, the Ministry of Agriculture and Forestry (hereafter referred to as "MAF") had prepared "Agriculture Development Vision toward 2020" (hereinafter referred to as "Vision 2020") in 1998. The Vision 2020 was further examined through the "Lao Agricultural Strategy Study" by the Asian Development Bank (hereafter referred to as "ADB") and the donor meeting held in November 1999, and finally compiled into the "Government's Strategic Vision for the Agriculture Sector" (hereinafter referred to as "Strategic Vision") in December 1999, and this "Strategic Vision" is adopted for the agriculture development strategy of NGPES as shown in Table 2.2.

Table 2.2 Alternative Agricultural Development Strategies by NGPES

Lowlands / Mekong Corridor	Sloping / Uplands
Improve and diversify farming systems with increased and intensified cash crop, livestock and fisheries production.	Plan land-use zoning based on bio-physical (slope and land capability) and socio-economic parameters.
Expand and intensify value added processing by promoting local and foreign investment.	Accelerate participatory landallocation and land use occupancy entitlement.
Develop market research and information systems and regional market links between producers and wholesale and retail buyers throughout the region.	Diversify farming systems and agro-forestry development through adaptive research, trials and demonstrations of farmers' fields.
Develop internationally accepted product grades and standards.	Promote community management of natural resources.
	Sustainable land use management with soil erosion control, afforestation, plantation forestry and conservation management.
	Strengthen demand driven extension programs.
Rehabilitate, expand and intensify irrigation schemes with community based management.	Expand and intensify small-scale community managed irrigation schemes.
Strengthen and expand rural credit facilities through free competition and market determined interest rates.	Develop and expand rural savings and credit systems; target credit to support technology adoption by the poor.
Strengthen rural and agribusiness lending by SOCBs and private commercial banks.	Strengthen the capacity and legal framework of SOCBs in commercial banking transactions.
	Open community market access by upgrading and expanding feeder roads and market information.

Source: Government's Strategic Vision for the Agriculture Sector, December 1999

Furthermore, the MAF has carried out the "Master Plan Study on Integrated Agricultural Development in Lao PDR (2001)" (hereafter referred to as "Agriculture Master Plan") in order to formulate practical projects under the framework of the "Strategic Vision" with technical cooperation of the GOJ. The "Agriculture Master Plan" identified and proposed a total of 110 projects/programs and examined their priority for implementation. As a result, 66 projects/programs were selected as projects to be commenced by 2010 (among which 8 projects are on-going). The selected 58 projects/programs were further examined from such aspects as implementing capability of the implementing agencies, expected achievable speed compared to the scale of investment, cost to benefit analysis, direct impact to the value added, and prioritized into 4 groups through committees and workshops. The first priority group involves a total of 11 projects that are considered to generate sufficient value added, to contribute to increasing farmer's income and to creating additional job opportunities, and they were recommended for urgent implementation.

In the NGPES, thus selected the first priority group in the "Agriculture Master Plan" is determined without modification as the priority projects in the agriculture sector as shown in Table 2.3. The projects in the sub-sectors of fisheries, livestock and non-timber forest products (hereafter referred to as "NTFP"), which have had insufficient budgets in the past, are dominant among those priority projects.

AQIP-1 was given top priority among the 11 priority projects, and there is the same high expectation for AQIP-2, which is implemented using the outcomes of AQIP-1.

Table 2.3 Poverty -Focused High Priority Projects by NGPES

Priority	Reference to the Master Plan	Name of Project/Program
1	LF-10	Aquaculture Improvement and Extension Project
2	LF-11	Fish Seed Center Rehabilitation/Expansion Project
3	LF-2	Animal Health and Quarantine Improvement
4	RF-11	Expansion of Micro-Finance Activities
5	LF-12	Rural Aquaculture Development Project
6	SC-4	Research Project on Sustainable Management and Utilization of NTFPs
7	AC-5	Outer City Horticulture Promotion Program
8	AC-1	Rice Seed Multiplication Improvement Project
9	MR-8	Processing and Marketing of NFTPs
10	AC-21	Basic Seed Production Technology Improvement Project
11	LF-16	National Animal Health Center Improvement

Source: NGPES, January 2004

2.3.3 Development Plan of Fisheries Sector

The fisheries subsection plays an important role in agriculture not only for stable production of food but also for diversification of agriculture activities. The current fishery development plan, "Fisheries Development in the Lao PDR – Towards Integrated Water Resources Management (2002)", highlights sustainable aquaculture development considering the position of fisheries in the agriculture sector and the reduced fish catch in the Mekong water system, and describes overall targets as follows:

- The contribution to food security with more emphasis in supplying more animal protein to rural areas particularly rural farming communities;
- The contribution to poverty reduction in the sense of obtaining additional income;
- Gradual integration of sustainable aquaculture farming into agricultural mixed farming, generating new employment for the sub-sector; and
- Supplementary food supplies to the urban growing by promoting peri-urban semi-intensive aquaculture (pond, cage, pen, etc) with attention to aquatic animal health and good management practices.

The fishery development plan shows target fish production calculated based on predicted population and per capita fish requirement as shown in Table 2.4. The total fish production of 73,000 ton in 2001 or about 14 kg fish/person/year is expected to increase to 188,600 ton in 2020 based on the increased per capita fish requirement of 23 kg/person/year.

Table 2.4 Current availability and requirement trend to the next 20 years

	1996**	2001	2005	2010	2020
1. Estimated* Population (millions)	4.7	5.2	5.7	6.4	8.2
2. Requirement of animal aquatic product (kg/person/year)	10.2	14.0	16.0	18.0	23.0
3. Total Amount (tons)	48,000	73,000	91,200	115,200	188,600

* Population based on National Statistic Centre
** DLF information 1997 revised according to FISHSTAT of FAO
Source: Fisheries Development in the Lao PDR – Towards Integrated Water Resources Management 2002

2.4 Relevant Donor-Assisted Projects

Many donors provide technical and financial cooperation to the fisheries-sector development project in the Lao PDR (Annex 1 Sub-table 10). Recent donor-assisted aquaculture projects are as follows.

1) Provincial Aquaculture Development Project: PADP (LAO/97/007) by the FAO/UNDP

In this project, individual farmers were organized into aquaculture groups in order to provide them with technical extension services in 14 districts of 5 provinces, Xiangkhouang, Oudomxay, Xaignabouri, Savannakhet and Xekong. The project has established 98 aquaculture groups with farmers of 1055 households who participated in the technical training during 1997-2000. However, farmer groups do not successfully engage in aquaculture activities after project completion.

2) Aqua Outreach Program by the AIT

The AIT is conducting the AOP in collaboration with counterparts in Thailand, Cambodia, Lao PDR, and Vietnam within the framework of the program of Aquaculture and Aquatic Resources Management.

The AOP is implemented to support small-scale seed production and aquaculture outreach in the three southern provinces (Savannakhet, Khammouan and Saravan) of the Lao PDR since 1993, and the target areas were expanded into six southern provinces (Attapu, Xekong and Champasak) from 2003. The AOP is still being continued. The Regional Development Committee for Livestock and Fisheries Development in Southern Laos (RDC) for the project operation is located in Savannakhet Province.

3) AQIP-1 by the GOJ

The AQIP-1, as the pre-phase project of the AQIP-2, had been implemented from February 2001 to February 2003. In the AQIP-1, the NADC was promoted, and aquaculture technology and extension capacity of counterparts were improved.

3. Problem to be Addressed and the Current Situation

3.1 Institutional Framework on Aquaculture Development

3.1.1 General Fishery Administration

Fishery-related administration in the central level is mandated to the DLF under MAF. The organization charts of MAF and the DLF are shown in Annex 2, while a simplified chart showing major organizations related to the Project is shown in Figure 3.1.

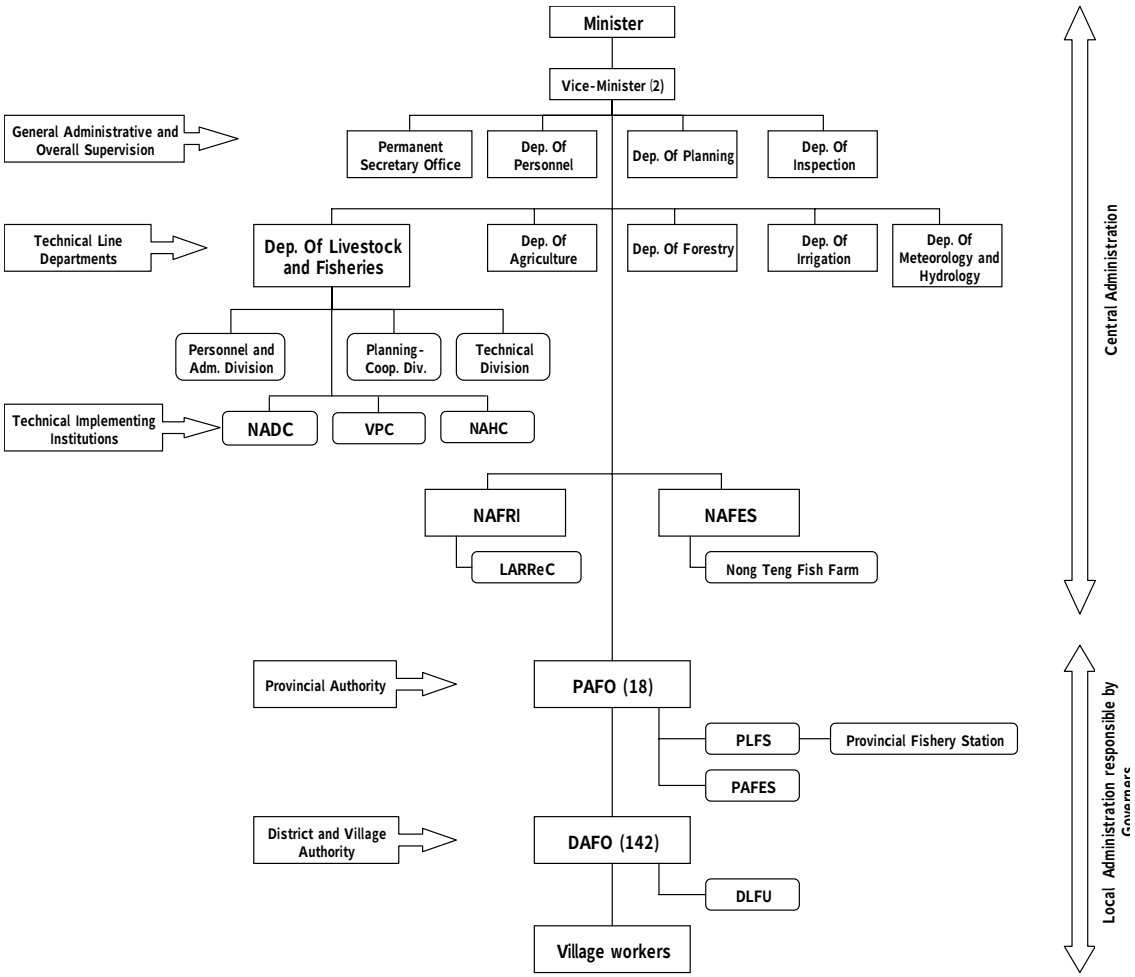


Figure 3.1 Organization charts of MAF, the DLF and relevant local authorities

The DLF has 3 divisions: the Personnel and Administration, Planning-Cooperation and Technical Divisions, and 3 technical centers including NADC promoted by AQIP-1. The DLF is responsible for policy planning at the central level and implementing relevant administrative services in collaboration with the Provincial Agriculture and Forestry Offices (hereafter referred to as "PAFO"s) and the District Agriculture and Forestry Offices (hereafter referred to as "DAFO"s). Practically, the Provincial Livestock and Fisheries Stations (hereafter referred to as "PLFS"s) in PAFOs and the District Livestock and Fisheries Units (hereafter referred to as "DLFU"s) in DAFOs

are directly involved in the administrative services at each local level.

Apart from the technical line departments such as the DLF, two technical implementing institutions, namely the National Agriculture Research Institute (hereafter referred to as "NAFRI") and the National Agriculture and Forestry Extension Service (hereafter referred to as "NAFES"), have been established as cross-sectional organizations with the tasks of research and development, and technical extension, respectively. In these organizations, there are subsidiary organizations acting in the sub-sector of fisheries and aquaculture, i.e., LARReC under NAFRI and the Nong Teng Fish Farm under NAFES. However, such cross-sectional reform particularly on technical extension has not been completed, and at present the DLF carries out administrative services in the livestock and fisheries sub-sections.

3.1.2 Major Relevant Organizations in the Central Government

1) NADC

The NADC was promoted in 2002 under the Japanese technical cooperation project, the AQIP-1, with mandates technical improvement, human resource development and enhancement of extension activities on aquaculture in the Lao PDR. At present, NADC carries out rearing experiments to improve seed production and aquaculture technologies as well as conduct training and extension activities. The NADC is expected to play a role as a core institute for aquaculture development and enhance its capacity.

2) NAFRI and LARReC

The Living Aquatic Resource Research Center (LARReC) established in 1999 is one of nine research centers under NAFRI. The aim of LARReC is mainly to assess the living aquatic resources and socio-economic studies of the fisheries in rivers, streams, reservoirs and back swamps. According to the LARReC Medium Term Research Plan 2001-2005, the center plans to focus on collaborative projects with international and/or national partners to upgrade staff's abilities to international level.

3) NAFES and Nong Teng Fish Farm

NAFES was established in 2001 under MAF with a view to supervise extension activities throughout the country in the sector of agriculture, forestry, livestock, fisheries and irrigation. At the provincial level, the Provincial Agriculture and Forestry Extension Service (PAFES), in fact subordinates of NAFES, have been set up in PAFO in some provinces. However, extension works at a district level are unchanged being carried out by staff of DAFO.

The institutional capacity of the NAFES-PAFES extension channel has not been established sufficiently because NAFES is a relatively new organization in MAF. As explained above, extension services in the sub-sectors of livestock and fisheries are supervised and carried out directly by the DLF not by NAFES at present. However, considering the Nong Teng Fish Farm, a national aquaculture experimental station with the functions of broodstock management and seed production, has already transferred to NAFES, it is plausible in the near future that NAFES undertakes extension services of fisheries on behalf of the DLF.

3.1.3 Major Relevant Organizations in the Local Government

After decree PM No.01 (2001) regarding decentralization was enacted, the provincial governments have been positioned to take control of the management, operation and budgets of PAFO and DAFO. However, at the present, PAFO and DAFO are still under the mandate of MAF, specifically under the technical line departments such as the DLF, although their budgets such as staff salaries and operation budget are allocated by the provincial governments.

The DLF is obliged to train the staff of the PLFS and the DLFU and is able to order necessary works directly to them. The DLF has the authority to shuffle personnel at these levels.

1) PAFO and DAFO

PAFOs have been established in all provinces (17 provinces and 1 special zone). The grade of the director of PAFO is the same level as the deputy director general in MAF. Similarly DAFOs have been established in all the 142 districts. As explained above, practical extension services on aquaculture are carried out by the PLFS of PAFO, provincial fishery stations and the DLFU of DAFO. At present there are 11 provincial fishery stations operating for fish seeds production and distribution.

2) Village workers

For conducting extension services at a grassroots level, the DLF has organized "village workers". These include Village Veterinary Worker (hereafter referred to as "VVW"), Village Fishery Worker (hereafter referred to as "VFW"), Village Animal Husbandry Worker (hereafter referred to as "VHW"), Village Development Coordinator (hereafter referred to as "VDC"), and Village Mass Organization (hereafter referred to as "VMO").

These village workers occasionally conduct extension for the sub-sectors in their communities with or without technical assistance by officers from the DLFU, and some of them are highly motivated and make significant efforts to improve the livelihoods of their communities.

3.1.4 Fishery Education

The department of Livestock and Fisheries, Faculty of Agriculture in the National University of Lao (hereafter referred to as "NUOL") is the only institute that provides fishery education at university grade in Lao PDR. In each year, around 50 students enter the course. After they finish studying general subjects concerning livestock and fisheries, they select a specific course in their final year, that is, 5th year. Fishery is one of the major courses, and NAFRI and other government facilities are often utilized for practice. When they graduate from the 5-year course, a bachelor of science in Zoology is presented.

In addition, the NUOL also provides a 4-year higher diploma course on Livestock and Fishery. About 100 students, including government staff to improve their skills, acquire a higher diploma certificate every year.

Other educational institutes on Livestock and Fishery include the agriculture technical schools located in Luangprabang Province, Vientiane Province, Vientiane city and Champasack Province. Around 35 students major in Livestock and Fishery are studying for three years at each institute. There

are lectures on aquaculture for approximately two hours per week.

The DLF recognizes the lack of fishery specialists to develop the aquaculture sub-sector, and is suggesting launching a BS in Fishery in the NUOL in collaboration with NADC and LARReC in the near future.

3.2 Analysis of the Current Situation and Problems

3.2.1 Technical Problems Observed in Aquaculture of Small-scale Farmers

At present, small-scale farmers in rural areas practice extensive fish culture with little artificial input and expense. Accordingly the fish productivity from ponds is very low. Major technical problems observed in those activities are explained below.

1) Amount of available water is insufficient

In most rural areas, irrigation facilities are not well developed so that the aquaculture depends mostly on rainwater. In such type of aquaculture, pond water often dries up completely in dry season and it is difficult to secure required growth period of fish for food.

Even in an area where irrigated water is available, pond water tends to suffer deficit during the rice harvesting season.

2) Pond water cannot be maintained due to leaking

It is important to prevent pond water from leaking, particularly for the rain-fed fishponds. However, no protection measures are taken for the bottom or walls of the pond at present and there are cases where pond water cannot be maintained during the culture period. As a low-cost countermeasure, it is recommended to coat the bottom and walls with surface mud or mud-cement.

3) Size of seed stocked in ponds is small

It is advisable to introduce and bigger stock seeds in order to increase the survival rate and to harvest them because small-scale farmers tend to use cheaper and smaller seeds.

4) Stocking density of seeds is inappropriate

Farmers tend to stock a large amount of seeds in the hope of increasing production. However, a high density of fish in extensive fishponds decreases the productivity due to a deficit of food organisms.

5) Pond preparation such as fertilization and elimination of prey is insufficient

It is important in extensive fishponds to use food organisms such as daphnia and copepods as much as possible. In order to introduce this, seeds should be released after those food organisms are propagated well in ponds by appropriate fertilization. However, such pond preparation is not employed at present. As fertilization materials, by-products of animal husbandry such as cow dung and chicken manure are effective. It is appropriate to build poultry houses above the pond to scatter manure into the pond directly.

In reservoirs, which are full of water throughout the year, drain facilities are generally not

constructed, and large fish and insects as prey organisms remain in the ponds when new fish seeds are to be introduced. Therefore the survival rate of seeds becomes lower due to being eaten by prey.

6) Feeding method is inappropriate

The quality and amount of food are often insufficient in rural fishponds. As for feed, rice bran, crushed rice and larval termites are popularly used by farmers, however, the feeding regime is not considered or developed well.

3.2.2 Technical Problems Concerning Aquaculture Extension

1) Provincial Fishery Stations are not used effectively

Provincial Fishery Stations (hereafter referred to as "PFSs") conduct seed production and distribution for fish farmers. They tend to produce a larger amount of small-size juveniles of 1-2 cm, which are difficult for farmers to rear, according to the instruction from upper organizations that often overemphasize "increase in production amount of seeds". The number of seeds to be distributed for farmers is not calculated properly considering the size of their ponds and the aquaculture methods adopted.

At present, most of the PFSs in Lao PDR have broodstock of the same species such as tilapia, common carp, Chinese carp, Indian carp and silver barb, and they try to produce the seeds of all species. However, such uniform activities of the PFSs are irrational considering the different natural environments and characteristics of the aquaculture suitable for each locality. For example, it is difficult to maintain a sufficient period of growth for Indian carp in southern provinces where rain-fed aquaculture is common because the spawning season of Indian carp is the end of rainy season, i.e., around October.

Although the PFS staff acquire a certain level of aquacultural technique, the technologies are not standardized as a package indicating systematic seed stocking density, size of seeds, feed, feeding method, fertilization method, etc., for practical extension to fish farmers. Instructions given to farmers are presently different among the PFSs and their technicians.

2) Number and capacity of extension workers are insufficient

The number of fishery-related extension workers in DAFO and their knowledge of aquaculture are insufficient. Considering they are directly involved in field extension work for farmers, it is essential to upgrade their capacity. It would be effective to collaborate with the technical staff of the PFSs in field extension because they have acquired a certain level of aquacultural technique.

3) It is difficult for small-scale farmers to procure necessary expenses for aquaculture

It is difficult for poor holders in Lao PDR to procure the necessary expenses for aquaculture. The average annual income of low income families in Lao PDR is estimated from one to two million kip (Annex 1 Sub-table 11), while it is estimated by the DLF in 2003 that the construction cost of a pond of 20 m x 40 m x 1.2 m is 2.4 million kip and approximately three million kip is required for the initial year including operational cost.

Institutional credit for farmers is available from the Agriculture Development Bank in Lao PDR. However, it is almost impossible for small-scale farmers to access and apply for credit from the Bank, and even though if they were able to apply for credit, approval is difficult to obtain and the current interest of 20% is too high for them.

4. Project Strategy

4.1 Project Strategy

This Project aims at extending aquaculture in rural areas where poverty and food security issues should be properly addressed. It is expected to contribute to improving the living of small-scale fish farmers. The following five strategies are to be employed in order to achieve those objectives:

1) To verify aquaculture methods suitable for different local conditions

The land of Lao PDR expands in a north-south direction having various types of natural and socio-economic environments. However, small-scale fish farmers employ similar or indifferent aquaculture methods across the regions. In the Project, the effectiveness of the improved aquaculture methods, and which are suitable for different local conditions will be verified to introduce these new methods to fish farmers.

2) To adopt a step-by-step approach in extension supports

This Project is directed to extent aquaculture activities in the 72 poor districts designated by NGPES. However, it would not be realistic and effective to intervene in all those districts with this particular Project considering the efficient resource allocation of the Project. It is plausible that some of those districts have little potential for aquaculture development.

The Project will be started with activities of pilot programs in focal districts, then success scenarios attained by the pilot programs will be disseminated to other areas.

3) To make full use of the outcomes of other projects

AQIP-1 has successfully completed promoting NADC and training technical staff. This Project plans to utilize NADC as the central training institute to train provincial and district extension staff.

Similar projects to AQIP-2 have been implemented, for example PADP by the FAO/UNDP and AOP by AIT (Section 2.4 of this document). The Project will formulate an effective extension network by incorporating the local human resources already developed by such foregoing projects.

4) To address the Project towards integrated farming development

Target groups of the Project, small-scale farmers, are engaged in integrated farming such as rice cultivation as a main livelihood, livestock such as cows, pigs, chickens and ducks, go fishing to near-by natural waters, and go into forests for collection of various products such as mushroom, edible plants, and small animals including insects.

Therefore, the Project takes into consideration integrated farming development in which aquaculture is one of the components to enhance the living standard of fish farmers, although the Project focus is still placed on the improvement and extension of aquaculture.

5) To encourage sustainability of Lao side

In order to accomplish sustainability of the Project even after the phase-out of the JICA cooperation, the Project will involve an activity to clarify the roles of respective aquaculture-related organization and stakeholder and their collaborative directions. To be concrete, the contribution of input from the Lao side shall be increased for further aquaculture development gradually in the later part of the Project, and an action plan of aquaculture extension after the planned period of AQIP-2 will be prepared in terms of realistic project scale and scope that are workable by the Lao side.

6) To consider gender issues

Small-scale fish farmers and their families conduct aquaculture at small-scale reservoir ponds, so it is usual for women to participate in aquaculture activities, such as feeding. This Project will consider all aspects of gender issues, and plans to invite a national level institute that deals with gender issues to become a member of the Joint Coordinating Committee (hereafter referred to as "JCC").

4.2 Target Groups and Target Areas

4.2.1 Target Groups

The target group of the Project is small-scale fish farmers who have water areas for aquaculture, and relevant government personnel.

The target groups of this Project are in 4 provinces, Oudomxay, Xayabury, Savannakhet and Saravan, and 2 focal districts in each province, 8 focal districts in total, which will be described in greater detail in Section 4.2.2 below. There are 896 villages with population of 440,182 and 73,571 families residing in the 8 focal districts (Table 4.1). Population of fish farmers to total population in 4 target provinces are presumed 9 % in northern regions, Oudomxay and Xayabury, and 5% in central/southern regions, Savannakhet and Saravan (Annex 1. Sub-table 3). A rural socio-economic survey conducted by the joint preparatory study team estimates that there are about 3,000 fish farmer families in those 8 focal districts, and they are the primary beneficiaries of the Project.

Table 4.1 Number of villages, f amilies and population of the eight f ocal districts in the 4 target provinces.

Province	District	No. of Villages	No. of Households	Population
Oudomx ay	Xay	110	10,625*	63,736
	Beng	74	5,920	32,100
Xay abury	Xay abury	102	11,867	70,614
	Phian	56	7,584	44,558
Savannakhet	Phine	116	7,033	47,987
	Xepong	159	7,093	40,459
Saravan	Saravan	167	12,897	83,518
	Laongam	112	10,552	57,210
Total		896	73,571	440,182

* Number of Households

Source: Rural socio-economic survey conducted September-October 2004

4.2.2 Target Areas

The target areas of the Project have been determined f or 4 provinces, Oudomx ay , Xay abury , Savannakhet and Saravan by the joint preparatory study team. The process of determination is as shown in Annex 3. These 4 provinces satisf y the criteria set by GOL:

1) good security ,
2) ex istence of the NGPES 72 poor districts,
3) strong leadership on aquaculture ex tension conducted by PAFO,
4) potential of aquaculture ex tension,
5) ex istence of a state-run hatchery station, and
6) apportionable budget required f or aquaculture f ield of PAFO.

Additional criteria used by thejoint preparatory study team are

7) strategic location f or suf f icient ex pansion, and
8) high dependence on f ish seeds f rom other countries.

The Project is ex pected to promote dif f erent ty pical aquaculturemethods considering the local conditions such as climatic conditions and water availability in those 4 target provinces located in be ex tended in accordance with. Such categoriz ation is shown in Table 4.2.

Table 4.2 Categoriz ation of target species f or technical improvement and ty pe of aquaculture considering with local conditions

Name of target provinces	Target species f or technical improvement	Water supply	Ty pe of aquaculture
Oudomx ay and Xay abury	Common carp which better adapted to lower water temperature	Limited	Low input home consumption
		Year round	Semi-intensive For income generation
Savannakhet and Saravan	Tilapia which better adapted to higher water temperature	Limited	Low input home consumption
		Year round	Semi-intensive For income generation

The Project will eventually cover a total of 8 f ocal districts (2 districts in each province) as the direct intervention areas. Among the 8 f ocal districts, pilot programs will be carried out in 4 districts (or 1 pilot district in each province) f rom the earlystage of the Project. The selection procedures of those 8 f ocal districts and the 4 pilot districts are also shown in Annex 3.

In addition, the sites of aquaculture ex tension activities that have already started around NADC since the AQIP-1 period are planned to be utiliz ed as on-f arm training y ards in the Project,

A tentative schedule of project intervention to those f ocal districts and one leading district, Vientiane Capital is shown in Table 4.3.

Table 4.3 Tentative Schedule of Project Intervention to 8 Focal Districts and 1 Leading District

	Province	District	Village	1st year	2nd year	3rd year	4th year	5th year
Pilot program	Vientiane Capital	Naxaythong		→	→	→	→	→
	Oudomxay	Xay	2-3 villages	→	→	→	→	→
	Xayabury	Phian	2-3 villages	→	→	→	→	→
	Savannakhet	Phine	2-3 villages	→	→	→	→	→
	Saravan	Laongam	2-3 villages	→	→	→	→	→
Expansion program	Oudomxay	Xay and Beng	about 20 villages			□	□	□
	Xayabury	Xayabury and Phian	about 20 villages			□	□	□
	Savannakhet	Phine and Xepong	about 20 villages			□	□	□
	Saravan	Saravan and Laongam	about 20 villages			□	□	□

Regends

→ : Positive intervention of the Project for improvement and verification of technologies suitable for local conditions

→ : Utilization of the site for demonstration to fish farmers

□ : Intensive training of fish farmers

Remarks: Expansion program will be conducted mainly in the districts described on the table above, but the Project does not exclude the districts in the four target provinces as far as those are designated as poverty district by NGPES.

The focal districts are not necessarily the NGPES priority districts since the Project should take into account an effective extension strategy that requires optimum resource allocation as well as the selection of promising districts as examples of successful, sustainable pilot programs. Such successful experiences of the pilot programs will be extended to the expansion sites by means of demonstration and farmers-to-farmers extension approach.

4.3 Implementing Structure

4.3.1 Implementing Organization

1) Executing agencies

The DLF will bear overall responsibility for the implementation of the Project. Activities stated in the PDM will be undertaken by NADC, PAFO of5 provinces, 4 target provinces and Vientiane Capital) and DAFO of 9 districts (8 focal districts and 1 leading district).

The number of staff and annual budgets of the DLF is shown in Tables 4.4 and 4.5, respectively .

Table 4.4 Number of personnel of the DLF

	Permanent		Temporary		Contract	Total
	Graduate	Non-Graduate	Graduate	Non-Graduate		
Director General	1	-	-	-	-	1
Deputy Director General	2	-	-	-	-	2
Personnel and Administration Division	7	-	-	-	1	8
Planning and Cooperation Division	8	-	1	-	1	10
Technical Division	15	-	-	-	3	18
NAHC	13	-	6	-	-	19
NADC	10	-	7	-	4	21
VPC	10	-	8	-	5	23
Total	66	-	22	-	14	102

Source: Annual report 2003/04, DLF, December 2003.

Table 4.5 Annual budget of DLF and MAF

Unit: Million kip

	2002/2003	2003/2004
Administration	50	50
Salary	300	300
Operational		
Livestock (NAHC)	50	50
Veterinary (VPC)	450	220
Fisheries (NADC)	150	130
Total	1000	750
Grand total of MAF	-	3500

In this Project, the Director General of DLF will be placed as the project director, and two project managers will be appointed, one is the Director of NADC who is responsible for overall technical training and individual practical training at the central level, and the other is the Director of the Technical Division of DLF who supervises overall technical extension and individual practical training at local levels. In addition, the Director of the Planning and Cooperation Division of DLF will participate in the Project as the project coordinator and play an important role in overall project coordination including addressing the Project in integrated agriculture development as well as collaboration with other relevant organizations.

In practical project implementation, it is important to realize vigorous participation of the staff of PAFOs and DAFOs as well as counterparts of the DLF.

2) Collaborating organizations

The Project will be implemented in collaboration with the following organizations:

a. National Agriculture and Forestry Extension Service (NAFES), MAF

b. National Agriculture and Forestry Research Institute (NAFRI), MAF

c. Network of Women and Gender in Livestock and Fishery Development (NWGL), DLF

4.3.2 Supervision of the Project

1) Joint Coordinating Committee

A JCC will be established in order to promote and supervise the Project activities. A JCC meeting will be held at least once a year and whenever necessity arises, and will work:

a. To deliberate and approve the plan of operation and the annual plan of operation of the Project.

b. To control the overall progress of the Project activities as well as the achievements of the above-mentioned annual plan of operation of the Project.

c. To review and exchange views on major issues arising from or in connection with the Project and recommend corrective measures.

The Chairperson of JCC will be the Permanent Secretary of MAF and the Vice Chairperson will be a Deputy Permanent Secretary of MAF. The other members will involve representatives of NAFES, NAFRI and the NWGL as well as relevant resource persons of the Project both from the Lao and Japan sides as shown in Annex 4.

2) Managerial and Technical Meeting

A Managerial and Technical Meeting (executive meeting) will be held once a month regularly and whenever necessity arises for smooth implementation of the Project. Its members will include Project Director, Project Managers and Project Coordinator from the Lao side, and Chief Advisor and Coordinator Expert from the Japan side.

5 Project Design

The Project Design Matrix (hereafter referred to as "PDM") of this Project is shown in Annex 5. Along with the role of the PDM, the project design is explained in this chapter.

5.1 Project Purpose

The Project Purpose is "Aquaculture suitable for local conditions is expanded in the 4 target provinces". The Joint Preparatory Study Team reconfirmed that the aquaculture technologies in rural areas of Lao PDR are primitive and that similartechnologies are employed nationwide without consideration of local conditions particularly natural conditions. The Project will aim to extend the aquaculture suitable for local conditions with simple technology for farmers to apply easily.

For example, major target species for technical improvement are determined from the water

temperature and supply , taking countermeasures f or leaking water f rom the ponds, improvement of f ertiliz er and the siz e of seeds. Based on the water availability , ty pes of aquaculture will vary f rom f ish production f or only self -consumption with minimum f arm input to the semi-intensive production f or partially sale in villages.

An indicator of Project success is the " number of f ish f armers who apply improved aquaculture technologies in 4 target provinces" .

5.2 Overall Goal

The Overall Goal is a development ef f ect as a result of achievement of the Project Purpose. The Overall Goal of the Project is that the " Standard of living of small-scale f ish f armers is improved through the dissemination of aquaculture suitable f or local conditions in the 4 target provinces." As mentioned in " 4.1 Project Strategy " , it is important to understand the Project, aquaculture ex tension, as part of integrated agriculture development,and the Overall Goal indicates how aquaculture development af f ects the standard of lif e of f armers. The Indicators of the Overall Goal are the " Amount of production and house consumption of f ish by f ish f armers participating in the Project" and " Income generation f rom selling f ish by f ish f armers participating in the Project" . These numerical data would be determined through a base line survey at the beginning of the Project and an actual condition survey and an intermediate evaluation survey .

5.3 Outputs

Outputs are specif ic objectives to achieve the Project Purpose, and they should be accomplished within the project duration. There are the f ollowing 4 Outputs:

Output 1. Adequate aquaculture methods are verif ied according to the local conditions of pilot sites

Output 2. The capacity of relevant persons such as f ish f armers, province/district ex tension staf f and staf f of PFSs regarding aquaculture technology and ex tension is improved.

Output 3. Fish f armers of the f ocal districts introduce improved aquaculture methods

Output 4. The f unctions of relevant organiz ations and their collaboration f ramework are strengthened regarding the aquaculture ex tension matched with the local conditions.

Based on the Project Strategy , the Outputs of the Project are planned to be achieved step-by -step and to encourage the sustainability of the ef f orts of the Lao side af ter the Project is phased out. Output 1 aims at accumulating successf ul aquaculture results in selected pilot sites with the initiative of the Project. As f or Indicators, the " Amount of production and house consumption of f ish by f ish f armers participating in the Project" , " Income generation f rom selling f ish by f ish f armers participating in the Project " and the " Number and availability of aquaculture techniques that are improved and developed at the f armers level will be used.

Output 2 aims at capacity development of relevant persons such as government staf f including ex tension staf f and core f ish f armers by means of technical seminars and practical f ield training. As training sites, not only NADC but also the PFSs and pilot program sites will be utiliz ed. As f or

indicators, the " Number of PFSs staf f who can train province/district ex tension staf f " , " Number of province/district ex tension staf f who can train f ish f armers" and " Number of core f ish f armers who trained to ex pand their acquired knowledge on aquaculture" will be used.

Based on the achievements of Output 1 and 2, Output 3 pursues aquaculture ex tension in all the 8 f ocal districts. In this stage, the Project supports independent action by the Lao side and ex tension of the method of the f armers-to-f armers, core f ish f armers to other f ish f armers. As f or indicators, the " Number of f ish f armers who apply improved technologies" , " Amount of production and house consumption of f ish by f ish f armers who apply improved technologies" , " Income generation f rom selling f ish by f ish f armers who apply improved technologies" will be used.

Output 4 ex amines the f ramework of sustainable development of the Lao side, af ter the Project. The Project will support preparation of aquaculture development strategies of each of the 4 target provinces, and promote understanding of the roles of relevant organiz ations and taking budgetary steps. At this stage, it is necessary to ex change constructive views among JCC members and participate in the Project. As f or indicators, the " Agreement on segregation of the duties of related organiz ations" and " Budgetary steps f or implementation of the plan by the Lao side" will be used.

5.4 Activities

The PDM includes major activities corresponding to each Output according to a time-line. The Plan of Operation (hereaf ter ref erred to as " PO") including a tentative schedule of implementation during the project period f or 5 y ears, responsible organiz ation and detailed ex planation of activities are shown in Annex 6. Summariz ed ex planations of the Activities are given hereinaf ter f or each Output. The PO is able to make amendments considering the actual conditions af ter start of the Project.

Output 1. Adequate aquaculture methods are verif ied according to the local conditions of pilot sites

1-1 Determine villages as pilot sites (pilot sites: 4 f ocal districts x 3 villages = 12 villages in total)
1-2 Establish operation and management plan of the pilot sites
1-3 Implement the pilot project
1-4 Improve and develop practical aquaculture techniques f or f armers level by leadership of NADC, as a central institution

In the pilot project, availability of improved aquaculture techniques, using common carp and tilapia as major target species f or technical improvement, will be appropriate by core f ish f armers at pilot sites. The data of appropriate aquaculture techniques will be stored up and controlled at NADC. The results of pilot programs of each y ear will be f eedback to the plan f or the nex t y ear, and compiled f or technical manuals in the second to third y ear of the Project.

Output 2. Capacity of relevant persons such as fish farmers, province/district extension staff and staff of PFSs about aquaculture technology and extension is improved.

2-1 Establish training programs and texts considering aquaculture suitable for local conditions and extension

2-2 Train PFS staff, province/district extension staff and core fish farmers at NADC and PFSs

2-3 Implement practical training utilized the outputs of pilot projects for PFS staff, province/district extension staff and core fish farmers

Taking into account the results of AQIP-1 and other foregoing relevant projects, training programs and materials have been prepared in order to upgrade the capacity of participants concerned (Activity 2-1). Training programs are prepared from two aspects, one is a curriculum-type, which is mainly used at NADC and the PFSs, and the other is a practice-type, which will be used at pilot program sites and by existing seed producers. Training materials shall include not only technical papers but also textbooks on practical extension services.

Along the programs prepared in Activity 2-1, curriculum-type training (Activity 2-2) and practice-type training (Activity 2-3) will be conducted respectively. Training of trainers (TOT) is included in these trainings, and interchange program of farmers will also be included according to need.

Output 3. Fish farmers of the focal districts introduce improved aquaculture methods

3-1 Strengthen functions of PFSs for aquaculture extension activities, such as seed production, technical trainings etc.

3-2 Select villages and fish farmers to introduce outputs of pilot programs (expansion sites: 8 focal districts x 10 villages = 80 villages in total)

3-3 Make audio-visual extension texts for fish farmers

3-4 Hold seminars and on-farm trainings utilized the outputs of pilot projects for selected fish farmers

3-5 Provide extension services and monitoring of aquaculture activities for selected fish farmers of the expansion project

The PFSs have functions as centers of technical extension and training of aquaculture in rural areas. Their roles in the Project are clarified particularly in the pilot program and the activities necessary for the Project are strengthened through technical cooperation (Activity 3-1).

Selection of villages or farmer groups for which results of pilot programs are introduced will be conducted based on proposals that are submitted to the Project from the candidates. The Project prepares a guideline including selection criteria for those expansion sites and disseminates it to extension staff through seminars, in order to support the preparation of proposals (Activity 3-2).

At this stage, audio-visual materials such as video, pamphlet and calendar will be effective, and they are readily prepared based on the achievements of Outputs 1 and 2 (Activity 3-3). In the expansion sites selected, seminars and practical trainings are conducted regarding successful scenarios

of pilot sites and individual aquaculture technologies (Activity 3-4). In addition, f ield training by ex tension staf f will be strengthened, technical ex tension through f armers-to-f armers channels and those activities are monitored by the Project (Activity 3-5).

Output 4. The f unctions of relevant organiz ations and their collaboration f ramework are strengthened regarding the aquaculture ex tension matched with the local conditions.

4-1 Collect and consolidate inf ormation on the aquaculture activities of target provinces

4-2 Prepare aquaculture development programs of the target provinces

4-3 Formulate an action plan of the Project af ter its cooperation period

4-4 Hold seminars on the action plan of the relevant organiz ations f or f urther aquaculture ex tension

Technical consultation is perf ormed f or improvement of the reporting f ormat regarding local aquaculture activities, and basic inf ormation will be collected by holding annual reporting seminars of the f our target provinces (Activity 4-1). Based on the inf ormation, workshops and seminars f or relevant of f icers are held so that the Project supports the preparation of aquaculture development strategies at provincial level (Activity 4-2). At the same time a working committee will be f ormulated in the DLF f or making an action plan af ter the Project ends (Activity 4-3). At the last stage of the Project, sy mposiums and seminars are held concerning those development strategies and the action plan, and then such matters are strengthen, i.e., the f unction of the relevant organiz ations, persons responsible f or f uture aquaculture development, and f ramework of their collaboration (Activity 4-4).

5.5 Inputs

5.5.1 Inputs from Japanese Side

Inputs f rom the Japanese side, especially dispatch of ex perts will be concentrated on f or the f irst three y ears of the Project period. At the remaining term, it will be reduced and replaced with Inputs of the Lao side f or the sustainability of the Project.

1) Dispatch of ex perts (main)

The f ollowing Japanese ex perts will be dispatched on a long-term basis.

(a) Chief advisor/Aquaculture technology

(b) Ex tension/Training

(c) Rural Development/Project coordinator

The duties of the Japanese ex perts are to advise, assist and work in collaboration with the Lao counterparts (hereaf ter ref erred to as C/P) on not only technical matters but also overall project management. The Terms of Ref erence (hereaf ter ref erred to as TOR) of the ex perts are shown in Annex 7.

2) Dispatch of other relevant ex perts

Other relevant ex perts will be dispatched in accordance with the needs f or ef f ective

implementation of the Project. The technical specialties required for short-term experts, their number and the TOR will be discussed between the Lao PDR and Japan sides not only at the start of the Project but also in each Japanese fiscal year.

3) Training of C/P in Japan and the third countries

During the Project period, 2-3 Lao C/Ps per year will be trained in Japan or third countries where technical training can be provided.

4) Provision of equipment

The equipment to be procured by the Project includes office equipment, vehicles for training and monitoring and equipment for seed production.

5) Allocation of other project costs

Part of the project operation costs will be supplemented by inputs of the Japanese side. This will include the expenses for field trips, training course operation, study tour, seminars and small-scale facility improvement of PFSs.

5.5.2 Inputs from Lao Side

1) Allocation of C/P

Necessary Lao C/Ps are to be allocated, which include a project director, two project managers and a project coordinator.

2) Allocation of extension staff at province/district levels

Government staff responsible for the Project shall be allocated from PAFO/PLFSs of the four target provinces. In addition, aquaculture extension staff of the 8 focal districts shall be clarified and specified in DAFO/DLFUs.

3) Budget allocation

The DLF makes its maximum effort to allocate the budget for implementation of the Project.

4) Provision of office space

The major working place of Japanese experts will be at NADC and the DLF. Office spaces will be provided.

5.6 Important Assumptions and Risk Analysis

Important Assumptions from Activity to Output are set as "Situations that hinder project participation of villagers have not occurred" and "C/Ps, province/district extension staff and PFS staff are not transferred to other organizations". One of envisioned risks for the former is such as the interest of villagers regarding agriculture and aquaculture is decreased due to rapid urbanization. However, this will not occur considering the present speed of economic development in rural areas. The latter

indicates the possibility of organizational transfer C/Ps, province/district extension staff and PFS staff to other donor-assisted projects as well as private companies. In AQIP-1, two counterparts transferred to each NAFRI and NAFES, in order to benefit themselves. There is a similar risk in AQIP-2. However, the risk can be minimized by stimulating their incentive, e.g., provision of interesting technical training.

Important Assumptions from Output to Project Purpose are "Serious epidemic fish diseases are not elaborated" and "Extreme natural calamities such as drought and flood do not occur". For the former, KHV (Koi herpesvirus), an epidemic disease specific to common carp, is presently spreading in Southeast Asian countries although it has not been reported in Lao PDR. It is important to strengthen monitoring of this disease because common carp is one of the major target species of the Project. For the latter, it is not so serious but, the rainfall level is tending to decrease in Lao PDR and so the water levels of the ponds will require attention.

Important Assumptions from the Project Purpose to Overall Goal are that the "Necessary budget is secured" and the "Socio-economic situation of rural areas is not changed largely". For the former, although the budget of Lao PDR is still severe, the budget for the aquaculture sub-sector, whose proportion in the agriculture sector is relatively low at present, is expected to increase according to the outcomes of the Project. For the latter, the possibility of dynamic change rural economic conditions such as dependence on agriculture is very low, as the target 4 provinces include the poorest districts identified by NGPES.

The Important Assumption of the Overall Goal is "The policy of agriculture and rural development is not changed drastically" and "The price of cultured fish has not been detrimentally affected". For the former, this assumption will be satisfied considering the "Vision 2020" for the agriculture sector indicating the continuous importance of this sector. For the latter, the price of fish becoming relatively expensive reflects the high demand for fish at this period of price growth in Lao PDR. Therefore it is unlikely that the price of fish would decline.

5.7 Pre-condition

The pre-condition that the "Security of the pilot sites is confirmed." The political situation is still unstable in parts of Laos, where JICA experts are not allowed to enter. However, since the security issue is an important criterion for selecting the two target provinces, the Pre-condition should be satisfied. However, it is of importance to confirm the security of target areas at the start of the Project based on the information obtained by the JICA Lao Office.

6. Ex-ante evaluation

The Project is justified by the following ex-ante evaluation.

6.1 Relevance

(1) There is a fundamental need to increase fish production in Lao PDR considering the per capita fish supply of about 14 kg/year, the lowest in the Indochina region. In rural areas, small-scale farmers culture fish mainly for self consumption. This implies a basic need for low-cost aquaculture development in rural areas.

(2) The Project is formulated basically to comply with the NGPES as well as the policy of food security of the nation. Because of the high expectations placed on aquaculture as a quick tool for poverty eradication, the Project has been given top priority among the 11 development projects in the agriculture sector by the NGPES.

(3) The GOJ has identified four priority sectors for cooperation to Lao PDR, namely i) human resource development, ii) Basic Human Needs, iii) agriculture and iv) infrastructure. The components of the Project match well with the above i), ii) and iii).

6.2 Effectiveness

(1) The Project employs a step-by-step approach to achieve its purpose in the 5-year cooperation period. This approach is considered effective for rural areas of Lao PDR where successful scenarios are expected. Although expansion speed may be a little slow at the beginning, it will be accelerated largely in the mid-final stage of the Project in terms of on-site extension.

(2) The DLF as the implementing organization of the Project has accumulated fruitful experience in the management of similar aquaculture development projects such as AQIP-1, the PADP of FAO/UNDP and the AOP of AIT. This experience will contribute to the effectiveness of the Project.

(3) The Japan Overseas Cooperation Volunteer (hereafter referred to as "JOCV") will assign aquaculture volunteers to work for the PAFOs of Oudomxay and Saravan Provinces. The Project will supplement the activities and share the information with the JOCV volunteers for enhanced cooperation. Thus the effectiveness will be promoted.

6.3 Efficiency

(1) The Project efficiency will be high, because it can use the NADC facilities established by AQIP-1 as well as resource persons capacity-built by AQIP-1 and other aquaculture projects.

(2) Because of the nature of aquaculture having seasonality in the fish production cycle, the timing

of the project input is sometimes crucial. Both the Lao and Japanese sides understand the importance of the starting timing of the Project.

(3) Because the GOL promotes decentralization, the communication from MAF to PAFO and DAFO is, strictly speaking, not a form of work instruction but a request or favor. Therefore, close communication between the central office and local offices is essential in this Project in which the headquarters is placed at the central government but the target is the aquaculture extension in local areas. From this aspect, the Director of Planning-Cooperation Division of DLF is going to be involved in the Project as the project coordinator, the same grade of project managers, which will improve the efficiency.

6.4 Impact

(1) The Project will develop the capacity of not only local government staff but also core farmers and ordinary farmers through various extension activities. In such direct involvement of farmers in the Project, the positive impact on aquaculture extension will be strengthened in the villages of core farmers as well as in the vicinity. In addition, farmers will be motivated to apply appropriate technologies when they visit the demonstration sites. Those participatory extension channels will contribute to the achievement of the Overall Goal.

(2) In rural areas, women often carry out routine tasks in aquaculture such as feeding. Some group work has been partly initiated by AQIP-1. The Project will actively support women's activities to obtain a positive impact on gender development in the target areas.

6.5 Sustainability

(1) Although it would be difficult to secure full sustainability of the Project in Lao PDR, which suffers severe deficit of government budget, the Project is designed to apply various means to mitigate the constraint.

(2) At the provincial level, past results of budgeting for the livestock and fisheries sector were used as a criterion for target province selection, so that the financial problem is relatively low.

(3) A farmer-to-farmer extension approach taken by the Project is considered effective for development of a grassroots extension mechanism with minimum input from the government. Strengthening this approach during the Project period will enhance the sustainability of the Project.

(4) The aquaculture methods to be improved and applied in the Project are clearly directed to low-input or semi-intensive methods for the purpose of home consumption and income generation of small-scale farmers who have to adjust their living to the local conditions. This technical approach involves due consideration of the practical methods of integrated farming

development in rural areas. It is therefore reasonable for farmers to accept the methods and to continuously apply them as their alternative livelihoods.

(5) The Project itself involves the activities to facilitate development of the ownership of the Project. Those are activities especially of Output-4, namely assistance for preparation of provincial aquaculture development programs and making an action plan after the cooperation period. The ownership of the Project has already been developed through the joint work in this preparatory study.

(6) Practical extension works of MAF is going to be integrated into a crosscut organization namely NAFES at the central level, although the DLF, with good collaboration of NAFES, is currently responsible for supervision of all the extension works in the field of livestock and fisheries including aquaculture. At present, MAF is holding intensive meetings regarding organizational reform especially on the relevant organization about extension services. Therefore it is important to monitor the progress of the meetings. Any how, the extension channel will not be changed drastically at provincial and district levels.

7. Monitoring and Evaluation

1) Monitoring

The progress of individual project activities is monitored by the "Managerial and Technical Meeting" as shown in Section 4.3.2 of this document. The outcomes to be monitored have been preliminary determined as shown in Annex 6 for each detailed activity. They are finalized after the commencement of the Project through detailed discussion in that meeting. The Indicators for each Output will be monitored by the Project. The practical monitoring formation of the Project will be clarified through discussion on individual detailed activities, which will be made after the commencement of the Project.

2) Evaluation

The annual achievements of the Project are to be reported to the JCC and evaluated jointly by the Lao and Japan sides, and then they will give feedback for the plan of the next year. In particular, the JICA headquarters will send evaluation missions at the mid-term of the Project and about half a year before completion of the Project, so that milestone evaluation will be performed in order to improve the project activities.

Annex 1: Sub-tables and Sub-figures.

Sub-table 1 Area of Water Bodies in Lao PDR

Unit: ha

Name of province	Mekong River and its branch	Reservoir	Irrigation cannel	Lake	Rice field where can do fishing	Rice cum fish	Fish pond	Small channel	Total
Phongsali	-	0	103	500	650	45	50	60	1,408
Loangnamtha	○	0	381	1,390	8,750	15	200	35	10,771
Oudomxai	○	0	250	1,950	8,500	35	932	20	11,687
Bokeo	○	0	180	12,750	7,000	10	80	140	20,160
Luangphrabang	○	2,000	120	1,000	9,000	170	947	100	13,337
Huaphan	-	0	123	790	7,996	867	842	150	10,768
Xaignaburi	○	50	730	2,900	30,000	35	195	465	34,375
Vientiane Mun.	○	1,600	1,500	8,700	51,155	150	2,388	2,600	68,093
Xiankhouang	-	0	283	810	28,000	1,450	1,137	130	31,810
Vientiane	○	57,025	1,453	1,665	41,655	200	1,537	1,800	105,335
Borikhamxai	○	1,050	1,233	15,850	25,055	40	150	3,271	46,649
Khammouan	○	6,770	1,500	8,250	56,155	50	100	400	73,225
Savannakhet	○	2,060	3,500	12,150	101,155	150	1,425	1,200	121,640
Xaisomboun	-	0	270	101	450	30	20	520	1,391
Saravan	-	3,700	800	1,150	40,000	50	400	500	46,600
Xekong	-	0	100	4,470	5,500	10	50	393	10,523
Champasak	○	3,763	841	11,660	51,155	40	1,287	1,000	69,746
Attapu	-	0	100	9,600	5,000	8	70	150	14,928
Total	254,150	-	-	-	-	-	-	-	254,150
	254,150	78,018	13,467	95,686	477,176	3,355	11,810	12,934	946,596

Source: PAFO, 18 provinces, 2001

Sub-table 2. Monthly Temperature in Lao PDR by Province

Unit: ℃

Name of provinces		Phongsali	Loangnamtha	Oudomx ai	Bokeo	Luangphrabang	Huaphan	Xaignaburi	Vientiane Mun.	Xiankhouang	Vientiane	Borikhamx ai	Khammouan	Savannakhet	Saravan	Xekong	Champasak	Attapu
Jan	Max .	18.5	25.8	24.8	26.4	28.9	20.7	28.5	29.3	23.7	29.5	29.5	29.8	28.3	37	32	32	36
	Min.	11.4	13.4	12.1	15.5	15	10.7	14.6	18	9.8	15.7	16.6	16.2	15.3	14.2	16.8	20.1	17.7
Feb	Max .	22.6	29.3	29.4	30.4	33.1	23.7	31.5	31.5	23.9	32	31.8	31.7	31.1	36.5	34	34.4	37.1
	Min.	13.9	13.3	13.3	16.7	16.9	11.2	15.2	19.3	7.3	16.4	18.2	18	16.4	14	16.5	21	18.2
Mar	Max .	26.7	30.6	32.2	32.4	36.2	28.8	35.3	34.7	28.1	34.8	34.7	35.1	36.2	38.4	36.5	35.1	37.1
	Min.	17.5	15.7	14.1	19	17.4	12.8	16.9	22.2	11.6	19.8	21.1	21.6	23.8	18	21.9	25.5	20.8
Apr	Max .	26.7	33.9	31.2	34.5	35.4	28.9	32.7	32.8	27.6	32.9	32.1	34	34.3	39.5	35	34.1	37.8
	Min.	18.3	17.1	20.8	17.8	23.1	17.8	22.9	24.4	16.4	23.8	23.7	23.1	24.3	20.2	23	25.1	23.4
May	Max .	23.6	31.1	28.8	30.8	32.8	27	30.8	30.8	25.7	31	29.7	31	31.8	38.5	31.6	31.7	36.4
	Min.	17.4	21.6	21.4	22.9	22.8	18.7	23.4	24.2	18.4	23.6	23.2	23.3	24.5	20.2	23.8	24.7	21
Jun	Max .	25.4	31.2	29.5	30.6	32.8	29.3	30.7	31.6	26.5	31.4	30.5	32.1	32.7	34	30.9	31.4	34.7
	Min.	19.1	22.2	22.8	24.4	23.6	20.8	24	25	19.6	24.4	24.3	24	25.6	20	23.9	24.7	22.9
Jul	Max .	25.2	29.3	29.9	28.4	33.3	29.4	31.6	32.1	26.2	32.1	31.9	31.5	31.7	30.4	29.5	30.5	33.6
	Min.	19.1	23.2	23.3	23.9	24.2	20.9	24.4	25.1	19.1	24.8	23.8	24.7	25.4	22.5	23.6	24.8	22.6
Aug	Max .	24.8	30.2	28.3	29.1	30.9	28.4	29.7	30.7	26.5	30.7	30.4	31	31.8	33.5	31.1	31.1	34
	Min.	18.6	22.2	22.4	23.4	23.6	20.4	23.6	24.3	19.2	24.2	23.9	24.1	25.4	23	23.3	24.7	23.2
Sep	Max .	25.2	31	29.8	29.9	32.1	27.9	30.1	30.7	25.9	31.1	30.8	31.5	31.2	33.4	31.2	31.1	33.9
	Min.	17.7	21.4	21.7	22.8	22.9	18.8	23.4	23.6	16.9	23.9	23.8	23.4	24.3	22.5	23.2	24.2	22.5
Oct	Max .	23.4	30	28.1	29.9	31.7	24.6	29.3	31	24.9	31.2	31.1	31.5	31.7	34.5	32.1	31.8	34.3
	Min.	17	19.8	19.8	20.7	22.8	17.6	21.7	23	16.3	22.9	22.8	22	23.2	21	22.3	23.4	21.3
Nov	Max .	20.5	27.1	26.1	27.6	29.7	22.6	28.7	30.4	23.5	30.6	29.5	30	30.2	39	30.9	30.7	32.8
	Min.	13.7	17.3	16	18.3	19.3	15.5	18.8	21.3	9.5	20.4	20.5	19.3	19.6	14.4	20.3	22.1	20.6
Dec	Max .	15.7	26.3	21.4	28	23.9	15	23.7	25.5	22.8	26.7	25.9	25.6	25.4	34.5	28	27.6	33.3
	Min.	8.3	16	8.3	17.2	12.2	4.5	11.8	15.2	9.4	13.5	14.4	13.6	14.6	11	15.1	17.8	13.5

Source: AQIP-1 Provincial Aquaculture Prof ile

Sub-table 3 Number of Households Operating Aquaculture by Province

Province	Total number of farmer's house holds	Number of farmers operating fish culture	Number of fish farmers by culture type			Total Area (ha)
			Pond culture	Rice-cum-fish culture	Other types	
Vientiane Mun	48,600	3,500	3,300	300	200	547
Phongsali	24,400	1,500	1,400	100		144
Loangnamtha	19,800	1,700	1,600	100	100	232
Oudomxai	33,400	2,900	2,800	20	400	348
Bokeo	18,800	2,200	2,200		200	168
Luangphrabang	55,700	3,200	3,000	200		288
Huaphan	36,900	12,400	11,700	1,700	1,700	877
Xaignaburi	49,400	4,600	4,400	300	200	402
Xiankhouang	28,100	7,100	6,700	2,100	300	837
Vientiane	43,700	4,000	3,600	400	300	719
Borikhamxai	26,500	600	400		200	75
Khammouan	43,600	500	400		100	86
Savannakhet	95,400	5,300	4,700	600	700	646
Saravan	41,300	1,900	1,800	100		210
Xekong	9,700	700	700		100	62
Champasak	70,200	2,100	1,900	200	100	596
Attapu	14,800	400	300	100	100	33
Xaisomboun	7,600	600	600	100	100	126
Total	667,900	55,200	51,500	6,320	4,800	6,396

Source: Lao Agriculture Census 1999.

Sub-table 4 List of Fishes Cultured in Lao PDR

Lao Name	Scientif ic Name	Description
Ex otic Fish Species		
1. pa nai	*Cyprinus carpio*	· Very popular cultured f ish f or both seed production and grow out through out the country.
2. pa nin	*Oreochromis niloticus*	· Very popular cultured f ish f or both seed production and grow out through out the country.
3. pa kingna	*Ctenopharyngodon idella*	· Seed production has been conducted only by Khang Pho station in Xiangkhouang province at present. · Mainly seeds are bought f rom Vietnamese trader in Houaphan Province. · Popular cultured f ish f or grow out in Xiangkhouang and Houaphan Province
4. pa ketlep	*Hypophthalmichthys molitrix*	· Mainly seeds are bought f rom Vietnamese and Thai traders. · Not so popular f ish f or culture in Lao PDR.
5. pa india	*Cirrhina mrigala*	· Seed production has been conducted by provincial station.
	Labeo rohita	· Seeds are bought f rom Vietnam in Houaphan Province.
6. pa douk	*Clarias gariepinus*	· Very popular cultured f ish through out the country . · Seed production has been conducted by some provincial station and private f arm. · Seeds are bought f rom Thai trader in Pakse, Champasak
7. pa wee	*Piaractus brachypomum* (*Colossoma brachypomum*)	· Recently introduced f rom China. · Seed production and grow out has been conducted by Chinese f arm in northern rgion and Vientiane City.
Indigenous Fish Species		
1. pa pak	*Barbodes gonionotus* and Barbodes spp.	· Very popular f ish f or both seed production and grow out through out the country.
2. pa phia	*Morulius chrysophekadion*	· *Seed production trial has been operated at Namhoum station in Vientiane City* · Grow out trial was not done.
3. pa keng	*Cirrhinus molitorella*	· *Seed production trial has been operated at Naluang station in Louang Phrabang Province.* · Grow out trial was not done.
4. pa phone	*Cirrhinus microlepis*	· *Seed production trial has been operated at KM8 station in Champasak Province.* · Grow out trial was not done.
5. pa eun	*Probarbus labeamajor*	· Seed production trial has been operated at KM8 station in Champasak Province. · Grow out trial was not done.
6. pa men	Osphronemus ex don	· Seed production and grow out trial has been operated at Namhoum station in Vientiane City.
7. pa beuk	Pangasianodon gigas	· Grow out trial has been conducted by f armers in Houay Xai District, Bokeo Probince. · Natural seeds were bought f rom f ishermen. · Seed production trial was not done.
8. pasouay	*Pangasius* spp.	· Seeds are produced constantly at Tangon f arm in Vientiane City · Fish culture was operated by f armers in Vientiane City .
9. pa douk	*Clarias batrachus*	· Seeds are produced constantly at Tangon f arm in Vientiane City · Fish culture was operated by f armers in Vientiane City .

Source: NADC, AQIP-1, 2003

Sub-table 5. Number of Seed Production Facilities and Amount of Seed Production by Province.

Province		Number of stations		Number of Fish Seeds (Mill.seeds)
		Government	Private f arm	
Northern		9	3	34.52
	Phongsali	1		
	Loangnamtha	1		0.52
	Oudomx ai	1		4.15
	Bokeo	2	1	5.55
	Luangphrabang	1	2	14.8
	Huaphan	2		5.3
	Xaignaburi	1		4.2
Central		17	7	44.4
	Vientiane Mun.	6	5	16.5
	Xiankhouang	3		7
	Vientiane	2	2	10.9
	Borikhamx ai	1		
	Khammouan	2		4.3
	Savannakhet	2		5.7
	Xaisomboun	1		
Southern		6	3	20.88
	Saravan	2		1.5
	Xekong	1		1.83
	Champasak	2	3	17.55
	Attapu	1		
Grand Total		32	13	99.8

Source: DLF (2002)

Sub-table 6. Estimated Seed Demand of Lao PDR by Provicne

Assumptions:

	Rice-cum- f ish culture	Fish pond	Small channel
Productivity (kg/ha)	100	1020	573
Harvest siz e (gm)	300	300	300
Survival rate (%)	50	20	10

Estimates: Unit: individuals

No	Name of province	Rice-cum- f ish culture	Fish pond	Small channel	Total
1	Phongsali	46,000	850,000	1,146,000	2,042,000
2	Loangnamtha	15,000	3,400,000	669,000	4,084,000
3	Oudomx ai	36,000	15,844,000	382,000	16,262,000
4	Bokeo	10,000	1,360,000	2,674,000	4,044,000
5	Luangphrabang	173,000	16,099,000	1,910,000	18,182,000
6	Huaphan	884,000	14,314,000	2,865,000	18,063,000
7	Xaignaburi	36,000	3,315,000	8,882,000	12,233,000
8	Vientiane Mun	153,000	40,596,000	49,660,000	90,409,000
9	Xiankhouang	1,479,000	19,329,000	2,483,000	23,291,000
10	Vientiane	204,000	26,129,000	34,380,000	60,713,000
11	Borikhamx ai	41,000	2,550,000	62,476,000	65,067,000
12	Khammouan	51,000	1,700,000	7,640,000	9,391,000
13	Savannakhet	153,000	24,225,000	22,920,000	47,298,000
14	Xaisomboun	31,000	340,000	9,932,000	10,303,000
15	Saravan	51,000	6,800,000	9,550,000	16,401,000
16	Xekong	10,000	850,000	7,506,000	8,366,000
17	Champasak	41,000	21,879,000	19,100,000	41,020,000
18	Attapu	8,000	1,190,000	2,865,000	4,063,000
Total		3,422,000	200,770,000	247,039,000	451,231,000

Source: AQIP-1, December 2003

Sub-table 7. Market Price of Fishes in 2003.

Name of commodity	Average (Kip/kg)	Min (Kip/kg)	Max (Kip/kg)
Alive common carp (cultured)	15,377	11,000	22,500
Alive common carp (natural)	13,609	8,000	18,000
Dead common carp (cultured)	12,776	8,000	16,500
Dead common carp (natural)	13,424	8,000	18,667
Alive Tilapia (cultured)	14,483	9,000	19,000
Alive Tilapia (natural)	11,109	9,000	15,000
Dead Tilapia (cultured)	12,371	7,000	18,000
Dead Tilapia (natural)	12,179	7,000	85,000
Puntius (cultured)	12,757	8,000	59,667
Puntius (natural)	12,715	9,000	18,000
Grass carp	13,766	10,000	18,000
Bighead carp	11,985	9,000	15,000
Silver carp	12,612	7,000	66,667
Rohu	13,637	9,000	15,500
Mrigal	12,365	9,000	15,500
Alive catf ish (cultured)	13,214	8,000	25,000
Alive catf ish (natural)	25,201	12,000	40,000
Dead catf ish (cultured)	10,452	6,000	59,667
Dead catf ish (natural)	17,242	7,000	25,000

Source: AQIP-1, Market Survey

Sub-table 8 Percentage of Available Markets in Villages by Province

	Permanent market (% villages)	Periodical (% villages)
Lao PDR	**9**	**5**
Urban	33	4
Rural	4	5
North	**6**	**6**
Phongsali	4	6
Loangnamtha	9	
Oudomx ai	0	
Bokeo	9	20
Luangphrabang	2	
Huaphan	15	18
Xaignaburi	8	6
Center	**12**	**4**
Vientiane Mun.	14	
Xiankhouang	9	7
Vientiane	11	2
Borikhamx ai	18	12
Khammouan	14	
Savannakhet	7	4
Xaisomboun	27	17
South	**6**	**5**
Saravan	5	3
Xekong	7	
Champasak	5	7
Attapu	17	

Source: LECS-II, 1999

Sub-table 9. Basic Demographic and Agriculture Activity Data of 47 Identified Poorest Districts in Lao PDR

No	Name of province/district	Area (square ha)	% Forestry 97	Agriculture area					Population 2000 (people)	No; of poverty people	% Poverty people	Average rice for consumption/kg/person	% Animal feeding family	No; of animal/family	No; of land for agriculture 1ha/p	No; of p/area/1 ha	Risk of UXO	Name of target area	Opium land	Agriculture and Forestry staff (p)					
				Total	Wet season rice field	Dry season rice field	Plantation	Other plant												Total	Agriculture	Livestock	Forestry	Irrigation	Others
	Phongsali province																		3,278						
1	Gnot-Ou district	305,420	26%	2,636	1,668	2	523	2,532	32,817	25,919	79%	231	97%	2.86	11	9.31	2.3	Lantui z one		8	1	1	2	0	
2	Samphan district	244,940	35%	3,504	35	4	3,285	3,484	19,428	18,696	96%	188	93%	2.69	8	12.61	2.0			4	1	2	0	0	
	Louangnamtha province																		1,681						
3	Long district	166,170	33%	3,862	963	5	2,569	3,676	29,583	11,070	37%	382	88%	2.50	6	5.62	2.3	V.Kang group		16	5	5	2	1	
4	Viangphukha district	140,240	40%	2,650	728	51	1,844	2,587	13,200	11,916	90%	393	54%	2.01	7	10.62	2.3	V.Nam-Oh group		12	2	1	3	3	
5	Nale district	175,670	11%	4,217	153	11	3,953	4,130	24,710	19,699	80%	338	62%	2.48	6	7.11	1.0	V.Om group		16	4	4	3	1	
	Bokeo province																		427						
6	Meung district	124,830	34%	607	401	9	148	561	3,764	923	25%	332	75%	2.42	10	33.16	2.0	D. Meung		7	2	2	1	0	
7	Pha-Oudom district	198,680	12%	3,152	958	18	2,037	3,018	32,219	20,282	63%	221	62%	2.53	10	6.17	3.0	Pha-Oudom		11	2	4	5	0	
8	Nam-gnu z one			429	40	1	390	429				254	46%	2.72	7		2.0			6		1	3	0	
	Oudomxai province																		3,113						
9	Namo district	139,990	23%	5,667	1,315	49	3,628	978	36,229	33,494	92%	316	92%	3.02	6	3.86	1.0			11	1	1	3	3	
10	Nga district	154,260	6%	3,588	1,104	143	2,011	3,353	15,757	10,502	67%	248	66%	3.30	7	9.79	2.3			7	0	2	2	2	
11	Beng district	147,750	9%	8,733	1,508	97	3,599	5,113	26,196	19,018	73%	349	107%	3.08	3	5.64		Na-hom		14	3	3	4	3	
12	Houn district	248,500	6%	16,670	1,703	247	6,982	9,447	60,153	48,393	80%	256	64%	3.08	4	4.13	2.3	Nam-kha		13	1	3	3	3	
13	Pakbeng district	121,450	7%	2,842	321	101	2,358	2,755	29,126	18,480	63%	170	68%	2.75	9	4.17	1.0			5	1	1	0	1	
	Louangprabang province																		2,950						
14	Pakx eng district	129,690	3%	4,708	-	-	4,044	4,476	29,409	23,065	78%	172	45%	2.63	6	4.41		Pakx eng area		10	4	4	2	0	
15	Phonx ai district	315,780	19%	6,968	136	6	3,019	3,983	10,556	9,404	89%	149	70%	3.13	4	29.91		Nam-pa area		13	3	4	3	1	
16	Viangkham district	402,790	15%	8,093	319	-	4,966	6,159	38,074	24,638	65%	170	59%	2.20	5	10.58		D.Phonthong-kao		17	3	3	5	1	
17	Phoukhoun district	79,200	9%	4,679	201	7	2,626	3,981	-	-	-	201	71%	3.23	4		1.0	Phukhoun area		11	4	2	3	1	
	Xaiyabouri province																		729						
18	Xaiy abouri district	420,510	27%	10,650	3,204	189	4,162	7,624	43,209	13,792	32%	221	64%	3.12	7	9.73	3.0			40	5	9	20	2	
19	Xianghon district	104,510	19%	5,620	2,930	553	2,435	5,660	29,459	18,085	61%	446	76%	3.60	5	3.55	2.3	Phulan		25	4	5	9	4	
	Houaphan province																		2,903						
20	Xiangkho district	298,230	25%	4,185	876	200	1,932	3,771	92,575	75,578	82%	221	71%	3.19	7	3.22	2.3			10	2	1	3	0	
21	Viangthong district	329,930	26%	2,966	1,038	172	1,545	2,730	10,726	10,134	94%	250	78%	3.41	9	30.76	2.3			10	1	1	2	2	
22	Viangx ai district	203,650	30%	5,202	2,117	15	1,682	4,727	32,390	24,675	76%	288	103%	3.22	7	6.29	1.0	Nongkhan area		15	3	2	3	2	
23	Houamuang district	155,840	19%	3,926	586	-	2,417	3,471	26,326	20,305	77%	242	93%	3.73	7	5.92				9	1	3	4	1	
24	Xam-tai district	384,440	26%	9,889	1,396	151	4,988	7,843	45,492	40,051	88%	257	84%	3.07	6	8.45	3.0			12	3	2	2	1	
	Xiangkhouang province																		1,427						
25	Nonghet district	206,870	5%	10,570	157	-	6,503	10,074	40,712	15,784	39%	209	87%	4.74	4	5.08	1.0			10	2	3	2	1	
26	Khoun district			4,862	2,607	-	1,493	4,255				317	130%	3.72	7					11	4	1	3	1	
	S.R. Xaisomboun																		521						

No	Name of province/district	Area (square ha)	% Forestry 97	Agriculture area					Population 2000 (people)	No; of poverty people	% Poverty people	Average rice for consumption/kg/person	% Animal feeding family	No; of animal/family	No; of land for agriculture 1ha/p	No; of p/area/1 ha	Risk of UXO	Name of target area	Opium land	Agriculture and Forestry staff (p)					
				Total	Wet season rice field	Dry season rice field	Plantation	Other plant												Total	Agriculture	Livestock	Forestry	Irrigation	Others
27	Xaisomboun district	174,540	37%	1,685	1,162	14	194	1,488	13,896	8,293	60%	157	144%	5.93	9	12.56	1.0	D.On		17	3	3	6	3	
28	Thathom district	155,810	71%	1,584	982	83	377	1,422	8,588	6,420	75%	221	88%	3.70	7	18.14	1.0	Thaviang		17	4	3	6	3	
	Vientiane province																		117						
29	Hom district	83,450	44%	1,139	540	3	192	745	26,743	13,238	50%	155	136%	4.40	7	3.12	2.0	Bonahan		10	3	1	2	2	
	Vientiane Municipality																								
30	Sangthong district			5,620	2,856	147	1,744	4,471				457	82%	4.37	4			Khokphuang z one		16	4	3	4	1	
	Borikhamxai province																		105						
31	Borikhan district	191,720	66%	4,022	2,274	94	1,022	3,380	24,841	5,309	21%	298	65%	3.51	6	7.72	1.0	Nameuang		23	4	4	9	3	
32	Khamkheut district	571,550	57%	10,133	5,396	640	2,340	8,209	36,296	19,404	53%	336	87%	4.77	6	15.75	3.0	Gnotnam		39	5	7	10	7	
33	Viangthong district	356,740	55%	2,843	798	71	1,544	2,476	23,765	10,697	45%	257	70%	3.27	6	15.01	3.0	Nax uang		16	3	3	8	1	
	Khammouan province																								
34	Boualapha district	381,850	55%	2,616	1,275	57	478	1,759	14,702	9,884	67%	202	96%	4.07	9	25.97	1.0	Nongping		30	7	5	16	1	
35	Nakay district	357,460	82%	2,410	2,180	12	11	2,200	-	-	-	297	115%	2.71	8		1.0			25	3	3	11	3	
	Savannakhet province																								
36	Phin district	296,810	70%	5,285	5,138	326	936	4,498	-	-	-	334	120%	4.28	10		3.1	Huoy hoy		50	8	5	25	1	1
37	Xepon district	236,180	29%	5,577	1,303	380	5,226	4,876	29,794	22,200	75%	167	68%	4.84	8	7.93	3.1	Tajialako		41	5	6	17	3	1
38	Nong district	135,580	24%	1,762	531	34	2,723	1,561	-	-	-	94	60%	4.30	11		1.0	Asing-palo		15	4	2	3	1	
39	Vilabouri district	155,420	46%	3,960	2,791	83	1,447	3,233	70,612	45,142	64%	319	133%	3.41	8	2.20	1.0	Namjalo		19	4	4	7	1	
	Saravan province																								
	Ta-Oy																								
40	Samouay district	37,830	28%	2,095	758	252	970	1,592	8,480	6,253	74%	495	90%	3.36	4	4.46	3.1	Asok		12		2	2		
	Champasak province																								
41	Bachiang district	94,130	41%	12,088	2,001	110	2,545	4,862	40,548	21,223	52%	195	76%	3.12	3	2.32				26	6	4	11	0	
42	Soukhouma district			10,803	9,474	454	-	9,507				607	118%	3.75	4			V.Hiang		22	4	2	8	2	
	Xekong province																								
43	Karum district	318,140	73%	1,434	73	7	1,030	1,127	10,255	6,422	63%	151	56%	2.46	7	31.02	2.0	Karum		14	2	1	3	3	
44	Dakchung district	278,700	62%	2,879	681	6	1,249	2,057	17,630	11,561	66%	199	81%	3.52	6	15.81	1.0	Dakchung		13	3	3	3	1	
	Attapu province																								
45	Sanamx ai district	208,410	78%	4,441	4,042	331	7	4,058	6,854	6,002	88%	490	105%	4.67	6	30.41	2.0	Low land area		16	3	6	5	2	
46	Phouvong district	249,570	83%	1,314	619	36	554	1,178	15,831	11,199	71%	250	61%	3.64	7	15.76	2.0	High land area		16	3	3	6	1	

Source MAF, 2003

The source data does not include Ta-Oy District in Saravan Province.

Sub-table 10. Lists of Project Related to Aquaculture Development since 1977.

Cooperating Agency	Project Name	Duration
Interim Mekong Committee	Rehabilitation of Nong Teng Fish Farm	1977-1978
Interim Mekong Committee	Tha Ngon Pilot Fish Farm	1978-1988
Interim Mekong Committee	Aquaculture Training Center	1983-1984
FAO	Rehabilitation of f ish seed f arms and f ish culture development	1978-1982
FAO	Rehabilitation of f ish seed f arms and f ish culture development	1983-1989
FAO	Development of f ish culture ex tension	1993-1996
FAO	Provincial aquaculture development project (LAO/97/007)	1997-2000
FAO	Telef ood project	1997-1998
AIT	Outreach project in Savannakhet	1993-cont.
CARE	School Nutrition Pilot Project	1992-1995
ACIAR/IDRC	Indigenous f ishery development and management in Lao PDR	1996-1998
ACIAR	Small-scale wetland indigenous f isheries management in Lao PDR	1999-2001
IDRC	Indigenous f ishery development project	1990-1993
AusAID	Community activities scheme: providing small-scale support to backswamp f isheries development	1998-2002
Marine Resources Assessment Group	Reservoir f isheries management, Savannakhet province: comparative study on ef f ect of aquaculture and irrigation on f isheries	1995-1997
Imperial College, London	Impacts of irrigation and aquaculture development on small-scale aquatic resources	1998-2000
UNDP	Introduction of aquaculture to reduce opium cultivation	
GTZ	Food f or work program: pond construction	
EU	Micro credit: loans to f armers to dig ponds in Louangphrabang	
EU	Forest conservation and rural development support to f ish culture	1999-2004
World Concern	Hatchery construction in Louangnamtha	
Save Children	Credit f or pond culture in Saravan and Borikhamx ai	
Japanese government	Construction of Xekong aquaculture station	1999-2000

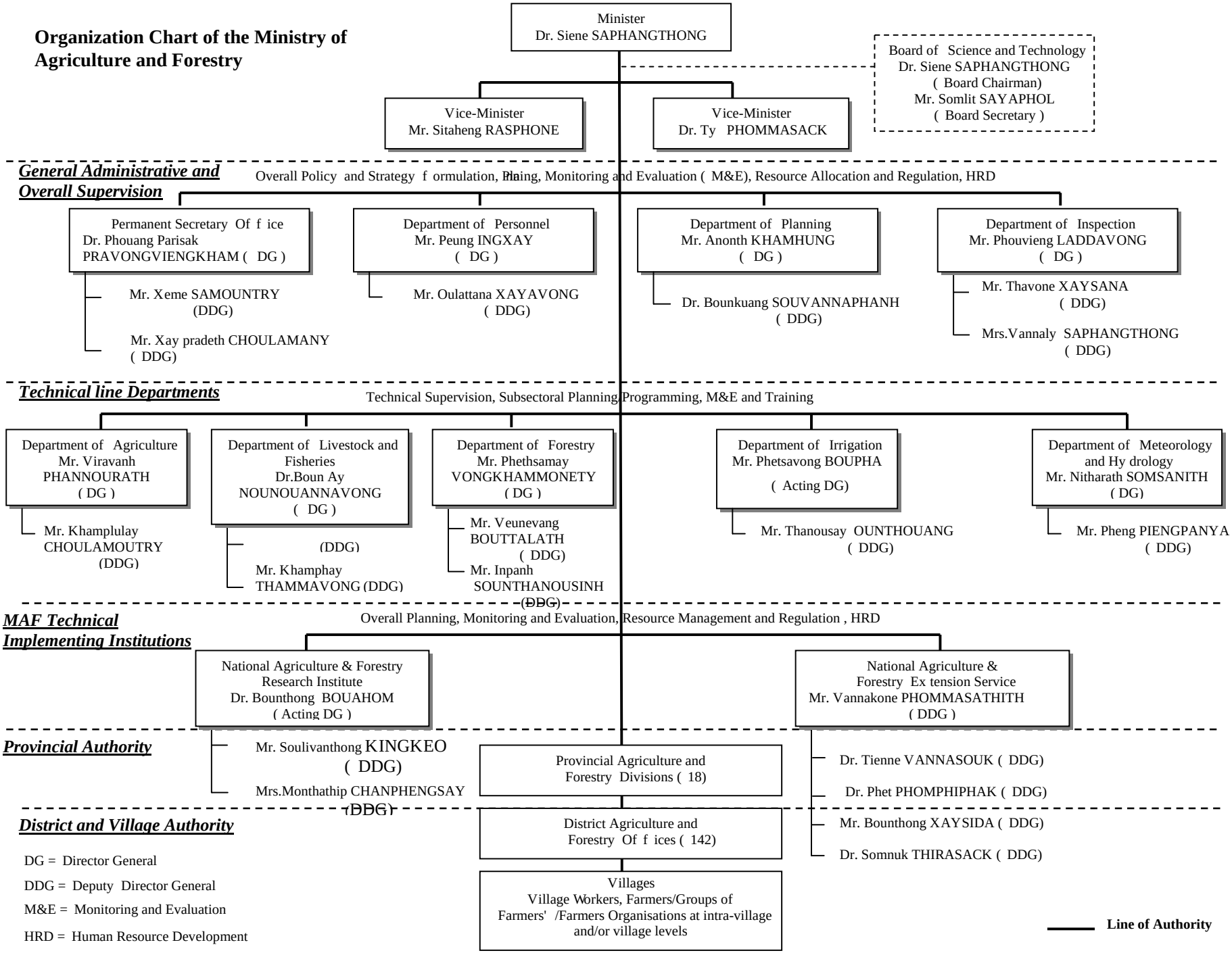
Source: LARReC Technical Report No. 0004, 2000 and others

Sub-table 11 Revenue and Cost of Agro Crops by Province in 1997/98: Unit: ' 000 Kip/household

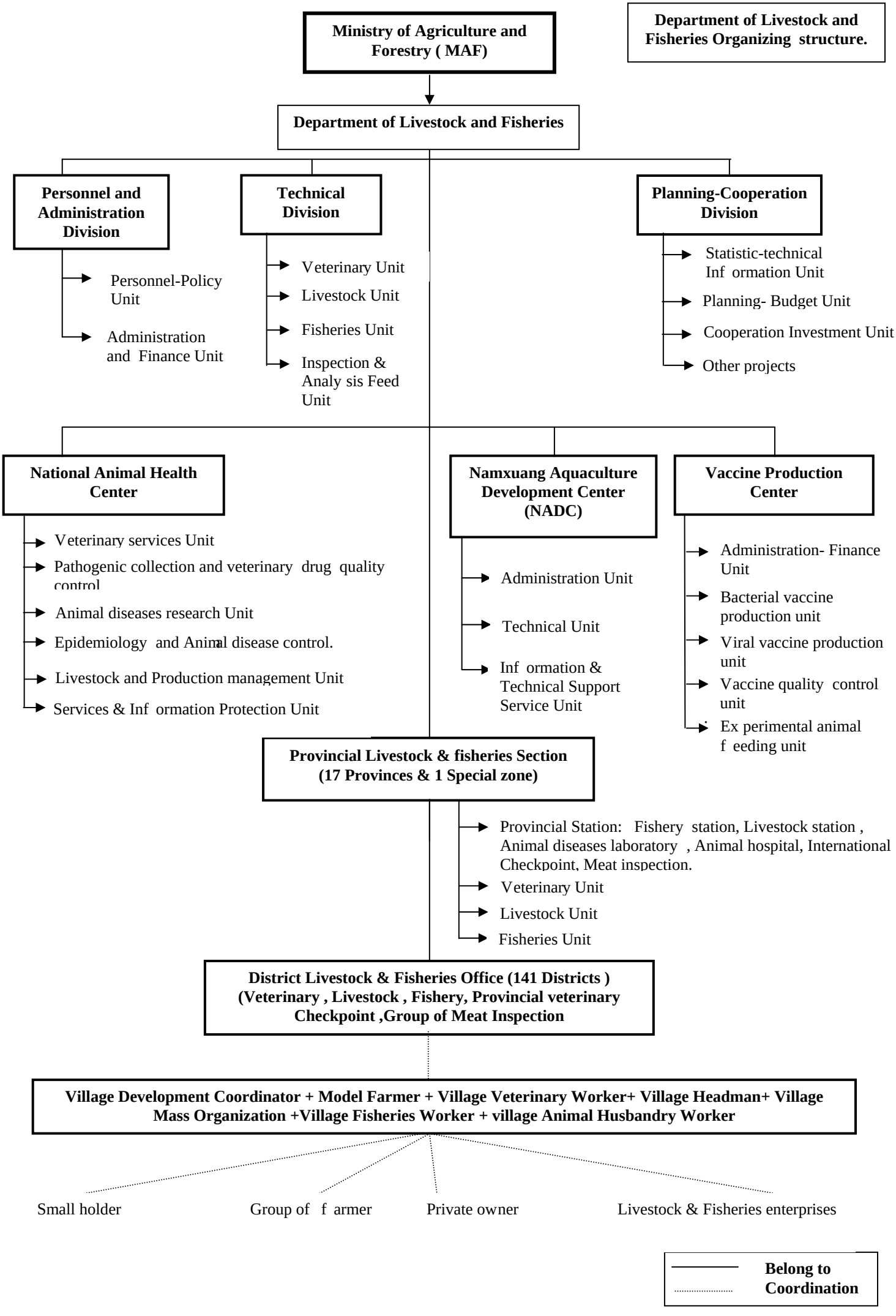
	Revenues f rom						Costs f or				Prof it
	Grain	Fruit, vegetable	Meat	Fish	Wood	Others	Seed f odder	Equip.	Wages	Others	
Lao PDR	**606**	**154**	**286**	**163**	**9**	**82**	**98**	**21**	**46**	**46**	**1089**
Urban	267	99	112	61	7	77	98	22	56	37	408
Rural	676	165	323	184	10	83	98	21	44	47	1230
North	**616**	**155**	**277**	**83**	**8**	**91**	**79**	**12**	**22**	**25**	**1093**
Phongsali	427	104	213	92	13	74	39	4	2	5	872
Loangnamtha	471	158	200	60	7	59	29	1	40	20	866
Oudomx ai	464	113	156	76	2	68	42	21	16	9	790
Bokeo	564	218	266	104	10	70	67	8	29	25	1104
Luangphrabang	504	147	237	70	9	114	43	9	7	18	1003
Huaphan	505	85	262	74	4	73	150	1	15	4	833
Xaignaburi	1119	247	487	109	9	124	141	28	48	71	1806
Center	**574**	**156**	**313**	**178**	**13**	**78**	**128**	**21**	**73**	**75**	**1015**
Vientiane Mun.	462	206	552	92	8	186	160	6	126	57	1157
Xiankhouang	670	166	399	162	14	49	336	2	4	20	1096
Vientiane P.	871	206	289	189	27	68	139	39	155	88	1229
Borikhamx ai	619	204	224	324	28	28	78	17	21	61	1250
Khammouan	394	116	212	235	25	37	74	44	28	21	852
Savannakhet	584	100	178	178	1	32	82	20	51	126	795
Xaisomboun	489	122	261	279	10	112	58	42	26	107	1039
South	**662**	**146**	**237**	**253**	**5**	**75**	**58**	**35**	**19**	**10**	**1257**
Saravan	1254	116	228	123	5	23	89	18	39	10	1593
Xekong	370	281	259	159	2	142	22	100	7	2	1083
Champasak	418	149	216	335	5	91	35	41	10	11	1116
Attapu	626	116	368	214	3	84	123	11	17	4	1255

Source: LECS-II, 1999

Organization Chart of the Ministry of Agriculture and Forestry



Department of Livestock and Fisheries Organizing structure.



Annex 3

Selection Criteria of Target Provinces and Focal Districts

The selection process of the 4 target provinces, 8 f ocal districts and 4 pilot districts is as f ollows:

1. Selection of 4 target provinces

(Oudomx ay , Xay abury , Savannakhet and Saravan)

The DLF has selected the 4 provinces as target areas of the Project based on the f ollowing criteria:

(1) Good security

(2) Ex istence of the NGPES 47 poorest districts

(3) Strong leadership on aquaculture ex tension conducted by PAFO

(4) Potential of aquaculture ex tension

(5) Ex istence of a state-run hatchery station, and

(6) Apportionable budget required f or aquaculture f ield of PAFO

Additional criteria used by thejoint preparatory study team are:

(7) Strategic location f or suf f icient ex pansion, and

(8) High dependence on f ish seeds f rom other countries

2. Selection of 8 f ocal districts

(Oudomx ay province: Xay and Beng, Xay abury province: Xay abury and Phian, Savannakhet province: Phine and Xepong, Saravan province: Saravan and Laongam)

The f ollowing criteria have been used f or the selection of the 8 f ocal districts (2 districts in each province).

(1) Degree of poverty in terms of NGPES designation (10 points)

(2) Security clearance (10 points)

(3) Accessibility f or ex tension activities (10 points)

(4) Potential of aquaculture development (10 points)

(5) Access to the state-run hatchery (10 points)

(6) Number of staf f f or aquaculture technical support services (10 points)

(7) Number of f isheries staf f (10 points)

(8) Conf ormity to the ty pe of aquaculture recommended (10 points)

(9) Ex perience of f isheries staf f (10 points)

(10) Strong leadership f or aquaculture development (10 points)

The result of the scoring according to the above criteria is shown in the f ollowing tables.

Table 1: Scoring result f or selection of f ocal districts, Oudomx ay province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Xay	C	A	A	B	A	A	A	A	C	A	**75**
Beng	A	A	A	C	C	A	A	A	B	A	**75**
Houn	A	B	A	B	C	B	B	B	B	A	50
Namo	A	B	A	B	C	C	C	C	C	A	40
Nga	A	C	A	B	C	C	C	C	C	B	30
Pakbeng	A	B	A	C	C	C	C	C	C	B	30
La	C	A	A	B	C	C	C	C	C	B	30

Note: A: 100%, B: 50%, C: 0%

The higher the total score is, the more suitable f or the f irst site the district is.

Table 2: Scoring result f or selection of f ocal districts, Xay abury province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Xayabury	A	A	A	A	C	B	A	B	A	A	80
Phian	C	A	A	A	A	B	B	A	A	A	80
Paklay	C	B	A	A	C	B	B	B	B	A	55
Kenthao	C	B	A	B	C	B	B	B	B	A	50
Kob	B	C	A	B	C	B	B	B	B	B	45
Xienhone	A	C	A	B	C	B	B	B	C	B	45
Honsa	B	C	A	B	C	B	B	B	C	B	40
Boten	C	B	A	B	C	C	C	C	C	A	30
Ngeun	B	C	A	B	C	C	C	C	C	B	25
Thonmix ay	B	C	A	B	C	C	C	C	C	B	25

Table 3: Scoring result f or selection of f ocal districts, Savannakhet province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Phine	A	A	A	A	C	B	C	A	B	A	**70**
Xepong	A	A	A	B	B	B	B	A	C	A	**70**
Virabury	A	A	A	B	C	B	B	B	B	B	55
Nong	A	B	A	C	C	C	B	B	B	B	45
Thepauthon g	B	B	A	B	C	B	B	B	A	A	45

Note: There ex ist 15 districts in Savannakhet and f ive districts belong to the 47 NGPES priority districts. This table compares only those f ive priority districts to select two f ocal districts among them.

Table 4: Scoring result f or selection of f ocal districts, Saravan province

Name of District	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Total
Laongam	C	A	A	C	A	A	A	A	C	A	**70**
Saravan	C	A	A	C	C	B	C	B	C	B	**45**
Vapy	C	A	A	C	C	B	C	B	C	B	35
Kongsedone	C	A	A	C	C	B	C	B	C	B	35
Lakhonpheng	C	B	A	C	C	B	C	B	C	A	35
Tumlane	B	A	A	C	C	B	C	C	C	B	35
Samouy	A	C	A	C	C	C	C	C	C	B	25
Taoy	B	C	A	C	C	C	C	C	C	B	20

3. Selection of 4 pilot districts

(Oudomx ay province: Xay district, Xay abury province: Phian district, Savannakhet province: Phine district, Saravan province: Laongam district)

The f ollowing criteria have been used f or the selection of the 4 pilot sites (1 district in each province).

Table 5: Rationale for the Selection of the First District

Criterion	Oudomxay		Xayabury		Savannakhet		Saravan	
	Xay	**Beng**	**Xayabury**	**Phian**	**Phine**	**Xepong**	**Saravan**	**Laongam**
Accessibility (10)	A	A	A	A	A	A	A	A
Potential of aquaculture (20)	B	C	A	A	B	C	C	C
Available resources capacitated by other projects (10)	A	A	A	A	A	B	B	B
Conf ormity to the ty pe of aqua-culture recommended (20)	A	A	B	A	A	A	B	A
Number of DLFU staf f (10)	A	A	B	B	A	A	B	A
Number of f isheries staf f (10)	A	A	A	B	C	B	C	A
Ex perience of f isheries staf f (10)	C	B	A	A	B	B	C	C
Fisheries ex tension activities (10)	B	B	B	B	B	B	B	B
Aquaculture development plan (10)	C	C	C	C	C	C	C	C
Total Score (120)	**75**	**70**	**80**	**85**	**70**	**60**	**35**	**60**

Note: For Oudomx ay province, Xay district and Beng district resulted in the same score of 85 points.

The joint preparatory study team has agreed to select Xay distr ict f or all the of f ices of DAFO, PAFO and provincial f isheries stations are located in Xay district, and theref ore collaborative ex tension activities can be more ef f ectively undertaken among them.

Annex 4: Expected members of Joint Coordinating Committee

Members	Main Role
Dr. Phouang Parisak PRAVONGVIENGKHAM, Permanent Secretary, MAF (Chairperson)	1. To set up and take the chair of JCC
	2. To take a responsibility for C/P budget and personnel assignment of the Project
	3. To approve and coordinate the annual plan of operation
	4. To approve the annual progress and monitoring report
	5. To coordinate effectively with other Ministries and donor
Mr. Xay pladeth CHOULAMANY Deputy Permanent Secretary, MAF (Vice Chairperson)	1. To assist the Chairperson
Dr. Boun Ay NOUNOUANNAVONGA cting, Director General of DLF (Project Director)	1. Overall responsibility for the administration and implementation of the Project as Project Director
	2. To coordinate the Project implementation with Program Managers
	3. To execute C/P budget
	4. To report the Project progress to MAF
	5. To finalize the annual progress and monitoring report and submit to the JCC
	6. To finalize the annual plan of operation and submit it to the JCC
	7. To provide office space and office facilities to the Project (DLF, NADC)
Mr. Chanthaboun SIRIMANOTHAM National Project Director of NADC (Project Manager)	1. Overall responsibility for the managerial and technical matters (mainly technology improvement and training in central level) of the Project as Project Manager
	2. To assist the Project Director
	3. To make the annual plan of operation
	4. To make the annual progress and monitoring report
Mr. Bounthong SAPHAKDY Head of Technical Division, DLF (Project Manager)	1. Overall responsibility for the managerial and technical matters (mainly extension and training in local level) of the Project as Project Manager
	2. To assist the Project Director
	3. To make the annual plan of operation
	4. To make the annual progress and monitoring report
Mr. Somphanh CHANPHENGXAY Head of Planning and Cooperation Division, DLF (Project Coordinator)	1. To coordinate for the Project with relevant organizations
	2. To assist the Project Director
	3. To Support the Project Managers
Representative of International Division, MAF	1. To coordinate, negotiate and mobilize for the Project
	2. To monitor JCC with proper action
	3. To provide appropriate bilateral aid procedures
Representative of Department of Planning, MAF	1. To allocate budget to contribute to the Project
	2. To supervise, monitor and evaluate the activities of the Project
Representative of NAFRI	1. To coordinate and assist the Project activities especially in the field of research
Representative of NAFES	1. To coordinate and assist the Project activities especially in the field of extension

Representative of NWGL	1. To coordinate and assist the Project activities especially in the issue of gender
5 Directors of PAFOs (Vientiane Capital, Oudomxay, Xayabury, Savannakhet and Saravan)	1. To allocate budget and personnel for local activities of the Project
	2. To support and coordinate local activities of the Project
	3. To finalize provincial aquaculture development program
	4. To monitor local activities of the Project in the province, and report the Project progress to Project Managers
Representative of Department of International Cooperation, MOFA	1. To make proper arrangement to obtain Government approval for commencing and implementation of the Project
	2. To monitor JCC with proper action
	3. To provide appropriate bilateral aid procedures
Japanese Experts of AQIP-2	1. To advise on the Project implementation
Program Coordinator of Rural Development Program, JICA	1. To advise on the Project implementation in line with the Rural Development
Representative of JICA Laos Office	1. To monitor JCC with proper action
	2. To provide appropriate bilateral aid procedures

MAF: Ministry of Agriculture and Forestry
DLF: Department of Livestock and Fisheries, MAF
NADC: Namxouang Aquaculture Development Center, DLF
NAFES: National Agriculture and Forestry Extension Service, MAF
NAFRI: National Agriculture and Forestry Research Institute, MAF
NWGL: Network of Women and Gender in Livestock and Fishery Development, DLF
PAFO: Province Agriculture and Forestry Office
MOFA: Ministry of Foreign Affaires
JICA: Japan International Cooperation Agency

Note: Official of the Embassy of Japan may attend the JCC as observer.
Other relevant personnel mutually agreed upon may attend the JCC as observer.

Annex 5 Tentative Project Design Matrix (PDM)
Project title: Aquaculture Improvement and Extension Project, Phase II (AQIP-2)
Duration: From 2005 to 2010 (5 years) **Implementing Agency: DLF, MAF**
Target group: Fish farmers who have experience of aquaculture, and relevant government personnel
Target areas: 4 provinces of Oudomxay, Xayabury, Savannakhet and Saravan

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
Overall Goal Standard of living of small-scale fish farmers is improved through the dissemination of aquaculture suitable for local conditions in the 4 target provinces.	1. Amount of production and house consumption of fish by fish farmers participating in the Project 2. Income generation from selling fish by fish farmers participating in the Project	1. Project impact survey report 2. Project impact survey report	・The policy of agriculture and rural development is not changed drastically . ・The price of cultured fish has not been detrimentally affected.
Project Purpose Aquaculture suitable for local conditions is expanded in the 4 target provinces	1. Number of fish farmers who apply improved aquaculture technologies in 4 target provinces	1. Project monitoring report 2. Project monitoring report	・Necessary budget is secured. ・Socio-economic situation of rural areas is not changed largely .
Output 1. Adequate aquaculture methods are verified according to the local conditions of pilot sites.	1-1 Amount of production and house consumption of fish by fish farmers participating in the Project. 1-2 Income generation from selling fish by fish farmers participating in the Project. 1-3 Number and availability of aquaculture techniques that are improved and developed at the farmers' level.	1-1 Project monitoring report 1-2 Project monitoring report 1-3 Technical reports	・Serious epidemic fish diseases are not elaborated. ・Extreme natural calamities such as drought and flood do not occur.
2. The capacity of relevant persons such as fish farmers, province/district extension staff and staff of PFSs in disseminating aquaculture technology and extension is improved.	2-1 Number of PFSs staff who can train province/district extension staff 2-2 Number of province/district extension staff who can train fish farmers 2-3 Number of core fish farmers who trained to expand their acquired knowledge on aquaculture	2-1 Placement tests 2-2 Placement tests 2-3 Records of farmer's training and monitoring	
3. Fish farmers of the focal districts introduce improved aquaculture methods.	3-1 Number of fish farmers who apply improved technologies	3-1 Project monitoring report	

	3-2 Amount of production and house consumption of fish by fish farmers who apply improved technologies 3-3 Income generation from selling fish by fish farmers who apply improved technologies	3-2 Project monitoring reports 3-3 Project monitoring reports	
4. The functions of relevant organizations and their collaboration framework are strengthened regarding the aquaculture extension matched with the local conditions.	4-1 Agreement of segregation of the duties of related organizations 4-2 Budgetary steps for implementation of the plan by the Lao side	4-1 Provincial aquaculture development program 4-2 Budget of DLF	
Activities 1-1 Determine villages as pilot sites (pilot sites: 4 local districts x 3 villages = 12 villages in total) 1-2 Establish operation and management plan of the pilot sites 1-3 Implement the pilot project 1-4 Improve and develop practical aquaculture techniques for farmers level by leadership of Namxouang Aquaculture Development Center (hereafter referred to as " NADC"), a central institution 2-1 Establish training programs and textconsidering aquaculture suitable for local conditions and extension 2-2 Train PFS staff , province/district extension staff and core fish farmers at NADC and PFSs 2-3 Implement practical training utilized the outputs of pilot projects for PFS staff , province/district extension staff and core fish farmers 3-1 Strengthen functions of PFSs for aquaculture extension activities, such as seed production, technical trainings etc. 3-2 Select villages and fish farmers to introduce outputs of pilot programs (expansion sites: 8 districts x 10 villages = 80 villages in total) 3-3 Make audio-visual extension texts for fish farmers 3-4 Hold seminars and on-farm trainings utilized the outputs of pilot projects for selected fish farmers 3-5 Provide extension services and monitoring of aquaculture activities for selected fish farmers of the expansion project 4-1 Collect and consolidate information on the aquaculture activities of target provinces 4-2 Prepare aquaculture development programs of the target provinces 4-3 Formulate an action plan of the Project after its cooperation period 4-4 Hold seminars on the action plan of the relevant organizations for further aquaculture extension	**Inputs** 〔Japan side〕 1. Experts 1) Chief advisor/Aquaculture technology 2) Extension/Training 3) Rural Development/Project coordinator 4)Other relevant experts (as per required) 2. Training of C/P in Japan or third countries 3. Provision of equipment 1) Vehicles for training and monitoring 2) Equipment for seed production, facility improvement, etc. 4. Allocation of other project costs 〔Laos side〕 1. Allocation of C/Ps 1) Project director 2) Project managers 3) Project coordinator 4) Other counterparts 2. Allocation of extension staff at provincial/district level 3. Budget allocation 4. Provision of office space	・Situations that hinder project participation of villagers have not occurred. ・C/Ps, province/district extension staff and PFS staff are not transferred to other organizations. **Pre-conditions** ・Security of pilot sites is confirmed.

Annex 6 Plan of Operation 1) Tentative schedule and responsible organizations

Outputs and Activities	Schedule of implementation					Responsible organiz ation in charge		Collaborative organiz ations
	1st Year	2nd Year	3rd Year	4th Year	5th Year	Central level	Local level	
Output 1. Adequate aquaculture methods are verified according to the local conditions of pilot sites.								
1-1 Determine villages as pilot sites (pilot sites: 4 f ocal districts x 3 villages = 12 villages in total)						DLF	4 PLFSs and 4 DLFUs	PAFO
1-2 Establish operation and management plan of the pilot sites						DLF	4 PLFSs and 4 DLFUs	PAFO
1-3 Implement the pilot project						ITSU of NADC	5 PLFSs and 5 DLFUs	Technical division of DLF
1-4 Improve and develop practical aquaculture techniques f or f armers level b leadership of Namx ouang Aquaculture Development Center (hereaf ter ref erred to as " NADC"), as a central institution						ITSU of NADC	5 PLFSs and 5 DLFUs	Technical division of DLF
Output 2. The capacity of relevant persons such as fish farmers, province/district extension staff and staff of PFSs regarding aquaculture technology and extension is improved.								
2-1 Establish training programs and tex t considering aquaculture suitable f or local conditions and ex tension						ITSU of NADC	5 PLFSs and 9 DLFUs	
2-2 Train PFS staf f , province/district ex tension staf f and core f ish f armers at NADC and PFSs						ITSU of NADC	5 PLFSs and 9 DLFUs	Technical division of DLF/NAFRI/NAFES
2-3 Implement practical training utiliz ed the outputs of pilot projects f or PFS staf f , province/district ex tension staf f and core f ish f armers						Technical division of DLF	5 PLFSs and 9 DLFUs	PAFO/DAFO
Output 3. Fish farmers of the focal districts introduce improved aquaculture methods.								
3-1 Strengthen f unctions of PFSs f or aquaculture ex tension activities, such as seed production, technical trainings etc.						Technical division of DLF	Provincial f isheries stations of the 4 target provinces	
3-2 Select villages and f ish f armers to introduce outputs of pilot programs (ex pansion sites: 8 f ocal districts x 10 villages = 80 villages in t)otal						DLF	4 PLFSs and 8 DLFUs	PAFO/DAFO
3-3 Make audio-visual ex tension tex ts f or f ish f armers						ITSU of NADC	4 PLFSs and 8 DLFUs	Technical division of DLF/NAFES
3-4 Hold seminars and on-f arm trainings utiliz ed the outputs of pilot projects f or selected f ish f armers						ITSU of NADC	4 PLFSs and 8 DLFUs	Technical division of DLF/NAFES
3-5 Provide ex tension services and monitoring of aquaculture activities f or selected f ish f armers of the ex pansion projec)						DLF	4 PLFSs and 8 DLFUs	PAFO
Output 4. The functions of relevant organizations and their collaboration framework are strengthened regarding the aquaculture extension matched with the local conditions.								
4-1 Collect and consolidate inf ormation on the aquaculture activities of target provinces						ITSU of NADC	4 PLFSs and 8 DLFUs	PAFO/DLF/NAFES/NWGL
4-2 Prepare aquaculture development programs of the target provinces						NADC/DLF	4 PLFSs and 8 DLFUs	PAFO/NAFES
4-3 Formulate an action plan of the Project af ter its cooperation period						NADC/DLF	4 PLFSs and 8 DLFUs	PAFO/NAFES
4-4 Hold seminars on the action plan of the relevant organiz ations f or f urther aquaculture ex tensio)						Project coordinator	4 PLFSs and 8 DLFUs	PAFO/DAFO/DLF/NADC/NAFES/ NAFRI/NWGL

Remarks;

1) PLFS: Provincial Livestock and Fisheries Section, DLFU: Distict Livestock and Fisheries Unit, ITSU: Inf ormation and Tech Support Unit.

2) 5 PLFSs mean those in the 4 target provinces and Vientiane Capital. 5 DLFUs mean those in the 4 pilot program districts of the 4 target provinces and 1 eading district of Vientiane Capital. 9 DLFUs involve the 8 ex pantion program districrts of the 4 target provinces and 1 leading district of Vientinane Capital. 4 PLFSs and 8 DLFUs means PLFSs of the 4 target provinces and 8 f ocal districts, respectively .

Annex 7: Terms of Reference for Japanese Experts

1. Chief Advisor/Aquaculture Technologies

1) Educational qualif ication: University graduate or more

2) Work ex perience: More than 18 y ears of ex perience in the f ield of aquaculture ex tension and training Activity

3) Required capability of language: Ex cellent in English and Japanese

4) Major Activities:

The Chief Advisor reports directly to the Project Director and assists the Project Director in every aspects of the implementation and management of AQIP-2. He/She is responsible f or overall technical matters about f reshwater aquaculture in the Project. The Chief advisor' s such assistance include, but not limited to, the f ollowings;

a. To prepare and update the detailed plans f or the PO in cooperation with Laotian C/Ps and other JICA ex perts

b. To organiz e and f acilitate relevant organiz ations f or the project activities

c. To organiz e and conduct regional/national training courses f or the project C/Ps and core f armers

d. To design and implement aquaculture ex periments in NADC

e. To carry out f ield survey on the PFSs and core f ish f armers

f . To evaluate their technologies and suggest necessary measures f or technical improvement

g. To prepare technical papers/manuals regarding aquaculture technologies developed in the Project

h. To support preparation of aquaculture development strategies f or the target provinces

i. To supervise JICA ex perts and coordinate their tasks

j. To disseminate technical inf ormation through mass-media and other measures

k. To monitor the project progress and prepare progress reports and the f inal report to JCC and responsible authorities

2. Aquaculture Extension/Training

1) Educational qualif ication: University graduate or more

2) Work ex perience: More than 8 y ears of ex perience in the f ield of aquaculture technologies

3) Required capability of language: Good in English and Japanese

4) Major Activities:

He/She has responsibility f or aquaculture ex tension and training of aquaculture technologies f or PFS staf f , province/district ex tension staf f and core f ish f armers. He/she will

work in close cooperation with the Chief Advisor. The major activities include the following:

a. To prepare and update the detailed plans for the PO in cooperation with Laotian C/Ps and other JICA experts
b. To plan, mobilize and coordinate all the project activities from technical aspects
c. To design curriculum for aquaculture training in different levels of extension system
d. To prepare for technical training and extension materials in cooperation with Lao counterparts and other JICA experts
e. To design framework for training of basic aquaculture techniques in cooperation with other experts
f. To prepare for technical reports/papers regarding aquaculture extension and training
g. To assist the Chief Advisor from technical point of view

3. Rural Development/Project Coordinator

1) Educational qualification: University graduate or more
2) Work experience: More than 13 years of experience in the similar project activities
3) Required capability of language: Excellent in English and Japanese
4) Major Activities:

His/Her most important role is coordination of the Project. And he/she also has responsibility for rural development, such as conduction of several surveys, monitoring and improvement of livelihood. The major activities include the following;

a. To prepare and update the detailed plans for the PO in cooperation with Lao counterparts and other JICA experts
b. To coordinate all the project activities in cooperation with the Chief Advisor, i.e., coordination with relevant organizations, administrative work of the project including budgeting, procurement of equipment, arrangement of seminars and workshops, recruitment of local resources, etc.
c. To assist selection and organization of farmers group in the target areas from the socio-economic point of view
d. To assist dissemination of technical information through mass-media and other measures
e. To collect and compile basic information on agriculture and aquaculture activities in the target provinces
f. To compile all the documents prepared in the Project for submission to relevant organizations
g. To assist project monitoring and preparation of progress reports and the final report to JCC and responsible authorities