

ラオス人民共和国
ベトナム社会主義共和国

プロジェクト・ファイナディング調査報告書

ラオス人民共和国

山間地における養蚕振興開発計画

少数民族貧困対策のためのアタプー盆地農業総合小規模灌漑開発計画

ベトナム社会主義共和国

中部高原作物多様化振興計画

平成10年7月

社団法人 海外農業開発コンサルタント協会

プロジェクト・ファインディング調査報告書

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I. 序言

海外農業開発コンサルタント協会は、ラオスおよびベトナム両国における有望な農業開発計画案件に関する現地調査および資料収集のために、1998年5月24日より同年6月9日まで予備調査団を派遣した。調査団は下記の2名で構成された。

- 1) 山崎 隆可（農村開発、養蚕担当：日本工営（株））
- 2) 伴 正一郎（農村開発、灌漑開発担当：日本工営（株））

ラオス国では、調査団はラオス国農林省官房、同農業・普及局および灌漑局の依頼により、下記の2計画について調査を行った。

- 1) ラオス国山間地域における養蚕振興開発計画
- 2) アタプー盆地灌漑・農業開発計画

ベトナム国では、農業・農村開発省国際協力局と農業普及局、およびベトナム養蚕企業組合（Cooperation of Sericulture Enterprises of vietnam:VISERI）の依頼により、下記の踏査を行った。

- 1) 中部作物多様化振興計画

調査団は、上記地区の現地踏査を行い、上記関係部局および関係県との討議を重ね、これらを通じて計画に関する各種資料および情報を入手した。本報告書は、上記の計画に関する現地踏査および討議の結果を取纏めたものである。

なお、調査団は本調査の実施に当り、ラオスおよびベトナム両国の農林関係機関、日本大使館およびJICA事務所より多大の協力を頂いた。これらの機関に対し深甚の謝意を表する次第である。

ラオス人民共和国

山間地における養蚕振興開発計画

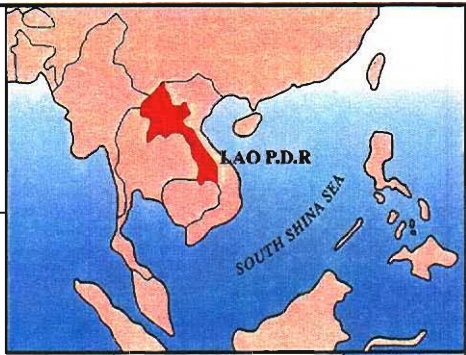


CHINA PR

VIETNAM

THAILAND

CAMBODIA



HANOI

HAIPHONG

YANH HOA

Gulf of Tongking

VIENTIANE

NONG KHAI

THAKHEK

M. PHITSANULOK

KHON KAEN

SAVANNAKHET

HUE

LEGEND

- Project area
- River
- Capital / Major City
- International Boundary
- Provincial Boundary

BANGKOK

UBON RATCHATHANI

PAKSE

GULF of Thailand

0 50 100 150km

ラオス国山間地における養蚕振興開発計画
調査対象位置図 (ラオス)

ラオス国山間地における養蚕振興開発計画

1. 一般背景

1.1 国家経済概況

ラオス国は、面積23万7千平方キロメートル、人口460万人、一人当りのGDP350ドルの農業を主産業とする内陸国である。中国、ベトナム、カンボディア、タイおよびミャンマーの5カ国に国境を接するラオス国は典型的な内陸国としてインドシナ半島の中央部に位置し、東は雲南高原より安南山脈が下がり、全土の約80%が高地である。西および南はメコン河が流れ、周辺の一部のみが農耕地に適しているが、その面積は全国土の約3%程度に過ぎない。北部山岳地帯には標高2,000m級の山脈が連なり、南部は比較的なだらかな高原地帯となっている。

この地理的特徴からうけるラオスの経済構造は、農業基盤を主体に成立している関係から、天候に左右されることが多い。また、豊富な天然資源が埋蔵されていると考えられる各種鉱物も、インフラ未整備、内陸的交通事情から採算に問題がある。

南西モンスーンは4月より10月までの雨期には豊かな降雨をもたらし、これが山岳地帯の豊富な森林資源を育て、農産物生産に貢献している。しかし、主要農産物である米は、一時自給を達成した時期もあったが(1992年)、現在は旱魃による不作もあって輸入をしている。また、高輸送コストのため隣国タイ、ベトナム、カンボディアに価格面で競合出来ず、将来余剰生産となっても海外輸出商品とはなりにくい。

メコン河および支流の水資源は水力発電に利用され、近隣諸国タイ、ベトナム向けに買電計画が進められている。従って、現在のラオス国経済の輸出構造は森林資源、買電を主体に成り立っている。

1995年の貿易収支は、輸出3億4,800万ドル、輸入5億8,700万ドルの大幅入超を記録、外貨準備高も1億9,110万ドルに対し対外債務高は12億3,600万ドルとなっている。

1995年の国民総生産は約17.6億ドルで、国民1人当りのそれは350ドルである。

1.2 国家開発計画

ラオス政府は1981年以降4次に亘る社会・経済開発5ヶ年計画を策定、実施しており、現在第4次社会・経済開発計画(1996-2000年)を実施中である。この開発計画には、生産、サービス、外交・経済協力、社会・文化および制度・行政・公共事業の5セクターに関してその構成要素とそれぞれの開発の方向が示されているが、全体を通じる一般的な開発方針は以下のとおりとされている。

- a. 市場経済化の促進
- b. 農業、工業、サービス業全部門における経済発展
- c. 地域の経済構造の改善と発展
- d. 農村開発促進、および
- e. 経済協力の拡充と外国投資の促進

この社会・経済開発計画においては期間内のGDPの成長率を年8~8.5%としており、一人当りのGDPを1996年の350ドルから2000年には500ドルに引き上げる計画となっている。また、農林業部門については平均5%としており、開発の重点方針として、米の増産および換金作物の導入と村落開発計画による山間地域の貧困の解消を掲げている。

この開発計画はまた、農林業セクターを含む9つのセクターに対する1996~2000年の公共投資計画で裏打ちされている。

上記開発計画に基づいて策定された農林部門開発計画では、1) 食料増産と自給の達成、2) 換金作物生産の奨励、3) 焼畑農業の縮小、4) 灌漑開発5) 農林業試験研究の強化、および6) 人的資源の開発の6つの戦略目標を掲げている。これら戦略の2000年の主要目標は以下のとおりである。

開発計画	産出量	2000年の目標値
1 食糧生産	米	2 百万トン
	トウモロコシ	20万トン
2 商品作物生産	木材	50万m3
	砂糖	21.4 万トン
	たばこ	7.2万トン
	コーヒー	1.5万トン
	綿	1.2万トン
3 焼畑の縮小	定着農業への切替え	5万トン (米及び換金作物)
		3万トン (果樹及び樹木作物)
		2万トン (畜産及び養殖)
4 灌漑	雨季灌漑	灌漑面積；20万ha
	乾季灌漑	灌漑面積；5万ha
5 農林業試験研究	既存試験研究機関及び	全土を対象
	普及センターの普及	
6 人的資源の開発	農科大学及び訓練センターの 改善普及教育の強化	

2. 農林業の現況および農林業関係行政組織

2.1 農林業の現況

ラオスの主要産業は農林業で、GDPの5割以上を占め、労働力の85%が農林水産業に従事している。ラオス全土の約8割は山岳地帯であり、この山岳地帯で農耕に適した土地は谷間の極く狭い農地に限られている。残りの地域は、主にメコン河およびその支流沿いの低地であるが、実際の耕地および農耕可能地は下表に見られるごとく国土面積の4% (849千ha) に過ぎない。

区 分	面積 (千 ha)	面積比 (%)
耕地および農耕可能地	849	4
草地	1,444	6
森林	11,168	47
その他	10,219	43
合 計	23,680	100

出典：SIDA, Forest Inventory Report 1992

社会主義国であるラオスは、基本的に土地は国家の所有となっている。農地も同様で農民は耕作権を有して営農を行っている。この耕作権の宗族、移転、転売は可能であり、実質的には土地所有と変わらない所有形態となっている。

農業生産は、1975年の革命以降戦後復興と共に堅調に推移していたが、生産主体は天水依存1期作、或いは焼畑による陸稲で、殆どの農家が栽培しているが、全体的に生産が安定しているとは言い難い。米以外の食料作物としては、トウモロコシ、芋類、野菜等が生産され、工芸作物としてコーヒー、たばこ、綿花、砂糖黍等が栽培されている。このうち、コーヒーは輸出品として重要な位置を占めている。生産構造は、米作が84%を占めているが、近年タバコ、綿花、砂糖黍等の工芸作物の生産の伸びが顕著である。

森林面積は、1940年代には国土の70% (170万 ha) あったが、焼畑によって年間20万 haの規模で焼失していると言われ、現在では110万 haに減少している。森林減少の原因とされている焼畑に従事する農民は全国に約275千家族、焼き畑耕作地は28万 haとされている (北部：163千戸・174千 ha、中部：79千戸・77千 ha、南部：33千戸・27千 ha)。

2.2 農林業関係行政組織

農林業関係行政組織として農林省 (Ministry of Agriculture and Forestry) がある。内部組織として官房部局に加えて、Agriculture & Extension、Livestock & Fishery、Forestry、Irrigation、Meteorology & Hydrologyの5つの技術部局がある。県レベルでは、18県全てに Service of Agriculture and Forestry があり、その下に同様の5部が置かれている。郡は全部で129あり、各郡に Bureau が置かれている。事業実施は各郡の自治体が行う。研究開発については、Agriculture & Extension の中の研究センターや試験場が実施している。なお、養蚕に関しては、従来は担当部局が無かったが、数年前から Agriculture & Extension が担当することとされている。

3. 養蚕の現況

3.1 養蚕の現況

ラオスは養蚕業に関して古い歴史を有し、現在に至るまで養蚕と伝統的織物文化が家内工業的に引継がれてきた。そして、その織物は自家消費以外に土産物用として旅行者等に販売され、農民のわずか

な現金収入源となっている。

しかしながら、養蚕業は伝統的に農村で行われてきたのみで、国家的重要産業として重要視されていなかったほか、商品経済の浸透に伴って自家消費用の生産は激減しているようである。

ラオスの養蚕は、多化性を用いる在来の養蚕が主流である。蚕は多化性黄繭種で蚕種は農家が自給する。一般には1年に5～6回飼っているようである。水害、旱魃、稲作との労力の競合、家庭の事情などで養蚕を休止した後の蚕種は親戚知人等から分けてもらう。桑は桑園の形で栽培しており、家の近くに多い。竹や木を地面に挿した粗末な垣根で囲み、家畜から守っている。品種は不明である。桑園の造成は挿木で簡単に行う。蚕室はなく、高床式住居の居間、食堂、台所、客間を兼ねた吹き通しの広い板敷きの一角に竹の蚕架を据えている。高さ1.5m、幅7m、奥行き0.9m位で、5～6段の棚を持つ。普通はこれを1基備え、2基並べたのは大規模に属するようである。蚕架は固定せず、蟻等の侵入を防ぐため脚を二重縁の焼物の腕の中に立て、そこに水を入れる。蚕箔は直径0.9mの円形で、高さ6～7cmの縁がついている。蚕を飼うときは、外敵の侵入を防ぐため、大きな綿布で蚕箔を表面からきっちりと包む。養蚕の規模は小さい。蚕種が自家製で無料なため20～30蛾分も掃くが、収繭量は1回に2～3kgのものとのことである。上簇には直径2m位の大きな蚕箔を使う。その底には幅2～3cmの割竹を横に立てて、幅3cm位の溝を渦巻き状に作るように固定してある。この溝が営繭の場となる。蚕は成育が不揃いなので少なくとも上簇に3～4日は掛かるとのことである。この簇は1戸に1枚か2枚である。蚕の病気が多いほか、繭の乾燥施設が無いため、繭内部の蛹が羽化したり、繭がくすんでしまう等の問題もある。

現在、ラオス国女性同盟（ラオス唯一の政党であるラオス人民革命党の機関であるが、行政府とほぼ同一の権限・機能を果たしている）はUNDPおよび2国間援助のもとで、村落開発プロジェクトを小規模ながら全国的に展開しているが、養蚕事業も畜産および家内織機と並んでの重点対象事業に採上げられている。

しかしながら、養蚕業に関する統計資料は全くと言っていいほど存在しておらず、今後養蚕業振興の施策を検討する上で大きな制約となっている。

3.2 養蚕開発に関する調査団所見

ラオス政府は1966年に第4次社会・経済開発計画を策定し、これに基づいて農林業開発計画を定めていることは既に述べた通りである。しかしながら、この農林業開発計画は必ずしも巨視的な分析を経た開発戦略とはなっておらず、また今後振興を図ろうとしている作物も、農民選好、商業的なニーズ、国際競争力等について十分な検討が行われているとは言い難い。このため、開発計画の目標である換金作物生産の奨励一つをとってみても、重点作物或いは新規導入作物等の選定はもとより、その実施・推進方策等については具体的にはなんら示されていない。同様なことが、焼畑農業の縮小についても言えることである。

さらに、ラオス国においては古くから伝統的に養蚕が行われてきたにもかかわらず、政府は養蚕事業の振興にさほどの重要性を与えてこなかった。しかしながら、最近になってラオス政府は以下の理由によって養蚕を積極的に推進しようとし、農林省の農業・普及局をこのための責任部局と定めるに至

った。

- ラオスの養蚕は伝統的に農民、特に山間地の農民によって行われていた実績があり、山間地の農民の多くが養蚕に関する知識・技術を有していること。
- 養蚕の生産労働は、単純作業で高度の技術や知識はさほど要求されない。また、育蚕、製糸および機織り作業は女性作業に向いていること。
- 養蚕は、地方農村地域、特に辺境山岳地域における農村女性の雇用機会の提供と、貧困撲滅に対する最有効事業の一つであることが既に多くの国に於て実証済みであること。
- 養蚕事業はまた、山間農村地域の小規模家内産業の育成・確立に活性を与えられる事業の一つでもある。
- 生糸は国際商品であり、国際競争力があれば市場性に問題がない上、世界の需給構造から見て今後とも需要の増加が期待される商品である。また、流通に関しては、保存が利くことから腐敗等の問題もなく、他農産物に比して比較的の問題が少ない。このことは、インフラの不十分なラオス国の山間僻地における農業振興作物として極めて有望な事業たりうること。
- 激減していると見られる養蚕事業の振興を通じて、伝統的な織物の維持・発展も可能となること。
- 山間焼畑農業の代替作物として桑が有望作物の一つと考えられる。また、桑は永年性樹木であるため土壌劣化・流亡等の問題も少なく、森林保全環境対策にも資すること。

以上のように、ラオス国農林省は、社会・経済開発計画および農業開発計画の戦略目標に鑑みて、同国の農業の発展にとって養蚕は極めて有望な事業と考えており、この振興に本腰を入れようとしている。

しかしながら、ラオス国養蚕事業の現状は衰退の一途をたどっているようである。この原因は、1) ラオスの養蚕は自給自足的な経済体制下において山間地農民が衣服を自家調達するために行っていたものであり、現在のように容易かつ安価に衣服が調達出来る環境下では、その必要性が少ないこと、2) 繭の品質および製糸の生産技術が低く、市場への販路が見いだせないこと、および 3) 商品としての流通量が確保出来ないこと等にあるようである。

このような状況下において、ラオスの養蚕を従来のように伝統的な自家用養蚕事業として復興することは殆ど不可能なことであり、農民自身も魅力を感じないと思われる。今後の養蚕の振興を図る場合には以下のような方向で考えることが必要と思われる。

- 商業的養蚕事業を目指す：

ラオスの養蚕は桑食蚕の家蚕であるが、その養蚕技術は多化性養蚕の技術体系が継続されている。蚕の品質が悪く、生産性および繭の品質も劣悪であり、現状のままでは国際的商品とはなれない。また、製糸技術も多化性蚕繭に対応した家内工業的小規模生産施設が主体であり、その結果、伝統的織物用製糸の生産技術が低く、経糸用製糸を輸入に依存せざるを得ない状況にある。

- 伝統的な養蚕業からの質的転換を図る：

今時調査を通じて聴取を行った農民の意向は、養蚕が儲かる事業であれば是非実施したいとする者が圧倒的であった。収益を生み出す養蚕のためには、蚕および桑の品種の改良を通じる品質および生産性の向上、集荷・一時貯蔵施設の整備、加工・販売ルート等の整備が図られねばならない。

- 上記の方向でラオスの養蚕事業の振興を図るため、以下の諸点を含む開発調査を実施し、これに基づく戦略的、段階的な体制整備を図る。

- a. 養蚕・絹産業の現状（統計面の整備を含む）と問題点の把握・確認
- b. 繭、絹糸および絹製品に対する需要予測と販路の確認
- c. 桑と蚕の適品種の選定、植林・灌漑・養蚕の方法および関連施設
- d. 技術指導体制、指導員の養成および技術普及の方法等
- e. 桑苗および蚕種の価格設定、および繭／生糸等に関する国際競争力のレビュー

3.3 養蚕振興に関する関係部局との協議

調査団は、上記のような基本的考えに基づいて、ラオス農林省関係者との協議を行った。協議を通じてラオス側より以下の点が明らかとされた。

- 農林省としては、養蚕事業を振興したく、これに必要な日本人専門家の派遣をお願いし、またビエンチャン市の養蚕センターの改修もお願いしたいと考えている。これに関連して坂井大使から、養蚕業の振興に関するラオス側の基本的方針について問われている。しかしながら、現状ではこれに答えうる具体策を持っていない。本件調査を通じてラオス養蚕業の短期対策を含む長期的な養蚕振興戦略を策定して貰えればありがたい。

- 調査対象地域については、全国を行う必要はないと考える。現在および過去に養蚕が行われていた地域が、今後の養蚕事業の中心地となるものと考えており、以下の9県を調査対象地域とすることでよい。

Luang Namtha、Oudomsay、Luang Prabang、Houa Phan、Xieng Khouang、Vientian、Bolikhamsai、Khammouane、and Savannakhet

- 調査を通じて、詳細な養蚕関係基礎資料が整備されると極めて有用である。

また、総理府の投資・協力委員会（CIC）の国際協力局二国間協力部の次長は、調査のタイトルについては、「山間地農業・農村開発調査」とするよりも、養蚕事業の重要性に鑑み「ラオス国養蚕振興開発調査」とするほうが望ましいとの意見を述べていた。

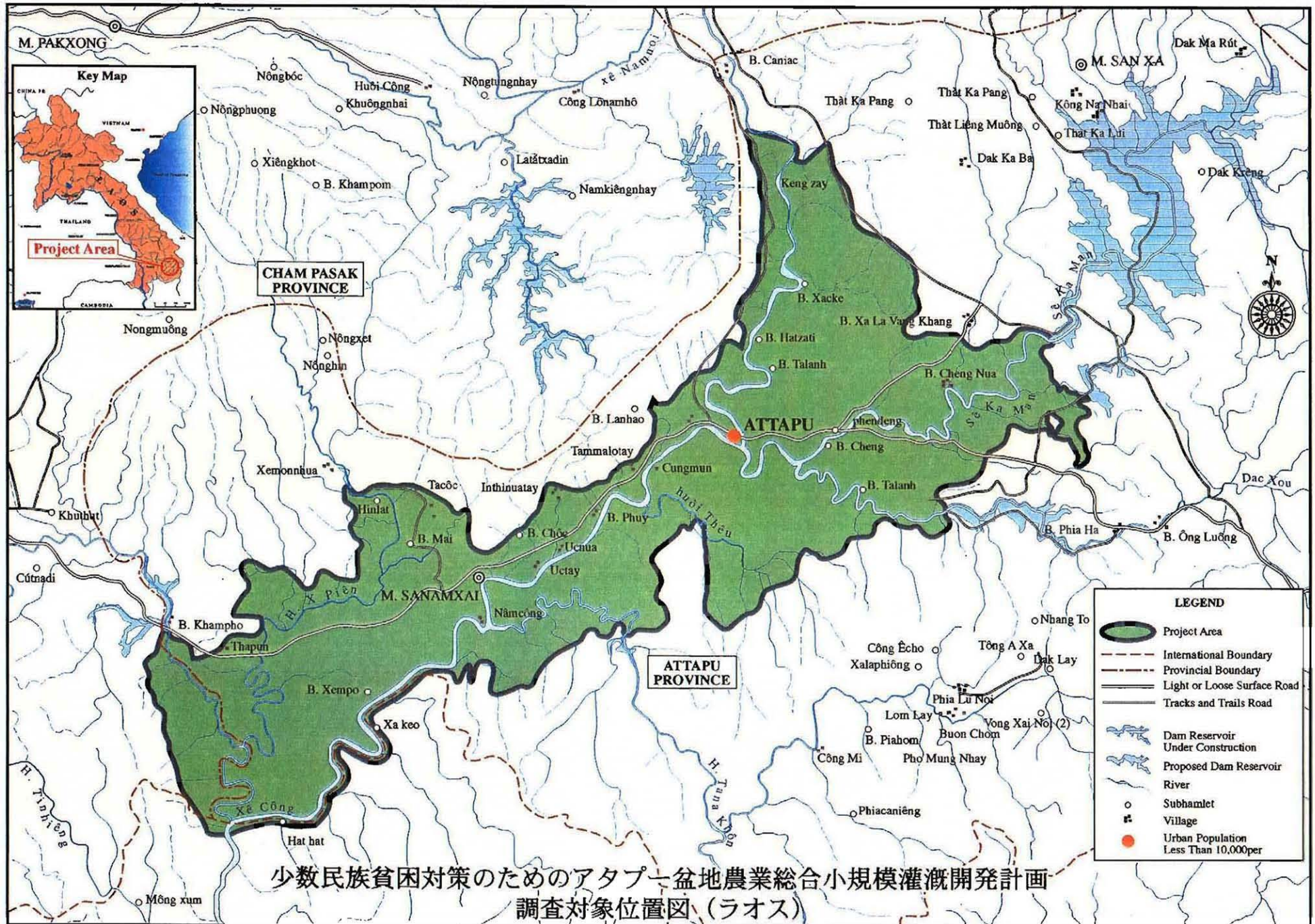
3.4 養蚕振興に関する開発調査の実施

以上の背景の下で、調査団は「ラオス国山間地における養蚕振興開発調査」の実施を提言する。この

調査に関する援助要請書（案）および調査実施書（TOR案）を付属資料-1に添付した。

ラオス人民共和国

少数民族貧困対策のための
アタプー盆地農業総合小規模灌漑開発計画



少数民族貧困対策のためのアタプー盆地農業総合小規模灌漑開発計画

1. 計画の背景と対象地区の現況

1.1 計画の背景

ラオス国農業開発計画の目標は (1) 米の主とする食料の自給率向上、(2) 換金作物生産、畜産の振興による農業の多様化による農家の所得増加、(3) 北部および北東部の山岳地区の焼き畑農業の抑制と少数民族の貧困対策を目標にした農村総合開発、(4) 住民参加型小規模灌漑を主とした農業総合開発計画、(5) 農林業の技術開発、(6) 人材育成を軸としている。

セコン河の上流域はセコン県とサラバン県の一部となっており、大半が山岳地帯である。中流から下流域はアタプー県に属しセコン河沿いに平坦な平野が広がっている。セコン県およびアタプー県はこれまでこの調査地区の西側に位置するボロベン高原等の自然の壁があり、メコン河流域からの幹線道路も建設されていおらず「陸の孤島」となっていた。近年のボロベン高原東部のセ・ナムノイ流域の2水力発電事業 (BOT および BOOT)、アタプー県東部のセ・カマン流域の水力発電事業 (BOT)、バクセ - アタプー - ベトナムの Kontum を結ぶ国道 16 号線開発事業の実施で、比較的、幹線道路によるアクセスは良くなっている。

この地域の人口は約 15.5 万人 (セコン県約 6.5 万人、アタプー県約 9 万人) で平野部を除き、中・高地ラオの少数民族が多く、移動式の焼畑農業を山岳地域で行っている。平野部は大半が天水田や灌木林に覆われている。しかし、この両地区全体へのアクセス道路網はまだ十分開発されておらず、米を中心とする農業生産物等の流通はスムーズでない。現況では毎年県全体として米不足に直面しており、現金収入や農業外の就業機会も貧弱であることから、県全域での農業生産の強化、特に平野部を中心とした米の増産と安定化が必要となっている。

工業投資省とラオス電力公社の管理下で実施されたセコン河の支流ホアイ・ホー川の水力発電事業 (BOT) では、その発電所の放水路水位が灌漑に必要な取水位を無視し決定され、一小流域内での水資源の合理的利用が無視されている。農林省灌漑局は、セコン中・下流域の灌漑開発計画対象地区に関する水力発電計画との整合性をとった灌漑開発計画の取纏めを早急に計画している。また、農林省灌漑局はセコン流域の水力発電や道路開発事業が進展することから、アタプー県を中心にラオス国の農業開発の上位計画目標に合った「小規模灌漑開発による米増産」、「焼畑農業抑制」、「少数民族の貧困対策」を目的とした農業・農村総合開発のマスタープラン調査を計画している。

1.2 調査地区の現況

調査地区はセコン中・下流域でアタプー県を中心とする。今回の調査で得た調査地区の現況概要は次のとおりである。

(1) 地形および土地利用

セコン河はラオス南東部のベトナム国境の山岳地域に水源を持ちボロベン高原の東側のセコンおよびアタプー近辺を南西方向に流下し、カンボジアとの国境を通過しカンボジアの Stung Treng 付近でメコン河本流と合流する。セコン河上流域のセコン県とサラバン県は主に山岳地区に覆われている。中流から下流域はアタプー県に属しセコン河沿いに平坦な平野が広がっている。セコン河の中流域のセコン - ケンサイ村 (Ban Kengxay) 間は右岸のボロベン高原と左岸の山岳がせり出し、幅4~5km程の狭い谷となっている。左岸の山岳地域はベトナム国境沿いに標高が高くなり1,000m以上となる。ケンサイ村から下流域では平坦な平野が20~40km程の幅で両岸に広がっている。この平野はセコン河の支流のセ・カマン川、セサ川、ナムコン川、セ・ピアン川、セカムポー川等が流れている。ボロベン高原の標高は1,000m以上である。平野部の土壌は粘性土で、土地利用は大半が天水田と灌木林によって占められており、灌木林の一部は森林保全地区にも指定されている。平野部に隣接した山岳地域では焼畑がおこなわれている。県の統計資料では1996~97年の焼畑面積は約2,800haと推定される。

(2) 水文気象

調査地区は大きく10月から5月の乾季と6月から9月の雨季の2季節にわかれており、アタプーの降雨記録によると、6年間(1991-1996)の年平均雨量は約2,406mmで90%以上の降雨が雨季に集中している。アタプー近辺の流量観測所(集水面積10,500km²)でのセコン河の3月(乾季)に観測された低水流量に近い流量は約110m³/sec程度となっている。大支流のセ・カマン川(集水面積4,454km²)、セ・ピアン川(集水面積1,038km²)等は年間を通じて水が流れており、セ・ピアン川の低水流量は約5m³/secとなっている。

(3) 社会現況

アタプー県の行政区域は Samakisay、Saysetha、Sanansay、Ohovvonig、Sansay の5郡から構成され村落数は204村、世帯数は約15,000世帯、人口は約9万人である。農家戸数は約13,400世帯で県の世帯数の約90%をしめる。人口の大半はアタプー町とチェン村(Ban Cheng)に集まっている。少数民族は山岳地域に散在しているが、大きな部落はセサ川左岸の山岳地域にみられる。近年オーストラリアの地方開発援助により、農村給水事業、小学校建設、ライスバンクの設立が実施されている。

(4) 農業

県の農業は天水田を中心にした米生産が主で、野菜、チリ、トウモロコシ等の畑作は自家消費を目的にした生産である。県の統計資料(1996~97年)では天水田面積は約8,190ha、灌漑施設を持つ水田面積は約2,190haと推定される。米の年生産量は約30,400トンであるが、県の米需要に対し、まだ約4,700トンの不足を生じ近隣の県から移入している。農業技術普及は技術普及員の人的資源不足や予算不足のため弱体化している。

(5) 灌漑

灌漑局の推定ではセコン河の中・下流域の灌漑利用可能な土地は約143,000haとしており、灌漑開発の水源も高い。しかし、農民の労働力が少ない為、大規模灌漑事業を直接実施する事は不可能である。

一方、灌漑局は、1985年から1994年にかけて農民による小規模灌漑事業（灌漑面積5～100ha程度）を実施し、1996年迄に26件の灌漑事業が完成している。灌漑は堰で取水する重力式灌漑で雨季の補給灌漑を目的にしている。この事業により雨季に約2,190ha、乾季に95haが灌漑されている。また、近年、アタプー近辺では小規模ポンプ灌漑事業を11カ所で計画している。1998年度中に6カ所が完成・運営される予定である。水源はセコン河とセ・カマン川であるが、両河川とも雨季・乾季の水位差が大きいためポンプはフローティング・ポンプで計画されている。小規模ポンプ灌漑の灌漑面積は150～250ha／1カ所で、11カ所のポンプ灌漑が完成すれば県全体で約2,000haの灌漑地区の拡大が可能となり、現在の米不足に大きく貢献することになる。県農林局はポンプ灌漑の拡大を推奨しているが、水利組合の設立および施設維持管理運営のトレーニング計画は、まだ、郡の農業普及部レベルにとどまっておらず各水利組合（村落ベース）までは至っていない。

(6) 社会インフラ整備

セ・ナムノイ川の2水力発電事業（BOTおよびBOOT）とセ・カマン上流のセ・カマン1発電事業の実施、ボロベン高原の西側のパクセ - パクソン - アタプー - コンツム（ベトナム）を結ぶ幹線道路（16号線）の改修工事により、アタプーへのアクセスは良くなっているが、セ・ピアン川へのアクセスは困難である。幹線道路から分岐する支線道路システムは未発達である。セコン河には橋梁が建設されておらずアタプーではフェリー・ボートが運用されている。アタプーを中心とする地区内のインフラ整備はオーストラリア、Farmer Irrigated Agriculture Training（FIAT）、UNISEFからの援助を受け、小学校建設、村落給水建設等を一部実施している。

(7) 自然環境

セコン河およびセ・カマン川には川イルカ（シロイルカ）等の数種の保護動物や調査地区周辺の森林地域の保護動植物等がある。

2. 開発の必要性

水力発電事業と16号線道路開発事業の実施により調査地区へのアクセスが良くなり、将来の地域産業の振興へのアプローチにも期待が持てる状況にある。県全体の米需給は現在不足しており、灌漑開発を通し米の増産と安定化が必要となっている。平野部の開発利用可能な土地は広く開発可能な灌漑水は高い。しかし、農業労働力が少ない為、一挙に大規模灌漑開発計画を実施することは不可能である。一方、少数民族は山間部で焼畑農業を継続しており、この労働力を平野部の開発する灌漑農地に移動・定住させれば、調査地区での米の増産と安定化と少数民族の貧困対策を同時に解決できる可能性が高い。その意味でもセコン河中・下流域のアタプー県を中心とする農業総合開発はその必要性が高くなっている。

また、農林省灌漑局はセ・ナムノイ川の水力発電事業（BOT）のケースでは、一小流域内での水資源ポテンシャルの合理的利用が困難となった事から水資源開発に係る本調査の早急な実施を予定している。

3. 開発に係る阻害要因

調査地区での開発阻害要因は次の通りである。

- 灌漑施設の未整備
- 農業労働力の不足
- 農業支援サービス（特に、農民金融、技術普及）の不足
- 圃場-市場流通道路および支線道路の不足

4. 開発基本構想

4.1 目的

アタプー盆地の土地ポテンシャルは水田に適した粘性土で、水田開発には適している。計画はこの平野部を中心に「雨季の補給灌漑を軸とした段階的小規模灌漑開発による米の自給率の向上」と「社会インフラ整備による少数民族の平野部への移住・定住計画」から構成し、少数民族の貧困対策と焼畑農業抑制を目的とする。

4.2 計画概要

計画は2期に分けたものとする。第1期では調査地域（セコン河中・下流域のアタプー県を中心とする地域）の農業総合開発のマスタープランを行い、平野部の灌漑開発ポテンシャルを評価し、少数民族の平野部への移住・定住計画に合わせた小規模灌漑開発の段階的開発方式と社会インフラの整備を検討する。さらに、開発モデル地区の選定基準を策定し、平野部での少数民族の移住・定住計画を含んだ灌漑開発モデル地区を選定する。第2期では将来の無償資金協力による実施を前提に開発モデル地区のフィージビリティ・スタディーを実施する。この調査では、次の諸点に留意した開発計画を策定する。

主な検討課題：

- 流域内の水収支の検討と灌漑開発計画を軸とする利水合理化計画
- 平野部での小規模灌漑開発による米の増産
- 少数民族の平野部への移住・定住に必要な灌漑農地および社会インフラ整備計画
- 水利組合および農民組合の設立・運営強化
- 事業実施政府関連組織の運営およびモニタリングの強化

5. 調査団所見

セ・カマン川の水力発電事業（BOT）の実施によって流域の水資源ポテンシャルは十分開発され、ダム下流の平野約40,000haへの灌漑計画（重力式）が可能であると考えられるが、一方、セ・ナムノイ川にみられるようにBOTの水力発電事業によって、灌漑開発への水の合理的配分が出来ない結果が生まれている。

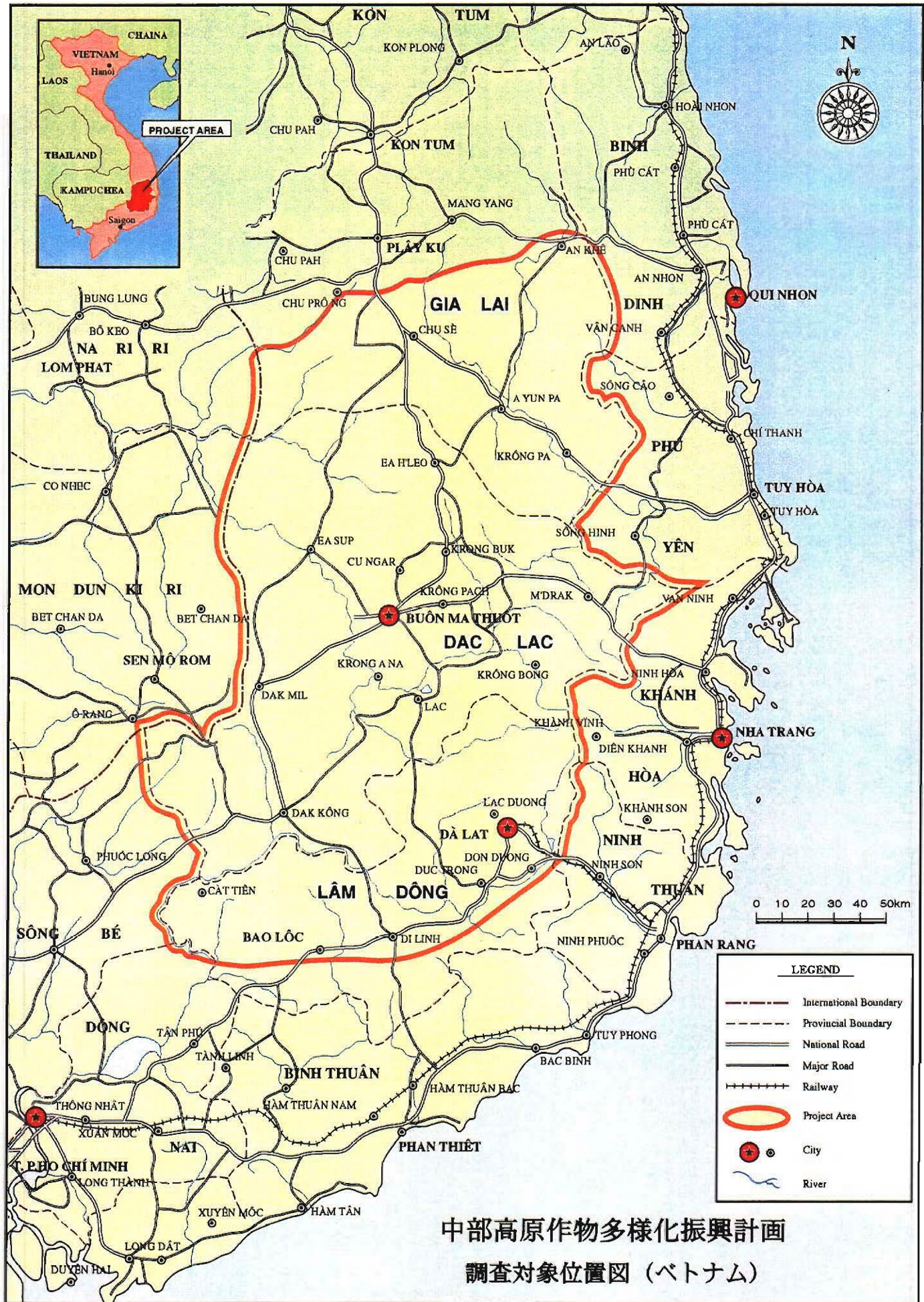
また、平野部の土地および水資源の大きなポテンシャルを利用して大規模灌漑事業を開発しても、地域内の労働力が絶対的に少ない為、事業実施に直接結び付けることは困難である。しかし現況では、平野部の灌漑施設はまだ少なく未整備のケースが多い。また、山間部の少数民族は依然と焼畑農業を継続している。一方、実施中の3地区での水力発電事業と道路建設事業を考えた場合、将来の県内の人口流入や自然増はかなりのものと予想される。

現在でもアタプー県内の米需給は不足しており、このような状況を考慮すると、少数民族の労働力の平野部への移動と周辺小流域の水資源開発計画との整合性をもったアタプー盆地の小規模灌漑開発の段階的開発は、将来のアタプー盆地全域の灌漑計画の第1ステップとして非常に重要な意義をもち、少数民族の貧困対策を同時に推進出来る。この少数民族の移動・定住計画の為の社会インフラの整備と農業支援サービス体制の強化も必要となる。

アタプー盆地周辺の小流域には溜池開発や重力式小規模灌漑計画のポテンシャルは十分ある。現在実施されつつある小規模ポンプ灌漑は、農家や農民組織が財務的に弱い事で、将来の施設維持管理面の不安材料がある。アタプー盆地周辺の小流域の地形を利用した溜池開発や重力式小規模灌漑計画を推進する方が、初期投資は大きい施設維持管理の面からは経済的であり、このような小規模灌漑計画の段階的拡大は少数民族の移住／定住計画によく適合すると判断される。

ベトナム社会主義共和国

中部高原作物多様化振興計画



中部高原作物多様化振興計画

1. ベトナム一般背景

(1) ベトナムの地域経済開発

第6次社会経済5ヶ年開発計画（1996-2000年）は第5次5ヶ年計画の経済政策を引き継ぎ、社会経済の安定、貧困と低開発の克服、人的資源の開発を課題としているが、新たに社会経済開発の地域格差対策と公共サービスの不足対策が追加されている。農業政策の開発目標は「食糧増産」と「市場経済政策に沿った農業生産の多様化」とされ、2000年には30百万トン、一人当たり366kgの食糧生産をめざしている。経済開発の目標は、GDPの成長率を年9-10%とし2000年までに1990年のGDPの倍増を計画している。

(2) 農村地域の貧困問題と地方人民委員会の少数民族貧困対策

近年の市場経済化の進展、経済成長の顕現化によって地域格差、貧富の格差が拡大傾向である。特に、農村地域においては、都市地域との貧富格差と弱小農民の貧困問題が発生し、地域の社会不安を招き兼ねない状況となっている。貧困問題は少数民族の集中する北部山岳地域および中部高原地帯で顕現している。1994年の世銀資料によると、貧困ライン以下の人口割合は全国レベルで約54%となっており、中部高原の農村地域でのその割合は約50%となっている。地域開発政策では、少数民族の主体性の擁護と森林環境保全に配慮した地域社会整備、地域条件に合った換金作物栽培の普及と林業開発の振興を奨励している。1995年のADB/UNDPとの援助協力会議で、ベトナム政府は1996-2000年の5年間のコーヒー、茶、生糸の生産向上の為に必要投資額を第5次5ヶ年計画の投資額の約2倍から5倍と見積もっており、この投資による品質改善の技術導入と加工施設改善および生産農民へのクレジットの強化等を要請している。

(3) 農業政策と食糧需給バランス

統計資料によれば、ベトナムの米生産量は1994年に26百万トン、一人当たり350kgの食糧生産を達成し、さらに2百万トンの米輸出をおこなっている。第6次社会経済5ヶ年開発計画目標で2000年には30百万トン、一人当たり366kgの食糧生産としているが、仮に、米生産量の10%を輸出をすると今後10年間で約10百万トンの増産が必要である。

2. 計画の背景と対象地区の現況

2.1 計画の背景

(1) 計画地区の農業多様化開発概況

計画地区の3省（ジアライ省(Gia Lai)、ラムドン省(Lam Dong)、ダクラック省(Dak Lac)）の地方人民委員会では、上記の政策に合わせ、林業、果樹や薬樹栽培、畜産、養蚕等を奨励している。

計画地区の平均的農家は少数民族や弱小農民であり、コーヒー、茶、養蚕等の換金作物栽培に従事しており、自己資金力が弱い市場経済の影響をまともに受けている。さらに、少数民族の多く分布する山岳地帯は、まだ小農民の営農運営の脆弱さに起因する農地放棄が多くみられる。

(2) 社会インフラストラクチャー状況

3省の地方人民委員会は、少数民族貧困対策の一環として住民に雇用機会を与える為、道路、上水道、小学校、病院施設等の社会基盤整備を推進・振興している。計画地域の国道等の幹線道路は整備され、この幹線の沿った上水道、公共衛生施設、小学校等の社会基盤施設は、ほぼ整備されているが、幹線道路から離れた地域の支線道路は未整備で、圃場から市場への流通と周辺住民の貧困問題を残している。

(3) 前回のプロジェクト・ファイナンス結果との修正・調整

前回の「中部高原農業振興計画」の調査結果は、ジャライ省の経済発展と少数民族の貧困対策を目的とし、農業の多様化を軸とした農業開発計画の策定を提案している。しかし、上記に説明したように3省の地域農業経済環境の変化により、代表的農産品目のコーヒー、茶、養蚕（桑）の3品を中心とした作物多様化振興の改善と平均的農家である少数民族の貧困対策が高まっている。また、換金作物栽培の進んだ調査地域の一部では「品質の向上、営農体制の強化、農業支援サービス（農業技術普及、農民金融等）、収穫後処理、市場流通」等の新たな課題が顕現し、さらなる改善が必要となっている。従って、調査地域をジャライ省南部からラムドン省北部地域に限定し、「地域の代表的農産品目のコーヒー、茶、養蚕（桑）の3品を中心とした作物多様化振興による少数民族および弱小農民の貧困対策」を目的とした調査に修正・変更する。

2.2 調査地区の現況

調査地区はジャライ省北部地域、ダクラック省、ラムドン省南部地域の3省とする。

(1) 地形および土地利用

3省は低平地（標高170-300m）から山岳地（標高1000m-2000m）に広がり、その大半は標高600-800mの山岳地帯である。面積は約4.6万km²で、ラムドン省が一番小さい面積で約1万km²となっている。調査地区はダクロン（Dak Krong）川やイアレオ（Ia Hleo）川沿いに広がる低地から東-南部の山岳地に広がる。ダクロン川やイアレオ川はダクラック省の首府ブオン・マ・ツーオ（Boun Ma Thuot）の北西部から西側のカンボジア国境へかけて流れ、川沿いに低地平野を形成している。3省の東地区とダクラック省とラムドン省の省境沿いは1000m-2000mの山岳地帯が広がっている。3省の農業用地は全面積の約11%（約517,000ha）、森林面積は約54%（約2,492,000ha）、丘陵地の未利用/荒廃農地等の放棄された土地が約32%（約1,490,000ha）となっている。

(2) 水文・気象

高地熱帯モンスーン気候で雨季と乾季に分かれている。UNEP/IHPのハイエトグラフの資料によると

計画地域の年平均雨量は2,000mm-2,800mmで、雨季は4月から10月迄、残りは乾季でとなる。年平均雨量の80%以上は雨季に集中する。年平均気温は標高によって左右されるが、概ね20-25℃となっている。ただし、標高1,000m以上では15℃以下となる。

(3) 社会現況

1996年の統計資料では、1995年のベトナム全国の人口は約74百万人で、地方の人口は全国人口の約80%となっている。3省の人口は資料が無いので不明だが、農家世帯数は約39.7万戸、農家人口は約2.04百万人で、一農家当たりの家族数は約5.1人となっている。

(4) 農業

計画地区の丘陵・山岳地域の農業は、気象と地形および標高等の条件によって、ゴムのプランテーション、果樹と薬樹栽培、コーヒーや茶栽培、桑等にゾーニングされている。コーヒーや茶はラムドン省とジャライ省の重要農産物で丘陵地や山岳地域の斜面に拡大している。コーヒーはロブスター種が中心であり、コーヒー樹の剪定やシェード・ツリーは殆どみうけられない。茶は農家ベースの生産で、加工は小規模工場でおこなっている。しかし、コーヒー、茶栽培等の換金作物生産は、まだモノカルチャー的な為、生産者は市場経済の影響をまともに受け、換金作物栽培面積は非常に流動的である。

3省のコーヒーと茶の生産は全国の生産地のなかでも高いグループに属する。1995年の統計資料でコーヒーの生産高でみるとダクラック省は全国1位(150,000トン/年)、ラムドン省は第3位(20,200トン/年)、ジャライ省は第4位(8,400トン/年)となっており、3省の生産高は全国の生産高の約80%を占めている。コーヒーの栽培面積は、3省で約76,000haで全国の栽培面積の約75%を占めている。

茶栽培は、ラムドン省が第1位(53,700トン/年)、ジャライ省が第12位(2,800トン/年)、ダクラック省は約600トン/年の生産高となっている。3省の生産高の合計は全国生産高の約32%に相当する。3省合わせた栽培面積は約15,500haとなっている。

(5) 養蚕概況

養蚕はラムドン省を中心に振興しており、バクロック(Bao Loc)にはベトナム養蚕企業会社(VISERI)の本部があり、ベトナム全土の養蚕事業活動の中心となっている。しかし、ここ数年、生繭市場の国際価格の低迷によってベトナム全土の養蚕農家が激減し、ラムドン省の養蚕農家も他の換金作物へ転作する傾向にある。VISERIは経営合理化を実施し、生糸品質向上の為に桑生産および養蚕に係る新技術の導入、当面の生糸輸出を維持する為の桑や繭生産拡大を検討している。

ベトナムの桑園面積は以下のとおりである。

地 域	1989年 (ha)	1997年 (ha)
北部デルタ地域	5,370	3,400
中部海岸地域	2,950	1,100
メコンデルタ地域	280	150
高原地域	4,810	6,800
全国合計	13,410	11,450

ベトナムにおける桑園面積は、タイビン省を中心とする北部デルタ地域とラムドン省を中心とする高原地域の割合が大きい。なかでも、高原地域のラムドン省は気象が年間平均気温 20～25℃という養蚕に適する地域であることから政策的にも積極的な桑園造成が進められ、多くの地域が桑園面積を減少させる中で、1989年の4,700haから現在の6,300haと際立った伸びを示している。養蚕が減少している最大の理由は生繭の国際価格の低迷にあるとのことである。

ベトナムでは繭の全国統計数字は無い。生糸生産量については下表のとおりである。

年	桑園面積 (ha)	生糸生産量 (ton)
1985	5,000	100
1989	13,410	365
1997	11,450	400

生産された生糸の大半は輸出に回されるとのことである。高品質の絹はイタリア、日本およびインドに、また低品質のものはインド、タイ、バングラデッシュおよびシンガポール向けとなる。

(6) 農村社会インフラ

1996年の統計資料によると農村電化、農村給水システムの遅れ、中学校、高校等の教育施設の不足等が目立つが、支線道路網の完備も必要となっている。

3. 開発に係る阻害要因

統計資料によれば、3省での森林破壊は1994年から1995年にかけて4,600haから9,200haの約2倍の面積に拡大している。この森林破壊面積は全国レベルの約35%に相当し、ラムドン省およびダクラック省での森林破壊が特に目立つ。これは3省のコーヒーの栽培面積が大きく拡大した事につながるものである。一方では、3省で丘陵地の未利用／荒廃農地等の放棄された土地が約1,490,000haある。換金作物栽培はモノカルチャー的営農形態に問題があり、小規模経営の大半を占める少数民族の生活に大きく影響を与えている。また農民組合の未熟や農業支援サービスと栽培事業を指導している政府担当諸機関の複雑な管理・運営方法にも作物多様化振興に係る阻害要因がある。

4. 開発基本構想

4.1 目的

計画の目的は少数民族や弱小農家の貧困対策である。そのアプローチとして、この地域の代表的農産品目のコーヒー、茶、養蚕（桑）の3品を中心とした作物多様化改善振興による少数民族や弱小農家の営農改善をととした農業所得向上と農村社会インフラ整備を検討する。

4.2 計画概要

調査期間は2期に分け、第1次調査では土地利用、営農形態、農業支援サービス、市場流通、農民組織、事業実施体制の改善・強化の観点から上記3品目を軸にした作物多様化改善振興のマスター・プランをおこない優先開発地域を選出する。第2次調査では円借款を前提とした優先開発地域のフィージビリティ・スタディーを行う。

主な検討課題：

- 土地利用
- 営農・栽培の改善
- 農民金融、農業技術普及等の強化
- 収穫後処理施設および市場流通の改善
- 農民組織と政府関係諸機関を含む事業実施体制の改善・強化
- 農業・農村基盤整備

5. 調査団所見

山岳地帯の少数民族の換金作物栽培はコーヒー、茶を主流とした小規模経営で、かつモノカルチャー栽培が多い。従って、市場経済の影響を直接受け、財務的に非常に不安定である。従来から行っていた焼畑農業は抑制されているが、放棄された農地はまだ山岳地帯に多大に広がっており、この放棄農地の環境改善と保全および土地利用計画が必要である。この観点から調査地区の有望視できるコーヒー、茶、養蚕を軸にした複合的営農改善、特に、少数民族が大半を占める弱小農家の営農強化と付随するインフラ整備を実施する必要がある。また、農地保全にはコーヒー、茶、桑、果樹や薬樹栽培技術普及が早急に必要と判断される。

添付資料 1

調査団調査工程表

2. 調査日程及び調査員の略歴

日 程 表					調査員名並びに経歴		
年月日	出発地	到着地	宿泊地	備 考	調査員名	経 歴	
平成10年5月24日 平成10年5月25日 平成10年5月26日	東京 バンコク	バンコク ビエンチャン	バンコク ビエンチャン ビエンチャン	移動 大使館・JICA事務所表敬訪問 農林省・ヴィエンチャン県農業局表敬訪問・ ハットセイフォン養蚕センター訪問および 資料収集	山崎 隆可	昭和10年12月15日生 昭和33年3月 北海道大学農学部卒 同年4月 農林省入省	
平成10年5月27日 平成10年5月28日	ビエンチャン アタプー	アタプー パクセ	アタプー パクセ	移動、現地踏査、資料収集 アタプー県農業局およびCPCと会議、 現地踏査、資料収集、移動		昭和44年4月 八郎潟新農村建設事業団 ～47年6月 企画課長	
平成10年5月29日	パクセ	サバナケット	サバナケット	資料収集、移動、 サバナケット県副知事表敬訪問		昭和47年7月 総理府、沖縄総合事務所	
平成10年5月30日 平成10年5月31日 平成10年6月1日	サバナケット ムナンピン	ムナンピン サバナケット	ムナンピン サバナケット サバナケット	現地踏査、資料収集 現地踏査、資料収集 サバナケット県農業局表敬訪問、 現地踏査、資料収集・整理		～50年8月 農政課長 昭和50年9月 農林水産省経済局国際経済課 ～55年8月 国際専門官	
平成10年6月2日 平成10年6月3日	サバナケット ビエンチャン	ビエンチャン ハノイ	ビエンチャン ハノイ	移動、大使館へ報告 農林省シタヘン副大臣に表敬訪問、 農林省へ報告、ハノイへ移動		昭和55年9月 農林水産省経済局国際部 ～56年8月 海外技術協力室長	
平成10年6月4日			ハノイ	大使館・農業地方開発省・VISERI・JICA等 表敬訪問、資料収集		昭和56年9月 国際協力事業団	
平成10年6月5日	ハノイ	バオロック	バオロック	ホーチミンへ移動、バオロック現地踏査、 資料収集		昭和58年9月 日本工営株式会社入社 同社営農部長、農業開発副事業部長を経て 現在 国際事業部理事	
平成10年6月6日	バオロック		バオロック	VISERIバオロック事務所表敬訪問、 現地踏査、資料収集、移動			
平成10年6月7日 平成10年6月8日 平成10年6月9日	ホーチミン ハノイ	ハノイ 東京	ハノイ ハノイ 東京	移動、資料収集 大使館・農業地方開発省へ報告 帰国			
						伴 正一郎	昭和24年5月29日生 昭和47年3月 九州大学農学部卒 同年4月 日本工営株式会社入社 現在 同社農業開発部課長

添 付 資 料 2

面会者リスト

面談者リスト（敬称略）

ラオス

1 在ラオス日本国大使館

坂井 弘臣

特命全権大使

長野 誠司

二等書記官

2 国際協力事業団ラオス事務所

高畑 恒雄

ラオス事務所長

TADA YUSUKE

プロジェクト形成顧問

IMAMURA TAMOTSU

技術専門家（農業・育種）

橋本 晃

派遣専門家（灌漑）

3 農林省

SITAHENG RASPHONE

副大臣

KHAMPHIOU VISSAPRA

官房次官

LATSANIVONG AMARATHITHADA

農業普及局副局長

LANGSY SAYVISITH

灌漑局長

VANKHAM

灌漑局技術職員

4 投資協力委員会、総理府

SOULASTH OUPRAVANH

国際経済協力部次長（2 国間援助協力）

5 ヴィエンチャン特別区農林局

SRISAVATH CHASANE

農林部次長

CHANTHA THIPPHAVONGPHAN

農業普及課長

VILAISAK HAT XAYFONG

養蚕センター所長

6 アタプー県

BUNTIEAN

県 CPC メンバー

農林局

7 サバナケット県

SOUKSEUM BODHISANE

副知事

BOUAKHAM SISOULATH

県職員（国際協力）

BOUMTHIEM PHOMMASAY

県農林部副部長

SITHIDET TANSAVATH

県農業普及課長

8 ラオス婦人同盟

BANDITH PRATHOUMVAN

婦人地方開発局副局長

ベトナム

1 在ベトナム日本国大使館

井田 充則

二等書記官

2 国際協力事業団ベトナム事務所

地曳 隆紀

ベトナム事務所長

佐分利 重隆

派遣専門家（農業）

3 農業地方開発省

DAO THI LOC

国際協力局

LE HUNG QUOC

農業普及局長

NGUYEN HUNG

農産加工・果樹部長

4 ベトナム養蚕公社（VISERI）

NGUYEN QUOC HUNG

BAOLOC 本社，理事

TRAN THI LUOT

ハノイ事務所長

PHAN DINH SON

貿易課長 ホーチミン事務所

TRAN VAN DAU

計画投資課長 BAOLOC 本社

添 付 資 料 3

現地調査写真集

ラオス人民共和国

山間地における養蚕振興開発計画



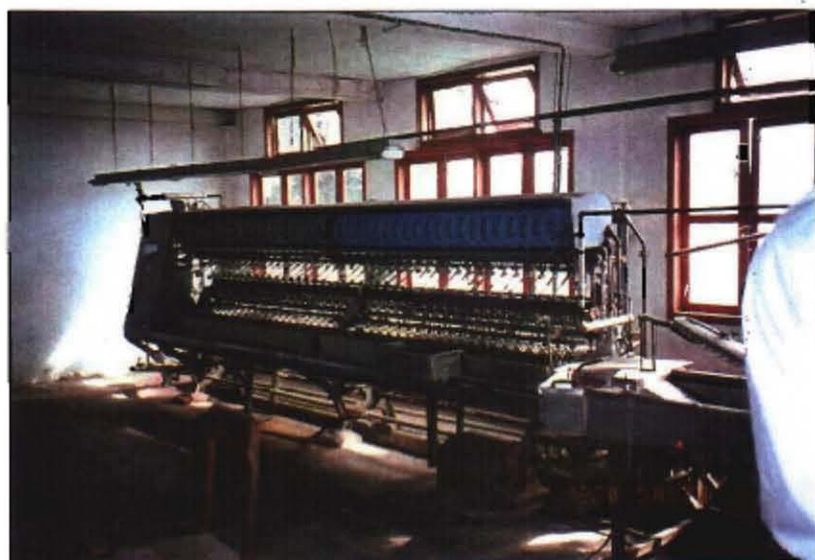
No.1 ハットセイフォン養蚕センターの桑畑試験場（ヴィエンチャン近郊）



No.2 試験場の桑の原木（養蚕センター）



No.3 養蚕センターの産室と蚕の卵



No.4 養蚕センターの日本の無償資金協力で導入された生糸機械



No.5 サバナケット県の養蚕農家の繭



No.6 養蚕農家の蚕



No.7 伝統的ラオスの生糸のとりだし道具



No.8 生糸とりだしの伝統的道具類

ラオス人民共和国

少数民族貧困対策のためのアタプー盆地農業総合小規模灌漑開発計画



No.1 セコン河のフェリー発着所（アタプー付近）



No.2 アタプー盆地の天水田（本計画の灌漑予定地区の一部）



No.3 アタプー盆地の農家



No.4 セカマン川の下流部



No.5 現在事業化進行中のセカマン川での小規模ポンプ灌漑（フローティングタイプ）



No.6 BOT で実施中の Se Namnoy 水力発電計画の発電所付近の少数民族の村



No.7 部落付近の天水田（灌漑計画地区の一部）



No.9 サバナケット県のムアンビン付近の少数民族の村



No.10 少数民族村の村長（ラオス婦人同盟の指導でかつては養蚕を営んでいた。）



No.11 ビエンチャン市内にあるラオス婦人同盟の絹織物展示販売所

ベトナム社会主義共和国
中部高原作物多様化振興計画



No.1 ラムドン省ダフアイ付近の果樹栽培
(国道20号線沿いにドリアン、ジャックフルーツ等の果樹園が並ぶ)



No.2 国道沿いの果物露店、農民が直接販売している。



No.3 ラムドン省バオロックにある VISERI の生糸工場内にある爾集荷場



No.4 熱湯で処理された繭から糸が引きだされている。



No.5 生糸のとりだし



No.6 出荷前の生糸



No.7 VISERI 本部周辺に広がる桑畑



No.8 養蚕農家の蚕



No.9 ラムドン省ダイリン付近の山間地でのコーヒーと茶の栽培



No.10 VISERI の傘下にある絹織物工場の染色場



No.11 バウロック近辺でのコーヒーと茶の栽培



No.12 デイリン付近の山間地でのコーヒー栽培

付 属 資 料 1

TECHNICAL AID PROPOSAL & TERMS OF REFERENCE (DRAFT) ON
MASTER PLAN / PRE-FEASIBILITY STUDY FOR
SERICULTURE PROMOTION PROJECT
LAO PDR

**TECHNICAL AID PROPOSAL
FOR
MASTER PLAN / PRE-FEASIBILITY STUDY
ON
SERICULTURE PROMOTION PROJECT IN
MOUNTAINOUS AREAS IN LAO PDR**

1. PROJECT TITLE

Master Plan and Pre-feasibility Study on the Sericulture Promotion Projects in Mountainous areas in Lao PDR

2. LOCATION

Luang Namtha, Oudomsay, Luang Prabang, Houa Phan, Xieng Khouang, Vientian, Bolikhamsai, Khammouane, and Savannakhet Provinces

3. EXECUTING AGENCY

Department of Agriculture and Extension, Ministry of Agriculture and Forestry, Lao PDR

4. PROPOSED SOURCE OF ASSISTANCE

The Government of Japan, through a Technical Assistance Program of Japan International cooperation Agency (JICA)

5. OBJECTIVE OF THE STUDY

The objectives of the study are to formulate a strategic development master plan on sericulture promotion projects in the mountainous areas covering the 9 provinces stated above and a pre-feasibility study on typical and priority projects in the selected province(s) as a model development project.

6. BACKGROUND

About 70% of Lao PDR is occupied by mountainous areas with an average altitude of EL 1,2000m and the remaining 30% of the land is covered by flat area along the Mekong river. The land use ratio is very low, only 4% of the whole land. The cultivation area in Lao PDR is estimated at about 700,000ha in total, of which 600,000ha are paddy fields and the remaining 100,000ha are other food and cash crops upland fields.

About 90% of people in the Lao PDR depend on agriculture for their livelihood, and most

farming activities are subsistence farm based. In particular mountainous areas, living condition of the population consisting of minority people is based upon natural production form through slash and burn cultivation. Slash and burn cultivation and forest products harvesting for self-sufficiency are the main activities for self-subsistence. Revenue generated from the production is very few due mainly to low productivity of slash and burn cultivation as well as poor condition of rural infrastructure. Thus, farmers living in mountainous areas have no idea and courage to find out suitable ways for upgrading their own living condition. Furthermore, increase of population in mountainous areas in recent years causes a serious problem of destruction of forest areas.

In 1996, the Government approved an agriculture and forestry sector development plan based largely on the priorities laid out in the Socio-economic Development Plan 1996-2000 of the Government. The plan covers six broad areas: (i) food production and self-sufficiency; (ii) cash crops production support; (iii) stabilization of slash and burn agriculture; (iv) irrigation development; (v) improving agriculture and forestry research; and (vi) human resource development. Unfortunately, the plan is not based on a broad macro-economics analytical strategy and has no concrete action plans.

In order to implement the policy aimed at cash crops production support and stabilization of slash and burn cultivation, the Government has now paid attention to promote sericulture production due mainly to the following reasons:

- Sericulture production is an age-old traditional profession of Lao people. Greater part of people in mountainous areas have technical know-how for raising silkworms ;
- Labor required for sericulture production doesn't need higher technical know-how. In addition, the work for raising silkworms, reeling and weaving of silk is suitable to women ;
- Sericulture is one of the most effective activities for providing employment opportunities to rural people, particularly to women in mountainous areas, and for eradicating poverty in rural areas. This fact has already been proved in many countries ;
- Sericulture is also one of promising ways for establishing small cottage industries in mountainous areas;
- Silk is an international commodity. If the silk produced in Lao is a competitive internationally, its trade marketability is hopeful in future due to tight demand and supply situation in the world ;
- Silk is not perishable but storable, and not weighty but lightly. Therefore, silk is very promising commodity to be encouraged to produce in mountainous areas being at disadvantage with inferior rural infrastructure, remoteness, etc.; and
- In order to stabilize slash and burn cultivation and expand agro-forest industry in rural areas, mulberry is an ideal tree crop for substituting for upland rice and for soil conservation.

However, sericulture in Lao has been on the decline at present due mainly to (i) less marketability resulting from inferior quality of cocoons and silk reeling, and (ii) less desire of people to raise silkworm because of no market and low profitability.

The Government of Lao has been desire earnestly to formulate a comprehensive strategy for the promotion of sericulture. The plan should basically be formulated through a study at least covering the following items :

- Clarify present condition of sericulture and identify its constraints and problems ;

- Estimate demand and supply of cocoons and silk in future and identify marketability ;
- Determination of recommendable silkworms and mulberry and improvement of sericulture technology ;
- Institutional set-up and establishment of sericulture supporting system including extension system ; and
- Review of international competitiveness

However, the Government has serious difficulties for formulating the comprehensive strategy for the promotion of sericulture because of no statistical data on sericulture and few technical staff of sericulture.

7. TERMS OF REFERENCE

The Terms of Reference for the Master Plan and Pre-feasibility Study on Sericulture Promotion Projects in Mountainous Areas are given in the attached paper.

8. EXPERTISE INPUTS

The following experts and engineers will be required for executing the Study.

- Team Leader
- Institutional Expert
- Ago-economist
- Sociologist
- Sericulture Expert
- Post Cocoon Expert
- Marketing Expert
- Irrigation/drainage Engineer
- Civil Engineer
- Architect
- Environmentalist

9. SCHEDULE OF STUDY

The Study will be carried out in the following two (2) stages, and each stage will be further divided into two (2) works respectively:

- (1) Stage-I : Master Plan Study for mountainous areas in the 9 provinces
 - Field Work-I: Data collection, field survey and investigations and formulation of basic development plan (5 months)
 - Home Works-I: Analyses, studies and preparation of a master plan report (3 months)
- (2) Stage-II : Pre-feasibility Study for the priority projects and selected province(s)
 - Field Work-II: Supplementary data collection, field survey and investigations mainly for selected provinces and formulation of development plan (3 months)

Home Work-II: Analyses, studies and preparation of a pre-feasibility report (3 months)

The duration of the Study is estimated at 18 months in total.

10. UNDERTAKING OF THE GOVERNMENT OF LAO PDR:

In order to facilitate the smooth and effective implementation of the Study, the Government of Lao PDR will undertake the following:

- To provide available information necessary to carry out the Study
- To nominate a counterpart group for the Study
- To provide logistic support for the Study
- To provide foreign experts with any necessary visas and permits for the Study in Lao PDR
- To exempt foreign experts from taxes and charges
- To ensure permission for entry into all areas as required for the proper conduct of the Study

TERMS OF REFERENCE (DRAFT)

FOR MASTER PLAN / PRE-FEASIBILITY STUDY

ON

SERICULTURE PROMOTION PROJECT

IN MOUNTAINOUS AREAS IN LAO PDR

1. PROJECT BACKGROUND

About 70% of Lao PDR is occupied by mountainous areas with an average altitude of EL 1,2000m and the remaining 30% of the land is covered by flat area along the Mekong river. The land use ratio is very low, only 4% of the whole land. The cultivation area in Lao PDR is estimated at about 700,000ha in total, of which 600,000 ha are paddy fields and the remaining 100,000ha are other food and cash crops upland fields.

About 90% of the people in the Lao PDR depend on agriculture for their livelihood, and most farming activities are subsistence farm based. In particular mountainous areas, living condition of the population consisting of minority people is based upon natural production form through slash and burn cultivation. Slash and burn cultivation and forest products harvesting for self-sufficiency are the main activities for self-subsistence. Revenue generated from the production is very less due mainly to low productivity of slash and burn cultivation as well as poor condition of rural infrastructure. Thus, farmers living in mountainous areas have no idea and courage to find out suitable ways for upgrading their own living condition. Furthermore, increase of population in mountainous areas in recent years causes a serious problem of destruction of forest areas.

In 1996, the Government approved an agriculture and forestry sector development plan based largely on the priorities laid out in the Socio-economic Development Plan 1996-2000 of the Government. The plan covers six broad areas: (i) food production and self-sufficiency; (ii) cash crops production support; (iii) stabilization of slash and burn agriculture; (iv) irrigation development; (v) improving agriculture and forestry research; and (vi) human resource development. Unfortunately, the plan is not based on a broad macro-economics analytical strategy and has no concrete action plans.

In order to implement the policy aimed at cash crops production support and stabilization of slash and burn cultivation, the Government has now paid attention to promote sericulture production due mainly to the following reasons:

- Sericulture production is an age-old traditional profession of Lao people. Greater part of people in mountainous areas have technical know-how for raising silkworms;
- Labor required for sericulture production doesn't need higher technical know-how. In addition, the work for raising silkworms, reeling and weaving of silk is suitable to women ;
- Sericulture is one of the most effective activities for providing employment opportunities to rural people, particularly to women in mountainous areas, and for eradicating poverty in rural areas. This fact has already been proved in many countries ;
- Sericulture is also one of promising ways for establishing small cottage industries in mountainous areas;

- Silk is an international commodity. If the silk produced in Lao is competitive internationally, its trade marketability is hopeful in future due to tight demand and supply situation in the world ;
- Silk is not perishable but storable, and not weighty but lightly. Therefore, silk is very promising commodity to be encouraged to produce in mountainous areas being at disadvantage with inferior rural infrastructure, remoteness, etc.; and
- In order to stabilize slash and burn cultivation and expand agro-forest industry in rural areas, mulberry is an ideal tree crop for substituting for upland rice and for soil conservation.

However, sericulture in Lao has been on the decline at present due mainly to (i) less marketability resulting from inferior quality of cocoons and silk reeling, and (ii) less desire of people to raise silkworm because of no markets and low profitability.

The Government of Lao has been desire earnestly to formulate a comprehensive strategy for the promotion of sericulture. The plan should basically be formulated through a study at least covering the following items :

- Clarify present condition of sericulture and identify its constraints and problems ;
- Estimate demand and supply of cocoons and silk in future and identify marketability ;
- Determination of recommendable silkworms and mulberry and improvement of sericulture technology ;
- Institutional set-up and establishment of sericulture supporting system including extension system ; and
- Review of international competitiveness

However, the Government has serious difficulties for formulating the comprehensive strategy for the promotion of sericulture because of no statistical data on sericulture and few technical staff of sericulture.

2. OBJECTIVE OF THE STUDY

The objectives of the study are to formulate a strategic and comprehensive development master plan on sericulture promotion projects in the mountainous areas covering the nine (9) provinces where mulberry cultivation used practice, and to carry out a pre-feasibility study on selected typical projects and priority provinces for a model development project.

3. STUDY AREA

The study covers nine provinces of the country where mulberry sericulture has been carried out and/or used to be carried out, namely Luang Namtha, Oudomsay, Luang Prabang, Houa Phan, Xieng Khouang, Vientian, Bolikhamsai, Khammouane, and Savannakhet provinces (hereinafter refereed to as "the Study Area")

4. SCOPE OF THE STUDY

The scope of the proposed master plan and pre-feasibility study (hereinafter referred to as "the Study") will be as follows:

The Study will cover:

- (1) Master Plan Study for the above the nine (9) provinces;
- (2) Pre-feasibility Study for typical projects and priority province(s)

The Study will be carried out in the following two (2) stages and each stage will be further divided into two (2) works respectively:

(1) Stage I : Master Plan Study

Field Work-I: Data collection, field survey and investigation and formulation of basic development plan.

Home Work-I: Analyses, studies and preparation of a master plan report.

(2) Stage-II : Pre-feasibility Study

Field Work-II: Supplementary data collection, field survey and investigations mainly for typical projects and priority province(s) and formulation of development concept.

Home Work-II: Analyses, studies and preparation of a pre-feasibility report.

4.1 Stage-I: Master Plan Study

4.1.1 Field Work-I

Data collection, field survey and investigation and formulation of basic development plan

(1) Data Collection and Review

Review and analyze all the existing data and information related to the Study such as national and provincial development plan and program, socio-economic condition including population, sociological structure and social infrastructure, agriculture and sericulture situation, agriculture, farmers' organization, and marketing system, etc.

(2) Fields Investigations and Basic Studies

Inventory study of the following items for all districts in the Study area ;

- Land and vegetation
- Accessibility
- Socio-economy
- Agriculture including farmers' economy
- Sericulture including related facilities
- Potential beneficiaries
- Farmers' development intention

Investigation of physical condition including meteorological and hydrological condition, irrigation and drainage and soil and land use

Investigation of socio-economy situation

Investigation of Agriculture and agro-economy condition

Investigation of social infrastructure

Investigation of environmental aspects

- (3) Potentiality study for sericulture development in terms of technical aspects covering from mulberry production to reeling and weaving as well as socio-economic aspects including marketing possibility
- (4) Basic concept and development strategy for sericulture promotion in the Study area.
- (5) Selection of the typical projects and priority province(s)

4.1.2 Home Work-I

Analyzes, studies and preparation of a master plan report;

- (1) Detailed analysis of field survey results
- (2) Preparation of Master Plan and strategy for comprehensive sericulture development, including;
 - Food plant and cocoon production plan,
 - Seed production and distribution plan,
 - Cocoon marketing and processing plan,
 - Institutional development plan including supposing system and facilities,
 - Rural infrastructure improvement plan related to sericulture development,
 - Rough estimation of the cost, and
 - Proposed implementation method

4.2 Stage II Pre-feasibility Study

The Pre-feasibility Study shall be implemented in accordance with the outcome of the above Master Plan Study.

4.2.1 Field Work-II

- (1) Additional data collection

Additional data collection will be made to supplement the data and information already obtained from Stage I Study especially for making Pre-feasibility Study on the selected typical projects and priority province(s).
- (2) Detailed field investigation of selected typical projects and priority province(s), including;
 - Socio-economic condition
 - Agriculture and sericulture condition
 - Infrastructure related to agriculture and sericulture production
 - Social infrastructure
 - Environmental condition
- (3) Preliminary study on sericulture development, including;
 - Proposed sericulture development plan for each selected province
 - Marketing and processing plan of cocoon products
 - Plan of improving and strengthening farmers organization and supporting

services

- Preliminary design of proposed project facilities.

4.2.2 Home Work-II

- (1) Proposed sericulture promotion project

Proposed sericulture promotion project in the selected typical projects and priority province(s) will be finalized through the following studies on:

- Identify sericulture promotion areas based on soils, climate, land capability, topography, water availability, etc.,
 - The most profitable cocoon production methods for the purpose of maximizing farmer's farm income,
 - Processing and marketing of sericulture products,
 - Farmers organization and sericulture/agriculture support services,
 - Determine optimum scale of facilities to be constructed under the project,
 - Prepare pre-feasibility level design and lay out of the proposed facilities and management systems,
- (2) Prepare a detailed implementation schedule for the project
 - (3) Recommended organization and procedures best suited for effective operation and management of the project,
 - (4) Cost estimate and project evaluation, and
 - (5) Prepare a comprehensive Pre-feasibility Study report for the project.

4.3 Transfer of Technology

Throughout the course of the Study, transfer of technology and training will be provided to counterpart personnels by foreign experts. The transfer of technology will be carried out in the form of on-the-job training and seminar during the course of the Study. Overseas training will also be programmed.

5. SCHEDULE OF THE STUDY AND REPORTS

The period required for the Study is estimated at 18 months in total. A tentative work schedule is presented in the attached paper.

The following report will be prepared in the course of the Study.

- (1) Inception Report : Within one (1) months from the commencement of the Study.
- (2) Progress Report (I) : Within eight (7) months from the commencement of the Study
- (3) Interim Report : Within ten (10) months from the commencement of the Study
- (4) Progress Report (II) : Within fifteen (15) months from the commencement of the Study
- (5) Draft Final Report : Within seventeen (17) months from the commencement of the Study

- (6) Final Report : Within eighteen (18) months from the commencement of the Study

6. EXPERT INPUTS

The following experts and engineers will be required for executing the Study.

- Team Leader
- Institutional Expert
- Agro-economist
- Sociologist
- Sericulture Expert
- Post Cocoon Expert
- Marketing Expert
- Irrigation/drainage Engineer
- Civil Engineer
- Architect
- Environmentalist

7. UNDERTAKING OF THE GOVERNMENT

In order to facilitate the smooth and effective implementation of the Study, the Government of Lao PDR shall undertake the following measures:

- (1) To provide available information necessary to carry out the Study, including maps, statistics, meteo-hydrological data, socio-economy and previous study reports relevant to the project.
- (2) To nominate a counterpart group, including a project coordinator responsible for the study and resolving any trouble arising throughout the Study period.
- (3) To provide logistic support including office space with appurtenant furniture and facilities, cleaning and guard.
- (4) To provide the foreign experts with any necessary entry visa, work permit and travel permit, if required, for the Study in Lao PDR.
- (5) To exempt the foreign experts from tax and charges of any kind imposed on or in connection with the living allowance remitted from abroad and from import and export duties imposed on their personal effects, and instruments equipment and materials necessary for the execution of the Study.
- (6) To secure permission for entry into all areas as required for the proper conduct of the study.

**WORK SCHEDULE FOR MASTER PLAN AND PRE-FEASIBILITY STUDY
ON
SERICULTURE PROMOTION PROJECT IN MOUNTAINOUS AREAS IN LAO PDR**

Items	Month																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
(1) Stage I: Master Plan Study																			
- Field Work - I		[Field Work]																	
- Home Work - I							[Home Work]												
(2) Stage-II: Pre-feasibility Study																			
- Field Work - II												[Field Work]							
- Home Work - II															[Home Work]				
Reports	ICR*					PR-I				IR				PR-II			DFR	FR	

[Solid Box] : Field Work [Dotted Box] : Home Work

Note: ICR: Inception Report, PR-I: Progress Report-I, IR: Interim Report
PR-II: Progress Report-II, DFR: Draft Final Report, FR: Final Report

付 属 資 料 2

TECHNICAL AID PROPOSAL & TERMS OF REFERENCE (DRAFT) ON
MASTER PLAN / FEASIBILITY STUDY FOR
INTEGRATED AGRICULTURE AND SMALL SCALE IRRIGATION DEVELOPMENT
FOR POVERTY ALLEVIATION OF ETHNIC MINORITY, LAO PDR

TECHNICAL AID PROPOSAL
FOR
MASTER PLAN / FEASIBILITY STUDY
ON
INTEGRATED AGRICULTURE AND SMALL SCALE IRRIGATION
DEVELOPMENT FOR POVERTY ALLEVIATION OF ETHNIC MINORITY
IN ATTAPU PLAIN OF LAO PDR

1. PROJECT TITLE

Master Plan and Feasibility Study on Integrated Agriculture and Small Scale Irrigation Development for Poverty Alleviation of Ethnic Minority in Attapu Plain of Lao PDR

2. LOCATION

Attapu plain along the Xe Kong and Xe Kaman rivers in Attapu Province

3. EXECUTING AGENCY

Department of Irrigation, Ministry of Agriculture and Forestry, Lao PDR

4. PROPOSED SOURCE OF ASSISTANCE

The Government of Japan, through a Technical Assistance Program of Japan International Cooperation Agency (JICA)

5. OBJECTIVE OF THE STUDY

The objectives of the Study are to formulate a master plan on integrated agriculture and small scale irrigation development to aim at increase of rice production through irrigation development including transmigration of ethnic minority groups from mountainous area to the Attapu plain, poverty alleviation of ethnic minority and stabilization of slash and burn cultivation, and a feasibility study on priority schemes of integrated agriculture and small irrigation development selected through the master plan.

Main subjects of this Study are as follows.

- 1) water balance in small basin of tributaries and establishment of rational water use program in a small basin including water right,
- 2) increase of rice production through small irrigation development in the Attapu plain,
- 3) development of irrigated agriculture land and rural infrastructure for transmigration of ethnic minority groups,
- 4) establishment of water users organization and farmers organization, and
- 5) strengthening of project management for direct implementation body and related local

government agencies and project monitoring.

6. BACKGROUND

6.1 National and Regional Background

In accordance with an agriculture and forestry sector development plan of the Socio-economic Development Plan 1996-2000. Main strategies of the plan are ;

- (i) increase of food production and self-sufficiency;
- (ii) increase of agriculture income through cash crops and livestock production support;
- (iii) stabilization of slash and burn cultivation;
- (iv) integrated agriculture development through small scale irrigation development;
- (v) improving agriculture and forestry research; and
- (vi) human resource development.

At present, the Government is paying attention to rice production in remote areas to aim at increase of food production, self-sufficiency and stabilization of slash and burn cultivation.

Xe Kong basin administratively extends in 3 province areas consisting of Salavan, Xe Kong and Attapu provinces. The upper stream basin is covered by mountainous area of Salavan province and the middle - lower stream basin is mainly covered by flood plain of Xe Kong and Attapu provinces. Xe Kong and Attapu province areas are remote from the Mekong basin due to lack of access road in Boloven plateau located between both the provincial areas and Mekong basin. However, construction works of hydropower and national road projects such as the 2 hydropower projects of Xe Nam Noi river and a rehabilitation project on national road No.16 (Pakse - Attapu - Kontum) recently implemented. In connection with the implementations of these projects, existing roads to Xe Kong and Attapu provincial areas are reinforced as access roads, and, therefore now easy accessibility to the areas is sustained in rainy season.

Population in the areas is estimated at approximately 155,000 consisting of about 65,000 in Xe Kong province and about 90,000 in Attapu province. A majority of population are ethnic minorities who sustain slash and burn cultivation in mountainous area. Plain area is covered by a lot of rainfed and bush areas. However, secondary roads are not sufficiently developed in the area, and market roads for agriculture input and output are not functioning. Furthermore, local Governments face rice shortage in province areas every year, and job-opportunities for provincial people are also scarce due to less regional economic development situation. Therefore, local Governments always emphasize increase and stabilization of rice production in the plain.

In case of hydropower project of the Xe Nam Noi implemented under BOT management of Ministry of Industry and Investment and Electro De Lao, tail water level of hydropower plant was determined lower than an intake water level for irrigation, and rational water use in Xe Nam Noi basin is contradicted. Taking into account this result of hydropower project implementation, Department of Irrigation insists urgently to make a master plan on rational water use in small basins of Xe Kong river as well as an integrated agriculture development in Attar plain aims at increase of rice production by small scale irrigation development, stabilization of slash and burn cultivation and poverty alleviation of ethnic minorities. A

master plan directly coincides with purposes of the Socio-economic Development Plan 1996-2000.

6.2 Need of the Development

Accessibility to the project area has been improved by project implementations of hydropower development and national road No.16. Rapid regional economic development will be expected in near future. However, rice shortage always occurs in the provincial area every year. An increase and stabilization of rice production are needed for rural economic development, and an implementation of agriculture and irrigation development is highly expected. In the Attapu plain, water and land resources for irrigation development are rather high comparing to other provincial areas. However, there is shortage of labor power for agriculture due to low population in the plain, and it is very hard to formulate a large scale irrigation development project in the plain within a short term.

On the other hand, a majority of ethnic minority groups who have continued slash and burn cultivation in mountainous areas surrounding the plain are poor due to lack of agriculture land and job opportunity.

Therefore, for coping with rice shortage in provincial areas, poverty of ethnic minority groups and stabilization of slash and burn cultivation, an integrated agriculture and small scale irrigation development including transmigration of ethnic minority groups is urgently needed for rural economic development.

Furthermore, Department of Irrigation insists urgently to make a master plan on rational water use in the Attapu plain.

7. TERMS OF REFERENCE

The Terms of Reference for the Master Plan and Feasibility Study on Integrated Agriculture and Small Scale Irrigation Development for Poverty Alleviation for Ethnic Minority in Attapu Plain are given in the attached paper.

8. EXPERTISE INPUTS

The following experts and engineers will be required for executing the Study.

- Team Leader
- Irrigation/drainage Engineer
- Hydrologist
- Infrastructure Engineer
- Design Engineer / Construction Planner
- Agronomist
- Agro-economist
- Agriculture Support Service Expert
- Pedologist
- Institutional Expert / Sociologist

- Geodetic Engineer
- Remote-sensing Expert
- Environmentalist

9. SCHEDULE OF STUDY

The Study will be carried out in the following two (2) phases and each phase will be further divided into two (2) works respectively:

(1) Phase-I : Master Plan Study for the Attapu plain

Field Work-1: Data collection, field survey, preparation of topographical maps and investigations and formulation of a master plan on the development (4 months)

Home Works-1: Analyses, studies, selection of priority schemes and preparation of a master plan report (4 months)

(2) Phase-II : Feasibility Study for the priority schemes

Field Work-2: Explanation and discussion on the selected priority schemes, Supplementary data collection, field survey and investigations mainly for selected schemes and formulation of development plan (4 months)

Home Work-2: Analyses, studies, design, cost estimate and preparation of a feasibility report (3 months)

The duration of the Study is estimated at 17 months in total.

10. UNDERTAKING OF THE GOVERNMENT OF LAO PDR

In order to facilitate smooth and effective implementation of the Study, the Government of Lao PDR will undertake the following :

- To provide available information necessary to carry out the Study
- To nominate a counterpart group for the Study
- To provide logistic support for the Study
- To provide foreign experts with any necessary visas and permits for the Study in Lao PDR
- To exempt foreign experts from taxes and charges
- To ensure permission for entry into all areas as required for the proper conduct of the Study

TERMS OF REFERENCE (DRAFT)
FOR MASTER PLAN PRE-FEASIBILITY STUDY
ON
INTEGRATED AGRICULTURE AND SMALL SCALE IRRIGATION
DEVELOPMENT FOR POVERTY ALLEVIATION OF ETHNIC MINORITY
IN ATTAR PLAIN of LAO PDR

1. PROJECT BACKGROUND

1.1 National and Regional Background

In accordance with an agriculture and forestry sector development plan of the Socio-economic Development Plan 1996-2000. Main strategies of the plan are ;

- (i) increase of food production and self-sufficiency;
- (ii) increase of agriculture income through cash crops and livestock production support;
- (iii) stabilization of slash and burn cultivation;
- (iv) integrated agriculture development through small scale irrigation development;
- (v) improving agriculture and forestry research; and
- (vi) human resource development.

At present, the Government is paying attention to rice production in remote areas to aim at increase of food production, self-sufficiency and stabilization of slash and burn cultivation.

Xe Kong basin administratively extends in 3 province areas consisting of Salavan, Xe Kong and Attapu provinces. The upper stream basin is covered by mountainous area of Salavan province and the middle - lower stream basin is mainly covered by flood plain of Xe Kong and Attapu provinces. Xe Kong and Attapu province areas are remote from the Mekong basin due to lack of access road in Boloven plateau located between both the provincial areas and Mekong basin. However, construction works of hydropower and national road projects such as the 2 hydropower projects of Xe Nam Noi river and a rehabilitation project on national road No. 16 (Pakse - Attapu - Kontum) recently implemented. In connection with the implementations of these projects, existing roads to Xe Kong and Attapu provincial areas are reinforced as access roads, and, therefore now easy accessibility to the areas is sustained in rainy season.

Population in the areas is estimated at approximately 155,000 consisting of about 65,000 in Xe Kong province and about 90,000 in Attapu province. A majority of population are ethnic minorities who sustain slash and burn cultivation in mountainous area. Plain area is covered by a lot of rainfed and bush areas. However, secondary roads are not sufficiently developed in the area, and market roads for agriculture input and output are not functioning. Furthermore, local Governments face rice shortage in province areas every year, and job-opportunities for provincial people are also scarce due to less regional economic development situation. Therefore, local Governments always emphasize increase and stabilization of rice production in the plain.

In case of hydropower project of the Xe Nam Noi implemented under BOT management of Ministry of Industry and Investment and Electro De Lao, tail water level of hydropower plant

was determined lower than an intake water level for irrigation, and rational water use in Xe Nam Noi basin is contradicted. Taking into account this result of hydropower project implementation, Department of Irrigation insists urgently to make a master plan on rational water use in small basins of Xe Kong river as well as an integrated agriculture development in Attap plain aims at increase of rice production by small scale irrigation development, stabilization of slash and burn cultivation and poverty alleviation of ethnic minorities. A master plan directly coincides with purposes of the Socio-economic Development Plan 1996-2000.

1.2 Need of the Development

Accessibility to the project area has been improved by project implementations of hydropower development and national road No.16. Rapid regional economic development will be expected in near future. However, rice shortage always occurs in the provincial area every year. An increase and stabilization of rice production are needed for rural economic development, and an implementation of agriculture and irrigation development is highly expected. In the Attapu plain, water and land resources for irrigation development are rather high comparing to other provincial areas. However, there is shortage of labor power for agriculture due to low population in the plain, and it is very hard to formulate a large scale irrigation development project in the plain within a short term.

On the other hand, a majority of ethnic minority groups who have continued slash and burn cultivation in mountainous areas surrounding the plain are poor due to lack of agriculture land and job opportunity.

Therefore, for coping with rice shortage in provincial areas, poverty of ethnic minority groups and stabilization of slash and burn cultivation, an integrated agriculture and small scale irrigation development including transmigration of ethnic minority groups is urgently needed for rural economic development.

Furthermore, Department of Irrigation insists urgently to make a master plan on rational water use in the Attapu plain.

2. OBJECTIVE OF THE STUDY

The objectives of the Study are to formulate a master plan on integrated agriculture and small scale irrigation development to aim at increase of rice production through irrigation development including transmigration of ethnic minority groups from mountainous area to the Attapu plain, poverty alleviation of ethnic minority and stabilization of slash and burn cultivation, and a feasibility study on priority schemes of integrated agriculture and small irrigation development selected through the master plan.

Main subjects of this Study are as follows.

- 1) water balance in small basin of tributaries and establishment of rational water use program in a small basin including water right,
- 2) increase of rice production through small irrigation development in the Attapu plain,
- 3) development of irrigated agriculture land and rural infrastructure for transmigration of

- ethnic minority groups,
- 4) establishment of water users organization and farmers organization, and
 - 5) strengthening of project management for direct implementation body and related local government agencies and project monitoring.

3. STUDY AREA

3.1 Topography and Land Use

The Xe Kong river originates in western mountainous areas of national boundary between Lao PDR and Vietnam and flows down near Xe Kong and Attapu towns located in east area of Boloven plateau. The Xe Kong crosses national boundary with Cambodia and is of confluence with the Mekong river near Stung Treng town of Cambodia. A whole basin is administratively separated into Salavan province of upper basin and Xe Kong and Attapu provinces of middle-lower basins. The upper basin is mainly covered by mountainous area, and middle -lower basin is covered by flood plain. An area of the middle basin which expands from Xe Kong town to Ban Kengxay village has a narrow valley with a width of 4-5 km. The valley is surrounded by mountainous area of left bank and Boloven plateau of right bank. Altitude of Boloven plateau and mountainous area of the left bank is more than 1,000 m. Attapu plain extends with a width of 20-40 km in lower basin which is located immediately down stream of Ban Kengxay village. Main tributaries of Xe Kong river, namely Xe Kaman, Xe Sa, Nam Kong, Xe Pian and Xe Kampo expand in the plain. Main soil is clayey soil. The plain is covered by rainfed paddy field, bush land and partial forest conservation area. Slash and burn cultivation is still continued in mountainous area adjacent to the plain. In accordance with statistic data of Attapu provincial office, slash and burn cultivation area was about 2,800 ha in 1996-97.

3.2 Hydrology and Climate

Climate is broadly divided into two (2) seasons such as rainy season from June to September and dry season from October to May. Mean annual rainfall for 6 years from 1991 to 1996 is 2,406 mm, and more than 90% of annual rainfall is concentrated in rainy season. River discharge of Xe Kong was observed at 110 m³/sec in March near Attapu town which catchment area is estimated at about 10,500 km². Major tributaries such as Xe Kaman and Xe Pian have perennial river flow. Catchment area is about 4,454 km² for Xe Kaman and about 1,038 km² for Xe Pian. In accordance with observation data, low river discharge of Xe Pian is estimated at about 5 m³/sec.

3.3 Sociology

Attapu province administratively consists of 5 districts namely Samakisay, Saysetha, Sanansay, Ohovvonning and Sansay districts. There are 204 villages in whole provincial area. Population and number of family are respectively estimated at 90,000 and 15,000 families. Farmhouses are estimated at 13,400 equivalent to about 90% of total families of the province. A majority of population concentrates at Attapu town and Ban Cheng, and ethnic minority

groups are scattered in mountainous area. One of the biggest ethnic minority village is located at left bank of the Xe Sa river. In recent years, projects on village water supply, building construction of primary schools, establishment of rice banks have been implemented in the provincial area.

3.4 Agriculture

In accordance with provincial agriculture statistic data of 1996-97, main crop is paddy in rainfed and used for family consumption. Other crops such as vegetables, chili, maize, etc. are cultivated in backyard of farmer's houses. Rainfed paddy field and irrigated paddy field are respectively estimated at about 8,190 ha and about 2,190 ha. Total paddy production is about 30,400 ton/year, but rice production is still insufficient for domestic consumption in the provincial area. Annual rice shortage is roughly estimated at about 4,700 ton. Local Government imported rice from neighboring provinces to cope with rice shortage. Agriculture support services are not fully functioned due to lack of human resources and budget.

3.5 Irrigation

Available land for irrigation development is roughly estimated at about 143,000 ha in the Attapu plain based on the study of Department of Irrigation. Water resource for irrigation is also estimated to be high in the area. Since there is shortage of expected labor for agriculture due to low population, it is impossible directly to implement large scale irrigation development.

The Department of Irrigation has implemented small scale irrigation projects since 1985, and 26 projects have been accomplished by 1996. Small irrigation systems have simple weirs and main canals, and conducted supplemental irrigation to scheme areas ranging from 5 ha to 100 ha in rainy season. Seasonal irrigation areas are estimated at about 2,190 ha in rainy season and 95 ha in dry season.

Furthermore, small pump irrigation development projects are scheduled to implement at 11 sites near Attapu town, and 6 projects will be accomplished by 1999. Water resources of the projects are Xe Kong and Xe Kaman rivers. Floating type of pump are used because of much difference of river water level between dry season and rainy season. Irrigation area ranges from 150 ha to 250 ha, and total irrigation area of the 11 projects is estimated at about 2,000 ha which is much useful to cope with rice shortage in the provincial area. Provincial agriculture services office will extend small irrigation development in the area. Establishment program of water user groups and training on water management and O & M works are still on the first stage of the development. Extension program is still discussed and suspended in district Government level, and doesn't attain at village level.

3.6 Infrastructure

Accessibility to Attapu from Pakse via Pakxong is improved because of implementation of development projects such as two (2) hydropower development projects in Boloven plateau,

No.1 hydropower project of Xe Kaman river and national road No.16 project. But, accessibility to the Xe Pian is still not good due to partial road sections and non jeepable roads in rainy season. Secondary roads are not sufficiently developed in the area. There is no bridge crossing Xe Kong river, and a ferry boat is only available near Attapu town. Rural infrastructures implemented in the area are only the buildings of primary schools and partial village water supply funded by Australian Government, FIAT and UNISEF.

3.7 Environmental Aspect

There are some species of flora, fish and fresh water dolphin protected by the Government in the area.

4. SCOPE OF THE STUDY

The Study will be carried out in the following two (2) phases and each phase will be further divided into two (2) works respectively:

(1) Phase-I : Master Plan Study for the Attapu plain

Field Work-1: Data collection, field survey, preparation of topographical maps and investigations and formulation of a master plan on the development (4 months)

Home Works-1: Analyses, studies and preparation of a master plan report (4 months)

(2) Phase-II : Feasibility Study for the priority schemes

Field Work-2: Explanation and discussion on the selected priority schemes, Supplementary data collection, field survey and investigations mainly for selected schemes and formulation of development plan (4 months)

Home Work-2: Analyses, studies, design, cost estimate and preparation of a feasibility report (3 months)

The duration of the Study is estimated at 17 months in total.

4.1 Phase-I : Master Plan Study

4.1.1 Field Work-1

Data collection, field survey and investigation and formulation of basic development plan

(1) Data Collection and Review

Review and analyze all the existing data and information related to the Study such as:

national and provincial development plan and other related development program, socio-economic condition including population, sociological structure including ethnic minority and farmers' organization, meteo-hydrology,

land use and soils
irrigation,
water resource development,
rural infrastructure,
agriculture,
agriculture supporting services,
agro - economy,
environmental aspect,
etc.

(2) Fields Survey and Basic Studies

Field survey on the following items in the Study area;
topography, soils and land use,
meteo-hydrology and water resources,
irrigation and drainage,
rural infrastructure,
agriculture,
agriculture supporting services,
agro - economy including farmers' economy,
environmental aspect,
institutional aspects including beneficiaries' intention for development,
sociological structure including ethnic minority and farmers' organization, and
ethnic minority 's intention on transmigration.

- (3) Potential study on small irrigation by gravity and small pumps and agriculture development in terms of technical aspects
- (4) Study on transmigration of ethnic minority
- (5) Formulation of basic concept and development strategy for small irrigation and agriculture development in the Study area.
- (6) Identification of small scale irrigation development areas based on land capability, topography, water availability, beneficiaries' activities, agriculture extension activities, local Governments' intention, etc.,

4.1.2 Home Work-1

Analyzes, studies and preparation of a master plan report;

- (1) Detailed analysis of field survey results
- (2) Preparation of a master plan on small irrigation and agriculture development, including;
land use plan,
agriculture and agriculture supporting services plan,
irrigation and drainage development plan based on small weirs, ponds and pumps,
ethnic minority transmigration plan ,

institutional development plan including agriculture supposing system and facilities, rural infrastructure improvement plan related to ethnic minority transmigration plan, rough estimation of cost and benefit, proposed implementation plan, and selection of the priority schemes

4.2 Phase II : Feasibility Study

A feasibility study shall be implemented in accordance with the outcome of the master plan study and results of discussion on the selection of priority schemes with the Government and beneficiaries.

4.2.1 Field Work-2

- (1) discussion on the selection of priority schemes with the Government and beneficiaries
- (2) Additional data collection
Additional data collection will be made for making a feasibility study on the selected priority schemes.
- (3) Detailed field investigation of priority schemes including;
irrigation and drainage,
rural infrastructure,
agriculture,
agriculture supporting services,
agro - economy including farmers' economy,
environmental aspect,
institutional aspects including beneficiaries' intention for development,
sociological structure including ethnic minority and farmers' organization, and
ethnic minority 's intention on transmigration.
- (4) Preliminary study on the selected priority schemes, including;
irrigation and drainage development plan,
agriculture development plan,
transmigration and rural infrastructure development plan,
plan of improving and strengthening farmers' organization and supporting services,
and
preliminary design of proposed project facilities.

4.2.2 Home Work-2

Analyzes, studies and preparation of a feasibility study report;

- (1) Detailed analysis of field survey results
- (2) Preparation of a feasibility study report on small irrigation and agriculture development, including;
 - land use plan,
 - agriculture and agriculture supporting services plan,
 - irrigation and drainage development plan based on small weirs, ponds and pumps,
 - ethnic minority transmigration plan,
 - institutional development plan including agriculture supposing system and facilities,
 - rural infrastructure improvement plan related to ethnic minority transmigration plan,
 - design of proposed project facilities,
 - estimation of the cost, and economic evaluation, and
 - proposed implementation plan

4.3 Transfer of Technology

Throughout the course of the Study, transfer of technology and training will be provided to counterpart personnel by foreign experts. The transfer of technology will be carried out in the form of on-the-job training and seminar during the course of the Study. Overseas training will also be programmed.

5. SCHEDULE OF THE STUDY AND REPORTS

The period required for the Study is estimated at 17 months in total. A tentative work schedule is presented in the attached paper.

The following report will be prepared in the course of the Study.

- (1) Inception Report : Within one (1) month from the commencement of the Study.
- (2) Progress Report (1): Within four (4) months from the commencement of the Study
- (3) Interim Report : Within eight (8) months from the commencement of the Study
- (4) Progress Report (2): Within twelve (12) months from the commencement of the Study
- (5) Draft Final Report : Within fifteen (15) months from the commencement of the Study
- (6) Final Report : Within seventeen (17) months from the commencement of the Study

6. EXPERT INPUTS

The following expatriate experts and engineers will be required for executing the Study.

- Team Leader
- Irrigation/drainage Engineer
- Hydrologist
- Infrastructure Engineer
- Design Engineer / Construction Planner

- Agronomist
- Agro-economist
- Agriculture Support Service Expert
- Pedologist
- Institutional Expert / Sociologist
- Geodetic Engineer
- Remote-sensing Expert
- Environmentalist

7. UNDERTAKING OF THE GOVERNMENT

In order to facilitate the smooth and effective implementation of the Study, the Government of Lao PDR shall undertake the following measures:

- (1) To provide available information necessary to carry out the Study, including maps, statistics, meteo-hydrological data, socio-economy and previous study reports relevant to the project.
- (2) To nominate a counterpart group, including a project coordinator responsible for the study and resolving any trouble arising throughout the Study period.
- (3) To provide logistic support including office space with appurtenant furniture and facilities, cleaning and guard.
- (4) To provide the foreign experts with any necessary entry visa, work permit and travel permit, if required, for the Study in Lao PDR.
- (5) To exempt the foreign experts from tax and charges of any kind imposed on or in connection with the living allowance remitted from abroad and from import and export duties imposed on their personal effects, and instruments equipment and materials necessary for the execution of the Study.
- (6) To secure permission for entry into all areas as required for the proper conduct of the study.

TENTATIVE WORK SCHEDULE FOR MASTER PLAN AND FEASIBILITY STUDY
ON
INTEGRATED AGRICULTURE AND SMALL SCALE IRRIGATION DEVELOPMENT
FOR
POVERTY ALLEVIATION OF ETHNIC MINORITY
IN
ATTAPU PLAIN OF LAO PDR

ITEMS	MONTH																						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18					
PHASE-I																							
Field Work-1																							
Data Collection and Analysis	█																						
Field Survey and Investigation	█																						
Preparation of Topographic Maps	█		█																				
Home Work-1																							
Formulation of Basic Development Concept				█																			
Selection of Priority Schemes						█																	
PHASE-II : FEASIBILITY STUDY																							
Field Work-2																							
Explanation /Discussion on Selected Priority Projects with Lao PDR and Beneficiaries								█															
Data Collection and Analysis								█															
Field Survey and Investigation								█															
Feasibility Study for Priority Schemes												█											
Explanation /Discussion on Priority Schemes with Lao PDR and Beneficiaries																█							
Finalization of Feasibility Study																	█						
REPORTS																							
			△ ICR				△ PR 1								△ Itr				△ PR 2			△ DFR	△ FR

Note: ICR: Inception Report, PR: Progress Report, Itr: Interim Report, DFR: Draft Final Report, FR: Final Report

付 属 資 料 3

**TECHNICAL AID PROPOSAL & TERMS OF REFERENCE (DRAFT) ON
MASTER PLAN / FEASIBILITY STUDY FOR
CROP DIVERSIFICATION IMPROVEMENT IN CENTRAL HIGH LAND REGION
VIETNAM**

**TECHNICAL AID PROPOSAL
FOR
MASTER PLAN / FEASIBILITY STUDY
ON
CROP DIVERSIFICATION IMPROVEMENT
IN
CENTRAL HIGH LAND REGION OF VIETNAM**

1. PROJECT TITLE

Master Plan and Feasibility Study on Crop Diversification Improvement in Central Highland Region of Vietnam

2. LOCATION

Three (3) Provinces of Southern Central Highland Region, namely Southern area of Gia Lai Province, Dac Lac Province and Northern area of Lam Dong Province

3. EXECUTING AGENCY

Department of Agricultural and Forestry Extension, Ministry of Agriculture and Rural Development

4. PROPOSED SOURCE OF ASSISTANCE

The Government of Japan, through a Technical Assistance Program of Japan International Cooperation Agency (JICA)

5. OBJECTIVE OF THE STUDY

The objectives of the study are to formulate a master plan on crop diversification improvement in central highland region of Vietnam to aim at increase of farmers' agricultural income through improvement and strengthening of cash crop diversification based on 3 cash crops such as coffee, tea and sericulture and poverty alleviation of ethnic minority and a feasibility study on the priority areas selected through the master plan.

6. BACKGROUND

6.1 National Background

Main strategies of Sixth 5-year National Economic Development Plan (1996-2000) are socio-economic stability including rural social services development, poverty alleviation and human

development. The plan was made based on the review of the results of the Fifth 5-year National Economic Development Plan (1991-1995). Growth rate of GDP is scheduled to increase 9-10%/year, and GDP in the year of 2000 is proposed to achieve two times of the GDP in 1990.

In agriculture development sector plan of the Sixth 5-year National Economic Development Plan, increase of staple food and agriculture diversification development are emphasized. Target of rice production is 30 million ton/year equivalent to 366 kg per head in the year of 2000.

Rural economic development progress in city areas including marketing development is rather progressive comparing to that in rural areas, and the differences of rural economic development progress tends to enlarge in the recent years. People 's income in city areas is higher than that in rural areas, and poverty problems of small farmers are pointed out as one of social problems in rural area. Poverty problems are distinguished in the Central Highland region and northern mountainous region where ethnic minority groups are mainly concentrated.

In accordance with statistic data of the World Bank, population which is under national poverty line is estimated at 54% in Vietnam, and the poor population is estimated at approximately 50% in rural areas of the Central Highland region.

In rural development plan, local Governments emphasize to strength rural socio-economic development to cope with rural poverty problems and apply the following strategies.

- development of ethnic minority societies,
- improvement of rural infrastructure paying special attention to forest conservation, and
- extension of cash crop diversification and strengthening of agro-forestry business.

In the aid coordination meeting with ADB and UNDP in 1995, the Government emphasized the needs of increase of cash crop production such as coffee, tea and sericulture, strengthening of agriculture technology for improvement of production quality, improvement of agro - processing and strengthening of agriculture credit. Furthermore, the Government emphasizes the need of bigger amount of investment during the next 5 years from 1996 to 2000, and the investment amount is roughly estimated at about 2 to 5 times of the past investment amount for the past 5 years.

6.2 Regional Background

A majority of farmers are ethnic minorities in the area. Their farming is mainly cash crop cultivation such as coffee, tea, sericulture, etc.. Their farming is small and severely influenced by market conditions. At present, a lot of farm lands are wasted in the area due to the abandon of farming of small farmers and past slash and burn cultivation.

Provincial governments of Gia Lai, Lam Dong and Dac Lac have emphasize to develop agro-business such as agro-forestry, fruit production, livestock breeding, sericulture, etc. for poverty alleviation of ethnic minorities and rural economic development. Provincial governments also provide job opportunities for small farmers through implementation of rural infrastructure development such as road, water supply systems, primary school buildings and public hospital buildings in order to increase their income. As a result of these implementation, main roads and some rural infrastructures are sufficiently provided, but, secondary roads

networks are not still accomplished. Specially, in remote areas, market roads are not fully provided for agricultural input and output, and poverty problems of ethnic minority groups are still remained.

Therefore, agriculture development mainly including crop diversification improvement is needed for poverty alleviation of small farmers and ethnic minority groups. Crop diversification improvement will be mainly verified based on three (3) cash crops such as coffee, tea and sericulture. Other improvement factors of agriculture including agriculture supporting services, post-harvest, farmers training and market shall be also verified.

In advanced area of cash crop diversification development, recently new subjects on cash crop cultivation such as quality control of cash crops, strengthening of farming and agriculture support services, post-harvest, market, etc. are emphasized. Further study on development and improvement of cash crop cultivation is urgently needed.

7. TERMS OF REFERENCE

Terms of Reference for the Master Plan and Feasibility Study on Crop Diversification Improvement in Central Highland Region are given in the attached paper.

8. EXPERTISE INPUTS

The following experts and engineers will be required for executing the Study.

- Team Leader
- Agronomist
- Agro-economist
- Sericulture Expert
- Institutional Expert / Sociologist
- Marketing Expert
- Irrigation / drainage Engineer / On-farm Development Expert
- Hydrologist
- Infrastructure Engineer
- Design Engineer
- Pedologist
- Geodetic Engineer
- Remote-sensing Expert
- Environmentalist

9. SCHEDULE OF STUDY

The Study will be carried out in the following two (2) phases, and each phase will be further divided into two (2) works respectively:

(1) Phase-I : Master Plan Study for 3 provinces

Field Work-1: Data collection, field survey, preparation of topographical maps and

investigations and formulation of a master plan on the development (4 months)

Home Works-1: Analyses, studies and preparation of a master plan report (4 months)

(2) Phase-II : Feasibility Study for the priority projects

Field Work-2: Explanation and discussion on the selected priority schemes, supplementary data collection, field survey and investigations mainly for selected schemes and formulation of development plan (4 months)

Home Work-2: Analyses, studies, design, cost estimate and preparation of a feasibility report (3 months)

The duration of the Study is estimated at 17 months in total.

10. UNDERTAKING OF THE GOVERNMENT OF VIETNAM

In order to facilitate the smooth and effective implementation of the Study, the Government of Vietnam will undertake the following:

- To provide available information necessary to carry out the Study
- To nominate a counterpart group for the Study
- To provide logistic support for the Study
- To provide foreign experts with any necessary visas and permits for the Study in Vietnam
- To exempt foreign experts from taxes and charges
- To ensure permission for entry into all areas as required for the proper conduct of the Study

TERMS OF REFERENCE (DRAFT)
FOR MASTER PLAN / FEASIBILITY STUDY
ON
CROP DIVERSIFICATION IMPROVEMENT
IN
CENTRAL HIGH LAND REGION OF VIETNAM

1. PROJECT BACKGROUND

1.1 National and Regional Background

Main strategies of Sixth 5-year National Economic Development Plan (1996-2000) are socio-economic stability including rural social services development, poverty alleviation and human development. The plan was made based on the review of the results of the Fifth 5-year National Economic Development Plan (1991-1995). Growth rate of GDP is scheduled to increase 9-10%/year, and GDP in the year of 2000 is proposed to achieve two times of the GDP in 1990.

In agriculture development sector plan of the Sixth 5-year National Economic Development Plan, increase of staple food and agriculture diversification development are emphasized. Target of rice production is 30 million ton/year equivalent to 366 kg per head in the year of 2000.

Rural economic development progress in city areas including marketing development is rather progressive comparing to that in rural areas, and the differences of rural economic development progress tends to enlarge in the recent years. People 's income in city areas is higher than that in rural areas, and poverty problems of small farmers are pointed out as one of social problems in rural area. Poverty problems are distinguished in the Central Highland region and northern mountainous region where ethnic minority groups are mainly concentrated.

In accordance with statistic data of the World Bank, population which is under national poverty line is estimated at 54% in Vietnam, and the poor population is estimated at approximately 50% in rural areas of the Central Highland region.

In rural development plan, local Governments emphasize to strength rural socio-economic development to cope with rural poverty problems and apply the following strategies.

- development of ethnic minority societies,
- improvement of rural infrastructure paying special attention to forest conservation, and
- extension of cash crop diversification and strengthening of agro-forestry business.

In the aid coordination meeting with ADB and UNDP in 1995, the Government emphasized the needs of increase of cash crop production such as coffee, tea and sericulture, strengthening of agriculture technology for improvement of production quality, improvement of agro - processing and strengthening of agriculture credit. Furthermore, the Government emphasizes the need of bigger amount of investment during the next 5 years from 1996 to 2000, and the investment amount is roughly estimated at about 2 to 5 times of the past investment amount for the past 5 years.

A majority of farmers are ethnic minorities in the area. Their farming is mainly cash crop

cultivation such as coffee, tea, sericulture, etc.. Their farming is small and severely influenced by market conditions. At present, a lot of farm lands are wasted in the area due to the abandon of farming of small farmers and past slash and burn cultivation.

Provincial governments of Gia Lai, Lam Dong and Dac Lac have emphasize to develop agrobusiness such as agro-forestry, fruit production, livestock breeding, sericulture, etc. for poverty alleviation of ethnic minorities and rural economic development. Provincial governments also provide job opportunities for small farmers through implementation of rural infrastructure development such as road, water supply systems, primary school buildings and public hospital buildings in order to increase their income. As a result of these implementation, main roads and some rural infrastructures are sufficiently provided, but, secondary roads networks are not still accomplished. Specially, in remote areas, market roads are not fully provided for agricultural input and output, and poverty problems of ethnic minority groups are still remained.

1.2 Need of the Development

In connection with the project background mentioned above, for poverty alleviation of small farmers and ethnic minority groups, it is urgently necessary to input agriculture development including strengthening of farming improvement such as cash crop diversification based on the 3 cash crops such as coffee, tea and sericulture.

Furthermore, new problems on cash crop cultivation such as quality control of cash crops, farming technology, agriculture support services, post-harvest, market, etc. recently occur in advanced area of cash crop diversification. Further study on development and improvement of cash crop cultivation is urgently needed.

2. OBJECTIVE OF THE STUDY

The objectives of the study are to formulate a master plan on crop diversification improvement in central highland region of Vietnam to aim at increase of farmers' agricultural income through improvement and strengthening of cash crop diversification based on 3 cash crops such as coffee, tea and sericulture and poverty alleviation of ethnic minority and a feasibility study on the priority areas selected through the master plan.

3. STUDY AREA

The Study area expands in three (3) provinces of southern Central Highland region, namely southern area of Gia Lai province, Dac Lac province and northern area of Lam Dong province.

3.1 Topography and Land Use

The 3 province areas expands from low land plain area (altitude 170 m-300 m) to mountainous area (altitude 1000 m-2000 m), and a majority of the areas are mountainous ranging from EL. 600 m to EL. 800 m. Total area of the 3 provinces is approximately 46,000 km². Lam

Dong province is the smallest of the 3 provinces, and the area is approximately 10,000 km². The Study area expands from low land plain along Dak Krong and Ia Hleo rivers to East-South mountainous areas. Dak Krong and Ia Hleo rivers flow west ward from northeast area of Boun Ma Thuot city (capital city of Dac Lac province), and flow down to national boundary between Vietnam and Cambodia. Low land plain extends along both the rivers. Mountainous area expands in eastern area of the 3 provinces and provincial boundary between Dac Lac and Lam Dong.

Agriculture land and forestry area are respectively approximately 517,000 ha (equivalent to about 11% of total area of the 3 provinces), and approximately 2,492,000 ha (equivalent to about 54% of total area of the 3 provinces). Other land use including wasted farm lands is 1,490,000 ha.

3.2 Hydrology and Climate

Climate is highland tropical monsoon and broadly separated into two (2) seasons such as rainy season from April to October and dry season from November to March. In accordance with hyetograph prepared by UNEP / HIP, mean annual rainfall is 2,000 mm to 2,800 mm in the Study area, and more than 80% of annual rainfall is concentrated in rainy season.

Mean annual temperature ranges from 20 °C to 25 °C in the Study area except for mountainous area. Because temperature is always influenced by altitude, and goes down less than 15 °C in higher area which has altitude of more than 1,000m.

3.3 Sociology

In accordance with statistic data of 1996, national population is approximately 74 million in 1995, and population in rural areas is about 80% of national population. Population in the 3 provinces is not clarified due to lack of detailed data, but farmhouses and population of farmhouses are respectively 397,000 nos. and 2.04 million. Therefore, family of farmhouse is roughly estimated at 5.1 heads/farmhouse.

3.4 Agriculture

A majority of farm lands in mountainous areas are zoned by different types of cash crop cultivation such as rubber, fruit, coffee, tea and mulberry depending upon nature conditions such as temperature, topography and elevation and social conditions. A majority of cash crop cultivation such as coffee, tea and other crops are mainly managed by small farmers and of mono-culture cultivation in the area. These farmers are severely affected by market conditions. Therefore, plantation area and production of each cash crop are not stable.

Main crops produced in the Lam Dong and Gia Lai provinces are coffee and tea. Plantation of both crops extends in slope lands of mountainous area. Main variety of coffee is robster, and technology on pruning of trees and shade trees are not found out in coffee plantation areas. Tea cultivation is managed by small farmers, and processing of tea leaves is carried out in small cottage industries in the area.

However, coffee and tea production of the 3 provinces are one of the largest producing provinces in Vietnam. In accordance with agriculture statistic data of 1995, coffee production is 150,000 ton in Dac Lac (the No.1 production in Vietnam), 20,200 ton in Lam Dong (the No.3 production in Vietnam) and 8,400 ton in Gia Lai (the No.4 production in Vietnam). Total production of the 3 provinces is about 80% of national production, and plantation area is 76,000 ha equivalent to about 75% of total coffee plantation area.

Tea production is 53,700 ton in Lam Don (the No.1 production in Vietnam), 2,800 ton in Gia Lai and 600 ton in Dac Lac, and total production of the 3 provinces is about 32 % of national production. Plantation area of the 3 provinces is about 15,500 ha.

3.5 Sericulture

Sericulture is one of main agriculture activities in the Lam Dong province, and Bao Loc of Lam Dong province is one of the center area for sericulture in the Vietnam. Because, Cooperation of Sericulture Enterprises of Vietnam (VISERI) which takes care of major activities and pays an important role in sericulture in the Vietnam. It has head office, research center, mulberry farm, silk reeling factories, etc. in Bao Loc. However, sericulture activities in Lam Dong province are recently declining due to low international market price of silk reeling, and sericulture farmers tend to change in crops cultivation from mulberry to more profitable cash crops.

On the other hand, the VISERI needs to sustain production of current silk production for export. The VISERI executes re-structuring of management to cope with decline of sericulture and exploits new technology on sericulture to improve quality of silk reeling, mulberry and silkworms.

Mulberry is produced in whole Vietnam as shown below, and Tay Bing province of North Delta Region and Lam Dong province of Central Coast Region are one of the biggest production areas. Lam Dong province has suitable climate conditions for sericulture which annual average temperature ranges from 20 °C to 25 °C, and local government also recommends and supports increase of mulberry plantation and sericulture development in the area. Plantation area of mulberry, except for Central Highland Region is decreasing at the national level. Decrease of mulberry plantation and sericulture are caused by low prices of international market. But, the plantation area in the Central Highland radically increases from 4,700 ha in 1989 to 6,300 ha in 1997 due to VISERI's activities.

Region	Mulberry Plantation Area (ha)	
	1989	1997
North Delta Region	5,370	3,400
Central Coast Region	2,950	1,100
Mekong Delta Region	280	150
Central Highland Region	4,810	6,800
Total	13,410	11,450

Statistic data on cocoon production in Vietnam is not available, but data on silk reeling production is as shown below. Almost of silk reeling are used for export.

Year	Mulberry Plantation Area (ha)	Silk Reeling (ton)
1985	5,000	100
1989	13,410	365
1997	11,450	400

3.6 Infrastructure

In accordance with statistic data of 1996, there is shortage of rural infrastructures such as village electrification, village water supply, buildings of junior and high schools. Specially, secondary road networks are also insufficient.

4. SCOPE OF THE STUDY

The Study will be carried out in the following two (2) phases and each phase will be further divided into two (2) works respectively:

(1) Phase-I : Master Plan Study for 3 provinces

Field Work-1: Data collection, field survey, preparation of topographical maps and investigations and formulation of a master plan on the development (4 months)

Home Works-1: Analyses, studies and preparation of a master plan report (4 months)

(2) Phase-II : Feasibility Study for the priority projects

Field Work-2: Explanation and discussion on the selected priority schemes, Supplementary data collection, field survey and investigations mainly for selected schemes and formulation of development plan (4 months)

Home Work-2: Analyses, studies, design, cost estimate and preparation of a feasibility report (3 months)

The duration of the Study is estimated at 17 months in total.

4.1 Phase-I: Master Plan Study

4.1.1 Field Work-1:

Data collection, field survey and investigation and formulation of basic development plan

(1) Data Collection and Review

Review and analyze all existing data and information related to the Study such as: national and provincial development plan and other related development program, socio-economic condition including population, sociological structure including ethnic minority and farmers' organization, meteo-hydrology, land use and soils irrigation, water resource development,

rural infrastructure,
agriculture and crop diversification,
agriculture supporting services,
agro - economy,
marketing, and
environmental aspect.

(2) Fields Survey and Basic Studies

Field survey on the following items in the Study area ;

topography, soils and land use,
meteo-hydrology and water resource,
irrigation and drainage,
rural infrastructure,
agriculture and crop diversification,
agriculture supporting services,
agro - economy including farmers' economy,
marketing,
institutional aspects including beneficiaries' intention for development,
sociological structure including ethnic minority and farmers' organization, and
environmental aspect.

- (3) Potential study on improvement of crop diversification and agriculture development in terms of technical aspects
- (4) Formulation of basic concept and development strategy for crop diversification improvement in the Study area.
- (5) Identification of crop diversification improvement and poverty alleviation of ethnic minority projects,

4.1.2 Home Work-1

Analyzes, studies and preparation of a master plan report;

- (1) Detailed analysis of field survey results
- (2) Preparation of a master plan on crop diversification improvement and poverty alleviation of ethnic minority, including;
- land use plan,
agriculture and crop diversification improvement plan,
agriculture supporting services plan,
institutional development plan
rural infrastructure improvement plan,
marketing plan,
rough estimation of the cost,
proposed implementation plan, and
selection of the priority projects.

4.2 Phase II: Feasibility Study

A feasibility study shall be implemented in accordance with the outcome of the master plan study and results of discussion on the selection of priority projects with the Government and beneficiaries.

4.2.1 Field Work-2

- (1) discussion on the selection of priority projects with the Government and beneficiaries
- (2) Additional data collection
Additional data collection will be made for making a feasibility study on the selected priority projects.
- (3) Detailed field investigation of priority projects including;
agriculture and crop diversification,
rural infrastructure plan,
agriculture supporting services,
agro - economy including farmers' economy,
institutional aspects including beneficiaries' intention for development,
sociological structure including ethnic minority and farmers' organization, and
environmental aspect.
- (4) Preliminary study on the selected priority projects, including;
agriculture and crop diversification improvement plan,
rural infrastructure development plan,
farmers' organization improvement plan,
supporting services improvement plan,
marketing plan, and
preliminary design of proposed project facilities.

4.2.2 Home Work-2

Analyzes, studies and preparation of a feasibility study report ;

- (1) Detailed analysis of field survey results
- (2) Preparation of a feasibility study report on small scale irrigation and agriculture development, including;
land use plan,
agriculture and crop diversification improvement plan,
agriculture supporting services plan,
marketing plan,
institutional development plan,
rural infrastructure improvement plan,
design of proposed project facilities
estimation of the cost and economic evaluation, and

proposed implementation plan

4.3 Transfer of Technology

Throughout the course of the Study, transfer of technology and training will be provided to counterpart personnel by foreign experts. The transfer of technology will be carried out in the form of on-the-job training and seminar during the course of the Study. Overseas training will also be programmed.

5. SCHEDULE OF THE STUDY AND REPORTS

The period required for the Study is estimated at 17 months in total. A tentative work schedule is presented in the attached paper.

The following report will be prepared in the course of the Study.

- (1) Inception Report : Within one (1) month from the commencement of the Study.
- (2) Progress Report (1) : Within four (4) months from the commencement of the Study
- (3) Interim Report : Within eight (8) months from the commencement of the Study
- (4) Progress Report (2) : Within twelve (12) months from the commencement of the Study
- (5) Draft Final Report : Within fifteen (15) months from the commencement of the Study
- (6) Final Report : Within seventeen (17) months from the commencement of the Study

6. EXPERT INPUTS

The following expatriate experts and engineers will be required for executing the Study.

- Team Leader
- Agronomist
- Agro-economist
- Sericulture Expert
- Institutional Expert / Sociologist
- Marketing Expert
- Irrigation / drainage Engineer / On-farm Development Expert
- Hydrologist
- Infrastructure Engineer
- Design Engineer
- Pedologist
- Geodetic Engineer
- Remote-sensing Expert
- Environmentalist

7. UNDERTAKING OF THE GOVERNMENT

In order to facilitate the smooth and effective implementation of the Study, the Government of

Vietnam will undertake the following:

- To provide available information necessary to carry out the Study
- To nominate a counterpart group for the Study
- To provide logistic support for the Study
- To provide foreign experts with any necessary visas and permits for the Study in Vietnam
- To exempt foreign experts from taxes and charges
- To ensure permission for entry into all areas as required for the proper conduct of the Study

TENTATIVE WORK SCHEDULE FOR MASTER PLAN AND FEASIBILITY STUDY
ON
CROP DIVERSIFICATION IMPROVEMENT
IN
CENTRAL HIGH LAND REGION OF VIETNAM

ITEMS		MONTH																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
PHASE-I Field Work-1	MASTER PLAN																		
	Data Collection and Analysis																		
	Field Survey and Investigation																		
	Preparation of Topographic Maps																		
	Home Work-1	Formulation of Basic Development Concept																	
	Selection of Priority Projects																		
PHASE-II : Field Work-2	FEASIBILITY STUDY																		
	Explanation /Discussion on Selected Priority Projects with Vietnam Government																		
	Data Collection and Analysis																		
	Field Survey and Investigation																		
	Feasibility Study for Priority Projects																		
	Explanation /Discussion on Priority Projects with Vietnam Government																		
	Finalization of Feasibility Study																		
REPORTS																			
		△ ICR			△ PR 1				△ Itr				△ PR 2				△ DFR		△ FR

Note: ICR: Inception Report, PR: Progress Report, Itr: Interim Report, DFR: Draft Final Report, FR: Final Report