

ベトナム社会主義共和国

1. ナムダン県農業・農村開発計画
2. メリン村農業・農村開発計画
3. キエンツイ県南部地域農業・農村開発計画
4. テンハイ県トンナット地域農業・農村開発計画

事前調査報告書

平成 2 年 3 月

社団法人 海外農業開発コンサルタント協会

まえがき

本報告書は1989年7月18日から26日までの8日間にわたって実施した「ナムダン県農業・農村開発計画」, 「メリン村農業・農村開発計画」, 「キェンツイ県南部地域農業・農村開発計画」, 「テンハイ県トンナット地域農業・農村開発計画」に係る事前調査結果をとりまとめたものである。

本調査は社団法人海外農業開発コンサルタンツ協会(ADCA)より派遣された太陽コンサルタンツ(株) 椎名乾治(団長/総括)と岩本 孝(農業土木)及び兼松(株)の戸田弘志(農業機械)の3名によって実施された。

後述のように、現在ベトナム社会主義共和国の経済・社会条件は 東南アジア諸国と比べて極めて悪く、ドイモイ(自由市場への“刷新”)政策とカンボジアからの撤兵宣言を機会に西側諸国からの技術、経済の援助再開を得るようにこれらの改良、発展を行うことを最大の政策としている。特に農業の総合的な近代開発は食糧増産及び食糧・農産品の輸出が最重点課題であり、今回の調査においてもハノイ人民委員長、農業食品工業省の次官はじめ行政部局及び経済協力部等からも強く西側の日本に対して協力要請を求められた。この報告書が日本、ベトナムの技術、経済協力発展の端緒となることを期待したい。

尚、調査団は現地調査、資料・情報収集を行うにあたり、在ベトナム日本大使館、ハノイ都庁、ベトナム社会主義共和国の農業食品工業省及び(株)日本・ベトナム産業技術協力会(JAVITECHS)の協力を得、所期の目標通りの成果を挙げる事ができた。これら関係諸機関に深謝致します。

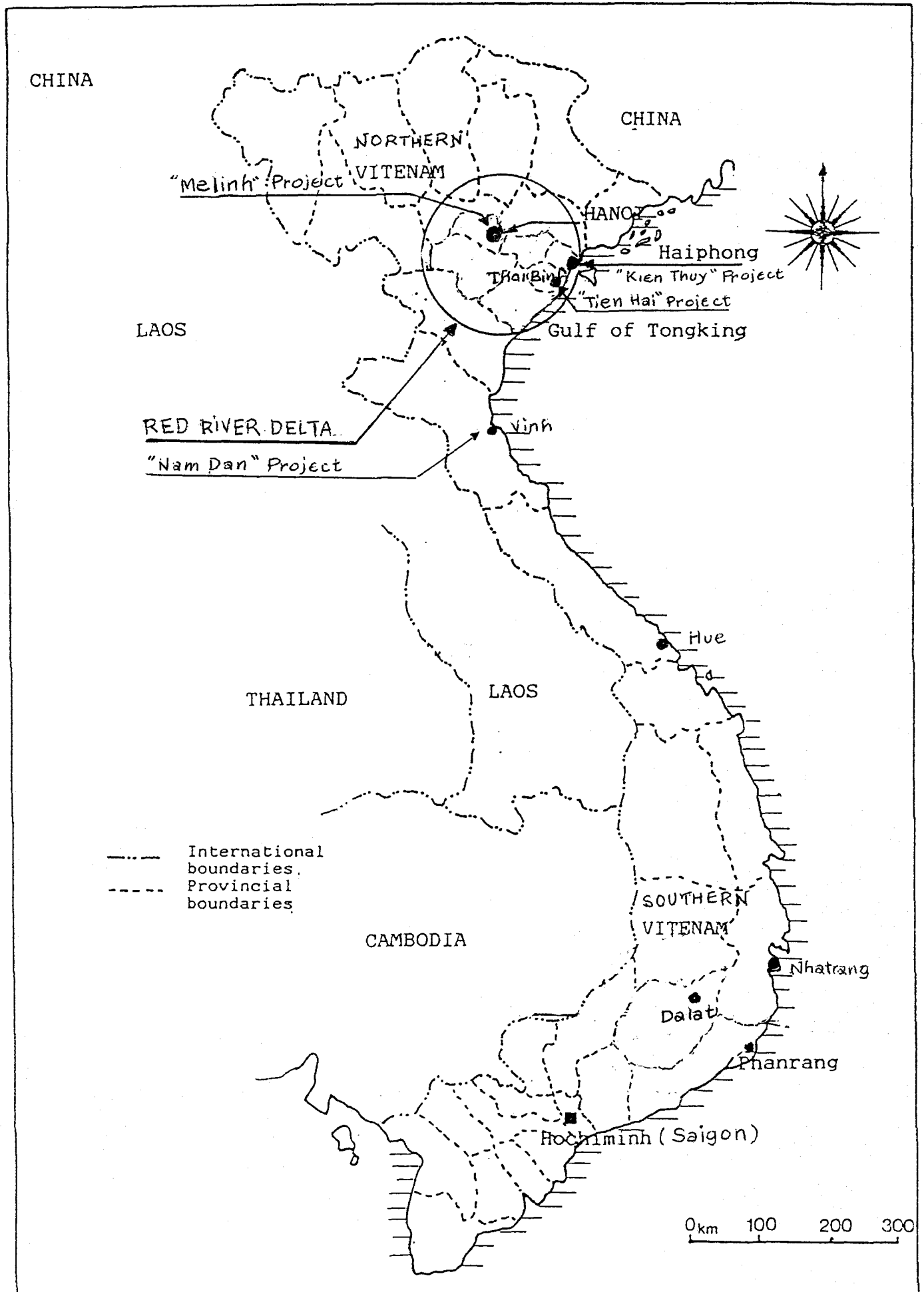
平成2年3月

調査団々長

太陽コンサルタンツ株式会社

椎 名 乾 治

LOCATION MAP



現 地 写 真



ハノイ空港に着く
調査団の歓迎風景



ハノイ人民委員長（右端）
への表敬訪問
（同市場からメリン村農業農
村開発計画の要請を受けた）



現地での打合せ
（ナムダン県、ギェティン省）



農業食品加工省との打合せ
 (椎名団長の前にいるめがね
 の方はトン次官である)



NIAPP (農業計画院)
 との打合せ
 (椎名団長の前にいるめがね
 の方はフォング院長である)



現地視察

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現地写真

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1. 背景

1.1 一般的背景

ベトナムの歴史においては、遠昔から王国として立国した以降中国との紛争が長引き、西暦 939年に中国の王朝支配を脱して独立したが 18 世紀に入ってからヨーロッパ諸国のアジア征服と共に1858年から部分的に始まったフランス支配が1880年頃には、ほぼその全土に及んだ。その後日本軍進駐、第2次世界大戦の終戦を機に第1次インドシナ戦争が勃発、南北ベトナムが分離（南は西側、北は共産圏）、後に北から南への解放進功による再びベトナム戦争及び第2次インドシナ戦争を経て、1976年、ベトナム社会主義共和国という統一国家として成立するに至った。東経100～109度、北緯9～23度に位置し、南北に1,800kmと細長く総面積は33,689km²で我が国より多少小さいである。西はカンボジアとラオス、北は中国と接しているが、東と南は南シナ海に面している。人口は我が国の半分、6,000万人余りである・多民族国家と言われているが約八割りが都（キン）族で、その他は華僑、チャムパ族、種々の山岳民族の60種類もいる。宗教は、殆どが仏教（国の西側は小乗仏教、東側は大乗仏教）、儒教であるが、18世紀に入ってからカトリック教、キリスト教、または、南部には新興宗教のカオダイ教等がある。地方行政区は、ハノイ首都、ハイフォン及びホーチミン（旧サイゴン）の両特別市の他、37省に分割されている。

気候は熱帯モンスーン気候で、平均気温は平地部で27℃であるが、中南部の高原地域は20℃前後で涼しい。降水は年間1,400～2,000mm程度であるが、5～10月の雨期に集中している。また、雨期には概して台風の襲来があり、地形との関係で紅河デルタとメコンデルタが洪水の被害を被る。

1.2 産業・経済

1.2.1 交通

鉄道は、ハノイを起点に北は中国と境のランソンやラオカイ、東に向っては北部の最大港のハイフォン（1902年建設で最古）、更に南に下っては王朝の都ユエ市を経て海岸沿いに南部の最大都市ホーチミン市（旧サイゴン）に至る。

主要道路は上記の鉄道に平行したもの他に、チュオンソン山脈を抜けてラオスに至るもの3本、カンボジアに通ずるもの1本、更にホーチミン市（旧サイゴン）

を起点としてカンボジアやメコンデルタに至るものが数本、又、中南部のタイグエン高原を縦断する道路等がある。しかし、メコンデルタ域では戦争の破壊目標と云う理由により橋梁の建設が遅れ、フェリーに依存する箇所が多い。

1.2.2 工鉱業

主要な地下資源はハイフォンの北のホンゲイを中心として無煙炭 530万t、天然ガス50万t、燐鉱石50万t、塩43.7万t（以上1980年）、クロム鉱 1.6万t（1979年）である。主要工業製品は銑鉄 2.8万t、粗鋼 6.2万t、セメント64万t、化学肥料31.3万t、紙類 4.7万t、砂糖11.4万t、ビール 6.1万t、綿織物 1億7,350万㎡等であって、概して工業は未発達である。（1980年）

発電は水力と火力とを併せて40億kwh(1981年)であるが、現在、紅河の支流ソンダー川に建設中の、ソ連の援助によるホアビン発電所は、24万kwhの発電機8基を備え、192万kwhの発電能力であり、1990年から順次稼働に入る。これによって、1992年には北部地域の電力問題は解消することが期待されている。

1.2.3 農 業

1986年のFAO統計によれば、ベトナムの総陸地面積 3,295.6万haのうち農耕地は 679.5万ha(21%)、永年草地27.2万ha、林地 1,305.0万ha、その他 1,241.9万haとなっている。農耕地のうち 620.0万haが耕地、59.5万haが樹園地である。また、かんがい面積は1970年には 9.8万haであったが、1985年には 177.0万haに拡大している。

1986年の主要作物の作付け面積は以下の通りである。

水 稲	610.2万ha	ヒ マ	0.4万ha
メ イ ズ	43.4万ha	胡 瓜	3.1万ha
ソルガム	3.3万ha	綿 花	1.7万ha
馬 鈴 薯	2.8万ha	甘 蔗	16.9万ha
甘 藷	40万ha	コーヒー	4万ha
キャッサバ	50万ha	茶	5.5万ha
大 豆	14.9万ha	煙 草	3.9万ha
その他の豆	87.1万ha	ジュート	3.1万ha
落 花 生	27.5万ha		

以上の他、野菜、果物等があり、南部のゴムは約14万haと推定される。

水稻は春稲と夏稲があり、かつては夏稲又は春稲の1年1作であったが、1960年代のポンプの導入によって2期作が進展し、紅河デルタでは、水稻の2期作に加えて、冬作に畑作物をいれた3毛作もみられるようになっている。稲作は紅河及びメコンデルタ、更にその他の中小河川の流域が中心であるが、南部では、この他にゴム、高原地方ではコーヒー、茶、更に養蚕も行われている。

家畜は主に豚（13,000千頭）、にわとり（70,000千羽）、水牛（2,700千頭）、牛（2,500千頭）と馬類（2,000千頭）である。水牛は農耕、馬類は主として運搬用である。

林業は素材生産が2,319万 m^3 で、このうち製材284万 m^3 を生産し、この他竹林、樹脂等を生産している。漁業は海面及び内水面があり、年産約101万トンで、このうちエビについては輸出用として養殖が行われている。（1982年）

1.2.4 貿易

1985年の輸出は3億6,400万\$、輸入は6億2,200万\$、このうち農林水産物の輸出は1億7,070万\$、輸入は1億9,410万\$、又、日本との関係では、対日輸出は6,000万\$、対日輸入は1億6,500万\$である。輸出入共に年々上昇してきているが、入超の傾向は依然として続いている。

農林水産物についても1985年の入超で、主な輸入品は穀類の45万t（9,900万\$）で、この他に農用資材として化学肥料（1.3億\$）を輸入し、輸出では豆類、唐辛子、茶、落花生等が1,000万\$を超える品目で、この他に2次加工品としては天然ゴム（4,000\$）、落花生油やココナッツ油（共に約400万\$）等がある。

1.2.5 経済

資料の制約のため、必ずしも明確ではないが、1988年11月11日のAsiaweekによれば、ベトナムの国民所得（GNP）は87.1億\$と推定され（1987年）、国民1人当たりでは130\$とされている。国民総生産（GDP）の成長率は4.3%である。又、「海外経済協力の現状と問題点」（通産省、1986年）によれば、1984年の対外責務残高は50.0億\$、前記のAsiaweekでは79億\$で、ベトナムの経済は未だ低位の段階にある。

又、国内の物価は安定せず、インフレが続き、1987年は1年で700%の上昇、1976年を100とした場合の農林物価の指数は以下の如くであった。（F A O統計）

品 目	1980	1981	1982	1983	1984	1985	1986
農家購買品	253	713	949	1,177	1,826	3,301	14,640
販売農産物	284	877	1,046	1,157	1,786	3,301	16,739
家畜及畜産物	245	556	796	1,319	2,293	3,626	13,221

なお、通貨はドンを用いているが、1988年11月14日から変動制に移行し、かつての公定レート of 1 \$ = 368ドンから 2,600ドンさらに 4,000ドンに切り下げられている。

又、外国からの政府開発援助（O D A）は、1985年は総額1億 1,390万 \$ で、そのうち 1,540万 \$ はOPEC諸国、 4,440万 \$ は国際機関、 5,410万 \$ がD A C加盟国で、主としてスウェーデンからの紙工場及び人道援助物品である。

2. 国家経済と農業開発計画

2.1 国家経済開発計画

ベトナムは1976年末の社会主義共和国として統一後初の経済開発計画として、南部も含め第2次5ヵ年計画を策定した。その内容は、国民総生産は年率14～15%、農業総生産は8～10%、工業は16～18%の増加を目指したものであった。しかし、内外諸事情による農業生産の不振、経済運営の不合理、性急な統一と社会主義化による南部の経済政策の失敗に加えて、カンボジア侵攻と軍の駐留、中越国境の紛争等による軍事費負担の増大、それに加えて日本など西側諸国からの援助の凍結などの悪条件が重なり、目標を大きく下廻ったと云われる。この計画期間中、毎年150万トンの食糧輸入を余儀なくされている。

第3次5ヵ年計画（1981～85年）は、目標を低く抑え、最重点実施事項として、南部の農業集団化など同地域の経済の社会主義化の一項が揚げられると云われる。しかし、統一前のソ連・中国等の支援で社会主義化が進められた北部と異なり、この間西側の援助の下で資本主義体制が維持されてきた南部との事情の差は大きく、農民の合作社への組織化、生産企業の国営化、商業等の流通機構の社会主義化等は、大きく緩和されたと云うことである。なお、この期間中に、北部を含め全国的に農業についての生産請負制が実施され、商業についても自由化が認められるに到った。

その背景に基づいて第4次開発計画（1986～90年）が現行の国の社会経済開発計画として実施されていた。公表されているものからは数量的なことは判らないが、大目標として食料生産（粍換算）は2,200～2,300万トン、前計画比300～350万トンの増、消費財の年増加率13～15%、輸出70%、石油生産（精油能力）年100～300万トン、人口増加率1.7%（現在2.2%）、国民総生産の年増加率6～7%が示されている。

しかし最近、東欧諸国の変化により、ベトナム社会主義共和国は今後コメコンからの支援を期待できなくなった。従って、この国は西側からの経済・技術協力を求め、今後の国家経済面だけでなく全体社会経済開発計画の方向も修正せざる得ないであろう。

2.2 農業開発計画

この第4次開発計画では先ず①食糧食品 ②日用品 ③輸出品の3大経済課題を

提起している。

ベトナムの農業開発の方針や方策の大綱は上述の5ヵ年計画の中に示されているが、これと1987年度の同計画に関する関係会議への報告書とを参考にしてその生産内容をみれば以下の通りである。

(1) 未利用農業資源

可耕未墾は200万haがあり、その上耕地の利用率は低く、その上800万haの空地や禿山、数十万haの可養殖水面等があり、農林水産面の開発の余地は大きい。

(2) 食料作物

食料作物としては稲の他にメイズ、甘藷、キャサバ、馬鈴薯等があるが、重点は稲とメイズである。稲作の主な開発方向は集約化で、メコンデルタと紅河デルタが重点地区、特に耕地利用率の低いメコンデルタの利用率の向上が必要である。

開発方策の第1は水利で、北部デルタでは堤防の補強、電気ポンプ場の維持発展、夏秋期の冠水面積の縮小、メコンデルタでは水利施設の整備強化が必要である。第2は肥料で、厩肥や緑肥の増産を図り、化肥の輸入のための外貨の手当が必要である。第3は病虫害の発生予察を的確に行い、農薬の輸入を十分に確保する。第4は人力等に依存する農耕を和らげるため、役畜牛の増加、耕運機の国内生産の推進と追加輸入、第5は優良種子の生産と配付のシステム化、第6は生産食料の損失防止のための野菜加工、輸送等の改善、第7は農業の生産請負制の改善の推進である。

(3) その他の食料作物

国民食料の質の向上のための畜産の拡充で、家庭畜産を奨励し、そのために種畜の供給、飼料の確保、家畜保健等に留意し、他方、野菜、果樹、油耕作物等については都市やその他の市場を配慮し、生産社及びその集団組織が都市へ出荷販売できるようにする。蛋白資源である水産物は輸出食品でもあり、漁場を開発し、内水面では家畜、家禽との結合をも考慮して養殖を組織し、漁港、漁船、漁具等の漁業手段を整備し、沿海漁業の拡充を図り、併せて漁民の生活き向上を図り、適正な販売条件を整える。

(4) 工業作物

1年生工業作物については、物質、価格、投資、資材、食料の供給等の施策を刷新し、特に豆醬、落花生、甘蔗、ジュート、煙草、い草等の集中的発展を図る。多年性工業作物、特にコーヒー、茶、椰子、胡椒等については、未開発の適地が多く、

開墾、混作、間作を通じて拡大を図り、他方、既栽培化についてはその集約化を行って生産の増大を務め、国营、集団、家族等の経営を通じ、及びそれらの連携によって、資本の蓄積、土地、労働の活用を図る。

(5) 林 業

森林資源の拡充、保護、火災を含めた災害の防止に務め、稼働耕作地については田耕作へ誘導して、土地の畜産利用と住民の生活安定を実現し、農地と同時に生産請負制を通用し、環境保全に留意しつつ森林生産の拡大化と、主要森林物の生産を図る。

以上が現行5ヵ年計画に盛られた農業開発方策についての概要であるが、この計画に対して、1986年の実績が報告されているが、農業生産面については、災害やその他の理由によって、食糧生産は同年の目標に対して未だ150万ト下廻る状況で、計画以上の進展をみたのは永年工業作物や林業の植林面積であり、その他の部面では、前年より減少、或いは若干増加したものの、計画量に達しなかったと云う状況である。

このため、1987年の計画としては、農業投資の比重を前年の24.5%から28.5%に高め、例えば、食糧作物については、メイズや馬鈴薯の増産に特に留意し、水利への投資を実現し、肥料の手当を充実し（窒素肥料190万ト）、農機については大型500台、小型2,000台を追加する等の年次対策が示されている。

2.3 農業構造の改革

ベトナムの農業構造の改革はほぼ中国と同様な軌跡を辿っている。つまり、農作業の労働力交換方式の互助組から土地、資本、労働力を持ち寄り、応分の配当を行う初級合作社、次いで基本基本財産を共有する高級合併社へと進みコルフォーズ的な農業が営まれている。1955年の互助組の総数は15.3万、北部の農家の40.5%が加入していた。

それと同時に合作社結成の試行（8社）が始まり、1958年から初級合作社に以降することとなったが、同年末には3,720社、更に1958～59年頃から高級合作社の結成も開始され、1960年末には初級が3.7万、高級が4,400を教え、北部ののうみっ

の85.7%が合作社に参加し、63年には88%、66年には85%が高級合作社となった。唯、中国と異なるのは政社合一の人民公社への移行がみられなかったことである。他方、ゴム、コーヒー等の長期資本投下を要する永年作物については国営農場方式が採用されることとなった。この農業の集団化は1976年の南北統一後、南部地区にも適用された。

しかしながら、市場はともかく、中国と同様1981年には生産請負制が導入され、合作社はそのままとして機能を変え、農業生産は労働力を単位として農民へ耕作権を移譲し、当初は3年、1988年からは15年間について責任生産を実施する運びとなった。この方式は国営農場にも波及し、南部においては農場用地の90%は農民に耕作を委ねるに至っていると云われる。

この段階での合作社の主要業務は、農用資材の供給、政府収納の生産物の取扱いで、合作社の規模はかつては現在の2倍程度であったが、現在は1村に2社、北部デルタの例では耕地役300ha程度である。このた、農村部の手工業についても品目別及び地域別に合作社が結成されている。なお、1986年の農業合作社数は39,000社、そのうち北部は合作社25,000、国営農場は441となっている。

また、農村部では、水利施設の進行に併って、その管理を別建とし、企業（エンタープライズ）として独立させ、施設と受益範囲毎に独立再三による維持管理を行っている。（概して、水利費は粗生産の5%程度）この方式は堤防、排水門、煉瓦製造等にも適用されている。この他、特定作物については中央、省、県を系列化した連合企業を組織し、集荷、加工、輸出等の一元化を図っている。

3. 各調査計画の要点

3. 1 ナムダン県 農業・農村開発計画

1. 計画地区概要

1.1 自然状況

(1) 位置

プロジェクト地区派ゲティン省ナムダン県で、ハノイ特別市から南へ 300km、ヴィン市の西 1 km に位置し、面積は 29,600ha であり、このうち農業面積は 14,234ha である。

(2) 地形・土壌

計画地区は南北 30km、東西 10km の三方を山に囲まれた盆地状の地形を呈し、その中央を西北西から東南東に向けラム川が流下している。土壌は沖積土とラテライト性土壌であり、肥沃土は低い。

(3) 気象・水文

酷暑季は 6～8 月で、12～2 月が冷涼季であるが、4～8 月の間にモンスーンがラオス国境の山脈を越えて吹き下ろすことがあり、この時にはフェーン現象により気温が 35℃ 以上で、湿度が 55% 以下となり、農作物に被害を与えている。台風の襲来は主に 9～10 月である。最近 20 年間の年間平均雨量は 1,928mm、最大は 1978 年の 3,000mm、最小は 1977 年の 1,000mm である。年平均気温は 23.3℃ で、日照時間は、1,637 時間/年であり、平均湿度は 86% と高い。

1.2 社会経済

(1) 人口

・総人口	135,000 人
・農業人口	130,000 人
・労働人口	50,000 人
・農業就労者	45,000 人
・人口密度	450人/km ²

(2) 行政

ナムダン県は、23 の郡で構成される。

(3) 農村インフラ整備状況

- ・貯水池 : 県周辺部の丘陵地に 20ヶ所建設されており、発電や家庭用水に利用されている。ダムの高さは高いものでも4 ～5mであり、その規模は小さい。
- ・ポンプ場 : かんがい用電動ポンプ場が 50ヶ所あるものの、モータ及びポンプの殆どが耐用年数を（1956年度製）を超えており、現状の稼働率は30～50程度しかない。
- ・水路 : 県中央部にてラム川より取水し、西へ向かって延長 7kmの幅員30m 深さ4mのソンダオ水路があり、これに数本の支線水路が連結している。ラム川からの取水門は、幅3.5mの水門4門と幅5mの舟通し1門を有するフランス植民地時代に建設されたもので、北爆の難をのがれ現在もかんがい用水と舟運に利用されている。
- ・道路 : ヴィン市とナムダン県とを結んでN0.7という省道がある。これはヴィン市からナムダンを通過し、ラオスのビエンチャンまでを結ぶ道路で全線アスファルト舗装されている。その他の道路は、ラテライトで簡囲舗装されているものの、路面の状態は悪くまた、ラム川にかかる橋は県内に鉄道用の1本があるのみで、横断は船によるしかないため、県の南西部への移動は極めて不便である。

1.3 農業

ナンダム県の農業生産は、水稻の2期作もしくは水田1作+畑作という作付体系によるものが多いが、条件のよいところでは、水田の2期作+畑作という作付が可能な地域もある。又、丘陵地帯では果樹や畜産なども盛んであり、内水面を利用した養魚も行われている。

- ・ナンダム県における農業土地利用面積は、以下のとおり

農地	14,057 ha	(100%)	
水稻	9,989 ha	(71%)	(沖積地及びかんがい地域)
畑作	2,887 ha	(21%)	(丘陵地及び沖積地)
(例: 大豆、さつまいも、落花生、くわ、とうがらし、さとうきび)			

果 樹	668 ha	(5 %)	(丘陵地及び沖積地)
放牧地	370 ha	(3 %)	(丘陵地及び山岳地帯)
養魚池	143 ha	(1 %)	
森 林	10,798 ha		(丘陵地及び山岳地帯)

・本県における主要作物の単位収量は低く、次に示すとおりである。

	本 地 区	紅河デルタ
水稻（2期作）	5.0 ton/ha	7.0 ton/ha
メ イ ズ	2.0 ton/ha	2.5 ton/ha
さつまいも	6.0 ton	7.0 ton

その他の生産物としては、牛16,000頭、水牛 8,000頭、豚35,000頭等がある。

上述のように生産性が低い原因として、以下のものが考えられる。

(1) ポンプの未整備と老朽化

県内の 50ヶ所に及ぶポンプ場に設置されているポンプは、殆どが1950年代中頃のものであり、既に耐用年数を超え老朽化している。又、雨水依存もしくはタットヌオックという、ヒモ付きバケツを用いた人力かんがいに頼っている水田が全面積の半分以上を占めており、渇水被害を受けやすい。

又、河川の後背地の低地では湛水被害が発生し、毎年 2,500ha程度が被害を受けている。

(2) ラオス風による被害

4月～8月の間にラオス国境の山脈から吹き下ろすモンスーンは、フェーン現象により高温、低湿になる。通常、月に10日から15日の発現回数であるが、1988年には60日間連続でラオス風が吹いたため干ばつとなり、全農地の半分以上が干害を被った。

又、落花生やとうがらし等の畑作物も収穫直前の4月にラオス風が吹くと、極端に収穫と商品価値が下落してしまい、湛水による潜熱冷却がある程度期待できる水田と違い、畑作物への影響は大きい。ナムダン県は木材の生産も盛んであるが、無計画な乱伐により山岳部が禿山となり、ラオス風による被害を助長しているばかりか、土壌浸食を誘引している。

(3) 農業・肥料不足

計画地区内の土壌は、ラテライト系の土壌が多く分布しており肥沃度が低い。

又、ph4.5 以下の酸性土壌が 3,500ha もあり土壌改良が必要である。さらに、いもち病やトビウンカ等による病虫害もかなり多く発生しており、1986年には、4,000ha 以上の被害が出ている。しかしながら、肥料や農薬及び散布機械が不足しており、施肥や病虫害対策を実施するのが困難な状態にある。

(4) 適切な圃場作業機械の不足

計画地区内にはトラクタステーションが設けられ、ソ連製の50馬力のトラクター20台を保有しているものの、耕地の規模や水管理状況と機械の規模が適切ではなく、細かい圃場作業は畜力と人力に依るところが大きい。このため、水田には不陸が多く認められるし、耕地単位の土壌監理が行われていないのが現状である。

(5) 農産加工・流通施設の未整備

ナムダン県では、水稻、落花生、とうがらし等の代表作物の他にも桑、果樹、茶、コーヒー等の換金作物や畜産物が生産されている。しかしながら、これら生産物を乾燥、貯蔵、加工、流通させるために必要な施設は全く整備されておらず、収穫後の品質及び市場性の低下が問題となっている。

2. 計画構成

2.1 計画の目的

- (1) 計画地区内の生産性を阻害している要因を明らかにし、高収量、高収益を得ることの、可能な農業を確立する。
- (2) 重要な国の政策である「食料の増産」計画に寄与するべく、先進農業技術を導入する。
- (3) 中部ベトナム地域に対する農村総合開発のモデルとする。
- (4) 貧困な地域に対して農村総合開発の手法を通じて、農家の生活水準を向上させるとともに、世界的自然環境保護の見地からも、極めて重要な保全対策を推進する。
- (5) 農業生産基盤の整備及び、農村工業の振興等により、農民に対する雇用機会の拡大を計る。

2.2 開発計画の内容

農業基盤整備と農地保全対策を基本とする、以下の開発計画を策定する。

(1) かんがい排水施設改善計画

ナムダン県の既存かんがい排水施設は、ポンプの老朽化、かんがい排水器の維持管理の不備等、円滑な運営を妨げるいくつかの物理的要因が存在する。効果の早期発現が期待される、これらの施設の改善に優先順位を置く。又、かんがい排水施設が未整備の圃場についても、土地利用計画と照合した上で、施設整備計画を作成する。

(2) 農業・土地利用計画

本地区の土壌、地形、気象等、自然条件を考慮し、生産性の高い作物、品種を導入することを目的とした農業土地利用計画を作成する。又、丘陵地帯や耕地の周辺部に対する植林、造林計画についても検討し、土壌保全対策を考慮した計画とする。

(3) 営農・栽培計画

本地区は、フェーン現象や台風等の被害を受けることが多いばかりか、土壌の肥沃度も低く、酸性土壌も一部で認められる。このため土壌改良や、肥沃度の増

加を図るための技術や、気象災害に強い作物を育成させる技術を適用させるための営農、栽培計画を作成する。又、これらの技術を適用するために必要な、圃場作業機械の導入についても勧告する。

(4) 圃場整備計画

地区内の圃場は、地形が平坦でないため、一筆毎に田面の高さが異なる形態を成しているばかりか、適切な農作業機械の不足から不陸なども多く、営農や生産性の面から課題となっている。また、農道の整備も遅れており、これらを含めた圃場整備計画を作成する。

(5) 農産物加工・流通施設整備計画

現在、地区内の加工、流通施設は皆無であり、生産物の品質を保ち、さらには生産物を加工し、付加価値を与えるという方策も実施されていない。高収益を得るためには、これらの施設は極めて重要であり、農村内部の新たな雇用の創出にも結び付くことから、農産物加工、流通施設計画を作成する。

(6) 農村生活基盤整備計画

農村生産基盤整備と併行して、農村の人々が生活してゆく上で、欠くことのできない生活基盤（飲雑用水の確保等）についても、計画を作成する。

2.3 調査計画の内容

(1) 調査の目的

中部ベトナム地域に対する、農村総合開発計画の導入の可能性を調査する。又、かんがい排水施設の改善や、先進的な営農栽培技術の普及を通じ、農業生産の増大を図り、農民の生活を改善するための各種計画を作成する。

(2) 調査地区

農業食品工業者、NIAPP(National Institute Of Agricultural Planning and Projection) は、ゲーティン省ナムダン県(29,600ha)を次の理由により、調査対象地区として計画している。

(a) ナムダン県には、中部地域の殆どが存在する、最も標準的な地区である。

(b) 当地区の一部に対して、NIAPP は概略調査を既に実施し、ある程度の資料情報が現存する。

- (c) ゲーティン省の省都ヴィン市に近く、又、故ホーチミン氏の生家が地区内にあるため、ベトナム全土から人々が訪れることから、他の地区に対する展示効果が期待できる。

(3) 調査内容

調査は、次のPhase に分けて実施される。

(A) Phase I (マスタープラン調査)

調査地区：ゲーティン省ナムダン県

(B) Phase II (フィジビリティ調査)

調査地区：Phase I 調査において選定された地区

各 Phaseに必要な調査は次のとおりである。

(A) Phase I (マスタープラン調査)

(a) 資料の収集及び解析

- ・地形、気象、水文、水質
- ・土壌、地質
- ・かんがい排水
- ・植生、土地利用
- ・植林、畜産、養蚕、漁業等を含む農業
- ・農業経済、地域開発計画
- ・インフラストラクチャー

(b) 現地調査

- ・地形、気象、水文、水質、地質等の調査
- ・リーチングテストを含む土壌調査
- ・農業調査
- ・社会経済、その他

(c) 土壌図、土地分級図の作成

(d) 土地利用計画図の作成

(e) 予備的に開発計画を評価し、優先順位をつけたプロジェクト・リストを作

成する。

(f) 優先順位の高い開発計画を選定しフィジビリティ調査地区を決定する。

(B) Phase II (フィジビリティ調査)

(a) フィジビリティ調査に必要な追加資料の収集及び現地調査

(b) 資料の解析及び調査

- ・ 気象、水文
- ・ 土壌及び土地利用
- ・ 植林、畜産、養蚕、漁業等を含む農業
- ・ かんがい排水
- ・ 社会経済

(c) 上記の調査及び解析に基づき各々の開発計画の作成

(d) 施設の予備設計

- ・ かんがい排水施設
- ・ 圃場整備（農道を含む）
- ・ 農産加工、流通施設
- ・ 農村生活基盤施設

(e) 事業費の積算及び評価

3.2 メリン村 農業・農村開発計画

1. 調査対象地域事前調査報告

1.1 調査対象地域の概要

メリン村は、ハノイ市の中心から28kmのメリン県南西部に位置し、平成元年度にADCA調査団により調査されたメリン県タンディム地域農業・農村開発計画の受益地区内の村である。その面積は、615 ha、人口は、1989年現在 8,700人であり、農業生産の主体は、米と、ハノイもしくは輸出用の野菜作が盛んである。

Thanh Diem農業水利システムの受益地中で、最も開発可能性の高い地域であると、ベトナム農業食品工業者が明言している。しかしながら、生産基盤の整備は、殆ど行なわれておらず、農業生産の増大と住民生活向上のための開発、とりわけ、かんがい排水施設や、通信、運輸、エネルギー供給等の施設の整備、及び農産加工、福祉、厚生等の施設の建設を実施することが望まれている。ベトナム政府は、本地域の開発整備を諸外国からの協力、援助によって実施することを考えており、特に日本の協力を期待している。

以下に本計画に対するプロポーザルを示す。

尚、本計画の前段の計画として、メリン県タンディム地域農業・農村開発計画事前調査報告の抜粋と、本計画と同様な形で開発が期待されているリエンマック村農業・農村開発計画に対するプロポーザルを次章に示す。

2. 追 補

2.1 ハノイ首都メリン県タンディム地域農業・農村開発計画事前調査（平成元年度実施）報告抜粋

2.1.1 メリン県の農業概況

(1) 概 況

ハノイ首都の中の農村県で、ハノイ市街地の北約32kmの地点にあり、ハノイ（Noi Bai）国際空港はその東側に隣接している。県の南側を紅河本流が東流し、

北側は海拔75～100 m、最高は 540mの丘陵地帯があり、その間は紅河によって形成された海拔 5～6 mの古沖積層の低地帯となっている。

ハノイの近郊にあるため、ハノイ住民への生鮮野菜等の供給基地の1つであり、近郊野菜地帯としての発展が期待されているが、丘陵地域では土壌侵蝕があり、土壌は前半に瘠せ、水利施設は建設の途上にあるが未だ整備されるに至らず、その上流通施設はシステム化を含めて不完全である。

総面積は26,500ha、そのうち 7,500haが丘陵で、農地は12,200ha、うち耕地が10,100haとなっている。総人口は18.3万人、農村人口は15万、農家戸数は 3.3万戸である。農村部は23村、都市部は2町で構成されている。

(2) 耕地条件

耕地の10,100haはその地理的特徴によって次の4地域に分けられる。

① 丘陵近辺の瘠地

面積は 2,500ha、砂質土でPHは 4.5～5.0、風乾土 100 g中の磷は11.8mgで磷酸吸収係数が高く、加里分は 7.5mg、有機物含量は1.37%である。

② 中央低地

面積は 4,000haで、概して稲作に供されている。PHは 5.7、磷は13.2mg、加里は 6.5mg、有機物含量は 1.7%である。

③ 南部地区

面積は 3,000ha、PHは 4.5～5.0、磷酸は12.9mg、加里11.2mg、有機物含量は 1.8%である。

④ 河川敷

紅河の河川敷として約 600haがある。

(3) 作 村

総作付面積は24,000～25,000haで、そのうち食料作物が18,000である。食料作物の中では稲が中心で14,400ha、メイズ 3,000haである。

稲作は春稲と夏稲に分かれるが、冬春期は野菜等が入るために前者は 6,200ha、後者が 8,200haである。メイズも冬作と春作がある。

稲作の単収は春稲が億、3.2～3.5 t/ha、夏稲は天水依存のため 2.5～2.8 t/ha、平均では 3.1～3.2 t/ha、また、2期作として場合は 5.5～6.0 t/haである。この他、食料作物として甘藷 1,800haがある。

県の食料生産の総量は粳米換算で 4.6~5.7 万ト、そのうち水稻が 3.7~4.5 万トを占め、農民人口 1 人当りの生産高は 330kg である。

野菜類は総作付け 1,800~2,100 ha、生産量は 36,000 t で、トマト、青菜、青かぶ、ねぎ等が主な作物である。

その他の作物として主なものは、馬鈴薯 600~700ha (8,000~9,000t)、落花生 1,200ha (1,000~1,600t)、大豆 600ha、ねぎ 150ha (2,500t)、また、茶や ジュート等もある。

(4) 家 畜

大家畜としては牛 9,200頭、このうち 6,200頭が放牧用である。主として役用に供せられる水牛は 7,500頭であるが、畜力や機械が不足気味であるものの如く、人力耕起が散見された。豚頭数は 56,000 頭、肉の生産量は 3,900t で、4,500 頭が繁殖用である。肉豚の飼料は糠等が主体で、約 100kg で屠殺されるが、それに至るのに 8 ヶ月を要すると云うことであった。なお、県内には屠殺場が設置されているが、1 日当りの屠殺数は 20 頭で、生産豚の 60% をカバーする程度である。

(5) 流 通

この県は近郊農業県であるが、流通システムに不十分である。県及び中央に取扱機関（企業）を設けているが、それらの取扱高は 40% 程度であって、残りの多くは個人出荷に依拠し、天秤、荷馬車等によって搬送している状況である。

2.1.2 タンデム地区の農業概況

(1) 一般的背景

本地区は、リンマック (Lien Mac)、チェーファン (Chu Phan)、タッチダー (Thach Da) バンケー (Van Khe)、ファンキム (Hoang Kim)、メーリン (Me Lin h)、の 6 ヶ村で構成されている。紅河本流沿いに位置しているため紅河の水位 (高水位 15.5m、低水位 3.5m) による影響を受け易く、これが農業生産を阻害する大きな要因となっている。

農業生産は、稲作がメインであるが、近年、冬期作として、メイズが耕作されたが、役畜、肥料、農薬等が需要に応えられないため、現在は全く見られなくなった。農村工業について未開発で住民の生活水準も極めて低く、生活基盤の整備も貧弱である。また地区内の道路の殆どは未舗装である。

(2) 土地利用及び農業生産

本地区の総面積は 4,917ha で、このうち 2,706ha (54.4%) が農地である。

農地のうち 2,089ha で稲、野菜類、イモ類、加工用作物等が耕作されている。作付面積は延 5,669ha (冬期22.3%、春作45.4%、夏作32.3%) で、うち食糧作物は、4,705 ha (米76%、雑穀類24%)、野菜及び加工用作物は 964ha である。米の収量は、3.4t/ha (春作3.81ト、雨期作3.10ト)、メイズは 2.0~2.4 t/ha、甘藷 6.0~7.0 t/ha、馬鈴薯 14.4~15.0t/ha である。

年総生産量は、15,000トであり、作物別では、野菜(コーラビ、キャベツ、カリフラワー)が 1,980ト、玉ねぎ 180ト、落花生55ト、にんにく 170ト、野菜の種子30トであるが、水利施設の整備等による増収が期待されている。

畜産の内訳は、豚15,000頭、水牛 777頭、牛 4,470頭であり、1980年のデータと比較すると豚の生産が増えている。牛の生産も同様に増加したが、水牛は減少した。農業生産に加えて本地区の住民、ジュータンや綿織物、刺しゅうやレースなどの手芸品や建築資材の加工等の伝統工芸技術を持っている。

(3) 水 利

① 灌がい

紅河沿岸に面積 3,000ha を目途にしたダンデム揚水機場がある。ここには 1,000 m³/hr のポンプ14基を装備(33~37kW)し、1段目の揚水で 1,400ha を灌がいし、次いで12ヵ所の小型ポンプ場で2段揚水して残りの 1,600ha に灌がいをすることとしている。紅河から取水するポンプ場は水位の高下によって移動できるようになっているが、高水位や低水位の時には取水困難となり稼働率は 70%にとどまっている。将来的には 8,000m³/hr の立軸ポンプを 5 台設置して固定式に変更することを意図している。なお、圃場への灌がいは乾期に当たる冬春期が中心であるが、未だ電力灌がいの段階に至らず、特に畑作物については 2 次水路からの人力灌がいが支配的である。

② 排 水

排水専用の施設としてこの地区の低地部に排水機場を設けている。Thuong Le 機場は 2,000~2,500 ha、海拔高は 5.5~5.6 m で、4,000 m³/ha の排水ポンプ21基宛を設備している。排水能力は 250mm の 3 日排水であるが、これは、1 日20時間の電力供給を前提にした場合である。現在、電力事情は必ずしも良

くないが、建設中の水力発電所が操業に入れば問題はなくなる筈である。唯、問題はポンプ（ソ連製15年前）の老朽化で、既に 250mm以上の降水に対応できなくなっている。

(4) 水利改善の効果の予測

上記の用排水施設及び末端でのかんがい方法の改善によって以下の直接効果がえられるものとされている。

- ① 稲 作 …… 稲作面積は 1,000ha拡大し、収量は 8.5t/haとなり、2,000tの増収となる。
- ② 冬 作 …… メイズの作付は 700ha増大し、2,100tの増収、また、馬鈴薯は 300ha 拡大し、4,500tの増収となる。
- ③ 養 豚 …… 作付の増大に伴う家畜飼料の増産によって、豚肉 1,000t の増収が見込まれる。

2.1.3 ハノイ郊外メイリン県タンデム地域の農業・農村開発計画

(1) 開発計画の必要性

前述のように、本地域は、ハノイ市中心部から35kmと近く、開発ポテンシャルの高い地域であり、投資に対する効果の発現も極めて早いことが予想される。また、当調査団の勧告により、農業食品工業省とハノイ市及びメイリン県の人民委員会は、開発概略計画を立案しているものの、事業の具体化のためには、フィジビリティ調査の実施が不可欠である。

尚、ベトナム政府は前出の開発概略計画における開発基本構想の策定、施設計画の検討、概算事業費の積算、農村開発計画項目の検討及びTERMS OF REFERENCEの作成を当調査団に依頼しており、これを受け平成元年度に再度、本地域に対する詳細事前調査を実施する予定である。

(2) 開発計画実施調査の内容

ー調査の目的

- ① 本地域の水利状況及び湛水状況を精査するとともに、用排水施設の現状を調査し、これをリンクすることによって将来の適正な施設計画を策定する。
- ② 用排水施設の改善を前提とした営農体系を確立する。
- ③ インフラストラクチャーの整備を基本とする農村総合開発計画を策定する。

一 開発計画の内容

本開発計画の項目として以下のものが考えられる。

- ① 用排水施設整備計画
- ② 農業・土地利用計画
- ③ 農道整備計画
- ④ 農村生活基盤整備計画
- ⑤ 農業技術センター建設計画
- ⑥ 環境保全計画
- ⑦ 農業技術研修及び普及計画

3.3 ケンツィ県南部地域農業農村開発計画

1. 計画地区概要

1.1 自然状況

(1) 位置

ハイフォン市にある同計画地域はハイフォン港の南20kmに位置し、キエンツイ県の南端及びドソンのリゾート地の隣である。

(2) 地形・土壌

海岸の地形でありながらほぼ平らである（海拔：0.4 ～ 2 m）が、北は南より、それから西は東よりやや高い。

土壌の性質は次の如くである。

化学的分類：

1. Medium saline soils	2.1 %
2. Lightly saline soils	10.4 %
3. Mediumsaline but strongly acid sulphate soils	10.2 %
4. Lightly saline but strongly acid sulphate soils	41.0 %
5. Medium saline and medium acid sulphate soils	2.2 %
6. Lightly saline and medium acid sulphate soils	30.5 %
7. Alluvial soils	3.6 %

物理的分類：

— Medium gleyed soils	61.1 %
— Heavily gleyed soils	10.7 %
— Sandy-gleyed soils	28.2 %
— Acid sulphate soils	80 %

(3) 気象・水文

気象条件は、熱帯モンスンにより23℃の年間平均温度及び 1,780mmの年間雨量なので、熱帯農業に適している気象である。

平均湿度は85%である。20℃以上の温度は3月から11月まで続く。同計画地域内には Da Do河があり、灌がいに適する水源である。

1.2 社会経済

(1) 人口

全人口は 51,061 である。

総家屋は 11,890 戸（平均 4.8人／戸）で、その割合は次の如くである。

1～3 人の家屋： 33 %

3～5 人の家屋： 37 %

5～7 人の家屋： 30 %

年間人口増加率は 1.6%なので、全国の 2.2%値と比べ低い。

(2) 行政

計画地域の 6 村 (Minh Tan, Tan Phong, Hop Duc, Tu Son, Doan Xa) はケンツイ県の南側にあり、ハイフォン市（特別市）に属している。

(3) 農村インフラ整備状況

電 気 : 6 村共の電気配線は全て完了したが、民家内利用が少ない。

道 路 : 4 つの主要道路 (401, 402, 403, 404)

船 場 : 4 つの主要船場 (Co Tieu, Doi, Nam Hai, Hon Muc)

教育面 : 幼稚園 × 6 ヶ所

小学校 × 6 ヶ所

中学校 × 1 ヶ所

厚生面 : 総合病院 (177 ベッド) × 1 ヶ所

村クリニック 6 ヶ所

上下水施設 : 不 備

農 業：

計画地域において 5,263ha農地の作物栽培は次の現況である。

稲	：	88 %
や さ い	：	7.8 %
サツマイモ	：	2.2 %
トウモロコシ	：	1.1 %
ジャガイモ	：	0.4 %
落花生	：	0.5 %

米の単収は 3 t/haなので、生産性はまだ低い。

年間食糧生産は14,000トﾝ（275kg/人）である。

<畜産の現況>

豚	：	約 10,000 頭
牛	：	約 1,500 頭
にわとり	：	約 43,000 羽

水産業において内水面及び海岸漁業の 2 種類が行っているが、両方共の規模はまだ小さい。

内水面漁業の年間生産量は 200トﾝ、内フライの数は 1,300万である。

海岸漁業には、Doan Xa, Dai Hopと Hop Lucの 3 村で行われ、約 1,000人が従事している。

モーターボートの数は11艘（12～13トクラス）、それから、モーターなし船は約 300艘がある。

2. 計画構成

2.1 計画の目的

- (1) 計画地区内の6村の農業生産性を阻害している要因を明らかにし、可能な近代農業技術を導入し、総合農業農村計画を開発する。
- (2) 農業生産基盤の整備に基づいて農村工業の振興を開発する。
- (3) 農家の生活水準を向上するため農村施設を開発する。

2.2 開発計画の内容

- (1) 土地利用：
約 3,000haの農地整備
- (2) かんがい農業
3毛作（稲の2毛作+畑の1毛作または、稲の1毛作+畑の2毛作）
- (3) 農業技術近代化
- (4) 水産業の開発
- (5) 農村工業の開発
- (6) 社会インフラの改良
- (7) 社会開発施設

2.3 調査計画の内容

(1) 調査の目的

ベトナム全土の海岸距離は約 1,500kmがあり、その住民のほとんどは農業または漁業に従事している。ハイフォン市はハノイ首都に隣接している重要な経済拠点である。このハイフォン市に農村総合開発計画の導入の可能性を調査する。農業生産の増大を図り、農民の生活を改善するため各種計画を作成する。

(2) 調査地域

同地域が調査対象地域として計画される理由は次の如くである。

- (a) 近代農業技術の導入により農産品の増産、ハノイ首都圏への供給、ハイフォン市からの輸出。
- (b) 当地域に対して NIAPPは概略調査を既に実施し、ある程度の資料情報がある。

- (c) 全国のため農業と水産業のモデル計画が期待される。
- (d) 北部の民間生活を向上する。
- (e) ドソンのリゾート地の隣りなので、パイロット案件として展視性も高い。

(3) 調査内容

調査は、次のPhase に分けて実施される。

(A) Phase I (マスタープラン調査)

調査地区：ゲーティン省ナムダン県

(B) Phase II (フィジビリティ調査)

調査地区：Phase I 調査において選定された地区

各 Phaseに必要な調査は次のとおりである。

(A) Phase I (マスタープラン調査)

(a) 資料の収集及び解析

- ・地形、気象、水文、水質
- ・土壌、地質
- ・かんがい排水
- ・植生、土地利用
- ・植林、畜産、養蚕、漁業等を含む農業
- ・農業経済、地域開発計画
- ・インフラストラクチャー

(b) 現地調査

- ・地形、気象、水文、水質、地質等の調査
- ・リーチングテストを含む土壌調査
- ・農業調査
- ・社会経済、その他

(c) 土壌図、土地分級図の作成

(d) 土地利用計画図の作成

(e) 予備的に開発計画を評価し、優先順位をつけたプロジェクト・リストを作

成する。

(f) 優先順位の高い開発計画を選定しフィジビリティ調査地区を決定する。

(B) Phase II (フィジビリティ調査)

(a) フィジビリティ調査に必要な追加資料の収集及び現地調査

(b) 資料の解析及び調査

- ・ 気象、水文
- ・ 土壌及び土地利用
- ・ 植林、畜産、養蚕、漁業等を含む農業
- ・ かんがい排水
- ・ 社会経済

(c) 上記の調査及び解析に基づき各々の開発計画の作成

(d) 施設の予備設計

- ・ かんがい排水施設
- ・ 圃場整備（農道を含む）
- ・ 農産加工、流通施設
- ・ 農村生活基盤施設

(e) 事業費の積算及び評価

3.4 テンハイ県トンナット地域農業農村開発計画

計画地区概要

1.1 自然状況

(1) 位置

計画地域はタイビン省のテンハイ県に属する9村のトンナット区である。タイビン市の東方15mの所に位置し、海岸に近く、交通便の良い所である。

(2) 地形・土壌

計画地区は平の地形を有し、0.75～1.0 mの海拔である。

土壌の化学的性質は次の如くである。

— Lightly salty soil	2,300 ha or 71.2 %
— Acid sulphate soil	21.4 ha or 7.2 %
— Alluvial soils	134 ha or 19.6 %
— Sandy soil	62 ha or 2.0 %

一方、計画地区は2つの区割に分かれる。

東側の区割は、Dong Co, Dong Trung, Dong Phong, Dong Quy の4村を有し、海岸に面する。土壌はLightly Salty 及び Lightly Acid Soilのほとんどである。

西側の区割は、他の5村を有し、陸に位置し、北から南への砂丘及び紅河の Alluvial soil を有する。東側より多少高く、凹凸の地形を有する。

農業開発上の土壌分布は次の如くである。

最適性	: 928 ha (30.2 %)
適性	: 1,050 ha (32.6 %)
条件的適性	: 690 ha (21.5 %)
不適性	: 504 ha (15.7 %)

(3) 気象・水文

計画地区は熱帯モンスンにの気象条件で、23.3℃の年間の平均温度と86%の平均湿度を有し、熱帯農業に適している。

年間雨量は 1,800～2,000mm で、その7割は5月～10月に集中する。7月～9月の間に雷雨と強風の特徴がある。

同計画地区には4つの川 (Song Traly, Song Ca, Song Kien Giang, Song Su)があり、農業かんがい利用に十分な水源と考えられる。

1.2 社会経済

(1) 人口

計画地区は 42,178 の人口を有し、その約53.5%は女性である。全家屋の数は、12,399軒 (平均 3.4人/家屋) で、その分布は次の如くである。

1～3人/家屋： 39.9 %

4～5人/家屋： 42.9 %

6人以上/家屋： 17.2 %

人口のほとんどは農業に従事している。一部は農村工芸の仕事をしている。

(2) 行政

行政上では計画地区の9村 (Dong Co, Dong Phong, Dong Trung, Dong Quy, Tay Son, Tay Ninh, Tay Luong, Tay An, Tay Giang) は、ベトナム北部の特別地区と決められている。こういう特別地区は開発優先権をもっている。

(3) 農村インフラ整備状況

電気 : 全村に配線されているが主にポンプ場と生産に用いられるている。生活にほとんど利用されていない。

道路 : 舗装道路は11kmしかない。
他の約 100kmは舗装なし村道である。

教育面 : 幼稚園 × 9ヶ所
小学校 × 9ヶ所 (145 教室)
中学校 × 1ヶ所 (30 教室)

厚生面 : 病 院 × 1ヶ所 (150 ベッド)

村クリニック × 9ヶ所

上下水施設 : 不 備

(4) 生産インフラ整備状況

計画地区においてトンナット・ポンプステーションは Tra Khuc 川に1976年に設置され、同地区のかんがい用水路に利用されている。

このポンプステーションには 4,000 m³/hの16台のポンプが設置されている。

用水路システムは次の如くである。

1 級 : 23.9 km

2 級 : 104 km

3 級 : 234.4 km

他の生産インフラ :

* 農機具センター (1)	┌	50HPのトラクター : 50 台
		農薬スプレーヤー : 20 台
		ワークショップ : 1 基

* 作物の種ステーション (1)

* 獣医ステーション (1)

農 業 :

現況の農業は農業用地の約 3,450ha (72.6) において、その7割が2毛作の稲を栽培している。3毛作利用地は全地区の約 6.5%に過ぎない。

作物別の農地利用の割合は次の如くである。

稲 : 85.6 %

トウモロコシ : 4.8 %

サツマイモ : 4.3 %

他の作物 : 5.3 %

米の単収について春作は 3.8 トン/ha に対して、雨期作はやや高く、3.9 トン/ha と報告されている。

1988年の食糧生産量は22,700トン、または638kg/人の高い水準と報告されている。

一方、肥料と農薬と近代農業技術が著しく不十分と報告されている。

従って、水と土壌の自然条件にめぐまれ、二毛作を徹底的に行ったと考えられる。

畜産と水産は盛んに行われていない。

2. 計画構成

2.1 計画の目的

- (1) 農業生産を向上するため近代農業技術を導入し、単収の増加及び合理化の営農を実施する。
- (2) 新規農村工業の導入及び現存農村工芸を改善する。
- (3) 農村生活を向上する施設を確立する。
農村施設を開発する。
- (4) 同特別地区の総合農業農村をモデル化する。
- (5) 日本からベトナム農民レベルで技術協力を強化する。

2.2 開発計画の内容

- (1) 圃場整備の実施
- (2) かんがい施設の完備
- (3) 合理の営農システムの導入
- (4) 近代農業（機械化、品種、ポスハーベスト、加工、流通）の実施
- (5) 社会インフラの改善
- (6) 農村工芸、農村工業の改善、確立
- (7) 農村生活向上の施設設備

2.3 調査計画の内容

(1) 調査の目的

ベトナム全土の海岸距離は約 1,500kmがあり、その住民のほとんどは農業または漁業に従事している。ハイフォン市はハノイ首都に隣接している重要な経済拠点である。このハイフォン市に農村総合開発計画の導入の可能性を調査する。農業生産の増大を図り、農民の生活を改善するため各種計画を作成する。

(2) 調査地域

同地域が調査対象地域として計画される理由は次の如くである。

- (a) 近代農業技術の導入により農産品の増産、ハノイ首都圏への供給、ハイフォン市からの輸出。

- (b) 当地域に対して NIAPPは概略調査を既に実施し、ある程度の飼料情報がある。
- (c) 全国のため農業と水産業のモデル計画が期待される。
- (d) 北部の民間生活を向上する。
- (e) ドソンのリゾート地の隣りなので、展望性も高い。

(3) 調査内容

調査は、次のPhase に分けて実施される。

(A) Phase I (マスタープラン調査)

調査地区：ゲーティン省ナムダン県

(B) Phase II (フィジビリティ調査)

調査地区：Phase I 調査において選定された地区

各 Phaseに必要な調査は次のとおりである。

(A) Phase I (マスタープラン調査)

(a) 資料の収集及び解析

- ・地形、気象、水文、水質
- ・土壌、地質
- ・かんがい排水
- ・植生、土地利用
- ・植林、畜産、養蚕、漁業等を含む農業
- ・農業経済、地域開発計画
- ・インフラストラクチャー

(b) 現地調査

- ・地形、気象、水文、水質、地質等の調査
- ・リーチングテストを含む土壌調査
- ・農業調査
- ・社会経済、その他

(c) 土壌図、土地分級図の作成

(d) 土地利用計画図の作成

- (e) 予備的に開発計画を評価し、優先順位をつけたプロジェクト・リストを作成する。
- (f) 優先順位の高い開発計画を選定しフィジビリティ調査地区を決定する。

(B) Phase II (フィジビリティ調査)

- (a) フィジビリティ調査に必要な追加資料の収集及び現地調査
- (b) 資料の解析及び調査
 - ・ 気象、水文
 - ・ 土壌及び土地利用
 - ・ 植林、畜産、養蚕、漁業等を含む農業
 - ・ かんがい排水
 - ・ 社会経済
- (c) 上記の調査及び解析に基づき各々の開発計画の作成
- (d) 施設の予備設計
 - ・ かんがい排水施設
 - ・ 圃場整備（農道を含む）
 - ・ 農産加工、流通施設
 - ・ 農村生活基盤施設
- (e) 事業費の積算及び評価

4. 調査の要点

上記の条件に基づいて4つの調査が必要である。しかも、4つの調査の全ては、北部にあり、内容はほぼ同じなので2件以上を同時に行うことも可能である。

一件の調査は現地作業及び国内作業の約80mmが必要としているが、2件以上を同時に行う場合、現地調査期間のみが増えると考えられる。

4.1 調査期間

調査期間は雨期と乾期の2回に分割して行う。

Phase I（雨期調査）

- (1) 社会経済の情報収集
- (2) 気象水文のデータ収集
- (3) 土壌・農業の基礎調査
- (4) 水源・かんがいの調査
- (5) 農産加工・マーケティング・流通の調査
- (6) マスタープランの案
- (7) 施設計画案
- (8) 経済社会評価

Phase II（乾期調査）

- (1) 追加調査
- (2) マスタープランの計画
- (3) 農業計画
- (4) かんがい計画
- (5) 施設計画
- (6) 実施設計
- (7) マネジメント計画

5. 総合所見

ベトナム農業には、他の東南アジア国々と同様に稲作が主体ですが、諸内外原因及び事情により生産性はまだ低い。しかも永年の戦争により、特に北部において圃場整備・生産技術の導入・農村近代化が大変遅れている。

現地の関係者は今後増産の安定化及び品質を向上するため日本の技術協力を期待している。従って、ベトナムに対するODA再開条件が今後の課題である。

ベトナムは、最近市場の自由性が必要と認識し、ドイモイ（自由市場への“刷新”）政策を実施し、経済面の改善は多少できたが、今後コメコンの支援なしでは他の方面にも西側との同調政策が期待される。

現況のベトナムは、国家計画の修正により食糧生産は国家経済の最も重要な分野と見直している。最近、ベトナムの経済政策の改革においても食糧生産及び市場自由性の改善により 100万トンの米の輸出達成ができた。

このような農業農村開発計画が実施できれば、今後、日本、ベトナムの技術協力及びベトナムの社会経済に良い成果を与えるだろう。

添 付 資 料

1. 調査団 及び 調査日程
2. 面会者リスト
3. 英文 T. O. R.

添付資料 1. : 調査団 及び 調査日程

1. 調 査 団

- (1) 椎 名 乾 治 : 団長／総括 (太陽コンサルタンツ(株) 社長)
- (2) 岩 本 勤 : 団員／土木 (" 主任 技師)
- (3) 戸 田 弘 志 : 団員／農業機械 (兼松株式会社 参事補)

2. 調 査 日 程

- (1) 7 / 18 : 移 動 日 (東京～バンコク)
- (2) 7 / 19 : AM. 移動日 (バンコク～ハノイ)
PM. NIAPP での打合せ
- (3) 7 / 20 : メリン村への現地調査及び打合せ
- (4) 7 / 21 : AM. NIAPP での打合せ
PM. 日本大使館への表敬訪問
- (5) 7 / 22 : ナムダン県への現地調査 及び 打合せ
- (6) 7 / 23 : 移 動 日 (ハノイ～ホーチミン市)
NIAPP 南支部との打合せ
- (7) 7 / 24 : 移 動 日 (ホーチミン市～バンコク)
- (8) 7 / 25 : 移 動 日 (バンコク～東京)

添付資料2： 面会者リスト

1. 農業食品工業省 (Ministry of Agriculture and Food Industry)

Nguyen Thien Luan	次官 (科学技術担当)
Nguyen Minh Thong	〃
Nguyen Van Phuoc	国際協力局局長
Nguyen Ich Chuong	〃 副局長
Doan Danh Tuyen	〃 通訳

2. 同上省 NIAPPスタッフ (National Institute of Agricultural Planning and Projection)

Tran an Phong	博士 所長
Bui Quang Toan	副所長 (ハノイ)
Nguyen An Tiem	〃 (ホーチミン)
Duong Anh Tuyen	(ハノイ) 土壌技師
Duong Van Xanh	(〃) 副博士 農業企画主任 (水利
Tran Duc Manh	(〃)
Hoang Quoc Tuan	(ホーチミン) 農学
Trinh Ba Dan	(〃) 〃
Nguyen Xuan Truong	(〃) 水利
Nguyen Ba Hoai	(〃) 農学

3. ハノイ市 (Hanoi City)

Tran Tan	(市長) ハノイ市人民委員会委員長
Le Sinh Tang	(副市長) 〃 副委員長
Nguyen Vuong	ハノイ市国際局副局長
Nguyen Long	〃 計画官

4. ゲーティン省 (NGHE TINH PROVINCE)

Nguyen Van Gian	ゲーティン省	人民委員会首席
Phan Van Tich	”	” 副首席
Ho Si Hoa	ゲーティン省	” 対外経済局長
Nguyen Van Cam	”	” 副局長

5. ナムダン県 (NAM DAN District)

Nguyen Cong Minh	ナムダン県	人民委員会首席
Nguyen Van Be	”	” 副首席
Dinh Xuan Que	”	” 水利担当技師

6. メイリン県 及び メイリン村

Luong Van Nghia	メリン県	党書記
Le Si Bo	”	人民委員会委員長
Hoang Van Chien	”	” 副委員長
Nguyen Van Diu	メリン村	党書記
Nguyen Huy Mi	”	人民委員会委員長
Nguyen Hin Vi	”	協同組合 組合長

7. ケンツイ県 テンハイ県

Pham Van Huan	ケンツイ県	党委員 人民委員会副委員長
Hoang Xuan Thien	テンハイ県	人民委員会委員長

8. ラムドン省

Truong Tinh	ラムドン県	人民委員会委員長
Do Huy Chien	コーヒー連合企業	副社長
Nguyen Van Tan	”	社員
Pham Van Phung	農業生産会社	部長

10. Chamber of Commerce & Industry of S.P.Vietnam

Nguyen Manh Hung

9. 日本大使館

庄司 良一

参事官

面会者リスト（日程別）

7月19日（水） 飛行場にて

Mr. Doan Danh Tuyen

Mr. Duong Anh Tuyen

Mr. Luong Van Nghia

Mr. Le Si Bo

7月19日（水） PM 2:00 NIAPPにて

Mr. Nguyen Minh Thong

Mr. Nguyen Van Phuoc

Mr. Doan Danh Tuyen

Mr. Bui Quang Toan

Mr. Duong Anh Tuyen

Mr. Duong Van Xanh

Mr. Luong Van Nghia

7月20日（木） メイリン県にて

Mr. Nguyen Vuong

Mr. Nguyen Long

Mr. Luong Van Nghia

Mr. Le Si Bo

Mr. Hoang Van Chien

Mr. Nguyen Van Diu

Mr. Nguyen Huy Mi

Mr. Nguyen Hin Vi

Mr. Bui Quang Toan

Mr. Duong Anh Tuyen

7月21日（金） 日本大使館表敬

庄司 良一

参事官

7月21日（金） キエンツイ県, テンハイ県打合せ

Mr. Bui Quang Toan NIAPP 副所長

Mr. Duong Anh Tuyen " 土壌技師

Mr. Tran Duc Manh " 職員課長

Mr. Dham Van Huan キエンツイ県 党委員

" 人民委員会副委員長技師

Mr. Hoang Xuan Thien テンハイ県 人民委員会委員長

日本側 4名

7月22日（土） NIAPP 打合せ

Mr. Nguyen Van Phuoc 農業省国際協力局局長

Mr. Bui Quang Toan NIAPP 副所長

Mr. Duong Anh Tuyen " 土壌技師

日本側 4名

7月22日（土） PM 3:00 NIAPP 総合打合せ

Mr. Nguyen Van Phuoc 農業省国際協力局局長

Mr. Nguyen Ich Chuong " 副局長

Mr. Doan Danh Tuyen 通訳

Mr. Bui Quang Toan NIAPP 副所長

Mr. Duong Anh Tuyet " 土壌技師

Mr. Duong Van Xanh " 副博士農業企画主任（水利）

日本側 5名

Mr. Nguyen Manh Hung JAVITECHS 通訳

7月23日（日） 飛行場打合せ

Dr. Tran An Phong	NIAPP 博士所長
Mr. Nguyen Anh Tiem	" 副所長
Mr. Nguyen Ba Hoai	"
Mr. Doan Van Hung	"
日本側	6名

7月23日（日） NIAPP 南支部での打合せ

Mr. Nguyen Minh Thong

Mr. Truong Tinh

Mr. Do Huy Chien

Mr. Pham Van Phung

Mr. Nguyen Van Tan

Dr. Tran An PHong

Mr. Nguyen An Tiem

Mr. Hoang Quoc Tuan

Mr. Nguyen Xuan Truong

Mr. Nguyen Ba Hoai

7月24日（月） NIAPP ホーチミン打合せ

Mr. Nguyen Minh Thong	農業省 次官
Dr. Tran An Phong	NIAPP博士所長
Mr. Nguyen An Tiem	" 副所長
Mr. Nguyen Ba Hoai	" 農学
Mr. Hoan Quoc Tuan	" "
Mr. Trinh Ba Dan	" "
Mr. Nguyen Xuan Truong	" 水利

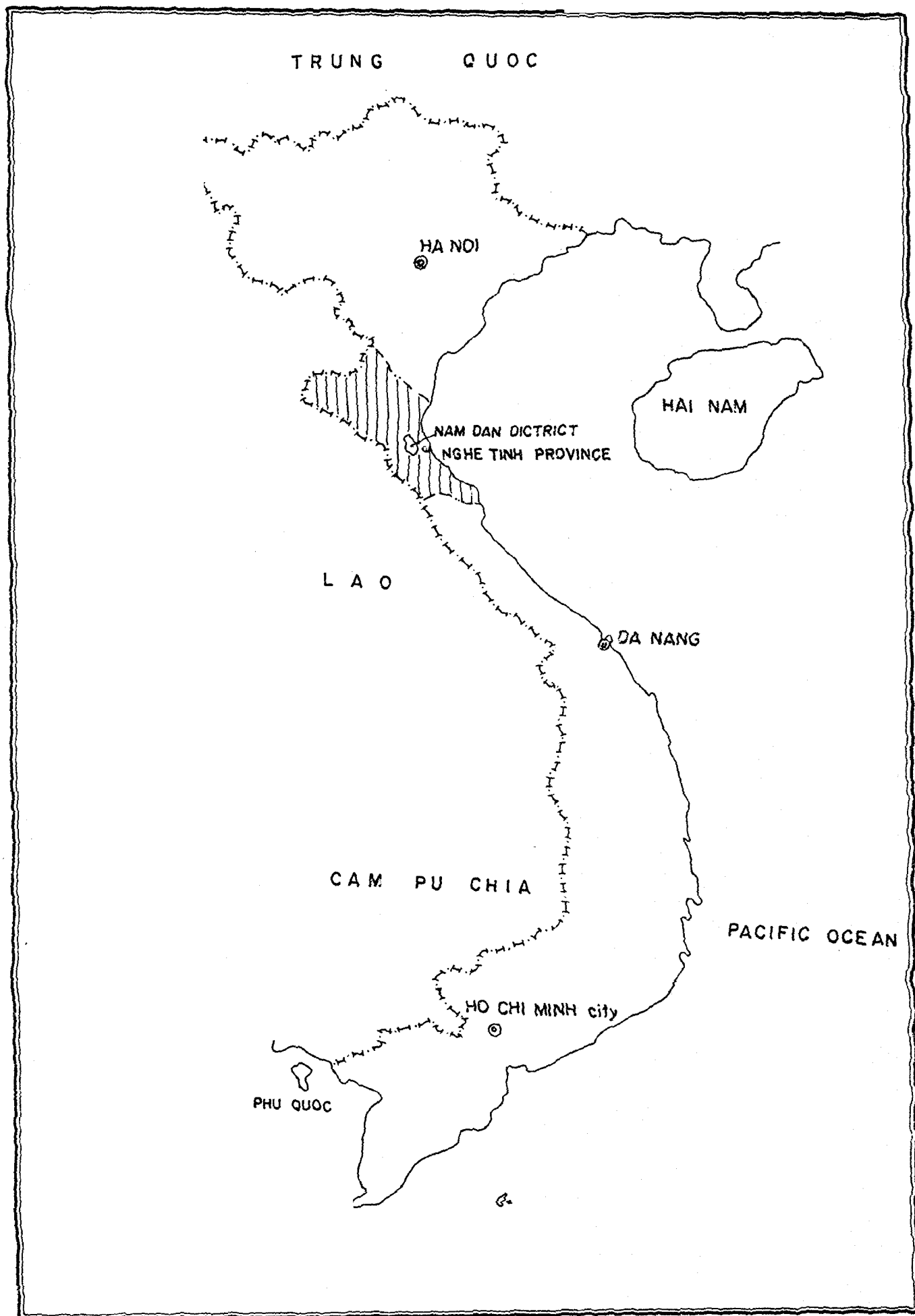
Mr. Truong Tinh	ラムドン県人民委員会委員長
Mr. Do Huy Chien	コーヒー連合企業副社長
Mr. Pham Van Phung	農業生産会社部長
Mr. Nguyen Van Tan	コーヒー連合企業社員

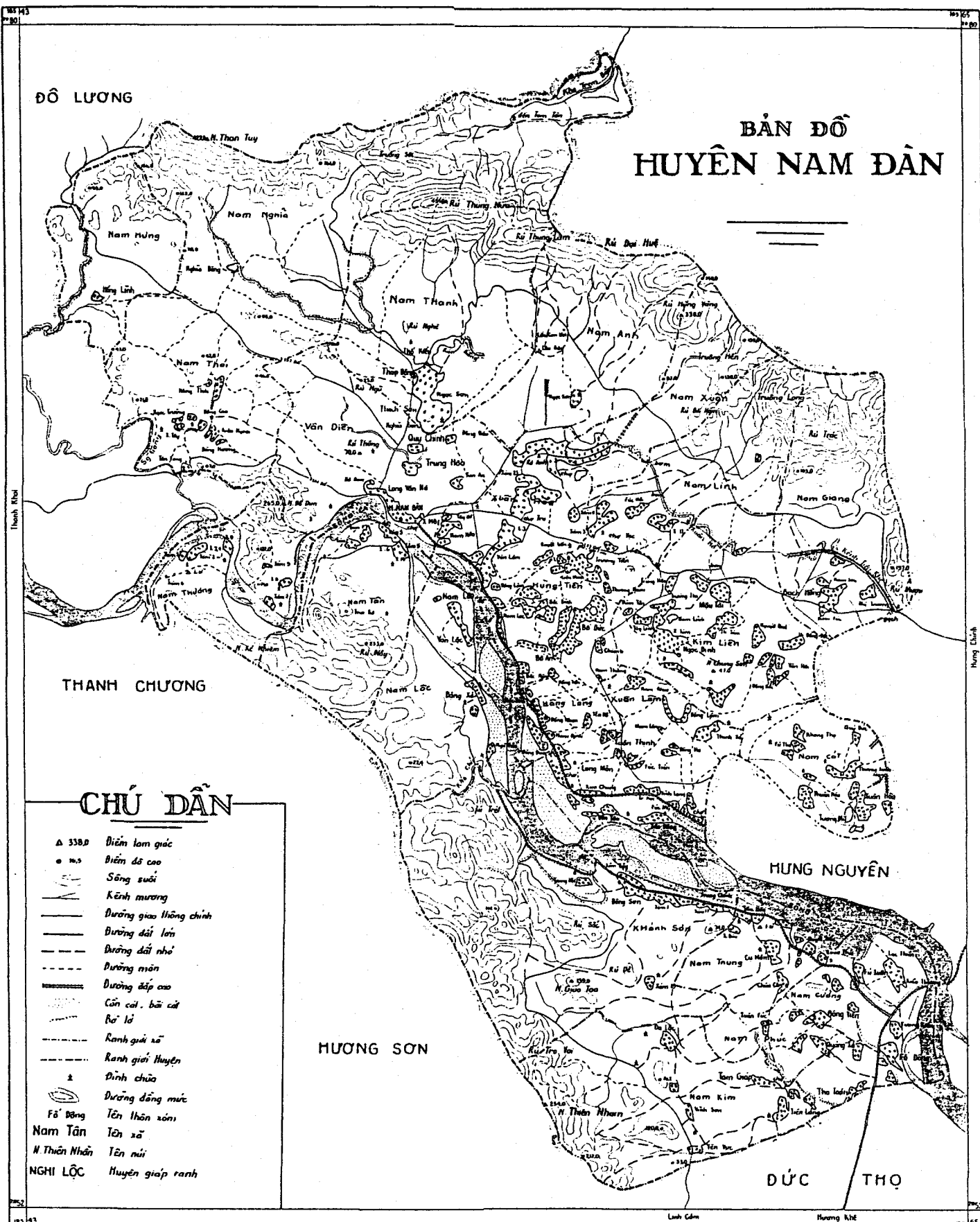
TERMS OF REFERENCE
FOR
THE STUDY
ON
AGRICULTURAL AND RURAL DEVELOPMENT
IN
NAM DAN DISTRICT
(NGHE TINH PROVINCE)

1990

MINISTRY OF AGRICULTURE AND FOOD INDUSTRY
NATIONAL INSTITUTE FOR AGRICULTURAL PLANNING AND PROJECTION (NIAPP)

LOCATION MAP





ĐÔ LƯƠNG

BẢN ĐỒ HUYỆN NAM ĐÀN

THANH CHƯƠNG

CHÚ DẪN

- ▲ 338,0 Điểm lam giác
- 10,5 Điểm đá cao
- Sông suối
- Kênh mương
- Đường giao thông chính
- Đường đất lớn
- Đường đất nhỏ
- Đường mòn
- Đường đắp cao
- Cầu cạn, bãi cát
- Cầu gỗ
- Ranh giới xã
- Ranh giới Huyện
- ✕ Đình chùa
- Đường đồng mức
- ⬢ Fả Bông
- ⬢ Nam Tân
- ⬢ N. Thuận Nhân
- ⬢ NGHỊ LỘC
- ⬢ Tên thôn xóm
- ⬢ Tên xã
- ⬢ Tên núi
- ⬢ Huyện giáp ranh

HƯƠNG SƠN

HƯNG NGUYÊN

DỨC THỌ

TERMS OF REFERENCE
FOR
THE
STUDY
ON
AGRICULTURAL AND RURAL DEVELOPMENT
IN
NAM DAN DISTRICT

I. BACKGROUND

Nam Dan district situated in Nghe Tinh Province is belonged to the tropical monsoon region of which its annual average temperature is 23.3° C and an annual rainfall amount of about 1,900 mm. These climatic conditions are considered suitable for agricultural production. However, dry and hot winds from the west mountains bordering Laos with Foehn phenomenon combined with seasonal floods and typhoons are its special climatic features which, now as before, have greatly affected its agricultural production. Lam River flows through the center of this district providing a sufficient amount of water use. Irrigation percentage, however is below 50%, because almost irrigation facilities become too old for operation. And in this district, soil is not fertile. Besides fertilizers and pesticides are in shortage while diseases and pests are in much occurrence. Per consequent, the agricultural productivity is still low.

Although, some rural infrastructures such as San Dao canal, pumping

stations and reservoirs are existing. If these infrastructures are repaired and upgraded, effects on agricultural production can be expected greater.

In addition, this district is known as the native land of the patriotist Phan boi Chau, and the first President of North Vietnam, Ho Chi Minh. It has been visited from the whole country by many peoples.

It is considered that the rural development of Nam Dan district from a point of view for building up a pilot rural area in this part of the country. Therefore, a feasibility study for making an integrated rural development plan shall be carried out for the purpose of implementing modern techniques in agricultural and rural development assisted by the Japanese Government.

II. THE STUDY AREA

1. Natural Conditions

(1) Location

Nam Dan district is belonged to Nghe Tinh province and located about 300 km south from Hanoi capital and 20 km southwest from Vinh city.

(2) Topography

With a natural area of 29,511 ha, of which a half is the mountainous area. Nam Dan district is situated in southwest of Vinh. The Lam River crossing the district divides it into two parts. The district,

lying from 0.5 to 10 m above sea level, is bordered by the Dai Hau mountain range (438 m) on the left and the Thien Nhan mountain (254 m) on the right.

(3) Soils

The soils of the district can be divided into 7 categories. Old alluvial soil occupies 12,000 ha or 40.4% of the total acreage. This is the main food-producing area of the district. Besides, it has 10,534 ha of eroded soil (35.7% of the total acreage) and about 2,000 ha of alluvial low-land (6.8% of the total). Both these soils categories need more investment for improvement and better use.

So far, about 11,800 ha of the district are used for agricultural production. This acreage is classified into 4 main categories of soils according to their natural productivity.

Located in the coastal plain of Central Vietnam, Nam Dan is hot and humid.

Dry and hot winds from the West and floods and typhoons are the special climatic features which, now as before, have greatly affected agricultural production. According to the Vinh meteorological station, in the past century, the region was visited by storms in 57 years, twice and triple in each of 30 years. The storms brought torrential rains (200 mm - 300 mm for 2 - 3 days) on the whole region, causing immersion to large areas of rice field. In these years, rice output dropped by 30-50% compared with normal years.

(4) Water Resources

The water shed of the Lam river is about 23,000 sq.km which will be the main source of water for the study area. The water will be taken in by pumping stations along the bank of Lam river through Nam Dan sluice gate ($b=13$ m) into a 15-km system of canals.

In addition, small water reservoirs can be built along a number of gills on Dai Hue and Thien Nhan mountain ranges for both irrigation and flood prevention.

2. Socio-Economic Conditions

(1) Population and Labor Force

Nam Dan has 23 villages and one district town with 28,200 households of whom 27,200 (96%) are agricultural families.

In 1988, the population growth rate in the 1981-1988 period was 2.1% annually.

About 49,000 persons are at working age and 90% of them practise farming.

(2) Cultural and Social Life

1) Education

The district has 3 secondary schools (one being a three-storeyed building) staffed by 270 teachers and enrolling about 4,300 pupils, but teaching equipments are very poor. Most of the 4,320 sq.m of classrooms are dilapidated. Most of villages have creches and kindergardens are poor in equipments and shortage of classrooms.

2) Health Care

In the projected area, there is one district-hospital with 150 beds, 25 doctors and 72 assistant-doctors and nurses, which is poorly equipped. Its 2,100 sq.m of floor space are in disrepair.

All the 23 villages have their own infirmaries with a total of 120 beds and 36 assistant-doctors and nurses, but with primitive equipments and low-quality houses.

3) Economy

Nam Dan is a small but densely district with 0.08 ha of arable land per capita compared to 0.1 ha in nationwide average.

The rural industry and handicrafts are underdeveloped with the output value accounting for only 10% of the total output of the district.

An initial infrastructure, including power supply and irrigation, has been laid down with a capital investment of 18.5 dollars/person/year.

Agriculture is the main economic activity of the district with 94% of the total population living on farming. Agriculture output value in 1988 accounted for 90% of the district's total production value. In recent years, progress has been made in agricultural production with the food production per capita of 310 kg in 1988, up by 65 kg as compared with 1981 and 21 kg with 1985.

But due to frequent floods and storms, the agricultural production remains unstable. During in the years of floods or storms, rice output in the rainy crops dropped by 30-50% compared with the normal years, causing serious food shortages.

The district's export value is very low (8.6 dollars/person/year compared to the national average of 15 dollars.)

The income of a farm household in the study area now average 275 dollars/year, 42% of which come from the cooperative and 58% from the family based economy (chiefly gardening and animal husbandry).

3. Agricultural Production

(1) The projected area 20,300 hectares of cover arable lands in 1988 growing mainly with annual crops (97.5%), such as rice (13,364 ha); sweet potato (1,895 ha); maize (1,044 ha); groundnut (1,549 ha); hot pepper (150 ha) and perennial crops occupy only 505 ha.

Generally speaking, since 1976, changes have been effected in the crop structure to avoid natural calamities (some 4,500 ha formerly grown with summer rice are now planted with Summer - Autumn rice), and the areas under plants of high economic value have been expanded (groundnut by 500 ha; maize by 800 ha etc.).

(2) Rice is the main crop, it is grown on nearly 65.8% of the total cultivated land. The Spring rice covers 6,500 ha. Acreage has markedly increased (4,200 ha accounting for 31% of the total rice fields in 1988, gradually replacing Summer rice.

(3) The number of buffaloes and pigs in several years varied from 8,100 to 8,500 and from 32,000 to 34,000 respectively. But the cow herd has fast increased with 15,000 heads in 1988, up by 6,500 heads over 1976.

Generally speaking, husbandry has developed slowly with its output value making up only 25% of the total farm product value.

(4) Nam Dan has about 6,400 ha of forest lands (including 3,560 ha of planted forests) of pine and eucalyptus or 21.7% of the district's land area. In recent years reforestation in Nam Dan has been stepped up to retain water and prevent flood in its plain as well as the low lying areas of neighboring Hung Nguyen and Nghi Loc districts.

4. Infrastructure

(1) Water Control

1) Irrigation: There are now in the study area 41 pumping stations with 113 pumps (1,000 - 2,000 cubic meters/hour each) capable of watering 15,200 ha and 28 medium and small - sized reservoirs which can hold 12 billion cubic meters of water, not enough for irrigating 1980 ha.

Because all the major pumping stations were built for a long time (1956) and the poor conditions of the sluices and canals, the pumps can serve only 4,300 ha (28.3% of designed capacity). The reservoirs can supply water for 1,021 ha (51% of designed capacity). The irrigated area accounts for only 46.5% of the total arable lands.

In 1988, these stations, together with motor pumps and hand - operated scoops, watered 8,265 ha (4,610 ha of Spring rice; 3,840 ha of Summer - Autumn rice and 445 ha of Summer rice), 41.85% of the cultivated area.

The rest remains rainfed.

2) Drainage: Due to the little dimension of the Nam Tra drainage system which runs through the districts of Nam Dan, Hung Nguyen and Nghi Loc, the inadequate embankment in Hung Nguyen district and the lack of a drainage system in the lower reaches, the region on the left bank of Lam river is submerged in the case with only 100 - 150 millimeters of rainfall. Most prone to water - logging are Ban Non, Kim Lien, Nam Giang, Nam Cat and Hung Tien.

In the region, on the right bank of Lam river, the area of Nam Nam is easily submerged because main drainage canal of Thien Nhan is too little, the dyke system along the La river in Duc Tho district has not been perfected and Nam Trung dyke has not been strengthened.

(2) Transportation

In the study area, there are 9.5 km of asphalt roads, 49 km of dirt road and 30 km of navigable river. The transport means include 27 trucks and tractors, 300 - ton - classed coastal ships, 24 cargos. The left bank of Lam river is fairly good while the right bank of Lam river needs repairing. There are one river - ferry and one river - port in the district town.

(3) Power supply

There are 113 km of high tension electric lines (66 km of 35 KV; 57 km of 10 KV and 94 km of 0.4 KV), a 1,800 KVA-transformer station and 60 smaller ones with a total capacity of 18,340 KVA. However, the power supply for irrigation and people's life remains erratic, meeting only 40-50% of the demand.

(4) Industry

There is no large scale industrial establishment in the study area, one engineering workshop, two farm - tool workshops to repair machines and turn out every year 4,800 hand plow and rakes, 250 wheel - barrows, 25,000 hand tools (plow shares, hoes, sickles, knives), 14 building material establishments which turn out every year 7 million bricks and 800,000 tones of lime; one animal feeds workshop, one establishment of sugar - candy - alcohol, one turpentine processing workshop. Each village has its own rice - husking workshop, enough for the service of villages.

(5) Technical service station

There is one tractor station in the project area, which can plow only 10% of the cultivated lands. Most of its 17 tractors have gone through medium repairs or overhauls.

In the study area, there is an enterprise of agricultural service which has several seed multiplying stations, a plant protection station, and animal breeding station, a veterinary station and a hydraulic station. This is a center responsible for technology

transfer, but its equipment remains awfully poor.

III. NECESSITY FOR AGRICULTURAL AND RURAL DEVELOPMENT PLAN

1. Objective of the Agriculture and Rural Development Plan

- According to the blocking effect of agricultural productivity in the study area, high productive and profitable agriculture shall be established.

- Advanced agricultural technology shall be introduced for the important goal of increasing food production in the national plan.

- This plan shall be made of integrated rural development in the area of Central Vietnam.

- Living conditions for inhabitants of rural area and countermeasure of farm land conservation which is an important matter for environmental protection shall be upgraded in accordance with methodology of rural development for poverty area.

- According to development of rural infrastructure and agricultural industry, opportunity for farmer shall be enlarged.

2. Content of the Agricultural and Rural Development Plan

Based on the agricultural infrastructure development and countermeasure of farm land conservation, following plans shall be made.

(1) Irrigation and drainage facilities improvement plan.

There is some physical effects as to prevent a smooth management in existing irrigation and drainage facilities of Nam Dam. It is to become old of almost pumps and poor management of irrigation canals. Therefore, the improvement of these facilities shall be given priority. And irrigation and drainage facilities improvement plan for undevelopment area shall be made in addition to compare with agricultural land use plan.

(2) Agricultural land use plan

Agricultural land use plan shall be made to introduce a high productive crop and variety by to consider natural conditions as soil, topography and meteorology in the study area. And according to examine afforestation plan, this plan shall be considered with soil conservation also.

(3) Farming and cultivation management plan

There are not only to get some damage by special climatic features as Foehn phenomenon and typhoon but also low fertile soil and acid soil in the study area. Farming and cultivation management plan shall be established to apply advanced technology in order to increase soil fertility and improve breed which is proof against for special climate.

In addition, introduction of adequate farm machinery shall be recommended necessary to apply technologies mentioned above.

(4) Farm land consolidation plan

Therefore, topography of farm land in the study area is very undulated. The elevation of field lots is different between each others. This land configuration is due to the shortage of farm machinery. Development of farm roads does not show a good progress.

So, farm land consolidation plan shall be made to solve above subjects.

(5) Agricultural processing and distribution facilities development plan

There are not agricultural processing and distribution facilities in the study area. Therefore measures to keep crop quality still fresh and to give on value added with processing do not carry out. These facilities are quite important to make a profit and to create a new employment within rural area.

So, agricultural processing and distribution facilities development plan shall be established.

(6) Rural inhabitant's living infrastructure development plan

Rural inhabitant's living infrastructure development plan, it is indispensable matter for them life, shall be established with other infrastructures.

IV. OBJECTIVES OF THE STUDY

- To carry out the field investigation for feasibility of agricultural and rural development project in Nam Dan district.
- To make various plans for upgrading of rural inhabitant's living condition and enlarging agricultural production through rural infrastructure development and extension of advanced agricultural technology.

V. THE STUDY AREA

National Institute of Agricultural Planning and Project (NIAPP), which is belonged to the Ministry of Agriculture and Food Industry, has recommended this Nam Dan District (29,600 ha) of Nghe Tinh Province as the candidate study area. The reasons are as follows.

- Nam Dan District, there are almost agricultural subjects of the Central Vietnam Area.
- Investigation of a part of this district was carried out by NIAPP, so some data have been available already.
- This is near Vinh city, the capital city of Nghe Tinh Province. Exhibition effect for other areas can be expected by many visitors from the whole country, because Nghe Tinh Province is known as the birth place of late president Ho-Chi-Minh.

VI. SCOPE OF THE STUDY

In order to achieve the above mentioned objectives the Study shall be carried out in 2 phases. In the Phase I study, the basic development concept and preparatory study on the study area shall be prepared through extensive data collection and the field survey. In the Phase II study, the plans for the agricultural and rural development plans shall be decided through the concentrated field survey and detailed analysis of data and information.

The scope of works for the Study will be broadly outlined as follows.

1. Collection and review of existing data and information

(1) Physical condition

- Topography
- Hydrology
- Meteorology
- Geology and soil mechanics
- Soils and erosion
- Natural ecosystems
- Others

(2) Socio-economic status

- Demographic conditions
- Regional and National economy
- Infrastrure
- Land use
- Agriculture

(3) Programme

- Regional and national development plans relevant to the project

2. Execution of Supplemental Field Survey and Investigations

(1) Soils and capability survey to supplement the existing soil maps prepared by the NIAPP.

(2) Hydrological survey including installation of water level records, discharge measurement, water quality tests and fluctuation.

(3) Meteorological survey including measurement of heat load for crops and livestock during Foehn phenomenon.

(4) Irrigation and drainage survey including infiltration test, moisture holding capacity test and to measure consumptive use of each candidate crops.

(5) Agriculture survey including to investigate unit yields of crops, farming practices, processing facilities, etc.

(6) Agro-economic survey

(7) Topographic survey to supplement the existing maps

(8) Rural inhabitant's intention survey

(9) Others

3. Analyses and Studies

The analyses and study for the promotion of consolidated agriculture and construction of pilot rural area in Nam Dan district shall be investigated through the concept of agricultural and rural development plans.

4. Work Schedule

The work schedule of the Study is shown in Fig. 1. It is proposed that all the works should be finished in two years.

5. EXPERTS REQUIREMENT AND MATERIALS SUPPLIED BY THE GOVERNMENT

5.1 Experts Requirement from Japan

Experts	Field M/M	Home M/M
Team Leader	4.0	4.0
Irrigation Cum Water Management	7.0	4.0
Meteorologist Cum Hydrologist	5.0	4.0
Drainage Engineer	7.0	4.0
Topologist Cum Geologist	3.0	3.0
Pedologist Cum Land Use Expert	6.0	3.0
Rural Development Export	5.0	4.0
Cultivation and Farming Expert	7.0	4.0
Agro-Economy and Organization Expert	6.0	4.0
Survey Engineer	3.0	
Cost Estimation and Implementation	4.0	3.0
Expert		
Project Evaluation	3.0	3.0
Total	60.0	40.0

This study team will be compact and experts will work in several disciplines.

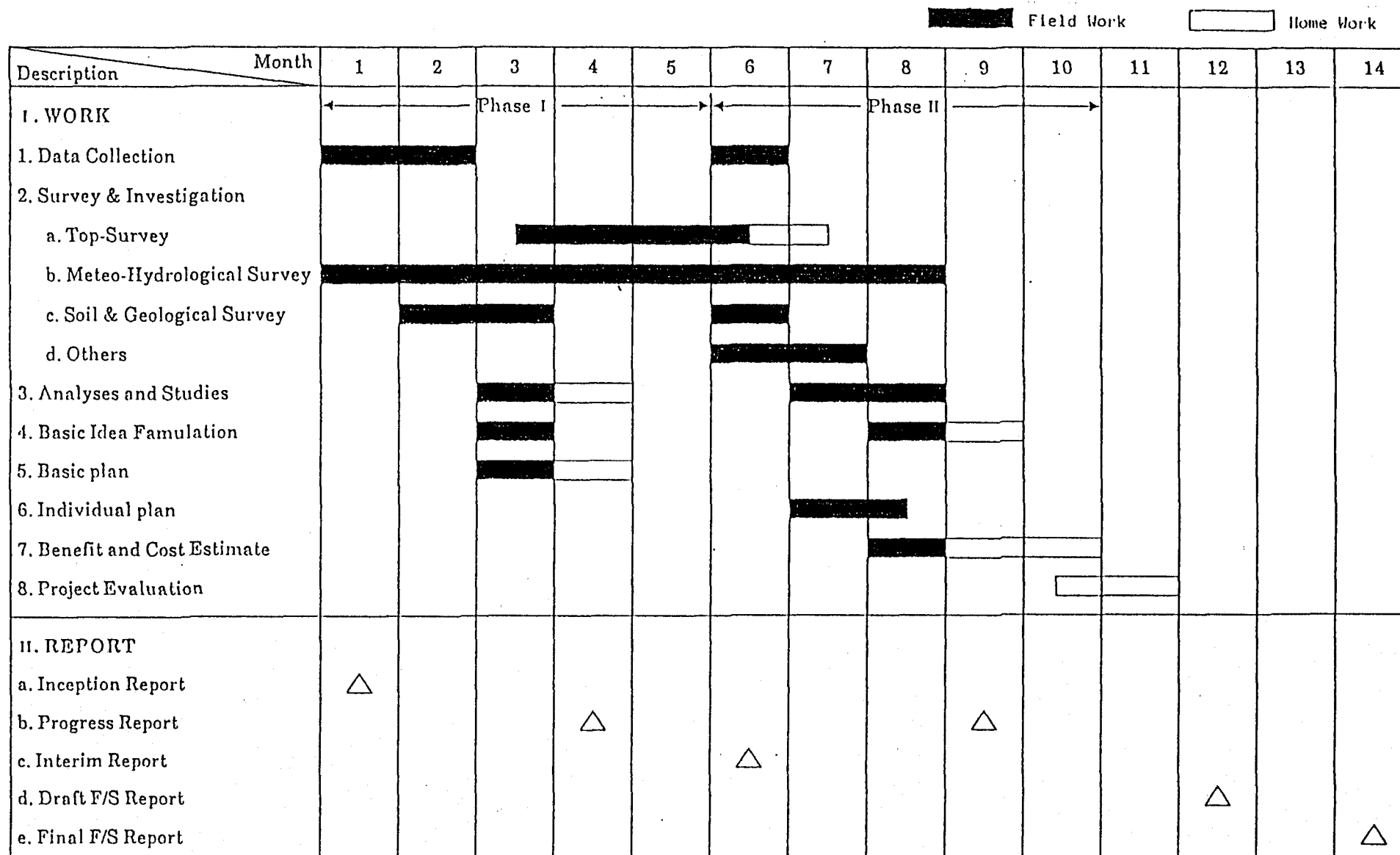


Fig. 1 WORK SCHEDULE

5.2 Materials Supplied by the Government

The Government of S.R. Vietnam shall provide the study team with an appropriate number of competent counterpart personnel, proper office space with necessary furniture, the necessary number of vehicles and other services and arrangements which are deemed necessary for execution of the Study. The following counterpart personnel will be assigned:

- Chief Counterpart,
- Hydrologist,
- Meteorologist,
- Irrigation & Drainage Engineer,
- Agronomist,
- Survey Engineer,
- Agro-economist,
- Pedologist,
- Geologist,
- Land use Engineer, and
- Rural Development Engineer

The Vietnamese Government shall pay particular attention to provision of the following maps, data and other relevant engineering materials as well as execution of additional survey and investigation.

(1) Topographic map and survey:

1:50,000 topographic map

1:5,000 topographic map

(2) Meteo-hydrological data

Annex 1:

MAIN SOIL TYPES OF NAM DAN DISTRICT

Soil type	hectare	percentage
Schist-based red yellow soil	1,744	5.9
Sandstone based yellow soil	435	1.5
Gravelly eroded soil	10,554	33.7
Old alluvion based degraded sedimentary! brown yellow soil	11,922	40.4
Alluvial soil with annual deposit	1,293	4.4
Water logged greyed alluvial soil	2,000	6.8
Water sources	957	3.2
<u>Total:</u>	<u>29,511</u>	<u>100.0</u>

Annex 2:HECTARAGE, YIELD AND OUTPUT OF SOME
MAIN CROPS OF NAM DAN DISTRICT IN 1988

Crop	! hectarage !	! yield ! (ton/ha)	! output ! (ton)
<u>TOTAL CULTIVATED HECTARAGE</u>	! 20,300 !	!	!
I. <u>ANNUAL CROPS:</u>	! 19,798 !	!	!
1. <u>Food crops:</u>	! 16,552 !	!	!
Rice (annual plantation)	! 13,364 !	! 2.7 !	! 36,261 !
Winter-Spring rice crop	! 6,535 !	! 3.3 !	! 21,643 !
Summer-Autumn rice crop	! 4,155 !	! 2.6 !	! 10,961 !
Rainy season rice crop	! 2,674 !	! 1.3 !	! 3,657 !
Sweet potato(annual plantation)	! 1,895 !	! 5.4 !	! 10,353 !
Maize (annual plantation)	! 1,044 !	! 2.5 !	! 2,650 !
Manioc	! 185 !	! 1.0 !	! 185 !
Other tuber plants	! 63 !	!	! 280 !
2. <u>Industrial crops:</u>	! 2,152 !	!	!
Peanut	! 1,549 !	! 1.3 !	! 2,021 !
Chilli	! 150 !	! 1.1 !	! 169 !
Sugar-cane	! 344 !	! 20.0 !	! 6,880 !
Soybean	! 73 !	! 0.38 !	! 26 !
Brown tabacs (for water pipe)	! 25 !	! 0.7 !	! 18 !
3. <u>Vegetables</u>	! 1,094 !	! 6.0 !	! 6,200 !
IIIPerennial plants	! 502 !	!	!

Annex 3:LIVESTOCK OF NAM DAN DISTRICT IN 1988

Animal type				
	total	percentage		
1. <u>Total head of buffaloes and cattle</u>	24,411	100		
Buffaloes	8,562	35		
Cattle	15,849	65		
Drawing buffalo and cattle	15,735	64		
2. <u>Total head of pigs</u>	31,549	100		
Sow	4,473	14		
Boar	87	3		
Fetening pig	26,989	83		
3. <u>Total poultry head</u>	205,407	100		
Duck	9,540	5		
Chicken	195,867	95		

Annex 4:

LAND USE SITUATION OF NAM DAN DISTRICT

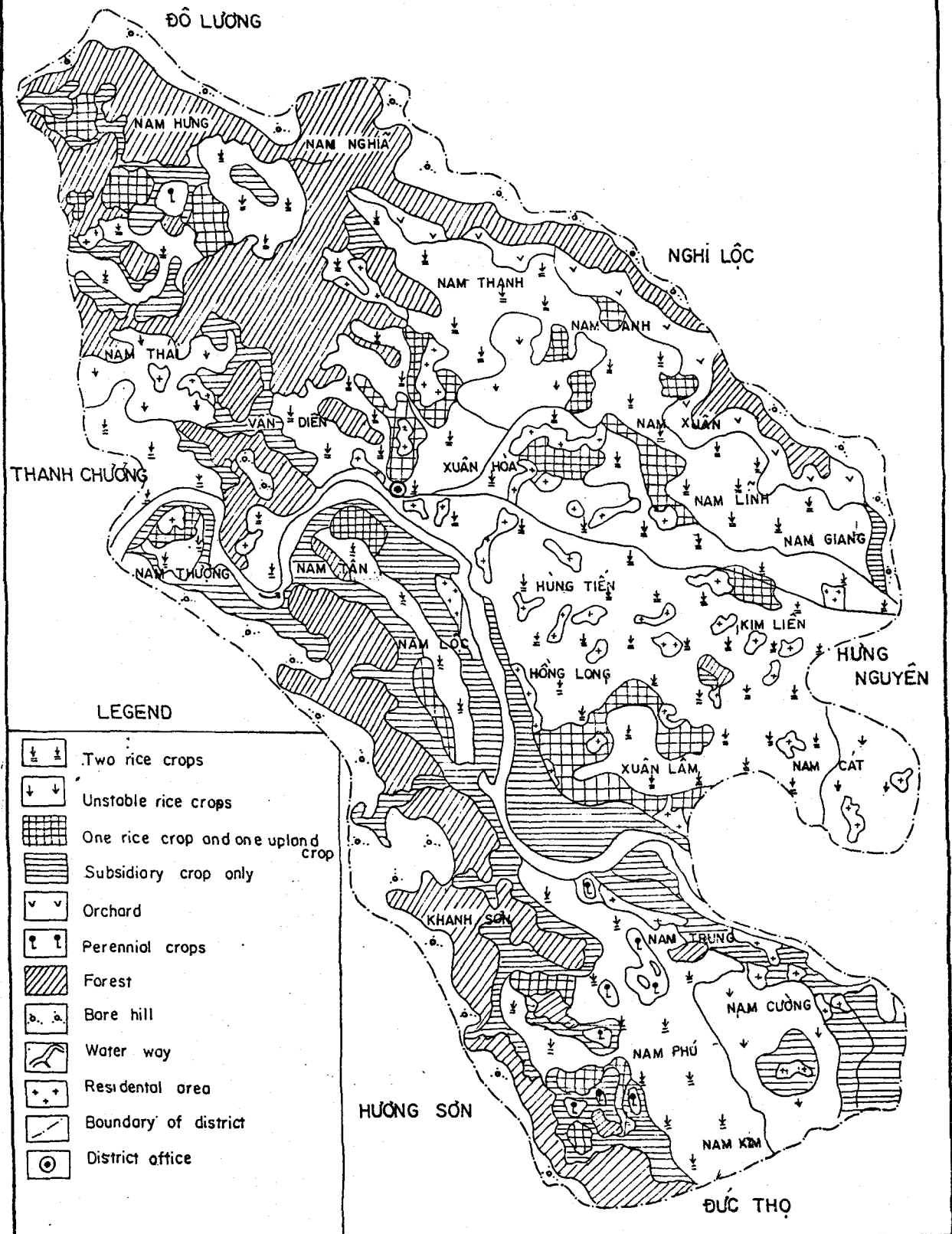
	<u>Actual land use</u>		<u>Land use planning by 1995</u>	
	<u>Hectarage</u>	<u>percentage</u>	<u>Hectarage</u>	<u>percentage</u>
<u>NATURAL HECTARAGE</u>	29,511	100	29,511	100
I. <u>FARMING LAND:</u>	11,869.8	40.2	12,113	41.05
1. Annual plant field:	10,847.8		10,712	
3 crops per year field	-		3,443	
2 crops per year field	6,674.1		4,148.3	
2 rice crops per year field	4,885.6		3,611.8	
1 rice crop+1 dry crop field	1,783.5		536.5	
1 crop per year field	1,797.2		797.2	
Winter Spring rice crop field	1,735.7		733.7	
Wet season rice crop field	63.5		63.5	
Specialized for rice nursery field	582.3		582.3	
Dry crop and industrial crop field	1,794.2		1,742.3	
2. Perennial plant field:	636		1,116	
3. Grazing pasture	25		25	
4. Water surface for farming use	204		260	
5. Newly reclaimed land for farming use	157		-	
II. <u>FOREST AND FORESTRY LAND:</u>	8,395	28.45	8,395	28.45
1. Natural forest	1,833		1,833	
2. Afforested land	5,562		6,562	
3. Bare land(to be afforested)	3,000			
III. <u>LAND OF SPECIAL USE</u>	4,051	13.73	4,637	15.71
IV. <u>IDLE LAND</u>	5,195	17.60	4,366	14.79

CULTIVATED CALENDAR OF NAMDAN DISTRICT

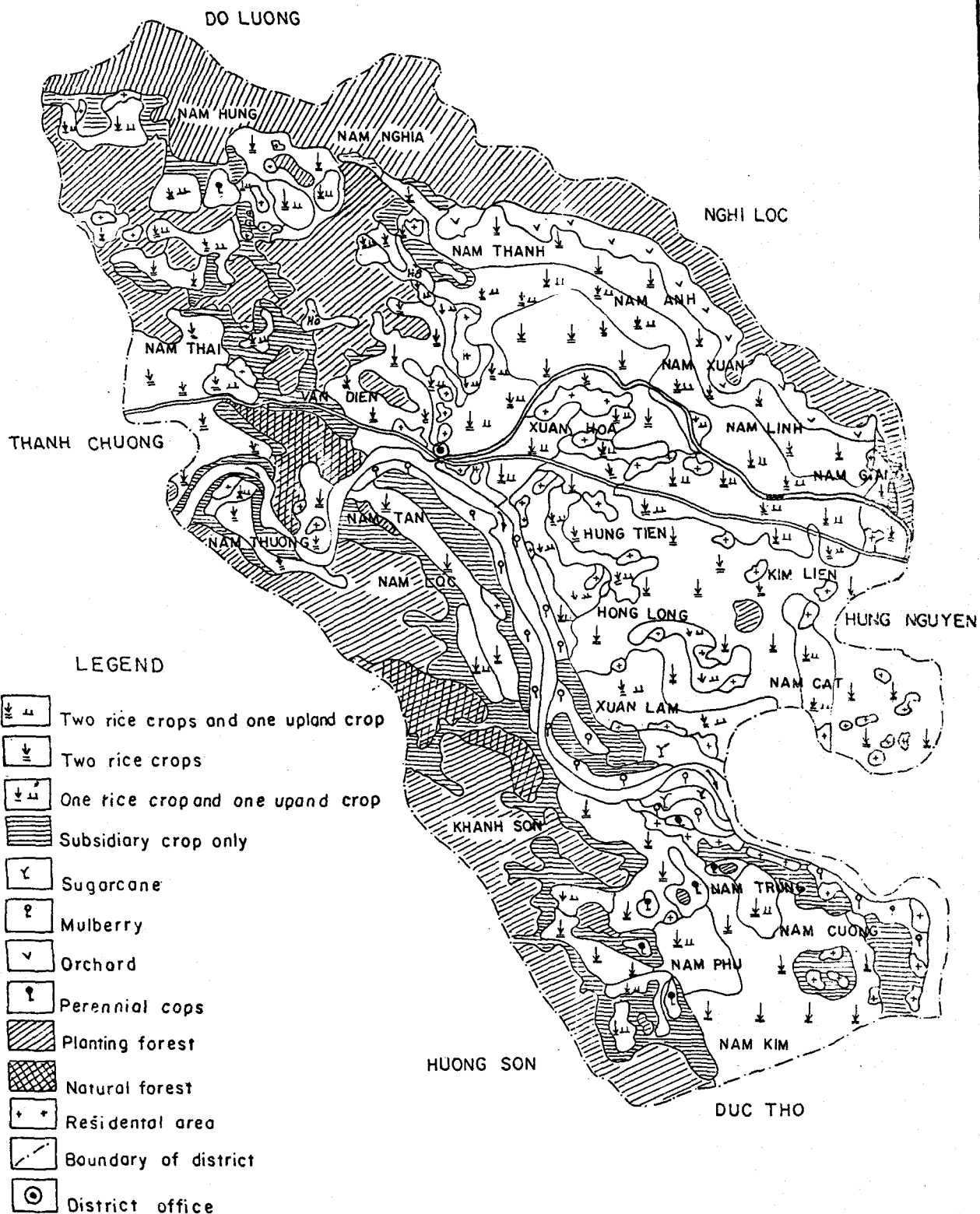
Annex 5

Land type	January	February	March	April	May	June	July	August	September	October	November	December
1- Two crops of rice & one dry crop	winter crop *****	*****	Spring rice	*****	*****	*****	*****	Summer-autumn rice	*****	*****	Winter dry crop *****	*****
2- Two crops of rice	*****	*****	Spring rice	*****	*****	*****	*****	Summer-autumn rice	*****	*****	*****	*****
	*****	Main spring rice *****	*****	*****	*****	*****	*****	Rainy season rice	*****	*****	*****	*****
3- One crop of rice & one dry crop	*****	*****	Winter-spring dry crop	*****	*****	*****	*****	Rainy season rice	*****	*****	Winter dry crop *****	*****
	*****	*****	Spring dry crop	*****	*****	*****	*****	Rainy season rice	*****	*****	*****	*****
4- One crop of rice	*****	*****	*****	*****	*****	*****	*****	Rainy season rice	*****	*****	*****	*****
	*****	*****	Spring rice	*****	*****	*****	*****	*****	*****	*****	*****	*****
5- Three dry crops	*****	*****	Spring dry crop	*****	*****	*****	*****	*****	*****	*****	*****	*****
	*****	*****	*****	*****	*****	*****	*****	Summer-autumn dry crop	*****	*****	*****	*****
	winter crop *****	*****	*****	*****	*****	*****	*****	*****	*****	*****	Winter dry crop *****	*****

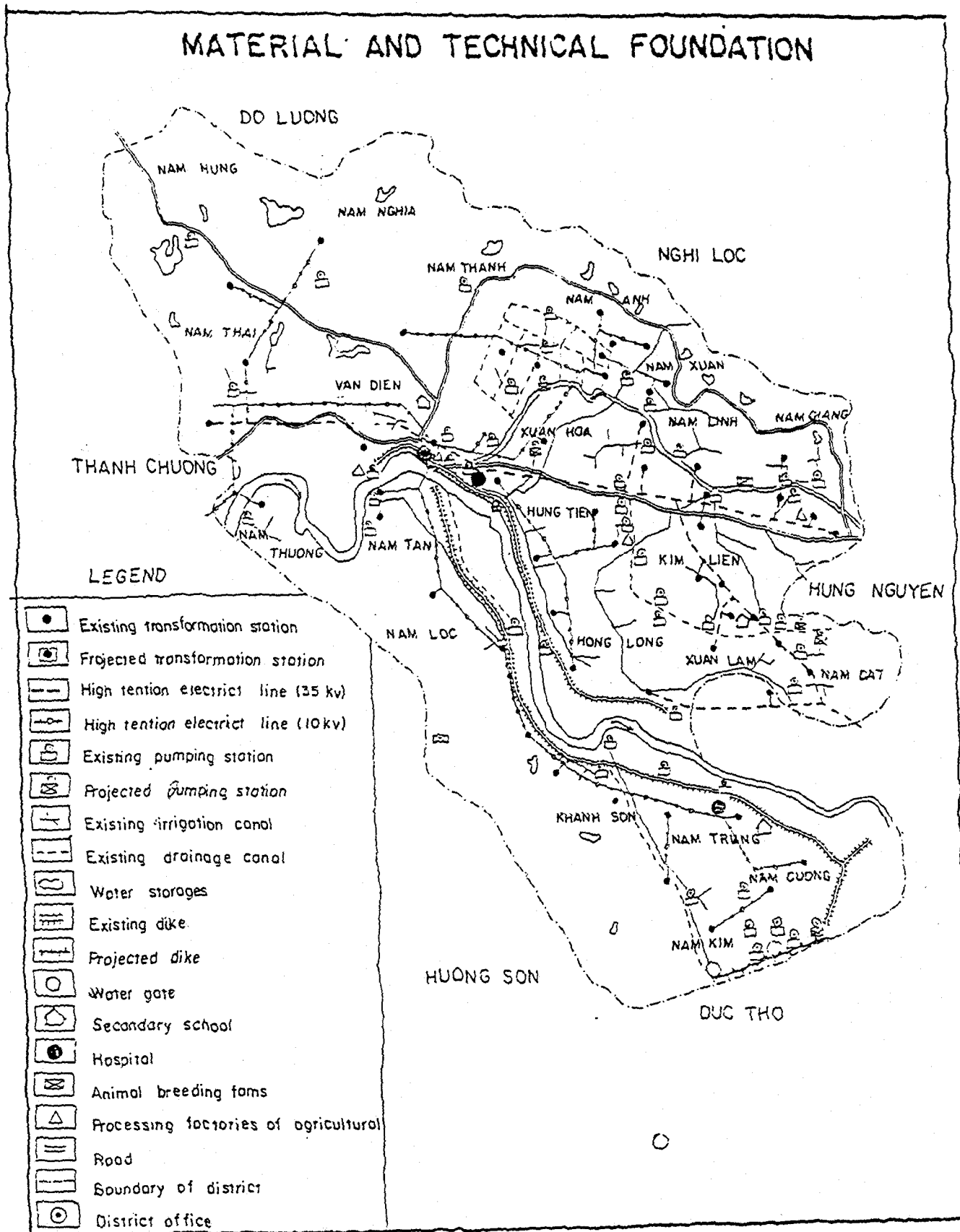
EXISTING LANDUSE MAP



POTENTIALLY LANDUSE PLANTING MAP



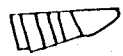
MATERIAL AND TECHNICAL FOUNDATION



TERMS OF REFERENCE
FOR
THE STUDY
ON
AGRICULTURAL AND RURAL DEVELOPMENT
OF
ME LINH VILLAGE
(ME LINH DISTRICT HANOI CITY)

1990

MINISTRY OF AGRICULTURE AND FOOD INDUSTRY
NATIONAL INSTITUTE FOR AGRICULTURAL PLANNING AND PROJECTION (NIAPP)



MATERIAL AND TECHNICAL FOUNDATION

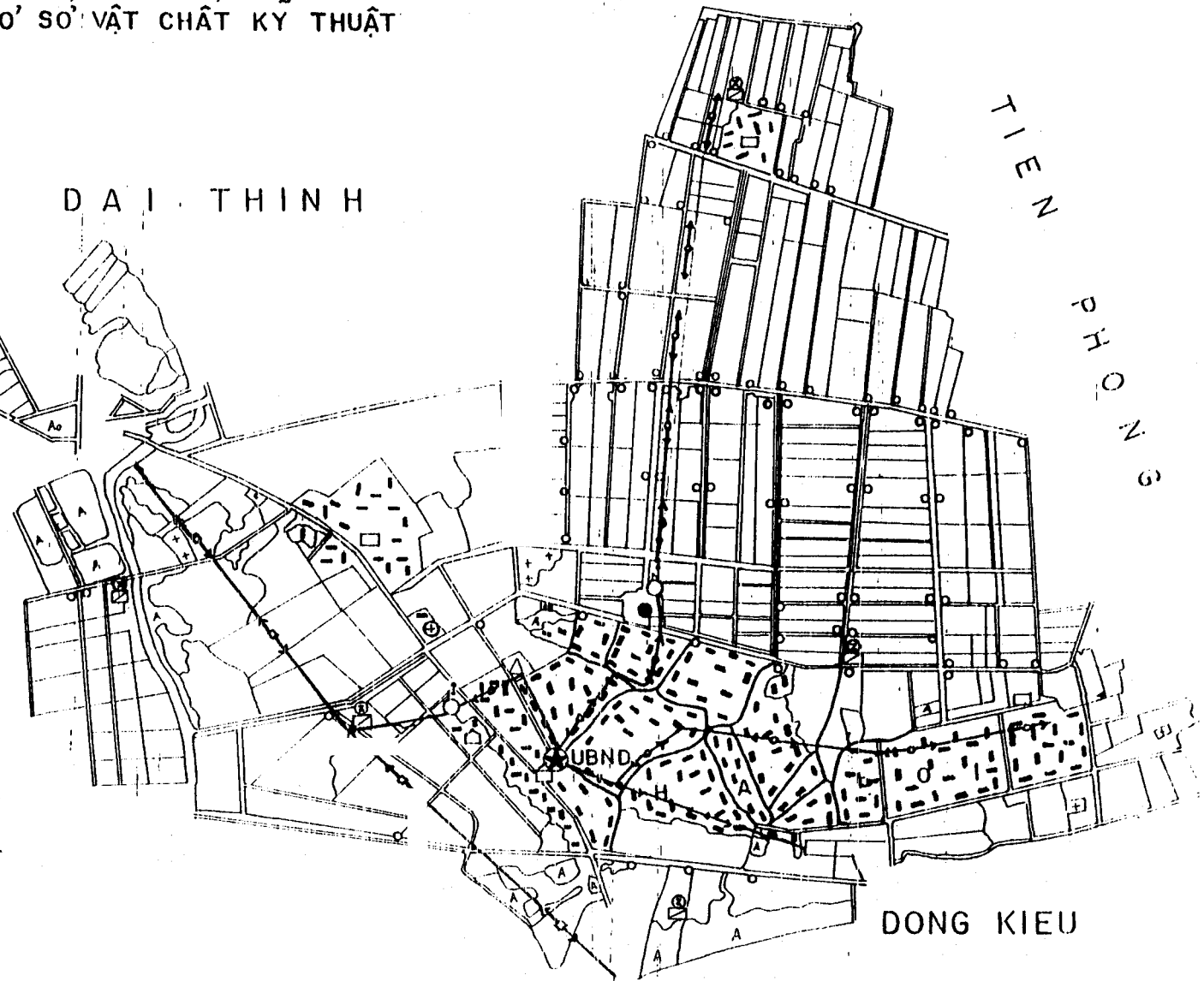
CƠ SỞ VẬT CHẤT KỸ THUẬT

DAI THINH

TIEN
PHONG

LEGEND

- Road
- Irrigation and drainage sys
- o Irrigation and drainage gat
- (P) Pumping station
- (T) Transformer station
- of the village
- Electrical line 10 KV
- Electrical line 0,4 KV
- Cooperative centre



2.2 PROPOSAL

PLAN FOR AGRICULTURAL AND RURAL DEVELOPMENT OF MELINH VILLAGE (MELINH DISTRICT, HANOI CITY) AFTER THE APPROVAL OF THE THANH DIEM PROJECT

Meling is a village situated in the area benefited by the Thanh Diem project, at the South-western part of Melinh district, 28 km away from the centre of Hanoi city.

Meling village covers a natural area of 615 ha, with a population of 8,700 inhabitants (1989). As for agricultural production, besides paddy rice, there are vegetables for supplying Hanoi city and for export.

In order to work out the village's working plan for developing production and improving people's life, it is necessary to make investments in the construction and up-grading the systems of irrigation and drainage, communication and transport, electricity supply, agro-products processing and conservation and bettering other cultural and welfare works.

I. PHYSICAL CONDITIONS:

1. Topography and soils:

- Melinh lies on a topographically most elevated area of the region benefited by the Thanh Diem agro-hydraulic network. The soils are formed by the alluvials of the Red river. Due to an irrigational farming and a continual washing away, the soils have an obvious trend of degradation.

- The soils, consisting of 339,13 ha of old alluvial soils with ferralitic products and 59.94 ha of alluvial gley, are of light structure, acid, poor in nutrients, of feeble absorption and conservation capability of water and

nutrients. Their light structure facilitates the tillage and is suited for the cultivation of upland crops. The crop diversification is still of big potentials.

- 70% of arable lands are of light sandy loam, of $PH > 5$ with a low or medium humus total, a low and very low phosphorus and potassium total.

- The majority of arable lands are under 3 crops per year, some are under 4 crops per year.

The land suitability can be divided into 5 categories:

Category 1: 71.60 ha

Category 2: 125.07 ha

Category 3: 92.34 ha

Category 4: 55.72 ha

Category 5: 57.94 ha

2. Climate:

It is a tropical climate with monsoon, of cold winter, with an average annual rainfall of 1,777 mm; the rainy season lasts from April to October, with 80% of the annual rainfall. Storms occur frequently in July, August and September. The dry season begins in November and ends in March. The average temperature of the rainy months is 24 - 29 C; and of the dry season, 16 - 20 C. The cold in winter is favourable for growing vegetables of origine from temperature zone.

3. Water resources:

There is no big water resource flowing through the Melinh village. The Red river runs at 1,500 m away from the territory of Melinh; so the irrigation of the village's fields depends on the Thanh Diem pumping station (following the Thanh Phu canal) and the Ap Bac pumping stations (following the West canal).

II. ECONOMICAL SITUATION

1. Land use

Land is utilized at a high rate. The farm lands make up 67.95% of the natural hectareage, in which 65.5% are arable land. There is no more potential arable land, and yet some hectareage of arable land will be used for construction site. The intensive land use ratio is actually 2.44. Thus the only one orientation for further developing agricultural production is to intensify the cultivation for an increase of yield and to re-structure the cropping systems for a hgiher economic efficiency.

2. Agricultural production

a. Drops

- The total hectareage of cultivated lands of 1988 was 979 ha, in which spring rice 272 ha, wet season rice 345 ha, onion 90 ha, kohlrabi 108 ha, cabbage 36 ha, pumpkin 72 ha, peanut 36 ha.

- In recent years, efforts were made in the introduction of high yielding varieties appropriate to the characteristics of soils (for instance the rice varieties CR 203, CN2, KV10 ..., the varieties of vegetable of Japan, China and Vietnam). But the main difficulties encountered in agricultural production here are the shortage of water for irrigation, the shortage of inspecticides and the shortage of manure and chemical fertilizers. In fact, the real output make up only 60% of the therioretical outputs.

- The production of food grains in 1988 was 1870 tons, averaging 214 kg of food per capita per year.

b. Livestock

- The pig herd totals 2800 heads, in which 1500 heads of slaughtering pigs, 95% of them are economic hybrids, and their slaughtering body weight is between 90 - 100 kg/head.

- The buffale and cattle herd consist of 500 heads, in which 425 head of drawing animals.

- On the average, each household keeps 5 - 10 heads of chickens/ducks.

- The annual production of meat makes up 1.50 tons.

- Manure is mainly applied for vegetable, partly for rice; but it should be doubled to satisfy the need of fertilizing the village's fields.

c. Sidelines

Actually the villagers have no other sideline than producing bricks; the collective brickkilns produce every year 200,000 pieces, and household brickkilns, 1 million pieces.

It is very urgent to find out jobs for extra labour force, including farmers' idle times.

3. Social aspects

- The population of the village numbers 8.700 inhabitants, in which 4654 women (or 53.5%). The rate of demographic growth is 2.2%. The households number 1,805, in which 38.8% of 1 - 3 people households, 28.8% of 4 - 5 people households and 32.4% of above 5 people households. The number of people of working age is 2,712, in which 2,571 agro-labourers. On the average, each labourer is in charge of 2.77 ha of cultivated land. The labour productivity is relatively high. In the vegetable growing periods, due to the lack of specialized implements, farmers should work 10 - 12 hours per day.

- Regarding the dwelling houses, 100% of families have built tileroofed houses, of which 20% are one-storeyed houses. About 50% of households have hygienic works, it means well, bath-room and latrine. The water of wells is of good quality, but the latrines should still be improved.

- A basic general school (grade I and grade II), comprising 4 class-rooms of a total surface of 960 m², has been established in the village. The buildings are mediocre, so are teaching aids, and they are more and more degraded. Actually the pupils number 1,660; due to the lack of class-rooms, they have to come to class in two shifts.

There are 4 creches (of a total surface of 200 m²) and 5 kindergartents (of a total surface of 250 m²).

- A clinic of 330 m² surface has been newly built, staffed with 2 assistant-doctors and 5 nurses. It consists of 12 patient beds and the equipment is very rudimentary.

- A wine-broadcasting system with 2 amplifiers of 250 W and 24 loud-speakers of 10 W has been set up, but some apparatuses have been worn out. 11% of house-holds access to TV and radio-cassette.

4. Material and technical basis

a. The fields have been well constructed.

b. Irrigation:

- 100 ha are irrigated by the Ap Bac pumping station through the West canal; 140 ha are irrigated by the Thanh Diem and Hei Tre pumping stations through the Thanh Phu canal. The drainage is done by the system of Thoung Le and Song Thiep pumping stations.

- The canal systems consist of: 3 km of grade 1 canal (5 m in breadth and 1.5 m in depth), 15 km of grade 2 canal (3 m in breadth and 1 m in depth), and 15 km of grade 3 canal. The canals are earthen, partly broken. There exist 2 electric pumping stations of 3540 m³/h capacity and 100 water pumps operated by Koler motors (already old).

- In the rainy season, the low lying lands at the end of the canals become the points of convergence of water which flows down from elevated fields. The dimension of the drain crossing the high way N 23 is too little (80 x 100 m) and can not completely controllable. In fact, only 60% of the fields are irrigated. In winter, vegetable fields are mainly watered by hand tools, 170 ha suffer serious drought (including 60 ha of Ap Ha fields, 48 ha of Dan fields and 62 ha of Lieu Tu fields), and 100 ha suffer serious submersion.

c. Communication and transport

- 2 km of the asphalted high-way N 23 lies through the village, but the asphalt layer has been worn out. There are 16 km of roads of 4 - 6 m width, including 4 km of inter-hamlet roads and 12 km of field roads. It is earthen roads of bad quality.

- There exist 7 big sewers under the road and 34 small sewers for both communication and irrigation. All sewers are built with brick, old and worn out.

- As for transport means, besides 2 Beng Sen small tractors, there exists a number of carts drawn by men or animals with a leading capacity of 200 - 500 kg.

d. Electricity supply

- A system of electricity supply has been built with a transformer of 180 KVA, 1.5 km of 10 KV high tension line and 3.5 km of 0.4 KV high tension line.

- An another system of electricity supply of 320 KVA with 1 km of 10 KV line and 1.5 km of 0.4 KV is under construction, but except the house and poles, the transformer and wire are not yet available.

The electricity is now supplied only for irrigation and some other production activities.

5. Environment

In this region, vegetables are traditionally applied with fresh dung and excrement; insecticides are often used; the drainage of wasted water from the dwelling quarter is bad; the verdure of plants and trees in the village is still not enough. All these conditions have bad influence upon the people's living conditions. There is no epidemics but diarrhea and eye trouble occur frequently in Summer.

GENERAL OBSERVATION

Meling village has a potentiality for the development of agricultural production, with marketable agro-products, especially vegetables, fruits and tubers of temperate-zone origine. The production patterns of crops and livestock is still now rationally proportioned. The soils are lack of fertilizers. Irrigation and are not yet completely controlled. Communication and transports are still mediocre. Material and technical foundation for the service of production and people's life is still poor, although the living conditions of this village are better than that of other villages in the region benefited by the Thanh Diem agro-hydraulic network. Intensification of production, construction of agro-products processing units for hightening their value and improvement of physical basis constitute the subjects to be solved urgently for the rural development in this village.

III. DEVELOPING ORIENTATION

1. Objectives

- To raise the yield of crops by intensive cultivation of the basis of improving the irrigation system and applying biological techniques;
- To develop rural industries, particularly small-scale products processing industry;
- To build a new countryside.

2. Staple measures to be taken

a. Land use planning

- 3 ha of farm land will be used for construction sites whereas for compensation, 5 ha of excavated and hollow land will be transformed into pond for fish rearing. Hence, the hectarage of farm land will be 420 ha, or 60.28% of the natural surface.

- After upgrading the agro-hydraulic system, 33 ha of actual 2-rice-crop fields will be added a maize crop in winter, so the hectarage of 3-crop fields will be increased from actually 257 ha to 290 ha by 1995, or 47.15% of the total surface; and 58 ha of 1 rice crop in Dam Lieu fields will be able to grow 2 rice crops. (see tab. 3).

b. Development of cropping patterns

Following cropping system will be applied:

- I. Early wet season rice - cabbage - kohlrabi - spring rice
- II. Early wet season rice - vegetable seedlings - onion - pumpkin
- III. Wet season rice - kohlrabi - cabbage - spring rice
- IV. Wet season rice - tomato - kolrabi - soyabean
- V. Early wet season rice - winter maize - tomato
- VI. Wet season rice - spring rice.

Hectarage, Yield and Output of Main Crops

Crops	Hectarage (ha)	%	Yield (ton/ha)	Output (ton)	Compare with
					1988 (Increase: + Reduction: -)
Total cultivated land	1,097	100			
I. Food crops	647	58.98			
Winter-spring rice	250	22.79	4.0	1,000	+ 181
Wet season rice	375	34.18	3.5	1,313	+ 261
Maize	22	2.02	2.5	55	+ 55
II. Food-stuff crops					
Onion	120	10.94	25	3,000	+ 1997
Kohlrabi	100	9.12	30	3,000	+ 905
Cabbage	50	4.56	33	1,650	+ 851
Tomato	50	4.56	41	2,050	+ 650

Pumpkin	100	9.12	36	3,960	+ 1966
Cucumber	20	1.82	20	400	+ 400
Peanut, soyabean					- 40

The total cultivated hectarage will be 1097 ha, an increase of 118 ha as compared with 1988, in which 56.8% are Winter-spring rice, 2% are main and 41% of other crops (kohlrabi, onion, cabbage, tomato ...).

For obtaining the yield as above-mentioned, following technical measures should be applied:

1. Introduction of new high yielding varieties which adapt to the soils of this village promising rice varieties are CR 203, KV 10, CN2. As for vegetable, local varieties and the varieties coming from Japan, China, Polland may be used.
2. Controlled irrigation and drainage.
3. Timely plant protection.
4. Improvement of soils, especially for increasing the humus; application of phosphorous and kalium fertilizers.

Fertilizers and insecticides kalium fertilizers.

- Organic fertilizer : 19,800 tons
- Urea : 320 tons
- Super phosphate : 293 tons
- Clorure kalium : 130 tons
- Inspecticides : 1.5 tons
- Pesticides : 27 tons

The villagers can meet only 50 - 60% of the requirement for manure, the rest should be provided from other sources such as green manure, alluvial water of the Thanh Diem agro-hydraulic system.

- Livestock

Besides maize and farming by-products, supplement fodder especially high-quality fodder such as fish podder, oil cake, should be provided for animals. Thus the pig herd will increase from 2800 heads to 4000 heads with an annual production of 2500 tons of pork, the increase of family poultry and fish rearing will contribute to both generating incomes and improving the daily meals of farmer families.

c. Infrastructural construction

- Irrigation

1. Improving the Thanh Diem agro-hydraulic system if investments are available to supply water for the fields of Melinh village. In addition, the irrigation will be ensured by upgrading the Hoi Cho pumping station-increasing from 3 pumps to 5 pumps of 1000 m³/ha.

2. Building the two small pumping stations of 540 m³/ha in Ap ha and Cua Den

3. Improving and upgrading the canal from Hoi Cho to Cua Den.

4. Building 30 sewers of 60 x 80 cm from the key canals to the fields and 30 sewers of 60 x 60 cm from the canals to the plots.

- Drainage

1. Hightening the path at edge of field plots and the dike of Thanh Phu canal for protecting the Dam Lieu field from submersion. On this field, additional 5 drainage sewers of 100 cl diameter and 5 drainage sewers of 60 cm diameter will be built.

2. Building 1 sewer of 100 cm diameter under the high-way N 23 and 8 sewers of 100 cm diameter in Bang Gieng, Cau Xanh, Ap Ha.

3. Building 1 regulator valve in Ap Ha for storing water in dry season.

4. Improving the Ap Ha canal (dredging the bed).

- Communication and transport

Asphalting 2 km of the high-way N 23 from the Temple of the two Sisters to the high-way N 50 (4 - 5 m width) and 3 km of inter-village road.

Paving with gravel and broken brick 11 km of inter-village roads and field roads (4 m width).

Improving the drainage system of the dwelling quarters.

Equipping with 1 lorry and 2 refrigerator trucks of 4.5 - 5 ton capacity, for the transport of vegetables and foodstuffs.

- Agricultural machanization

The ensure the land preparation, the transport of fertilizers, agro-products and other materials, besides existing drawing animals, it is necessary to equip with 40 power-tillers of 12 HP and attached implements and trailers.

Supplying 100 hand sprayers and 20 motor sprayers.

- Electricity supply

A supply of 680 KW is needed. So it is necessary to install a transformer of 320 KVA (room for installation is available), at the same time to change the transformer of 180 KVA at Hoi Cho pumping station for a transformer of 320 KVA. As for high tension line, 1 km of 10 KV line and 6 km of 0.4 KV line are to be set up.

Besides, a small generator is needed.

- Agro-product processing

- Building up an unit for processing chilli, garlic, pumpkin and other agro-products.

- Purchasing, small-machines appropriate for the processing of agro-products of a family or a group of families.

d. Rural development

With a rate of annual demographic growth of 2%, the population of the village will be 9,800 inhabitants by 1995, in which 3,050 laborers Extra laborers will be drawn for agricultural production, construction and processing of agro-products.

To ensure the schooling of 1,870 pupils, it is necessary to build a new one-storeyed school with 50 class-rooms of 50 m² surface each and sufficient furniture and teaching equipment.

To construct 5 buildings with a total surface of 700 m² for creches and kindergartents in the hamlets of Duong Bang, Xanh Cau, Hoi Cho Ap Ha and Lieu Tu.

To improve the village clinic with necessary equipment of health care.

To establish the village market (of 2,000 m² surface).

To build the cultural house of 400 seats.

To assist 50% of households in materials for the construction of hygienic work (water tanks, wells, latrines).

e. Natural conservency and recreation

To plant trees, especially in the area of the Two Sisters' temple, for beautifying the landscape and generating incomes.

g. Expertize and training

It is necessary to invite International experts for helping the village and the project area of Thanh Diem in irrigation, agro-products processing, and to send abroad 5 cadres for studying on agricultural production and rural development, and to organize in-service training course for 20 technicians in operation of farm machines and 20 technicians in agriculture.

4. Estimation of investments and economic efficiency

a. Investments

Total inputs	:	2,100,000 US\$
Construction:		955,000 - (45.48%)
Equipment	:	845,000 - (40.23%)
Others	:	300,000 - (14.29%)

The total inputs may be distributed for different sectors as follows:

Agriculture, irrigation and technical

services for agricultural production : 838,000 US\$ (39.90%)

Agro-products processing : 200,000 - (9.52%)

Communication and transport

(road construction and transport means): 328,000 - (15.62%)

Culture and public welfare : 434,000 - (20.67%)

Consultancy, training and others : 300,000 - (14.29%)

b. Socio-economic efficiency

The project implementation will result in an output equal to 1.9 times as compared with the actual output, with a value of 4,536 million dong or 1,134,000 US\$.

The marketable products of the village consist of : onion, pumpkin, cucumber, tomato, kohlrabi, cabbage, pork, chilli, peanut, soyabean, exportable products consist of onion, cucumber, kohlrabi, cabbage.

The profit obtained from the investments (not including labour costs) is estimated at 820 million dong, or 210,000 US\$.

With this profit, in 10 years, the investments would be returned.

If the budget is invested only for the development of production (agriculture, irrigation, technical services, processing, means of transport) totalling 1,083,000 US\$, and the interest is 3%, the investments may be returned in 7 years.

The project will bring more jobs for labourers, increase the incomes of farmers, thus improving the material and cultural life of the communities.

5. Phasing of investments

This project lasts 5 years and is divided into 3 phases:

- Phase 1 (2 years): emphasis should be laid on irrigation, electricity supply, agricultural mechanization, transport means, dryers and implements for agro-products processing, consultancy and training.

- Phase 2 (2 years): continuation of the phase 1 activities, especially the construction of communication and transport, cultural services and public welfare, consultancy and training.

- Phase 3 (1 year): Activities for the completion of the project, consultancy.

Financial distribution:

- Phase 1 : 1,133,000 US\$ (53.95%)
- Phase 2 : 617,000 - (29.38%)
- Phase 3 : 350,000 - (16.67%)

6. Structure for the implementation of the project

The project implementing commission of the village will be establishment under the leadership of the Project Implementing Commission of Thanh Diem area, responsible for the realization of approved working plan, and represents the villagers in the relation with concerned institutions.

V. SCOPE OF THE STUDY

In order to achieve the above mentioned objectives the Study shall be carried out in 2 phases. In the Phase I study, the basic development concept and preparatory study on the study area shall be prepared through extensive data collection and the field survey. In the Phase II study, the final plans for the agricultural and rural development plans shall be decided through the concentrated field survey and detailed analysis of data and information.

The scope of works for the Study will be broadly outlined as follows.

1. Collection and review of existing data and information

(1) Physical condition

- Topography
- Hydrology
- Meteorology
- Geology and soil mechanics
- Soils and erosion
- Natural ecosystems
- Others

(2) Socio-economic status

- Demographic conditions
- Regional and National economy
 - Infrastructure
 - Land use
 - Agriculture

(3) Programme

- Regional and national development plans relevant to the project

2. Execution of supplemental field survey and investigation

(1) Soils and capability survey to supplement the existing soil maps prepared by the NIAPP.

(2) Hydrological survey including installation of water level records, discharge measurement, water quality tests and fluctuation.

(3) Meteorological survey including measurement of heat load for crops and investocks during Foehn phenomenon.

(4) Irrigation and drainage survey including infiltration test, moisture holding capacity test and to measure consumptive use of each candidate crop.

(5) Agriculture survey including to investigate unit yields of crops, farming practices, processing facilities, etc.

(6) Agro-economic survey

(7) Topographic survey to supplement the existing maps

(8) Rural inhabitant's intention survey

(9) Others

3. Analyses and studies

The analyses and study for the promotion of consolidated agriculture and construction of pilot rural area in Nam Dan district shall be investigated through the concept of agricultural and rural development plants.

4. Work Schedule

The work schedule of the Study is shown Fig. 1 . It is proposed that all the work should be finished in two years.

5. EXPERTS REQUIREMENT AND MATERIAL SUPPLY BY THE GOVERNMENT

5.1 Experts Requirement from Japan

Experts	Field M/M	Home M/M
1. Team Leader	2.5	3.5
2. Irrigation & Drainage Engineer	4.5	5.0
3. Meteorologist cum hydrologist	4.0	4.0
4. Pedologist cum Land Use Expert	4.0	4.0
5. Rural Development	4.0	5.5
6. Cultivation and Farming Expert	4.0	4.5
7. Agro-Economy and Organization Expert	4.5	5.5
8. Survey Engineer	3.0	4.0
9. Cost Estimation and Implementation Expert	3.0	4.0
10. Project Evaluation	3.0	4.0
Total	36.5	4.0

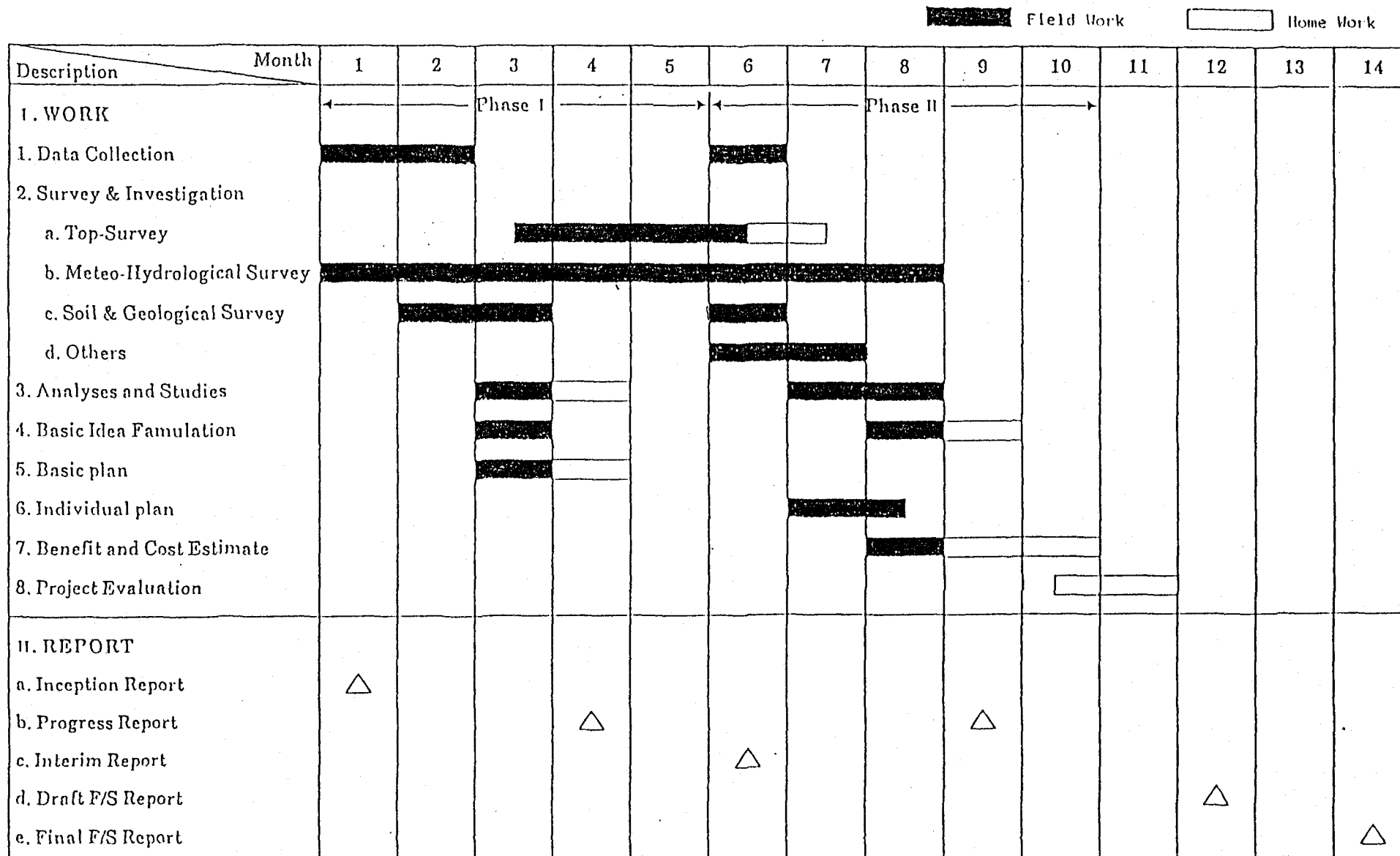


Fig. 1 WORK SCHEDULE

This study team will be compact and experts will work in several disciplines.

5.2 Materials Supplied by the Government

The Government of S.R. Vietnam shall provide the study team with an appropriate number of competent counterpart personnel, proper office space with necessary furniture, the necessary number of vehicles and other services and arrangements which are deemed necessary for execution of the Study. The following counterpart personnel will be assigned:

- Chief Counterpart,
- Hydrologist,
- Meteorologist
- Irrigation & Drainage Engineer,
- Agronomist,
- Survey Engineer,
- Agro-economist,
- Pedologist,
- Geologist,
- Land use Engineer, and
- Rural Development Engineer

The Vietnams Government shall pay particular attention to provision of the following maps, data and other relevant engineering materials as well as execution of additional survey and investigation.

(1) Topographic map and survey:

1:50,000 topographic map

1: 5,000 topographic map

(2) Meteo-hydrological data

Annex 1

MAIN SOILS OF MELINH COOPERATIVE

(Basing on topography and mechanical structure of soils)

Soil type	symbol	surface (ha)	%	Elevated field		Rather elevated field				Medium field			
				b	+	b	c	d	+	b	c	d	+
1. Degraded soil	B	3.60	0.89	0.20	0.20	3.40			3.40				
2. Alluvial soil with ferrallitic products in the sub soil	P ^h _f	399.13	84.3	2.00	2.00	25.13	25.8	15.0	65.93	41.37	131.77	137.34	210.48
3. Gleyed alluvial soil	P ^h _g	59.94	14.8										
		402.67			2.20				69.33				210.48

	Rather low field				Low lying field	
	c	d	e	+	e	+
1.						
2.	20.75	18.82	23.15	62.72		
3.					57.94	57.94

Topography of the fields

Elevated field	⏟	: 2.20 ha
Rather elevated field	⏟	: 69.33 -
Medium field	⏟	: 210.48 -
Rather low lying field	⏟	: 62.72 -
Low lying field	⏟	: 59.94 -

Mechanical structure of the soils

Sandy loam	b	: 72.10 ha
Light loamy soil	c	: 178.32 -
Medium loamy soil	d	: 71.16 -
Heavy loam	e	: 81.09 -

Annex 2LAND EVALUATION FOR AGRICULTURE
OF MELINH VILLAGE

land use	total	soil category				
		I	II	III	IV	V
- 2 rice crops+1 dry crop	! 139.50	! 30.04	! 55.37	! 50.19	! 5.40	! -
- 2 dry crop+1 Rice crop	! 117.86	! 32.26	! 46.40	! 17.90	! 21.30	! -
- 2 rice crops	! 62.72	! 7.50	! 15.00	! 17.50	! 24.92	! -
- 2 dry crops	! 22.65	! 1.3	! 11.80	! 6.95	! 2.10	! -
- 1 rice crop	! 57.94	!	!	!	!	! 57.94
- 1 dry crop	! 2.00	!	!	!	! 2.00	!
	!	!	!	!	!	!
<u>Total</u>	! 402.60	! 71.60	! 125.07	! 92.34	! 55.72	! 57.94

Annex 3POTENTIALLY LAND USE OF MELINH VILLAGE

Item	1988		1995		1988/1995 comparision
	surface	percentage	surface	percent.	
	(ha)	!of total	(ha)	!of total	
	! surface	! surface	! surface	! surface	
<u>NATURAL ACREAGE</u>	! 615.10	! 100.00	! 615.10	! 100.00	!
I. <u>Farming land</u>	! 417.99	! 67.95	! 420.00	! 68.28	! + 2.01
1. <u>Annual plant acreage</u>	! 402.67	! 65.46	! 400.00	! 65.03	! - 2.67
a. Rice field	! 380.02	! 61.78	! 337.00	! 61.29	! - 3.02
+ 5 crop field	! 257.36	! 41.84	! 290.00	! 47.15	! +32.64
- 2 rice crops+1dry crop	! 139.50	! 22.68	! 170.00	! 27.65	! +30.50
- 2 rice crops+2dry crops	! 117.36	! 19.16	! 120.00	! 19.52	! + 2.14
+ 2 crop field	! 64.72	! 10.52	! 87.00	! 14.14	! +22.28
- 2 rice crops	! 62.72	! 10.10	! 85.00	! 13.82	! -22.28
- 1 rice crop+1dry crop	! 2.00	! 0.42	! 2.00	! 0.32	!
+ 1 rice crop field	! 57.94	! 9.42	!	!	! -57.94
b. Dry crop field	! 22.65	! 3.68	! 23.00	! 3.74	! + 0.35
2. <u>Water surface</u>	! 15.32	! 2.49	! 20.00	! 3.25	! + 4.68
II. <u>Land of special use</u>	! 155.84	! 25.34	! 159.00	! 25.85	! + 3.16
1. Dwelling	! 76.40	! 12.42	! 78.00	! 12.68	! + 1.14
2. Irrigation	! 28.26	! 4.59	! 30.00	! 4.88	! + 1.74
3. Road	! 40.96	! 6.66	! 41.00	! 6.67	! + 0.09
4. Other construction	! 10.26	! 1.67	! 10.00	! 1.62	! - 0.26
III <u>Others</u>	! 41.26	! 6.71	! 36.00	! 5.87	! - 5.26

CULTIVATION CALENDAR

ME LINH COOPERATIVE

LỊCH CANH TÁC

A. Sow.
B. Harvest

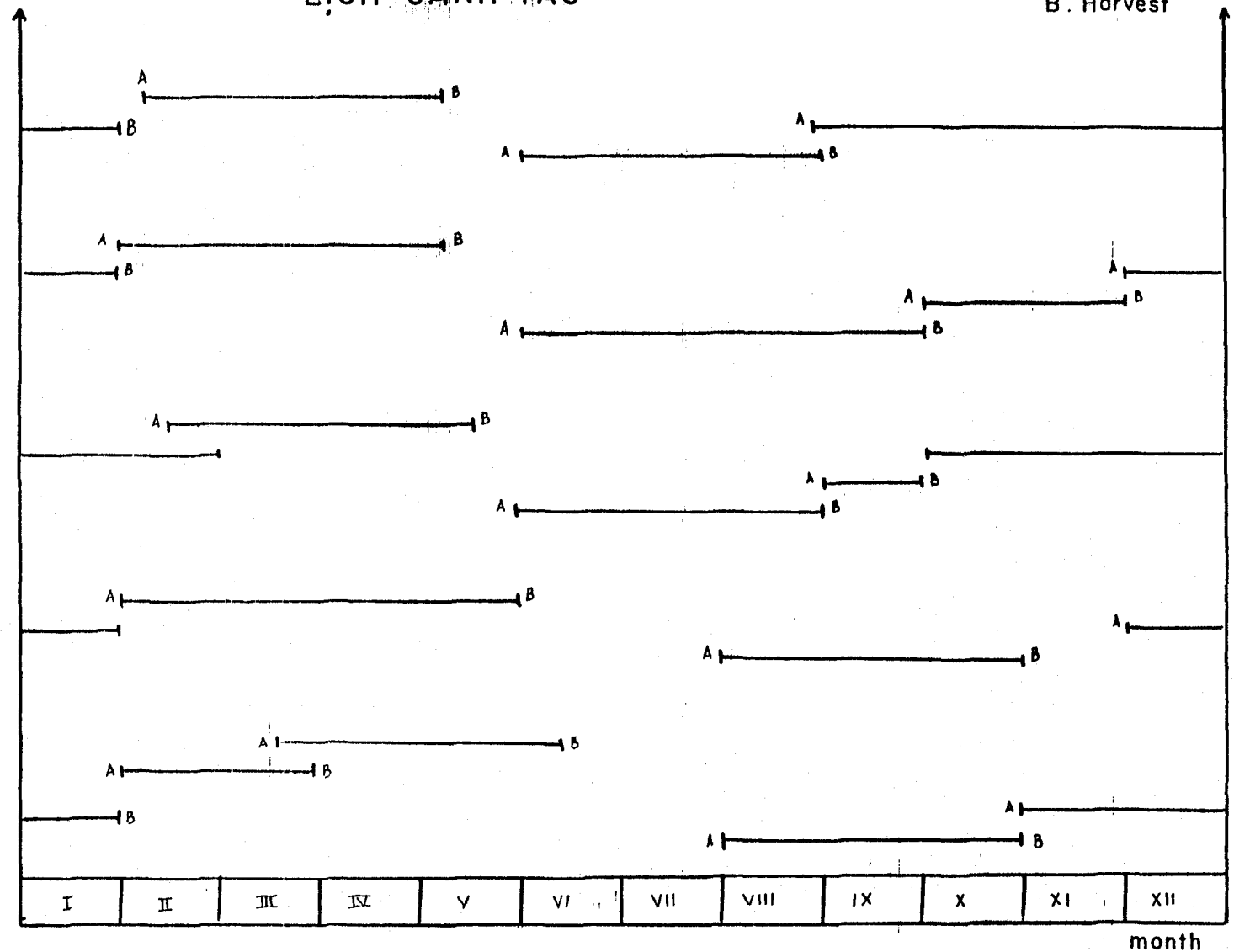
TYPE I
1 Potatoes
2 Wintermaize
3 Early summer rice

TYPE II
1 Late spring rice
2 Vegetables
3 Vegetables
4 Early summer rice

TYPE III
1 Pumpkin
2 Onions
3 Vegetable seedlings
4 Early summer rice

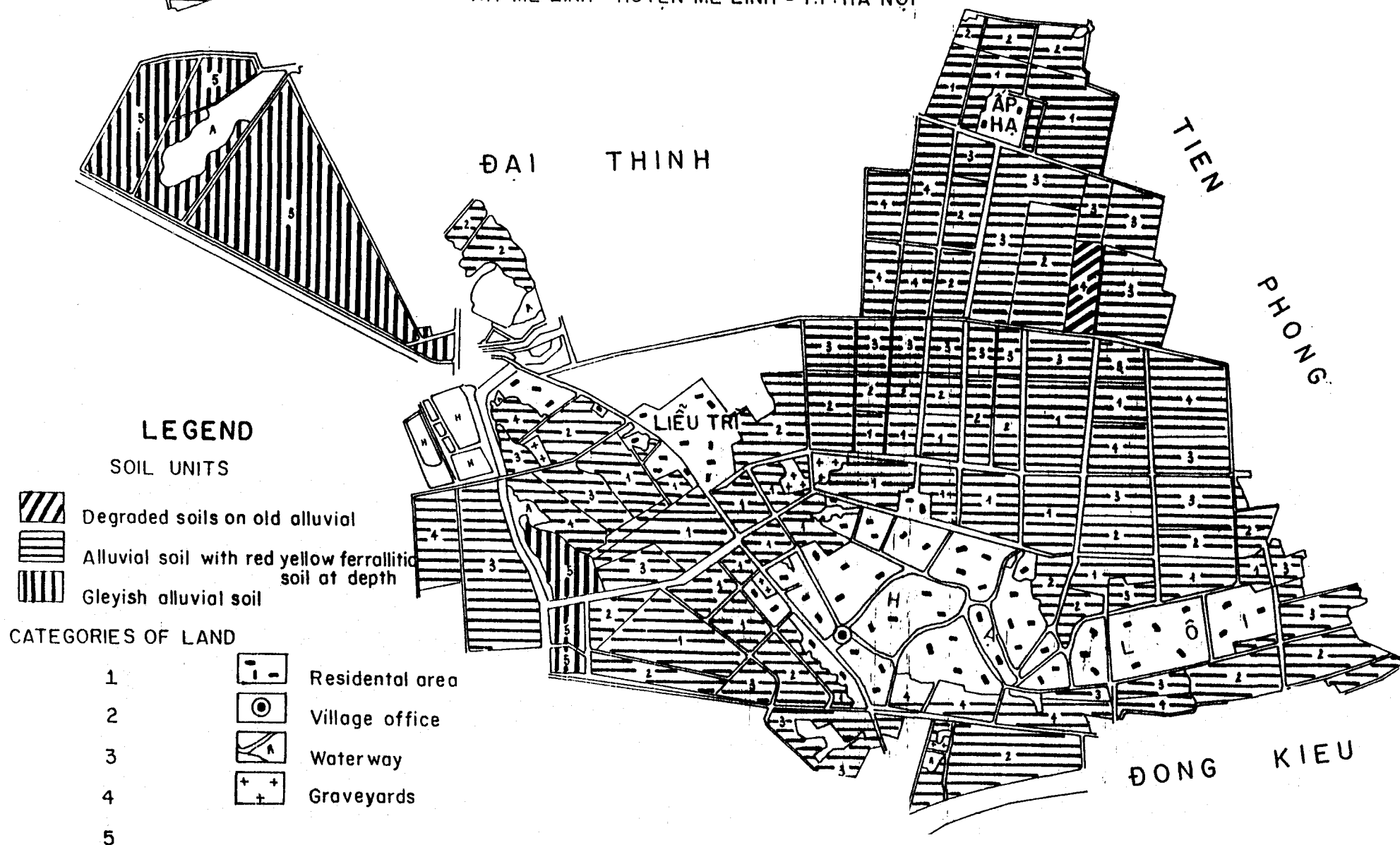
TYPE IV
1 Spring rice
2 Vegetables
3 Summer rice

TYPE V
1 Soybean
2 Vegetables
3 Potatoes
4 Summer rice



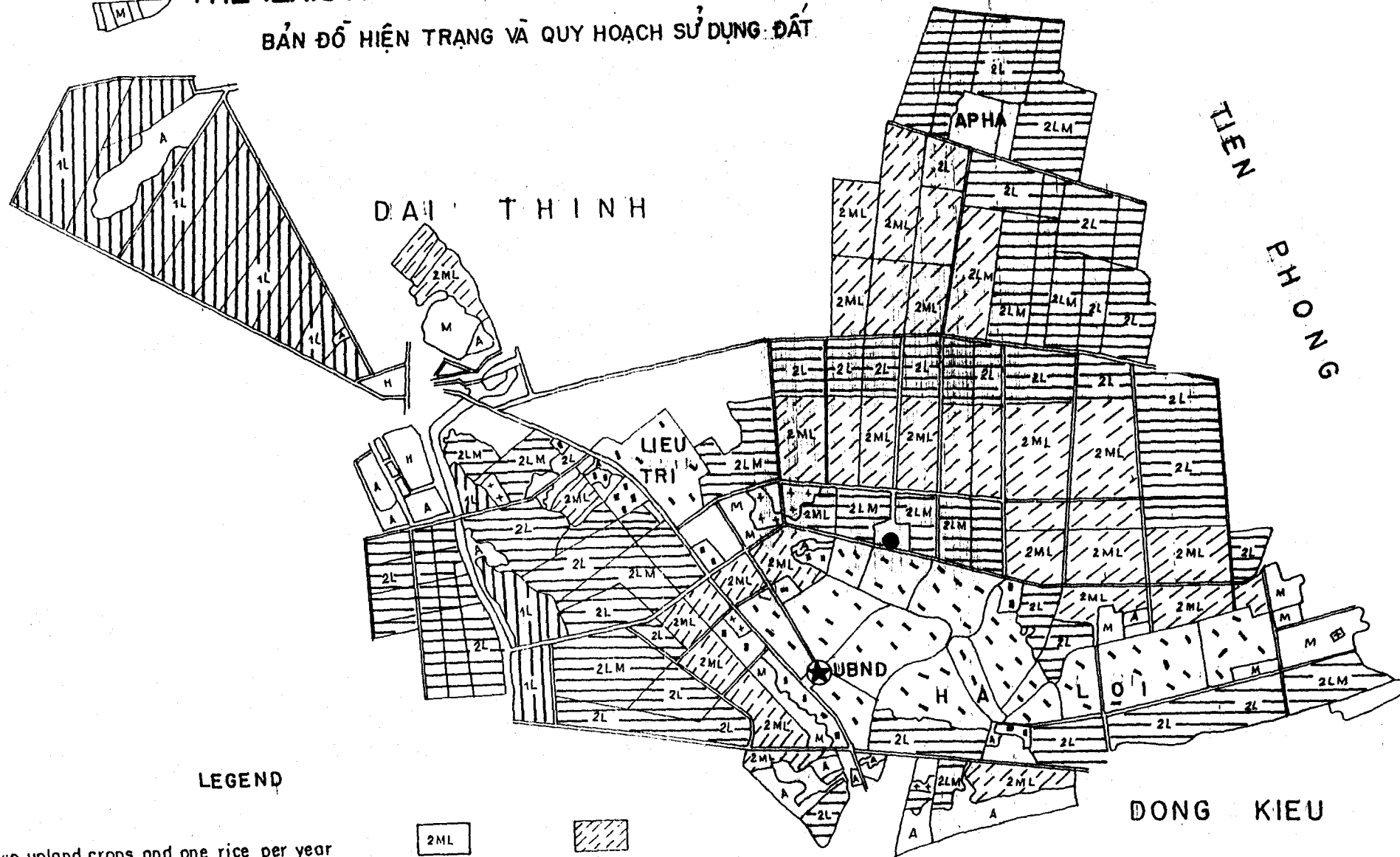
SOIL MAP AND LAND EVALUATION SYSTEM ME LINH VILLAGE - ME LINH DISTRICT - HA NOI CITY

BẢN ĐỒ ĐẤT VÀ PHÂN HẠNG ĐẤT
XÃ MÊ LINH - HUYỆN MÊ LINH - T.P. HÀ NỘI



THE EXISTING AND POTENTIALLY LANDUSE PLANNING MAP

BẢN ĐỒ HIỆN TRẠNG VÀ QUY HOẠCH SỬ DỤNG ĐẤT



LEGEND

no upland crops and one rice per year

2ML



no crops of rice and one upland crop per year

2LM



two crops of rice

2L



one upland crop per year

M

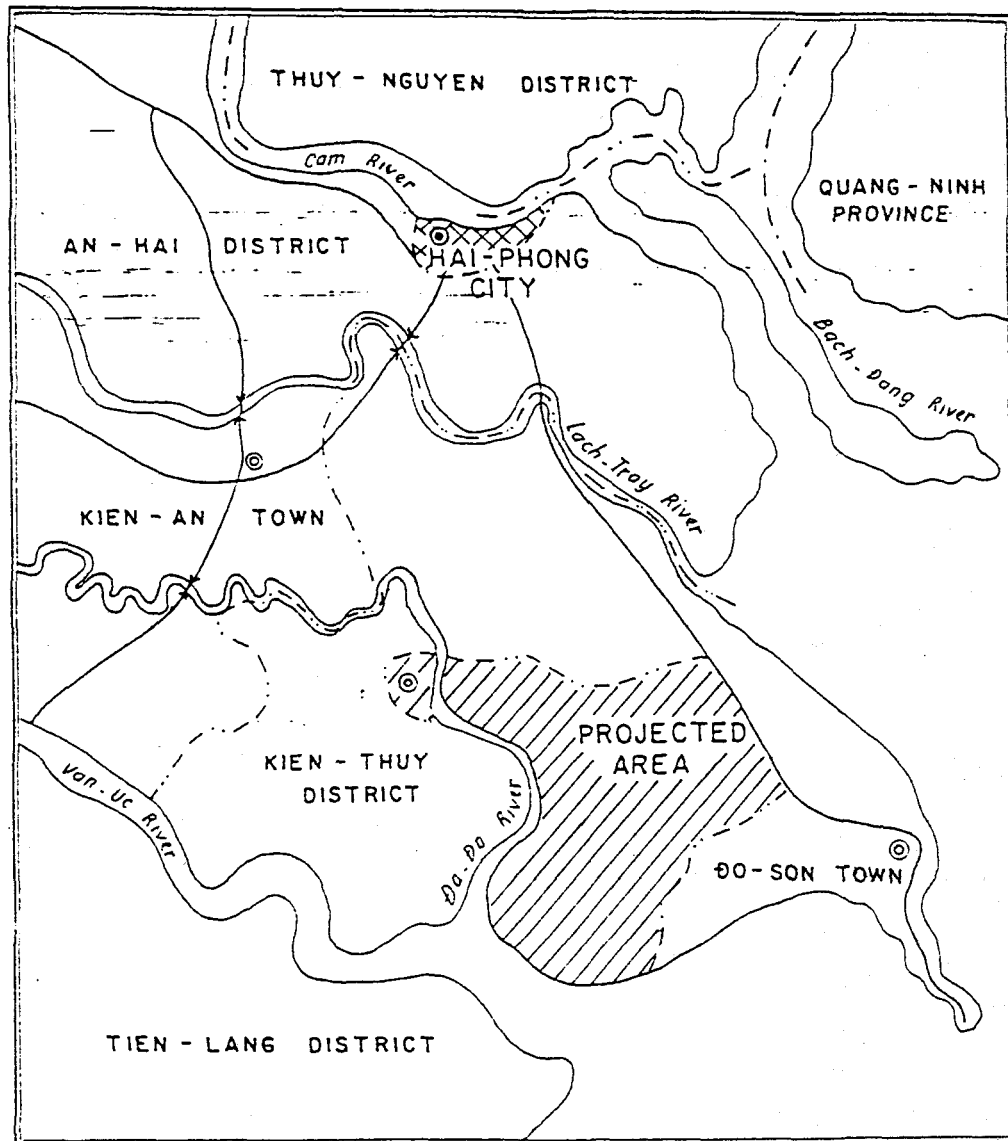


TERMS OF REFERENCE
FOR
THE STUDY
ON
AGRICULTURAL AND RURAL DEVELOPMENT
OF
KIENHUY DISTRICT HAIPHONG

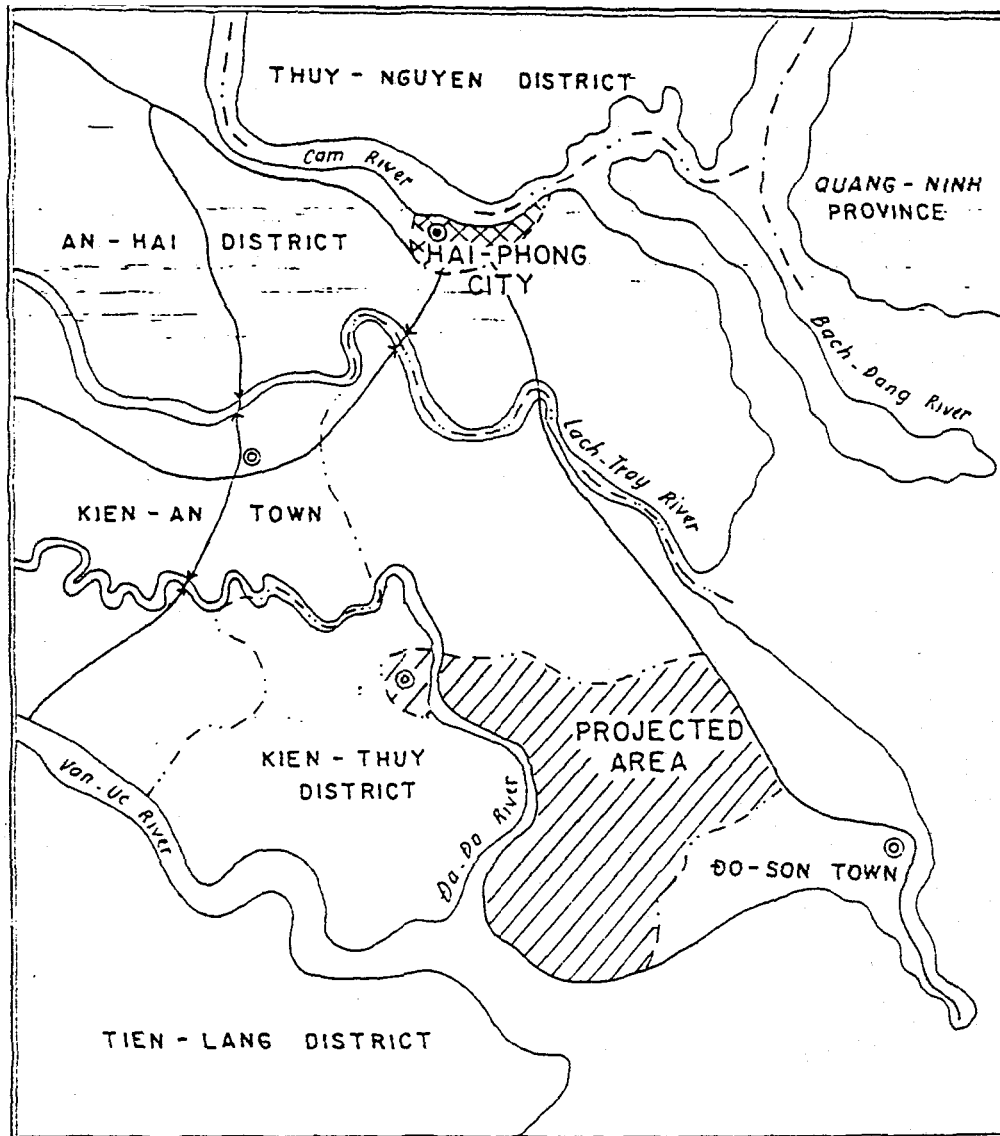
1990

MINISTRY OF AGRICULTURE AND FOOD INDUSTRY
NATIONAL INSTITUTE FOR AGRICULTURAL PLANNING AND PROJECTION (NIAPP)

THE LOCATION OF THE PROJECTED AREA



THE LOCATION OF THE PROJECTED AREA



TERMS OF REFERENCE FOR THE STUDY ON
AGRICULTURAL AND RURAL DEVELOPMENT OF KIEN THUY DISTRICT
HAI PHONG CITY

I. GENERALITIES

The project area consists of 6 villages: Minh Tan, Tan Phong, Hop Duc, Tu Son and Doan Xa in the Southern part of Kien Thuy District, Hai Phong City.

Kien Thuy is a coastal district, 20 km southward from Hai Phong Port, next to the touristic resort of Do Son, with favourable communications to Hai Phong and Hanoi.

The natural acreage of the district is of 16,000 ha; out of which, 9,485 ha or 59% are farm lands. The population is of 143,000, among them 51,890 are labourers, and 84% of labourers are involved in agricultural production.

The potentiality of agricultural development are expected from the land reclamation by transgressing to the sea, thousands hectares may be reclaimed and transformed into farm lands, and from the additional vegetable and subsidiary crops in winter on the fields where only 2 crops are actually done per year. The average yield of rice of Kien Thuy is still limited at 5.8 - 6.0 tons/ha/year, while some villages have obtained an average yield of 8.0 - 9.0 tons/ha/year.

Endowed with an abundant labour force, including a big number of well educated young people, situated close to the sea and adjacent to the high way No. 4 linking Hai Phong City to the Do Son Summer holiday resort, the villages of the projected area may develop not only agriculture but also fisheries, industries and different services, mostly touristic services.

The integrated development in this area comprise the improvement of hydraulic systems, the improvement of soil fertility, the application of advanced farming techniques for increasing the yield of rice, vegetable and subsidiary crops, the development of animal husbandry, fisheries, small industries and handicrafts, the construction of socio - economic infrastructures. The investment for these activities will be surely effective.

II. PRESENT NATURAL AND SOCIO - ECONOMIC CONDITIONS

1. Natural Conditions

- Climate: It is a humid tropical region influenced by the monsoon and the sea. The average annual temperature is 23 C oscillating, between 4.5 C and 41.5 C and the total temperature of 8,420 C. It is rather cold from December to March and the temperature is unstable. These conditions are considered suitable for the growth of vegetables and several plants originated from temperate zones. Summer is also rainy season, it is hot and wet with an annual rainfall averaging 1,780 mm, of which 85% concentrate in July, August, September accompanied often with storms. The average air humidity is 85%. The temperature of above 20 C is stable from 25 March to 25 November, suitable for the growth of tropical plants.

- Topography: The area is topographically uneven, with the difference between 0.4 - 2 m above the sea level, due to the coastal plains take shape alternately with the old sediments, thus creating the low - lying lands and elevated fields, forming a light inclination from North to South and from West to East. The Tu Son and Dai Hop villages is higher and that of Hop Duc Village is lower.

- Soils: It is a region of coastal estuary, the typical profile consist of a layer of alluvium of 30 - 50 cm depth deposited on a layer of residual mangrove remains overlaid on the sea bottom with plenty of soluble Fe and Al ions. The main characteristics of sub soil, top soil are saline and acid.

It may be divided into 7 groups of major soils as follows (see Annex 2 & 3):

1. Medium saline soils	2.1%
2. Lightly saline soils	10.4%
3. Medium saline but strongly acid sulphate soils	10.2%
4. Lightly saline but strongly acid sulphate soils	41.0%
5. Medium saline and medium acid sulphate soils	2.2%
6. Lightly saline and medium acid sulphate soils	30.5%
7. Alluvial soils inside the dyke systems	3.6%

In terms of physical structure, the percentage of different soils are as follows:

- Medium gleyed soils	61.1%
- Heavily gleyed soils	10.7%
- Sandy - gleyed soils	28.8%
- Acid sulphate soils	80%

By the chemical characteristics of the soils, the classification can be as follows: 80% of arable lands are acid sulphate, with mainly SO_4 -- component of 0.3 - 0.8% (the majority is above 0.5%), Cl^- component of 0.05 - 0.25% (the majority is above 0.15%). About 10% of the acreage are purely saline with Cl^- component of 0.05 - 0.15%. 90% of the soils are of pH_{KCl} 4.5 - 5.0.

Almost all the fields are of rich or rather rich in humus (2 - 3%); some low - lying fields content 4% humus. The total phosphorus ranges from medium to rather rich (0.04 - 0.08%); but it is very poor in nitrogen and available phosphorus.

Acidity and salinity represent actually the constraints to the farming intensification and the multiplication of crops in the area.

As far as the suitability of paddy field, the soils can be classified as follows:

- Very suitable	25.8%
- Suitable	46.5%
- Poorly suitable	14.1%
- Presently unsuitable	13.6%

- Hydrography: The Da Do River runs across this area, on which there have been built the Trung Trang water gate at the up - stream and the Co Tieu water gate at the downstream. And consequently these water gates in fact have transformed the river into a reservoir of fresh water for irrigating the fields of An Lao and Kien Thuy districts. This is also a main water resource for the projected area. When necessary to drain, the Co Tieu water gate will be opened for lowering the water level of the reservoir from its maximum height of 1.2 - 1.4 m to its shallowest level of 0.6 m.

Besides, there are some branches of the Da Do River which supply water for different fields of the area and discharge with extra water into the sea.

The sea adjoining to Kien Thuy district is of daily tidal regime with the difference between 1.5 m at high tide and 0.13 m at low tide.

In the dry season, salty water intrusion occur deeply into the mainland, hence water gates should be closed to prevent salinity. In the rainy season, fresh water overflows almost until the sea.

2. Socio-Economic Conditions

(1) Existing land use

The natural acreage of the area is of 4,627.1 ha, of which 2,849.9 ha, or 61.1% are farm lands, 1,051.2 ha, or 22.7% are of special use and 726 ha, or 15.7% are idle farm lands, 84% are two - crop per year only 1.0% is suitable for three crops per year, the rest are either one crop or lands with specialized for rice nursery or water space. The improvement of hydraulic network will facilitate the crop diversification of the area.

67.6 ha of idle lands are situated inside the dykes and other 67.8 ha of idle lands are adjacent to the rivers and the sea, these swamps, ponds and lakes may be certainly re - arranged for farming.

(2) Agricultural production

- Cultivation: The total cultivated acreage in 1988 was 5,263.5 ha, with the intensive landuse ratio is of 1.9, in which 88% rice, 7.8% vegetable, 2.2% sweet potato, 1.1% maize, 0.4% potato and 0.5% peanut.

Rice is the most important main crop. Attention has been paid for the intensification of rice culture, especially in the soil acidity and salinity. Due to the lack of appropriate irrigation systems for leaching purpose, the introduction of high yielding varieties have not been largely applied. 33% of the spring rice fields are obliged to grow with "Bau", a local variety of low yield. Further more, due to the lack of fertilizers, insecticides and the practice of irrational techniques, the rice yields average 2.8 - 2.9 tons/ha in spring crop and 2.9 - 3.1 tons in the summer crop.

Other food crops such as sweet potato, maize, potato are mainly planted on the rice nursery fields, some on the two - rice - crop fields. Their yields are rather low.

The annual food production amounts to 14,000 tons, averaging 275 kg per capita.

This is an area near by the city and the port, has been planned for vegetable production, for both local consumption and export, with a total of 7,000 - 8,000 tons per year. But the export vegetable quantity is still of no account (600 tons in 1988). The yield of vegetable averages 17.5 tons/ha. The principal vegetable producers actually are Tu Son and Doan Xa villages.

(3) Animal husbandry: Pigs, buffaloes and cattle (for drawing force) and poultry constitute principal livestock of the area.

In 1988, the herd of pigs totaled 10,906 heads of which 1,745 reproductive sows. Almost all fattening pigs were crossbred, with a slaughtering weight of 70 - 100 kg each and a total pork production of 877 tons. A small quantity of lean meat and sucking - pig was exported.

The herd of buffaloes and cattle was of 1,591 heads, of which 1,478 heads were used as drawing animals.

The flock of poultry consisted of 43,000 heads, of which 600 heads were egg - living ducks.

(4) Aquaculture: In the area, big water spaces comprising ponds, lakes, deep water lodging fields, low - lying beaches next to the rivers and the sea are very suitable for the development of aquaculture. Actually, fish is kept only

on the ponds at the vicinity of the dwellings. Other water bodies are not properly managed. The annual production of fish and shrimp, both in fresh water and brackish water average 200 tons, not including 13 millions of fry.

Maritime fisheries are practised in the villages next to the sea of Doan Xa, Dai Hop, Hop Duc, equipped with 11 motor boats of the freight - capacity of 12 - 13 tons each, 33 wooden boats of 2 - 3 ton capacity, 250 bamboo boats and rudimentary fishing implements. 1,060 labourers are engaged in fishing, with an annual production averaging 1,150 tons of shrimp, of which 50 tons are exportable.

(5) Handicrafts: Embroidery, lacing, knitting, tailoring, shoe - making, lacqueware production, bamboo blind production, building material production, agro - and aqua - product processing ... are practised in the area, both collectively and privately. There are a tailoring workshop of 80 workers and a shoe - making workshop of 35 workers. Private production is done in the households. Although the equipment is still rudimentary, the labour productivity is still low, in 1988, 11,000 suits of clothes, 34,000 pairs of shoe - uplayers, 5,000 sets of embroidered clothes, 5,700 m² of bamboom blinds, 2,650 pieces of lacqueware, 15 million bricks and tiles ... were produced. Thousands of labourers may be involved in these production lines.

(6) Infra-structures

- Irrigation and drainage: In the area, there exist 22 electric water pumping stations, equipped with 35 pumps of 540 - 1,000 m³/h each, totalling a capacity of 28,200 m³/h. Besides the principal canals such as the Dong Tho canal of 6.6 km length, the Cai Sanh canal of 2.5 km length, the Cong Thong canal of 6 km length, the Minh Tan canal of 4 km length ..., there are 24 km of secondary canals and hundreds kilometers of smaller canals. Dredging and

repair are to be conducted for improving the majority of canals and accompanied works.

The big water gates of Dong Tho, Lieu Vi, Sanh are used principally for irrigation, and the water gates of Cua Tieu, Cong Thong, Dong Tac, C2, C3 are for drainage. In the fields of this area, there exist 540 sewers, but most of them need repair and upgrading.

1,200 ha, or 33% of the arable lands are irrigated by the pumps. The rest are irrigated by the water flow current and by hand tools. 280 ha, or 10.3% are often damaged by drought, and 590 ha, or 21.3% often suffer from waterlodging.

Because of the combination between irrigation and drainage in the same systems and the degradation of accompanied works, management of hydraulic network appears not highly effective.

- Communication and transport: In the area, exist 4 inter - village high ways (No. 401, 402, 403 and 404) paved with pebbles, of 4 - 6 m width, with a total length of 22.8 km and 20 bridges, 50 km of inter - hamlet earthenpaths, of 4 - 6 m width, with 47 bridges. The quality of these roads are now not good.

The so called ports of Co Tieu, Doi, Nam Hai, Con Muc remain simply empty beaches, without any construction and equipment.

- Electricity: All the villages of the area have been supplied with electricity. There exist actually 14 transformers of a total capacity of 2,320 KVA, 14.9 km of high tension lines of 10 KV, 21.7 km of 0.4 KV. Electricity is mainly used for water pumping and partly for living consumption.

- Transport means and machineries: There exist 8 tractors MTZ 50, 1 tractor DT - 75, 37 12 HP power tillers, 2 - 5 ton trucks, 1 2.8 ton trucks, 53 ox carts, 530 hand - drawing carts, 7 cargo boats, 36 milling machines, 2 fodder grinding machines, 4 motor sprayers and 360 hand sprayers. Almost all tractors and trucks are old.

- Technical stations: The company of agricultural technical services is entrusted with plant protection and veterinary activities and supplying of seeds and young animals for farmers.

The farming machine enterprise (equipped with 5 tractors) assumes the task of land preparing, repairing implements and hand tools.

(7) Social aspects

- The population of the area is of 51,061, with an annual demographic growth of 1.6%. It consists of 11,890 households, of which 335 of 1 - 3 people, 37% of 3 - 5 people, and 30% of above 5 - 7 people.

- Living conditions:

One-storeyed houses	1.4%
Tile roofed houses (40 - 50 m ² /house)	78.5%
Thatched cottages	20.1%
Households having water well	
(water of unsatisfied quality)	1,012
Households having water tank	
(6 - 12 m ³ volume each)	1,350

the rest of households have to use water from the rivers, ponds and lakes.

Households having double - vault

latrines

1,350

Education:

In the area, there are:

+ A secondary general school comprising 12 class-rooms (low quality constructions) for 480 pupils.

+ 6 primary general school comprising 32 class-rooms (4 schools of one - storeyed buildings) for 8,830 pupils.

+ 312 teachers (on the average 1 teacher for 28 pupils).

+ 6 kindergartens comprising 28 class-rooms (low quality constructions) for children of 3-5 age old.

+43 creches.

The class-rooms of general schools are insufficient in number; pupils have to be at school in 2 or 3 shifts. The majority of schools are degrading and poorly equipped.

- Health care: There are in the area a polyclinic hospital of 177 - beds and 6 village medical stations. Hospital and stations are rudimentarily equipped. 13 doctors and assistant doctors and 13 nurses in these public health care establishments, on the average 1 doctor or assistant doctor serves 4,000 people.

- Culture: 5 villages have installed the wire - broadcasting system with 5 amplifiers of 40 - 100 W and 9 loud speakers which are very often broken down. The cultural house is not yet established.

The district town (situated in the projected area) represents the cultural and economic center of the district. In this town, there are the district cultural house, library, market, state shops, cooperative shops and private shops.

III. THE PROJECT FOR AGRICULTURAL AND RURAL DEVELOPMENT

A. Objectives

- Development of agriculture
- Development of rural industries
- Development of rural public welfare

B. Alternatives

1. Land use

- To reclaim 115 ha of alluvial beaches near by the rivers and the sea, for farmlands, to rear fish and shrimp on 106 ha of water spaces, thus increasing 196.9 ha of farmlands up to 3,046.8 ha, or 65.8% of the total acreage of the area.

- To improve the hydraulic network for mastering irrigation and drainage, at the same time, improve the soils by washing away acidity and salinity, introduce machineries for increasing the labour productivity, and increase the annual crops on 1,052 ha: the acreage of three - crop - fields will be 35.1% of the total farm lands (mainly on the cultivated alluvial soils, lightly acidity and weakly acid sulphate soils of light or medium texture in elevated or rather elevated areas).

- To improve the problem soils of 2,300 ha which are actually seriously or rather seriously infected by acidity and salinity and realize land consolidation.

2. Production

- Crops: The cropping system should be restructured according to seasons and different soils as follows:

+ 2 rice crops + 1 upland crop: - Spring rice

- Early wet season rice

- Winter vegetable

- Spring rice

- Early wet season rice

- Sweet potato

+ 1 rice crop +2 upland crops: - Spring peanut (vegetable or water melon) - Early wet season rice - potato winter vegetable.

+ 2 rice crops : - Spring rice - wet season rice

+ On the rice seedling nursery fields, besides the breeding of rice seedlings, an additional crop of rice or vegetable can be done.

The cultivated acreage will total 6,773.3 ha, with a land use intensive ratio of 2.37, and the percentage of the main agro - products will be as follows:

Rice	76.3%
Sweet potato	13.7%
Vegetable	8.9%

(Potato and peanut are grown only on a very small acreage for farmer household's consumption).

To obtain the average rice yield of 9 tons/ha/year, following technical measures should be applied:

- Improvement of hydraulic network for mastering irrigation and drainage, utilization of water for the improvement of soil acidity and salinity.

- Introduction of new varieties of crops that can tolerant to acidity and salinity, resistant to pests and diseases and of higher yield.

- Application of appropriate farming techniques for different crops and different cropping systems.

- Development of vegetables, mostly Kohlrabi and cabbage for export.

It is expected that after the implementation of the project, the annual food production will reach 26,530 tons, or an average of 485 kg per capita (compared with 210 kg/people actually) and the annual vegetable production will be 13,700 tons.

- Livestock breeding

The development of food crops, mostly sweet potato and vegetables, will produce a large quantity fodders for the development of livestock. It is estimated that there will be able to keep more 7,500 pigs, thus increasing the actual annual porck production of 600 tons to 1,480 tons. Pig breeds should be improved for the export suitability. The number of sows should be increased for responding to the farmers' requirements in breeding piglets and enlarging the quantity of exportable sucking - piglets. Poultry should also be developed to satisfy the local consumption in meat and egg.

- Aquaculture and fisheries:

184.1 ha of water spaces, including ponds, lakes, fenced rivers, water lodging fields, water surfaces near by the sea and rivers ... should be used for rearing fish and shrimp. 67.6 of deep - water fields, where only one crop can be done, will also be used for rearing shrimp. It is estimated that the annual production of fish and shrimp will be 450 tons.

1,500 fishers of Dai Hop, Doan Xa, Hop Duc villages near by the sea should be provided with 30 motor boats of 33 H.P, 150 motor boats of 22 H.P, 150 engines of 12 H.P (for wooden boat use) and different fishing facilities to ensure the annual production of 3,500 tons (trifling the existing situation).

- Rural industries: It is planned to establish proper rural industrial enterprises.

At the same time, the existing handicrafts should be developed, mostly family production, absorbing all possible labour force. The embroidery will produce 10,000 sets of clothes annually.

3. Infrastructure Constructions

a. Hydraulic systems: The orientation is to separate the irrigation systems from the drainage systems in order to master the water management and improve the soils. Concrete measures are as follows:

For irrigation:

- Improving the Dong Tho irrigation system by increasing the Dong Tho water gate for enlarging the quantity of water from the Da Do river, enlarging the Dong Tho canal, and the Thai Lai water gate, building a new pumping station in Tan Hop village, upgrading the Lao Phong pumping station the Lao Phu pumping station building several above - ground canals with concrete and related water regulating works on these canals.

- Improving the Cai Sanh irrigation system by enlarging the Cai Sanh water gate and its canals (there is a canal section to be concreted because of the sandy foundation), building the Cai Sanh pumping station, improving the Dai Hop pumping station, building a system of above ground canals with concrete, and necessary water regulating works on these canals.

- Improving the Minh Tan irrigation system, building water regulating works of these canals.

- Building the irrigation systems with concrete

For drainage:

- The main water gates for draining are Co Tieu, Thong, Dong Tac, Hong, C2, C3. The existing canals should be deepened and enlarged by dredging.

The Dong Tac and C2 water gates should be enlarged.

b. Communication and transport:

To ensure the convenient communication and transport, it is necessary to upgrade the existing roads, to build the ports, including fishery ports and to provide transport means.

3. Steps of investment and project implementation

The project will be implemented into 3 steps as follows:

- Step I: Priority is given to the hydraulic constructions, the soil improvement, the mechanization of agriculture and fisheries, the strengthening of farming technical stations and the construction of some medical establishment

- Step II: Construction of hydraulic works, land reclamation, field construction, soil improvement, construction of industrial establishments, communication and transport, public health care and education establishments.

- Step III: Completion of the remaining tasks, mainly industry, communication and transport and public welfare constructions.

V. SCOPE OF THE STUDY

In order to achieve the above mentioned objectives the Study shall be carried out in 2 phases. In the Phase I study, the basic development concept and preparatory study on the study area shall be prepared through extensive data collection and the field survey. In the Phase II study, the final plans for the agricultural and rural development plans shall be decided through the concentrated field survey and detailed analysis of data and information.

The scope of works for the Study will be broadly outlined as follows.

1. Collection and review of existing data and information

(1) Physical condition

- Topography
- Hydrology
- Meteorology
- Geology and soil mechanics
- Soils and erosion
- Natural ecosystems
- Others

(2) Socio-economic status

- Demographic conditions
- Regional and National economy
- Infrastrure
- Land use
- Agriculture

(3) Programme

- Regional and national development plans relevant to the project

2. Execution of Supplemental Field Survey and Investigations

(1) Soils and capability survey to supplement the existing soil maps prepared by the NIAPP.

(2) *Hydrological survey including installation of water level records, discharge measurement, water quality tests and fluctuation.*

(3) Meteorological survey including measurement of heat load for crops and livestock during Foehn phenomenon.

(4) Irrigation and drainage survey including infiltration test, moisture holding capacity test and to measure consumptive use of each candidate crop.

(5) Agriculture survey including to investigate unit yields of crops, farming practices, processing facilities, etc.

(6) Agro-economic survey

(7) Topographic survey to supplement the existing maps

(8) Rural inhabitant's intention survey

(9) Others

3. Analyses and studies

The analyses and study for the promotion of consolidated agriculture and construction of pilot rural area in the district shall be investigated through the concept of agricultural and rural development plans.

5. EXPERTS REQUIREMENT AND MATERIALS SUPPLIED BY THE GOVERNMENT

5.1 Experts Requirement from Japan

Experts	Field M/M	Home M/M
Team Leader	4.0	4.0
Irrigation Cum Water Management	7.0	4.0
Meteorologist Cum Hydrologist	5.0	4.0
Drainage Engineer	7.0	4.0
Topologist Cum Geologist	3.0	3.0
Pedologist Cum Land Use Expert	6.0	3.0
Rural Development Export	5.0	4.0
Cultivation and Farming Expert	7.0	4.0
Agro-Economy and Organization Expert	6.0	4.0
Survey Engineer	3.0	
Cost Estimation and Implementation	4.0	3.0
Expert		
Project Evaluation	3.0	3.0
Total	60.0	40.0

This study team will be compact and experts will work in several disciplines.

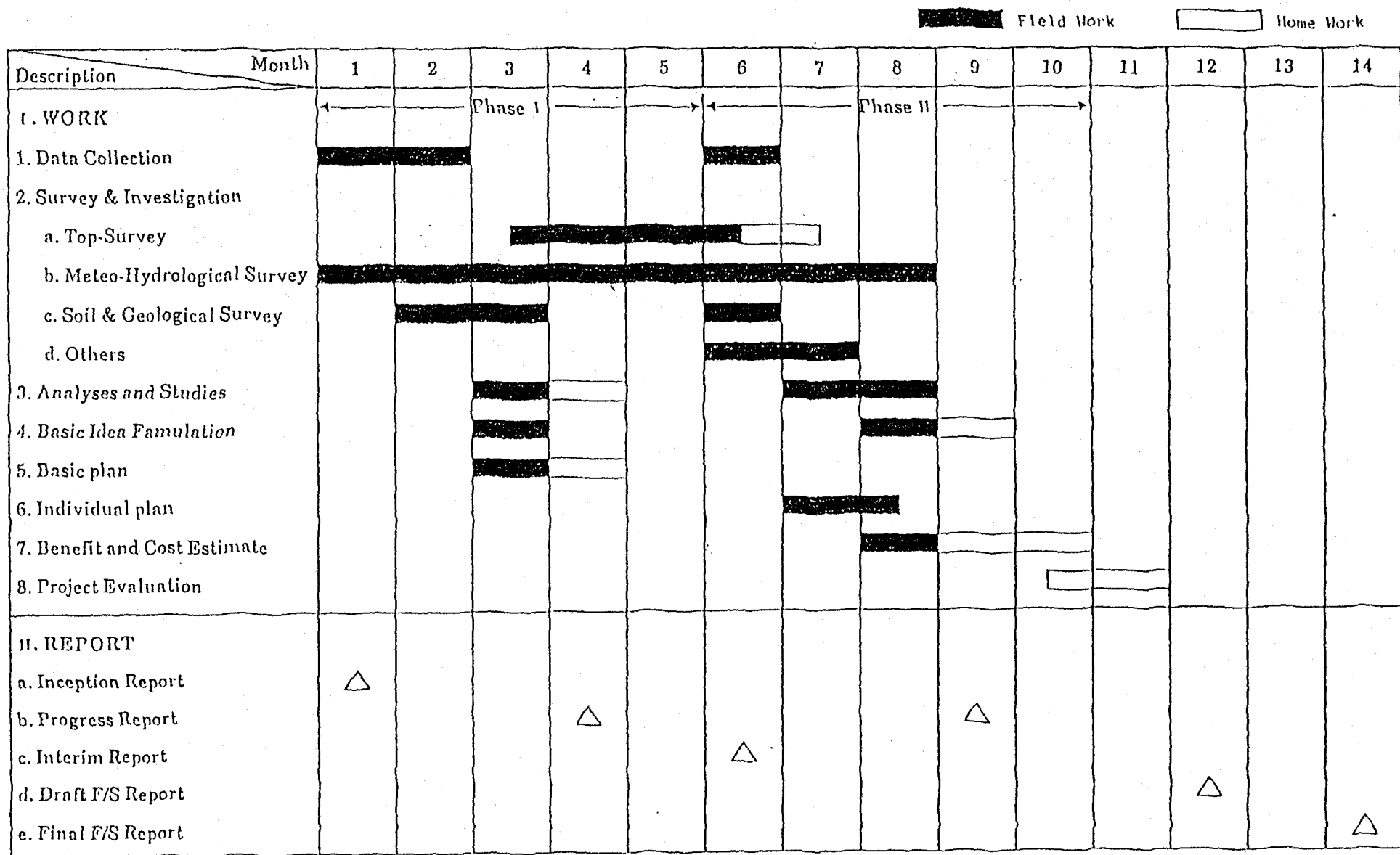


Fig. 1 WORK SCHEDULE

5.2 Materials Supplied by the Government

The Government of S.R. Vietnam shall provide the study team with an appropriate number of competent counterpart personnel, proper office space with necessary furniture, the necessary number of vehicles and other services and arrangements which are deemed necessary for execution of the Study. The following counterpart personnel will be assigned:

- Chief Counterpart,
- Hydrologist,
- Meteorologist,
- Irrigation & Drainage Engineer,
- Agronomist,
- Survey Engineer,
- Agro-economist,
- Pedologist,
- Geologist,
- Land use Engineer, and
- Rural Development Engineer

The Vietnamese Government shall pay particular attention to provision of the following maps, data and other relevant engineering materials as well as execution of additional survey and investigation.

(1) Topographic map and survey:

1:50,000 topographic map

1:5,000 topographic map

(2) Meteo-hydrological data

ANNEX 1 :

MAIN SOILS OF THE PROJECT AREA

Unit : ha

Soils	Symbol	Total acreage (ha)	Doan Xa Coop.	Dai Nop	Tu Son	Tan Phong	Hop Duc	Minh Tan	Percentage of cultivat acreage
1. Medium saline soils	M	58.82	22.00		36.82				2.13
2. Lightly saline soils	M i	287.42	36.34	156.30	94.78				10.42
3. Medium saline & heavily acid soils	SnM	282.08					282.08		10.22
4. Lightly saline & strongl acid sulphate soils	Si	1,121	200.07	1175	52.79	337.81	398.23	94.89	40.96
5. Medium saline & acid sulphate soils	SM	60.81				60.81			2.20
6. Lightly saline & medium acid soils	SMi	841.34	178.89	160.40	319.62			182.43	30.51
7. Alluvial soils inside the dyke	P	97.45						97.45	3.53
Total cultivated acreage		2,757.46	471.30	328.45	504.01	398.62	680.31	374.77	100
Total arable lands		2,839.91	475.78	328.83	504.01	438.17	697.99	396.16	
Total natural acreage		4,549.40	976.72	522.97	687.22	635.92	1,075.47	651.10	

CULTIVATED CALENDAR AND CLIMATE OF SOUTH KIEN - THUY AREA

WINTER CROP

- Maize , potato.
- Vegetable , potato , onion

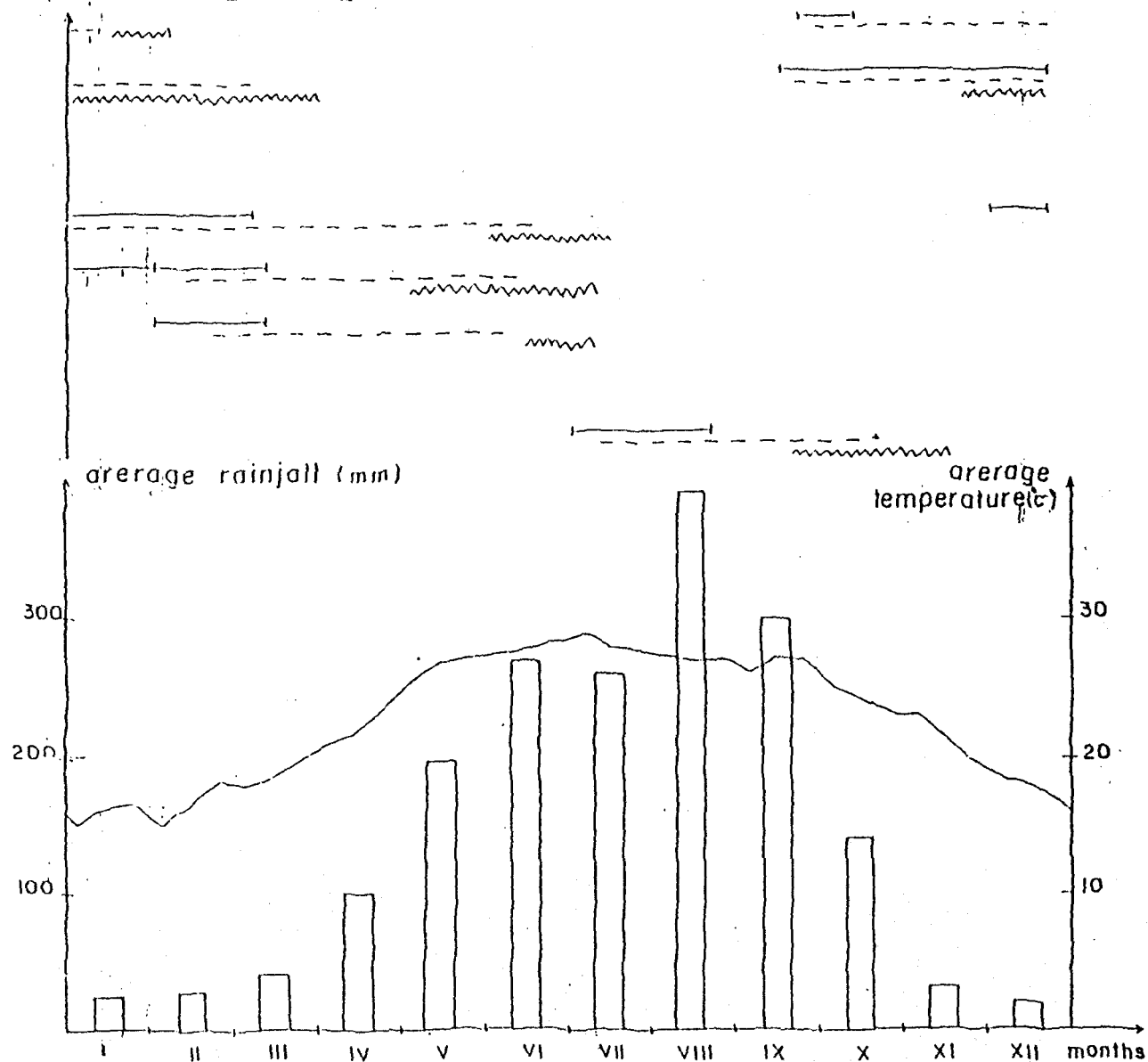
WINTER - SPRING CROP

- Rice
- Maize , s. potato
- Ground - Nut

SUMMER CROP

- Rice

- Seedling planting
- plant protection
- Harvesting
- Average temperature
- Average rainfall



SOILS	Total areap	Higher fields				High fields				Medium fields				Lower fields				Deep-laying fields			
		Light	Medium	Heavy	Total	Light	Medium	Heavy	Total	Light	Medium	Heavy	Total	Light	Medium	Heavy	Total	Light	Medium	Heavy	Total
Đoan xa																					
hi	36.31		1.74		1.74						3.80	2.03	5.83		5.18		5.18			23.59	23.59
Smh	231.07	5.82	25.46	11.77	54.05	1.98	36.67	1.12	42.77	4.19	39.41	7.22	50.82		21.71	5.26	26.97	10.79	38.59	7.08	56.46
Shi	178.89	8.21	8.13	7.99	24.33	7.90	52.36	1.49	61.64	3.97	5.83	4.29	13.64		13.13		13.13	11.58	51.57		63.15
hi	25																			25.00	25.00
Dai Hoa																					
hi	156.30	10.31			10.31	39.17	1.26		40.43	11.13	23.89	16.62	51.64	16.26	17.21		33.45	7.63	23.19		30.82
Shi	160.40		32.28		32.28	30.08	9.07		39.15	29.15	32.93	8.27	70.35	6.37	4.87	1.70	12.94		4.98		4.98
Shi	11.75																		11.75		11.75
Ti Son																					
hi	94.78	35.52	7.10		42.62	10.07			10.07	12.96			12.96	6.20	20.61		26.82				
hi	36.82	10.03			11.03	4.16			4.16	10.31			10.31	9.64			9.64	1.36			1.36
Shi	319.62	23.63			23.63		47.17	2.10	49.27		92.04	6.35	98.39		138.63		138.63		8.78		8.78
Shi	52.79	4.17			4.17		6.27		6.27		10.02	2.86	12.89		29.45		29.45				
Tan Phong																					
Shi	50.91					2.51	8.09		10.60		7.77	16.11	23.89			3.51	3.51		22.79		22.79
Shi	137.31					29.13	100.23		129.36		72.71	1.93	74.64	13.85	54.88	22.73	91.52		29.76		29.76
Hop Luc																					
Shi	198.23	12.99	23.12	6.27	42.39	18.65	30.28		48.93	30.72	205.20	5.27	281.19		5.58		5.58	0.60	11.51		20.12
Shi	282.08									19.02	174.18	9.00	202.51		20.34	2.73	23.07		20.39	36.09	56.48
Hop Lam																					
Shi	34.89						5.51		5.51		25.77		25.77		27.78				35.79		35.79
Shi	171.44	5.33	12.37		17.70	1.53	34.35		35.88		57.94		57.94		18.93	10.28	29.21		25.45		25.45
hi	17.15	1.74	38.53	3.39	49.87		5.60		5.60		7.94		7.94		11.41		11.41				

ANNEX 4 :

LAND SUITABILITY FOR PADDY FIELDS

Unit : ha

	Total of the area	Percentage of arable lands	Doan Xa Coop.	Dai Hop Coop.	Tu Son coop.	Tan Phong coop.	Hop Duc coop.	Minh Tan coop.
1. Very suitable	712.41	25.83	248.63	72.84	101.22	65.97	81.22	142.53
2. Suitable	1,282.09	46.49	65.40	150.88	367.39	104.13	460.00	134.29
3. Poorly suitable	389.02	14.10	43.78	63.88	10.36	157.51	74.80	38.69
4. Presently unsuitable	373.94	13.56	113.49	40.85	25.04	71.01	64.29	59.26
	2,757.46	100.00	471.30	328.45	504.01	398.62	680.31	374.77

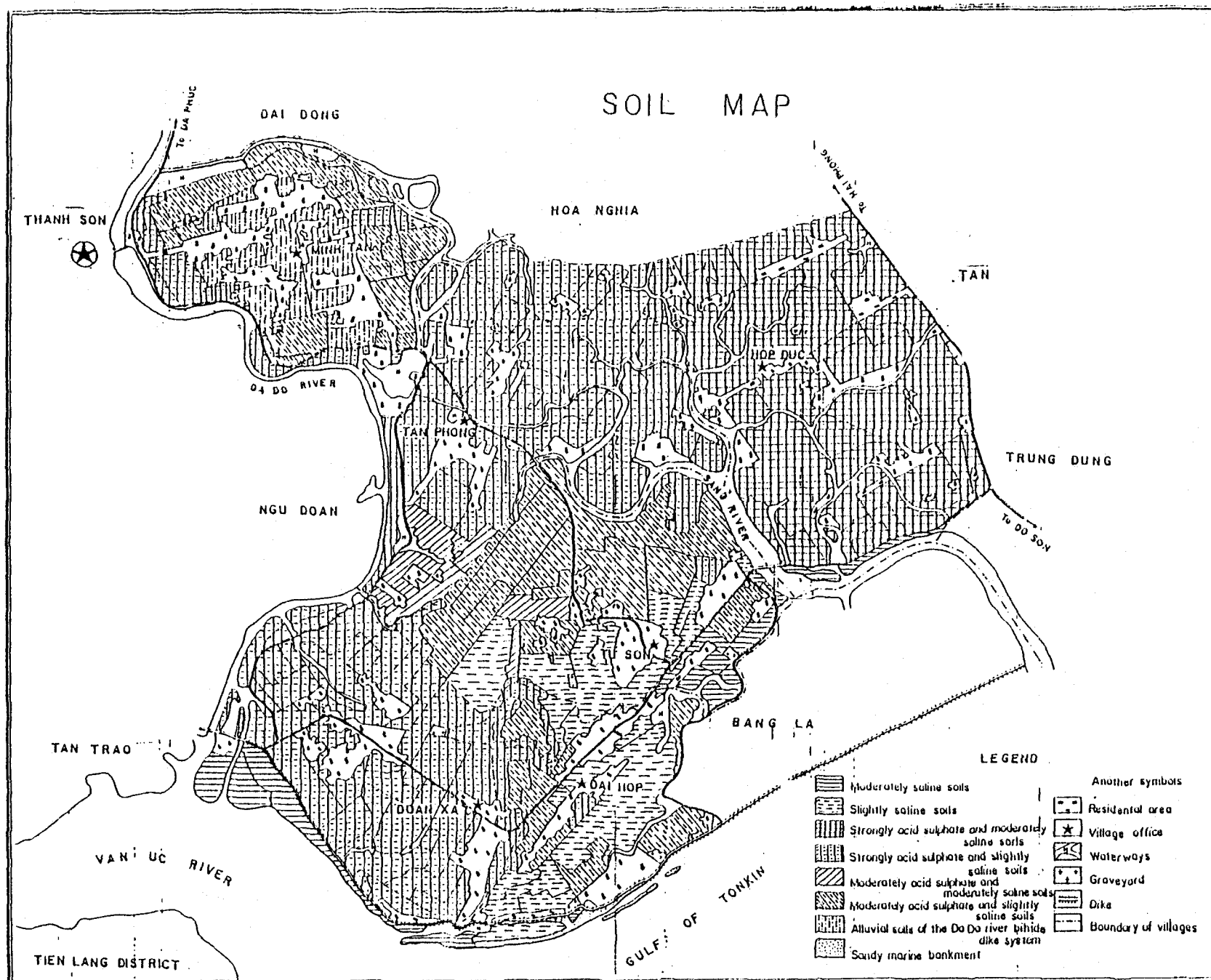
ANNEX 5 :

LAND USE PLANNING

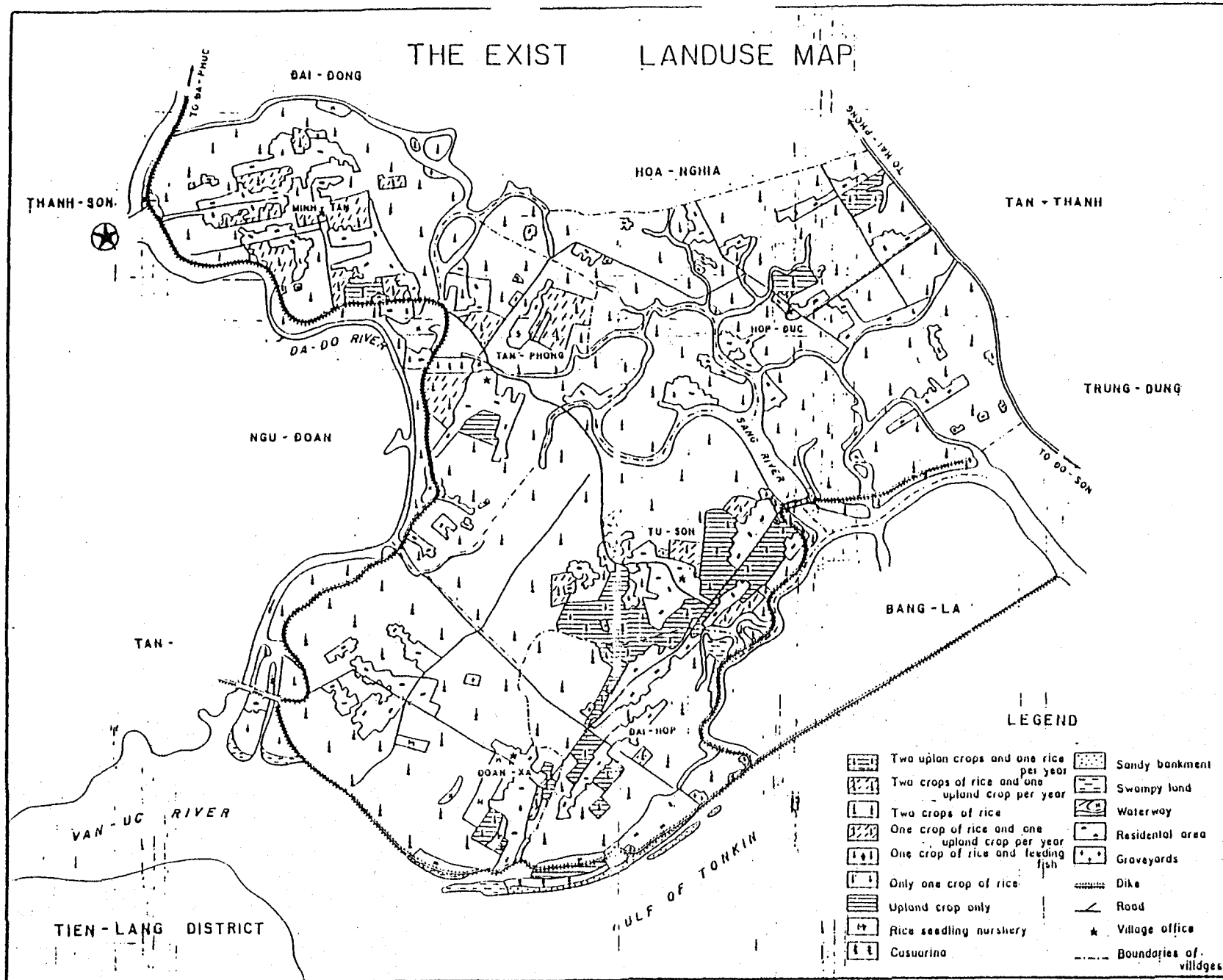
Land utilization types	existing acreage 1988 (ha)	Planning acreage (ha)	Percent- age (%)	Differen- ce (compared with existing situation)	Village distribution							Note
					By projected area				Tan Phong	Hop Duc	Minh Tan	
					Total	Dai Hop	Doan Xa	Tu Son				
1	2	3	4	5	6	7	8	9	10	11	12	13
Total acreage	4,627.1	4,627.1	100		2,187.1	523.0	976.9	687.2	654.0	1,075.5	710.5	
I. Arable lands	2,849.9	3,046.8	65.8	+ 196.9	1,438	344.6	576.7	516.7	438.2	758.8	411.5	
A. Annual crops	2,767.6	2,859.7	93.9	+ 95.1	1,361.6	339.2	510.4	512	398.7	710.3	389.1	
1. Paddy fields	2,754.2	2,851.8	93.6	+ 97.6	1,353.7	331.3	510.4	512	398.7	710.3	389.1	
a. 3 crop fields	16.4	1,068.8	35.1	+1052.4	628.8	203.3	120	305.5	150	130	150	
- 2 rice crop+ 1 dry crop	16.2	915		+ 898.8	475	140		230	150	130	160	
- 1 rice crop + 2 dry crops	0.2	153.8		+ 153.6	153.8	63.3	15	75.5				
b. 2 crop fields	2,398.2	1,415.6	47.4	- 952.6	556.6	101.6	301.7	153.3	199.4	465.4	194.2	
- 2 rice crops	2,241.1	1,415.6		- 795.5	556.6	101.6	301.7	153.3	199.4	465.4	194.2	
- 1 rice crop + 1 dry crop	157.1			- 157.1								
c. 1 rice crop	67.6	95.4	3.1	+ 27.8	54.		44.	10.	6.7	34.7		
d. Rice nurseries	272.	272.	8.9		114.3	26.4	44.7	43.2	42.6	80.2	34.9	

Continued Annex 5

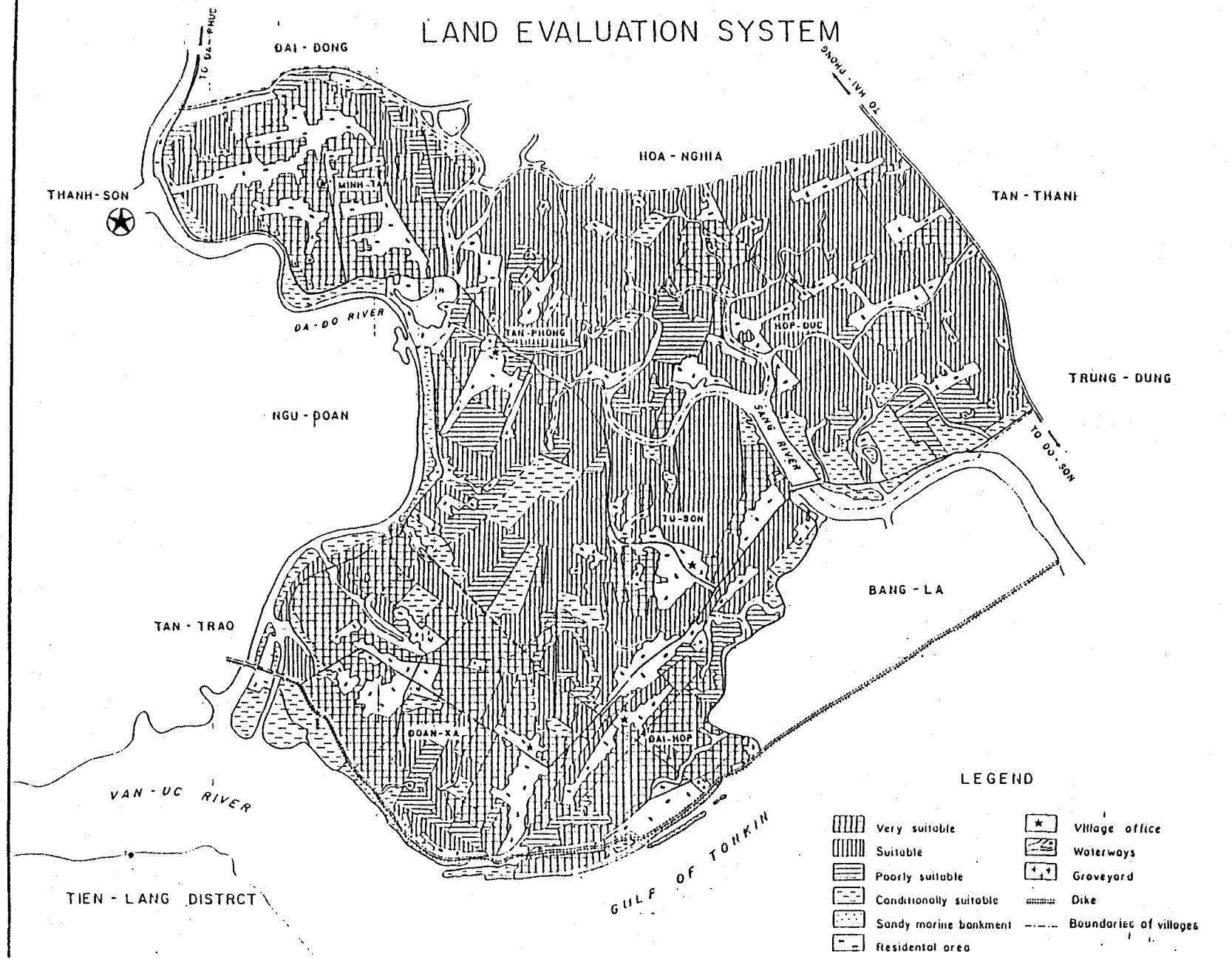
1	2	3	4	5	6	7	8	9	10	11	12	13
upland crop	10.4	7.9	0.2		7.9	7.9						
ial crop	2.0	2.0	0.1		0.6	0.4	0.2			0.8	0.6	
	4.3			4.3								
paces	79	185.1	6.1	+ 106	76.1	5	66.1	5	39.5	47.7	21.8	
and use	<u>1,051.2</u>	<u>1,078.5</u>	<u>23.3</u>	<u>+ 27</u>	<u>458.9</u>	<u>142.9</u>	<u>165.5</u>	<u>150.5</u>	<u>147</u>	<u>250.5</u>	<u>222.1</u>	
g	489.7	508.2		+ 18	199.7	68.7	60	71	68	127	113.5	
cation and ansport	191.7	195.9		+ 4	72.9	11.4	32.5	29	32	48	42	
c works	288.4	288.4			152	46	62	44	35	66	35.4	
aneous	81.4	86		+ 4.6	34.3	16.8	11.0	16.5	12.0	19.5	30.2	
ands	<u>726</u>	<u>501.8</u>	<u>10.9</u>	<u>- 224.2</u>	<u>289.9</u>	<u>35.5</u>	<u>234.7</u>	<u>19.7</u>	<u>68.8</u>	<u>66.2</u>	<u>76.9</u>	



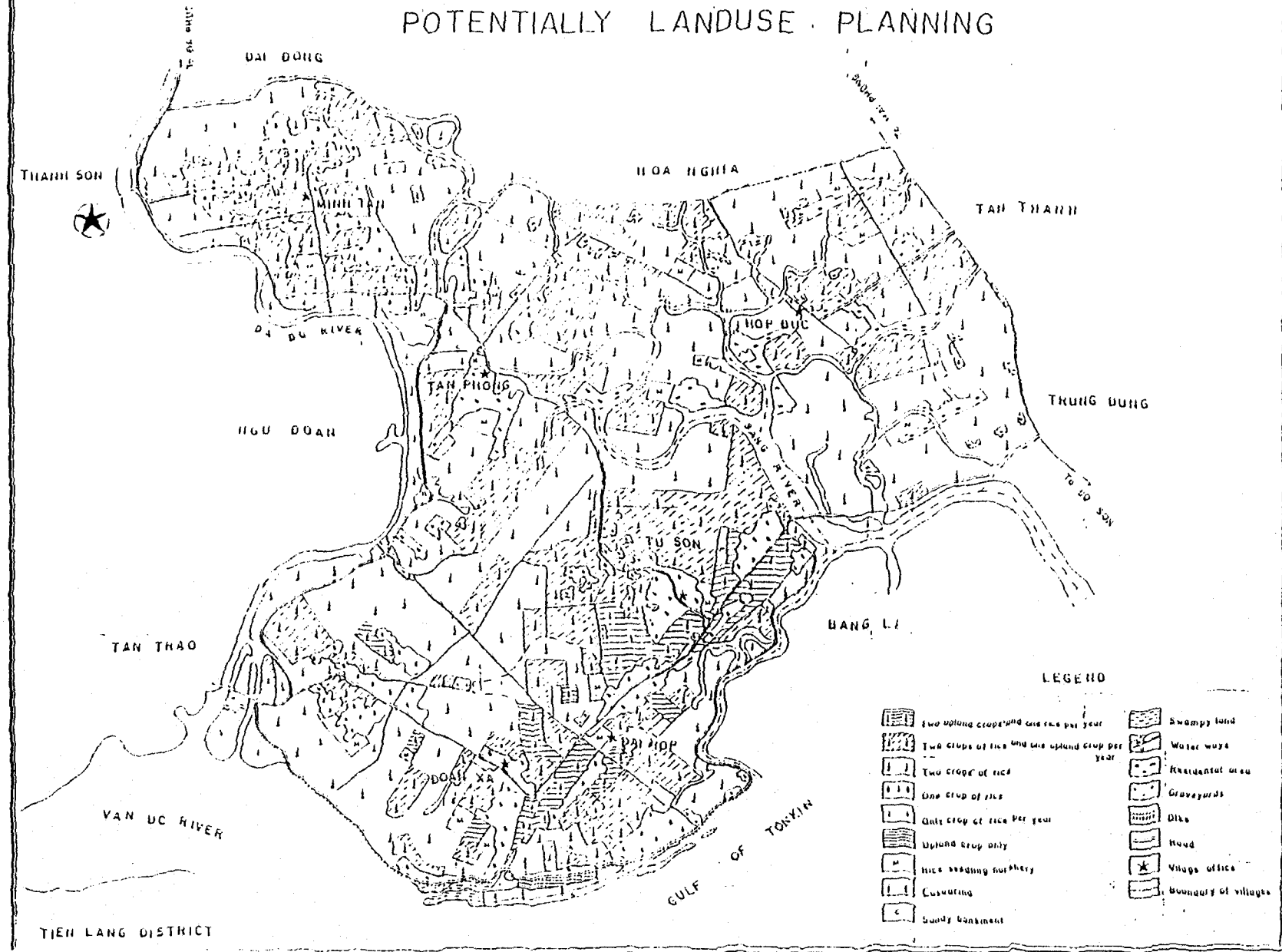
THE EXIST LANDUSE MAP



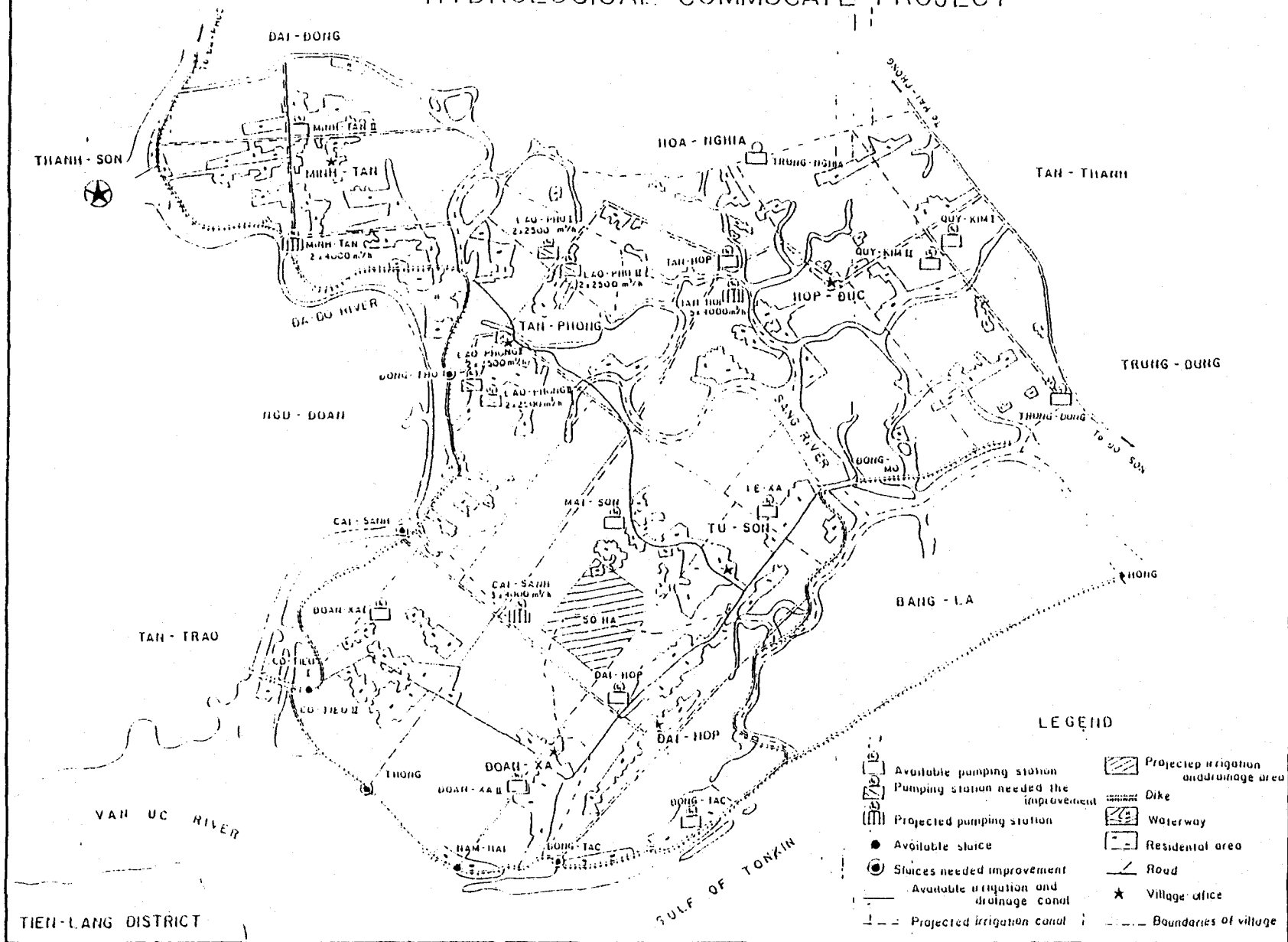
LAND EVALUATION SYSTEM



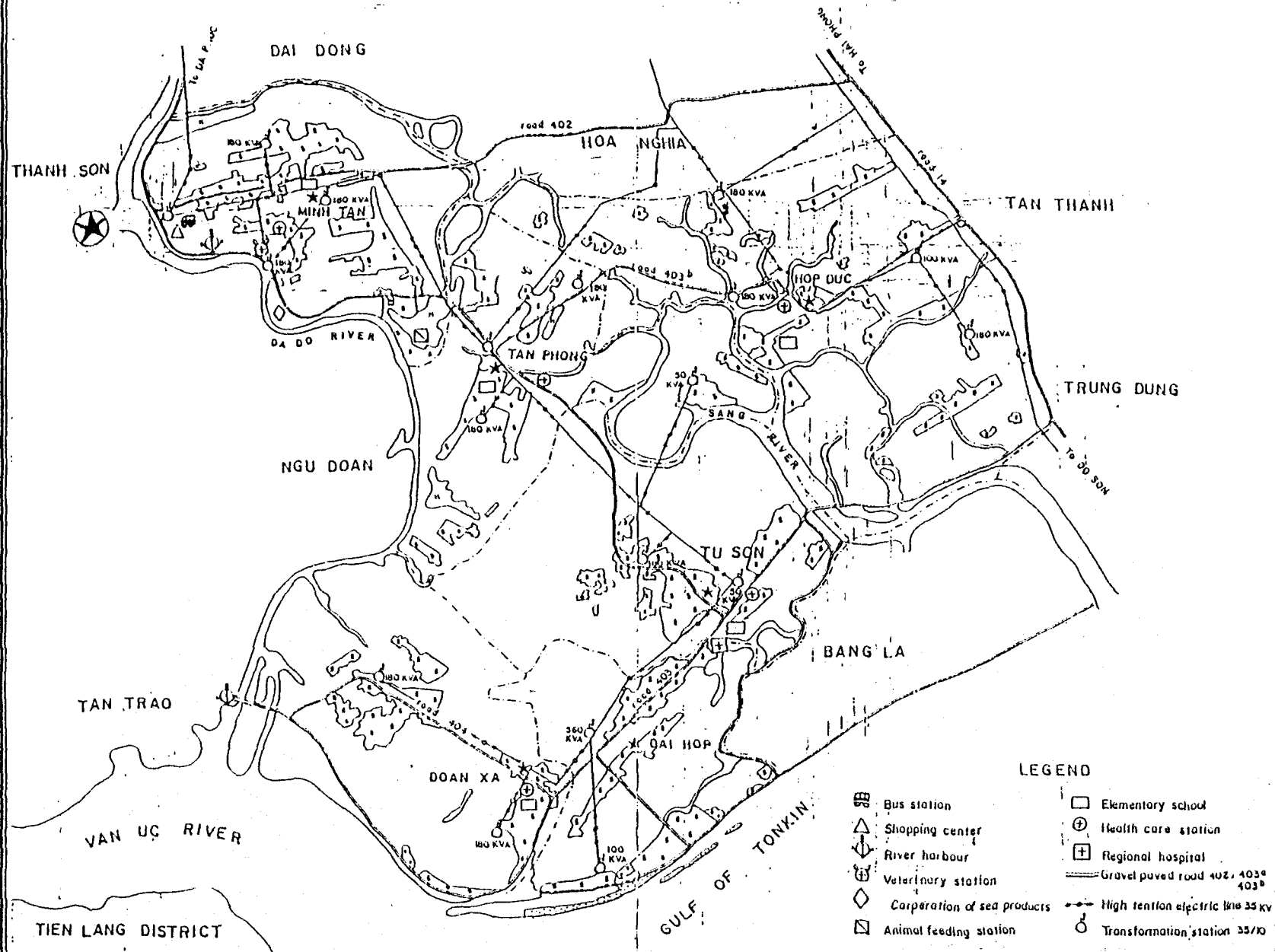
POTENTIALLY LANDUSE PLANNING



1



MATERIAL AND TECHNICAL FOUNDATION

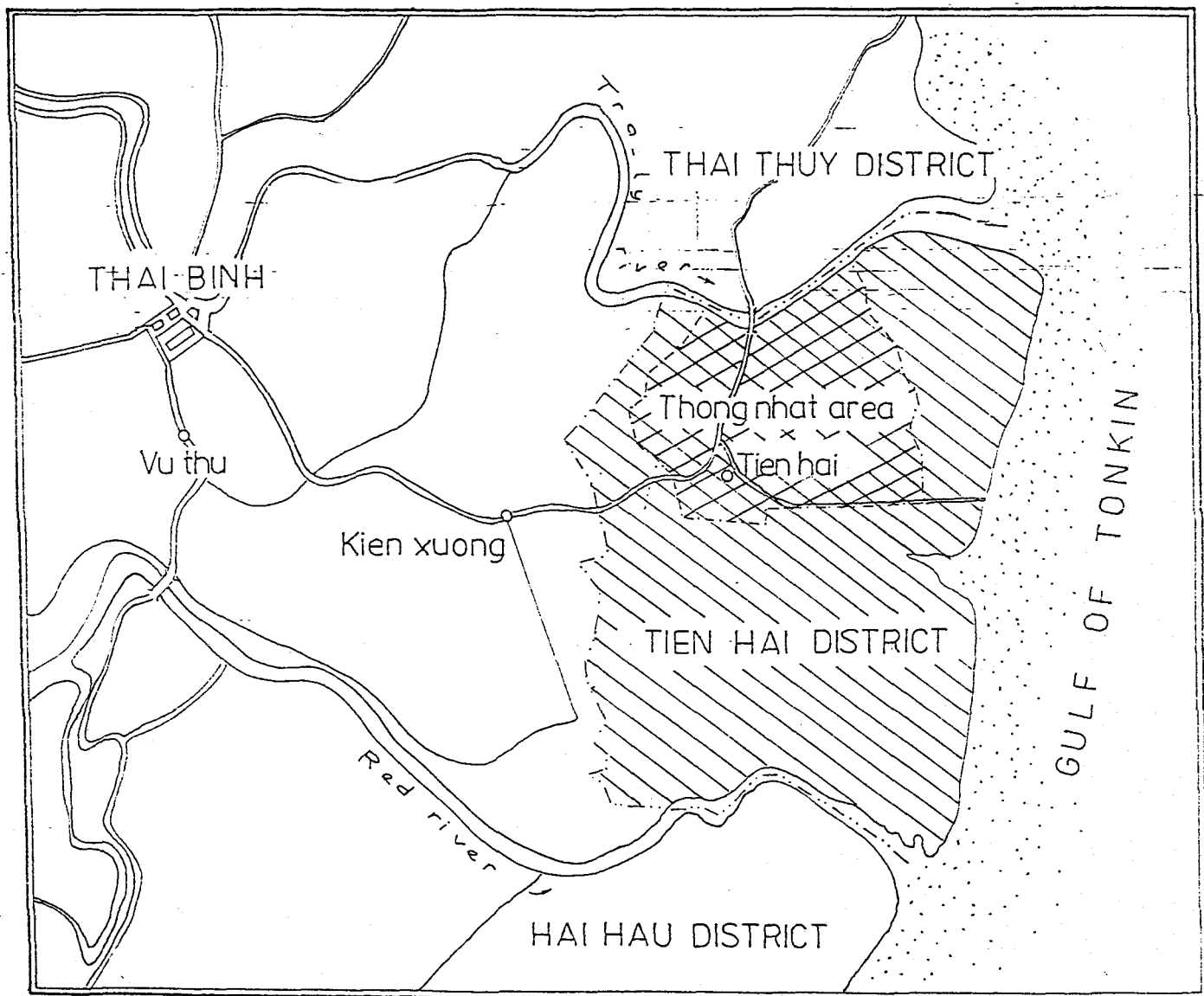


TERMS OF REFERENCE
FOR
THE STUDY
ON
AGRICULTURAL AND RURAL DEVELOPMENT
IN
TIEN HAI DISTRICT
(THAI BINH PROVINCE)

1990

MINISTRY OF AGRICULTURE AND FOOD INDUSTRY
NATIONAL INSTITUTE FOR AGRICULTURAL PLANNING AND PROJECTION (NIAPP)

POSITION OF THONG NHAT AREA



POSITION OF THONG NHAT AREA
ON AGRICULTURAL
AND RURAL DEVELOPMENT
IN TIEN HAI DISTRICT, THAI BINH PROVINCE

I. GENERALITIES

The Thong Nhat area in Tien Hai District, Thai Binh Province, comprises a number of a villages Dong Co, Dong Phong, Dong Trung, Dong Quy, Tay Son, Tay Ninh, Tay Luong, Tay An and Tay Giang situated in the Northern part of this district.

This is a coastal district, located 20 km East of Thai Binh provincial town, easily accessible to Thai Binh, Hanoi and Hai Phong. The natural acreage of the district is of 24,800 ha, out of which 13,770 ha are agricultural lands originated from the alluvium of the Red River deposited on marine sediment.

The population of the district is 170,000 (1,235 people/km²), in which 65,000 labourers, and 85% are a farmers.

Along the 22 km coast of the district, natural combustible gas has been exploited, and on the beaches there are valuable minerals such as ilmenite, zircon, magnetite, monazite etc., and hot gas.

Basically important infrastructures have been built up: irrigation and drainage system, communication systems, some industrial and artisanal enterprises, hospitals, schools kindergartens etc. The district can produce paddy, pork, chicken, duck, fish and shrimp, and different kinds of exportable handicrafts such as wollen carpet, jute carpet, reed mat, reed basket, frozen shrimp ...

The projected area is surrounded by four rivers, Song Tra Ly, Song Ca, Song Kien Giang and Song Su. The acreage of this region is of 4,753.3 ha, with a high potentiality for the development of agriculture.

II. PRESENT NATURAL AND SOCIO - ECONOMIC CONDITIONS

1. Natural Conditions

* Climate: It is a wet tropical region influenced by monsoon, hot and cold and frequently shifted in Winter. The annual temperature averages 23.3 C with an oscillation from 6 to 36 C. The period of temperature stable and favourable for the vegetation growth (above 20 C) lasts from the end of March until the end of November every year, with a total temperature of 8,400 - 8,500, an annual rainfall of 1,800 - 2,000 mm out of which about 70% concentrated from May to October, and an average air moisture of 86%. This climate is suitable for tropical crops and some sub-tropical crops. But storms accompanied with violent 12 grade whirl wind and heavy rain, often appear in July, August and September.

* Topography: This area is quite plane, 0.75 - 1.0 m above the sea level, parcelled out by canals and rivers.

* Soils: The soils consist of young alluvium with high potential fertility, influenced by underground salty water, but the soil salinity becomes lighter thanks to the irrigation system. There are 4 main groups of soils (see Annex).

- Lightly salty soil	2,300 ha or 71.2% of the total area	
- Acid sulfate soil	21.4 ha or 7.2%	-
- Alluvial soil	134 ha or 19.6%	-
- Sandy soil	62 ha or 2.0	-

The majority of these soils are rich in humus, average in total nitrogen and phosphorus, lightly acidic and lightly salty. 70% of soils are of medium structured and 5 - 8 me/100 g of absorption (see annex 2, 3).

The region can be divided into 2 parts:

- The Eastern part, consisting of the 4 villages Dong co, Dong Phong, Dong Trung and Dong Quy, is topographically rather low, next to the sea, lightly salty, lightly acidity of middle or heavy structured. Two crops of rice are done actually, but a winter crop (maize) can be added.

- The Western part, consisting the remaining villages, is topographically higher, with sandy ridges lving in the North - South direction. The elevated areas are constituted by sandy ridges and aluvium from the Red River; The lower areas are of lightly salty and lightly acid sulphate soils.

From the rate of soils fertility and the suitability of the main crops.
Land evaluation observed (see Annex 4):

- Highly suitable	:	982 ha or 30.2% of the total area.	
- Suitable	:	1,050 ha or 32.6%	-
- Conditionally suitable	:	690 ha or 21.5%	-
- Very poorly suitable	:	504 ha or 15.7%	-

* Hydrography: Situated at the end of the river basin, this area is abundant in water. During the dry season, salty water intrusion happen along the Red River and the Tra Khuc River, 20 km inland. The irrigated water is supplied by the Thong Nhat pumping station from the Red River to Kien Giang River. In rainy season, fresh water can flush until the sea; and in August, September, alluvial water can directly flow from Tra Ly River into the fields.

The sea next to Tien Hai district has a tidal regime with the different high between + 2.6 m (at the high tide) and - 1.5 m (at the low tide). The drainage

of this area, depending on this tidal regime, is generally favourable.

* Minerals: Combustible gas, basically methane is exploited and used as fuel for industrial and artisanal production. Mineral water, used as drink, is also exploited no-need of pumping, from 450 m depth.

2. Socio Economic Conditions

a. There are 3,449.2 ha of arable lands, or 72.6% the total area, of which 70.7% are two - crop rice fields. The annual three - crop fields amount to 6.4% of the total area. Although the land reclamation is limited, there is a big potentiality for increasing crops and the intensification of cultivation if the irrigation system is improved.

b. The cultivated area in 1988 was 6,578.3 ha, or 2.05 times as much as the natural arable land. The main crop is rice, 85.6%; followed by maize, 4.8%; sweet potato, 4.3% and other crops (peanut, beans, vegetables), 5.3%.

The lacking of insecticides, fertilizers, with improved systems of irrigation and drainage combined with the sluggishness in the introduction of new high yielding varieties and in the application of advanced techniques, constitute its main problems.

Recently, attention has been paid to the development of maize, mostly as winter crop.

The production of food in 1988 was reportedly 22,700 tons, averaging 638 kg per capita.

c. For livestock, the most important animals are pigs, buffaloes, cattle

(for drawing force) and poultry.

d. Fish is kept in 208 ha of lakes and ponds, but the yield is very low: 0.5 - 1.0 ton/ha.

e. Industrial and artisanal production

Some small - sized industrial enterprises such as pottery - kiln, glass - works, construction material enterprises ... have been built within the district. And in the projected area, there are a gas power station and 6 handicraft cooperatives. These cooperatives consist of approximately 1,000 workers who conduct the production with rudimentary equipments.

Handicraft commodities amount 13 - 15% of the total value of agricultural and industrial production of the area.

f. Production Infrastructure

The Thong Nhat water pumping station was built in 1976 consisting of 16 axial pumps of a capacity of 4,000 m³/h each; the majority of pumps have been overhauled. Besides, there are a group of supplementary pumps, in which 12 pumps of 1,000 m³/h and 2 pumps of 540 m³/h each, to be used if necessary.

There are: The system of canals has been built completely.

- 23.9 km of canals of grade I, in which 6.4 km are above ground canals.

- 104 km of canals of grade II.

- 234.4 km of canals of grade III.

2/3 of the length of above ground canals are built on sandy soil, easily to be crumbled; this status has happened several times, and for the safety of the canals the maximum number of pumps in operation is limited at 12 - 14.

Equipments and instruments attached to the canals are insufficient, inadequate and damaged, hence the irrigation and drainage can not be done satisfactorily, and effectively. There are 200 ha easily suffered from drought and 500 ha easily suffered from logging. It is very difficult to drain out a two day rainfall of 300 mm, especially in high tide.

In the projected area, there are 11 km of asphalted high way of 4 - 6 m width, 27 km of rocky road of 4 m width, 80 km of parochial path and 57 km of path to the fields; 35 bridges for motor vehicles to cross, 84 small bridges, 20 sewers of 80 cm diameter. The path from hamlet to hamlet and the path to the fields are of bad quality. The port of Tra Ly is primitively equipped.

The power station is operated by 2 gas motors of 17.5 KW and equipped with a transformer 110/35/10: 25,000 KVA. Actually, only one motor is operated, with a capacity of 8,000 - 12,000 KW.

Electricity has been supplied to all villages of the area, through 12 transformers of a total capacity of 2,240 KVA and a system of 10 KV cable. Electricity is mainly used for pumping water and industrial production, and partly for people's life.

g. Social aspects

The population of the projected area is 42,178, in which 53.4% are female, with a demographic growth of 1.06% and a rate of birth of 1.9%. There are in total 12,399 households, in which 39.9% of 1 - 3 peoples, 42.9% of 4 - 5

peoples, and 17.2% of up to 6 peoples. 16,483 people or 39% of the population are at the labour age. Almost work are done manually, with very low efficiency, and labourers have a lot of idle time. On the average each farmer is responsible for 0.47 ha of cultivated land per year, with number of 200 working days annually.

As for the dwelling situation, 20% of houses are of concrete roof, 60% of tiled roof, and 20% of thatched roof. All households have water basin. Due to the high salinity and chalybeate underground water and well water are used limitedly. 30% of households have double vault latrines, the rest use only simple dug latrines.

In the area, there are a secondary school with 30 class - rooms, enough for 1,200 pupils, 9 primary schools, with 145 class - rooms for 10,000 pupils, and 9 creches & kindergartens. Schooling aids remain very poor.

A district hospital of 150 beds and 9 village medical stations, built on a total acreage of 1,150 m² are available in the projected area, staffed with 15 assistant doctors and 30 nurses. On the average an assistant doctor is responsible for the health care of 2,500 people. But hospital and medical stations are still poorly equipped.

In the district town, there are a cultural club and a cinema; besides, there is a mobile film projecting group coming to the villages one after another. A wire broadcasting system, with loud speakers of 250 W (already very old), has been built in each village.

III. THE AGRICULTURAL AND RURAL DEVELOPMENT

1. Objectives of the Project

Intensification of farming production on the basis of the improvement of Hydraulic system.

Development of rural industries (of small and medium sizes).

Improvement of rural living conditions

2. Project Components

a. Land use

Land reclamation: by leveling the elevated areas and filling up the holes and ancient canals, 53 ha of new lands will be used for agricultural production, increasing the arable lands up to 3,490 ha, or 73.4% of the total area.

By improving the system of irrigation and drainage, increasing technical equipments for hightening the labour productivity, and supplying timely and adequately fertilizers and other necessary materials, there will be the possibility of crop multiplication on 1,320 ha of actual 1 - 2 crop fields. Two crops of rice will be practised, in accordance with labour force of the cooperatives, on all lightly salty or lightly acidity soils, old alluvial soils, even soils and loamy soils of light structured. The acreage of 3 crop fields will be 49.8% of the annual crop fields, or an increase of 5.6 times, compared with the actual cropping lands (see Annex V).

b. Development of farming systems

- Cultivation: depending on different types of soils, crops will be rationally re-structured as follows:

+ On the fields of 2 rice crops and 1 dry crop: spring rice - early rainy season rice - and winter maize.

+ On the fields of 1 rice crop and 2 dry crops: spring peanut - early rainy season rice and winter vegetable or sweet potato.

+ On the fields of 2 rice crops: spring rice - rainy season rice.

+ On the fields specialized for dry crops and short-term industrial crops: spring peanut - summer-autumn soyabean or vegetable - winter vegetable.

+ On the fields specialized for rice nurseries, a crop of spring soyabean or rainy season rice can be done.

The total cultivated area will be 7,746 ha, with a cropping land use ratio of 2.41, in which rice 74.1%, maize 18.6%, peanut and soyabean 4.1%, vegetable 2.3%.

To obtain the average annual rice yield of 10 tons/ha, intensive farming techniques should be applied:

+ Introduction of high yielding varieties resistant to acidity and salinity, resistant to pests and diseases and suitable for intensive farming (e.g. VN10, VN20, V14, V15, CR203 ... varieties).

+ Thorough plant protection.

+ Close combination of the irrigation and drainage with the application of fertilizers for soil improvement.

+ Scientific application of fertilizers on the basis of the characteristics of the soils.

Crops	Acreage	%	Yield	Output	Comparison with
					(+ increase, - reduction)
Cultivated acreage	7,716	100			
1. Food crops	7,219	93.6		32,777	+ 10,064
- Rice	5,709	74		28,290	+ 6,766
- Spring rice	2,727		60	16,362	+ 3,429
- Summer rice	2,982		40	11,928	+ 3,337
- Maize	1,445	18.7		3,613	+ 3,087
- Sweet potato	65	0.9		455	- 1,218
2. Industrial crops	316	4.1			
- Peanut	256	3.3	15	384	+ 300
- Soyabean	60	0.8	10	60	+ 54
3. Vegetable	181	2.3	250	4,525	
Total output				34,246	+ 10,374
(converted into paddy)					

- Animal husbandry:

+ More subsidiary crops should be done in winter, with these increased subsidiary food.

+ Restoration of the flock of ducks.

+ Development of poultry and fish rearing in the households. Planting mulberry in the gardens and all possible places for the development of silk - worm rearing.

c. Development of rural industries

The proper small size rural industrial enterprises shall be considered for implementation.

Artisanal cooperatives should be equipped with hand - weaving machines, rock grinding machines tannin and talc producing facilities ...

d. Infrastructure construction

- Irrigation system

+ To renew the Thong Nhat pumping station.

+ To concrete the Thong Nhat canal.

+ To build two smaller pumping stations (of the capacity of 1,000 m³/h each) for replacing the old, deteriorated pumps.

+ To concrete the canal of grade II.

+ To equip small pumps for the irrigation of small areas.

- Drainage system

+ To preserve and improve the existing system.

+ To repair seriously damaged sewers of the canals of grade I.

+ To build and renew sewers of grade Ii and grade III (60 - 80 cm diameter).

+ To install valves for making the water control easier.

- Communication and transport:

For ensuring the convenience of communication and transport, it is necessary to up - grade existing means and equip with new facilities:

3. SCOPE OF THE STUDY

In order to achieve the above mentioned objectives the Study shall be carried out in 2 phases. In the Phase I study, the basic development concept and preparatory study on the study area shall be prepared through extensive data collection and the field survey. In the Phase II study, the final plans for the agricultural and rural development plans shall be decided through the concentrated field survey and detailed analysis of data and information.

The scope of works for the Study will be broadly outlined as follows.

1. Collection and review of existing data and information

(1) Physical condition

- Topography
- Hydrology
- Meteorology
- Geology and soil mechanics
- Soils and erosion
- Natural ecosystems
- Others

(2) Socio-economic status

- Demographic conditions
- Regional and National economy
- Infrastrure
- Land use
- Agriculture

(3) Programme

- Regional and national development plans relevant to the project

2. Execution of Supplemental Field Survey and Investigations

(1) Soils and capability survey to supplement the existing soil maps prepared by the NIAPP.

(2) Hydrological survey including installation of water level records, discharge measurement, water quality tests and fluctuation.

(3) Meteorological survey including measurement of heat load for crops and livestock during Foehn phenomenon.

(4) Irrigation and drainage survey including infiltration test, moisture holding capacity test and to measure consumptive use of each candidate crop.

(5) Agriculture survey including to investigate unit yields of crops, farming practices, processing facilities, etc.

(6) Agro-economic survey

(7) Topographic survey to supplement the existing maps

(8) Rural inhabitant's intention survey

(9) Others

3. Analyses and studies

The analyses and study for the promotion of consolidated agriculture and construction of pilot rural area in the district shall be investigated through the concept of agricultural and rural development plans.

5. EXPERTS REQUIREMENT AND MATERIALS SUPPLIED BY THE GOVERNMENT

5.1 Experts Requirement from Japan

Experts	Field M/M	Home M/M
Team Leader	4.0	4.0
Irrigation Cum Water Management	7.0	4.0
Meteorologist Cum Hydrologist	5.0	4.0
Drainage Engineer	7.0	4.0
Topologist Cum Geologist	3.0	3.0
Pedologist Cum Land Use Expert	6.0	3.0
Rural Development Export	5.0	4.0
Cultivation and Farming Expert	7.0	4.0
Agro-Economy and Organization Expert	6.0	4.0
Survey Engineer	3.0	
Cost Estimation and Implementation	4.0	3.0
Expert		
Project Evaluation	3.0	3.0
Total	60.0	40.0

This study team will be compact and experts will work in several disciplines.

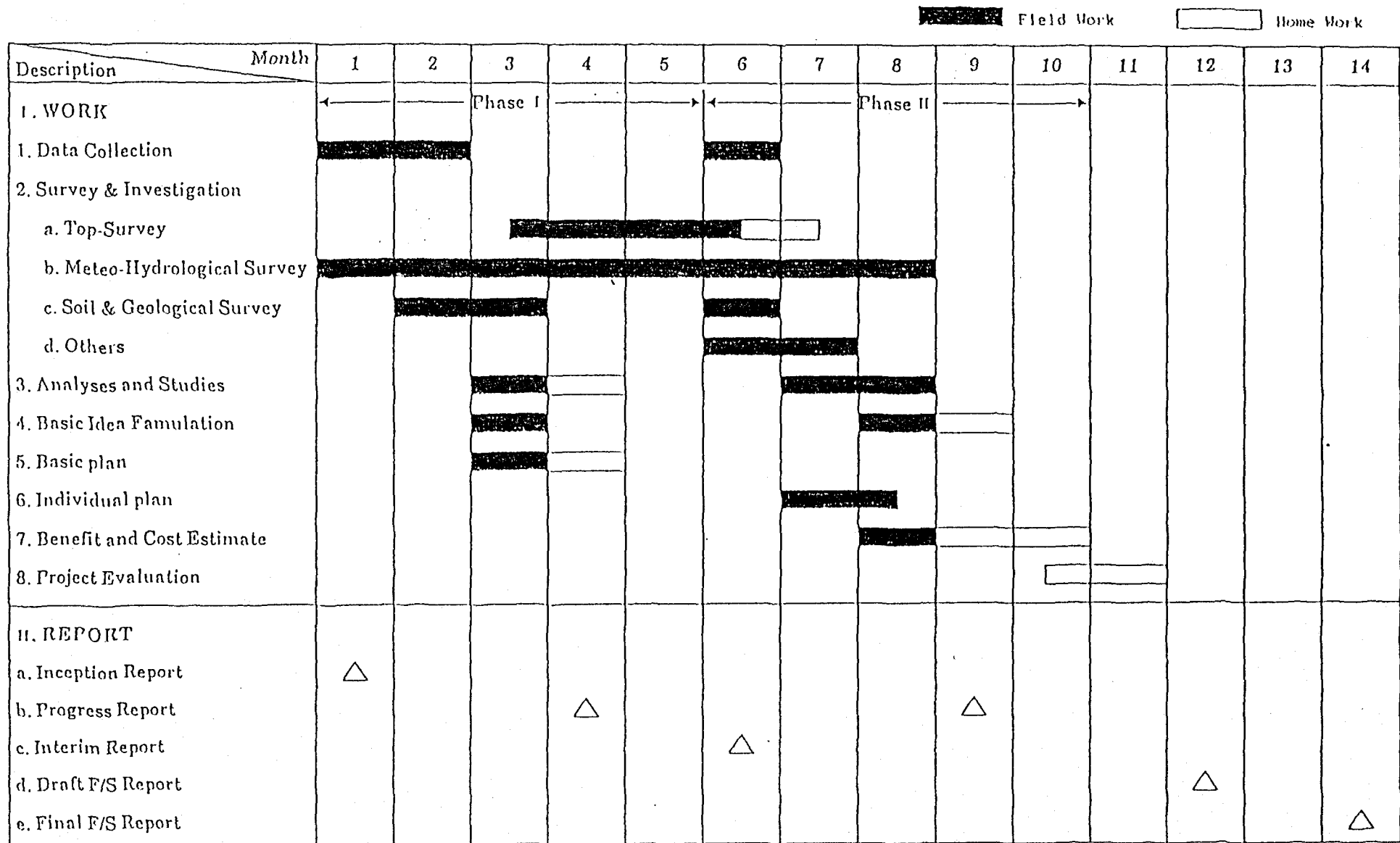


Fig.1 WORK SCHEDULE

5.2 Materials Supplied by the Government

The Government of S.R. Vietnam shall provide the study team with an appropriate number of competent counterpart personnel, proper office space with necessary furniture, the necessary number of vehicles and other services and arrangements which are deemed necessary for execution of the Study. The following counterpart personnel will be assigned:

- Chief Counterpart.
- Hydrologist.
- Meteorologist.
- Irrigation & Drainage Engineer.
- Agronomist.
- Survey Engineer.
- Agro-economist.
- Pedologist.
- Geologist.
- Land use Engineer. and
- Rural Development Engineer

The Vietnamese Government shall pay particular attention to provision of the following maps, data and other relevant engineering materials as well as execution of additional survey and investigation.

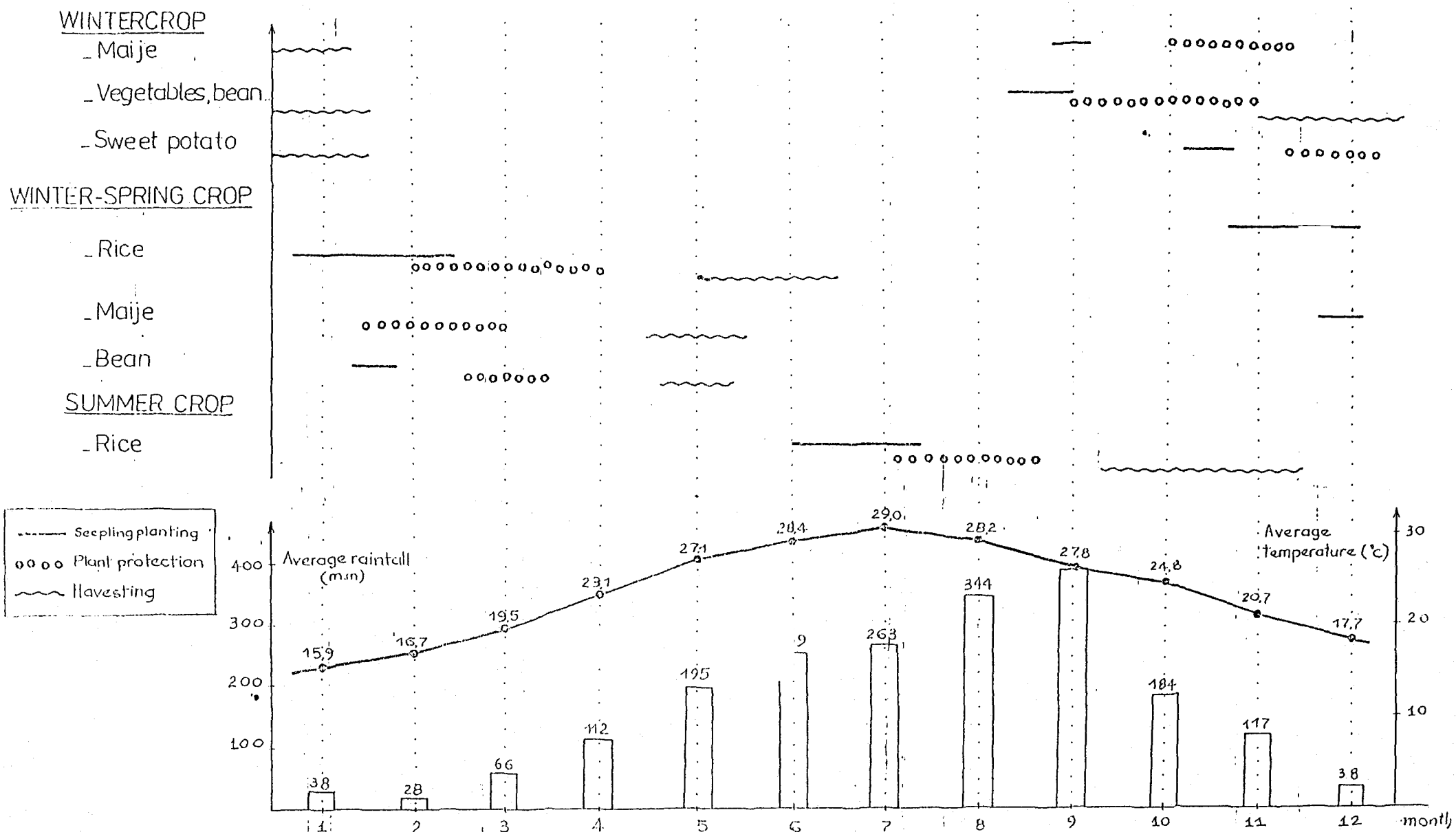
(1) Topographic map and survey:

1:50,000 topographic map

1:5,000 topographic map

(2) Meteo-hydrological data

CULTIVATION CALENDAR AND CLIMATE OF THONG NHAT AREA



Annex 2 :

MAIN SOILS OF THE THONG NHAT AREA

Unit : ha

[illegible]

Annex 3 :

CHEMICAL CHARACTERISTICS OF PRINCIPAL SOILS

SOILS	Symbol	pH _{KCl}	Humus	Total %		Cl ⁻ %	SO ₄ ⁻⁻ %	CEC ldl/100gr
				N	P ₂ O ₅			
1. Sandy ridges	Cz	5,0 - 5,5	0,5-0,8	0,01-0,0	0,01-0,03	-	-	-
2. Medium saline soils	M	6,0 - 7,0	1,2-2,3	0,10-0,20	0,07-0,10	0,15-0,25	-	5,6-9,2
3. Lightly saline soils	Mi	6,0 - 6,5	1,4-2,8	0,08-0,14	0,05-0,09	0,05-0,15	-	5,0-8,0
4. Acid sulphate soil	SM	4,5 - 5,0	1,5-2,5	0,10-0,25	0,06-0,10	0,05-0,15	0,05-0,15	
5. Alluvial soils of Red River inside dike system	pH	5,1 - 6,4	1,7- 3,1	0,10-0,15	0,06-0,09	-	-	6,0-8,5

Annex 4 :

LAND EVALUATION OF THE THONG NHAT AREA

Unit : Ha

No	Classification	Total(ha)	Percentage in cultivated area %	Dong co	Dong phong	Dong trung	Dong qui	Tay son	Tay ninh	Tay giang	Tay huong	Tay an
1	I- Very suitable	928,46	30,14	129,73	144,06	149,80	53,30	61,21	140,36	113,76	160,74	15,5
2	II- Suitable	1049,80	32,67	115,14	174,89	78,00	109,80	101,05	149,18	115,92	100,90	104,92
3	III- Conditionally suitable	690,61	21,49	158,96	60,70	12,00	84,30	110,37	36,07	64,45	90,60	73,16
4	IV- Poorly suitable	504,16	15,70	99,68	58,12	35,96	68,94	40,70	33,26	54,70	41,30	71,52
	Total	3213,03	100%	503,51	437,77	275,76	316,34	313,33	358,87	348,83	393,54	265,1

SOIL TEXTURE :	Sandy loam	a =	3,00 ha	0,09%	TOPOGRAPHY GRADE :	Elevated	=	315,98ha	9,83%
	Clay loam	b =	193,11	6,01		Rather elevated	=	859,38	26,73
	Lightly clay	c =	665,93	20,72		Plane	=	1172,62	36,49
	Medium clay	d =	1094,87	34,07		Low plane	=	526,70	16,39
	Heavy clay	e =	1256,12	39,11		Low lying land	=	338,35	10,56

Annex 5 :

LAND USE PLANNING IN THE THONG NHAT AREA

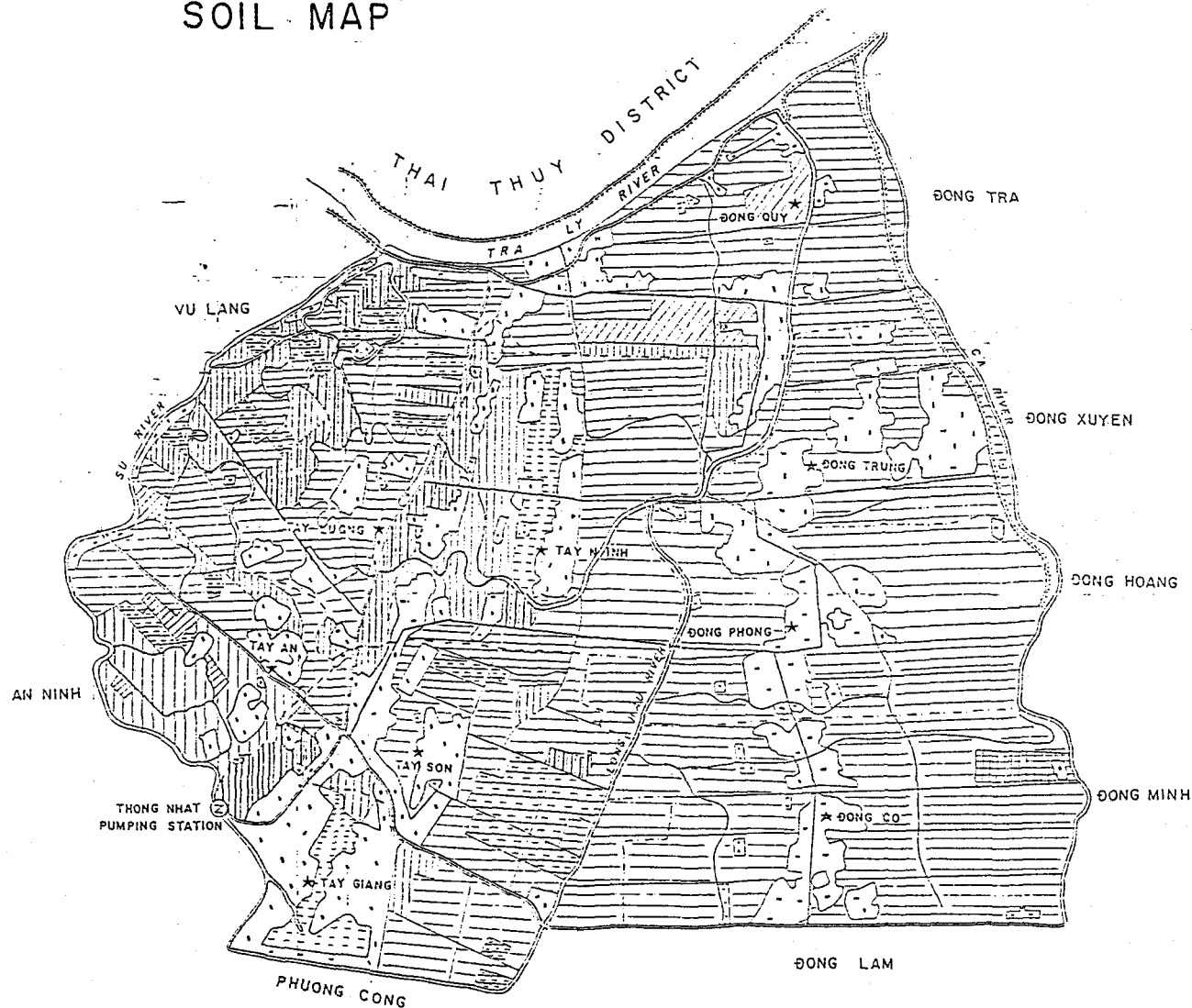
Unit : ha

Land utilization types	Existing	Planning	Percentage %	Difference compared with existing situation (+/-)
1	2	3	4	5
<u>Total acreage</u>	<u>4,753.3</u>	<u>4,753.3</u>	<u>100</u>	
I. <u>Arable lands</u>	<u>3,449.2</u>	<u>3,490.9</u>	<u>-73.4</u>	<u>- (+) 41.7</u>
1. Annual crops	3,205.8	3,249.9	93.1	+ 44.1
a. Paddy fields	3,093.2	3,128.9	89.6	+ 35.7
+ 3 crops	290.0	1,610.2	46.1	+1320.2
- 2 rice crop + 1 dry crop	257.0	1,455.0	-	+1198.0
- 1 rice crop + 2 dry crops	33.0	155.2	-	+ 122.2
+ 2 crops (rice + dry crop)	2,567.2	1,286.7	36.9	-1280.5
- 2 crops of rice	2,443.1	1,286.7	-	-1156.4
- 1 rice + 1 dry crop	124.1	-	-	- 124.1
+ 1 rice crop	4.0	-	-	- 4.0
+ Rice nurseries	232.0	232.0	6.0	-
b. Annual dry crops and short term cash crops	118.6	121.0	3.5	+ 2.4
2. Perennial crop	7.2	11.1	0.3	+24.9
3. Water space	230.2	229.9	6.6	- 0.3
II. <u>Other lands use</u>	<u>1,166.2</u>	<u>1,174.1</u>	<u>24.7</u>	<u>+ 7.9</u>
1. Dwelling land	465.3	481.3		+16.0
2. Hydrolic works	452.1	439.5		- 12.6
3. Communication and transport	198.7	201.3		+ 2.6
4. Construction side	50.0	52.0		+ 2.0
III. <u>Other</u>	<u>137.9</u>	<u>88.3</u>	<u>1.9</u>	<u>- 49.6</u>

Continued Annex 5

Differentiation between villages								
Dong Co	Dong Phong	Dong Trung	Dong Quy	Tay Son	Tay Ninh	Tay Luong	Tay An	Tay Giang
6	7	8	9	10	11	12	13	14
<u>726.3</u>	<u>603.5</u>	<u>433.8</u>	<u>485.0</u>	<u>467.7</u>	<u>494.1</u>	<u>635.5</u>	<u>372.6</u>	<u>534.8</u>
<u>530.7</u>	<u>463.4</u>	<u>344.7</u>	<u>349.7</u>	<u>340.8</u>	<u>376.8</u>	<u>417.9</u>	<u>295.1</u>	<u>371.8</u>
409.1	434.8	295.0	325.3	319.6	361.5	396.7	269.6	348.3
493.6	432.5	295.0	312.6	311.6	298.6	392.1	259.6	333.3
205.0	200.0	205.0	213.0	105.3	160.0	172.7	120.0	229.2
-205.0	200.0	205.0	210.0	65.0	-150.0	150.0	-120.0	150.0
-	-	-	3.0	40.3	10.0	22.7	-	79.2
245.4	187.7	66.1	71.6	175.8	138.6	188.1	123.0	90.4
245.4	187.7	66.1	71.6	175.8	138.6	188.1	123.0	90.4
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
43.2	44.8	23.9	28.0	30.5	-	31.3	16.6	13.7
5.5	2.3	-	12.7	8.0	62.9	4.6	10.0	15.0
2.3	1.0	2.3	-	-	-	-	5.5	-
29.3	27.6	47.4	24.4	21.2	15.3	21.2	20.0	23.5
<u>192.1</u>	<u>129.9</u>	<u>77.6</u>	<u>126.4</u>	<u>123.3</u>	<u>104.7</u>	<u>191.8</u>	<u>68.4</u>	<u>160.0</u>
64.6	49.6	30.1	47.7	63.0	47.8	65.5	28.5	84.5
82.5	51.0	23.5	52.7	33.0	42.2	82.3	24.8	47.5
38.0	24.3	18.0	22.0	21.3	14.2	25.0	12.0	26.5
7.0	5.0	-6.0	4.0	6.0	0.5	19.0	3.0	1.5
<u>3.6</u>	<u>10.2</u>	<u>11.5</u>	<u>8.9</u>	<u>3.6</u>	<u>12.6</u>	<u>25.8</u>	<u>9.1</u>	<u>3.0</u>

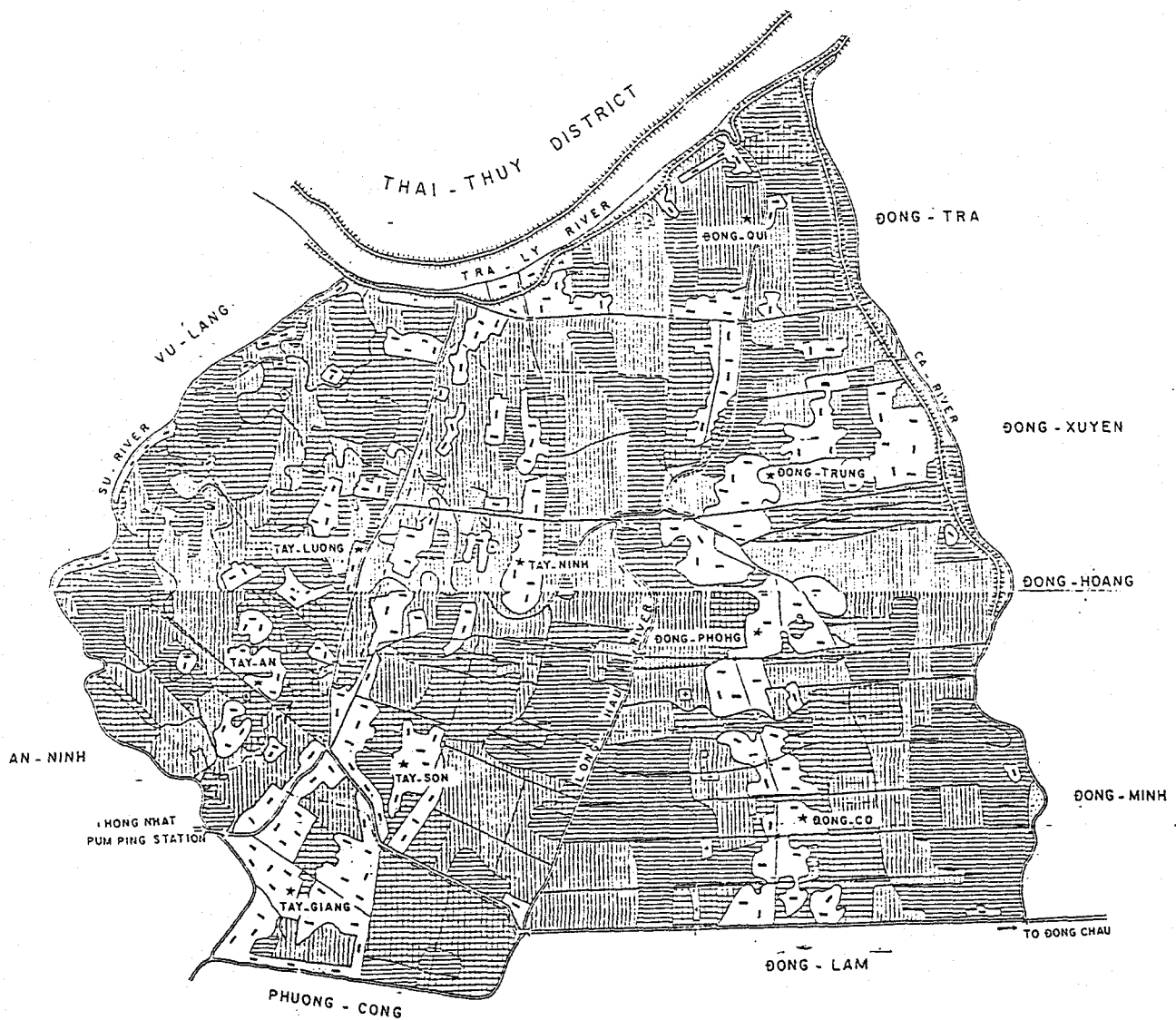
SOIL MAP













LEGEND

- | | | | |
|--|---|--|------------------|
| | Sandy bankment | | Residential area |
| | Sandy soils | | Village office |
| | Moderately saline soils | | Water ways |
| | Slightly saline soils | | Graveyards |
| | Saline, Acid sulphate soils | | Dike |
| | Alluvial soils of the Red river
(behind dike system) | | Roads |
| | Gleyish alluvial soils | | Pumping station |
| | Alluvial soils with a redish-yellow
layer in the subsoil | | Canal |

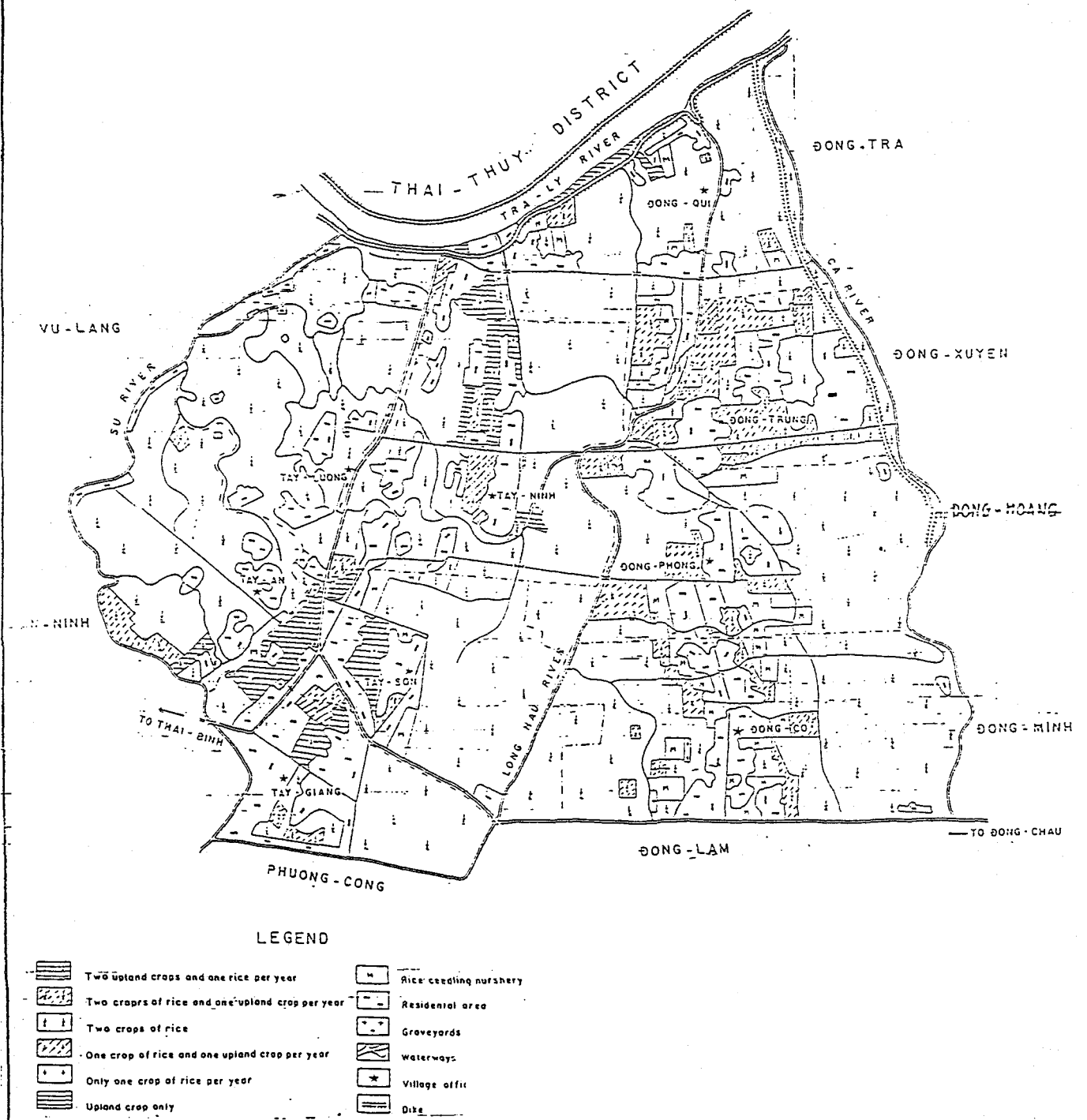
LAND EVALUATION SYSTEM



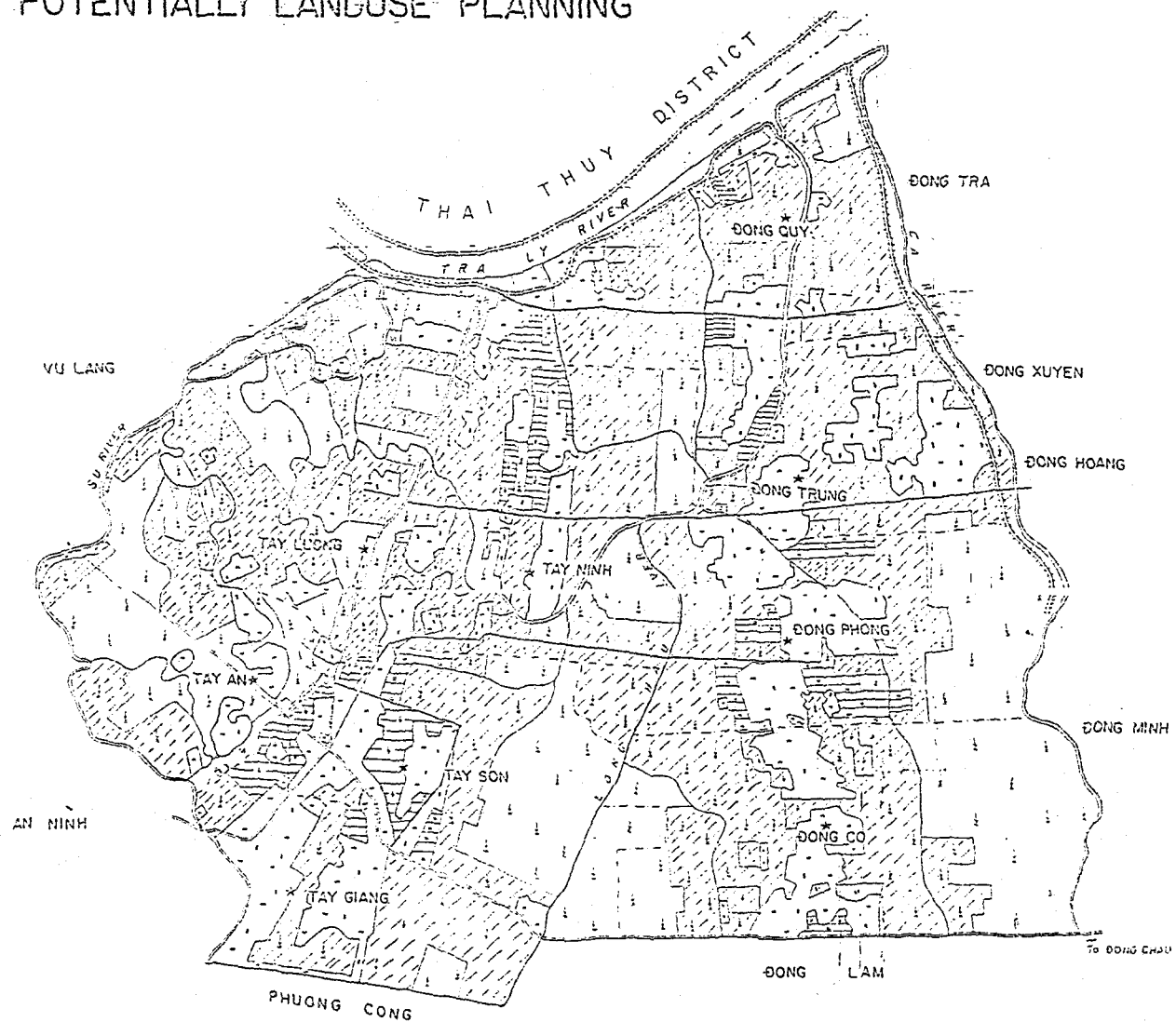
LEGEND

- | | | | |
|---|------------------------|---|----------------|
|  | Very suitable |  | Village office |
|  | Suitable |  | Waterway |
|  | Poorly suitable |  | Graveyards |
|  | Conditionally suitable |  | Dike |
|  | Residential area |  | Roads |

THE EXISTING LANDUSE MAP



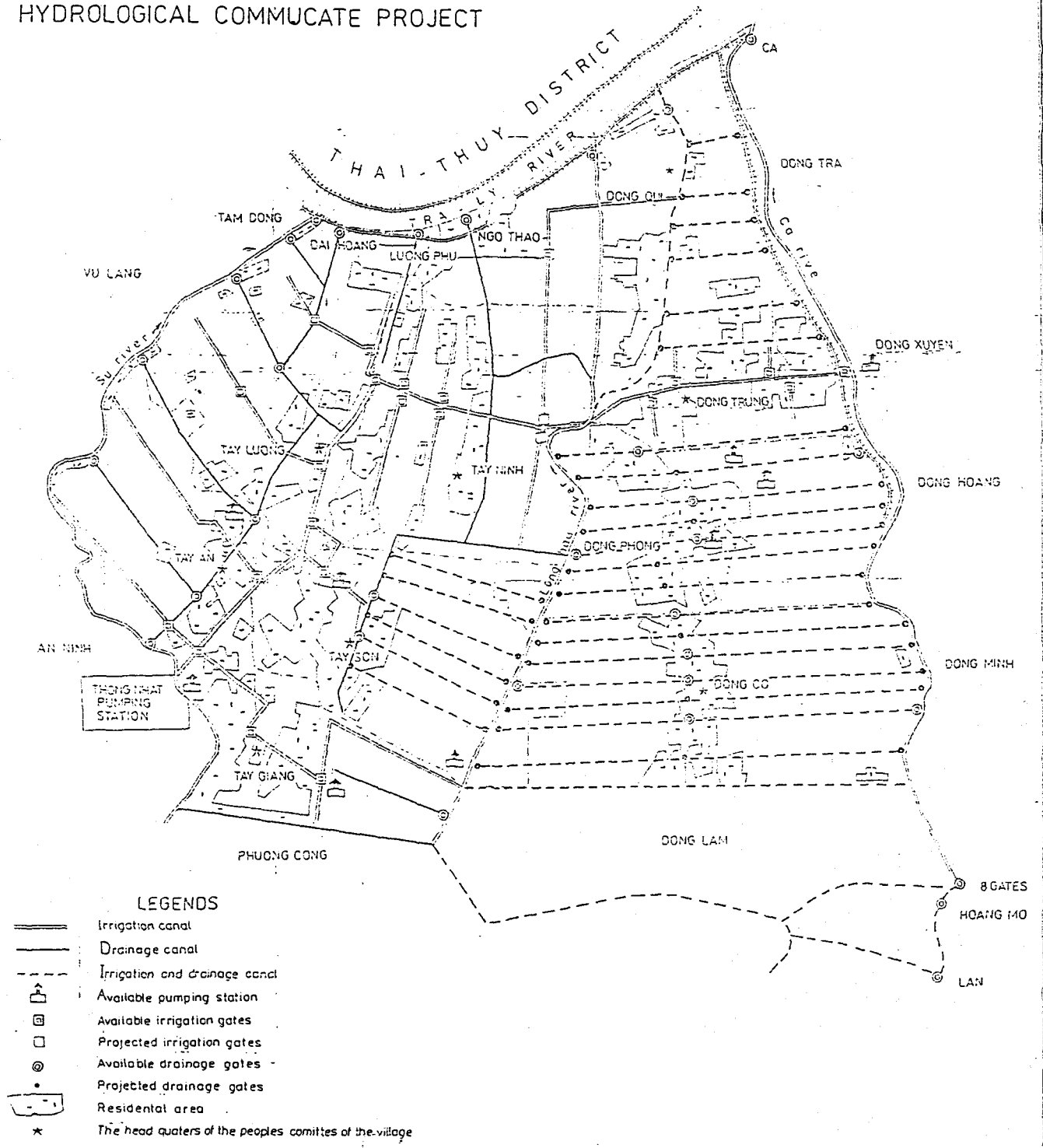
POTENTIALLY LANDUSE PLANNING



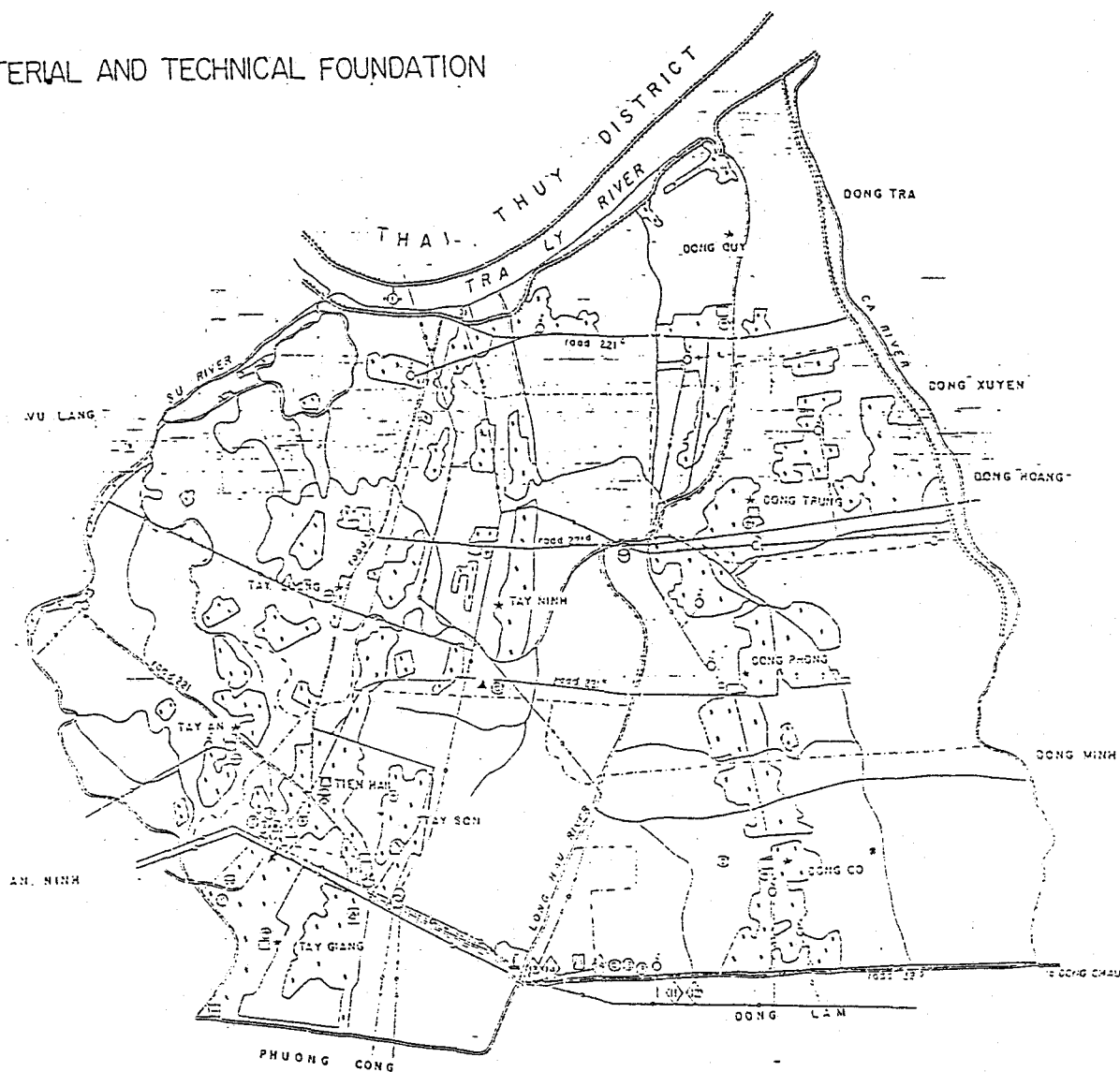
LEGEND

- | | | | |
|--|--|--|----------------------------|
| | Two upland crops and one rice per year | | Residential area |
| | Two crops of rice and one upland crop per year | | Graveyards |
| | Two crops of rice | | Water ways |
| | One crop of rice and one upland crop per year | | Village office |
| | Upland crop only | | Dike |
| | Upland crop and rice seedling nursery | | Rice seedling nursery only |


































HYDROLOGICAL COMMUNICATE PROJECT



MATERIAL AND TECHNICAL FOUNDATION



LEGEND

- | | | | | | |
|---|--------------------------------------|---|---|---|--|
|  | Hydraulic unit |  | Porcelain factory for construction |  | Gravel paved road |
|  | Tien Tien repairing workshop |  | Crystal factory for home furniture |  | High tension electric line 10KV and transformation station 10/0.4KV |
|  | Agricultural machinery station |  | Crystal factory for construction and optics |  | High tension electric line 35KV and transformation station 35/10KV |
|  | Veterinary station |  | Power station |  | High tension electric line 60KV and transformation station 110/35/10KV |
|  | Plant protection station |  | Mineral water unit |  | School |
|  | Plant seed breeding station |  | Sewing unit for export |  | Health care station |
|  | Rice seed production station |  | Electrical furniture center |  | Hospital |
|  | In-service training center |  | Animal food stuff processing center |  | Cultural center |
|  | Agricultural product drying center |  | Mineral water exposed point |  | Shopping center |
|  | Freezing center |  | Natural gas, drilled point |  | River harbour |
|  | Porcelain factory for home furniture |  | Asphalt paved road |  | Bus station |

Memorandum :

With the agreement of the Ministry of Agriculture and Food industry of Vietnam and the Japanese Agricultural Development Consultants Association (ADCA) a mission of a group of Japanese specialists headed by Dr. K. Shiina, President of Tayio consultant Company visited Hanoi from 19 to 23 July 1989

The main purposes of the mission is to continue the detaile survey and discussion with Vietnamese side on a number of proposal projects for Agricultural and rural developments in the Red river Delta formulated by the two sides in the privious Japanese project finding mission aiming at using the resources of ODA and long-term credit of Japanese Government for Vietnam.

Taking part in discussion and field investigation of the two sides are :

Japanese side :

- | | |
|-------------------|---|
| 1/ Dr. K. Shiina | President of Tayio Consultants Company, leader |
| 2/ Mr. A. Iwamoto | Chief engineer of Tayio Consultants Company, Irrigation and drainage engineer |
| 3/ Mr. K. Toda | Kanematsu Gotho L.t.d agricultural machinly |

Vietnamese side :

- | | |
|-------------------------|---|
| 1/ Mr. Bui quang Toan | NIAPP Vice Director, Leader |
| 2/ Mr. Nguyen van Phuoc | Director of the Department for International relation of MAFI |
| 3/ Mr. Luong van Nghia | Secretary of the People's Committe of Melinh District Hanoi |
| 4/ Mr. Le si Bo | Chairman of the People's Committe of Melinh District Hanoi |
| 5/ Mr. Hoang xuan Thien | Chairman of the People's Committe of Tienhai District Thaibinh |
| 6/ Mr. Pham van Huan | Chairman of the People's Committe of Kienthuy District Haiphong |

and a number of staff members of NIAPP , DIR the Division for Economic foreign affair of Hanoi, Melinh, Kienthuy, Tienhai and Namdan Districts.

Before the meeting of discussion the two sides carried out supplementary survey in Melinh and Namdan Districts.

The Japanese Delegation was welcomed by Tran Tan Mayer of Hanoi and Nguyen thien Luan and Nguyen minh Thong Vice-Minister of MAFI.

For the two days 21 and 22 July 1989 at NIAPP office, biteral meeting was held for more detaile discussion, suplemetary adjustrments of the proposal projects and the follow up of working plans implement after the aproval of the two Governments.

Discussion and agrements are :

1. A overall Masterplan on Evaluation and planification for using the lands, water and labour resources of the Red river Delta should be early completed. Base on the Masterplan priority

activities could be outline for Economic and social developments within the Delta.

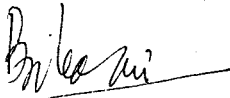
Japanese side will send as soon as possible a group of concerned specialities joint hands with NIAPP staff members to complete the project documents and Vietnamese side hope that these project will be implemented at the expensive of Japanese O.D.A

2. Together with the formulation of the Masterplan of the Red river Delta, it is nessesory to complete the proposal project for Melinh (Hanoi) Tienhai (Thaibinh) and Kienthuy (Haiphong) sothat they can be excuted early after aprovaled by Japanese Government.

For the time being, each of the 5 ecological categories of the Delta such as the fresh alluvial, old alluvial, acid and saline, swampy, outside the dikes of Red river should be made some pilots areas (3-5 villages) with the more detailed surveys and design. The documents of the pilots would be passed through to Japanese side as soon as possible.

3. Both sides have to promote to the higher level the Governmental organizations all these agreements, so that priorities can be made for the implementation of the abouve aprovaled projects.

On behalft of the
Vietnamese side



Bui quang Toan
NIAPP Vice Director

On behalf of the
Japanese side



Dr. K. Shiina
President Tayio Consultant Company