No.

ラオス国
養殖改善・普及計画フェーズ２
（AQIP２）
中間評価報告書

平成21年３月
（2009年）

独立行政法人国際協力機構
ラオス事務所

ラオ事
ＪＲ
09-002

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序　　文

独立行政法人国際協力機構は、ラオス人民民主共和国（以下、「ラオス」）政府との討議議事録（R/D）に基づき、技術協力プロジェクト「ラオス養殖改善・普及計画フェーズ2 （AQIP2）」を2005年4月から5年間の計画で実施しています。

プロジェクトの中間地点である2008年1月21日から1月30日までの間、日本及びラオス側での合同評価を通じて協力期間前半における活動の実績の確認と評価及び後半に向けての課題の抽出と提言を行うことを目的として、JICA国際協力専門員千頭聡を団長とする中間評価調査団を現地に派遣しました。

本報告書は、これらの中間評価調査団による現地調査や協議の内容・結果をまとめたものであり、今後のプロジェクト運営に広く活用されることを願うものです。

最後に、調査の実施にあたりご協力をいただいた内外の関係各位に対し、心より感謝の意を表します。

2009年3月

独立行政法人国際協力機構
ラオス事務所
所長　高島宏明

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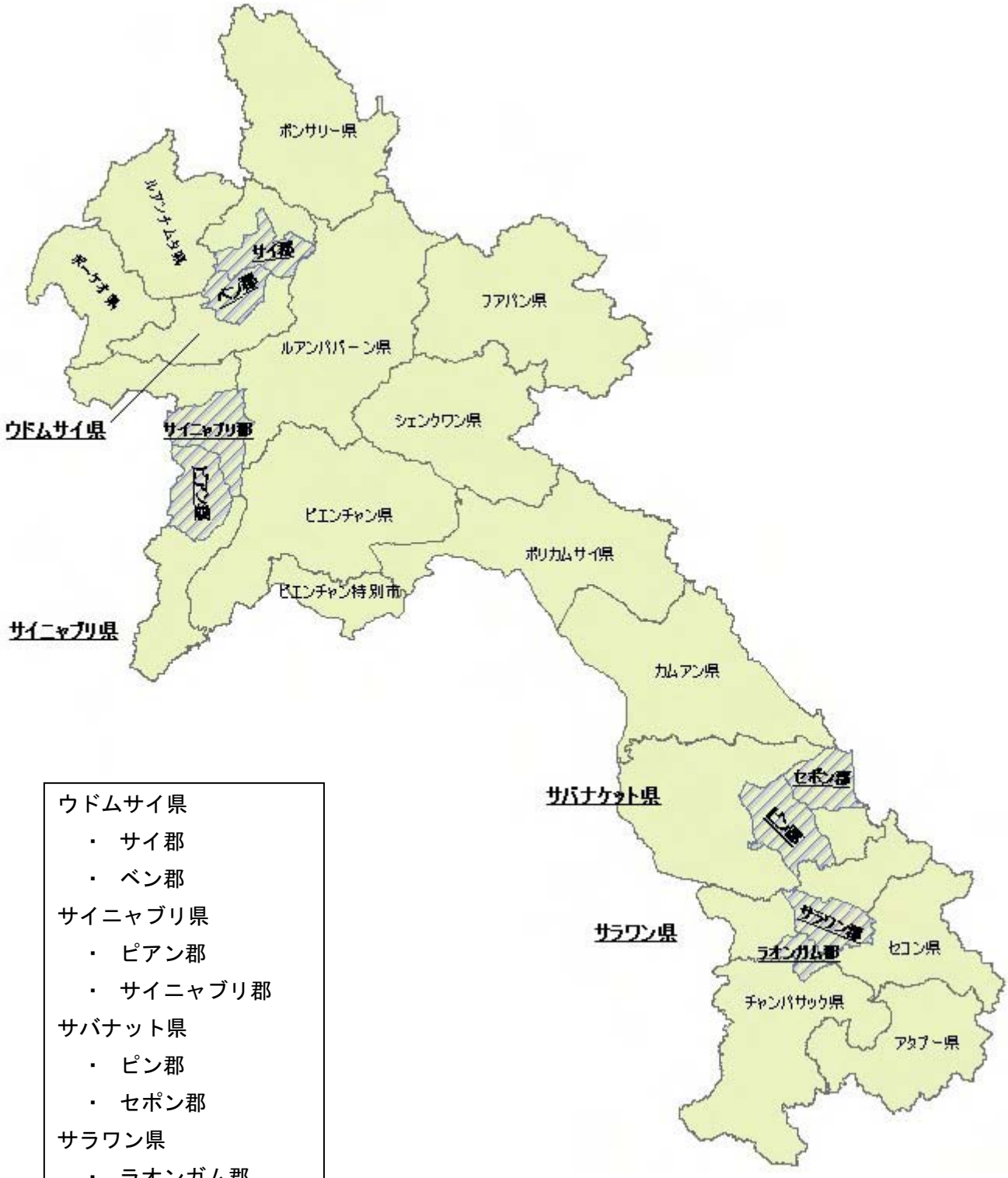
ミニッツ署名

プロジェクト対象地域地図



ウドムサイ県
- サイ郡
- ベン郡

サイニャブリ県
- ピアン郡
- サイニャブリ郡

サバナット県
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- セポン郡

サラワン県
- ラオンガム郡
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略　語　表

AQIP2	Aquaculture Improvement and Extension Project Phase 2	養殖改善・普及計画フェーズ 2
C/P	Counterpart	カウンターパート
DAFEO	District Agriculture and Forestry Extension Office	郡農林普及事務所
DAFO	District Agriculture and Forestry Office	郡農林事務所
DOP	Department of Planning	（農林省）計画局
DLF	Department of Livestock and Fishery	（農林省）畜水産局
FORCOM	Forest Management and Community Support Project	森林管理・住民支援プロジェクト
JCC	Joint Coordination Committee	合同調整委員会
JICA	Japan International Cooperating Agency	独立行政法人 国際協力機構
JOCV	Japan Overseas Cooperation Volunteers	青年海外協力隊
LARReC	Living Aquatic Resource Research Center	水生生物研究センター
MAF	Ministry of Agriculture and Forest	農林省
NADC	Namxuang Agriculture Development Center	ナムスワン養殖開発センター
NAFES	National Agriculture and Forestry Extension Service	農林普及局
NAFRI	National Agriculture and Forestry Research Institute	農林研究所
NGPES	National Growth and Poverty Eradication Strategy	国家成長・貧困撲滅戦略
PAFO	Province Agriculture and Forestry Office	県農林事務所
PAS	Province Aquaculture Station	県養殖ステーション
PDM	Project Design Matrix	プロジェクト・デザイン・マトリックス
PO	Plan of Operation	（プロジェクト）活動計画
PLFS	Provincial Livestock and Fisheries Section	県農林局
R/D	Record of Discussions	討議議事録
TSC	Technical Service Center	技術サービスセンター
VADW	Village Aquaculture Development Worker	村落養殖開発ワーカー
VAPC	Village Aquaculture Promotion Committee	村落養殖振興委員会
VVW	Village Veterinary Worker	村落畜産防疫ワーカー
WU	Woman’s Union	女性同盟

評価調査結果要約表

Ⅰ．案件の概要	
国名	ラオス
案件名	養殖改善・普及計画フェーズ 2
分野	水産（増養殖）
援助形態	技術協力プロジェクト
主管部署	ラオス事務所
先方関係機関	農林省 畜水産局（MAF・DLF）
協力期間	（R/D） 2005 年 4 月～2010 年 3 月（5 年間）
日本側協力機関	農林水産省
１．協力の背景と概要	ラオス政府は、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はかり、小規模農民の営農改善に寄与することを目的とした技術協力をわが国に対し要請した。これを受け、わが国は、2005 年 4 月から、農林省畜水産局を実施機関とする技術プロジェクトを実施中である。 なお、本プロジェクトは、「より良い養殖の普及を通じたより良い農村造り支援」をスローガンとし、活動を推進するものである。
２．協力内容	
(1) 上位目標	協力対象 4 県（ウドムサイ県、サヤブリ県、サバナケット県、サラワン県）において、立地条件に適合した養殖普及を通じて、小規模養殖農家の生活が向上される。
(2) プロジェクト目標	協力対象 4 県において、立地条件に適合した養殖手法が普及する。
(3) 成果	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。 成果 2： 関係者（養殖農家、県・郡普及員および県技術員）の養殖技術とその普及に関する能力が改善される。 成果 3： 協力重点郡の養殖農家が改良された養殖を導入する。 成果 4： 立地条件に適合した養殖手法の普及に際し、関係機関の機能と連携が強化される。
(4) 投入（評価時点） 日本側：	長期専門家： 3 名（82.5MM） 短期専門家： 7 名（23.5MM） 本邦への研修員受入れ： 14 名 機材供与： 約 12 百万円 （113,310 ドル） ローカルコスト負担： 約 40 百万円 （363,372 ドル）
相手国側：	土地・施設提供、資機材提供、人員配置（カウンターパート 24 名配置）
３．フェーズ１の成果と課題	
(1) 協力期間	2001 年 2 月 19 日～2004 年 2 月 18 日（3 年間）
(2) フェーズ 1 で得られた成果	・ ナムスワン養殖開発センター（NADC）の整備により、養殖開発のための拠点が整備され、中央レベルで技術開発と研修が行えるようになった。 ・ 技術者 6 名が親魚育成及び種苗生産の手法を修得し、中央レベルでの養殖の人材育成が行われた。 ・ 県技術員の養殖基礎研修、研修テキストの作成、各県の養殖関連情報の整備を行い、地方養殖関係者への技術移転の試行が行われた。なお、実地研修等は未実施であった。 ⇒養殖技術の地方展開に着手する土台が築かれた。
(3) フェーズ 1 における課題	・ 中央職員が研修講師となるための継続的な指導の必要性 ・ 県技術員・郡普及員の能力不足 ・ 地方における適正種苗の不足 ・ 地方レベルの普及活動の不足 ・ 不適正な養殖技術のひろがり（例：不良な種苗の使用、非効率的な給餌、池の不適切な利用等） ⇒フェーズ 2 で地方展開に着手し、立地条件に適合した養殖の普及を行うこととする。

II. 評価調査団の概要	
評価者	（担当分野・氏名・職位） 総括　千頭　聡　国際協力機構 国際協力専門員 評価分析　三浦　真理　同　農村開発部 第1グループ 水田地帯第2チーム 計画管理（1）波多野　誠　同　ラオス事務所員 計画管理（2）Viensavanh Sisombath　同　ラオス事務所員 計画管理（3）Sayamno Sanoubane　同　ラオス事務所員 ＊加えてラオス側も合同評価者として参加
調査期間	2008年1月21日～2008年1月30日
評価種類	中間評価

III. 評価結果の概要	
1．評価結果の要約	
(1) 妥当性	本プロジェクトの妥当性は高いと判断される。 ラオスの農村部における国民一人当たりの年間魚供給量は、8～10kg と非常に低いレベルにあるため、プロジェクト目標である自家消費を主な目的とする農村部での低コストな養殖開発に対するニーズは高い。 また、上位目標である養殖の普及による住民の生活向上は、ラオスの国家政策の重点分野のうちの「食料安全保障」及び「貧困削減」に合致する。 本プロジェクトの対象4県には、ラオス政府が重点開発地域として指定する貧困72郡のうちの20郡を含む。気候や生活条件の異なる北部と南部を対象とし、それぞれの地域に合った養殖手法をパイロット事業にて開発し、その手法を普及対象村に普及する本プロジェクトのアプローチは、効率的・効果的な養殖手法をラオス全土に普及させるために適切なアプローチであると考えられる。
(2) 有効性	本プロジェクトの有効性は高いと判断される。 本プロジェクトの活動である現地調査、パイロット村での養殖、中央・政府機関職員および養殖農家・村人に対する研修、村における養殖のための組織形成などは、プロジェクト目標を達成するために有効な手段およびアプローチである。 パイロット事業の結果、女性同盟（WU）、学校、低所得者等のグループによる養殖が有効であると判明し、その活動は順調に進捗しているが、その成果を定着させ、普及対象村に普及させるためには、予定されている3年というパイロット事業の実施期間は短いことが懸念される。
(3) 効率性	本プロジェクトの効率性は概ね高いと判断される。 日本側からの投入およびタイミングは概ね適切であった。ラオス側の投入のうち、プロジェクトの拠点であるナムスワン養殖開発センター（NADC）に配置されている人員の不足（センター長の不在および2名のスタッフの欠員）は、プロジェクトの効率性をやや低下させた。しかし、本中間調査の提言を受け、調査終了直後にNADC のセンター長代行が正式にセンター運営責任者として任命されたことにより、意思決定が迅速になるなど、プロジェクトの活動が効率的に行われるようになっている。 本プロジェクトの活動は順調に行われており、期待される4つの成果は、概ね達成されつつある、もしくは、今後達成される見込みである。 プロジェクトのために供与された施設や機材は概ね適切に利用・管理されている。
(4) インパクト	本プロジェクトのインパクトは大きいと判断される。 上位目標である年間一人当たりの魚の消費量22kg は、パイロット事業を行う12村のうち5村ですでに達成した。11村においては、パイロット事業の開始前に比べ、現在の魚の消費量は増加した。これらのことから、上位目標達成の見込みは高いと考えられる。 本プロジェクトでは、研修や巡回指導において、男女が平等に参加できるようになっており、女性の養殖への参加が増加している。いくつかの村では、女性同盟（WU）がグループで養殖を始めたことにより、収益をグループの資金として積み立て、女性同盟基金としてメンバーに対する貸付けを開始するなど、女性同盟の活

	動の活発化に繋がったケースもある。 本プロジェクトは、パイロット事業対象県の養殖ステーションに配属されている青年海外協力隊（JOCV）と連携して活動を行い、その結果、プロジェクトと県養殖ステーション（PAS）の関係が強化されたり、JOCV が PAS の種苗生産や施設改善、研修の実施をサポートするなどの成果を得ている。 また、本プロジェクト（AQIP2）の対象県の一つであるサヤブリ県で活動を行う JICA 森林管理・住民支援プロジェクト（FORCOM）とも連携した活動を行っている。本プロジェクトは、「より良い養殖、より良い農村」をキャッチフレーズに、養殖による農村開発を目指しているが、FORCOM では、焼畑農業の代替となる畜産や果樹栽培を含めた複合型農業の推進による住民支援を行っているため、それらの技術や経験、成果を活用することで、本プロジェクト（AQIP2）の対象村において、より効果的・効率的な養殖による農村開発、生計向上を図れることが期待される。
(5) 自立発展性	本プロジェクトの自立発展性は、概ね高いと判断されるが、自立発展性を確保するための方策のさらなる検討が必要である。 本プロジェクトの目標は、ラオス政府の国家政策に合致しており、また、関係機関は、国家目標や県・郡の目標を達成するために、本プロジェクトが有効なツールであると認識しているため、プロジェクト終了後も実施機関がオーナーシップを持って活動を継続する可能性は高いと思われる。 受益者である養殖農家・住民が継続的・積極的に養殖活動を行うためには、パイロット事業の成果を目に見える形で示すこと（参加者が利益・利点を実感すること）が必要であるが、養殖農家・住民は、養殖により、家族の栄養状態の改善や収入の増加などの利点・利益を実感している。また、プロジェクトに参加していない住民のプロジェクトへの参加の要望が増えるなど、受益者の養殖に対するモチベーションの継続性は高いと思われる。 本プロジェクトでは、異なる気候や生活条件に合わせた養殖手法が開発されつつあり、また、その養殖手法を普及するための普及員が育成されつつあるため、プロジェクトの終了後も、開発された養殖手法がラオス全土に普及されることが期待される。 県や郡では、慢性的な人材・資金不足により、普及員による安定的な普及活動に、若干の懸念が残る。しかし、本プロジェクトでは、魚の種苗を生産する中核農家が育成されつつあり、中核農家が、養殖農家・村人に種苗を販売する際に、必要な技術を指導し、技術が農民間で普及されることが期待される。このような「農民から農民への技術移転アプローチ（Farmer to Farmer Approach）」は、地方政府の普及活動を補完する上で重要である。 またラオス政府は郡のなかにいくつかの村で構成するクラスター（村グループ）に対する農業普及を推進してきており、本プロジェクトが行う養殖普及においてもクラスター制度を考慮して行う必要がある。 本プロジェクトの残りの期間において、関係機関のオーナーシップをさらに高めること、異なる気候や生活条件を類型化し、類型ごとの養殖手法をマニュアルに取りまとめること、クラスター制度を踏まえた「農民から農民への技術移転アプローチ」の定着化などのためのさらなる検討と活動が必要である。
2．効果発現に貢献した要因	
(1) 計画内容に関すること	・プロジェクト目標が、国、県、郡の開発戦略である「食料安全保障」「貧困削減」「住民の生活改善」に合致している。 ・受益者である農家・村人が、養殖を導入することにより、家庭内での魚の消費量が増加している。また、魚の購入量が減り、家庭消費の余剰分の魚を売ることで収入が増加するなど、受益者に直接的なインパクトをもたらしている。 ・日頃より、関係機関にプロジェクトの情報共有を積極的に行ったり、写真を多用したラオス語のニュースレターを発行するなど、プロジェクトの進捗を関係機関や農民・村人に伝えるための活動を行っている。 ・中間評価のために、評価準備委員会を構成し、評価作業を通じて、直接のカウンターパート（C/P）以外の機関も含めた関係機関の本プロジェクトへの理解が深まり、また、課題に対する討議も活発に行われるなど、ラオス側のオーナーシップ

	が高まった。
(2) 実施プロセスに関すること	・対象村内の既存の村組織を活用し、村落養殖振興委員会（VAPC）が組織・運営され、農民間の役割分担が明確になることにより、村での養殖を組織的に推進することができている。特に女性同盟（WU）によるグループ養殖は、順調に行われている。村の中で中核となる養殖農家を育成し、中核農家が種苗生産や技術移転を担うことで、村内や近隣村に対して養殖普及を効率的に推進することができている。また中核農家は、種苗を生産・販売することで、現金収入を増加させているが、その種苗を村人に安価で販売しており、中核農家とそれ以外の農家の間に顕著な収入格差やトラブルが生じていない。

３．問題点及び問題を惹起した要因

(1) 計画内容に関すること	特になし。
(2) 実施プロセスに関すること	・郡農林事務所（DAFO）の予算が、恒常的に不足する傾向にある。普及員の日当、移動手段としてのバイクの燃料代が不足し、村によってはアクセスが容易でない場所もあるため、必要なモニタリングがやや不足している。

４．結論

プロジェクト開始後 2 年 9 ヶ月が経過しているが、詳細活動計画・投入計画に基づき、ほぼ予定通りに活動が行われている。

パイロット事業（4 県 4 郡 12 村）においては、県・郡における養殖技術者・普及員の知識・技術が向上し、ラオスの農村地域の実情に合った農業普及が行われつつある。またパイロット村では、村落養殖振興委員会（VAPC）が中心となって、村内で養殖手法の定着が図られつつあり、養殖魚の生産性や生産量の増加といった具体的な成果が現れている。特に女性同盟（WU）によるグループ養殖では、養殖技術の定着や生産性の向上、基金の積み立てといった目に見える成果がでており、村落レベルで養殖を普及するにあたってグループによる養殖の推進が期待できる。

普及展開事業（4 県 8 郡 56 村）においては、村の選定および基本情報の収集を行い、具体的な養殖活動を開始している。普及展開村の養殖農家がパイロット村での視察研修を行ったり、パイロット村の中核農家を普及展開村で研修講師に活用するなど、パイロット事業の成果を生かして養殖普及が行われている。

本プロジェクトの残りの期間においては、関係機関のオーナーシップをさらに高めること、異なる気候や生活条件を類型化し、類型ごとの養殖手法をマニュアルに取りまとめること、「農民から農民への技術移転アプローチ」の定着化などのためのさらなる検討と活動が必要である。

５．提言（当該プロジェクトに関する具体的な措置、提案、助言）

＜プロジェクトの計画内容に関すること＞

(1) PDM 指標の変更

以下の 2 つの指標を次のとおり修正する。

(1-1) 指標 2-2. 各県畜水産課（PLFS）および郡農林事務所（DAFEO）それぞれにおいて、2 名以上の職員が養殖農家に技術指導を行うことができる。 を、

指標 2-2. 各県畜水産課（PLFS）において、2 名以上の職員が県養殖計画を策定でき、また県養殖ステーション（PAS）や郡農林事務所（DAFO）に対して養殖普及に必要な指導を行うことができる。 および、
指標 2-3. DAFO において、2 名以上の職員が養殖農家に技術指導を行うことができる。に修正する。

(1-2) 指標 4-2. 関係機関が全国養殖開発計画に基づき必要な予算措置を行なう。を削除する。

＜実施プロセスに関すること＞

(2) 関係機関の役割の明確化及び連携強化

プロジェクトの活動を通じて養殖の技術開発や普及に関わる畜水産局（DLF）やナムスワン養殖開発センター（NADC）、県農林事務所（PAFO）、郡農林事務所（DAFO）の関係はプロジェクト対象県において強化されてきている。今後ラオスに適した養殖技術を対象県内の他の郡や、他県に広げていく上では、中央レベルの畜水産局（DLF）や農林普及局（NAFES）、農林研究所（NAFRI）、地方レベルの県農林事務所（PAFO）、郡農林事務所（DAFO）の役割を明確化したり、具体的な連携の方策に

ついてさらなる検討を進めるべきである。
プロジェクト後半に「県別養殖開発戦略」や、「全国養殖普及計画」の策定プロセスを通じて、関係機関で養殖の技術開発や普及における役割分担や連携の方策を検討することが求められる。

(3) グループ養殖手法のさらなる推進
プロジェクト前半の活動を通じて、女性同盟(WU)や学校、低所得者などグループによる養殖普及の可能性が明らかになった。グループ養殖は、池を所有していない農民や、養殖に必要な投入が経済的に困難な零細農民に対しても、養殖による便益をもたらすことで、村内の経済格差拡大を緩和することが期待できる。したがって、パイロット事業における女性同盟によるグループ養殖の成果を踏まえ、プロジェクト後半に学校や低所得者を含めたグループ養殖の活動やその分析を行い、グループ養殖手法の確立に取り組むべきである。
そのためにはすでに村落養殖振興委員会（VAPC）が十分に機能しており、グループ養殖の成功事例が出始めているパイロット村を活用しつつ、普及展開村においてもニーズや可能性がある村では積極的に取り組みを行うべきである。

(4) 魚の消費量の測定方法の検討
ラオス政府が定める魚の消費目標の達成状況をモニタリングし、各村・農家レベルでの食料確保の状況を確認するためには、魚の消費量を正確に測定することが必要であるが、現在のところその測定方法は標準化されていない。農林省（MAF）は、「全国養殖開発計画」や「県別養殖開発戦略」を策定するプロセスの中で、具体的な魚の消費量の測定方法について検討を進め、魚の消費量の測定方法の確立を早急に検討するべきである。その際、現在プロジェクトがパイロット村で行っている魚の消費量測定の経験や教訓を活用することが可能である。

(5) 村落養殖開発ワーカー（VADW）の認証制度の検討
プロジェクト対象村では、種苗の生産や中間育成（稚魚をある程度の大きさまで育成する）を行う中核農家が現れ始めている。畜水産局（DLF）が、このような農家を「村落養殖開発ワーカー（VADW）」として認証し、農村地域における養殖技術の農民間・村落間普及の中核とすることを検討している旨を確認した。中核農家が、VADW として政府から正式に認証されることにより、モチベーションが向上し、また、種苗を売る際に政府からの「お墨付き」というインセンティブが与えられることは、「農民から農民への技術移転アプローチ」を推進する上で、有効だと考えられる。VADW の認証制度を具体的に検討する際には、現在 DLF が行っている村落畜産防疫ワーカー（VVW）の認証制度も参考にし、VADW の役割や、資格要件、県・郡の行政普及サービスとの関係等について、検討を進めるべきである。
プロジェクト 4 年目にパイロット事業を通じて育成されている中核農家の分析等を通じて VADW 認証制度のガイドラインを作成し、DLF および関係部局にて制度化を行い、プロジェクト 5 年目には、認証制度を開始するべきである。

(6) クラスター制度に合わせた養殖普及システムの確立
現在、ラオス政府は、新たな行政システムとして、郡のなかに複数の村（7～10 村）で構成するクラスター（村グループ）を設定し、それぞれのクラスターに技術サービスセンター（TSC）を設立し、住民の行政サービスへのアクセスの改善を推進している。本プロジェクトの成果を効率的に普及するためには、プロジェクト後半にてクラスター制度を踏まえて、ラオスの県・郡普及体制のキャパシティを考慮した農民間・村落間の養殖普及を推進する養殖普及システムを検討する必要がある。例えば、TSC では、郡農林事務所（DAFO）職員に加えて農家も農業普及のためのメンバーとして参画することになっているため、村落養殖開発ワーカー（VADW）が TSC を通じて、養殖技術をクラスター内で普及する、といったことが考えられる。

(7) 森林管理・住民支援プロジェクト（FORCOM）との連携促進
上述 III. 評価結果の概要、1. 評価結果の要約、(4) インパクトに記載するように、本プロジェクトと FORCOM の連携は、プロジェクト活動をより効果的・効率的に実施する上で重要である。本プロジェクトと FORCOM では、これまでの活動をレビューした上で、2008 年に連携村を定め、それぞれの成果を活用した複合型農業の実証活動を行う予定である。その活動を通じた県・郡職員の情報共有の推進や人材育成、また村レベルでの経験交流や生産活動の改善といった具体的な

成果が期待されるとともに、それら連携事業の経験や教訓について分析を行い、ラオス農村における複合型農業を推進する上での知見を取りまとめることが期待される。

(8) 養殖普及の定着のための課題に対する対応

プロジェクト前半の活動を通じて、ラオスにおける養殖普及を行う上で新たに検討すべき課題としては、上述のとおり、①グループ養殖手法の確立、②魚の消費量の測定方法の検討、③村落養殖開発ワーカー（VADW）の認証制度の検討、④クラスター制度に合わせた養殖普及システムの確立、⑤FORCOM との連携促進が挙げられる。これらは、プロジェクトの上位目標の達成や自立発展性を確保するため、ラオスの農村立地条件にあった養殖技術を普及展開する上で重要な課題であり、プロジェクト後半で専門家の支援のもと、ラオス側関係機関が取り組むべきである。これら課題に対する助言や活動を行うためには、4 年次にも 3 年次と同等レベルの専門家の投入を行うことが妥当であると思われる。同時に、ラオス側も、関係機関の人員や予算について、必要な投入を行うべきである。

第 1 章中間評価調査の概要

１－１　中間評価調査団の派遣の経緯と目的

ラオス人民民主共和国（以下「ラオス」）は、国民の約 8 割が農村部に居住する内陸国であり、農業生産が GDP の約 3 割を占めている（2007 年）。ラオス政府は国家政策として、全国民の食料の確保と生計の向上を最重要課題のひとつとしており、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。 ラオスは、魚を好む食文化にあるが、国民一人当たりの年間魚供給量は 14kg であり、近隣諸国の魚供給量と比べると少ない。一方、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状況にある。しかし、地方レベルにおいては、養殖関係者の能力不足、適正種苗の供給量不足、普及活動の不足等による不適正な養殖手法が使われているため、生産性は低い。また、国、県、郡、村レベルでの養殖分野での技術、設備、人員、予算の整備は不足がちであり、行政等による養殖の適正な生産システムの確立は未だ十分とは言えない状況にある。なお、ラオスでは、養殖振興に関連した国際機関、外国政府、NGO からの技術、資金支援が数多く行われているが、自立発展性や農民から農民への養殖普及システム形成の不足などの課題が見られる。そのため、ラオス政府は、農家レベルの養殖生産性の向上を強く要望している。

このような背景のもと、貧困や食料確保の問題を抱えるラオスの農村地域を対象に、地方の養殖普及関係者の人材育成および立地条件に適合した養殖手法の普及により、小規模農民の営農改善に寄与することを目的として「養殖改善・普及計画フェーズ 2」が 2005 年 4 月から実施されている。なお、協力対象は、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 県である。

わが国は、2001 年 2 月 19 日から 2004 年 2 月 18 日まで「養殖改善・普及計画 フェーズ 1（AQIP）」を実施した。その成果として、ナムスワン養殖開発センター（NADC）を整備し、養殖に係る技術の開発と人材の育成を行うことにより、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こととなった。本案件は、フェーズ 1 の成果を持続し、より発展させ、課題の解決に資する活動を行うものである。

今般、プロジェクトの中間地点において、日本及びラオス側の合意の基で双方による合同評価を通じて、協力期間前半における投入実績、活動の実施状況、成果の達成度、プロジェクト目標の達成度を調査し、評価 5 項目（妥当性・有効性・効率性・インパクト・自立発展性）の観点から評価分析を行い、その結果を日本およびラオス側両国政府に報告するとともに、プロジェクト計画内容の修正の必要性や実施体制・運営の問題点等を把握し、以降の協力期間における活動をより効果的にするための指導及び提言を行うことを目的として調査団を派遣することとなった。本中間調査の目的は、以下のようにまとめられる。

(1)プロジェクトの中間地点における成果、活動実績、投入実績、計画達成度を プロジェクト・デザイン・マトリックス（PDM）や活動計画（PO）に基づき確認する。
(2)評価 5 項目の観点からプロジェクトを評価し、プロジェクト後半の実施に役立てる。
(3)プロジェクト実施のプロセスを関係者間で共有し､プロジェクト後半及びその後の展開に向けた共通認識を醸成する。
(4)プロジェクト後半に向けた課題・懸案事項を明確化し、解決方法を検討する。
(5)プロジェクト後半の活動計画や投入計画を明確にする。

１－２　評価者の構成

評価は、日本側およびラオス側により、日・ラオス合同調査委員会が構成され、合同評価形式で行われた。評価メンバーは、以下のとおりである。

＜日本側　調査団員＞

総括	千頭　聡	国際協力機構 専門員
評価分析	三浦　真理	同 農村開発部 第 1 グループ 水田地帯第 2 チーム
計画管理(1)	波多野　誠	同 ラオス事務所員
計画管理(2)	Mr. Viensavanh Sisombath	同 ラオス事務所員
計画管理(3)	Ms. Sayamno Sanoubane	同 ラオス事務所員

＜ラオス側　評価メンバー＞

団長	Dr. Bounkhuang Khambounheung	畜水産局長
メンバー	Mr. Bounthong Saphakdy	同　水産課長
メンバー	Mr. Chanthaboun Sirimanotham	同　計画協力課長
メンバー	Mr. Chanthaneth Symahano	同　協力・監査課長
メンバー	Mr. Bounkham Syaksone	監査局　総務課長補佐
メンバー	Mr. Liengkham Sivilay	農林研究所　水産生物研究センター所長
メンバー	Mr. Salieo Kemmalath	農林業普及局　上級普及アドバイザー
メンバー	Mr. Valiya Sychanthongthip	計画投資省　国際協力局　技術官

１－３　評価調査日程

2008 年 1 月 20 日（日）～2008 年 1 月 30 日（水）
詳細行程は付属資料 1 のとおり。

１－４　主要面談者

（敬称略・順不同）

＜ラオス養殖改善・普及計画 フェーズ2 専門家＞

池ノ上　宏	チーフアドバイザー
枝　　浩樹	専門家（訓練/親魚育成/種苗生産）
茶木　博之	同（養殖技術１/普及）
佐野　幸輔	同（養殖技術２/村落開発/流通調査）

＜農林省＞

Dr. Bounkhuang Khambounheung	畜水産局長
Mr. Somphanh Chanphengxay	同　次長
Mr. Bounthong Saphakdy	同　水産課長
Mr. Chanthaboun Sirimanotham	同　計画協力課長
Ms. Nounak Liepvisay	同　ナムスワン養殖開発センター所長代理
Mr. Savanh Hanephom	計画局次長
Mr. Xaypladeth Choulamany	
Mr. Chanthaneth Symahano	同　協力・監査課長
Mr. Bounkham Syaksone	監査局 総務課長補佐
Mr. Liengkham Sivilay	農林研究所 水生生物研究センター 所長
Mr. Sinthavong Viravong	同 水産生物学者
Mr. Salieo Kemmalath	農林業普及局　上級普及アドバイザー

＜計画投資省＞

Mr. Houmphanh Soukprasith	国際協力局次長
Mr. Valiya Sychanthongthip	国際協力局 技術官

＜ウドムサイ県農林局＞

Mr. Bounleum Xayavong	次長

＜サヤブリ県農林局＞

Mr. Somchit Chanthavong	次長

＜在ラオス日本大使館＞

目徳　有一	二等書記官
小材　幸聖	草の根委嘱員

＜JICA 専門家＞

長岡　　明	農業政策アドバイザー
渡邉　和眞	灌漑開発政策アドバイザー
上倉　健司	農業統計能力強化計画

清治　　有	稲種子増殖普及システム改善計画
三好　　陽	森林管理・住民支援プロジェクト(FORCOM)

＜JICA ラオス事務所＞

高島　宏明	所長
武井　耕一	次長
佐々木　貢	所員

１－５　評価コンセプト

本中間評価は、以下 3 点の独自のコンセプト及び評価方法によって実施された。

(1) 直接のカウンターパート（C/P）のみならず、養殖の技術開発・普及に携わる様々な関係者が評価プロセスに参加する。

本中間評価では、プロジェクトの直接の C/P だけでなく、淡水魚養殖の技術開発や普及に関係のある機関のスタッフも評価準備委員会の一員を務めている。また、対象県の養殖普及に関する責任者もプロセスの一員となっている。従来の中間評価では、関係機関は評価報告を受けるのみで、自らがプロジェクトを評価し、その問題点を捉えて改善策を練るというプロセスには十分には加わっていなかった。本プロジェクトでは、ラオスに適した養殖技術をラオス側が自ら研究し普及できるようにすることを目標としているため、関係機関も積極的に評価に加わってもらう必要があり、そのために様々な関係者を巻き込んでいる。

(2) 指標としては測りにくい、目に見えない要素の評価を重要視する。

PDM における目標・成果の指標だけでなく、村人の養殖へのモチベーションや女性同盟の結束の強さ等、数値や指標としては表れにくい要素も、プロジェクトを成功させる上で数値と同様に重要であると考える。したがって、こうした目に見えにくく数値としては現れにくい部分も本中間評価では重要視する。

(3) 「自立発展性」に最大の焦点を当てる。

本中間評価も JICA 事業評価ガイドラインに基づいて 5 項目（妥当性、有効性、効率性、インパクト、自立発展性）の観点から調査を実施するが、5 項目の中でも、特に「自立発展性」に重点を置いて評価を実施する。中間評価という早い時点において自立発展性へ向けた課題やその解決策を共有することにより、プロジェクト後半に自立発展性をより高めることが可能になると考えられるためである。自立発展性の確保は、プロジェクト終了後も継続して養殖技術の技術開発・普及が行われる上で必要不

可欠である。

１－６　評価項目・評価方法

上記のコンセプトに基づき、本中間評価は以下の 3 つのステップにより実施された。

第 1 ステップ：プロジェクト自己評価
↓
第 2 ステップ：評価準備委員会
↓
第 3 ステップ：日・ラオ合同調査委員会

第 1 ステップでは、プロジェクトによる自己評価が行われた。ラオス側 C/P 及びプロジェクト専門家が、PDM 指標に基づき、評価 5 項目に沿った形でプロジェクトの自己評価を行った。プロジェクト目標及び成果の指標ごとの達成状況を示した達成グリッド案、成果に沿った活動の実績状況を示した活動チャート案、5 項目評価に沿った評価グリッド案、専門家や機材・研修等の投入実績をまとめた投入実績表、協議すべき課題をまとめた重要事項をプロジェクト側がまとめた。

第 2 ステップでは、評価準備委員会による評価が行われ、ラオス側 C/P 及び関係者、プロジェクト専門家、JICA ラオス事務所スタッフから成る評価準備委員会を結成し、次のようなプロセスを経て評価が実施された。

(1) AQIP2 中間評価概要セミナー：C/P や関係者がプロジェクトの概要や進捗、評価のポイントを理解する。
(2) プロジェクト視察・ワークショップ（南部・北部）：プロジェクトの現場での成果を確認するとともに、パイロット事業の結果を踏まえて、ラオスにおける養殖普及のあり方、関係機関の連携、持続可能性などについて議論を行った。
(3) 評価取りまとめ会議：中間評価概要セミナー及び現場ワークショップでの議論の結果を踏まえて、プロジェクト準備委員会としての評価や今後の検討課題についてとりまとめる。

本中間調査は、**第 3 ステップ**の日・ラオ合同評価調査（本調査）として位置付けられる。ステップ 1 および 2 にて行われたプロジェクト自己評価および評価準備委員会の評価結果をもとに、評価 5 項目に沿って本プロジェクトの現段階における成果及び課題を確認すると共に、プロジェクト後半へ向けた提言を行うものである。本合同評価調査団は、北部の事業対象村の視察を行い、評価準備委員会のメンバーとの意見交換における合意事項を合同評価表として協議議事録（Minutes of Meeting）としてとりまとめ、署名した。

第２章 プロジェクトの実績と現状

２－１　実績と現状の総括（プロジェクト全体の進捗状況）

プロジェクト開始後２年９ヶ月が経過しているが、詳細活動計画・投入計画に基づき、ほぼ予定通りに活動が行われている。

パイロット事業（4 県 4 郡 12 村）においては、県・郡における養殖技術者・普及員の知識･技術が向上し､ラオスの農村地域の実情に合った農業普及が行われつつある。またパイロット村では、村落養殖普及委員会（VAPC）が中心となって、村内で養殖手法の定着が図られつつあり、養殖魚の生産性や生産量の増加といった具体的な成果が現れている。特に女性同盟（WU）によるグループ養殖では、養殖技術の定着や生産性の向上、基金の積み立てといった目に見える成果がでており、村落レベルで養殖を普及するにあたってグループによる養殖の推進が期待できる。

普及展開事業(4 県 8 郡 56 村)においては､村の選定および基本情報の収集を行い、具体的な養殖活動を開始している。普及展開村の養殖農家がパイロット村での視察研修を行い、パイロット村の中核農家を普及展開村で研修講師に活用するなど、パイロット事業の成果を生かして養殖普及が行われている。

プロジェクト活動における主要な項目ごとの現状は、以下のとおりである。

２－１－１　ラオスに適した養殖技術手法の開発

(1) 養殖普及手法の確立および村ごとの養殖形態の違い

ラオスの農村の立地条件に合った養殖技術は確立されつつあり、異なる立地条件に合った養殖技術の普及が行われている。北部 2 県のパイロットサイトに比べ、南部 2 県のパイロットサイトでは､年間気温が高く降雨量が少ない気候条件にあるが、これらの気候条件に合わせた養殖手法が確立されつつある。周辺の自然環境（水、土壌、気候など）に加えて、パイロット村により社会経済的状況（財政的余裕、教育水準、時間的余裕、市場へのアクセスなど）が大きく異なる。これらの各条件に合致した養殖手法は、プロジェクトによって類型化されてまとめられつつある。プロジェクト終了までにハンドブックの形式にして配布されることが期待される。

これらのプロジェクトを通して導入された養殖技術は定着しつつあり、その結果として養殖池の数および魚の生産量は増加している。プロジェクトにこれまで参加していなかった村人のうち、南部の 35 名と北部の 86 名がプロジェクトで導入した養殖技術を新たに取り入れるなど、養殖を始める人の数も増加している。

(2) グループ養殖のさらなる推進

パイロット村では、女性同盟のグループ養殖が順調に行われており、またそのポテンシャルが高いことが確認された。本プロジェクトではその他の形態のグループ養殖として、学校で教員が中心となって行われているもの、土地・水・資金を持たない低所得者を中心としたものなどの取り組みが始まっている。

女性同盟（WU）によるグループ養殖は、その試行が進んでおり、すでに大きな

成果を得ている。パイロット村のほとんどには既存の女性同盟（WU）が存在し、主に助け合いを目的とした活動を行っている。女性同盟（WU）は、共同で池を借り（もしくは村が所有する池を使い)、養殖を行っている。得られた魚は、メンバーで分け合い、各家庭で消費したり、村の中や近隣の村に売ることで得た現金収入を積み立てることによってメンバーの病気や出産時に必要な費用を貸し付けるなどの活動を行っている。

北部サヤブリ県ソムワサン村などでは、学校の池を使っての養殖が開始されている。得られた魚は、児童の給食として提供されるほか、売ることにより得られる現金で、学校で利用される教材などを購入することが期待されている。学校では運営資金が常に不足している状態にあり、必要な機材や教材を購入できない状況にある。また、子供の頃から養殖に触れることは、教育上においても良いことであると思われる。

養殖を行うには、池や機材などある程度の投資が必要であるため、それらを持たない村人は養殖に参加する機会を失いがちである。本プロジェクトでは、そのような低所得者がグループを作り、共同で養殖を行う取り組みを開始している。グループを作ることにより、池などの管理を分担することができるため、稲作などの他の農業に従事する者も参加し易くなる。このように、グループ養殖は村の中の格差が拡大することを避ける一手段として有効である。

これらのグループ養殖の取り組みを行ううちに、村人が寺にある池に着目して僧侶から使用の許可を得るなど、村人による自発的な取り組みが見られ始めている。これらは村人のオーナーシップが醸成されつつあることの証であり、プロジェクト終了後の自立発展性の確保に期待が出来る。

(3) カウンターパート（C/P）およびパイロット農家の能力向上

プロジェクトは県・郡の養殖ステーションの職員や普及員および養殖農家等を対象に研修やワークショップ、オン・ザ・ジョブ・トレーニングを行っている。研修はナムスワン養殖開発センター（NADC）や各県の養殖ステーションで実施されており、親魚の管理法、種苗生産法、餌の作り方そして池などの施設や機材の管理方法などに関する講義や演習が行われている。これらの研修によって各県の種苗生産の量や質が向上している。

中央・県・郡の各レベルのカウンターパートは、プロジェクトの活動に概ね積極的に関わっていると言える。一方、県農林事務所（PAFO）や郡農林事務所（DAFO）の職員の中には、養殖に関する知識や経験が不足している者もいるため、今後も必要な研修を必要な人材に効果的に行うことが望まれる。

養殖農家は、研修に参加することにより、養殖に必要な技術を身につけている。また研修に参加した農家が他の村人に習得した知識や技術を教えることにより、研修の成果が波及している。

養殖農家と接する機会の最も多い郡農林事務所（DAFO）の普及員及び農家との関係は概ね良好である。DAFO 職員は各村の状況を良く理解しており、農家は DAFO の普及員より適切な指導を受けていると感じている。しかし、農家は郡の職員にさ

らに頻繁に村を訪れて欲しいとも感じており、畜水産局（DLF）のカウンターパートも郡の巡回指導はやや不足していると考えている。しかし郡の普及員は限られた人数の普及員で多くの村をカバーせねばならず、村の中にはバイクと徒歩で5時間以上かかる村もあるため、現在以上の頻繁な巡回指導を行うことは容易ではない状況にある。また移動の主要手段であるバイクの不足や近年のガソリン代の高騰もその一因となっている。

２－１－２　普及展開事業の評価

(1) パイロット村から普及展開村への普及事業

プロジェクトを開始して2年9ヶ月がたっているが、最初の3年までにパイロット事業を行い、3年目から5年目に普及展開事業を行うこととなっている。

本プロジェクトでは、パイロット事業の成果を踏まえ、普及展開の段階に入っている。北・南部4県12村で行っているパイロット事業を普及展開対象村の56村に展開を行うものである。すでに、普及展開対象村は選定され、村や養殖に関する基礎情報が得られているとともに、一部の村では普及事業が開始されている。

種苗農家が稚魚の販売に合わせて養殖農家に技術的な指導やアドバイスを行うなど、プロジェクトに参加している農家から他の農家への養殖技術の移転の事例が見られた。

普及展開村の数が多く、プロジェクトによる巡回指導等を通じた技術移転の頻度はパイロット村よりは少ないため、効率的な技術普及に取り組む必要がある。

一方、パイロット事業のうち、上記２－１－１「(2) グループ養殖のさらなる推進」のとおり、特にグループ養殖が順調な成果をあげており、プロジェクト終了後の自立発展性を確保するための重要なツールであることが期待される。現在、女性同盟によるグループ養殖は順調に進んでいるが、学校でのグループ養殖と低所得者によるグループ養殖はその試みが始まったばかりである。グループ養殖は養殖手法の普及およびプロジェクト終了後の自立発展性を確保する上で非常に高いポテンシャルを有する活動として期待ができるが、当初予定のパイロット事業の終了まであと3ヶ月程度しかない。そのため、普及展開事業を開始する4年目にも、グループ養殖のさらなる推進とその成果の検証を普及展開事業と平行して行うことが妥当と考えられる。

(2) 効果的・効率的な普及のための取り組み

①村落養殖普及委員会（VAPC）の強化

各村で VAPC が組織されて概ね期待通りに機能している。VAPC は代表者とメンバーで構成され、組織図の作成と会則の設定が行われている。また毎月 VAPC ミーティングが開かれ、実施計画が策定されている。一部の村では、独自のデータ管理のしくみも作られている。VAPC では、養殖によって得られた収入の一部を VAPC 基金として積上げている。一方、一部の村では VAPC があまり機能していない。村人たちが農作業で忙しくて VAPC の会合に参加できない、資金が足りない、リーダシップをとる人材がいないなどがその理由である。VAPC がうまく

機能していない村に対しては、プロジェクト後半において、VAPC の組織化・運営が順調に行われている村の事例をもとに、VAPC 改善をはかる必要がある。

②村落養殖開発ワーカー（VADW）の位置付け

プロジェクト開始後の 2 年間のパイロット事業を通して、養殖への関心が高く養殖技術を周囲の人々に普及させる能力のある中核養殖農家が、各パイロット村に最低 1 人は現れている。畜水産局（DLF）から、この中核養殖農家を政府が正式に村落養殖開発ワーカー（VADW） として認定することで、中核養殖農家のオーナーシップやインセンティブを高め、農民間養殖技術普及を促進するというアイディアが出されている。畜水産局（DLF）は、現在、村落畜産防疫ワーカー（VVW）の認証制度を運用している。ラオス政府から認証を受けた VVW は、他の農家の保有する家畜に予防接種を行うなどの資格を有し、ワクチンの接種料として現金収入を得る仕組みとなっている。現在のところ VVW の認証制度は効果的に機能している。この制度を参考に、養殖においても、中核農家を VADW として認証してはどうかという提案である。

しかし、現在まで、DLF による VADW の認定のアイディアは、VADW 認証の目的、役割、資格要件、認証のプロセスなど、その詳細に関する議論は十分に行われていない状態である。また、VADW に関するアイディアは、中央レベルである DLF のみで議論され、県や郡には、その意識の共有は十分に行われていない。今後、VADW の認証制度の有効性や運用の仕方を、県別養殖開発戦略や全国養殖開発計画の策定プロセス等を通じて引き続き検証する必要がある。

一方、村で将来 VADW となり得る中核農家自身は政府（中央・県・郡）から認証を受けることで、種苗の品質などが保障されるため、より多くの顧客を確保できるという点で期待できるシステムであると感じている。

２－１－３　実施機関の役割・体制

(1) 関係機関の役割・連携

本プロジェクトの活動を通して、養殖技術関係や普及に関する関係機関（農林省畜水産局（MAF･DLF）、ナムスワン養殖開発センター（NADC）、県農林事務所（PAFO）、県養殖ステーション（PAS）、郡農林事務所（DAFO）等）間のコミュニケーションが活発に行われるようになった。また、ワークショップや会議の実施により、中央と地方政府間の関係が強化された。各対象県において、県の養殖開発戦略のドラフトが策定された。

一方、農林省畜水産局（DLF）、計画局（DOP）、農林普及局（NAFES）、農林研究所（NAFRI）といった中央機関である農林省（MAF）の関係機関の役割が不明確であり、また連携・協力関係も希薄である。例えば水産に関する研究における畜水産局（DLF）下のナムスワン養殖開発センター（NADC）と農林研究所（NAFRI）下の水生生物研究センター（LARReC）の役割分担が明確でない。このため、本プロジェクトの進捗や課題についてもコミュニケーションが十分に行われておらず、情報共有が不足している。加えて、農林省（MAF）の組織改編は未だ完了しておらず、

ナムスワン養殖開発センター（NADC）の役割や機能が明確になっていない。

(2) 予算・人員

①必要な予算の配分

ナムスワン養殖開発センター（NADC）の活動資金不足は養殖を行うための設備や機材、薬品等を購入する資金不足となっている。県・郡の予算は恒常的に不足傾向にあり、普及やモニタリングに必要な普及員の旅費が十分に確保できないため、養殖の普及のための活動の一部に支障をきたしている。

②必要なカウンターパートの配置

特にナムスワン養殖開発センター（NADC）においては、センター長が不在のために意思決定に時間がかかり、プロジェクトの効率的な運営に支障をきたしている。しかし、本中間評価を通じて行った討議や協議により、畜水産局（DLF）は、現在センター長代行の Ms. Nounak LIEPVISAY を正式にセンター運営責任者（正式なセンター長ではないが、実質的にセンター長と同様の権限と義務を持っている）に任命することを決定した。

一方､プロジェクト開始時には 10 名いた職員のうち 2 名が大学に進学中であるが欠員が補充されておらず、プロジェクトの活動に支障をきたしている。2 名の大学卒の職員やフィールド調査員の補充が望まれる。

２－１－４　他の JICA プロジェクト・スキームとの連携

(1) 森林管理・住民支援プロジェクト（FORCOM）との連携

本プロジェクト（AQIP2）は、養殖手法の開発と普及を行うプロジェクトである。一方、FORCOM は、総合的森林管理を通じた統合的な農村開発を行っている。本プロジェクトは、FORCOM のパイロット村である北部サヤブリ県の Tha 村、Namon 村および Longseng 村において、養殖現場を視察し、養殖に関する助言を行ったり、ポスターを用いたワークショップを実施して村人達に養殖技術指導を行っている。本プロジェクトは、プロジェクトで開発した手法が、総合的な農村開発の中ではどのように位置づけられるのか、他の営農活動と適切なバランスが保てるのかなどについて検証を行うことが出来るなどのメリットがある。一方､FROCOM にとっては、本プロジェクトで実証された養殖手法が導入され、技術的指導を本プロジェクトより受けることができるなどのメリットがある。これらの連携は、本プロジェクトと FORCOM 双方の得意分野をお互いの活動に活かすことにより､双方の活動の効率化および効果の拡大が期待できるものである。また、双方のプロジェクトのカウンターパート（C/P）や村人たちの間の交流が行われることによって、お互いの技術や知識を高めていくことも可能である。

(2) 青年海外協力隊（JOCV）養殖隊員との連携

ウドムサイ、サバナケット、サラワンの 3 県において、県養殖ステーション（PAS）に配属の「養殖」JOCV 隊員によるプロジェクト巡回指導への参加、PAS 研修への

支援などの活動が行われた。その結果、プロジェクトと県養殖ステーションとの関係の強化などの成果が得られている。また、プロジェクトより JOCV に対し技術支援などを行ったことにより、県養殖ステーション（PAS）の種苗生産量が向上してプロジェクトの養殖普及活動に大きな役割を果たした。

今後、JOCV との連携を円滑に進めていくためには、養殖関連分野で JOCV がラオスに派遣される際には、本プロジェクトと連携して農山村養殖普及活動に参加する可能性があることを JOCV 隊員の TOR・要請背景の中に明記し、JOCV が本プロジェクトとの連携活動が隊員の本来業務に含まれることを承認した上で赴任されること、赴任後には本プロジェクトについてのブリーフィングを行い、プロジェクトへの理解を深めてもらうことが必要である。

２－２　投入実績

プロジェクトの投入実績は、以下のとおりである。

２－２－１　日本側投入

(1) 専門家派遣

プロジェクト開始時より長期専門家 計 3 名（研修／親魚育成／種苗生産、養殖技術 1／普及、養殖技術 2／村落開発／流通調査）が派遣されるとともに、短期専門家が計 7 名（チーフアドバイザー、ジェンダー主流化／生活改善、参加型開発、初期開発（Early Level Development）、施設設計、営農改善、域内ネットワーク強化）及び水産普及／マネージメントに関するタイ第三国専門家が派遣された。

(2) 研修

①本邦研修

淡水魚養殖、持続的養殖開発、ジェンダー主流化と養殖開発に関する研修を 14 名が受けた。参加者が新たな知識や経験を得ることでプロジェクトの活動がスムーズに進むようになった。これらの本邦で行われる研修に参加することは、参加者のモチベーションを向上させ、また日本およびラオス間のネットワークを構築する機会となった。

②第 3 国研修

主として、県および郡の職員 21 名がタイにおいて養殖現場視察研修を受けた。タイはラオスと気候、文化、言葉に類似性を有するため、参加者は養殖の具体的なイメージや有効な知識と技術を身につける機会を得た。

③国内研修

県・郡職員、農民 692 名が、国内の研修において、種苗生産・水質管理・魚餌の作成についての知識や技術を習得し、その後、それらを他の職員や農民へと移転した。農民は視察旅行に参加することで養殖を導入することに対する興味を持った。研修は主にナムスワン養殖開発センター（NADC）、県養殖ステーション（PAS）およびパイロット村で行われた。

(3) 供与機材

プロジェクト活動に必要な機材、4 WD 車両、モーターバイク、コンピューター、コピー機などが、ナムスワン養殖開発センター（NADC)、各県養殖ステーション（PAS)、郡農林事務局(DAFO)などに供与された。供与された機材の合計は、113,310 ドルであった。

また秤や網といった養殖活動に必要な資機材は、DAFO を通じて、パイロット村に供与されたが、村落養殖振興委員会（VAPC）のリーダーおよび機材管理担当者によって適切に管理、使用されている。VAPC は機材を農家に貸与してその費用を VAPC の基金として積み上げている。

(4) 施設改修

ナムスワン養殖開発センターや県・郡養殖ステーションの施設改善養殖のための実験池や水槽の施設改修が必要に応じて行われた。合計は約 133,800 ドルであった。

(5) 現地業務費

研修・セミナー実施経費、巡回指導経費、普及教材作成経費などを目的に、現地業務費として合計約 363,372 ドルの支出が行われた。

２－２－２　ラオス側投入

(1) 土地・施設・機材等

土地、建物の他、トラック 1、4 輪駆動車 3、ミニバス 1、バイク 2、PC 3、プリンター1 などの機材が提供された。

(2) カウンターパート配置

農林省畜水産局長、ナムスワン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、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等など 24 名が配置された。

その他、プロジェクト活動経費など、合計 32.3 百万円の支出が行われた。

２－３　活動実績

(1) 活動 1-1. パイロットサイトとなる農村及び対象農家を選定する。

①活動 1-1-1. 基礎的情報の収集・整理・分析

2005 年 5 月～6 月に情報収集のための調査が行われ、パイロット候補村各々の生活および養殖状況についての報告がまとめられた。

②活動 1-1-2. パイロット村の選定

郡農林事務所（DAFO）によりパイロット村が推薦され、パイロットを実施するにあたり適切であることが確認された。

(2) 活動 1-2. パイロット事業の活動運営計画を策定する。

①活動 1-2-1. PDM 指標の決定

2005 年 6 月に主体的参加型農村開発手法（PRA）ワークショップが実施され、各々の対象県およびパイロット村での養殖普及に関する現況および課題が明確にされた。6 月から 11 月にかけてベースライン調査が行われ、各パイロット村における生活や養殖の状況に関するデータを得て各々の村の特性などが明確化された。これらのデータに基づいて PDM 指標が設定され、2006 年 2 月の第 1 回合同調整委員会（JCC）で承認された。活動は計画通りに実施されたが、パイロット村における生活や養殖の状況は不安定であるため、プロジェクトはそれらの変化に対応するように留意することが必要である。

②活動 1-2-2. 郡別活動計画の策定

主体的参加型農村開発手法（PRA）ワークショップおよびベースライン調査で得られたデータに基づき、村での養殖推進のためのアクションプランが準備された。ただし、アクションプランは村落養殖振興委員会（VAPC）や対象農家への理解を深めるための説明に時間を要したため予定より遅れて作成された。

③活動 1-2-3. パイロット事業に参加する中核養殖農家の選定及び村落養殖振興委員会（VAPC）の組織

各村において養殖農家および村落養殖振興委員会（VAPC）のメンバーが選定された。各々の人数は村の規模により異なる。選定された養殖農家および VAPC メンバーは郡農林事務所（DAFO）およびプロジェクトにより継続的にモニターされる必要があり、メンバー等に変更の必要が生じた場合にはその対応を行う。

(3) 活動 1-3. パイロット事業を実施する。

農村部に適した複数の手法と普及方法が明確になった。現地指導により、ナムスワン養殖開発センター（NADC）、県農林事務所（PAFO）、県畜水産局（PLFS）、県養殖ステーション（PAS）、郡農林事務所（DAFO）および村の協力体制が強化された。2 年目に本格的な技術指導が開始された。

(4) 活動 1-4. 主にナムスワン養殖開発センター（NADC）において、農家レベルの養殖実用技術の改良と開発を行う。

対象村の養殖における課題を踏まえて、低投入及び低リスク養殖技術開発のための実証試験が行われるなど、計画通りに実施されている。

(5) 活動 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。

①活動 2-1-1. 研修計画の策定

地方政府職員および対象養殖農家向けのナムスワン養殖開発センター（NADC）研修、県養殖ステーション（PAS）研修および視察研修の実施内容が決まり、コースガイドが作成された。

②活動 2-1-2. 各種テキストの作成

テキスト 2 種（「ティラピア種苗生産」、「コイ種苗生産」）、マニュアル「ラオスにおける養殖普及」、ガイドライン「養殖普及におけるジェンダー主流化」が準備された。配布されたテキストやマニュアルは、各村の村落養殖振興委員会（VAPC）に供与されている。しかし、個々の農家からもテキスト等の配布に関する要望が出されているため、増刷やコピーなどの対応が望まれる。なお、改訂版は 4 年目に作成される予定である。

(6) 活動 2-2. ナムスワン養殖開発センター（NADC）、県養殖ステーション(PAS)及びタイにおいて、県技術員、県・郡普及員及び中核養殖農家の研修を行う。

NADC における養殖研修（24 名）、対象農家に対する養殖研修（48 名）、県養殖ステーション（PAS）における OJT（80 名）、タイ（20 名）、ラオス国内（36 名）、本邦（12 名）での視察研修が実施された。研修の計画策定にあたっては、県農林事務所（PAFO）との緊密な連携が必要である。また、農家向けの研修は、農作業の繁忙期を外して実施されることが必要である。

(7) 活動 2-3. 県養殖ステーションの養殖普及活動のための機能を強化する。

ウドムサイ、サヤブリ、サバナケットおよびサラワン県の県養殖ステーション（PAS）並びにサラワン県ラオンガム郡養殖ステーションの研修および種苗生産機能が強化された。

(8) 活動 3-1. 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。

郡農林事務局（DAFO）に推薦された村のうち、2 村を除く全ての村（すなわち 56 村）は、普及展開対象村として適切であると判断された。各村のベースライン調査（生活状況、主な産業、養殖状況、女性同盟の活動状況など）が行われた。また、普及展開計画も準備されている。

(9) 活動 3-2. 養殖農家を対象とした、養殖手法の視聴覚教材を作成し、研修を行う。

ティラピアとコイ育成のために必要な技術を収録した VCD（視覚教材）が作成された。その他、壁掛けパネルや紙芝居などが用意され、村落養殖振興委員会(VAPC)、農家や小学校などで養殖に対する理解を深めるために役立っている。

(10) 活動 3-3. 選定した養殖農家に対して普及活動とモニタリングを行う（養殖普及展開事業）。

対象村における養殖の特色や村人の本プロジェクトに対する期待（ニーズ）が明らかにされて技術指導や現場研修などが行われた。

(11) 活動 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。

対象県における養殖活動に関するデータが収集及び集積された。

(12)活動 4-2. 対象県の養殖普及戦略の策定を支援する。

2007 年 1 から 2 月に対象県においてワークショップが行われて養殖における現状や解決されるべき課題が討議された。その結果として、県養殖開発戦略（PADS）の第一段階のドラフトが作成された。

(13)活動 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。

活動はまだ行われていない。4 年目から 5 年目にかけて実施される予定である。

(14)活動 4-4. 養殖普及の促進のために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。

活動はまだ行われていない。5 年目に実施される予定である。

２－４　成果達成状況

２－４－１　指標によるプロジェクト成果ごとの達成状況の評価

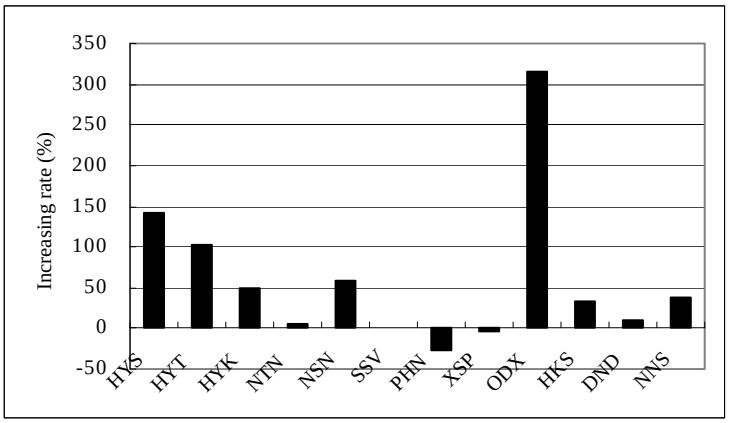
(1) 成果 1　パイロットサイトの立地条件に適合した養殖手法が実証される。

A 指標 1-1. 現地の状況に合ったマニュアルが整備される。

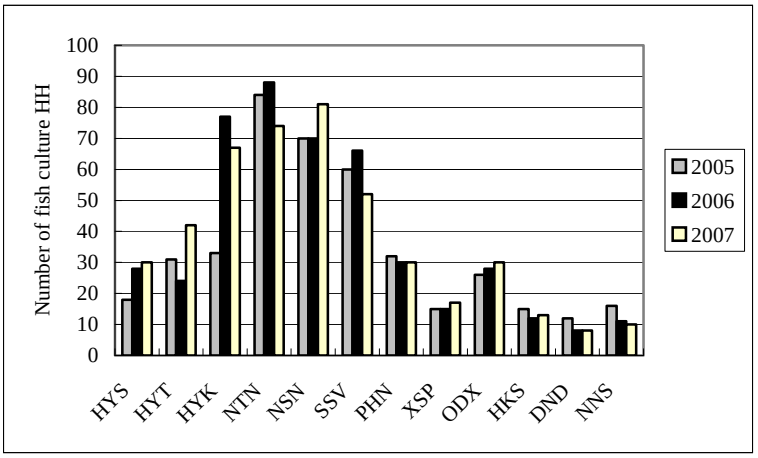
3 種の技術マニュアル、視聴覚教材（ティラピアおよびコイの育成技術 VCD)、壁掛けめくりタイプおよび紙芝居（魚の生産量の増やし方）が作成された。マニュアル等は、現地語で写真や図、表などが活用され、養殖農家の理解を得やすい構成となっている。養殖農家は、給餌や施肥の方法、種苗生産や中間育成技術についての理解が深まった。

B 指標 1-2. パイロット村において対象農家の魚生産が平均 40%増加する。

パイロット 12 村のうちの 7 村において、魚の生産量が 40%以上増加した。なお、池の数は南部で 46%、北部で 191%増加したことに伴い、魚の生産量も増加している。



表：パイロット村における各養殖農家ごとの魚の生産量（2005～2006 年）



表：パイロット村における各養殖農家数の推移（2005～2007 年）

C 指標 1-3. パイロット村の対象農家のうち 60%以上が、パイロットプロジェクト終了時に養殖を継続する高い意欲を有す。

ワークショップの結果により、ほとんどの農家が、養殖を継続して実施したい意向を有すことが判明した。

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

A 指標 2-1. 各 PAS において 2 名以上の職員が郡県職員および農民に研修を行うことができる。

各県養殖ステーション（PAS）のうち、2 名以上の職員がナムスワン養殖センター（NADC）での研修、タイへの視察研修、本邦研修、現場の活動、ワークショップなどによって能力が向上した。また、PAS 研修を実施することにより農民を訓練する能力が向上した。

県・郡養殖ステーションで稚魚を購入する多くの村人たちは、県・郡養殖ステーション職員から池の作り方や稚魚の適切な放流の量等についての助言を受けながら、概ね養殖に成功している。

B 指標 2-2. 各県農林局（PLFS）および郡農林事務所（DAFO）においてそれぞれ 2 名以上の職員が農民を指導することができる。

本プロジェクトによって各 PLFS および DAFO の職員の 1 名のみが訓練された。今後、PLFS において、本プロジェクトによって訓練される職員が増加する見込みは少ない。一方 DAFO においては、DAFO 内研修により訓練される職員数は増加する見込みである。

C 指標 2-3. 各パイロット村において少なくとも 1 名以上が他の農家に普及を行うための意欲の高い村落養殖開発ワーカー（VADW）となる。

パイロット事業開始後の 2 年間の活動を通して、養殖への関心が高く養殖技術

を周囲の人々に普及させる能力のある中核農家が、南部で 9 農家、北部で 19 農家存在し、各パイロット村に 1 人以上が VADW となる可能性がある。中核農家を政府により正式に VADW として認証することで農民から農民への普及システムが形成され、プロジェクトの自立発展が期待できる。しかし、中核農家を VADW として認証する制度はまだ導入されていない。また、認証制度について現在までに十分な検討は行われていないため、引き続き検討が必要である。

(3) 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（養殖普及展開事業）。

指標 3. 8 つの協力重点郡において、少なくとも 600 農家以上（普及村）が改良された手法を導入する。

養殖普及のための活動は 3 年目に開始された直後にあるため、現時点で達成状況を測ることは困難であるが、普及拡大対象村の適切性の検証、各村のベースライン調査（生活状況、主な産業、養殖状況、女性同盟の活動状況など)、「県別養殖開発戦略」のドラフトの準備などが計画通りに進捗している。また、すでに普及展開村は選定されて基本的なデータが収集されており、一部の村では普及活動が開始されて女性同盟のグループ養殖なども行われている。2 年間の普及展開事業において、プロジェクトの直接および間接的な指導によって 600 以上の農家が本プロジェクトによって開発された手法を導入する見込みである。

(4) 成果 4　立地条件に適合した養殖手法の普及に際して関係機関の機能と連携が強化される。

指標 4-1.　関係機関が各機関の役割を明確にした協力協定を受け入れる。

指標 4-2.　責任を持つ機関が国家養殖普及計画のために必要な予算を確保する。

指標 4-3.　プロジェクトはラオスにおける持続可能な養殖開発に関する提言を行う。

各機関の連携は本プロジェクトを通じて強化された。協力の形態の最終的な形として、県養殖開発戦略および国家養殖普及計画がプロジェクト最終年度に作成される。

２－５　プロジェクト目標の達成度

プロジェクト自己評価（ステップ 1)、評価準備委員会（ステップ 2）の評価結果を踏まえ、現時点において、プロジェクト目標「協力対象 4 県（ウドムサイ県、サヤブリ県、サバナケット県、サラワン県）で、立地条件に適合した養殖手法が普及する。」は下記の指標 1、2 の達成状況により達成の見込みは高いと考えられる。

プロジェクト目標：協力対象 4 県（ウドムサイ県、サヤブリ県、サバナケット県、サラワン県）で、立地条件に適合した養殖手法が普及する。

指標 1：4 県 720 養殖農家（パイロット村 120、普及村 600）で魚の生産量平均 40%増加

対象村に適合した養殖技術の改善や適切な普及活動の結果、パイロット村の平均生産量は40%以上の増産となっている(２－４　成果達成状況（1)Ｂにデータを記載）。なお、普及村の活動は開始直後のためにデータはまだ存在しないが、パイロット事業の成果を踏まえると達成の見込みは高いと思われる。

指標 2：県および郡レベルで養殖開発計画が策定される

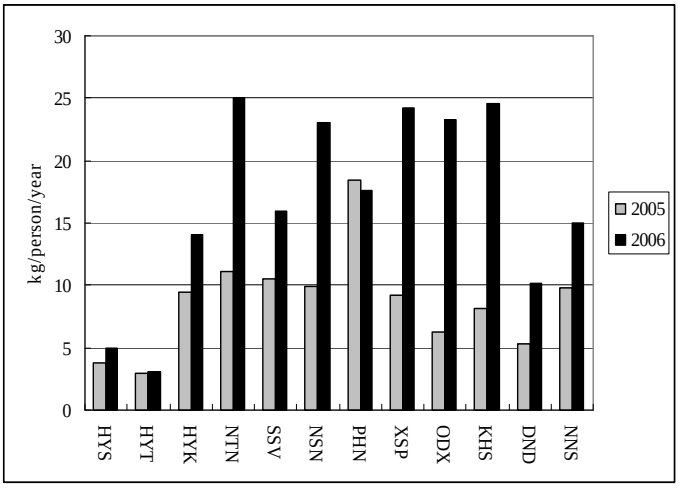
2 年目に県養殖開発計画のドラフトが作成された。ラオスの状況に合致した養殖開発は最終年度に提言される。

２－６　上位目標の達成見込み

上位目標：

指標：対象 4 県において、村落部の住民の魚の消費量が 22kg／人／年となる。

パイロットプロジェクトにおいて、魚の消費量は急激に増加しており、12 村中 5 村ですでに 22kg を達成している。また、2005 年より 2006 年に消費量が増加したのは 12 村中 11 村である。このことから、プロジェクトによって導入された養殖システムにより、上位目標が達成される見込みが高いと考えられる。



表：パイロット村における魚の消費量（kg／人／年）

ラオス政府は食料安全保障戦略の中で魚の供給量（魚の消費量と同等の意味）をモニターする必要性について言及しており、魚の消費量の増加は村人の生活向上の度合いを図る重要な指標である。プロジェクトではパイロット村における村の魚の消費量をモニターしているが、その方法はまだ標準化されていないため、郡農林事務所（DAFO）によりその手法の確立と普及が必要である。

２－７　指標以外によるプロジェクト評価

(1) 村人の養殖へのモチベーションの高さ

魚は村人にとって最重要な動物性蛋白源であり、その安定供給を可能にする養殖への関心は極めて高い。また、水田稲作が広く行われている比較的裕福な村では米より価格が高い魚を生産することへのモチベーションは高い。

(2) 女性同盟の結束力の強さ

ラオスでは中央・県・郡・村の各段階に女性同盟が組織されており、階層間でのネットワークは強固で情報共有も良くなされている。本プロジェクトでは女性同盟を活用することで、対象村内の女性同盟メンバーによる養殖技術の効率的な移転や生産性の向上に寄与するとともに、他村の女性同盟に対する波及効果についても期待ができる。

(3) フェーズ 1 の成果のフェーズ 2 における継続性と課題の解決

中央レベルの技術開発と研修を行うことを目的としてフェーズ 1 で整備されたナムスワン養殖開発センター（NADC）は現在も適切に維持・管理されていて、プロジェクトオフィスは NADC の中に配置されている。実験用の池は一部に亀裂が入って使用できなくなっているものもあるが、補修の一部はすでに行われて残りもこれから行われる予定である。

フェーズ 1 では、技術者（6 名）が親魚育成及び種苗生産の手法を修得した。フェーズ 1 の際に勤務していた職員 10 名のうち 6 名が現在も NADC で勤務を行っている。

一方、県技術員・郡普及員の能力、地方における適正種苗、地方レベルの普及活動の不足、不適正な養殖（過剰な施肥による池の富栄養化、不良な種苗の使用、非効率的な給餌、池の不適切な利用など）などの課題が残っているが、県技術員・郡普及員はプロジェクトでの研修や村での実地指導を通してその能力を向上させている。また、県・郡の職員に加え、農民に対する研修を強化することで、不適切な養殖手法から、それぞれの立地条件に合った養殖手法を取り入れつつある。

第３章　評価結果

３－１　評価結果総括

本プロジェクトの妥当性、有効性、効率性、インパクトおよび自立発展性は高いと判断される。しかし自立発展性を確保する方策のさらなる検討が必要である。

３－２　評価５項目による分析

３－２－１　妥当性

本プロジェクトの妥当性は高いと判断される。

＜必要性＞

・**プロジェクト目標とラオス国のニーズの整合性：**ラオスの農村部における国民一人あたりの年間魚供給量は約 8～10kg とインドシナ諸国で最も低い水準にある。ラオスにおける農村部での養殖は、自家消費を主な目的としているため、低コストの養殖開発に対する基本的なニーズが存在する。

＜優先度＞

・**上位目標とラオス国家政策との整合性：**本プロジェクトは、ラオスの「第５次社会経済５ヵ年開発計画（2001～05 年)」で示された８つの重点分野のうちの「食料の安定供給」と「貧困世帯の削減」の達成に資するものである。また、「国家成長・貧困撲滅戦略（NGPES)」（2004 年）において、貧困削減を重視した農林業開発は重点課題に位置づけられている。NGPES では、全国 142 郡の内 72 郡を貧困削減のための対策上の優先地域と指定しているが、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、貧困削減の達成を目指す国家の戦略に沿うものである。

・**上位目標とわが国の対ラオス国 ODA 政策との整合性：**上位目標はわが国の開発途上国援助の協力方針において重点の置かれる食料安全保障と貧困緩和に合致する。また、JICA の対ラオス国別事業実施計画における４つの援助重点分野のうちの「人的資源開発」「ベーシック・ヒューマン・ニーズ」「農業」に合致する。

＜手段としての適切性＞

・**プロジェクトの被援助国の開発課題に対する効果をあげるための戦略の適切性：**本プロジェクトは、農村部の立地条件に合致した養殖手法の確立を行い、その後、普及を行うステップにあり、また、ラオス政府が指定する貧困郡を 20 郡含んでいることから、貧困削減の達成および食料の安定供給に資することが期待される戦略である。

・**ターゲットグループの選定の適正性、ターゲットグループ以外への波及性の有無：**本プロジェクトは、北部および南部の各２県をターゲット県としていることから、南北で気候条件等が大きく異なるラオスにおける今後の普及に資するものである。

また対象地域の農民にとって、現金収入源及び栄養源の確保の観点から、養殖技術普及に関するニーズは高い。

・**わが国が本プロジェクトを実施する意義：** 本プロジェクトは農村部での安定した養殖の実践を目指すもので、日本の有する高い養殖技術と普及能力の技術移転を行う本プロジェクトの実施意義は高い。

・**フェーズ 2 実施の意義：** 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政府のナムスワン養殖開発センター（NADC）の施設及び同協力で育成された人材を活用して実施されており、フェーズ 1 の成果を継続的かつ持続的に活用し、ラオスの養殖開発に資するものであることから、フェーズ 2 の実施の意義は高い。フェーズ 1 での成果をさらに発展させ、抽出された課題を解決しうることで、より地域の状況に合った養殖手法をラオス全土へ普及させることが可能であると思われる。

３－２－２　有効性

本プロジェクトの有効性は高いと判断される。

・**プロジェクト目標の達成予測：**本プロジェクトの活動（パイロットプロジェクト事業、研修、技術改良のための実証試験、種々の現地調査など）は、プロジェクト目標達成に資するものである。また、関係機関（JICA ラオス事務所、プロジェクト、畜水産局（DLF)、地方行政機関）の連携状況は良好である。PDM においては、養殖普及は個別の養殖農家を対象としているが、実際のパイロット事業および普及活動では、グループ／コミュニティ、女性同盟（WU)、学校、低所得者等のグループによる養殖の普及手法を確立することの必要性が判明した。しかし、グループ／コミュニティ養殖普及パターンを確立するには、予定されている 3 年というパイロットプロジェクトの実施期間は短いことが懸念される。

３－２－３　効率性

本プロジェクトの効率性は概ね高いと判断される。

日本側からの投入は適切であった。ラオス側からの投入は概ね適切であったが、ナムスワン養殖開発センター（NADC）の人材が不足している点により、効率性がやや低下したと思われる。地方機関職員および養殖農家への研修は効果的に実施され、有益な結果を得た。

＜アウトプットの達成度及び投入結果＞

・**アウトプットの達成度：**現時点で、概ね予定していたとおりの成果を達成していると考えられる。

・**日本人専門家の投入：**日本人専門家の分野、人数、投入時期は、適切であった。

・**ラオス側 C/P の投入：**中央及び地方政府のカウンターパート（C/P）はプロジェクトに積極的に参画している。ただし、ナムスワン養殖開発センター（NADC）における本プロジェクトへ参加する職員数およびNADCの本プロジェクトへの投入金額は不足している。現在、NADC では、7 名の常勤職員、6 名の非常勤職員が配置されているが、NADC の活動およびプロジェクトの活動の円滑な実施、また、プロジェクト終了後も持続的に活動を継続するには、現状の人員では不足である。ラオス政府から NADC に配分される運営資金には、警備、魚の餌、燃料その他の設備をカバーする費用が含まれていない。これらの費用に加え、現在、日本側の負担している種々の現地での費用は、プロジェクト終了後はラオス側で負担される必要があるため、必要な方策を考える必要がある。

・**設備：**ナムスワン養殖開発センター（NADC）、県養殖ステーション（PAS）、地方機関の施設はプロジェクトで適切に使用されている。

・**供与機材：**ナムスワン養殖開発センター（NADC）に供与された全ての分野、事務所、研究所における機材は十分に活用された。地方機関、パイロット村に供与された機材も同様に活用された。

・**研修：**パイロット村に養殖農家は研修で得た知識や技術を適用した。何人かの農家は知識や技術を他の村に移転した。県・郡の職員は普及活動において研修成果を活用して僚に成果を共有する努力を行った。

・**プロジェクト実施費用：**日本およびラオス側から供与された資金はプロジェクトの活動を行う上で適切に使われている。

＜過去の教訓の活用や他のプロジェクト等との連携＞

・**他のプロジェクト等との連携：**青年海外協力隊（JOCV）の活用および森林管理・住民支援プロジェクト（FORCOM）との連携を行うことにより、本プロジェクトの効果の向上に寄与していると思われる。

・**効率性を阻害する要因：**本プロジェクトには高い効率性が認められるが、以下の 2 点について改善を行うことにより、さらに有効性を高めることができると考えられる。①日本人専門家の一部の投入開始時期を種苗生産シーズンの 4 月上旬から行うこと、②ナムスワン養殖開発センター（NADC）における大卒の職員およびフィールドワーカーを増員すること。

・**残りのパイロットプロジェクト期間に必要とされる追加投入：**現在実施されているパイロットプロジェクトは「農民から農民への養殖普及システム」の確立のために必要なものであるが、2 年半のパイロットプロジェクトを経て、3 年間のパイロットプロジェクトはそれらのシステムの確立には不十分であると思われるため、少な

くとも 1 年間の期間の延長を行い、4 年間とすることが望ましい。

３－２－４　インパクト

本プロジェクトのインパクトは、大きいと思われる。

・**上位目標達成の見込み、相手国の開発計画への貢献：**上位目標である年間一人当たりの魚の消費量 22kg は本プロジェクトの 12 村中 5 村ですでに達成し、11 村においては 2005 年に比べて 2006 年の消費量が上昇していることから、上位目標達成の見込みは高いと思われる。

・**青年海外協力隊（JOCV）活動との連携：**プロジェクト期間中にウドムサイ県・サバナケット県・サラワン県の養殖ステーションに養殖分野の JOCV が配置されて活動を行っている。AQIP2 はこれら JOCV と連携を図り、JOCV の活動の結果によってプロジェクトと県養殖ステーションの関係強化及び県ステーションの種苗生産の向上や施設改善のモニタリングに貢献している。また JOCV 側もプロジェクト側から NADC での研修やマニュアルの共有等を通じて技術支援を得ている。

・**森林管理・住民支援プロジェクト(FORCOM)との連携：**FORCOM 対象村において AQIP2 の養殖技術が活用され、養殖技術の改善や生産性の向上といった成果が上がっていることが確認できた。FORCOM では養殖の活動を行なっている村も多くあり、引き続き AQIP2 の成果を活用して養殖普及を行なうことが望まれる。

・**予期しなかったプラス・マイナス効果：**本プロジェクトでは研修や巡回指導において男女平等に参加できるようにされており、巡回指導の際の女性の参加者数が向上した。また、女性同盟のメンバーがプロジェクトの技術支援を得て養殖を行ったことによって家族の栄養価が向上して収益を得たことから、女性同盟では養殖活動の経験を元に、メンバー内で出資金を積み立てて貸し出す活動を開始するなど、養殖を始めたことにより女性同盟の活動の活発化に繋がったケースがある。

３－２－５　自立発展性

本プロジェクトの自立発展性は概ね高いと思われるが、自立発展性を確保する方策のさらなる検討が必要である。

＜組織のキャパシティ等＞

・**政策的支援の持続・実施機関のオーナーシップ：**本プロジェクトの目標はラオス政府の国家政策等に完全に合致し、関係機関が本プロジェクトを国家政策の達成のために重要なツールの１つであることを認識していること及びプロジェクト側からの情報共有に努めて評価等をカウンターパート（C/P）を含めたラオス側と一緒に行ってきていることから、実施機関のオーナーシップは強い。

・**受益者の参加意欲の継続：**実際に養殖に参加する村民の自立発展性を確保するには

パイロット事業の成功を目に見える形で示すこと（村民が利益・利点を実感すること）が最も重要である。現在、パイロット事業は順調に行われていて、本プロジェクトで開発された養殖手法は村民に積極的に取り入れられていること、本プロジェクトに対する農民の期待は高いことがワークショップ等の結果により判明している。

＜行政・技術面＞

・**地域性に合った養殖手法の開発：**本プロジェクトはパイロット事業において地域性に合った養殖手法が開発されつつあり、プロジェクトの終了後も継続的に養殖農家においてその手法が用いられる見込みが高い。

・**プロジェクト成果の普及：**本プロジェクトは、パイロット事業において、地域性に合った養殖手法を確立し、その後、パイロット対象外の村落への普及というアプローチを取っている。パイロット事業の成果がパイロット対象外の村落へ普及されるためにはパイロット対象外の村落における中核農家・普及員が育成されることが重要である。

・**村落クラスターアプローチ制度の推進に伴う養殖普及法の導入：**ラオス政府は現在、新しい行政制度として村落クラスターアプローチを導入しつつある。1 つのクラスターは平均 7～10 村を含み、各クラスター（村グループ）は各々に技術サービスセンター（TSC）を設置して農村から行政、行政から農村のサービスなどのアクセスを改善することを目的に推進されている。プロジェクトの今後の普及展開にあっては村落クラスターアプローチ制度を有効に活用することで、より普及がスムーズかつ効果的に行われることが期待される。

・**受益者（農民）のプロジェクトへの継続的な参加に対するモチベーション：**最終受益者である農民の自立発展性を確保するためには、成功事例を目に見える形で示して農民自身が活動により得られる利益を体感することが重要である。現在までパイロット事業は順調に行われていてプロジェクトによって開発された養殖手法は農民に積極的に取り入れられている。プロジェクトに参加している農民の継続的な参加意思は極めて高い。また、プロジェクトに参加していない農民からの参加要望も多い。

第４章　提言

４－１　ラオス政府への提言

＜関係機関の役割の明確化及び連携強化＞

プロジェクトの活動を通じて養殖の技術開発や普及に関わる畜水産局（DLF)、ナムスワン養殖開発センター（NADC)、県農林局（PLFS）及び郡農林事務所（DAFO）の関係はプロジェクト対象県において強化されてきている。今後ラオスに適した養殖技術を対象県内の他の郡や他県に広げていく上では、中央レベルの畜水産局（DLF)、農林普及局（NAFES)、農林研究所（NAFRI)、地方レベルの県農林局（PLFS）及び郡農林事務所(DAFO)の役割を明確化して具体的な連携の方策についてさらなる検討を進めるべきである。

プロジェクト後半には県別養殖開発戦略や国家養殖普及計画の策定プロセスを通じて、関係機関で養殖の技術開発及び普及における役割分担と連携の方策を検討することが求められる。

４－２　プロジェクトの運営についての提言

＜PDM 指標の変更＞

以下の 2 つの指標について、見直しを行い、次のとおり修正する。指標の変更については、2008 年 3 月に行う予定の JCC にて正式な承認手続きを行う必要がある。

(1) 指標 2-2. 各県農林局（PLFS）及び郡農林事務所（DAFEO）それぞれにおいて、2 名以上の職員が養殖農家に技術指導を行うことができる。を以下の２つの指標に分ける。

指標 2-2. 県農林局（PLFS）において、2 名以上の職員が県養殖計画を策定でき、また県養殖ステーション（PAS）や郡農林事務所（DAFO）に対して養殖普及に必要な指導を行うことができる。

および

指標 2-3. 郡農林事務所（DAFO）において、2 名以上の職員が養殖農家に技術指導を行うことができる。

修正理由：PLFS の主な役割は農家に対する技術指導ではなく、県養殖計画の策定やそれに基づく県養殖ステーションや郡農林事務所に対する指導であり、その役割を踏まえて指標を整理する。また、ラオスにおける農林業行政の組織改変によって DAFEO は DAFO となっているため。

(2) 指標 4-2. 責任を持つ機関が国家養殖普及計画のために必要な予算を確保する。を削除する。

修正理由：プロジェクトの活動のための関係機関による予算措置は外部条件にあたるのでプロジェクトの直接の活動に含まれない。ただしプロジェクトの円滑な活動や自立発展性を確保するためには予算措置は必要不可欠でるため、全国養殖開発計画や県別養殖開発戦略の中で具体的な予算措置についても検討がなされるべきである。

(3) 変更を行わないが継続検討が必要な指標：指標 2-3. 各パイロット村において少なくとも 1 名以上が、他の農家に普及を行うための意欲の高い村落養殖開発ワーカー（VADW）となる。

評価準備委員会で修正提案のあった本指標については、プロジェクト後半の VADW の任命制度の検討状況を踏まえて、指標の変更について検討をするべきである。

４－３　プロジェクト後半の期間における活動に対する提言

４－３－１ グループ養殖手法の確立

パイロット事業において、女性同盟によるグループ養殖により生産量の拡大や基金の積上げといった成功例が見られる。グループで養殖を行なうことで、養殖に必要な投入を分け合ったり、グループ内で技術移転を行なったり、給餌や池の管理を分担できるといったメリットがあると考えられる。

農家のなかでは養殖を行ないたくても十分な投資ができないために始めることができないケースもあり、そのような農家が養殖技術を導入するためにもグループ養殖の方法は有効と考えられる。

プロジェクト前半を通じて、女性同盟、学校及び低所得者によるグループ養殖について可能性があることが明らかになった。パイロット事業における女性同盟によるグループ養殖の成果を踏まえた上でプロジェクト後半に、グループ養殖の活動とその分析を行い、グループ養殖手法の確立に取り組むべきである。

そのためにはすでに村落養殖振興委員会（VAPC）が十分に機能していてグループ養殖の成功事例が出始めているパイロット村を活用しつつ、普及展開村においてもニーズや可能性がある村では積極的に取り組みを行うべきである。

４－３－２　魚の消費量の測定方法の確立

魚の消費量を正確に測定することは、ラオス政府が定めている魚の消費目標の達成状況をモニタリングするため、また各村・農家レベルでの食料確保の状況を確認するために重要であるが、現在のところその測定方法は標準化されていない。農林省（MAF）としては予算や人材面を考慮した魚の消費量の測定方法の確立を早急に検討するべきである。

プロジェクトでは対象村における魚の消費量のモニタリングを行っている。その経験や教訓を活かして、県別養殖普及計画や国家養殖普及計画を策定するプロセスの中で、具体的な魚の消費量の測定方法について検討を進めるべきである。

４－３－３　村落養殖開発ワーカー（VADW）の認証制度の検討

畜水産局（DLF）は養殖を村レベルで普及する中核人材としての VADW の認証制度を検討しているが、養殖普及における中核農家の役割を明確にして農民から農民への養殖普及アプローチを推進するためには VADW の認証制度は有効であると考えられる。

プロジェクト対象村では稚魚の生産や中間育成を行う中核農家が現れ始めている。農林省畜水産局としては、このような農家を VADW として認証して、農村地域における養殖技術の農民間・村落間普及の中核としたい方針を確認した。養殖の中核を担う農家を VADW として認証してインセンティブを与えることで、養殖技術の農民間・村落間普及が推進されることが期待される。VADW の制度を具体的に検討するためには既存の村落畜産ワーカー（VVW）の制度も参考にしつつ、VADW の役割、資格要件及び県・郡行政普及サービスとの関係等について、検討を進めていく必要がある。

プロジェクト 4 年目にはパイロット事業を通じて育成されている中核農家の分析等を行い、VADW 制度のガイドラインを作成し、畜水産局および関係部局にて制度化を行った上でプロジェクト 5 年目には具体的な認証を行うべきである。

４－３－４　森林管理・住民支援プロジェクト（FORCOM）との連携

本プロジェクトでは「より良い養殖、より良い農村」をキャッチフレーズに、魚の養殖を含めた複合型農業を推進している。本プロジェクトと同じくサヤブリ県を対象に実施をしている FORCOM では畜産や果樹といった生産活動を行っており、FORCOM の技術や経験を活用することで、本プロジェクト対象村においてより効果的・効率的な生計向上を図れることが期待されている。また FORCOM 対象村でも養殖を行っている農家は多く、本プロジェクトの技術や経験の活用がすでに先行している協力事例からも見込まれる。

本プロジェクトと FORCOM は 2008 年に連携村を定めて、それぞれの成果を活用した複合型農業の実証活動を行なう予定であり、その活動を通じた県・郡職員の情報共有の推進や人材育成、また村レベルでの経験交流や生産活動の改善といった具体的な成果が期待される。またそれら連携事業の経験や教訓について分析を行い、ラオス農村における複合型農業を推進する上での知見を取りまとめることが期待される。

４－３－５　クラスター制度に合わせた養殖普及システムの確立

近年ラオスでは行政システムとして郡のなかに複数の村で構成するクラスター（村グループ）を設定して、クラスターごとに技術サービスセンター（TSC）を設立して住民の行政サービスへのアクセスの改善を進めてきている。本プロジェクトの成果を効率的に普及するためにもプロジェクト後半でクラスター制度を踏まえて、ラオスの県・郡普及体制のキャパシティを考慮した農民間と村落間の養殖普及を推進する養殖普及システムを検討する必要がある。

例えば TSC では郡農林事務所（DAFO）職員に加えて農家も農業普及のためのメ

ンバーとして参画することになっているが、村落養殖開発ワーカー（VADW）の役割としてTSCを通じて養殖技術をクラスター内で普及することが考えられる。

４－３－６　養殖普及の定着のための課題への対応

プロジェクト前半の活動を通じて、ラオスにおける養殖普及を行う上で新たに検討すべき課題としては、上述のとおり、①グループ養殖手法の確立、②魚の消費量の測定方法の検討、③村落養殖開発ワーカー（VADW）の認証制度の検討、④クラスター制度に合わせた養殖普及システムの確立、⑤森林管理・住民支援プロジェクト（FORCOM）との連携促進が挙げられる。これらは、プロジェクトの上位目標の達成や自立発展性を確保するため、ラオスの農村立地条件にあった養殖技術を普及展開する上で重要な課題であり、プロジェクト後半で専門家の支援のもと、ラオス側関係機関が取り組むべきである。これら課題に対する助言や活動を行うためには、4年次にも3年次と同等レベルの専門家の投入を行うことが妥当であると思われる。同時に、ラオス側も関係機関の人員や予算について必要な投入を行うべきである。

付　属　資　料

１．調査団日程表

２．協議議事録（Minites of Meeting）

調査団日程表

Date	Schedule	Stay
Jan. 20th (Sun)	Travel: Narita-Bangkok-Vientiane	Vientiane
Jan. 21st (Mon)	9:00 Meeting at JICA Laos Office 10:30 Courtesy visit to Dept. of Planning, Ministry of Agriculture and Forestry (MAF) 11:00 Courtesy visit and meeting at Dept. of Livestock and Fisheries (DLF), MAF 14:00 Site visit and meeting at Namxouang Aquaculture Development Center (NADC)	Vientiane
Jan. 22nd (Tue)	Travel: Vientiane-Luanprabang (plane) Luanprabang-Oudomxay (car)	Oudomxay
Jan. 23rd (Wed)	8:30 Courtesy visit and meeting at Oudomxay Provincial Agriculture and Forestry Office (PAFO) 10:00 Site visit to Oudomxay Provincial Aquaculture Station 11:00 Visit to Pilot Village, Houaysang village (1) 14:00 Visit to Pilot Village, Houaykhoun village (2) 16:00 Visit to Expansion Village, KM10 Village (3)	Oudomxay
Jan. 24th (Thu)	8:00 Travel:Oudomxay-Luanprabang-Xayabouly	Xayabouly
Jan. 25th (Fri)	8:30 Courtesy visit and meeting at Xayabouly PAFO 10:00 Site visit to Xayabouly Provincial Aquaculture Station 13:30 Visit to Pilot Village, Somsavanh village (4) 16:00 Visit to Pilot Village, Natane village (5)	Xayabouly
Jan. 26th (Sat)	8:30 Site visit to a FORCOM target village where AQIP2 is cooperating (Namon Village) 13:00 Travel:Xayabouly-Luanprabang (car) Luanprabang-Vientiane (plane)	Vientiane
Jan. 27th (Sun)	Drafting the Minutes of Meeting	Vientiane
Jan. 28th (Mon)	AM Site visit to Living Aquatic Resource Research Center, NAFRI, MAF Site visit to Livestock and Fisheries Extension Center, NAFES, MAF PM Discussion on Minutes of Meeting among JES members	Vientiane
Jan. 29th (Tues)	AM Internal meeting on Minutes of Meeting PM Final Discussion on Minutes of Meeting among JES members	Vientiane
Jan. 30th (Wed)	AM - Signing of the Minutes of Meeting - Report to the Dept. of Planning, MAF PM - Report to the Dept. of International Cooperation, Ministry of Planning and Investment - Report to the Embassy of Japan - Report to JICA Laos Office	Vientiane

MINUTES OF MEETINGS
BETWEEN
THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND THE AUTHORITIES CONCERNED OF
THE GOVERNMENT OF THE LAO PEOPLE'S DEMOCRATIC REPUBLIC
ON JAPANESE TECHNICAL COOPERATION
ON AQUACULTURE IMPROVEMENT AND EXTENSION PROJECT PHASE II

The Aquaculture Improvement and Extension Project Phase 2 (hereafter referred to as "AQIP2") has been implemented since April, 2005 with the duration of five years by Department of Livestock and Fishery (hereafter referred to as "DLF"), Ministry of Agriculture and Forestry (hereafter referred to as "MAF") until March in cooperation with Japan International Cooperation Agency (hereafter referred to as "JICA"). After two years and nine months since its start, the Mid-term evaluation has been conducted in the following three steps; first step: "Project self-evaluation", second step: "Joint Evaluation Preparation Committee (JEPC)", and third step: "Lao-Japan Joint Evaluation Study".

The third step above was carried out by forming the Lao-Japan Joint Evaluation Study Team (hereafter referred to as "the Team"). The Japanese mid-term evaluation team, organized by JICA and headed by Mr. Satoshi CHIKAMI, visited the Lao People's Democratic Republic (hereafter referred to as "Lao PDR") from January 20th to January 30th, 2008 for the Lao-Japan Joint Evaluation Study and had consultation with the project personnel and other parties concerned on the implementation of the Japanese technical cooperation for the project.

Vientiane, January 30th, 2008

Mr. Satoshi CHIKAMI
Team Leader of Japanese Side
Lao-Japan Joint Evaluation Study Team
Senior Adviser for Aquaculture and Fishery
Japan International Cooperation Agency

Dr. Bounkhuang Khambounheung
Team Leader of Lao Side,
Lao-Japan Joint Evaluation Study Team
Director General
Department of Livestock and Fishery
Ministry of Agriculture and Forestry

1. Outline of the AQIP2 Lao-Japan Joint Mid-term Evaluation Study

Introduction

The AQIP2 has been implemented since April, 2005 with the duration of five years by Department of Livestock and Fishery (DLF), Ministry of Agriculture and Forestry (MAF) until March in cooperation with JICA. After two years and nine months since its start, the Mid-term evaluation has been conducted in the following three steps; first step: "Project self-evaluation", second step: "Joint Evaluation Preparation Committee (JEPC)", and third step: "Lao-Japan Joint Evaluation Study". The third step above was carried out by forming the Lao-Japan Joint Evaluation Study Team, for which a JICA mission was dispatched from January 20th to 30th, 2008.

1-1 Purpose of the AQIP2 Lao-Japan Joint Mid-term Evaluation Study

The Lao-Japan Joint Mid-term Evaluation Study has been conducted by the Team based on the results of Self-evaluation and JEPC with the following purposes;

(1) To confirm the achievement, progress, input at the mid-term of the project.

(2) To evaluate the project in terms of five (5) evaluation criteria.

(3) To discuss main issues between Lao government and JICA side.

(4) To make suggestions and recommendations for the latter period of the project.

1-2 Member of the AQIP2 Lao-Japan Joint Mid-term Evaluation Study

Lao government side

1	Dr. Bounkhuang Khambounheung	Director General, DLF	Team Leader
2	Mr. Bounthong Saphakdy	Director of Fishery Division, DLF	Member
3	Mr. Chanthaboun Sirimanotham	Director of Planning Division, DLF	Member
4	Mr. Chanthaneth Symahano	Director of Division of International Cooperation and Investment (DICI), Department of Planning (DOP)	Member
5	Mr. Bounkham Siackhasone	Deputy of Chief of Admin. Division, Department of Inspection (DOI)	Member
6	Mr. Liengkham Sivilay	Director of Living Aquatic Resource Research Center (LARReC), National Agriculture and Forestry Research Institute (NAFRI)	Member
7	Mr. Salieo Kemmalath	Senior Extension Advisor, Extension and Project Coordination Division, National Agriculture and Forestry Extension Service (NAFES)	Member

8	Mr. Valiya Sichanthongthip	Technical staff for International cooperation, DIC, Ministry of Planning and Investment (MPI)	Member

JICA side

1	Mr. Satoshi CHIKAMI	Senior Adviser for aquaculture and fishery, JICA HDQ	Team Leader
2	Ms. Mari MIURA	Project Officer, Rural Development Dept., JICA HDQ	Member
3	Mr. Makoto HATANO	Assistant Resident Representative, JICA Laos office	Member
4	Mr. Viengsavanh Sisombath	Program Officer, JICA Laos office	Member
5	Ms. Saymano Sanoubane	Assistant Program Officer, JICA Laos office	Member

1-3 Schedule of the AQIP2 Lao-Japan Joint Mid-term Evaluation Study

The Joint Mid-term Evaluation was conducted from January 21st to January 30th, 2008. The detailed schedule of the mid-term evaluation is attached as Attachment 1.

1-4 Methodology of the AQIP2 Lao-Japan Joint Mid-term Evaluation Study

The team conducted Joint Mid-term Evaluation by,

(1) reviewing progress and achievement against the result of First step: self-evaluation of the project and Second step: Joint Evaluation Preparation Committee (JEPC),

(2) reviewing implementation process by discussion and interviewing among relevant parties and field survey in the northern target provinces,

(3) evaluating the project by means of the five evaluation criteria, i.e. "relevance", "effectiveness", "efficiency", "impact" and "sustainability",

(4) consolidating the recommendations for improved implementation of the project and for expected achievement of the project proposed by the end of the project duration.

2. Outline of Mid-term Evaluation

2-1 Concept of Mid-term Evaluation

The mid-term evaluation was conducted under the following concepts.

(1) Various people involved in aquaculture development and expansion join to evaluation process as well as Japanese side and Lao side counterparts.

(2) Evaluation by factors which is not numerical, such as motivation of farmers as well as evaluation by indicators.

(3) "Sustainability" is mostly focused on five criteria evaluation.

2-2 Process of Mid-term Evaluation

This mid-term evaluation was conducted by taking following three steps.

(1) First Step: Self-evaluation of the project

- Implementers

Lao government side: Counterparts of the Project (DLF, Namxuang Aquaculture Development Center (NADC) , Provincial Agriculture and Forestry Office (PAFO), District Agriculture and Forestry Office (DAFO))

JICA side: Project experts

- Purposes

(a) To confirm the progress of activities based on Plan of Operation (PO).

(b) To conduct self-evaluation for the achievement of the project based on PDM indicators.

(c) To conduct self-evaluation in terms of five (5) evaluation criteria.

(d) To confirm the input record of both Lao government side and JICA side.

(e) To evaluate the achievement of pilot operation.

(f) To clarify issues to be discussed through mid-term evaluation.

(2) Second Step: Joint Evaluation Preparation Committee (JEPC)

- Implementers

Lao government side: Member of Joint Evaluation Preparatory Committee (JEPC)

JICA side: JICA Laos Office and Project experts

Local Consultant: Lao Management & Development Consultants Co., Ltd.(LMDC)

JEPC meeting was conducted four times in total from November 2nd to December 11th, 2007 including the workshops and field trips to southern and northern project areas.

- Purposes

(a) To make the members of the Evaluation Preparatory Committee understand the project strategy/outline/activities until the mid-term.

(b) To inspect the pilot operation in the target village and evaluate the outputs/activities of pilot operation.

(c) To analyze outputs until the mid-term and verify operation direction for the latter half of the project as the Evaluation Preparatory Committee.

(d) To clarify issues/ concerns for the latter half of the project and verify solutions.

(3) Third Step: Lao-Japan Joint Evaluation Study

On a basis of the result of Self-evaluation of the project (first step) and Joint Evaluation Preparation Committee (JEPC) (second step), Lao-Japan Joint Evaluation Study was conducted. The detail is mentioned in "1. Outline of AQIP2 Lao-Japan Joint Mid-term Evaluation Study".

3. Outline of the Project

3-1 Background of the Project

Fish and aquatic animals are the most important animal protein source to the rural people in Lao PDR. Increase of fisheries product supply is an urgent need in rural area in order to achieve national food security, to raise nutritional level and to improve livelihood of the people.

Catching fisheries production from natural and man-made water bodies seems already to exceed the level of sustainable production in recent years due to strong fishing pressure on the fisheries resources. Therefore, promotion of aquaculture is the most promising way to increase supply of fisheries products.

Aquaculture in rural area in Lao PDR is characterized by the fact that it is conducted as a part of the integrated agricultural production system composed of rice and vegetable cultivation, collection of wild products, cottage industry, livestock farming and so on.

The purpose of the present project is to establish an appropriate model of "farmer to farmer aquaculture extension system" to increase production of such rural aquaculture in order to contribute to improvement of livelihood of rural people.

The project is implemented under four slogans, namely, "poverty alleviation", food security", "environmental friendliness", and "gender mainstreaming".

3-2 Purpose of Project

(1) Overall goal

Standard of living of small-scale fish farmers is improved through the dissemination of aquaculture suitable for local conditions in the four (4) target provinces.

(2) Project purpose

Aquaculture suitable for local conditions is expanded in the four (4) target provinces

(3) Outputs

- Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites.
- Output 2: The capacity of relevant persons such as fish farmers, province and district extension staffs and staff of PASs regarding aquaculture technology and extension is improved.
- Output 3: Fish farmers of the focal districts introduce improved aquaculture methods.
- Output 4: The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.

4. Accomplishment of the project

Accomplishment of the project was measured in terms of inputs, activities, outputs and project purpose, as specified in the record of discussions of the project, PDM and PO.

4-1 Input

(1) Japanese side

The summery of input by Japanese side is as follows. Most of inputs by Japanese side have been appropriate both in quantity and timing.

(a) Experts

Since the commencement of the project in April, 2005, three long term experts and eight short term experts as shown below have been dispatched/dispatched.

(a-1) Long term experts

- Training, Bloodstock management, Seed production
- Aquaculture technique, Extension
- Aquaculture technique, Rural development, Market survey

(a-2) Short term experts

- Chief advisor
- Gender mainstreaming, Life improvement
- Participatory development
- Early larval development
- Planning of aquaculture facility
- Improvement of agriculture system
- Strengthening regional network
- Third country expert: Fisheries extension and management in Thailand

(b) Trainings

(b-1) Training of Lao counterpart personnel in Japan

In total fourteen (14) counterpart personnel have received trainings in Japan on "Freshwater fish breeding", "Lectures, practice and observation on freshwater aquaculture", "Observation on freshwater aquaculture", "Sustainable aquaculture development", "Gender mainstreaming in fishing community development" and "Observation and discussion on freshwater aquaculture". The participants of the trainings gained new knowledge and experiences, which have made project activities effectively. These training courses contributed to make participants motivated and also it help to make network between Japan and Lao.

Also, Japanese accepting organization of these trainings were able to have good opportunities

to discuss about the aquaculture development with Lao experts.

(b-2) Training of Lao counterpart personnel in the third country

In total 21 counterpart personnel, mainly staff of PAFO and DAFO have received training in Thailand on "Observation and discussion on freshwater aquaculture" Since Thailand has the similarity on climate and ethnic characters with Lao PDR, the participants of the trainings could gain the practical image of the aquaculture and useful knowledge and experiences.

(b-3) Training of local government staff and farmers

Training and study trip made for in total 692 persons. Training for local government staff gave necessary knowledge and techniques of seed production, water quality control, feed preparation etc., and the result of trainings have been transferred to other staff and farmers. The study trip for farmers brought out their intention to introduce the aquaculture.

(c) Machineries, Equipments and Facilities,

Necessary equipment to promote the activities such as, desktop PCs, motor bikes, seine nets, water pumps were provided to each DAFO, Provincial and District Agriculture Station and NADC. Equipment provided to pilot villages through each DAFO, have been maintained and managed well by each Village Aquaculture Promotion Committee (VAPC) leaders and person in charge of equipment management. VAPC rents these equipments to farmers and rental fees are pilled up as VAPC fond.

Total amount of provision is 113,310 USD. Also, NADC provided high quality seeds to Provincial Aquaculture Station (PAS) and the PAS succeeded to grow the seeds.

Facilities such as water tank and experimental pond were repaired where its necessity. Total amount of cost is 133, 800 USD.

(d) Local cost borne by Japanese side

A total amount of 363,372 USD was distributed by the end of FY 2007 as local operation costs. The amount of cost on FY2007 is budget.

(2) Lao side

The summery of input by Lao side is shown below. Inputs by Lao side have been appropriate except for two items, namely (a) number of persons allocated at NADC, and (b) provision of operation costs of NADC.

At NADC, ten personnel as permanent staff were allocated until 2006 and six personnel as temporary staff. However, Director of NADC has been vacant and two staff is currently absence. Currently NADC is managed by the Acting Director after the former Director was transferred. Two staff is studying at Universities and replenishment has not been done so far. Absence of Director

sometimes causes inconvenience such as taking a time for decision making process. For absence of two graduate level staff, NADC activities sometimes bogged down in its operation during some staff are in the project field.

Operation costs of NADC provided by Lao side does not cover such costs as that for security, fish feed, fuel and other utility. In addition, operation costs required for various field activities, presently covered by Japanese side, should be covered by Lao side after the project. To ensure sustainability of the project outcomes, it is necessary for Lao side to seek an appropriate solution on this problem.

(a) Assignment of counterpart personnel

Lao side have provided 27 personnel so far as follows,

- Project Director (Director General of the Department of Livestock and Fisheries)
- Project Manager (Director of NADC)
- Project Manager (Head of Technical Division, DLF)
- Project Coordinator (Head of Planning and Cooperation Division, DLF)
- Technical /Training/ Extension Staff (NADC)
- Technical /Training/ Extension Staff (PLFS)
- Technical /Training/ Extension Staff (DAFO)

4-2 Activities

- It has been two years and nine months since project has started. Most of activities have been implemented well as scheduled as per detailed operation of project (P/O) and plan of input.
- **Pilot Operation:** During the pilot operation (Four (4) provinces, Four (4) districts, twelve (12) villages), the ability of technical staff and extension workers in provinces and districts have been improved trough the trainings and field activities. Seeds production and cultivation have been done depends on each climate and water supply condition, character of villages, life condition and so on. Aquaculture development and expansion have been promoted.
- **Village Aquaculture Promotion Committee (VAPC):** In pilot villages, VAPC and core farmers have functioned well and aquaculture suitable for the local condition has been established. As a result, number of fish farmers and fish production has been increased. Core farmers increases their income by seed production. At the same time, they look after other fish farmers in the same village by offering fish seed at reasonable prices.
- **Group aquaculture:** Group aquaculture has been promoted favorably. It has been proved that group aquaculture is effective tool for expansion method of aquaculture and potential to ensure the sustainability is high.
- **Women's Union (WU):** Group aquaculture by Women's Union (WU) especially has been

successful. They sell fish and pool its profit as group fund, and it is used for the purpose of mutual support in case of necessity such as delivery or sickness of members. Most of villages have existent WU, and leaders and rules are already set, so that operation of group aquaculture has been implemented smoothly and effectively. The reaction of men to the activities by WU is mostly favorable, and men help hard labor of WU activities.

- **Group aquaculture for low income villagers:** Since group aquaculture has advantage that low income villagers who don't have own pond and equipment can participate in aquaculture. They can share the necessary input for aquaculture, and transfer the techniques among the groups. Also maintaining of pond and feeding can be shared.
- **School aquaculture:** Some villages such as Samsavanh village of Xaignabouli Province have tried aquaculture in school. It is expected that school provides fish produced at the school to students, and gain income to buy necessary materials for studying since the budget in the schools tends to be limited. It is also expected that children would have intension to aquaculture by touching to the aquaculture when they are young.
- **Expansion Operation:** For expansion operation (four (4) provinces, eight (8) districts, 56 villages), expansion target villages were selected and necessary information was collected. Expansion operation has been started from April 2007 (3rd year of the project) . Some farmers in expansion villages made study trip to pilot villages and observed actual operation of aquaculture and its result. Core farmers in pilot villages acted as trainers in expansion villages.
- **Role of PAFO and DAFO:** Since the coverage of expansion villages is wide, monitoring and guidance by project experts has limitation. Therefore, the role played by provincial and district level staff (PAFO and DAFO) are quite important. Most of staff of PAFO and DAFO have high motivation for their work and keep a good relation with villagers. However, the budget, especially for DAFO tends to be insufficient. Because of lack of budget such as daily allowance and fuel for motorbike, there is concern that necessary monitoring and guidance would not be conducted.

4-3 Outputs

Outputs is evaluated by each indicators as follows,

Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites.

Indicator 1-1. Manuals on aquaculture techniques suitable to local conditions are prepared.

Three types of technical manuals and visual aid materials (VCD, Hanging paper panel etc.) have been prepared and have been effectively used by expansion workers and farmers.

Indicator 1-2. Production of fish culture by target farmers in pilot villages increases by more than 40% on average.

Fish production by target farmers was increased almost or more than 40 % at seven (7) villages of 12 pilot villages. In addition, eleven (11) of twelve (12) pilot villages increased their fish production in year 2006 comparing to year 2005.

Indicator 1-3. More than 60% of target farmers in pilot villages are well motivated to continue aquaculture at the time of termination of the pilot operation.

It has been observed through on-site guidance and monitoring survey that more than 85% of target farmers in the South and 93% in the North has been well motivated to continue the aquaculture. Farmers feel benefit of aquaculture by increasing consumption of fish in their household and/or generate income by selling seeds and/or fish. It makes farmers motivated to continue aquaculture.

Output 2: The capacity of relevant persons such as target farmers, province/district extension staff and staff of PASs regarding aquaculture technology and extension is improved.

Indicator 2-1. More than two staff members of each PAS can train district staff and farmers.

More than two staff members of each PAS have improved their ability through NADC training, study trip to Thailand, training in Japan, field activities, and workshops. Also, PAS training gave them good opportunities to improve their ability to train the farmers.

Indicator 2-2. More than two staff members of each PLFS and more than two staff members of each DAFO (former DAFEO) can give guidance to farmers.

Only one staff has been trained under AQIP2 at each PLFS and DAFO. The number of staff to be trained under AQIP2 will not be increased at PLFS, while it will be increased at DAFO under new "Village Cluster Approach".

Indicator 2-3. At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers.

It has been recognized that nine (9) fish farmers in the South and nineteen (19) in the North have the potential to be a Village Aquaculture Development Worker (VADW). At least one farmer or women's union exists as potential VADW in each village. They are expected to be the core

body to promote the "farmer to farmer aquaculture extension approach" at each pilot village.

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

Indicator 3. At least 600 target farmers (expansion villages) apply improved methods in 8 focal districts.

Because activities in the expansion villages have just started from 3rd year of the project; April 2007, it is too early to evaluate the achievement at this time. However, expansion operations have been started smoothly.

Output 4: The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.

Indicator 4-1. Related organizations approve a collaboration agreement defining duties of each organization.

The final form of collaboration would be formulated in the Provincial Aquaculture Development Strategy and National Aquaculture Extension Plan to be prepared in the final year of AQIP 2.

Indicator 4-2. Responsible organizations allocate sufficient budget to the national aquaculture extension plan.

The budget for the activities at NADC and DAFO partly has not been sufficient so far. However the budgets of other organizations are not relevant to the AQIP2 implementation. Thus, this indicator is considered as inappropriate.

Indicator 4-3. The project makes recommendations for sustainable development of aquaculture in Lao PDR.

The recommendation is to be prepared by the terminal evaluation of the project on the last year of the project implementation, based on the result of pilot and expansion operation.

4-4 Project Purpose

Project purpose: Aquaculture suitable for local conditions is established in the 4 target provinces

Indicator 1. 720 fish farmers (120: pilot villages, 600: extension villages) increase their fish production by more than 40% on average by applying improved aquaculture methods in 4 target provinces.

The production of fish in the pilot villages has been increased by more than 40% at 3rd year. It is expected that 720 fish farmers (120: pilot villages, 600: extension villages) increase their fish production more than 40% on average by applying improved aquaculture methods in four (4) target provinces.

Indicator 2. Aquaculture development plans are prepared at province and district levels.

The first draft of Provincial Aquaculture Development Strategy has been formulated for each target province in the second year. The recommendations for sustainable development of aquaculture in Lao PDR will be prepared by the final evaluation.

4-5 Cause and Effect Relationship to Project Outputs

- The National, Provincial, District policy such as "food security", "poverty reduction" and "life improvement" matches to the project purpose.
- Villagers can get direct benefit to improve their nutritional conditions by increased consumption of fish and to generate income by selling seeds and growth fish and reducing cost for buying fish.
- Though core farmers generate incomes by seed production, they provide seeds reasonably to other farmers, so that much trouble between core farmers and other farmers have not been occurred so far.
- The formulation of Village Aquaculture Promotion Committee (VAPC) and core farmers is effective way to promote the aquaculture in the village, because aquaculture is managed systematically and roles of farmers are clarified.
- By using existent group such as Women's Union (WU), it is not necessary to organize new group for starting the group aquaculture. Group aquaculture by WU has been going well.

4-6 Obstructing Factor

- The budget, especially for DAFO tends to be insufficient. Because of lack of budget for daily allowance and fuel of motorbike, it is concerned that necessary monitoring and guidance would not be conducted because not all villages have good access and road condition.

5. Evaluation Result

5-1 Relevance

The relevance of the project is high.

- **Consistency of project purpose and needs of Lao PDR:** Amount of fish supply per person per year in Lao PDR is around eight (8) to ten (10) kg, which is the lowest level in Indochina

countries. Since the purpose of aquaculture in rural area in Lao PDR is mainly for consumption in their household, therefore, basic needs for aquaculture development with low cost exists.

- **Consistency of overall goal and national policy of Lao PDR:** This project contributes for achievement of "stable food supply" and "reduction of poverty" which are included in "Fifth Social Economic Five years Development Plan (2001-2005)" as focused issues. In addition, agriculture and forestry development focused on poverty reduction is one of the most important issues in "National Growth and Poverty Eradication Strategy (NGPES)". In NGPES, 72 districts of 142 districts in the whole country are designated as prior area for poverty reduction countermeasure. The target province in the project includes poverty 20 districts, and it could contribute for achievement of Lao National Development Plan.
- **Appropriateness of project strategy for Lao National Development Policy:** The project aims to establish the aquaculture method suitable for local condition and expand its result to the expansion target villages. The project target area includes North and South areas that each climate and local condition is different. The project is expected to contribute to the food security and poverty reduction of Lao PDR.
- **Significance of implementation of Phase 2:** The project (phase 2) utilizes the result of phase 1 such as facility of NADC and staff trained in phase 1. It strengthens the result of phase I continuously and effectively and contributed to achievement of aquaculture development of Lao PDR. From these, the significance of implementation of phase II is high. It is expected to develop the result and solve the problem of phase I, and extend the aquaculture method suitable for the local condition to the nation wide of Lao PDR.

5-2 Effectiveness

The relevance of the project is almost high.

- **Prospect of project purpose achievement:** The activities of the project will contribute to the achievement of project purpose. Also relation among JICA, project experts, Lao counterparts, target villagers and parties concerned are good. In PDM, the project target is set mainly for personal aquaculture farmers, but based on the project activities of two years and nine months, it has been clarified that group aquaculture is effective and potential method. However, to make group/ community aquaculture become established, three years pilot operation period is considered as insufficient.

5-3 Efficiency

The efficiency of the project is almost high.

- **Achievement of outputs:** Expected outputs are mostly achieved as planed so far.
- **Input by Japanese and Lao side:** Most of inputs by Japanese and Lao side have been appropriate both in quantity and timing. However, number of personnel allocated, and

provision of operation costs of NADC and each DAFO is not sufficient Other activities were mostly conducted as planned. Most of Lao side counterpart has been involved in the project continuously, and it makes the project activities smooth and effective.

- **Use of facilitates, materials and cost provide by Japan:** Items have been used mostly appropriately.

5-4 Impact

The impact of the project is quite high.

- **Prospective of achievement of the overall goal and contribution to the development policy of Lao PDR:** The amount of fish consumption which is targeted by Lao National Policy as well as project overall goal; 22 kg/person/year is expected to be achieved because it has been already achieved in five (5) villages of twelve (12) pilot villages. Also, eleven (11) of twelve (12) pilot villages increase the fish consumption in year 2006 comparing to year 2005.
- **Unexpected positive impact:** The project has tried to involve women aggressively in the activities such as training, field guidance, monitoring. A number of women's participation in these opportunities was increased. In Houaykhoum village of Oudomxai Province, Women's Union (WU) has implemented aquaculture. As a result, nutritional condition of their family was improved, and group has generated the income. Based on the experiences of group aquaculture, activities of WU have become active. As one of the new activities of WU, they have started the loan activities for the purpose of mutual support among the members.
- **Collaboration with JOCV:** Japan Overseas Cooperation Volunteer (JOCV) has implemented the activities in the field of aquaculture at Oudomxay, Savannakhet, and Salavan Provincial Aquaculture Centers. AQIP2 have collaborated with these JOCV. As a result of the activities of JOCV, the relation between AQIP2 and each Provincial Aquaculture Stations (PASs) have been strengthened. JOCV also have contributed to improve seeds production, and conduct the monitoring for improvement of facilities with AQIP2 experts and counterparts. At the same time, JOCV have received technical supports from AQIP2. JOCV participated in the training at NADC and technical manuals were provided from AQIP2.
- **Collaboration with FORCOM Project:** Aquaculture techniques introduced by AQIP2 have been utilized at Namon village of Sayabouly Province, where is the target village of JICA Forest Management and Community Support Project (FORCOM) since 2006. Because FORCOM have implemented the integrated forest management, it is expected that AQIP2 is able to prove the aquaculture suitable in the integrated farming system at the village. For FORCOM side, improvement of aquaculture techniques and its productivity have been tried using result and experts of AQIP2.
- **Unexpected possible negative impact:** Since it is declared that the income of fish farmers tends to be higher than non fish farmers, it might cause that harmony among villagers would disturbed because of income generation of core farmers by seed production. AQIP2 have

paid attention on it, and promotion of aquaculture group is considered as one of the way to avoid its possible negative impact.

5-5 Sustainability

Sustainability of the project is considered mostly high, however, further consideration of secure the sustainability is necessary.

- **Initiative of Lao PDR:** The project purpose completely matches to the national policy of Lao PDR so that initiative of Lao side is high. In addition, AQIP2 has shared information among relevant parties. Mid term evaluation was conducted by Japan side and Lao side together so that mutual understanding was created.
- **Introduction of agriculture extension method by Village Cluster Approach:** Lao government has set the Village Cluster Approach as new governmental administrative system. One cluster consists of several villages (seven to ten villages in average) It is planed that each cluster has Technical Service Center in order to improve the access between the governmental administrative services and villagers. Expansion operation of aquaculture techniques is needed to consider this new Village Cluster Approach.
- **Continuity of motivation of beneficiaries for participation in the project:** It is important to show the successful cases and have villagers feel benefit in order to ensure the sustainability of villagers who engaged in aquaculture. Pilot operation has been implemented smoothly and aquaculture method developed by AQIP2 is favorably accepted by farmers. It was confirmed that expectation to the project of farmers are high, and villagers who has not participated in the project show the interests.
- **Technical aspect:** Aquaculture method suitable for the local condition has been developed, and expected to be used continuously after the project.
- **Expansion of the project:** The project takes approaches that establish the aquaculture method first and expand it to the other villages during the project implementation duration. Promotion of capacity building of core farmers and staff at DAFO is important to expand the result of pilot operation to other villages.

6. Recommendations and Suggestions

Through the Lao-Japan Joint Evaluation Study, valuable suggestions and recommendation were raised. In order for the project to ensure successful implementation in the latter half of the project duration, the Team recommends that the following actions be taken by the concerned agencies of the Government of Laos.

(1) Modification of PDM Indicators

It is suggested that the following PDM indicators should be modified as follows. These modifications of indicators should go through the official procedure of Joint Coordination Committee (JCC) that will be conducted on March, 2008.

(1-1) Indicator 2-2. More than two staff members of each PLFS and more than two staff members of each DAFO (former DAFEO) can give guidance to farmers.

is changed to,

Indicator 2-2. More than two staff members of each PLFS can make provincial aquaculture plan and give necessary guidance for aquaculture extension to the Province Aquaculture Station (PAS) and District Agriculture Forestry Office (DAFO).

and

Indicator 2-3. More than two staff members of each DAFO can give guidance to farmers.

Reason for modification: Because the main role of PLFS is not technical guidance but drafting the Provincial Aquaculture Plan, guidance to the Provincial Aquaculture Station (PAS) and District Agriculture and Forestry Office (DAFO) based on the provincial Aquaculture Plan. Also, DAFEO (District Agriculture and Forestry Extension Office) was changed its name to DAFO by reorganization of agriculture and forestry administration.

(1-2) Indicator 4-2. Responsible organizations allocate sufficient budget to the national aquaculture extension plan.

is deleted.

Reason for deletion: This indicator is not appropriate as indicator of project PDM because budget allocation by related agencies is not directly managed in the framework of AQIP2 (important assumption for achieving overall goal). However, necessary budget allocation is essential for smooth implementation of activities and securing of sustainability. Therefore, specific budget allocation should be considered on National Aquaculture Development Plan and Provincial Aquaculture Development Strategy.

(1-3) Indicator 2-3. At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers.

is not be modified.

Reason for not being modified: This indicator was suggested as modified to At least one target farmer at each target village nominated the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers. at Joint Evaluation Preparation Committee (JEPC). However, it needs further consideration upon the discussion of official certification system of VADW by government, as mentioned below.

(2) Allocation of Staff to NADC

It would be more effective to conduct the activities of NADC and AQIP2, if Ministry of Agriculture and Forestry (MAF) allocates the Director of NADC. In addition, it is considered that if graduate level researchers and field workers are allocated, it would contribute to effective operations of expansion activities in latter half of the project period and thus, to ensure the sustainability after the project.

(3) Clarification of Roles and Strengthening of Relationship among Related Organizations for Better Aquaculture

Coordination among agencies concerned with aquaculture development / extension such as DLF, NADC, PAFO and DAFO have been strengthened through the project activities. In order to expand the aquaculture techniques suitable to the local condition to other districts of target provinces and other provinces, the role of national level organization such as DLF, NAFES, NAFRI, and local level organization such as PAFO and DAFO should be clarified. Also, specific collaboration measure should be considered.

These should be discussed in the latter half of the project through the making process of the National Aquaculture Development Plan and Provincial Aquaculture Development Strategy.

(4) Group Aquaculture

Successful cases of improvement of fish production and accumulation of fund by group aquaculture conducted by Women's Union are found. Since group aquaculture has advantage that needy villagers who don't have own pond and equipment can participate in aquaculture. They can share the necessary input for aquaculture and transfer the techniques among the group members. Also maintaining of pond and feeding can be shared. From these cases, group aquaculture is evaluated to be effective to expand the aquaculture. Through the first half of the project, it was confirmed that group aquaculture by Women's Union (WU), school and low income farmers is likely to be effective. Considering the results of pilot operation, further analysis is

needed to establish the methodology of group aquaculture method.

It is suggested to utilize the pilot villages that VAPC functioned well for the demonstration of group aquaculture and also promote the group aquaculture in expansion villages depends if there are the needs and possibility.

(5)Method for Measuring Fish Consumption

Measuring accurate fish consumption is important to monitor the goal of fish consumption amount which is set by Lao government as well as to confirm the situation of food security at the village/household level, however, the method for measuring fish consumption is not standardized at the moment.

AQIP2 has been conducting monitoring surveys including fish consumption data collection so that the project can contribute to consider the method for measuring fish consumption with its experiences and lessons.

Suitable method for measuring fish consumption in Laos should be discussed through the process of formulating "Provincial Aquaculture Development Strategy" and "National Aquaculture Development Plan" among relevant organizations.

(6) Certification System of Village Aquaculture Development Worker (VADW)

VADW certification system which has been under consideration by DLF is considered to be effective for clarifying the role of core farmer in aquaculture extension and promoting farmer-to –farmer / village-to-village aquaculture promotion.

In some pilot villages of AQIP2, core farmers who can conduct fish seed production and intermediate fish culture have been appeared. JES members considered those core farmers can be the expansion agent for the aquaculture in rural area and motivated by certification of VADW.

Certification system of VADW should be discussed and examined in terms of role, qualification, relationship with government extension service, etc., referring to the system of village veterinary worker (VVW).

AQIP2 is recommended to support for drafting the guideline of VADW certification system by analyzing core farmers in pilot villages in fourth year of the project. DLF and related organizations should establish VADW certification system and certificate some VADW in project target villages within project period.

(7)Collaboration with Forest Management and Community Support Project (FORCOM)

AQIP2 is aiming to promote integrated agriculture including aquaculture with the slogan "For a better aquaculture, for better rural village". FORCOM which covers Xayabouly Province as one of target provinces same as AQIP2 has been supporting income generation activities such as livestock and fruit cultivation. It is expected that villagers in AQIP2 target villages improve livelihood effectively and efficiently by utilizing techniques and experiences of FORCOM.

Aquaculture techniques developed by AQIP2 also can be helpful for villagers in FORCOM target villages many of whom are conducting aquaculture activities.

In 2008, AQIP2 and FORCOM plan to conduct collaboration activities in one of each target village to promote integrated agriculture. Trough this collaboration activities, it is expected to share the techniques and information and improve capacity of expansion staff in PAFO/DAFO as well as promote farmer to farmer / village to village expansion and improve agriculture activities at village level. Furthermore, it is also expected to study the way to promote integrated agriculture as well as farmer to farmer / village to village extension system in rural area of Lao PDR by analyzing the experiences and lessons of collaboration activities.

(8)Aquaculture Expansion System in Consideration of Village Cluster Approach

In these years, Lao government has been forwarding Village Cluster Approach which improves the access of government services for villagers and has been setting Technical Service Center (TSC) in each cluster. It is necessary to establish suitable aquaculture expansion system by considering cluster system in order to strengthen farmer-to-farmer / village-to-village aquaculture expansion for effective expansion of the AQIP2 outcome. For example, one of the roles of VADW is set to be expansion agent of aquaculture in each cluster through TSC which is composed of DAFO and advanced farmers for agriculture extension.

(9)Measure for Issues on Establishment of Aquaculture Extension System

Through the first half of the project period of AQIP2, following issues have been clarified for establishment of aquaculture expansion system; (a) establishment of group aquaculture, (b) method for measuring fish consumption, (c) certification of VADW, (d) collaboration with FORCOM, (e) aquaculture extension system in consideration of village cluster approach.

Those issues are important to achieve the overall goal of the project and make sure the sustainability, in other words, to expand suitable aquaculture in rural area of Lao PDR nationwide, so that those issues should be tackled by relevant organization of Lao government with the supports of AQIP2 experts. In order to conduct additional activities and discussions to solve those issues, input of Japanese experts in fourth year should be the same level as third year. Lao government side also should allocate enough budget and human resources in related organizations to address above-mentioned issues.

Attachment

Attachment 1: Schedule of Lao-Japan Joint Evaluation Study

Attachment 2: Current Project Design Matrix (PDM)

Attachment 3: Report of Joint Evaluation Preparatory Committee of AQIP2 Mid-term Evaluation

Annex 1: Activity chart

Annex 2: Accomplishment grid

Annex 3. Status of input

Annex 4: Evaluation grid

Annex 5. Review of the pilot operation

Abbreviations

AQIP2	Aquaculture Improvement and Extension Project 2
DAFO	District Agriculture and Forestry Office
DIC	Department of International Cooperation
DICI	Division of International Cooperation and Investment
DLF	Department of Livestock and Fishery
DOP	Department of Planning
FORCOM	Forest Management and Community Support Project
HDQ	Head Quarter
JCC	Joint Cooperation Committee
JEPC	Joint Evaluation Preparation Committee
JICA	Japan International Cooperation Agency
LARReC	Living Aquatic Resource Research Center
MAF	Ministry of Agriculture and Forestry
MM	Minute of Meeting
MPI	Ministry of Planning and Investment
NADC	Namxuang Aquaculture Development Center
NAFES	National Agriculture and Forestry Extension Service
NAFRI	National Agriculture and Forestry Research Institute
PAFO	Provincial Agriculture and Forestry Office
NGPES	National Growth and Poverty Eradication Strategy
PAS	Provincial Aquaculture Station
PDM	Project Design Matrix
PLFS	Provincial Livestock and Fishery Section
PO	Plan of Operation
VACP	Village Aquaculture Promotion Committee
VADW	Village Aquaculture Development Worker
VVW	Village Veterinary Worker
WU	Women's Union

Attachment 1

Schedule of Lao-Japan Joint Evaluation Study

Mid-term Evaluation of Aquaculture Improvement and Extension Project (AQIP2)

Date	Schedule		Accom.	Remark
Jan. 20th (Sun)	Travel:	Narita-Bangkok-Vientiane	Vientiane	
Jan. 21st (Mon)	9:00 10:30 11:00 14:00	Meeting at JICA Laos Office Courtesy visit to Dept. of Planning, Ministry of Agriculture and Forestry (MAF) Courtesy visit and meeting at Dept. of Livestock and Fisheries (DLF), MAF Site visit and meeting at Namxouang Aquaculture Development Center (NADC)	Vientiane	
Jan. 22nd (Tue)	Travel:	Vientiane-Luanprabang (plane) QV109 09:40-10:20 Luanprabang-Oudomxay (car)	Oudomxay	Check in time: 8:00
Jan. 23rd (Wed)	8:30 10:00 11:00 14:00 16:00	Courtesy visit and meeting at Oudomxay Provincial Agriculture and Forestry Office (PAFO) Site visit to Oudomxay Provincial Aquaculture Station Visit to Pilot Village, **Houaysang village (1)** Visit to Pilot Village, **Houaykhoun village (2)** Visit to Expansion Village, **KM10 Village (3)**	Oudomxay	
Jan. 24th (Thu)	8:00	Travel: Oudomxay-Luanprabang-Xayabouly	Xayabouly	
Jan. 25th (Fri)	8:30 10:00 13:30 16:00	Courtesy visit and meeting at Xayabouly PAFO Site visit to Xayabouly Provincial Aquaculture Station Visit to Pilot Village, **Somsavanh village (4)** Visit to Pilot Village, **Natane village (5)**	Xayabouly	
Jan. 26th (Sat)	8:30 13:00	Site visit to a FORCOM target village where AQIP2 is cooperating **(Namon Village)** Travel: Xayabouly-Luanprabang (car) Luanprabang-Vientiane (plane) QV104 19:50-20:30	Vientiane	Check in time: 18:00
Jan. 27th (Sun)		Drafting the Minutes of Meeting	Vientiane	
Jan. 28th (Mon)	AM PM	Site visit to Living Aquatic Resource Research Center, NAFRI, MAF Site visit to Livestock and Fisheries Extension Center, NAFES, MAF Discussion on Minutes of Meeting among JES members	Vientiane	- All members are expected to participate in the discussion on MM. - Place & time for the discussion is needed to be confirmed.
Jan. 29th (Tues)	AM PM	Internal meeting on Minutes of Meeting Final Discussion on Minutes of Meeting among JES members	Vientiane	- All members are expected to participate in the final discussion on MM. - Place & time for the final discussion is needed to be confirmed.
Jan. 30th (Wed)	AM PM	- Signing of the Minutes of Meeting - Report to the Dept. of Planning, MAF - Report to the Dept. of International Cooperation, Ministry of Planning and Investment - Report to the Embassy of Japan - Report to JICA Laos Office	Vientiane	

Project Design Matrix (PDM-2)

Project title: Aquaculture Improvement and Extension Project, Phase II (AQIP II)
Duration: from April 2005 to March 2010 (5 years)
Target group: Rural fish farmers who have experience of aquaculture, and relevant government personnel
Implementing Agency: The Department of Livestock and Fisheries (DLF)
Target areas: 4 provinces of Oudomxai, Xaignyabouli, Savannakhet and Salavan
Approved: at 2nd Joint Coordination Committee Meeting held on 28 February 2006
Super goal: Fish production meets the demand of the people of Lao PDR through sustainable development of aquaculture.

Narrative Summary	Objectively Verifiable Indicator	Means of Verification	Important Assumptions
Overall goal: Standard of living of rural fish farmers is improved through the dissemination of aquaculture suitable for local conditions in the 4 target provinces.	Fish consumption of 22 kg/person/year by the rural people in 4 target provinces.	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 established in the 4 target provinces	1. 720 fish farmers (120: pilot villages, 600: extension villages) increase their fish production by more than 40% on average by applying improved aquaculture methods in 4 target provinces. 2. Aquaculture development plans are prepared at province and district levels.	1. Project monitoring report 2. Aquaculture development plan of target provinces	-Necessary budget is secured. -Socio-economic situation of rural areas is not changed largely.
Outputs: 1. Adequate aquaculture methods are verified according to the local conditions of pilot sites.	1-1. Manuals on aquaculture techniques suitable to local conditions are prepared. 1-2. Production of fish culture by target farmers in pilot villages increases by more than 40% on average. 1-3. More than 60% of target farmers in pilot villages are well motivated to continue aquaculture at the time of termination of the pilot operation.	1-1. Project monitoring report 1-2. Village monitoring report 1-3. Village monitoring report	-Serious epidemic fish diseases do not occur. -Extreme natural disasters such as drought and flood do not occur.
2. The capacity of relevant persons such as target farmers, province/district extension staff and staff of PASs regarding aquaculture technology and extension is improved.	2-1. More than two staff members of each PAS can train district staff and farmers. 2-2. More than two staff members of each PLFS and more than two staff members of each DAFEO can give guidance to farmers. 2-3. At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers.	2-1. Project monitoring report 2-2. Project monitoring report 2-3. Village monitoring report	

3. Fish farmers of the focal districts introduce improved aquaculture methods. 4. The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.	3. At least 600 target farmers (extension villages) apply improved methods in 8 focal districts. 4-1. Related organizations approve a collaboration agreement defining duties of each organization. 4-2. Responsible organizations allocate sufficient budget to the national aquaculture extension plan. 4-3. The project makes recommendations for sustainable development of aquaculture in Lao PDR.	3. Village monitoring report 4-1. The national aquaculture development plan defining collaboration system 4-2. Budget of DLF and PAFO. 4-3. Action plan for national aquaculture development	
Activities: 1-1. Identify pilot villages and target farmers (4 focal districts, 12 villages, 120 target farmers in pilot villages) 1-1-1. Collect and analyse data on focal districts 1-1-2. Determine pilot villages 1-2. Prepare operation and management plan of pilot sites 1-2-1. Determine indicators in PDM 1-2-2. Prepare pilot operation plan by district 1-2-3. Determine target farmers and organize a Village Aquaculture Promotion Committee (VAPC) in each pilot village 1-3. Carry out pilot operation 1-4. Improve methods on seed production and grow-out culture mainly at NADC 2-1. Prepare training programs and materials considering conditions of localities 2-1-1. Prepare training programs 2-1-2. Prepare textbooks 2-2. Conduct training for extension staff and target farmers at NADC, PASs and in Thailand 2-3. Strengthen function of PASs 3-1. Select villages (extension villages) and farmer groups for which outputs of pilot operations are to be introduced (8 focal districts, 50-60 villages, 200 farmers in the northern provinces and 400 farmers in the southern provinces, 600 target farmers in total in extension villages) 3-2. Prepare visual extension materials on practical aquaculture and train selected farmers 3-3. Carry out aquaculture expansion operation for selected farmers	**Inputs:** [Japanese side] 1. Experts 1) Chief advisor 2) Aquaculture technique, extension 3) Training, broodstock management, seed production 4) Aquaculture technique, rural development, marketing survey 5) 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 Lao government estimation and development plan on fish supply (kg/person/year) (DLF. 2005)	[Lao 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	-Situation that hinder project participation of villagers have not occurred. -C/Ps, province/district extension staff and PAS staff are not transferred to other organizations. **Preconditions:** -Security of pilot sites is confirmed.

Year	2005	2010	2020
Rural area	8-10	13	22
Urban area	14	16	27
Average		14	24

4-1. Collect and compile information on the aquaculture activities of target provinces 4-2. Assist preparation of aquaculture development strategies of the target provinces 4-3. Make an action plan of the project after its cooperation period. 4-4. Hold a seminar on the action plan of the relevant organizations for further aquaculture extension.		

Report

Preparatory Committee

for AQIP II Mid-term Evaluation

January 2008

AQUACULTURE IMPROVEMENT AND EXTENSION PROJECT PHASE II

(AQIP II)

Contents

Report of Joint Evaluation Preparatory Committee For AQIP2 Mid-term Evaluation

1. Outline of the project

1-1 Background of the project

Fish and aquatic animals are the most important animal protein source to the rural people in Lao PDR. Increase of fisheries product supply is an urgent need in rural area in order to achieve national food security, to raise nutritional level and to improve livelihood of the people.

Catching fisheries production from natural and man-made water bodies seems already to exceed the level of sustainable production in recent years due to strong fishing pressure on the fisheries resources. Therefore, promotion of aquaculture is the most promising way to increase supply of fisheries products. Aquaculture in rural area in Lao PDR is characterized by the fact that it is conducted as a part of the integrated agricultural production system composed of rice and vegetable cultivation, collection of wild products, cottage industry, livestock farming and so on. The purpose of the present project is to establish an appropriate model of "farmer to farmer aquaculture extension system" to increase production of such rural aquaculture in order to contribute to improvement of livelihood of rural people.

The project is implemented under four slogans, namely, "poverty alleviation", food security", "environmental friendliness", and "gender mainstreaming".

1-2 Outline of the project

(1) 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.

(2) Project purpose

Aquaculture suitable for local conditions is expanded in the 4 target provinces

(3) Outputs

Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites.

Output 2: The capacity of relevant persons such as fish farmers, province and district extension staffs and staff of PASs regarding aquaculture technology and extension is improved.

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

Output 4: The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.

2. Outline of the Mid-term Evaluation

2-1 Purpose of the AQIP2 Mid-term Evaluation

(1) Confirm achievement of output, accomplishment of activities and input at midterm of the project, based on the Project Design Matrix (PDM) and the plan of operation (P/O)

(2) Evaluate the project from the point of 5 evaluation criteria to help implementation of the latter half of the project. (Especially from the point of effectiveness, efficiency and sustainability)

(3) Project implementation process shall be shared among the related parties and create common recognition for operation of the latter half of the project and thereafter.

(4) Clarify issues/ concerns for the latter half of the project and verify solutions.

(5) Clarify the activity plan and input plan for the latter half of the project.

2-2 Detailed Procedure for AQIP2 Mid-term Evaluation

(1) Step 1: Self-evaluation of the Project

Implementer

Lao government side: C/P of the Project (NADC, DLF, PAFO, DAFEO)
JICA side: Project experts

Purpose

1) To confirm the progress of activities based on Plan of Operation (PO)
2) To conduct self-evaluation for the achievement of the Project based on PDM indicators
3) To conduct self-evaluation in terms of 5 evaluation criteria
4) To confirm the input record both Lao government side and JICA side
5) To evaluate the achievement of pilot operation
6) To clarify issues to be discussed through mid-term evaluation

(2) Step 2: Joint Evaluation Preparation Committee (JEPC)

Implementer

Lao government side: Member of Joint Evaluation Preparatory Committee
JICA side: JICA Laos Office and Project experts
Local Consultant: Lao Management & Development Consultants Co., Ltd.(LMDC)

Purpose

1) To make the members of the Evaluation Preparatory Committee understand the project strategy/outline/activities until the mid-term
2) To inspect the pilot operation target village and evaluate the outputs/activities of pilot operation

3) To analyze outputs until the mid-term and verify operation direction for the latter half of the project as the Evaluation Preparatory Committee

4) To clarify issues/ concerns for the latter half of the project and verify solutions

(3) Step 3: Lao-Japan Joint Evaluation Study

Implementer

Lao government side: Lao Government evaluation team

JICA side: JICA HDQ, JICA Laos Office

Purpose

Based on the result of Self-evaluation and JEPC, the Lao-Japan Joint Evaluation Study Team will

1) confirm the achievement, progress, input at the mid-term of the project.

2) evaluate the project in terms of 5 evaluation criteria.

3) discuss main issues between Lao government and JICA side.

4) make suggestion and recommendation for the latter of the project.

3. Outline of the Joint Evaluation Preparation Committee (JEPC)

No. of meetings	Duration	Place
1st JEPC meeting	2nd November 2007	NADC
2nd JEPC / Southern Trip	4th – 9th November 2007	Savannakhet and Salavan
3rd JEPC / Northern Trip	19th – 24th November 2007	Oudomxay and Xayabouly
4th JEPC / wrap up meeting	11th December 2007	Lanexang Hotel, Vientiane City

3-1 Purpose of JEPC See above (2-2(2))

3-2 Member of JEPC See Attachment

3-3 Main Issues to be discussed

(1) Suitable aquaculture method by evaluating pilot operation

(2) Role and relationship among related organizations for better aquaculture development

-Vertical line: MAF-PAFO-DAFEO

-Horizontal line: Central Government: DLF-NAFES-NAFRI-DOP,

Provincial Government: Livestock and Fishery Division-PAFEC-PAS

(3) Measure to secure the sustainability for aquaculture development

- Aquaculture extension by government service
- Farmer to Farmer/Village to Village extension approach

3-4 Detailed Procedure of JEPC

<u>1st JEPC: AQIP2 Mid-term Evaluation Outline Seminar</u>

(1) Objective 1) To acknowledge the AQIP2 outline and progress

2) To discuss methodology and issues for AQIP2 mid-term evaluation

(2) Methodology

- One day seminar at NADC
- Explain project outline and progress
- Explain methodology of AQIP2 mid-term evaluation and exchange opinions
- Explain the result of Self-evaluation and exchange opinions
- Discuss issues to be considered through the JEPC
- Confirm schedule for JEPC including site observation
- Observe NADC facilities and activities

<u>2nd and 3rd JEPC: Site Observation and On-site Workshop</u>

(1) Objective 1) To confirm the progress and output of pilot operation at pilot village

2) To discuss main issues among JEPC members

(2) Methodology

- Organize two times (one in North, one in South)
- PAFO explains progress of project activities
- Visit pilot village (1-2 village one province) and exchange opinions with villagers
- Based on site visit, JEPC members discuss main issues which are decided at 1st JEPC

<Workshop at Pilot Village in the 2nd and 3rd JEPC>

＊Purpose

To identify the impact of target village and farmers (changes between before and after the Project) in order to evaluate the achievement of pilot operation.

＊Methodology

- Conduct a participatory workshop in one village a target province
- Divide participants (villagers) into 3 groups as follows
  - (1) Village Aquaculture Promotion Committee (VAPC),
  - (2) Target aquaculture farmers (PJ participants),
  - (3) Farmers who do not participate in the Project

4th JEPC: Wrap-up Meeting

(1) Objective 1) Review the site observation and on-site discussion

2) Discuss the evaluation for AQIP2 by JEPC

- Project Achievement
- Main Issues/Important Issues

(2) Methodology

- One day meeting at Vientiane.
- Draft JEPC report will be prepared.
- Based on draft JEPC report, JEPC member will discuss the project achievement, main issues, and important issues for tackling in the latter of the project.
- Discuss the relationship and responsibility of related organization as well as measure to secure the sustainability.
- The meeting will be leaded by the chairperson of JEPC with support of experts, JICA Laos office.

4. Evaluation Results

4-1 Project achievement

(1) Inputs

(a) Inputs up to now

Inputs by Japanese side

Most of inputs by Japanese side have been made appropriately both in quantity and timing (Attachment 2: Accomplishment grid). Only one weak point of Japanese input is timing of dispatch of Japanese experts. Many fish farmers in rural area prepare their fish ponds and start culture in March and April. However, Japanese experts are used to be absent from the end of March to middle April in the first three years of the project. This seems to have caused some inconvenience in giving sufficient technical support to fish farmers at target villages.

Inputs by Lao side

Inputs by Lao side have been made appropriately except for two items, namely (1) number of persons allocated at NADC, and (2) provision of operation costs of NADC (Attachment 2: Accomplishment grid).

Presently, seven persons are allocated at NADC as permanent staff and six persons as temporary staff. To cover all activities for the operation of NADC and the project, and to ensure sustainability in project outputs in the future, this number of permanent and temporary members is quite insufficient.

Operation costs of NADC provided by Lao side does not cover such items as costs for security, fish feed, fuel and other utility. In addition to those costs, operation costs required for various field activities, presently covered by Japanese side, should be covered by Lao side after the project. To ensure sustainability of the project outcomes, it is necessary for Lao side to seek an appropriate solution on this problem as soon as possible.

(b) Expected inputs during rest of the project period

The pilot operation is the most important component in the present project to establish an appropriate institutional and technical package of “farmer-to-farmer aquaculture extension system”. It has become clear, after two and half years of actual field activities in rural area, that three years allocated to the pilot operation is insufficient to fully establish such system. Therefore, it is necessary to extend the pilot operation period at least one more year, to be four years in total, maintaining the same level of inputs from Japanese side.

(2) Activities

(a) Activities up to now

All activities necessary to achieve project outputs have been conducted as planned (Attachment 1: Activity chart, Attachment 2: Accomplishment grid).

(b) Expected activities during rest of the project period

Activities at the pilot villages should be maintained at least until fourth year of the project in order to establish sustainable “farmer-to-farmer aquaculture extension system”.

(3) Outputs

(a) Achievement up to now

Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites.

Indicator 1-1. Manuals on aquaculture techniques suitable to local conditions are prepared.

Various types of technical manuals and extension materials have been prepared as follows:

Types	Title/contents
Technical manual	1. Textbook on Tilapia seed production 2. Textbook on common carp seed production 3. Manual on aquaculture extension in Lao PDR
VCD	Culture technique of Tilapia and common carp
Hanging paper panel	How to increase fish production.
“Paper theatre”	How to increase fish production.

Indicator 1-2. Production of fish culture by target farmers in pilot villages increases by more than 40% on average.

As shown in Fig. 3 in Attachment 4, fish production by target farmers has increased more than or almost 40 % at 7 villages out of 12 pilot villages.

Indicator 1-3. More than 60% of target farmers in pilot villages are well motivated to continue aquaculture at the time of termination of the pilot operation.

Most of fish farmers want to continue aquaculture. Furthermore, number of fish farmers will increase more and more.

Output 2: The capacity of relevant persons such as target farmers, province/district extension staff and staff of PASs regarding aquaculture technology and extension is improved.

Indicator 2-1. More than two staff members of each PAS can train district staff and farmers.

More than two staff members of each PAS have improved their ability in training district staff and farmers, through NADC training, study trip to Thailand, training in Japan, field activities, and workshops. Also, PAS training gave them a good opportunity to improve their ability to train farmers.

Indicator 2-2. More than two staff members of each PLFS and more than two staff members of each DAFO (former DAFEO) can give guidance to farmers.

Only one officer has been trained on aquaculture extension under AQIP II at each PLFS and DAFO. The number of officer to be trained under AQIP II will not increase at PLFS, while it will increase at DAFO under new "cluster development system".

Indicator 2-3. At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers.

At least one fish farmer or women's union fish culture group has acquired sufficient knowledge and technique fore the core body for future "farmer to farmer aquaculture extension system" at each pilot village. They should be certified as VADW either by central or local government.

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

Indicator 3. At least 600 target farmers (extension villages) apply improved methods in 8 focal districts.

There is no information on this indicator yet as aquaculture expansion operation has just started in the third year. However, it is expected that more than 600 farmers will improve their aquaculture technique under direct or indirect guidance by AQIP II.

Output 4: The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.

Indicator 4-1. Related organizations approve a collaboration agreement defining duties of each organization.

Collaboration among related organizations has been improved through various activities of AQIP II. The final form of collaboration should be formulated in the provincial aquaculture development strategy and national aquaculture extension plan to be prepared in the final year of AQIP II.

Indicator 4-2. Responsible organizations allocate sufficient budget to the national aquaculture extension plan.

Indicator 4-3. The project makes recommendations for sustainable development of aquaculture in Lao PDR.

Those two items should be most important issues in discussion to formulate provincial aquaculture development strategies for target provinces and the national aquaculture extension

plan.

(b) Expected achievement during rest of the project period

All outputs required for the establishment of "farmer-to-farmer aquaculture extension system" will be expected to achieve at the end of the project based on the achievement of pilot operation. However, it should be considered to strengthen the pilot operation as well as the allocation of necessary budget and staff by Lao government side in order to make sure the achievement of outputs in the latter half of the project.

(4) Project purpose: Aquaculture suitable for local conditions is established in the 4 target provinces

Indicator 1. 720 fish farmers (120: pilot villages, 600: extension villages) increase their fish production by more than 40% on average by applying improved aquaculture methods in 4 target provinces.

As for pilot villages, AQIP II can clear the target shown by the indicator, since average fish production per fish farmer has already increased higher than or almost equal to 40 % on average as of August 2007.

As for expansion villages, there is no data available to assess the achievement yet, since the operation has been just started in 3rd year. However, it is expected to achieve in expansion villages considering the achievement of pilot operation.

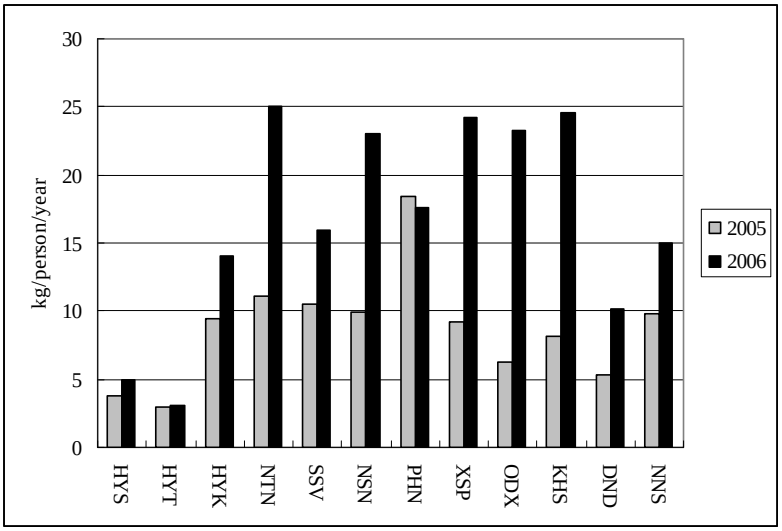
Indicator 2. Aquaculture development plans are prepared at province and district levels.

The first draft of provincial aquaculture development strategy has been formulated for each target province in 2nd year. The recommendations for sustainable development of aquaculture in Lao PDR would be prepared by the final evaluation.

(5) Overall goal: Standard of living of rural fish farmer is improved through the dissemination of aquaculture suitable for local conditions in the 4 target provinces.

Indicator 1. Fish consumption of 22kg/person/year by the rural people in 4 target provinces.

Among five of the pilot villages, fish consumption has shown significant increase, up to the level higher than 22kg/person/year. It shows that aquaculture method introduced by AQIP II can be expected to contribute to achieve the overall goal, if the method will be strengthened in the expansion operation as well as expanded to the whole area in 4 target provinces.



Average fish consumption (kg/person/year) at pilot villages.

4-2 Participatory Workshops at Pilot Villages in the South and the North

The situation after the project implementation is summarized below.

- A number of fish ponds are increased 46% in the South and 191% in the North.
- A number of fish productions have been increasing both in the south and north.
- A number of household who raise fish is increased.
- The amount of fish consumption is increased, and the amount of fish purchasing is reduced because some fish farmers sufficiently have their own fish for consumption. They also can generate some income from their increased fish production.
- Some fish farmers can raise more fish species than before (about 9 species) which is quite applicable to the market demand, for example Tilapia, Common carp, Common silver carp, Grass carp, Indian carp, Chinese carp, Catfish, snack head fish and silver carp.

The suitable manual/methods used by fish farmers are summarized below.

Aquaculture methods	Southern	Northern
1. Know how to prepare the fish ponds such as drying ponds, lime putting and fertilizing	☒	☒
2. Know how to improve water quality and make green water	☒	☒
3. Know how to determine and release correct number of fingerings in the various sized ponds	☒	☒
4. know how to feed fish twice a day	☒	☒
5. know how to clean and maintenance the fish ponds	☒	☒
6. Know how to produce mixed fish feed by mixing of broken rice grain, rice bran and a piece of vegetable	☒	☒
7. Some fish farmers can breed fingerling by themselves such as Tilapia, Common silver carp and Common carp	☒	☒

Most of the above methods are suitable to local conditions; however, some methods are difficult and confused for some farmers to practice in the actual circumstances, for example fish breeding, mixed feed producing, nursery and make green water (plankton).

The improvement of fish farmers' capacities are summarized below.

- Fish farmers' knowledge and skills on aquaculture are improved.
- Nine (9) fish farmers in the South and 19 ones in the North have the potential to be Village Aquaculture Development Worker (VADW).
- Constraints of being VADW are ponds condition, water supply, fingerling supply and natural disaster.
- Refer to the data gathered from the target farmers and non-participated members,
  - The percentage of target farmer motivation to continue aquaculture practice in the South is more than 85% and 93% in the North.
  - The project has introduced improved aquaculture methods to 35 non-participated members in the South and 86 people in the North.
  - The percentages of non-participated members apply the introduced aquaculture methods in the South are 55% and 49% in the North.

Fish farmers' expectation and requirement are summarized below.

Item of prior activities	Southern	Northern
1. Strengthen of village aquaculture fund	✓	✓
2. Fish breeding	✓	✓
3. Construct more fish ponds	✓	✓
4. Mixed feed producing	✓	✓
5. Construct the small dam, nursery ponds and breeding concrete tank	✓	
6. Seek for the brood stock	✓	
7. Fingerling nursery	✓	
8. Conduct more training on aquaculture practice for all PJ members		✓
9. Conduct the campaign training on aquaculture for all the villagers		✓
10. Conduct more training on project's aquaculture methodology		✓
11. Conduct the aquaculture training for all fish farmers in the villages		✓

Item of prior activities	Southern	Northern
12. Lesson learnt by comparing with village to village, district to district and province to province in field of aquaculture		✓
13. Strengthen the rule of Village Aquaculture Group		✓
14. Repair nursery ponds		✓
15. Improve and repair for broken ponds		✓
16. Construct new Village meeting hall		✓
17. Construct the catfish concrete tank		✓
Items of the villages' requirement	**Southern**	**Northern**
18. Some equipments on aquaculture practice such as holding net, gillnet and Ph and Do meter	✓	
19. Study tour for catfish raising	✓	
20. Training on catfish raising and breeding	✓	
21. Study tour to exchange of knowledge and progress between village to village, district to district and province to province		✓
22. Aquaculture in practice term such as on the job training provided by the NADC's technicians		✓

The problem and constraints faced by fish farmers are summarized below.

Southern	Northern
▪ Lack of – fish breeding concrete tank and fingerlings – water to supply for fish ponds – concentrate feed – capital to purchase fingerlings – fund to conduct the aquaculture practice ▪ Fish stealing is commonly existed in some areas. ▪ The fish farmers' ponds are far from their houses so it is difficult to take care and protect from fish robbers. ▪ Fish predator is one of important constraints for farmers.	▪ Fish feeding is irregularly practiced. ▪ The fish farmers' ponds are far from their houses, so it is difficult to take care and protect from fish robbers. ▪ Flood in some areas during raining season ▪ The difficulty of water releasing and discharging. ▪ Green water making is difficult in some areas where the ponds quickly absorb water. ▪ The fish nursery still takes time (about 3 months) because feeding practice is not standardized and feed is insufficient. ▪ Lack of feed because the bran is so

▪ Many fish farmers can not raise fish in dry season because of insufficient water. ▪ Raise fish in the holding net is difficult because fish usually dies. ▪ Some fish ponds are broken. ▪ Fish farmers have to practice other income generation activities, so aquaculture practice becomes less priority.	expensive. ▪ Some fish ponds can not keep water for a whole year. ▪ It is difficult to produce mixed feed because farmers don't have crasser machine. ▪ Some fish ponds are not standardized yet.

4-3 Main Issues 1 "Role and relationship among related organizations for better aquaculture"

4.3.1 Role and responsibility

(a). **Department of Livestock and Fishery** is responsible for developing the strategic master plans base on the government policy which is consistent with the 4 development goals and 13 approaches.

(b). **National Agriculture and Forestry Research Institute** is responsible for conducting researches, analysis, experiments and also study on new hybrid that is suitable to the real condition.

(c). **National Agriculture and Forestry Extension Service** is responsible for extension, and leading people on agriculture, support food processing and income generation activity to improve local people's livelihood.

(d). **Nam Xuang Aquaculture Development Center** is responsible for collaboration, improve aquaculture techniques and support the extension, provide training and conduct several study tours and support necessary aquaculture equipments/materials.

(e). **Province Agriculture and Forestry Office** (PAFO) is responsible for materializing the GoL strategic master plans.

(f). **Province Livestock and Fishery Section** is responsible for monitoring, inspection, statistic data collection, and materializes provincial strategic plans in livestock and fishery section.

(g). **Province Aquaculture Station** is responsible for producing of fingerling and fishes that can fulfill expected demand of social and community. The station allow students from National University of Laos, Faculty of Agriculture (Nabong Campus), Champasak University, College and Technical Vocation School, individual fish farmers and people who are interested in aquaculture to visit and study.

(h). **District Agriculture and Forestry Office (DAFO)** is responsible for extension of agriculture and fishery according to approval plans.

(i). **Village Aquaculture Promotion Committee** is responsible for extension aquaculture techniques and practices in target villages and encourages more people to practice aquaculture by their own initiative.

4.3.2 Coordination among relevant organizations related to AQIP2

- NADC's function and operation seem to be still under consideration due to the restructure of MAF.
- Although roles and responsibilities of each organization are officially written in the document, in actual situation there is still a gap and miscommunication among related organizations; therefore, the information on AQIP2's work and progress have not been shared and informed entirely.
- NAFES and NAFRI have little involvement in the project implementation at the moment. To promote extension and sustainability, NAFES recommended that the project should initiate concrete coaching system and monitoring and evaluation system.
- Lack of budget and funding for related staffs to follow up and monitor the project activities is one of the crucial constraints of the project sustainability.

4.3.3 Constraints and Recommendation

Problems and issues	Southern	Northern
▪ Cooperation or relation between departments and sections are not clear or transparent.	✓	
▪ Work and responsibility are not appropriate and relevant to the local condition as well as to local authorities.	✓	
▪ Inadequate information sharing on AQIP project implementation and progress in the phase II	✓	
▪ Not enough budgets for inspection, monitoring and evaluation of the project activities	✓	
▪ The budget would not cover the whole targets at district and village levels in the provinces.	✓	
▪ Coordinator mechanisms among local and central authorities are unclearly defined, inadequate, and inappropriate.		✓
▪ There are no systematic work methods or work planning for the project implementation in the communities' level.		✓
▪ Inadequate production monitoring at target and pilot villages due to insufficiency of budget for local staff, and misunderstanding about the local environmental condition		✓
▪ Inadequate data and report system by villages and/or VAPCs		✓
Recommendation to the project		
▪ The project should upgrade educational background, technical knowledge, skills, exchange experience for local staff and project counterpart in the section.	✓	✓
▪ The project should attempt to complete its activities in the rest of project implementation period.	✓	✓
▪ The project should provide laptop and digital camera to province coordinator for data monitoring.		✓
▪ The project should continue each aquaculture activities in the villages and pilot farmers.		✓
▪ The project should continue aquaculture expansion in the districts, villages and also pilot households or pilot farmers level as well as to produce more fry and fingerling.		✓
▪ The project should continue to support the government on aquaculture		

improvement especially infrastructure such as fund for fish pond expansion, office construction, training center construction, equipments/materials. ▪ The PAFO also requested project to support some fund for administration and management in the office and field.		✓

4-4 Main Issues 2 "Suitable aquaculture method by evaluating pilot operation"

The main aquaculture methods which are introduced by AQIP2 are summarized below.

Method 1: Combination of fish species

Method 2: Fly and fingerlings nursery in the pond

Method 3: Optimum stocking density of tilapia fry into a grow-out pond (separate male and female fish)

Method 4: Prevention of fish poaching and enhancement of natural feed production by sticking bamboo poles on the pond bottom

Method 5: Efficient and easy seed production method of tilapia by partitioning a pond into brood stock part and fish fry part (to product tilapia fingerlings for sell)

Method 6: Fly and fingerlings nursery in the holding net

Method 7: Fly and fingerlings production

Method	Constraints	Measure to improve
Method 1:	– Fishes grow unequally. – Big fishes eat small fishes.	– Release fly and fingerling into pond at the same date.
Method 2 & 7:	– There are various fish's predators such as birds, frogs, snakes and insects.	– Fish pond preparation should follow aquaculture techniques and methodology. – Fish pond management such as cleaning pond, nursery pond, brood stock pond, to make green water (phytoplankton and zooplankton) by putting fertilizer to pond.
Method 3:	– Not enough experience to select fishes. – Brood stock (small tails thus: body weigh, body length and life period are not standardized, not suitable for breeding) and also fingerling. – Local people want to raise different fish species.	**For method 3 & 7:** – Continue provide training course on aquaculture techniques and methodology. – Brood stocks and fingerlings improvement such as quality brood stocks and fingerlings selection, brood stocks and fingerlings should buy from different areas. – If this can be done properly, fishes will grow very quickly with high production.

Method 4:	– Difficult harvest and cleaning fish pond.	
Method 5 & 6:	– Difficult to harvest fingerlings in fish pond. – Used for tilapia specie only – Fingerlings always die in the holding net.	**For method 6:** – Appropriately select aquaculture techniques such as volume of holding net that can contain fishes, water level, fish pond location and etc.

Evaluation	Constraints	Measure to improve
Village Aquaculture Promotion Committee (VAPC)		
Most of VAPC are well managed to support fish farmers – The VAPC has it own group's organizational chart. – Has managerial regulation. – There is implementation plan and monthly meeting. – There has it own data collection system.	Some of VAPC have constraints as follows. – Inadequate equipments/materials management. – Inadequate fund support. – Some fish ponds are narrow and there are a lot of gravels. – There are some robbers appeared in this village. – Insufficiency equipments/materials for aquaculture activities. – Limitation of village aquaculture workers to carry out project's extension aquaculture techniques and methodologies.	– Provide regular training on budget management to fish farmers and Women's Union. – Lesson learnt from some successful case in fund management. – Create strict regulation in order to prevent fish robber.
Group aquaculture		
In some villages, aquaculture group by WU made good result such as increasing fish production. – Each village uses Lao women's union fund. – Some equipment/materials were provided to support aquaculture practices in each village. – Village aquaculture workers can transfer AQIP2 methods to other fish farmers.	– Methodology to promote group aquaculture has not been established.	– Training on fund/budget management should be provided to farmers and women's union – Lesson learnt from some successful cases in fund management – Support more equipment/materials, for example, For breeding: injection hormone, medicines, syringes, air pump and so on. For training: note books, net, pens, pencils, book cabinet, tables, desks, telephone and so on.
Monitoring and Coaching by local government		
Monitoring and coaching system by PAFO, PAS, DAFO is improved through project activities.	– Lack of budget to inspect and monitor the project implementation. – Insufficiency of aquaculture	– The village or VAPC should coordinate with other government organizations. – The district should operate

– Inadequate support from DAFO and PAS – Insufficient aquaculture technical staffs (skillful)	technical staff. – Inadequate meeting organized in the past and there were not well coordination among PAFO, PLFS, PAS, DAFO and VAPC. – Local technical staffs still do not have much experience on aquaculture techniques and methodologies. – Insufficiency of collecting statistics in fishery	plan jointly with PAS and discuss with coordinator and PLFS. – The project should support the Coordinator Committee Meeting such as PAFO, DAFO, PAS and village or VAPC from four targeted provinces. – The project, PAFO and DAFO should frequently monitor and inspect the activities, which could be around two to three times a month.

4-5 Main Issues 3 "Measure to secure the sustainability for aquaculture development"

Village Level

Successful case	Issues and Constraints	Measure to improve
Skills/Techniques (suitability for farmers)		
– Some techniques provided by the project are suitable to local condition. – Method of Tilapia fingerling production by using net in the middle of fish pond. – Natural fish breeding is appropriate. – Fly and fingerling nursery in local ponds is appropriate.	– Equipment/material provision is limited, especially for breeding such as injection, hormone, syringes and air-pump. – Some farmers have difficulty to use some techniques due to skills and budget.	– Continue provide aquaculture training in targeted villages. – Select and develop aquaculture methods according to farmers' demand. – More promotion on aquaculture in the target areas.
Human Resources (core farmer, VADW)		
– The village aquaculture development group, pilot households and farmers are well cooperated in aquaculture practices. – Village aquaculture experiment is existed.	– The condition of the member is limited such as responsibility, limited area for producing, lack of fund and laborers.	– Create more good opportunity for local people or farmers to share knowledge with the group members. – The VAPC duties and responsibilities should clearly be assigned for the village aquaculture group.
Organization/Institution (VAPC)		
– Most of village organizations give support	– In a few VAPC, the Administration and	– Rules of some VAPC should be reviewed and

and very good cooperation such as Head of villages, Head of village aquaculture groups , Women's union and all local people	Management on village aquaculture group are not yet in good operation such as responsibility/duty are not clear and lack of discussion in the group.	strengthened.
Finance/Budget (HH input, village fund)		
– There is initiation of village aquaculture group's fund.	– Fund management is not well in some villagers.	– Fund sharing between the project and village aquaculture group's members
Extension system (farmer to farmer)		
– Some farmers supported by the project can transfer techniques to other villagers.		

District Level

Present situation	Issues and Constraints	Measure to improve
Human Resources (extension staff)		
– Around 50% of staffs have skills and knowledge that can be extended to aquaculture farmers.	– The existing staffs are not specific on aquaculture. – Most of staffs have no skills and knowledge on aquaculture.	– The staff in charge of the aquaculture should be trained in specific filed of aquaculture. – The staff should regularly practice with local farmers. – Motivation building should be provided for government staffs to operate their works at field.
Organization/Institution (DAFO)		
– DAFO understands the important of the aquaculture extension.	– There are not enough staffs that specialize in aquaculture practice.	– The local staff should regularly be trained on aquaculture techniques and methodologies.
Finance/Budget (for extension and monitoring)		
– The budget for aquaculture extension is limited such as lack of budgets in the PLFS, PAS and PAFO to support aquaculture extension activities.	– No any budget from the government is specifically allocated in aquaculture practice	– The government should provide specific budget for aquaculture extension. – The budget plan should be proposed in each academic year.
Extension system (DAFO extension, cluster extension, village to village)		
– The aquaculture extension system is appropriate.	– Lack of relationship between the local staff and local farmers in aquaculture, especially for the	– Give consulting on aquaculture methods and technique from local staff to local farmers, approximately

	monitoring on the local farmers' aquaculture practice.	three times a month

Provincial Level

Present situation	Issues and Constraints	Measure to improve
Skills/Techniques (at PAS)		
Skills/techniques are improving in: – Brood stock selection – Fish breeding – Equipments operation and maintenance – Fly and fingerling nursery – Pond management such as pond cleaning, predator protection, nursery ponds, Brood stock ponds and feeding – Aquaculture techniques training	– The techniques, skills and knowledge of the staff on aquaculture are still not high. – The Brood stocks and fingerlings are not standardized and insufficient. – Infrastructure, equipments/ materials, aquaculture techniques and methodologies are not enough for the stations and local farmers.	– The project should provide necessary infrastructure, equipments and materials to the stations and pilot local farmers. – The station should improve or change new good quality and popular brood stocks.
Human Resources (planning staff, technical staff)		
– Many staffs are capable in aquaculture, but number of them is not enough to work in the fields. – There are only 2 staffs for planning.	– Lack of specific aquaculture technical staffs (lack of upgrading such as skills, experiences, knowledge and lesson learnt. – Insufficient administration and management staffs in the stations.	– Up grade local staff to be aquaculture technician such as in practices, coaching in the fields, providing frequent training, study tours in-country or abroad. – The PAFO should provide more administration and management staff at PLFS and PAS.
Organization/Institution (PLFS, PAS), (PAFO fish plan)		
– The organizations and the project have a good relationship and cooperation.	– It is still not systematic in coordinating among any GoL's organizations.	– The coordinators should follow the GoL's organization system.
Finance/Budget (for extension and monitoring)		
– There is budget initiative from the government.	– The budget is not enough to support aquaculture extension, monitoring, inspecting and evaluation.	– Necessary budget for aquaculture planning and technical service to local farmers should be secured by PAFO.
Extension system (PAFO training for DAFO and farmers)		

– PLFS and PAS staffs get knowledge skills of aquaculture for local farmers.	– The training on aquaculture methods are not covered over the target area. – The budget for aquaculture extension is not enough.	– Capacity building more village aquaculture technical staffs – Seek and provide more budget in aquaculture extension and for sustainability in aquaculture

MAF Level (DLF, NAFES, NAFRI and DoP)

Present situation	Issues and Constraints	Measure to improve
Skills/Techniques (at NADC, NAFRI)		
– Most of aquaculture techniques of AQIP2 can be applied in rural villages. –	– Technique on mono sex fish raising only for Tilapia –	– Some of techniques should be modified to match the local conditions.
Human Resources (planning, research, extension)		
– HR for planning, researching and extension are enough to support and cooperate with another section. – There are trainers on aquaculture practice such as fish raising, fish breeding, fly and fingerling nursery and also fish feeding.	– Technical staffs are not standardized and lack of experiences.	– The local staff should be specially trained and up graded on the aquaculture technical terms.
Organization/Institution (relationship at MAF, national fish dev. Plan)		
– Relationship among related organizations such as MAF to DOP to DOLF and also cooperate with two centers NAFRI and NAFES is improved.	– The role between DoLF (NADC) and NAFRI (LARRec) is not clear yet.	– The released responsibilities of related organization at MAF should be revised.
Finance/Budget (for suitable fish culture expenditure at national level)		
– Finance/Budget of NADC and is not enough.	– Budget is not enough to support aquaculture extension.	– Fund raising by themselves
Extension system (extension system from MAF to village)		
– Particular extension system is divided into three parts: 1. Government Aquaculture System (GES) 2. Village Extension System (VES) 3. Village Extension Worker	– The extension system of MAF can not cover across the country so that another part of PAFO, PLFS, PAS and DAFO have to implement some tasks by themselves.	– DLF, NAFRI and NAFES should operate aquaculture technical extension system together. – NADC and NAFES should implement aquaculture extension system together to

(VEW)		facilitate aquaculture extension for PAFO, DAFO and village around two times a month.

5. Important issues and measures to be taken

5-1 Important issues

(1) Establishment of extension method of group aquaculture

1) Group fish culture by women's union

When AQIP II was started, the target farmers were supposed to be individual fish culture farmers/households. In the pilot operation, group fish culture by women's union (WU) members has been tried in the most of the pilot villages. As the result of the first two years of the pilot operation, fish culture operated by WU has been successful in some pilot villages. The success of fish culture by WU has shown such effects as:

1) To generate additional cash income to the members of fish culture group.
2) To increase fish consumption of member's household.
3) To increase WU fund.
4) To enhance activities of WU in the village.
5) To improve women's ability of record keeping in household economy.
6) To encourage gender mainstreaming in decision making in the village.
7) To share useful knowledge and technique of fish culture among WU members, so that they have improved their fish culture skill.

It can be said that fish culture by WU is a promising way of aquaculture extension in rural area.

2) Village community fish culture

Some village has a large pond owned by the village community (a pond at the temple in some village), not privately owned. At such village, village community fish culture is very useful to advance mutual help among villagers and to improve public facilities, such as village road and security facility using money saved by selling fish.

3) School fish culture

Motivated by the success of fish culture by WU, school teachers at some pilot villages have started fish culture at the school in the third year of the pilot operation. Fish culture at the school is expected to be useful in such ways as:

i) The school will be able to save some money to improve its facilities and to buy teaching materials by selling fish.
ii) School can serve fish to children as school lunch to improve their nutritional condition.
iii) Children will acquire knowledge on fish culture to become good fish culturists in the next generation.

4) Group fish culture by low-income farmers

Low-income farmers are, in many cases, reluctant to invest their very limited resources into fish culture (the monitoring survey has shown that income of fish culture HH is higher than

non-fish culture HH). Even if they once start fish culture, the scale of their fish culture is usually too small for applying improved techniques, and eventually resulted in failure. If those low-income farmers organize a group for fish culture, they can conduct fish culture at larger scale by putting their resources together, with much higher possibility of technical and economic success. Therefore, group fish culture by low-income farmers should be tried in the pilot operation to establish a method of aquaculture extension to low-income farmers who are hesitating to start fish culture.

(2) Standardizing estimation method for amount of fish consumption by rural people

Increase in fish consumption per person is an important indicator for contribution of aquaculture development to upgrade villager's livelihood. As Lao government set targets for fish supply (almost identical with fish consumption) in the national food security policy (Table 1) current fish consumption by villagers at the target villages should be properly monitored.

AQIP II has been monitoring fish consumption by villagers at pilot villages. However, its method has not been standardized yet. An appropriate standardized estimation method should be established and disseminated to DAFO staff to monitor fish consumption per person in rural area.

Table 1. Lao government's estimation and development plan on fish supply

(kg/person/year).

Year	2005	2010	2020
Rural area	8-10	13	22
Urban area	14	16	27
Average		14	24

(DLF. 2005)

(3) Government certification of core farmers as Village Aquaculture Development Worker (VADW)

To make the concept of the core farmers clear, DLF should set criteria for qualification of VADW as a core body for "farmer to farmer aquaculture extension". DAFO, under the guidance of DLF and PLFS, should nominate VADW at pilot villages. DAFO also should give necessary technical training to and organize information exchange meetings of VADW regularly to maintain quality of VADW.

(4) Necessity to increase number of researchers and field workers at NADC

The number of NADC staff members are insufficient, particularly university graduate senior staff for researcher and field workers. This will adversely affect to the sustainability of AQIP II achievements.

5-2 Measures to be taken

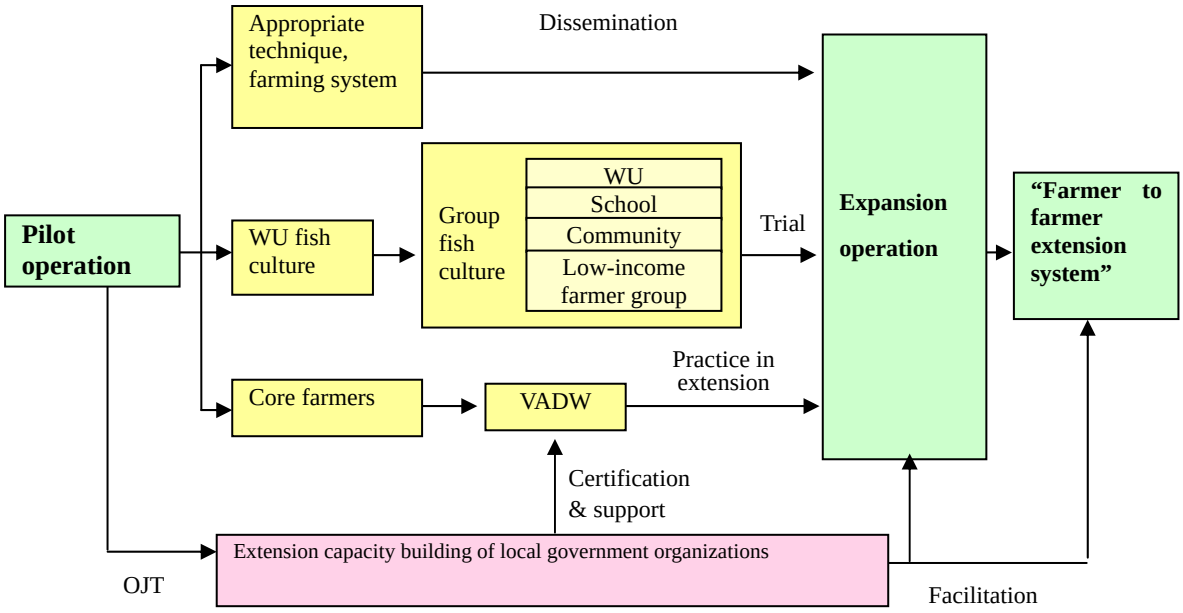
(1) Extension of pilot operation period

JEPC proposes to extend the period for the pilot operation to four years from the originally planned three years, in order to establish successful cases for fish culture by group and methods necessary for aquaculture extension in future. The main items to be conducted in the fourth year are:

1) Women's union fish culture.
2) Village community fish culture
3) School fish culture
4) Low-income group fish culture
5) Establishment of extension methods for group fish culture.
6) Establishment of qualification and criteria for selection of VADW.
7) Standardization of a method and making a manual for estimation of fish consumption per person in the rural village

To conduct those items smoothly, input of long-term Japanese experts in the fourth year should be increased to the same level at that in the third year.

The following diagram shows the project strategy to progress from the pilot operation to the expansion operation.



Concept of the project strategy to progress from the pilot to the expansion operation.

(2) Modification of PDM indicators

(a) Appropriate Number for Capacity Building at PLFS

To consider the actual number of staff members who are in charge of aquaculture in each PLFS as well as the change of the institute name at district level, PDM indicators are modified as follows:

2-2. More than two staff members of each PLFS and more than two staff members of each DAFEO can give guidance to farmers.
↓
2-2. More than <u>one</u> staff members of each PLFS and more than two staff members of each <u>DAFO</u> can give guidance to farmers.

(b) Nomination of VADW

To consolidate "farmer-to-farmer aquaculture extension system", status of core farmers should be officially recognized as Village Aquaculture Development Worker (VADW) by the government. VADW should be officially nominated as follows:

2-3. At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers.
↓
2-3. At least one Village Aquaculture Development Worker (VADW) is nominated at each pilot village

(3) To request Lao government to increase researchers and field workers at NADC

NADC should have at least two more university graduate (bachelor degree) researchers and two more field workers to secure sustainability of the achievements of AQIP II.

6. Recommendations

6-1 General

- Preparation of the provincial aquaculture profile (PADS) for each target province

  PAFO, PLFS and DAFO concerned, collaborating with AQIP II, should prepare PADS for each of four target provinces by the end of 4th year. The first workshop was organized at each target province and the report "Formulation of Provincial Aquaculture Development Strategy (the first draft) " was prepared in February 2007. In February 2008, the second workshop will be organized at each target province to formulate more detailed draft of PADS, and the final shape of PADS will be completed at the third workshop to b e organized in January or February 2009 at each target province.

  The main points to be clarified in the PADS are:

  (1) Improvement measure for aquaculture production statistics.

  (2) Areas of high aquaculture development potential in the province.

  (3) Aquaculture development plan in the whole framework of agriculture development plan.

  (4) Aquaculture extension system.

  1) Duties of each organization concerned.

  2) Collaboration network of responsible organizations.

  3) Aquaculture extension system under the cluster system.

- Methodology for nomination of VADW

  In order to establish "farmer-to-farmer aquaculture extension system", MAF and related organizations at provincial and district level should consider the VADW nomination system including the role of VADW and support by local government.

- Review of aquaculture methods for introducing to farmers

  While most of aquaculture methods are proven to be suitable to utilize in the villages, a few methods are not easy to introduce in rural village conditions. Therefore, methods to be introduced to new villages should be reviewed and revised appropriately.

6-2 MAF level

- Necessary to strengthen the relationship among DLF, NAFES, NAFRI and DoP for better aquaculture development.
- Necessary to consider aquaculture extension system considering the village cluster extension approach.
- It should be considered to allocate sufficient budget and staff at NADC for aquaculture improvement and extension.

6-3 Provincial level

- It should be strengthen the supervision and technical support to DAFO and farmers by PLFS and PAS.
- It should be considered to allocate sufficient budget and staff at PLFS and PAS for providing adequate technical support to DAFO and farmers.

- Support for Village Development Fund

  VAPC needs support and assistance on village fund management. To maintain the growth and sustain the village fund, saving practices should be introduced. For example, Lao Women's Union plays an important role in this field; therefore Provincial Lao Women's Union could be a supportive partner to assist VAPC and villagers.

6-4 District level

- DAFO staff should provide regular guidance and monitoring to target villages more frequently. (2-3 times per month for one village)
- DAFO should make close relationship with village and local farmers furthermore, and promote "farmer to farmer"/"Village to Village" extension system.

6-5 Village level

- Necessary to promote the group aquaculture.
- Necessary to strengthen the VAPC for sustainable aquaculture development at village level.
- It should be considered to make use of village fund for securing the sufficient budget of aquaculture activities.
- Farmers participated in the project are recommended to provide aquaculture techniques to non-participated farmers.

7. Outline of the Joint Evaluation Study (JES)

7-1 Purpose of the JES

Based on the result of Self-evaluation and JEPC, the Lao-Japan Joint Evaluation Study Team will

1) confirm the achievement, progress, input at the mid-term of the project.
2) evaluate the project in terms of 5 evaluation criteria.
3) discuss main issues between Lao government and JICA side.
4) make suggestion and recommendation for the latter of the project.

7-2 Members for JES

<Lao government side>

1	Mr. Bounkhuang Khambounheung	DG of DLF	Team Leader
2	Mr. Bounthong Saphakdy	Director of Fishery Division, DLF	Member
3	Mr. Chanthaboun Sirimanotham	Director of Planning Division, DLF	Member
4	Mr. Chanthaneth Symahano	Director of DICI, DOP	Member
5	Mr. Bounkham Syaksone	Deputy of Chief of Admin. Division, Department of Inspection	Member
6	Mr. Liengkham Sivilay	Director of LARReC, NAFRI	Member
7	Mr. Salieo Kemmalath	Senior Extension Advisor, Extension and Project Coordination Division, NAFES	Member
8	Mr. Valiya Sychanthongthip	DIC, MPI	Member

<JICA side>

1	Mr. Satoshi CHIKAMI	Senior Adviser for aquaculture and fishery, JICA HDQ	Team Leader
2	Ms. Mari MIURA	Program Officer, Rural Development Dept., JICA HDQ	Member
3	Mr. Makoto HATANO	Assistant Resident Representative, JICA Laos office	Member
4	Mr. Viengsavanh Sisombath	Program Officer, JICA Laos office	Member
5	Ms. Sayamno Sanoubane	Assistant Program Officer, JICA Laos office	Member

Remark

- Although some members can not join the site visit in the North on 22-26 January 2008, all members are expected to participate the discussions on the Minute of Meeting and the MM signing ceremony (please see the tentative schedule).

7-3 Tentative Schedule

Date	Schedule	Accom.	Remark
Jan. 20th (Sun)	Travel: Narita-Bangkok-Vientiane	Vientiane	
Jan. 21st	9:00 Meeting at JICA Laos Office	Vientiane	

(Mon)	10:30 (MAF) 11:00 14:00	Courtesy visit to Dept. of Planning, Ministry of Agriculture and Forestry Courtesy visit and meeting at Dept. of Livestock and Fisheries (DLF), MAF Site visit and meeting at Namxouang Aquaculture Development Center (NADC)		
Jan. 22nd (Tue)	Travel:	Vientiane-Luanprabang (plane) Luanprabang-Oudomxay (car)	Oudomxay	QV109 09:40-10:20 Check in time: 8:00
Jan. 23rd (Wed)	8:30 10:00 11:00 14:00 16:00	Courtesy visit and meeting at Oudomxay Provincial Agriculture and Forestry Office (PAFO) Site visit to Oudomxay Provincial Aquaculture Station Visit to Pilot Village, **Houaysang village (1)** Visit to Pilot Village, **Houaykhoun village (2)** Visit to Expansion Village, **KM10 Village (3)**	Oudomxay	
Jan. 24th (Thu)	8:00	Travel: Oudomxay-Luanprabang-Xayabouly	Xayabouly	
Jan. 25th (Fri)	8:30 10:00 13:30 16:00	Courtesy visit and meeting at Xayabouly PAFO Site visit to Xayabouly Provincial Aquaculture Station Visit to Pilot Village, **Somsavanh village (4)** Visit to Pilot Village, **Natane village (5)**	Xayabouly	
Jan. 26th (Sat)	8:30 13:00	Site visit to a FORCOM target village where AQIP2 is cooperating **(Namon Village)** Travel: Xayabouly-Luanprabang (car) Luanprabang-Vientiane (plane)	Vientiane	 QV104 19:50-20:30 Check in time: 18:00
Jan. 27th (Sun)		Drafting the Minutes of Meeting	Vientiane	
Jan. 28th (Mon)	AM PM	Site visit to Living Aquatic Resource Research Center, NAFRI, MAF Site visit to Livestock and Fisheries Extension Center, NAFES, MAF Discussion on Minutes of Meeting among JES members	Vientiane	- All members are expected to participate in the discussion on MM. - Place & time for the discussion is needed to be confirmed.
Jan. 29th (Tues)	AM PM	Internal meeting on Minutes of Meeting Final Discussion on Minutes of Meeting among JES members	Vientiane	- All members are expected to participate in the final discussion on MM. - Place & time for the final discussion is needed to be confirmed.

Jan. 30th (Wed)	AM	- Signing of the Minutes of Meeting - Report to the Dept. of Planning, MAF	Vientiane	
	PM	- Report to the Dept. of International Cooperation, Ministry of Planning and Investment - Report to the Embassy of Japan - Report to JICA Laos Office		

Attachment

Member List of the JEPC for AQIP2 Mid-term Evaluation

I. Lao government side

No.	Name	Postion	Remark	Contact
1	Mr. Bounkhuang Khambounheung	DG of DLF	Special observer	
2	Mr. Somphanh Chanphengxay	DDG of DLF, MAF	ditto	
3	Mr. Xaypladeth Choulamany	DDG of DOP	ditto	
4	Mr. Nan Vienvongsith	Director of PAFO, Oudomxay	ditto	
5	Mr. Thongdy Chanhthavong	DD of PAFO, Salavanh province	ditto	
6	Mr. Somchit Chanthavong	DD of PAFO, Xayabouly province	ditto	
7	Mr. Souli Gno Keophalyvanh	DD of PAFO, Savanakhet province	ditto	
8	Mr. Gnungthong Sihanath	Director of Livestock and Fisheries Extension Center, NAFES	Special observer & member	
1	Mr. Chanthaboun Sirimanotham	Director of Planning Division, DLF	Leader	5715476
2	Mr. Bounthong Saphakdy	Director of Fishery Division, DLF	Deputy Leader	5618950
3	Mr. Bounkham Siakkhasone	DD of Admin. Division, Department of Inspection, MAF	Member	2242945
4	Mr. Phommy Inthichack	Technical Officer of DICI, DOP, MAF	ditto	6523904
5	Ms. Nouhak Liebvixay	Acting Director of NADC	ditto	5923026
6	Mr. Buasavanh Viengsombath	Director of Senior Officer Unit, NADC	ditto	5666040
7	Ms. Thongsavath Boupha	Deputy Head of Extension and Project Coordination Division, NAFES, MAF	ditto	2243480
8	Mr. Khamphet ROGER	DD of Fisheries Research Center, NAFRI	ditto	5699416
9	Mr. Somboun Chanliya	Technical Officer of Fisheries Research Center, NAFRI, MAF	ditto	2259293
10	Mr. Thong On Malychanhsy	Director of PLFS, PAFO, Salavan province	ditto	5448043
11	Mr. Bountien Somthaboun	Director of PLFS, PAFO, Savanakhet	ditto	5641198
12	Mr. Phansy Homekingkeo	Officer of PLFS, PAFO, Savanakhet	ditto	5633450

13	Mr. Somvang Vilayphanh	Acting Director of PLFS, PAFO, Oudomxay	ditto	2376459
14	Mr. Sysouphanh Singphavanh	Director of DAFO, Xay district, Oudomxay	ditto	2378639
15	Mr. Khamphuth Phoummakeo	Director of PLFS, PAFO, Xayabouly	ditto	2358020

II. JICA side

No.	Name	Position	Remark	Contact
1	Mr. Koichi TAKEI	Deputy Resident Representative, JICA Laos	Special observer	
2	Mr. Makoto HATANO	Assistant Resident Representative, JICA Laos	Member	5526890
3	Mr. Yuki ARAI	Program officer, JICA Laos	ditto	5517635
4	Mr. Viengsavanh	Program officer, JICA Laos	ditto	5424856
5	Ms. Saymano	Assistant Program officer, JICA Laos	ditto	5444419
6	Mr. Akira NAGAOKA	Agriculture Policy Advisor, MAF	ditto	5526670
7	Mr. Akira MIYOSHI	FORCOM Expert	ditto	5855855
8	Mr. Hiromu KENOUE	Chief Advisor, AQIP2	ditto	
9	Dr. Hiroki EDA	AQIP2 Expert	ditto	5300077
10	Mr. Hiroyuki CHAGI	AQIP2 Expert	ditto	5930195
11	Mr. Kosuke SANO	AQIP2 Expert	ditto	5889742

Annex 1. Activity chart

Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites

Planned Conducted

Activities		Detailed Activities		2005			2006				2007				Inputs			Results	Progress & Problem
				4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	Human Resources	Materials & Equipment	Operation Costs		
1-1	Identify pilot villages and target farmers (4 focal districts, 12 villages, 120 target farmers in pilot villages)	1-1-1	Collect and analyse data on focal districts												All experts, Tokyo University, C/Ps, staff of PAFO and DAFO	Vehicle, Computer, Questionnaire	General implementation costs	The survey for collection of information was conducted between May to June, 05. The report was prepared on the life and aquaculture situation in each candidate village.	Progressed as planned without problem.
		1-1-2	Determine pilot villages												All experts, C/Ps, staff of PAFO and DAFO	Vehicle, Reports of DLF and DAFO	General implementation costs	All candidate villages recommended by DAFOs were judged as suitable for pilot operation; Houaysang, Houaythong, Houaykhoum in Oudomxai, Nasomnyai, Natane, Somsavanh in Xaignabouli, Nonsoung, Houakhouaset, Dondou in Salavan, and Oudomxai, Saysamphan, Phin in Savannakhet	Progressed as planned without problem.
1-2	Prepare operation and management plan of pilot sites	1-2-1	Determine indicators in PDM												All experts, C/Ps, staff of PAFO and DAFO	Vehicle, Computer, Questionnaire	General implementation costs	The PRA workshop in July, 05, clarified situation and problems in aquaculture extension at each focal district and pilot village. The baseline survey between June to November, 05, provided a large ammount of data on life and aquaculture situation in pilot village, and clarified characteristics of each village. PDM indicators were decided based on infromation collected, and approved at the 1st JCC meeting in February 2006.	Progressed as planned. Since the situation of life and aquaculture at pilot villages is not stable, AQIP II should have enough flexibility to respond any changes that will occur at pilot villages.
		1-2-2	Prepare pilot operation plan by district												All experts, C/Ps, staff of PAFO and DAFO	Reports of PRA workshop, Baseline survey, etc.	General implementation costs	Action plan for village aquaculture promotion was prepared based on the results of PRA workshop and baseline data.	The operation plan was made on Februaly, getting behind the original work plan. The action plan should be explained well to VAPC and target farmers. It will take some time to get their full understanding on the plan. Furthermore, as situation in the villages is always changing, AQIP II should be highly flexible to modify the action plan responding to such changes.
		1-2-3	Determine target farmers and organize a Village Aquaculture Promotion Committee (VAPC) at each pilot village												All experts, C/Ps, staff of PAFO and DAFO	Vehicle	General implementation costs	Target fish farmers and members of VAPC were selected at each village. The number of target farmers and VAPC members were decided depending on the village size.	Progressed as planned. Target farmers and members of VAPC should be continuously monitored, and if there is any change, appropriate action sould be taken.

Annex 1. Activity chart

Output 1: Adequate aquaculture methods are verified according to the local conditions of pilot sites

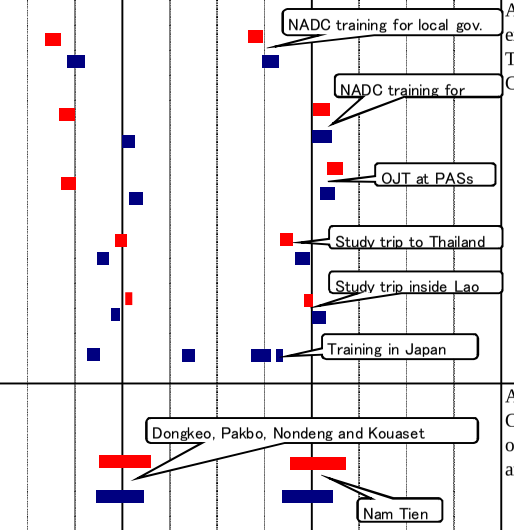
Planned Conducted

Activities		Detailed Activities		2005			2006				2007				Inputs			Results	Progress & Problem
				4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	Human Resources	Materials & Equipment	Operation Costs		
1-3	Carry out pilot operation														All experts, C/Ps, staff of PAFO and DAFO	Vehicle, Motorbike, Computer, Water pump, Scale, Net cage, Fish seed, Feed, Fertilizer, VCD, Paper theater, etc.	General implementation costs	Several techniques and extension methods appropriate for rural villages have been clarified (referred to the review of the pilot operation). Through on-site guidance, collaboration among NADC, PAFO, PLFS, DAFO and villages has become strengthened.	Full scale technical guidance to target farmers started in the second year. As most of target villagers stock fish seed in April to June, asystem of technical guidance in March to April, when Japanese experts are absent, should be established.
1-4	Improve methods on seed production and grow-out culture mainly at NADC														All experts, C/Ps	NADC facilities, Net cage, Feed, Fertilizer, pH meter, DO meter, Microscope, etc.	General implementation costs	To develop low-input, low-risk fish culture techniques to be applied at pilot villages, experiments are being conducted on the following topics 1) Efficient and easy seed production method of tilapia by partitioning a pond into broodstock part and fish fry part. 2) Intensive seed production method of tilapia using a net cage. 3) Study on feed efficiency of rice bran fed to tilapia. 4) Prevention of fish poaching and enhancement of natural feed production by sticking bamboo poles on the pond bottom. 5) Optimum combination of fish species in poly-culture of common carp, tilapia, Puntius and catfish. 6) Optimum stocking density of common carp and tilapia fry into a grow-out pond.	Progressed as planned without problem.

Output 2: The capacity of relevant persons such as target farmers, province/district extension staff and staff of PASs regarding aquaculture technology and extension is improved

Planned Conducted

Activities		Detailed Activities		2005			2006				2007				Inputs			Results	Progress & Problem
				4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	01-12	Human Resources	Materials & Equipment	Operation Costs		
2-1	Prepare training programs and materials considering conditions of localities	2-1-1	Prepare training programs												All experts, C/Ps	FAO training series, etc.	General implementation costs	Contents of aquaculture trainning at NADC and PAS and study trip for local government staff, and target farmers were decided, and course guides were prepared.	Progressed as planned
		2-1-2	Prepare textbooks												All experts, C/Ps	Peports of AQIP II, FAO trainig series, etc.	General implementation costs	Two textbooks, 1) on tilapia seed production, 2) on common carp seed production, and one manual on aquaculture extension in Lao PDR were prepared. Guideline to gender mainstreaming in aquaculture extemsion was also prepared.	Progressed as planned. Revicsed edition will be prepared in forth year.
2-2	. Conduct training for extension staff and target farmers at NADC, PASs and in Thailand														All experts, expert from Thailand, C/Ps	Projector, Computer, Vehicle, Micorscope, Water quality analyzer, Materials for practice, etc.	General implementation costs	Aquaculture training at NADC, OJT at PAS, and study trip to Thailand, inside Lao and Japan were conducted. Total number of participants in each training and study trip are as follow: NADC training for local government officers 24, for farmers 48; OJT at PAS 80; Study trip to Thailand 20, inside Lao 36; Training in Japan 12	All planned training were conducted. It is necessary to make smoother communication with PAFO for the preparation of training. Training for farmers should be planned in the farmere's off-season.
2-3	Strengthen function of PASs														All experts, C/Ps, staff of PAFO and DAFO	Vehicle, pH meter, DO meter, Thermometer, etc.	Facility improvement costs, general impremention costs	Facilities of PASs in Oudomxai, Xaignabouli, Savannakhet and Salavan provinces, and aquaculture station of Laongum dsitrict were much improved, and training and seed production ability of those stations were strengthened.	Progressed as planned



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

Planned Conducted

Activities		Detailed Activities		2005			2006				2007				Inputs			Results	Progress & Problem
				4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	Human Resources	Materials & Equipment	Operation Costs		
3-1	Select villages (extension villages) and farmer groups for which outputs of pilot operations are to be introduced (8 focal districts, 50-60 villages, 200 farmers in the northern provinces and 400 farmers in the southern provinces, 600 target farmers in total in extension villages)														All experts, C/Ps, staff of PAFO and DAFO	Vehicle, Motorbike, Questionnaire, Report for candidate villages of expansion operation by DAFOs	General implementation costs	All villages recommended by DAFOs have been found to be suitable as target villages except for two villages (Boung village and Donegene village) recommended by Xaignabouli DAFO. Thus, 56 target villages have been selected for the aquaculture expansion operation. Baseline data for each village, such as population, year of establishment, main production activity, situation of aquaculture, activity of WU, profiles of village leaders, etc. have been collected. Also, an activity plan for the aquaculture expansion operation has been prepared.	Progressed as planned
3-2	Prepare visual extension materials on practical aquaculture and train selected farmers														All experts and C/P	AQIP II prepared senarios and contracted out the shooting, editing and recording of narration to a proffessional VCD maker.	General implementation costs	One VCD showing techniques necessary in tilapia and common carp culture, including breeding, intermediate culture, water management, grow-out culture, feeding, etc. has been prepared. As visual extension materials, large hanging paper sheets illustrating good fish culture practice and a “paper theatre” on water environment protection have been prepared. The hanging sheets were used to explain good fish culture practice to VAPC members and fish farmers, and the “paper theatre” was shown to school children at class rooms of village primary schools.	Progressed as planned
3-3	Carry out aquaculture expansion operation for selected farmers														All experts, C/Ps, staff of PAFO and DAFO	Vehicle, Motorbike	General implementation costs	Characteristics of aquaculture at target villages and expectations of villagers toward AQIP II at target villages are clarified (refer to “Report of the participatory workshop in the newly selected villages for aquaculture expansion operation. January 2007.”	Progressed as planned

Output 4: The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions

Planned Conducted

Activities		Detailed Activities		2005			2006				2007				Inputs			Results	Progress & Problem
				4-6	7-9	10-12	1-3	4-6	7-9	10-12	1-3	4-6	7-9	10-12	Human Resources	Materials & Equipment	Operation Costs		
4-1	Collect and compile information on the aquaculture activities of target provinces														All experts, C/Ps, staff of PAFO, DAFO	Vehicle, Reports from AQIP II	General implementation costs	Aquaculture information for target provinces was collected and compiled.	Progressed as planned
4-2	Assist preparation of aquaculture development strategies of the target provinces														All experts, C/Ps, staff of PAFO, DAFO	Vehicle, Reports from AQIP II	General implementation costs	Workshop was organized at each province between January to February, 2007 to discuss the situation of aquaculture, problems to be solved for sustainable aquaculture development, possible solutions for the problems, etc. As the result of the workshops, the first step report on PADS has been prepared.	Progressed as planned
4-3	Make an action plan of the project after its cooperation period														All experts, C/Ps, staff of PAFO, DAFO				
4-4	Hold a seminar on the action plan of the relevant organizations for further aquaculture extension														All experts, C/Ps, staff of PAFO, DAFO				

Annex 2. Accomplishment Grid （Midterm Evaluation）

Note: 3: satisfactory, 2: moderate, 1: not satisfactory

Category	Indicators	Evaluation Methods	Accomplishment	Grade
Input	**J-1 Japanese side**			
	J-1 Japanese experts			
	J-1-1 Amount	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	By December 2007, three (3) long-stay experts were dispatched as scheduled. Thirteen (13) short-term experts were dispatched as required. see attachment 1: List of Japanese and third country experts	3
	J-1-2 Quality and timing	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	Since the project activities started in late April every year, input timing of Japanese experts did not meet well with aquaculture cycle of Lao rural farmers. In other aspects, timing and quality of Japanese experts were appropriate.	2
	J-2 Counterpart training in Japan			
	J-2-1 Amount	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	Up until December 2007, fourteen (14) C/Ps were sent to Japan and twenty-one (21) were sent to Thailand for training as scheduled. see attachment 2: Counterpart training	3
	J-2-2 Quality and Timing	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	The input has been timely and adequate.	3
	J-3 Provision of materials, equipment, and facilities			
	J-3-1 Amount	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	Equipments of twelve million Yen and facilities of sixteen million Yen, in value, have been provided by the government of Japan to NADC and Pilot villages as planned. see attachment 3: Provision of equipment and materials, and attachment 4: Facility improvement	3
	J-3-2 Quality and timing	- Comparison between plan and result by reviewing reports. - Interview to both J/E and C/P	Most of the equipments have been maintained well and used for the Project activities effectively.	3
	J-4 Local cost expense			
	J-4-1 Amount	- Examination of reports - Interview to both J/E and C/P	Up until December 2007, 32,3million Yen, in value, has been spent as local expenses for the improvement and maintenance of the facilities and the Project activities. see attachment 5: Local expenses	3

	J-4-2 Item and timing	- Examination of reports - Interview to both J/E and C/P	The input was timely and adequate in items.	3

Category	Indicators	Evaluation Methods	Accomplishment	Grade
Input	**L-1 Laos Side**			
	L-1 Land, building and facilities at the project site			
	L-1-1 Amount	Joint site inspection by J/E and C/P.	Land (12ha), buildings and facilities for the project have been provided by Laos government as decided by R/D.	3
	L-1-2 Quality and Timing	Interview to both J/E and C/P.	The input has been timely and adequate.	3
	L-2 Allocation of C/P			
	L-2-1 Amount	Discussion among and interview to J/E and C/P.	Number of C/Ps assigned for the Project has been quite insufficient for smooth conduct of daily routine works at NADC and project activities.	1
	L-2-2 Quality and Timing	Discussion among and interview to J/E and C/P.	The timing and quality of C/P input has been adequate.	3
	L-3 Tools and Other Materials			
	L-3-1 Amount	Discussion among and interview to J/E and C/P.	One (1) truck, three (3) four-wheel drive cars, one (1) minibus, two (2) motorbike, three (3) computers and one (1) printer.	3
	L-3-2 Quality and Timing	Discussion among and interview to J/E and C/P.	The input has been timely and adequate.	3
	L-4 Operation Cost			
	L-4-1 Amount	Checking the financial record and interview to C/P.	Lao government has provided certain budget for the operation of NADC. However, the amount of budget has not been sufficient to cover all of the operation costs of NADC.	2
	L-4-2 Quality and Timing	Discussion among and interview to J/E and C/P.	Sometimes, budget was not disbursed on time.	2
Final note for the Input Achievements 2				
Summary for the Input Achievements In general, inputs from both Japanese and Lao side have been made appropriately in terms of amount, timing and quality. However, the number of C/P allocated to NADC by Lao government has been insufficient.				

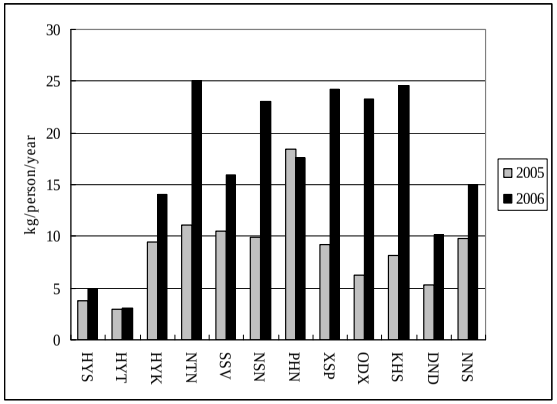
Category	Summary of Activities	Evaluation Methods	Accomplishment	Grade
Activities	**1.1 Identify pilot villages and target farmers (4 focal districts, 12 villages, 120 target farmers in pilot villages)**	Examine the timing and results of the activity based on the reports.	Three pilot villages were selected in each of four focal districts. They are Houaysang, Houaythong, Houaykhoum in Xai district, Oudomxai province, Nasomnyai, Natane, Somsavanh in Phiang district, Xaignabouli province, Nonsoung, Houakhouaset, Dondou in Laongam district, Salavan province, and Oudomxai, Saysamphan, Phin in Phin district, Savannakhet province. Target fish farmers (progressive farmers and ordinary farmers) and members of "Village Aquaculture Promotion Committee (VAPC)" were listed at each village. Also, aquaculture group was organized by the members of village women's union at each village. The number of target farmers (including women aquaculture group members) at each pilot village was decided depending on the socio-economic condition of the village, not fixing 10 farmers at each village to make total target farmers at 120.	3
	1.2 Prepare operation and management plan of pilot sites	-Examine the inception report and plans of operation	Action plan for aquaculture promotion at pilot villages was prepared based on the results of PRA workshop, baseline survey, and monitoring survey. A clear operation and management plan has been prepared by the end of the first year.	3
	1.3 Carry out pilot operation	-Examine two reports. -Discussion among J/E and C/P.	1. Extension methods appropriate for rural villages have been clarified as follows: 1) in core farmer type extension, some persons or organization conduct aquaculture extension with economic motivation, 2) in demonstration type extension, good aquaculture practice is gradually spread through observation and informal communication. 2. Through on-site guidance, collaboration among NADC, PLFS, DAFEO and villages has become strengthened. 3. Some farmers participated to the verification test culture has become active in seed production, intermediate culture and/or grow-out culture. 4. VAPCs of some villages have shown good performances in promoting aquaculture in the villages. 5. Women`s unions of some villages have shown good performances in aquaculture activities, and become core bodies for spreading group aquaculture.	3
	1.4 Improve methods on seed production and grow-out culture mainly at NADC	-Examine final reports -Discussion among J/E and C/P	Experiments are being conducted on the following topics 1) Efficient and easy seed production method of tilapia by partitioning a pond into broodstock part and fish fry part. 2) Intensive seed production method of tilapia using a net cage 3) Study on feed efficiency of rice bran fed to tilapia 4) Prevention of fish poaching and enhancement of natural feed production by sticking bamboo poles on the pond bottom 5) Optimum combination of fish species in poly-culture of common carp, tilapia, Puntius and catfish 6) Optimum stocking density of common carp and tilapia fry into a grow-out pond	3
	2.1 Prepare training programs and materials considering conditions of localities	-Examine final reports -Discussion among J/E and C/P	1. Contents of aquaculture training at NADC and PAS and study trip for local government stuff and target farmers were discussed, and course guides were prepared. 2. Two textbooks, 1) on tilapia seed production, 2) on common carp seed production and one manual, on aquaculture extension in Lao PDR were prepared. 3. Guideline to gender mainstreaming in aquaculture extension was prepar	3
	2.2 Conduct training for extension staff and target farmers at NADC, PASs and in Thailand	-Examine final reports -Discussion among J/E and C/P	Aquaculture training at NADC, OJT at PAS, and study trip to Thailand, inside Lao and Japan were conducted. Total number of participants in each training and study trip are as follow: NADC training for local government stuff 24, for farmers 48; OJT at PAS 80; Study trip to Thailand 20, to inside Lao 36; Training in Japan 12 Ability of trained local government staff and farmers on aquaculture extension has been significantly improved.	3

	2.3 Strengthen function of PASs	-Examine reports -Discussion among J/E and C/P	Facilities of PASs in Oudomxai, Xaignabouli, Savannakhet and Salavan provinces, and aquaculture station of Laongum dsitrict were much improved, and training and seed production ability of those stations were strengthened	3
	3.1 Select villages (extension villages) and farmer groups for which outputs of pilot operations are to be introduced (8 focal districts, 50-60 villages, 200 farmers in the northern provinces and 400 farmers in the southern provinces, 600 target farmers in total in extension villages)	-Examine reports -Discussion among J/E and C/P	All villages recommended by DAFEOs have been found to be suitable as target villages except for two villages (Boung village and Donegene village) recommended by Xaignabouli DAFEO. Thus, 56 target villages have been selected for the aquaculture expansion operation. Baseline data for each village, such as population, year of establishment, main production activity, situation of aquaculture, activity of WU, profiles of village leaders, etc. have been collected. Also, an activity plan for the aquaculture expansion operation has been prepared.	3
	3.2 Prepare visual extension materials on practical aquaculture and train selected farmers	-Examine VCD -Discussion among J/E and C/P	One VCD showing techniques necessary in tilapia and common carp culture, including breeding, intermediate culture, water management, grow-out culture, feeding, etc. has been prepared. As visual extension materials, large hanging paper sheets illustrating good fish culture practice and a "paper theatre" on water environment protection have been prepared. The hanging sheets were used to explain good fish culture practice to VAPC members and fish farmers, and the "paper theatre" was shown to school children at class rooms of village primary schools.	3
	3.3 Carry out aquaculture expansion operation for selected farmers	-Examine reports -Discussion among J/E and C/P	Based on the collected baseline data and the activity plan, expansion operation has been started in July 2007.	3
	4.1 Collect and compile information on the aquaculture activities of target provinces	-Examine provincial aquaculture profiles -Discussion among J/E and C/P	Collected information has been compiled as additional data for provincial aquaculture profiles.	3
	4.2 Assist preparation of aquaculture development strategies of the target provinces	-Examine the report	Workshop was organized at each province between January to February, 2007 to discuss the situation of aquaculture, problems to be solved for sustainable aquaculture development, possible solutions for the problems, etc. As the result of the workshops, the first step report on PADS has been prepared.	3
	4.3 Make an action plan of the project after its cooperation period		Not conducted yet.	
	4.4 Hold a seminar on the action plan of the relevant organizations for further aquaculture extension		Not conducted yet.	
	Final note for the Achievements in Activities: 3			
	Summary for the Achievements in Activities As a whole, the accomplishment of the activities has been evaluated as satisfactory at the time of mid-term evaluation.			

Category	Indicators	Evaluation Methods	Accomplishment	Grade
Outputs 1.Adequate aquaculture methods are verified according to the local conditions of pilot sites.	1-1 Manuals on aquaculture techniques suitable to local condition are prepared 1-2 Production of fish culture by target farmers in pilot villages increases by more than 40% on average 1-3 More than 60%of target farmers in pilot villages are well motivated to continue aquaculture at the time of termination of the pilot operation	-Examine reports -Discussion among J/E and C/P	Based on the firm basis established in the first year, second year activities have been conducted in full extent at pilot villages. Various effective aquaculture techniques and extension method have been verified in the pilot operation. 1-1. Manuals on tilapia seed production, on common carp seed production and on aquaculture extension in Lao PDR were prepared in first and second year. Revised version will be prepared in fourth year 1-2. Production of fish culture by target farmers in 6 villages out of 12 pilot villages increased by more than 40% as of August 2007. 1-3. It has been observed through on-site guidance and monitoring survey that more than 90% of target farmers in pilot villages has been well motivated to continue aquaculture.	3
2. The capacity of relevant persons such as target farmers, province/district extension staff and staff of PASs regarding aquaculture technology and extension is improved.	2-1 More than two staff members of each PAS can train district staff and farmers 2-2 More than two staff members of each PLFS and more than two staff members of each DAFEO can give guidance to farmers 2-3 At least one target farmer at each target village becomes the Village Aquaculture Development Worker (VADW) well motivated to extend aquaculture to other farmers	-Examine reports -Discussion among J/E and C/P	Capacity of local government staff has been improved through participation to training, study trip, workshops, on-site guidance survey, etc. Progressive farmers at pilot villages have improved their knowledge on aquaculture and enhance their motivation to conduct aquaculture through participation to NADC training course, study trip in Laos and on-site guidance. 2-1. Ability in aquaculture techniques and extension of the two staff members of each PAS has been much improved through participation to NADC training, training in Japan, study trip in Thailand and on-site guidance survey. They can train district staff and farmers. 2-2. Ability of aquaculture techniques and extension of the one staff members of each PLFS and two staff members of DAFEO has been much improved through participation to NADC training, training in Japan, study trip in Thailand and on-site guidance survey. They can give guidance to farmers. 2-3. At least one to three farmers or groups at each target villages has been nominated to the Village Aquaculture Development Worker as of December 2007	3

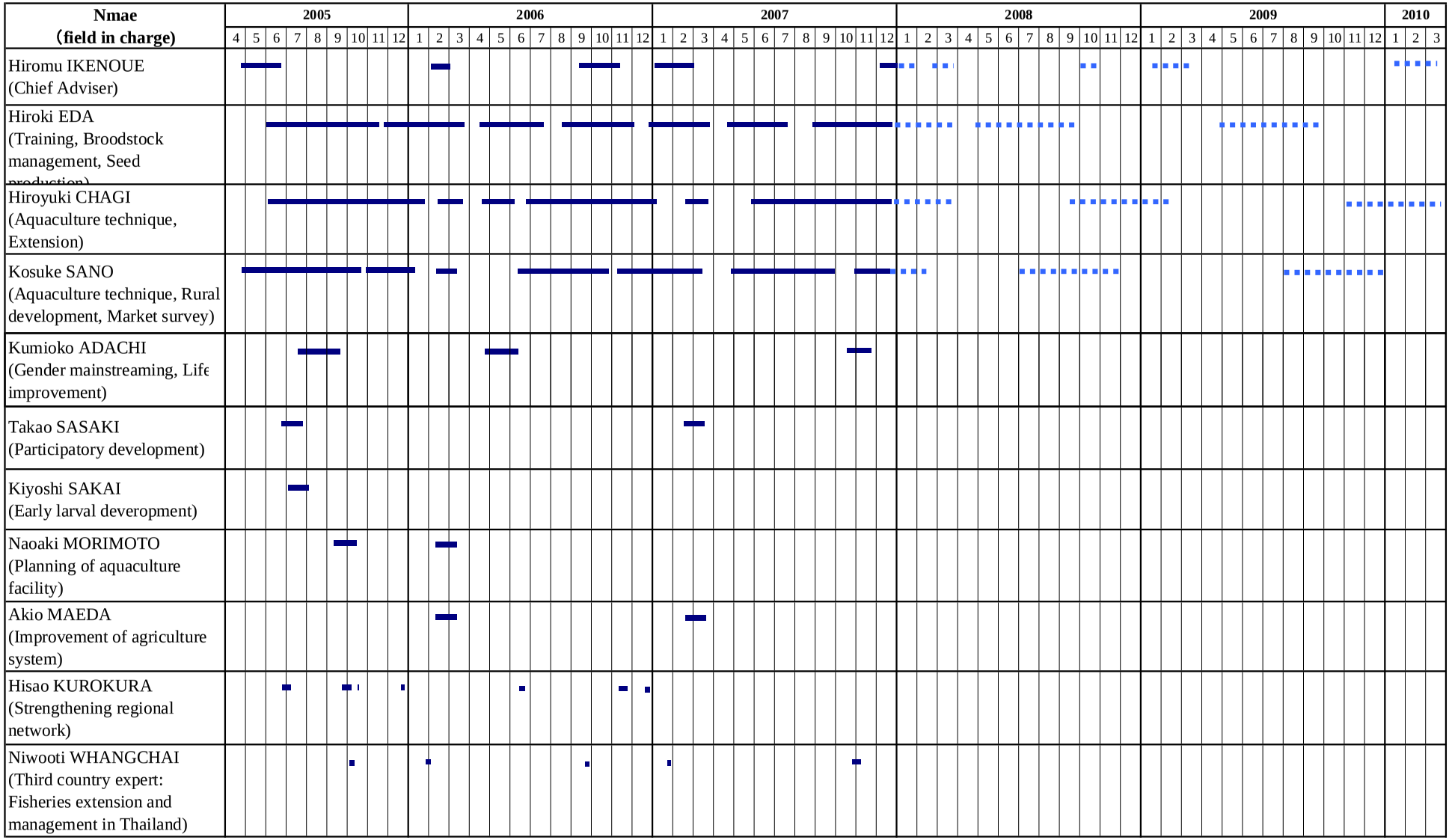
3.Fish farmers of the focal districts introduce improved aquaculture methods.	3 At least 600 target farmers (extension villages) apply improved methods in 8 focal districts	-Examine reports -Discussion among J/E and C/P	AQIP II has selected target villages for aquaculture expansion project and collected various kinds of information on those villages necessary to conduct the expansion operation. Also framework of the expansion operation has been clearly established. 3. Expansion operation has been started in 3rd year, there is no data available to assess the achievement. However, visual extension materials such as VCDs and paper theaters on aquaculture techniques were prepared for expansion operation.	3
4. The roles of relevant organizations are clarified and their collaboration mechanism is developed regarding the aquaculture extension matched with the local conditions.	4-1 Related organizations approve a collaboration agreement defining duties of each organization 4-2 Responsible organizations allocate sufficient budget to the national aquaculture extension plan 4-3 The project makes recommendations for sustainable development of aquaculture in Lao PDR	-Examine reports -Discussion among J/E and C/P	4-1. Communication network among DLF, NADC, PAFO, PAS and DAFEO has been strengthened through various activities of AQIP II. 4-2. Not applicable as of December 2007. 4-3. The first draft of provincial aquaculture development strategy has been formulated for each target province in 2nd year. The recommendations for sustainable development of aquaculture in Lao PDR would be prepared by the final evaluation.	3

Category	Indicators	Evaluation Methods	Accomplishment	Grade
Project Purpose Aquaculture suitable for local conditions is established in the 4 target provinces	1. 720 fish farmers (120: pilot villages, 600: extension villages) increase their fish production by more than 40% on average by applying improved aquaculture methods in 4 target provinces . 2. Aquaculture development plans are prepared at province and district levels	-Examine reports -Discussion among J/E and C/P	By pilot operation, various aquaculture technique and method, as well as aquaculture extension method suitable for the natural, social and economic conditions of the target area have been clarified 1. As for pilot villages, AQIP II can clear the target shown by the indicator, since average fish production per fish farmer has already increased higher than or almost equal to 40 % on average as of August 2007. As for expansion villages, there is no data available to assess the achievement yet, since the operation has been just started in 3rd year. 2. The first draft of provincial aquaculture development strategy has been formulated for each target province in 2nd year. The recommendations for sustainable development of aquaculture in Lao PDR would be prepared by the final evaluation.	3

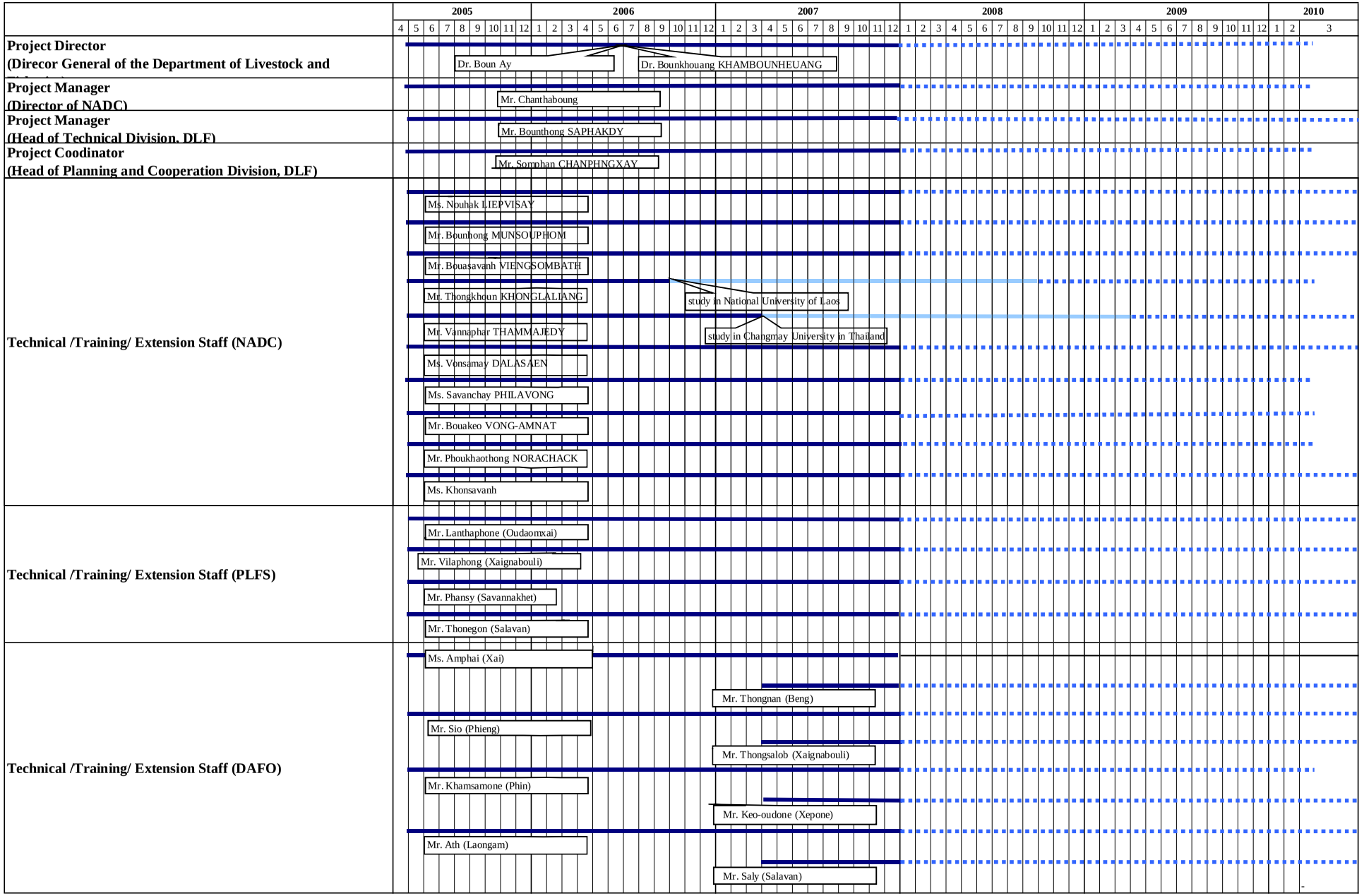
category	Indicators	Evaluation Methods	Accomplishment	Grade
Overall goal Standard of living of rural fish farmer is improved through the dissemination of aquaculture suitable for local conditions in the 4 target provinces.	Fish consumption of 22kg/person/year by the rural people in 4 target provinces.	-Examine reports -Discussion among J/E and C/P	Five of the pilot villages, fish consumption has shown significant increase, up to the level higher than 22kg/person/year, the target amount for 2020, set by Lao government.  Average fish consumption (kg/person/year) at pilot villages.	3

Annex 3. Current status of input

1. Japanese and third country experts



2. Current status of Input for Lao Counterparts



3. Counterpart training

Training	Contents	No. of participants	2005										2006												2007											
			4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Counterpart Training in Japan	Freshwater fish breeding	2															24/May - 18/June (26 days)																			
Counterpart Training in Japan	Lectures, practice and observation on freshwater aquaculture	6																				11/Sep. - 19/Oct. (39 days)														
Counterpart Training in Japan	Observation on freswater aquaculture	2																					10/Oct. - 24/Oct. (15 days)													
Group Training Course in Japan	Sustainable aquaculture development	1													16/Mar. - 25/Jul. (132days)																					
Group Training Course in Japan	Gender mainstreaming in fishing comuunity development	1											20/Jan. - 5/Mar. (45days)																							
Group Training Course in Japan	Gender mainstreaming in fishing comuunity development	2																								20/Jan. - 5/Mar. (45days)										
Countetpart Training in Thailand	Observation and disccusion on freswater aquaculture	21									28/Nov. - 4/Dec. (8days)														17/Dec. - 21/Dec. (5days)											

4. Aquaculture Training for local government staff and farmer

Training	Contens	No. of participants	2005										2006												2007											
			4	5	6	7	8	9	10	11	12		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12
Aquaculture Training for local government staff at NADC	Seed production technique, grow-out technique, water quality analysis, gender mainstreaming, aquaculture extension, aquaculture extension in Thailand	24							27/Sep. - 17/Oct. (21days)													25/Sep. - 15/Oct. (21days)														
Aquaculture Training for target farmers at NADC	Seed production technique, grow-out technique, aquaculture extension in Thailand	48											15/Jan. - 29/Jan. (15days)												15/Jan. - 24/Jan. (10days)							29/Jul. - 11/Aug (14days)				
Aquaculture Training for target farmers at PAS	OJT in daily activities at PAS, lecture on seed production and grow-out techniques	80											1/Feb. - 2/Mar. (30days)												31/Jan. - 9/Feb. (10days)										
Study trip inside Lao for VAPC members	Observation on succesful community aquaculture in a village in Savannakhet and discussion with villagers	36											18/Dec. - 28/Dec. (11days)												23/Jan. - 26/Jan. (4days)										
Study trip to pilot villages for farmers at expansion villages	Observation of progressive fish farmers at pilot villeges , and discussion with them	224																											North: 8 and 12/Sep. South: 21 and 25/Sep.						
On-site training at expansion villages for farmers at expansion villages	Seed production technique, intermediate culture technique, grow-out technique, food making	280																											South: 19- 26/Oct. North: 29/Oct.- 8/Nov.						

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5. Ptrovision of equipment and materials

Item	Year (FY)	Place													Quan.	Unit Price(US$)	Total Price(US$)
		DAFO								Provincial and District Aquaculture Station					NADC			
		Xai	Phiang	Laonga	Phin	Ben	Xagna	Salavan	Sepon	Donekeo	30-h/Namtian	Pakbo	Nonden	Vangyen			
Desktop PC	2005	1	1	1	1					1	1	1	1			8	1,290	10,320
Printer	2005	1	1	1	1					1	1	1	1			8	250	2,000
Facsimile	2005	1	1	1	1											4	400	1,600
Motorbike	2005	1	1	1	1					1	1	1	1			8	2,420	19,360
Microscope	2005									1	1	1		1		4	2,685	10,740
Water pump	2005									1	1	1		1		4	1,920	7,680
Hund tractor	2005									1	1	1		1		4	1,200	4,800
Seine net	2005									1	1	1		1		4	550	2,200
Air blower	2005									1	1	1		1		4	120	480
Photocopy machine	2005														1	1	4,000	4,000
Generator	2005									1	1	1		1			1,320	5,280
4WD vehicle	2006														1	1	33,200	33,200
Motorbike	2006					1	1	1	1							4	1,050	4,200
Color photocopy machine	2006														1	1	3,000	3,000
Notebook PC	2006														1	1	1,500	1,500
LCD Projector	2006														1	1	950	950
pH meter	2007														2	2	1,230	2,460
DO meter	2007														2	2	1,350	2,700
Handy microscope	2007														2	2	850	1,700
Thermometer	2007														10	10	110	1,100
																		111,310

6. Facility improvement

Station	Description	Year (FY)	Cost (US$)
Donekeo Aquaculture Station (Oudomxai)	Construction of training building, and renovation of piping system and reservoir tank	2005	**24,100**
Pakbo Aquaculture Station (Savannakhet)	Renovation of office, training center, ponds and raft of water intake pomp, and repairing filter tank	2005	**28,700**
Nongdeng Aquaculture Station (Salavan)	Renovation of nursery ponds, spawning tanks and constraution of filter tank	2005	**6,800**
Vangyen Aquaculture Station (Laongam District)	Renovation of broostock ponds, nursery ponds, hatchery tanks, training building and water piping system	2005	**17,500**
Namtian Aquaculture Station (Xaignabouli)	Costruction of hatchery, nursing pond and water intake system	2006	**21,000**
Namxouang Aquaculture Development Center (NADC, Vientiane)	1. Repairing ceiling board of main building 2. Renovation of five experimental ponds 3. Construction of two concrete tanks of 7mx7m and six concrete tanks of 3mx3m 4. Costruction of concrete floor for 5t of FRP tanks 5. Repairing roof of main building	2006	**35,700**
			Total 133,800

6. Facility improvement

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			Total 133,800

7. Local expenses

Item	Item of expenditure	Expense (US$) 1$=￥113			Total (US$)
		2005(FY)	2006(FY)	2007(FY)*	
Training	NADC training, Study trip, OJ training, etc.	28,434	23,407	23,788	75,628
Consumption	Materials for pilot and expansion operation, Artficial food, Fertilizaer, Fuel, comunication, etc.	25,920	36,257	35,912	98,088
Employment	Driver, Secretary, Baseline and monitoring survey, Thierd country expert, etc	19,664	24,956	21,894	66,513
Travel	On-site guidance, Participatory workshop, etc.	19,699	24,310	25,735	69,743
Text	Audio-visual materials, Brochure, Hand book for fish culture, etc.	15,354	5,310	7,106	27,770
Maintenance and management	Fuel, NADC facilities and equiopment, Maintenance of official cars, etc.	3,425	12,239	9,965	25,628
		112,496	126,478	124,398	363,372

*Fiscal Year 2007 is Budget

Annex 4. Evaluation Grid

Evaluation item/ Survey subjects	Necessary information and data	Method of survey	Results	Evaluation
Relevance				
Is overall goal consistent with the national development plan? Overall goal: "Standard of living of rural fish farmers is improved through the dissemination of aquaculture suitable for local conditions in the 4 target provinces"	① National development policy ② Fisheries development policy ③ Significance of aquaculture in above policies	- Review of the national , agriculture, and fisheries development plans	Food security and poverty alleviation through development of agricultural development are among the most important items in national and agriculture development plan. Development of aquaculture is considered as one of the most important policies of the Ministry of Agriculture and Forestry.	The overall goal is fully consistence with the national development plan.
Is the project purpose consistent with the needs of country? Project purpose: "Aquaculture suitable for local conditions is established in the 4 target provinces"	① Needs of the fisheries sector in Lao ② Needs of the aquaculture sector in Lao ③ Needs of rural fish farmers	- Questionnaire and interview to C/Ps・experts, and all the stakeholders - Review of reports on aquaculture and natural-social-economic conditions of rural villages	The purpose of the project has been decided based on a large amount of data on the conditions and needs of rural area in the target provinces collected during AQIP I. Also it has been confirmed through village surveys, meetings with stakeholders, participatory workshops, and gender surveys conducted in the initial stage of AQIP II.	The project purpose is fully consistent with the needs of country.
Is the overall goal consistent with Japan's cooperation policy?	The international cooperation plan by the Japanese government	- Review of JICA's cooperation policy and cooperation program for Lao PDR	Overall goal of the project is consistence with Japan's cooperation policy stressing human security and poverty alleviation in the developing countries. .	The overall goal of the Project is consistent with the JICA's cooperation plan to the country of Lao.
Is Japan's cooperation for this project justified?	Comparative advantage of Japan's technology and extension in aquaculture	- Questionnaire to C/Ps・Experts, and information form specialists of the evaluation study team	The Japan's high technologies and extension abilities in aquaculture is justified as relevant to the implementation of this project which requires development abilities on the aquaculture suitable for local condition mentioned in PDM (, supply of facilities and technical transfer from the Japanese experts to Lao counterparts).	The Project is justified from the view of Japan's technical advantage in the fisheries' sector.

Evaluation item/ Survey subjects	Necessary information and data	Method of survey	Results	Evaluation
Effectiveness				
Achievement of project purpose	Refer to the Accomplishment Grid		Refer to the Accomplishment Grid.	
Do the project activities and outputs effectively contribute to the achievement of the project purpose?	① Reports on project progress monitoring survey for the first and second years ② Final reports for the first and second years	- Review of the project reports - Questionnaires and interview to C/Ps, experts and all the stakeholders - Interview to DLF	Pilot operation, training, experiments for technical improvement, various field surveys are achieving project outputs and will effectively contribute to the achievement of the project purpose.	Project activities will effectively contribute to the achievement of the project purpose.
What are the contributory/ obstructive factors, which affect effectiveness?	<u>Contributory factors</u> Extent of collaboration among JICA Laos office, AQIP II, DLF and local government organizations. <u>Obstructive factors</u> None <u>Matters of concern</u> Too short period of the pilot operation	- Review of the project reports - Interview to C/Ps, experts, and staff of DLF and local government organizations	<u>Contributory factors</u> Close collaboration among JICA Laos office, AQIP II, DLF and local government organizations. <u>Matters of concern</u> In the PDM, aquaculture extension was targeted only individual farmers. However, in the pilot operation and expansion operation, aquaculture extension targeted groups/communities, such as women's union and school, has been found to be effective way to establish aquaculture suitable for local conditions. The period of three years allocated to the pilot operation seems to be too short to fully establish group/community aquaculture extension patterns.	

Evaluation item/ Survey subjects	Necessary information and data	Method of survey	Results	Evaluation
Efficiency				
Are outputs corresponding to the resources of inputs provided?	Appropriateness of; ① Dispatch of Japanese experts; -Field, number, period, timing ② Allocation of C/Ps; -Qualification, number ③ Facilities ④ Equipment and materials provided -Kind, amount, timing ⑤ Training -Capacity building, knowledge dissemination ⑥ Project implementation expenses	- Examination of project reports - Questionnaire survey and interview to C/Ps, experts, DLF, local government staff	① Fields, number and timing of dispatch of Japanese experts have been all appropriate. If some experts could be dispatched in April every year, input of Japanese experts will become more efficient. ② All C/Ps, both at central government level and local government level, have fully participated to the project activities. Therefore, input of C/Ps can be said to be efficient both in qualification and number. However, if more C/Ps could be allocated at NADC, input of C/Ps will become more efficient. ③ Facilities at NADC, PAS and other local government organizations have been utilized efficiently in the project activities. ④ All items of field, office and laboratory equipment and materials, provided to NADC have been fully utilized. Also, all items of equipment and materials provided to local government organizations and pilot villages have been fully utilized. ⑤ Participants from pilot villages have been utilizing knowledge and technique acquired during the training in their own production activities. Some of them have been disseminating knowledge and technique acquired to other villagers. Some participants, not all, from local government organizations have also been utilizing acquired knowledge and technique in their extension activities, and have been making effort to disseminate knowledge and technique to their colleagues. ⑥ Project implementation expenses, both from Japanese and Lao sides, have been utilized efficiently for project activities.	Inputs from Japanese side are appropriate. In general, inputs from Lao side are appropriate except for insufficient number of C/Ps allocated to NADC. Trainings for local government staff and farmers have been conducted efficiently and created useful results.
What are the contributory/ obstructive factors, which affect to efficiency?	<u>Contributory factors</u> None <u>Obstructive factors</u> ① Timing of Japanese expert dispatch ② Number of NADC C/P	- Review of the reports on former cooperation - Interview to C/Ps・Experts	<u>Obstructive factors</u> ① Some modification should be made in the year-end/year-start procedures of JICA. ② Number of university graduate members and field workers should be increase at NADC.	

Evaluation item/ Survey subjects	Necessary information and data	Method of survey	Results	Evaluation
Impact				
Contribution to overall goal	Data on living standard (cash income, animal protein intake, education, health care, etc.)and aquaculture situation in the pilot villages	- Review of monitoring survey reports - Questionnaire to C/Ps・Experts	At mid point of the project period, there is not sufficient data to examine the changes occurred in the living standard of villagers.	
Positive impact	① Changes occurred in the pilot villages ② Collaboration with organizations other than JICA and DLF.	-Review of monitoring survey reports -Questionnaire survey and interview to C/Ps・Experts - Questionnaire survey and interview t to farmers at pilot villages	① Same as above. ② Several non-governmental organizations have shown interest on collaborative work with AQIP II. They are Nagao Environmental Foundation and Japan International Cooperation Foundation. Also, there are some persons who want to contribute to the development of rural villages in Lao PDR.	The project has been creating various positive impacts.
Negative impact	① Changes occurred in the pilot villages	- Questionnaire to C/Ps・Experts - Questionnaire to small-holder farmers	So far, there has been no negative impact of the project to village life and environmental conditions of the village.	
What are the contributory/ obstructive factors, which affect impact?	Contributory factors ① None Obstructive factors ① None	- Questionnaire and interview to C/Ps・Experts		

Evaluation item/ Survey subjects	Necessary information and data	Method of survey	Results	Evaluation
Sustainability				
Institutional and financial sustainability of NADC	① Ability and skill of NADC staff members - Ability to carry out research and experiment - Ability to carry out field survey - Ability to collaborate with local government staff - Ability to collaborate with villagers - Ability to carry out training courses - Ability to generate cash income by producing and selling fish seeds - Ability to manage money flow ② Income and expenditure of NADC ③ Budget allocation by DLF to NADC ④ Number of staff members	- Interview and discussion at NADC, DLF and MAF	① Ability and skill of all C/Ps have been upgraded. - Upgrade in ability to carry out research and experiment: Modest - Upgrade in ability to carry out field survey: High - Upgrade in ability to collaborate with local government staff : High - Upgrade in ability to collaborate with villagers: High - Upgrade in ability to carry out training courses: High - Upgrade in ability to generate cash income by producing and selling fish seeds: Modest - Upgrade in ability to manage money flow: Modest ② Ability of NADC to cover expenses by income: Modest ③ Allocation of budget by DLF to cover personnel expense, power supply expense, and other operation expenses: Modest ④ Allocation of NADC staff members: Low	NADC will be able to attain institutional and financial sustainability by the end of the project, if some more effort is made by its staff and DLF. Increase in staff members, in particular, is very important for sustainable development of NADC.
Aquaculture extension by local government staff	Ability and skill of local government organizations - Ability to collect necessary information from villages - Ability to transfer necessary information and technique to farmers - Ability to adopt aquaculture techniques suitable to local conditions - Ability to organize training for farmers and DAFO extension workers - Ability to collaborate with related organizations	-Questionnaire survey, interview and discussion at PAFO, PLFS and DAFO	Ability and skill of local government organizations have been upgraded. - Upgrade in ability to collect information from villages: High - Upgrade in ability to transfer information and technique to farmers: High - Upgrade in ability to adopt suitable aquaculture techniques: Modest - Upgrade in ability to organize training for farmers and extension workers: Modest - Upgrade in ability to collaborate with related organizations: Modest	Local government organizations will be able to establish sustainable aquaculture extension system by the end of the project, if some more effort is made by their staffs collaborating with NADC.

Results of pilot operation at pilot villages	Ability of pilot villages in attaining sustainable aquaculture development - Number of fish farmers - Number of group fish farms - Technical and management I of fish farmers - Activities of VAPC - Aquaculture activities of village women's unions - Number of potential core farmers	-Village survey, interview and discussion at pilot villages -Questionnaire survey, interview and discussion at PAFO, PLFS and DAFO	Ability of pilot villages in attaining sustainable aquaculture development has been moderately upgraded*. - Increase in the number of fish farmers: Modest - Increase in the number of group fish farms: Modest - Degree of technical and management improvement of fish farmers: Modest - Activeness of VAPC: High in some villages, modest in general - Activeness of village women's unions: High in some villages, modest in general - Possibility of creating core farmers: High in some villages, modest in general * Data on the present aquaculture situations at pilot villages are shown in the attached sheet.	Aquaculture activities have been enhanced at all pilot villages by the pilot operation. However, it will take more than three years to ensure full sustainability in aquaculture development at pilot villages.
What are the contributory/ obstructive factors, which affect to sustainability?	① Contributory factors: - Collaborative works with Japanese organizations ② Obstructive factors: - Under-employment at NADC - Short period allocated for the pilot operation	- Interview and discussion at NADC, DLF and MAF	① Contributory factors: - Collaborative researches and works with the University of Tokyo, Nagao Environment Foundation, Japan International Cooperation Foundation, and some NGOs will help attaining sustainable development of NADC and sustainability of project outputs at PAFO, DAFO and pilot villages. ② Obstructive factors: - NADC has been always facing to under-employment to fully perform its functions. - Three years allocated to the pilot operation is too short to attain full sustainability in aquaculture development at pilot villages and to disseminate outputs of pilot operation to expansion villages and surrounding area.	

Annex 5. Review of the pilot operation

1. Summary

(1) Profile of pilot village

Table 1. Profile of pilot villages.

Province	Village	Rice production	Source of cash income	Cash income (Fig. 1)
Oudomxai province Xai district	Houaysang (HYS)	Upland/rain-fed	Livestock, NTFP	Low
	Houaythong (HYT)	Upland/rain-fed	Livestock, NTFP	Low for Hmong
	Houaykhoum (HYK)	Rain-fed	Non-agriculture, livestock	High
Xaignabouli province Phiang district	Natane (NTN)	Rain-fed, irrigated	Livestock	Medium
	Somsavanh (SSV)	Rain-fed, irrigated	Non-agriculture (brick)	High
	Nasimnyai (NSN)	Rain-fed, irrigated	Non-agriculture	High
Savannakhet province Phin district	Phin (PHN)	Rain-fed	Non-agriculture, livestock	Medium
	Xaisamphan (XSP)	Rain-fed	Non-agriculture, livestock	Medium
	Oudomxai (ODX)	Rain-fed	Non-agriculture, livestock	Medium
Salavan province Laongam district	Houakouaset (KHS)	Rain-fed	Upland products, livestock	Medium
	Dondou (DND)	Rain-fed	Coffee	Medium
	Nonsoung (NNS)	Rain-fed	Livestock	Medium

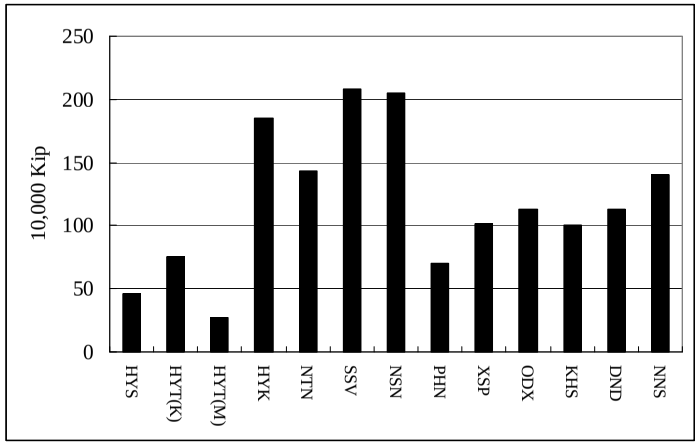

Fig. 1. Average cash income (Kip/person/year) from 2005 to 2006 at pilot villages.

(2) Number of fish culture household is increasing at half of the pilot villages, particularly at pilot villages in Oudomxai province.

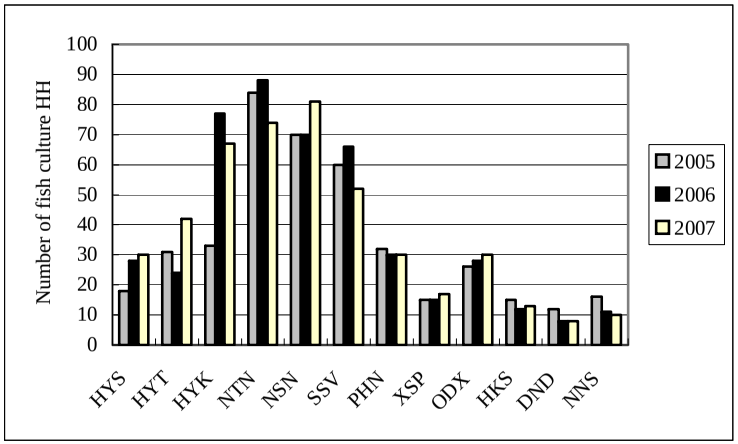

Fig. 2. Number of fish culture households at pilot villages.

(3) Seed production has increased at most of the pilot villages

Table 2. Amount of seed production by year, by village.

Province	Oudomxai province			Xaignabouli province		
Village	Houaysang	Houaythong	Houaykhoum	Natane	Nasomnyai	Somsavanh
2005	None	None	?	None	None	60,000
2006	5,000	None	3,500	None	None	50,000
2007	64,000	21,000	35,300	24,200	None	50,000

Province	Savannakhet province			Salavan province		
Village	Phin	Xaisamphan	Oudomxai	Houkhuaset	Dondou	Nonsoung
2005	None	None	None	None	None	65,000
2006	None	500	None	None	None	105,000
2007	None	2,650	530	None	None	160,000

(4) Fish production by fish farmers has shown significant increase from 2005 to 2006 at most of the pilot villages.

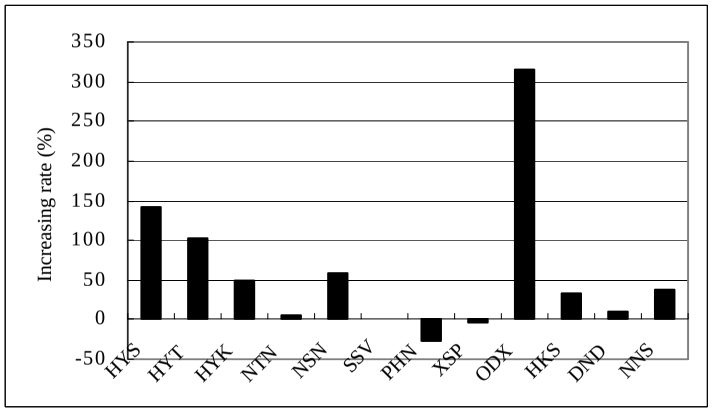

Fig. 3. Increasing rate (%) of fish production from 2005 to 2006 by fish farmers at pilot villages.

(5) At most of the pilot villages, fish consumption has shown significant increase, up to the level higher than 13 kg/person/year, the target amount for 2010, set by Lao government. However, at Houaysang village and Houaythong village in Oudomxai province and Dondou village in Salavan province, fish consumption still remains at a low level.

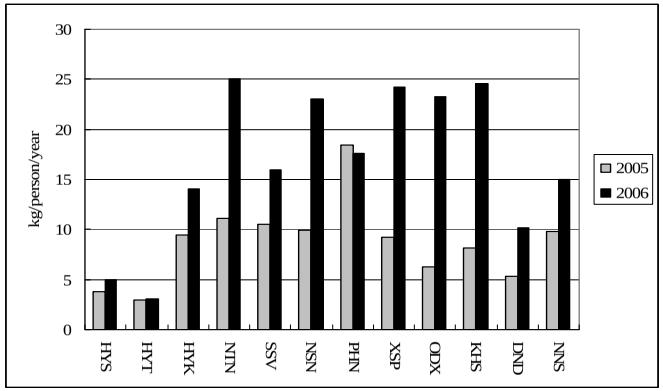

Fig. 4. Average fish consumption (kg/person/year) at pilot villages.

(6) Aquaculture extension ability has been much improved at district level in most of the target districts. Also seed production amount has been increased at provincial and district aquaculture stations.

Table 3. Donkeo Aquaculture Station in Oudomxai province.

Year	Selling number							Number of trainee		
	C. carp	Tilapia	Puntius	Indian carp	Chinese carp	Catfish	Total	Student	Farmer	Total
2005	-	-	-	-	-	-	2,285,500* (669,525)	0	32	32
2006	88,000* (156,335)	- (13,950)	700,000* (113,525)	- (114,985)	- (22,600)	- (22,843)	1,428,000* (444,238)	1	38	39
2007	272,000* (114,330)	- (42,400)	3,900,000* (27,040)	1,500,000* (43,600)	- (55,930)	0	5,672,000* (283,300)	1	159	160

*: 3-5 days after hatching.

( ): 45 days after hatching.

Table 4. 30ha Aquaculture Station in Xaignabouli province.

Year	Amount of production						Number of trainee		
	C. carp	Tilapia	Puntius	Indian carp	Catfish	Total	Student	Farmer	Total
2005	97,000	0	79,000	89,000	0	265,000	6	6	12
2006	75,000	0	120,000	138,000	0	333,000	13	13	26
2007	88,000	3,300	132,000	206,700	0	430,000	9	1	10

Table 5. Namtiane Aquaculture Station in Xaignabouli province.

Year	Amount of production						Number of trainee		
	C. carp	Tilapia	Puntius	Mrigal	Catfish	Total	Student	Farmer	Total
2007	40,000	0	0	15,000	2,000	57,000	0	0	0

Table 6. Pakbo Aquaculture Station in Savannakhet province.

Year	Amount of production								Number of trainee		
	C. carp	Tilapia	Puntius	Rohu	S. carp	Mrigal	Catfish	Total	Student	Farmer	Total
2005	210,000	175,000	325,000	50,000	55,000	200,000	0	1,015,000	21	0	21
2006	165,000	127,000	255,000	45,000	50,000	11,000	0	752,000	23	21	44
2007	215,500	185,345	375,300	81,000	115,000	325,000	52,000	1,349,145	12	11	23

able 7. Nongdeng Aquaculture Station in Salavan province.

Year	Amount of production						Number of trainee		
	C. carp	Tilapia	Puntius	Mrigal	Catfish	Total	Student	Farmer	Total
2005	150,000	0	250,000	450,000	0	850,000	1	6	7
2006	0	0	0	0	0	0	0	3	3
2007	0	0	0	0	0	0	0	30	30

Note) No water supply to the station in 2006 and 2007.

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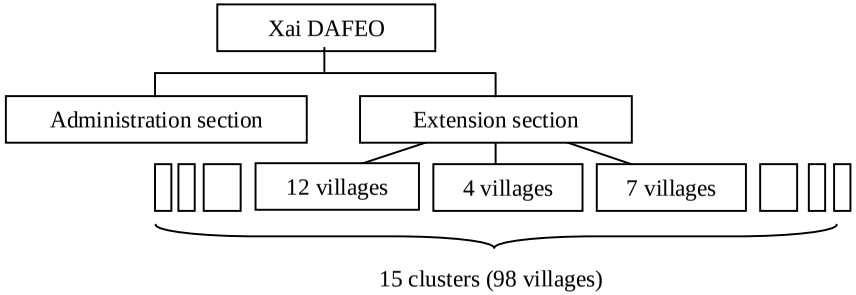
Table 8. Vangyen Aquaculture Station at Laongam district in Salavan province.

Year	Amount of production						Number of trainee		
	C. carp	Tilapia	Puntius	Mrigal	Catfish	Total	Student	Farmer	Total
2005	100,450	0	23,550	2,000	3,000	129,000	5	0	5
2006	229,200	16,930	33,950	74,880	4,290	395,250	3	0	3
2007	320,600	170,000	254,000	186,000	19,400	950,000	9	43	52

(7) Fish culture by women's group has shown promising results. Motivated by successful fish culture by women's union, VAPC of some villages want to start school fish culture and temple fish culture.

(8) Fish farming households are generally richer than non-fish farming households.

2. Situation at local government and villages levels.

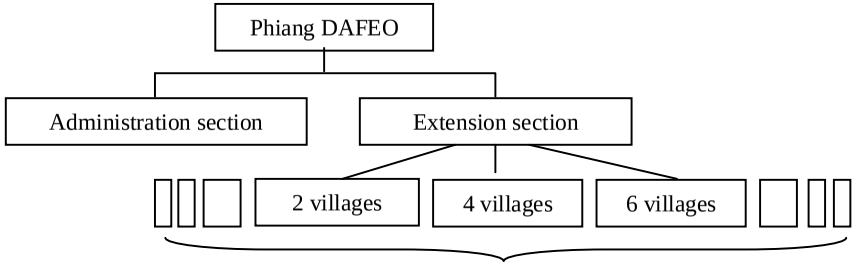
<table>
<tr><td colspan="3">Oudomxai province, Xai district</td></tr>
<tr><td rowspan="3">Local government</td><td>PLFS/PAFO</td><td>(1) Mr. Lanthaphone, PLFS, has been working for AQIP II since 2005. He is a member of the on-site guidance team that visits pilot villages every two months.
(2) Mr. Lanthaphone leads PLFS Youth Union to start fish culture based on his experience and knowledge acquired in AQIP II activities.
(3) The role of PLFS in AQIP II is to collect information on the pilot villages, to dispatch DAFEO and PAS staffs to pilot villages for extension service to support aquaculture related activities, to make necessary arrangements for NADC training, PAS training, study tour, and on-site guidance.
(4) PLFS reports progress of AQIP II to PAFO.</td></tr>
<tr><td>DAFEO</td><td>(1) Ms. Amphai, the head of fisheries section at Xai DAFEO, has been working for AQIP II since 2005. She is a member of the on-site guidance team.
(2) The role of DAFEO is to collect information at three pilot villages and bring up the information to PLFS, to give technical and managerial guidance on aquaculture activities to VAPC, fish farmers, and aquaculture group of Women’s Union.
(3) DAFEO requests to PLFS to dispatch staff of PAS, when there is technical problem at the pilot villages.
(4) AQIP II supplied to DAFEO a motorbike, computer, facsimile machine, printer, etc in 2005.
(5) A new cluster system will be introduced into the agriculture development policy by the end of 2007. Accordingly, the organization of DAFEO will be changed to fit to the new cluster system as follows. Presently, DAFEO is waiting for approval on the new organization by MAF.
 
</td></tr>
<tr><td>PAS</td><td>(1) There are 3 permanent and 3 temporary employees at the station.
(2) Mr. Somphet, a permanent employee, has been working for AQIP II since 2005.
(3) A JOCV is working at the station to improve the aquaculture techniques and to support AQIP II activities.
(4) The role of PAS is to give technical guidance to the villages, to produce high quality seed fish for selling to fish farmers, and to train fish farmers on aquaculture technique.
(5) AQIP II supplied to PAS a motorbike, computer, printer and facsimile machine in 2005. AQIP II also constructed a training building, repaired ponds, and improved water supply system at PAS in 2006.</td></tr>
<tr><td>Houaysang</td><td>Fish farmers</td><td>(1) Number of fish culture HH: 18 in July 2005; 28 in July 2006; 30 in August 2007
(2) Number of fish pond: 49 in July 2006; 58 in August 2007
(3) Average fish production: 28 kg/HH/year in 2005
(4) Group fish culture: Only by women’s union</td></tr>
</table>

	Improvement of fish farming	(1) Some fish farmers are feeding boiled feed. (2) Three ponds were deepened by July 2006. (3) At least 24 fish farmers applied improved aquaculture method recommended by AQIP II. (4) WU also applied intermediate culture technique introduced by AQIP II. AQIP II gave guidance to WU not only on culture technique, but also on book-keeping and farm management.
	VAPC	(1) VAPC has 14 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 900 fingerlings to VAPC in 2006. VAPC distributed fingerlings to six fish farmers. (4) VAPC saves 565,000 kip as VAPC fund through collection of fee for supply of fingerlings and equipment rental in July 2007. (5) VAPC requested AQIP II for support on pond making for school fish culture in order to give good knowledge on fish culture to the children.
	Women's union	(1) All of 59 members of WU joined the fish culture group. (2) The group conducted two times of intermediate culture, and started growing out culture in 2006. (3) WU member in south area of the village also started growing out culture in 2006. (4) Presently, WU has three fish ponds, two ponds in the north and one pond in the south. (5) WU has saved 600,000kip as WU fund through selling fingerlings and table size fish. (6) Members of WU are discussing to change the leader, because she is not active.
	Fish consumption	(1) Average fish consumption: 5 kg/year/person (2006)
	Life	(1) Main products at the village: Rain-fed rice, upland rice, livestock, sesame and NTFP. (2) Total rice production does not cover demand at the village. (3) Average cash income: 0.46 million Kip/person/year. (4) Sometimes a small essence making business is operated in the village. Villagers are selling NTFP to the business to get cash income. (5) A village hall for extension service was built by financial support by a Japanese private foundation in 2007.
	Achievement	(1) VAPC and fish culture group of WU have been well established to continue culture fish and related activities. (2) Mr. Kounoy is a successful and highly motivated farmer and expected to be a core farmer. 1) He has started seed production under the guidance of AQIPII. 2) AQIP II has supplied him some materials needed for seed production. 3) He will sell fingerling at a cheep price (80 Kip/fingerlings) to VAPC members under the VAPC regulation. 4) He earned 300,000kip by selling fingerlings in 2006, contributing to stable supply of fingerlings to fish farmers at the village. (3) VAPC disseminated improved aquaculture techniques to at least 13 fish farmers. (4) 26 HH among 30 fish farming HH (86.7%) answered that fish culture production has been increased from 2005 to 2006. (5) Total fish production of fish farmers increased by 136% from 2005 to 2006.
	Necessary activities	(1) 66% of fish farmers hope to study on fundamental aquaculture techniques, 56% of fish farmers hope to do seed production, and 20% of fish farmers hope to do intermediate culture (monitoring survey in August 2007). (2) AQIP II needs to continue small-scale workshop on technical improvement of fish culture techniques using posters and VCD prepared in 2006 with collaboration with VAPC and Mr. Kounoy. (3) It is not necessary to promote seed production in the village any more, because Mr. Kounoy has already been production sufficient number of fry fish. (4) AQIP II should promote intermediate culture using fry produced by Mr. Kounoy, because there is strong demand on medium and large size fingerlings inside as well as outside the village. (5) AQIP II will support school fish culture requested by VAPC as a part of aquaculture extension and environment awareness campaign. (6) AQIP II will support a trial of group fish culture by low-income farmers.

Houaythong	Fish farmers	(1) Number of fish culture HH: 31 in July 2005; 24 in July 2006; 42 in August 2007 (2) Number of fish pond: 32 in July 2006; 61 in August 2007. (3) Increase of eight fish culture HH is due to merger of KM 11 village and Houaythong village. (4) Average fish production: 20 kg/HH/year by LT and 75 kg/HH/year by LS in 2005. (5) Group fish culture: By WU and VAPC members
	Improvement of fish farming	(1) VAPC members and WU members are jointly carrying out seed production of common carp by a group using Mr. Thongpheng's pond. (2) WU has started growing out culture applying improved methods including bamboo stick method. (3) At least 19 fish farmers applied improved aquaculture methods recommended by AQIP II (monitoring survey in August 2007).
	VAPC	(1) VAPC has 26 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 4,135 fingerlings to VAPC. VAPC distributed fingerlings to 17 fish farmers. (4) VAPC saves 95,000 kip as VAPC fund through collecting fee for supply of fingerlings and equipment rental in July 2007. (5) VAPC requested AQIP II to support school fish culture. They hope to educate school children on good fish culture method.
	Women's union	(1) There are two WU, one for LT and one for LS. (2) All of 37 members of LT WU joined the fish culture group. (3) LS WU does not conduct aquaculture activities. (4) Village head has suggested that LS WU should join to fish culture activities with LT WU. (5) In 2007, eight WU members established seed production group. WU has two fish ponds and conducted one cycle of intermediate culture in 2006. In 2007, (6) WU is using only one fish pond and conducting seed production and growing out culture, applying bamboo stock method acquired at NADC training. (7) WU saves 405,000kip as WU fund through selling fingerlings and table size fish by August 2007.
	Fish consumption	(1) Average fish consumption: 3.1 kg/year/person (2006).
	Life	(1) There is a big gap between LT and LS in life conditions. Condition of LT is superior to that of LS who settled at the village later. (2) Main production activity of LT is rain-fed rice combined with upland rice cultivation, while that of LS is only upland rice cultivation. (3) Total rice production is not self sufficient to meet demand at the village. (4) Other important products are livestock, vegetable, fruits, and NTFP. (5) Average cash income: 0.75 million Kip/person/year for LT and 0.27 million Kip/person/year for LS. (6) A village hall for extension service will be built with financial support by a Japanese private foundation by the end of 2007. (9) New school building is under construction with financial support by German Agro Action.
	Achievement	(1) VAPC and aquaculture group of WU have been well established. (2) Mr. Ounset and Mr. Thongpheng, both VAPC members, have jointly started carp seed production. At least 11 fish farmers at the village bought fingerlings from them. (3) VAPC gave technical guidance on aquaculture techniques for at least 6 fish farmers. (4) 23 out of 28 fish farmers (82.1%) at the village said that fish production increased from 2005 to 2006. (5) Total fish production of fish farmers increased by 68% from 2005 to 2006.
	Necessary activities	(1) 62% of fish farmers hope to study on fundamental aquaculture techniques, and 27% of fish farmers hope to do seed production (monitoring survey in August 2007). (2) AQIP II should organize small workshops using visual extension materials, and support to increase seed supply through promotion of intermediate culture.

Houaykhoum	Fish farmers	(1) Number of fish culture HH: 33 in July 2005; 56 HH in July 2006; 67 in August 2007 (2) Average fish production: 70 kg/HH/year in 2005.
	Improvement of fish farming	(1) Some farmers is feeding boiled feed, some made their ponds deeper, and some applied bamboo stick method. (2) Two farmers conducted Tilapia seed production using separation net method. (3) At least 20 fish farmers applied improved aquaculture methods recommended by AQIP II (monitoring survey in August 2009). (4) WU conducted intermediate culture under guidance by AQIP II.
	VAPC	(1) VAPC has 28 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 7,175 fingerlings to VAPC. VAPC distributed fingerlings to 29 fish farmers. (4) VAPC has saved 375,000 kip as VAPC fund through collecting fee for fingerling supply and equipment rental in July 2007. (5) Some VAPC members are trying to conduct seed production of common carp under technical guidance by PAS.
	Women's union	(1) WU conducted intermediate culture using 3-4 days old fry. (2) WU earned 720,000 Kip in 2006, and 620,000 kip in August 2007 by selling fingerlings. (3) WU selected a new leader of fish culture group, because the former leader started to work at the battery factory nearby.
	Fish consumption	(1) Average fish consumption: 14 kg/person/year (2006).
	Life	(1) Main products at the village: Rain-fed rice, upland rice, livestock, and NTFP. (2) There are some factories, such as battery and sodium glutamate factories, around the village. (3) Average income: 1.85 million Kip/HH/year (4) Average income of fish farming HH: 10 million Kip/HH/year (monitoring survey in August 2007).
	Achievement	(1) VAPC and fish culture group of WU have been well established. (2) The number of fingerlings produced at the village is increasing. At least 10 fish farmers purchased fingerlings inside the village. (3) VAPC gave guidance on aquaculture techniques to at least eight fish farmers at least. (4) 18 out of 28 fish farmers (64.3%) said that fish production increased from 2005 to 2006. (5) Total fish production of fish farmers increased by 96% from 2005 to 2006.
	Necessary activities	(1) 55% of fish farmers hope to do seed production, and 27% of fish farms hope to study on fundamental aquaculture techniques and intermediate culture (monitoring survey in August 2007) (2) AQIP II should organize small workshops using visual extension materials. (3) AQIP II should promote intermediate culture to produce more fingerlings.

Xaignabouli province, Phiang district		
Local government	PLFS/PAFO	(1) Mr. Vilaphong, PLFS, has been working for AQIP II since 2005. He has been nominated as the head of Namtiane Aquaculture Station constructed by financial support of AQIP II in 2006. He has been a member of the on-site guidance team. (2) The role of PLFS is to collect information on the pilot villages and report to AQIP II, to dispatch DAFEO and PAS staffs for extension service at villages, and to make necessary arrangement for NADC and PAS training, study tour and on-site guidance (3) PLFS reports progress of AQIP II to PAFO.

	DAFO	(1) Mr. Sieo, fisheries section at Phinag DAFEO, has been working for AQIP II since 2005. He is also a district veterinary in Phiang district. He has been a member of on-site guidance team. (2) The role of DAFEO is to collect information at three pilot villages and bring up the information to PLFS, to give guidance on aquaculture techniques and fish farm management to VAPC, aquaculture group in Women's Union and fish farmers. (3) DAFEO requests to PLFS to dispatch staff of PAS, when there is any technical problem at pilot villages. (4) AQIP II supported a motorbike, computer, fax, printer, etc. (5) By the end of 2007, the function and organization of DAFEO will be changed to fit to the new cluster approach in agriculture development policy initiated by MAF. 
	PAS	(1) There are two PAS at Phiang district (30 ha Station) and Xaignabouli district (Namtiane Aquaculture Station) in Xaignabouli province. (2) There are two permanent employees and several temporary employees at 30 h Stations (3) Mr. Pheng, a permanent employee at 30 ha Station, has been working for A 11 clusters (4) The role of PAS is to produce high quality seed and sell to farmers, to train farmers on aquaculture techniques, and to give technical guidance to farmers upon request. (5) AQIP II supplied materials and equipment for seed production in 2005. (6) The facility of Namtiane Aquaculture Station was constructed in 2006 with financial support by JICA. (7) Namtiane Station is under the PLFS. Mr. Vilaphong is head of the station. From June to September, they sold fingerlings of common carp and Indian carp, 27,000 in total number. (8) From June to September, they sold fingerlings of common carp and Indian carp, 80,000 in total number.
Natane	Fish farmers	(1) Number of fish culture HH: 74 in August 2007 (2) Number of fish pond: 88 in August 2007 (3) Average fish production: 139 kg/HH/year.
	Improvement of fish farming	(1) Some fish farmers have started common carp seed production, though the production is not enough to meet the demand at the village. (2) At least 15 fish farmers have applied improved aquaculture methods recommended by AQIP II (monitoring survey in August 2007).
	VAPC	(1) VAPC has 26 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 20,800 fingerlings to VAPC in 2006. VAPC distributed fingerlings to 21 fish farmers. (4) VAPC tired to collect fee for the fingerling supply, but could not raise VAPC fund by July 2007. VAPC at this village is inactive.
	Women's union	(1) WU has a culture pond to conduct growing out culture. (2) WU harvested 26kg fish and earned 240,000kip in 2006. (3) Some fish culture group members of WU took some fish without approval of WU. This caused internal conflict in WU, resulted in quit of some members from the fish culture group. (4) AQIP II supplied 1,200 fingerlings to WU in 2007. WU has saved 240,000kip as WU fund through selling table size fish in August 2007.

	Fish consumption	(1) Average fish consumption: 25 kg/person/year (2006).
	Life	(1) Main products at the village: Rain-fed rice and livestock. (2) Average cash income: 1.43 million Kip/person/year (2006). (3) Average cash income of fish culture HH: 16.8 million Kip/HH/year (monitoring survey in August 2007).
	Achievement	(1) Mr. Phiang is a successful and highly motivated fish farmer. He is selling fingerlings of common carp, Puntius and Indian carp. At least 10 fish farmers at his village bought fingerlings from him. He has sufficient knowledge and technique on aquaculture to join the on-site guidance team and to give technical guidance to farmers at expansion villages. (2) VAPC and DAFEO gave guidance on aquaculture techniques to at least three fish farmers. (3) 20 out of 30 fish farmers (66.7%) said that fish production increased from 2005 to 2006. (4) Total fish production of fish farmers increased by 49% from 2005 to 2006.
	Necessary activities	(1) 40% of fish farmers hope to study on fundamental aquaculture techniques, 36% of fish farmers hope to do seed production (monitoring survey in August 2007). (2) AQIP II should organize small workshops using visual extension materials. (3) AQIP II should continue to support active farmers in order to create core farmers who can supply enough fingerlings at the village.
Somsavanh	Fish farmers	(1) Number of fish culture HH: 52 in August 2007 (2) Number of fish pond: 67 in August 2007 (3) Average fish production: 173 kg/HH/year in August 2007 (4) Group fish culture: One by WU and one by the primary school.
	Improvement of fish farming	(1) Some fish farmers started common carp seed production, and some applied boiled feed mixing soybean and maize. (2) At least 18 fish farmers applied improved aquaculture methods recommended by AQIP II (monitoring survey in August 2007). (3) WU has made their pond deeper to increase the fish production in 2007.
	VAPC	(1) VAPC has 21 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 20,800 common carp fingerling and 9,900 Puntius fingerling in 2006. VAPC distributed fingerlings to 18 fish farmers. (4) VAPC tried to collect fee for the fingerling supply from the recipient farmers, but had no fund yet in July 2007. (5) School fish culture has been started by initiative of VAPC.
	Women's union	(1) WU has a culture pond in the ground of the primary school. 1) WU harvested 53kg (690 fish) and sold 48kg (15,000Kip/kg) fish in February 2007. 2) WU made their pond deeper to increase the fish production during dry season. 3) WU bought 2,000 fingerlings (60kip/fingerling) from core farmer at the village in 2007. 4) WU saved 550,000Kip as WU fund though selling table size fish in August 2007. 5) WU at this village is highly motivated and very active.
	Fish consumption	(1) Average fish consumption: 16 kg/person/year (2006).
	Life	(1) Main products at the village: Rain-fed rice, livestock, brick (2) Average cash income: 2.08 million Kip/person/year. (3) Average cash income of fish culture HH: 19.0 million Kip/HH/year (for 29 HH, monitoring survey in August 2007)

	Achievement	(1) Mr. Xiengbounthanh is a successful and highly motivated fish farmer. 1) AQIP II supplied him some equipment and materials for seed production. 2) He is selling common carp, Puntius and Indian carp fingerlings to VAPC members at a cheap price, 80 Kip/fingerling, under the VAPC regulation. 3) He earned 10 million Kip through selling of fingerling. 4) He has sufficient ability to join the on-site guidance to expansion village. (2) At least 11 fish farmers bought fingerlings inside the village. (3) VAPC and DAFEO gave guidance on aquaculture techniques to at least four fish farmers. (4) 28 out of 29 fish farmers (96.6%) said that fish production increased from 2005 to 2006. (5) Total fish production of fish farmers increased by 46% from 2005 to 2006.
	Necessary activities	(1) 37% of fish farmers hope to study on seed production (monitoring survey in August 2007) (2) Since sufficient number of small fry can be supplied only by Mr. Xiengbounthanh, AQIP II should promote intermediate culture rather than spawning and egg incubation. (3) Further support to school fish culture on techniques and operation.
Nasomnyai	Fish farmers	(1) Number of fish culture HH: 70 in July 2006; 81 in August 2007 (2) Average fish production: 119 kg/HH/year.
	Improvement of fish farming	(1) Some fish farmer started to feed boiled feed, to conduct pond drying, to use fertilization, and to improve pond management. (2) At least 17 fish farmers applied improved aquaculture methods recommended by AQIP II.
	VAPC	(1) VAPC has 23 members. (2) VAPC has prepared regulation on aquaculture activities in the village. (3) AQIP II supplied 5,000 fingerlings to VAPC. VAPC distributed fingerlings to 25 fish farmers in 2006. (4) VAPC collected fee for the fingerling supply from recipient farmers, but has no fund yet in July 2007. (5) Some VAPC members hope to try catfish culture using small-scale net-cage. (6) VAPC wants to start school fish culture.
	Women's union	(1) AQIP II supported 50% of budget to construct water gate of WU pond in 2006. As the result, WU has a large pond. However, they could not stock fingerlings due to too high water level in 2007. (2) WU has no fund and is not active.
	Fish consumption	(1) Average fish consumption: 23 kg/person/year (2006).
	Life	(1) Main products at the village: Rain-fed rice, livestock (2) Average cash income: 2.05 million Kip/person/year (2006) (3) Average cash income of fish culture HH: 22.3 million Kip/HH/year (for 20 HH, monitoring survey in August 2007).
	Achievement	(1) At least 7 fish farms bought fingerlings inside the village (monitoring survey in August 2007). (2) VAPC and DAFEO gave guidance on aquaculture techniques to at least four fish farmers. (3) 26 out of 30 fish culture farmers (86.7%) said that fish production increased from 2005 to 2006. (4) Total fish production of fish farmers increased by 38% from 2005 to 2006.
	Necessary activities	(1) Some VAPC members hope to conduct catfish culture using small-scale net cage. AQIP II should support net cage culture techniques and some materials and equipment. (2) To guide VAPC to create a revolving fund system under the VAPC regulation. (3) To support VAPC to start school fish culture.

Savannakhet province, Phin district		
Local government	PLFS/PAFO	(1) Mr. Phansy, PLFS, is working for AQIP II from 2005, and has been a member of on-site guidance team. (2) Mr. Phansy attended NADC aquaculture training course and study trip to Thailand.
	DAFO	(1) Mr. Khamsamong, DAFEO, is working for AQIP II from 2005, and has been a member of on-site guidance team. (2) Mr. Khamsamong attended NADC and PAS training course and study trip to Thailand. (3) AQIP II provided DAFEO with a motorcycle and other equipment and materials.
	PAS	(1) Pakbo Fish Farm organized aquaculture training course twice for DAFEO staff and pilot village farmers. (2) Skill of aquaculture training of Pakbo Fish Farm staff has improved clearly since they took part in the NADC training course, study trip in Thailand and training in Japan. (3) AQIP II provided Pakbo Fish Farm with a motorcycle, a hand tiller, and water pump. (4) AQIP II improved training facilities and culture ponds of Pakbo Fish Farm.
Phin	Fish farmers	(1) Number of fish culture HH: 30 in August 2007 (number of target farmer is 11 in 2007, decreased from 14 in 2005). (2) Number of fish pond: 60 in August 2007. (3) Mrs. Done Shom carried out test culture on intermediate culture. Puntius grew well from 23.4g in August to 48.7g in September in average body weight in 2006. (4) Mr. Kham Bon carried out test culture on polyculture. He stocked fingerlings of common carp, silver carp and mrigal into his pond in May-June 2006. Silver carp grew to 326.7g, and mrigal to 40.6g by February 2007. (4) Mrs. Mo carried out test culture on tilapia mono-sex culture. Tilapia grew from 29.7g in August 2006 to 101.5g in February 2007 in average body weight. She fed tilapia rice bran.
	Improvement of fish farming	(1) Most of target fish farmers are observing fish condition more closely, maintaining fish pond better, and feeding fish regularly.
	VAPC	(1) VAPC has 3 members in 2007, decreased from 5 in 2005. (2) VAPC start recording member's fish farming activities. (3) AQIP II supplied to VAPC 3,800 fish seeds and fish farming material such as water pump, balances, buckets, net cages(2.4m×4m, 2m×1.5m), scoop nets, and seine net(2m×15m). (4) VAPC bought fish seeds to sell to villagers in 2007 with the money collected by selling fish seeds supplied by AQIP II in 2006.
	Women's union	(1) WU does not conduct fish culture. (2) WU manages a micro finance with the fund made by money collected from women in village.
	Fish consumption	(1) Average fish consumption: 17.6 kg/person/year (2006)
	Life	(1) Main products in the village: rain-fed rice (2) Most of villagers are engaged in non-agricultural activities. (3) Average cash income: 0.7 million Kip/person/year.
	Achievement	(1) Farmers have improved skills for not only fish farming, but also fish culture tool making. (2) Results of verification test culture: 1) Tilapia grows to certain size with feeding rice bran 2) By intermediate culture, small fish fry grow to fingerling, big enough to stock into the pond for grow-out, in a short period. 3) Silver carp grows fastest under poor feeding condition among three species in poly-culture. (3) Total fish production of fish farmers decreased by 27% from 2005 to 2006.

	Necessary activities	(1) VAPC should be strengthened so that it can contribute more to promotion of fish culture in the village. (2) AQIP II should give further technical support to progressive farmers to make them core farmers in aquaculture extension.
Saisamphan	Fish farmers	(1) Number of fish culture HH: 17 in August 2007 (number of target farmer is 8 in 2007, decreased from 10 in 2005). (2) Number of fish pond: 24 in August 2007 (3) Mr. Davanh carried out test culture on intermediate culture of common carp and tilapia using net cage in 2006. Common carp grew from 0.6g in August to 37.7g in September, and tilapia grew from 9.4g, in August to 51.2g, in November. (4) Mr. Lam Thoun carried out test culture on tilapia mono-sex culture using commercial fish feed in 2006. He released tilapia seed into pond in June. Tilapia grew 183.3g in average body weight by February 2007. (5) Mr. Lam Thoun participated to NADC training course in 2005. After the course, he built three concrete tanks at the back yard of his house for seed production of catfish. He is now producing catfish seed using natural spawning method in those tanks. He also culture tilapia in his the back yard pond trying his own feeding method and improvement of water quality. (5) Mr. and Mrs. Kibear carried out test fish culture on poly-culture in 2006. He stocked seeds into the pond in June. Tilapia grew 66.7g, common carp to 76.9g, catfish to 1,000g,, and mrigal to 66.7g in average body weight by February 2007.
	Improvement of fish farming	(1) 11 target Farmers have improved their fish farming skills such as feeding method, pond maintenance and pond management.
	VAPC	(1) VAPC has 5 members. (2) VAPC hops to culture fish at temple in the village. (3) Some farmers request to join AQIP II activities. (4) AQIP II supplied VAPC 6,200 fish seed, and fish culture materials such as water pump, balances, buckets, net cages (2.4m×4m, 2m×1.5m), scoop nets, seine net (2m×15m) in 2006. (5) VAPC bought fish seed to sell to villagers with the money collected by selling seeds supplied by AQIP II in 2006.
	Women's union	
	Fish consumption	(1) Average fish consumption: 24.2kg/person/year (2006)
	Life	(1) Main product in the village: Rain-fed rice (2) Most of the villagers are engaged in non-agricultural activities. (3) Average cash income: 1.01 million Kip/person/year (2006)
	Achievement	(1) Mr. Lam Thoun is very progressive in fish culture farmers, and expected to be a core farmer for aquaculture extension. (2) Fish production by cultured fish in the village showed considerable increase in the second year compared to the first year. (3) Most of the target farmers have improved fish culture skill. (4) Total fish production of fish farmers decreased by 4% from 2005 to 2006.
	Necessary activities	(1) VAPC should be further strengthened to be more active in aquaculture promotion in the village. (2) AQIP II should give further technical support to VAPC, so that VAPC can disseminate fundamental fish culture skills to the villagers. (3) AQIP II support temple fish culture.

Oudomxai	Fish farmers	(1) Number of fish culture HH: 26 in July 2005; 30 in July 2006; 30 in August 2007 (2) Number of fish pond: 60 in August 2007 (3) Mr. Dee attended NADC training in 2005. After the training, he started test intermediate culture in 2006. Many fry died due to parasite in the first culture, but he continued intermediate culture buying fry by himself. He harvested fish about 120kg in 2006.. (4) Mr. and Mrs. Somdy carried out test culture on tilapia mono-sex culture in 2006. They were taking care of fish well. Sometime they collect termites in the forest to feed tilapia. The tilapia grew 142.9g in average body weight in February 2007. (5) Mr. Boua Vanh carried out test fish culture on poly-culture of common carp and mrigal in 2006. Common carp grew to 525.0g and mrigal to 38.1g in average body weight by February 2007. (6) Mr. Bounray participated to NADC training. After the training, he built big and small concrete tanks at backyard of his house. He bought catfish fingerling for culturing in the tanks. He had started this because he wanted to show and explain what he learnt in the training to the people who could participate to the training. Since his catfish has grown well, he has started to produce seed by using those catfish in 2007.
	Improvement of fish farming	(1) Fish production by culture in the village increased in 2006 compared with 2005. (2) Farmers began to closely watch fish pond for better pond management.
	VAPC	(1) VAPC has 4 member in 2007, decreased from 5 in 2005. (2) VAPC established a fund and began to give loans to target farmers money for buying fish seed. (3) VAPC began to register harvesting record of target farmers. (4) AQIP II supplied to VAPC 9,700 fish seeds and fish culture materials such as water pump, balances, buckets, net cages (2.4m×4m, 2m×1.5m), scoop nets, and seine net (2m×15m, 2m×20m). (5) VAPC bought fish seeds to sell to villagers in 2007 with the money collected by selling fish seeds supplied by AQIP II in 2006.
	Women's union	(1) WU raises puntius, grass carp and tilapia using village community pond. Puntius grew to 55.6g, and grass carp to 51.7g in average body weight by February 2007. (2) WU attempts to make and saell net cage.
	Fish consumption	(1) Average fish consumption: 23.3kg/person/year (2006).
	Life	(1) Main products in the village: Rain-fed rice. (2) Most of the villagers are engaged in non-agricultural activities. (3) Average cash income: 1.13 million Kip/person/year (2006)
	Achievement	(1) VAPC commenced to loan farmers funds for fish seed purchase. (2) WU started fish culture in community pond by support of VAPC. (3) One progressive farmer is expected to become a core farmer for aquaculture extension. (4) Total fish production of fish farmers increased by 111% from 2005 to 2006.
	Necessary activities	(1) AQIP II should give technical support to improve survival rate of hatched fry in seed production. (2) AQIP II should give technical support to women's union for their sustainable activities.

Salavan province, Laongam district		
Local government	PLFS/PAFO	(1) Mr Tongon, PLFS, is working for AQIP II from 2005. He is a member of the on-site guidance team. He participated to NADC training and study trip to Thailand (2) AQIP II provided PAFO with a motorcycle.
	DAFEO	(1) Mr Ath, DAFEO, is working for AQIP II from 2005. He is a member of the on-site guidance team. (2) DAFEO operates Wangen Fish Farm that produces hundreds of thousands of several kinds of fish seeds every year. The production capacity and productivity of Wangen Fish Farm is increasing after improvement of its facility by AQIP II and participation of its technicians to NADC and PAS training. (3) Mr. Pompanom, the director of DAFEO, is promoting fish farming actively since participated aquaculture technical training in Japan. (4) AQIP II supplied to Wangen Fish Farm a motorcycle and a hand tiller with water pump.
	PAS	(1) Nongdeng Fish Farm organized aquaculture training course for DAFEO staff and pilot village farmers twice. (2) The skills of aquaculture training at Nongdeng Fish Farm improved clearly since its staff participated to the aquaculture technical training in NADC and Japan and study trip in Thailand. (3) Renovations of the facilities by AQIP II have an effect to improve training ability and fish seed productivity. (4) AQIP II supplied to Nongdeng Fish Farm a hand tiller with water pump.
Houakouaset	Fish farmers	(1) Number of fish culture HH: 13 in August 2007 (number of target farmer is 9) (2) Number of fish pond: 32 in August 2007 (3) Mr. Thongdeuan carried out test fish culture on intermediate culture in 2006. He stocked 1,500 common carp seeds and 1,500 puntius seeds into the net cages in June. He sold 1,300 grown fingerlings. 1,000 fingerlings were transferred to the pond in August. Common carp grew to 110.5g, and puntius to 66.6g by November.. (4) Mr. Turn carried out test culture on poly-culture in 2006. He stocked 100 common carp seeds, 200 puntius seeds and 200 mrigal seeds into the pond in June. Common carp grew to 500g, puntius to 166.7g, and mrigal to 90.9g by February 2007.
	Improvement of fish farming	(1) Farmers have improved their fish farming skills such as feeding method, pond maintenance and pond management.
	VAPC	(1) VAPC has 5 members. (2) VAPC is discussing about tilapia seed production using a partition net. (3) AQIP II supplied to VAPC 6,700 fish seeds, and fish culture materials such as water pump, balances, buckets, net cages (2.4m×4m, 2m×1.5m), scoop nets, and seine net. (4) VAPC bought fish seed to sell to villagers in 2007 with the money collected by selling seeds supplied by AQIP II in 2006.
	Women's union	(1) Mrs. Vone, leader of WU, is active in WU activities. (2) WU cultures fish with piglets above the pond. (3) WU also raises catfish using concrete tank. (4) WU attempts to make and sale net cage.
	Fish consumption	(1) Average fish consumption: 4.6 kg/person/year (2006)
	Life	(1) Main products of the village: Rain-fed rice. (2) Average cash income: 1.0 million Kip/person/year.
	Achievement	(1) One progressive farmer is expected to be a core farmer for aquaculture extension. (2) An effectiveness of intermediate culture was demonstrated and the method was established. (3) It has been shown that damages on fish farming by flood can be avoided by stocking intermediate-culture fingerlings after the flooding eason. (4) Total fish production of fish farmers increased by 34% from 2005 to 2006.

	Necessary activities	(1) AQIP II should further strengthen VAPC, so that VAPC can promote aquaculture more actively in the village. (2) AQIP II should give further technical support to WU to make WU as more viable organization. (3) AQIP II should find a suitable method to make paddy field suitable for fish culture.
Dondou	Fish farmers	(1) Number of fish culture HH: 8 in August 2007 (number of target farmer is 8) (2) Number of fish pond: 36 in August 2007 (3) Mr. Nou Sit carried out test fish culture on intermediate culture in 2006. He stocked 1,500 seeds of common carp and 1,500 seeds of puntius nto net cages in June. He sold 300 tails of fingerlings of 4-13cm in body length to fish farmers in August. He stocked rest of fingerlings into his pond for grow-out. Common carp grew to 118.3g and puntius to 35.4g by November 2006. (4) Mr. Bounmone carried out test culture on tilapia mono-sex culture in 2006. He stocked 860 tilapia seeds into the pond in July. Tilapia grew to 81.2g in average body weight by February 2007. (5) Mr. Kham Say carried out test culture on polyculture. He stocked 100 seeds of common carp and 700 seeds of puntius into the pond in June. Common carp grew to 92.5g, and puntius to 47.7g in average body weight by February 2007. He began to closely attend his pond after he participated to NADC training.
	Improvement of fish farming	(1) Farmers have improved their fish farming skills such as feeding method, pond maintenance and pond management.
	VAPC	(1) VAPC has 5 members. (2) AQIP II supplied to VAPC 1,400 fish seeds, and fish culture material such as water pump, balances, buckets, net cages (2.4m×4m, 2m×.5m), scoop nets, and seine net (2m×15m). (3) VAPC bought fish seeds to sell to villagers in 2007 with money collected by selling seeds supplied by AQIP II in 2006.
	Women's union	(1) WU is trying to find a suitable aquaculture activity.
	Fish consumption	(1) Average fish consumption: 10.1 kg/person/year (2006).
	Life	(1) Main products in the village: coffee (2) Average cash income: 1.13 million Kip/person/year (2006)
	Achievement	(1) VAPC established technique on intermediate seed culture using net cage. (2) Total fish production of fish farmers decreased by 34% from 2005 to 2006.
	Necessary activities	(1) AQIP II should strengthen VAPC, so that VAP can promote aquaculture in the village more actively.
Nonsoung	Fish farmers	(1) Number of fish culture HH: 10 in August 2007 (number of target farmer is 11 in August 2007, decreased from 16 in 2005) (2) Number of fish pond: 25 in August 2007 (3) Mr. Khamray carried out test culture on intermediate culture in 2006. He stocked 1,500 seeds of common carp and 1,500 seeds of puntius into net cages in June. Common carp grew to 56.6g, and puntius to 35.5g in average body weight by September. Presently he is producing fish seeds by his own method applying knowledge acquired in NADC training in 2007. (4) Mr. Intha carried out test culture on tilapia mono-sex culture without any result in 2006. (5) Mr. Thongdan carried out test culture on polyculture. He stocked 500 seeds of common carp, 300 seeds of puntius and 450 seeds of mrigal into the pond in June. Common carp grew to 145.8g, puntius to 125g, and mrigal to 76.9g in average body weight by February 2007. Presently, he has been trying to culture fish with his wife who attended NADC training . They built two concrete tanks beside the fish pond and producing and selling common carp.

	Improvement of fish farming	(1) Some farmers made concrete tank for seed production or fish culture facility by themselves. (2) Some farmers have acquired skills of fish culture tool (net cage, scoop net, seine net, spawning nest, etc.) making. (3) One farmer carries out intermediate culture with net cages during flood season. He stocked grown fingerlings into his pond after the flood season to avoid damage of fish culture by flooding. This way of late fingerling stocking has shown effective in the area where flooding often causes damage of fish culture ponds .
	VAPC	(1) VAPC has 3 members (5 in 2005) (2) VAPC is discussing about catfish farming. (3) AQIP II supplied to VAPC 4,300 fish seeds, and fish culture materials such as water pump, balances, buckets, net cages (2.4m×4m, 2m×1.5m), scoop nets, and seine net (2m×15m, 2m×20m) in 2006. (4) VAPC bough fish seeds for selling to villagers in 2007 with the money collected by selling seeds supplied by AQIP II in 2006.
	Women's union	(1) WU constructed facility and started frog culture.
	Fish consumption	(1) Average fish consumption: 15 kg/person/year (2006).
	Life	(1) Main product in the village: Rain-fed rice (2) Average cash income: 1.4 million Kip/person/year (2006)
	Achievement	(1) VAPC established technique on intermediate seed rearing using net cage. (2) Some progressive farmers will be able to be core farmers for aquaculture extension. (3) Total fish production of fish farmers increased by 37% from 2005 to 2006.
	Necessary activities	(1) AQIP II should further strengthen VAPC, so that VAPC can carry out more activities to promote aquaculture in the village. (2) AQIP II should give further technical support to progressive farmers, so that they can carry out aquaculture extension effectively.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