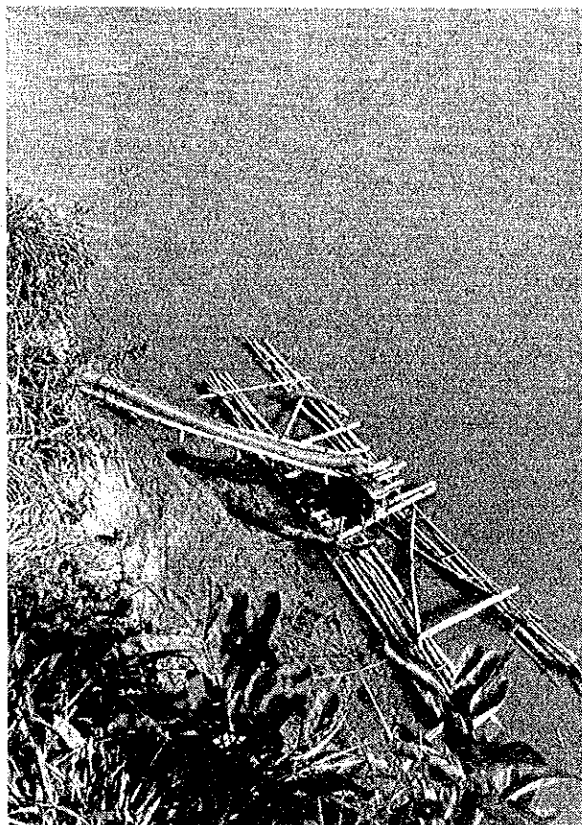


No. 5 : Thin Then project



(13) Pump station site
Temporary pump with a
capacity of irrigating
10 ha only



(14) Existing
distribution
system of
irrigation
water

No. 6 : Simano project



(15) Pump station site

No. 7 : Na Long Project



(16) Paddy fields to be irrigated (left side) and existing water delivery system (centre). The latter is not operational due to lack of pumping capacity.

No. 8 : Ma Hiao Project

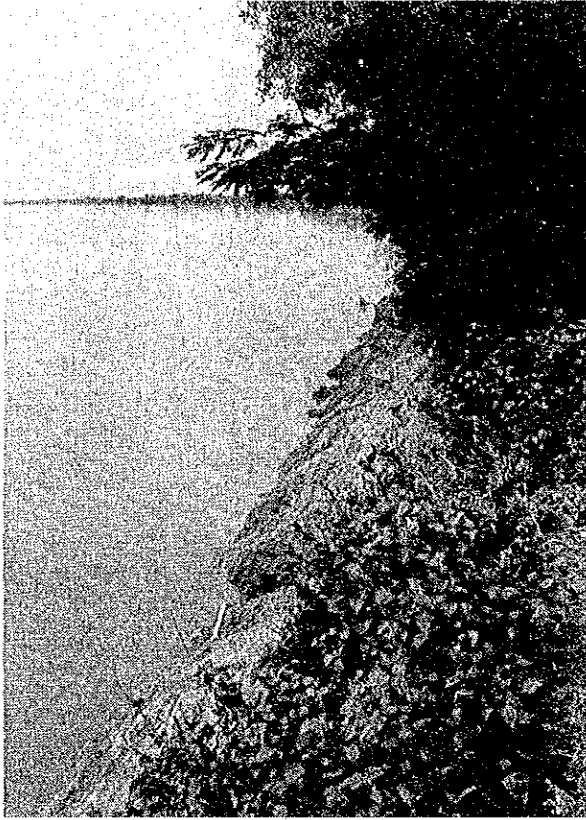


(17) Pump station site



(18) Planned canal site

No. 9 Mak Nao Project



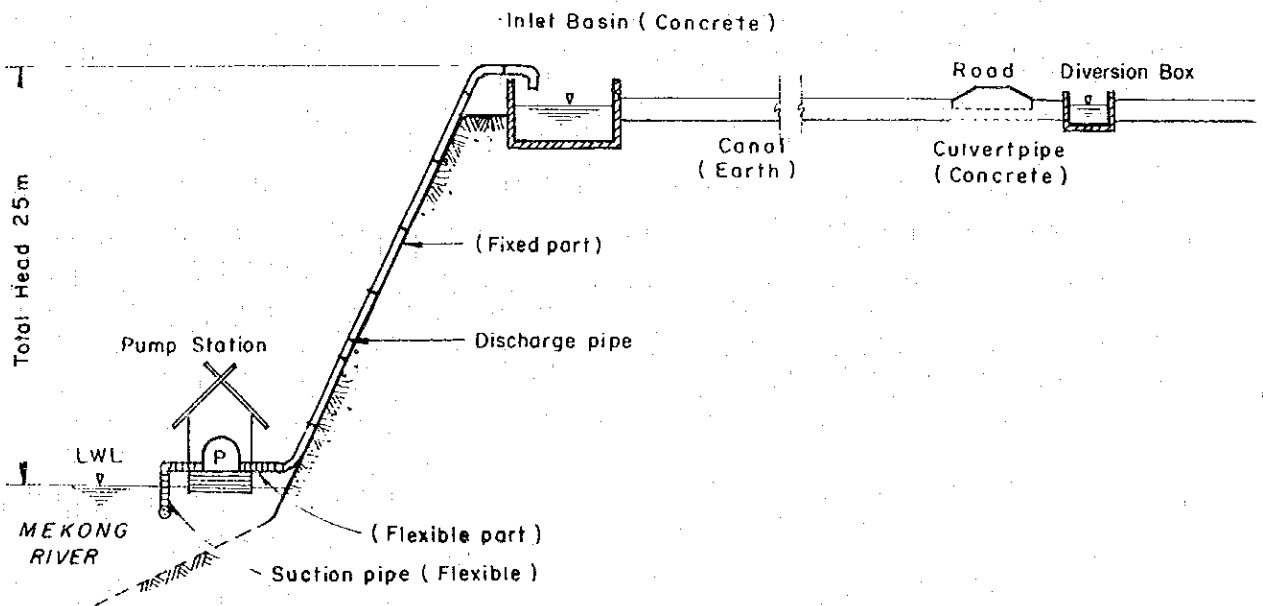
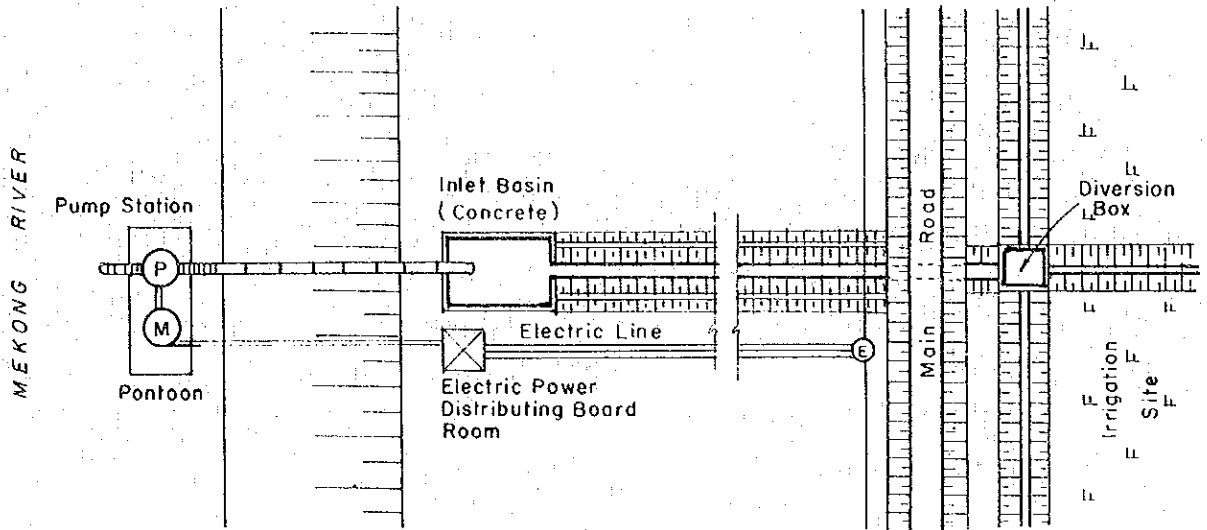
(19) Pump station site

No. 10 : Wang Pho Project



(20) Pump station site

FIG.21: TYPICAL PLAN OF PUMP STATION



PROJECT DATA SHEET

COUNTRY : LAO P.D.R.

PROJECT : VEUNE KHAM EDUCATION, HEALTH AND SOCIAL SERVICES

1. SUMMARY

The Veune Kham project is a pioneering effort of the Lao PDR in improving the standard of living of resettlers, many of whom have never been engaged in agriculture before. As such, the project has a high priority. The first phase, related to infrastructure improvement is being executed with assistance from the Government of the Netherlands, through the Mekong Committee. The present request is for improving education, health and social services for families living in the project area. The total cost is estimated at US\$ 100,000.

2. BACKGROUND

With the generous assistance of the Government of the Netherlands, through the Mekong Committee, the first phase of the Veune Kham infrastructure project is now under construction. For ready reference, a copy of the relevant project data sheet, including a general description of the project area is attached hereto.

The present request is for assistance in improving the education, health and social services for the families living in the Veune Kham project area. There are about 360 such families now, which number is expected to increase during the construction of flood control and irrigation facilities to about 500 families of permanent settlers. The autochthonous population is very small, since the project area has a low productivity because of flood hazard in the lowlands, and lack of water in the higher lands. Therefore, the greater majority of families are new settlers, many of whom have never been engaged in agriculture before. The educational programme is therefore intended to both children and adults.

3. OBJECTIVE

The objective is to provide education, health and social services for the inhabitants of the Veune Kham project area. To this end it will for the inhabitants of the Veune Kham project area. To this end it will be necessary to build

a school, a health dispensary and a meeting hall for vocational promotion. These facilities will be built at the Veune Kham service centre, indicated on Figure 1. The existing facilities are shown on photographs 1-10, which illustrate the deficiency of the present situation.

4. THE PROJECT

Since the population in the project area lives in small hamlets of 10-50 families (as indicated on Fig. 1), it is not practicable to disperse the health and education facilities. It is, therefore, the intention to build these at the main service centre. For this reason some transportation facilities are included in the request for assistance. The design of the school, dispensary and meeting hall are shown in Figures 2, 3 and 4 respectively.

5. PROPOSED PROGRAMME OF WORK AND IMPLEMENTATION COST

All facilities will be built and completed during 1978. Assistance is requested only for materials not available in the Lao PDR. All other costs are borne by the project administration.

5.1 For education

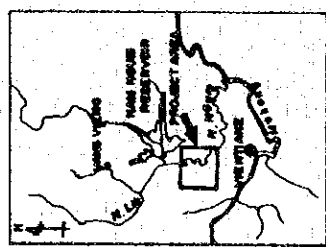
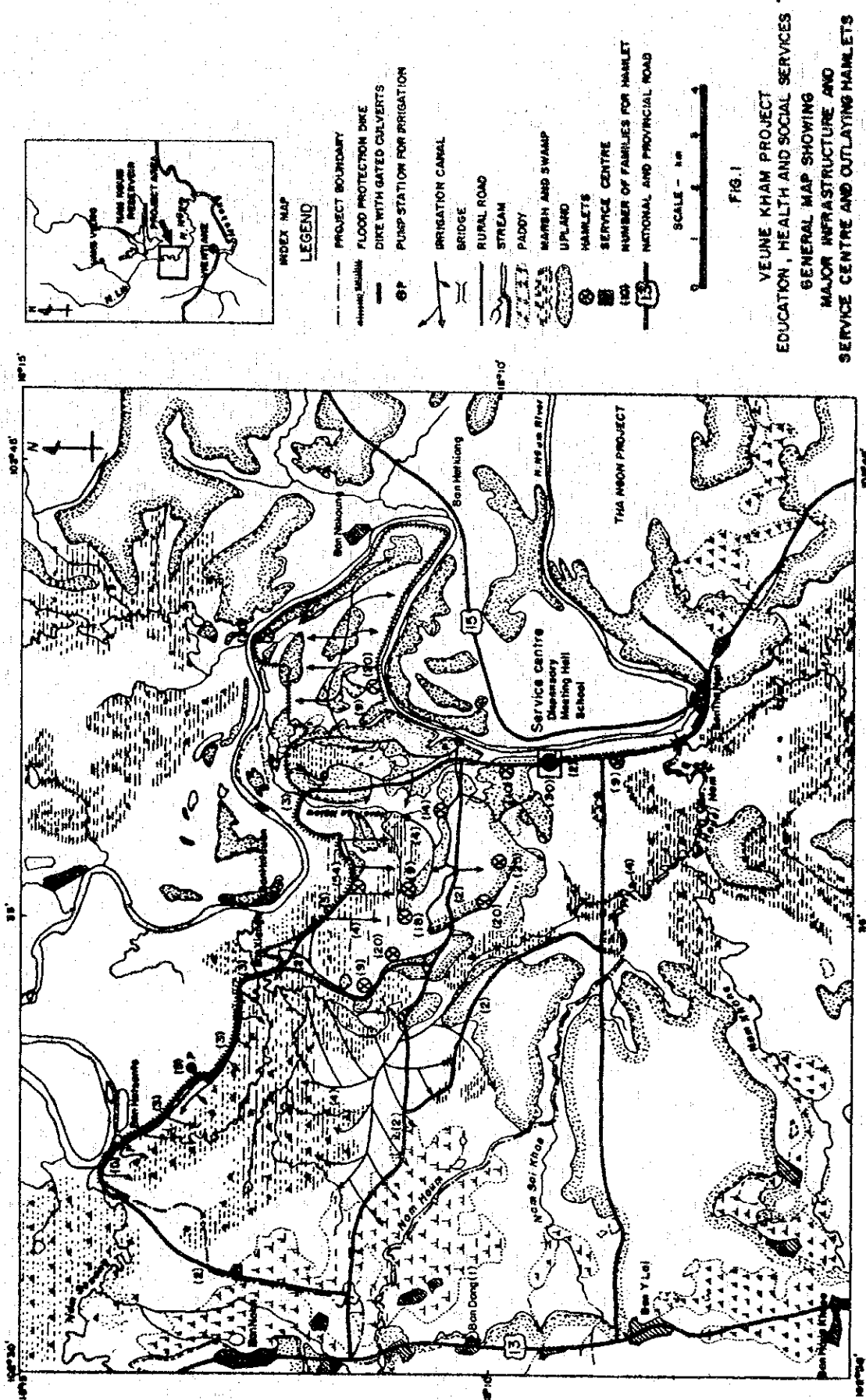
	(in US\$)
- Construction materials for school buildings (4 units)	19,320 = 19,300
- Educational equipment	3,100
- Transportation, 2 micro-buses 6,800	<u>13,600</u>
Sub-total	36,000

5.2 For health facilities

- Construction materials for dispensary	= 5,300
- Purifier for drinking water 1 set	11,000
- Delivery pipe for drinking 2,000 m 1.5 water ($\phi = 1.5''$, steel pipe)	3,000
- Flexible pipe for existing pump 12 pieces 75 for drinking water ($\phi = 4''$, l = 6.0 m)	900
- Medical instruments and medicines	<u>20,000</u>
Sub-total	40,200

5.3	<u>Adult education</u>	
-	Construction material for meeting hall for adults	14,175 = 14,200
-	Speaker set, 1 set	<u>1,200</u>
	Sub-total	15,400
5.4	<u>Contingency</u>	8,400 ^{1/}
5.5	<u>Total</u>	<u>100,000</u>

^{1/} This item is rather high, since a generator set may be needed (5 kVA), depending on the electrification plan for the Veune Kham area.



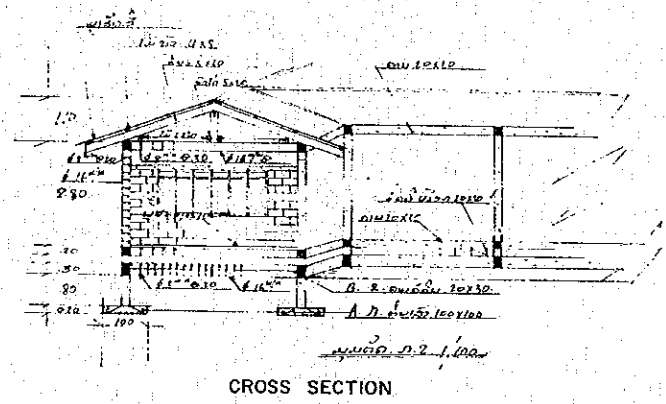
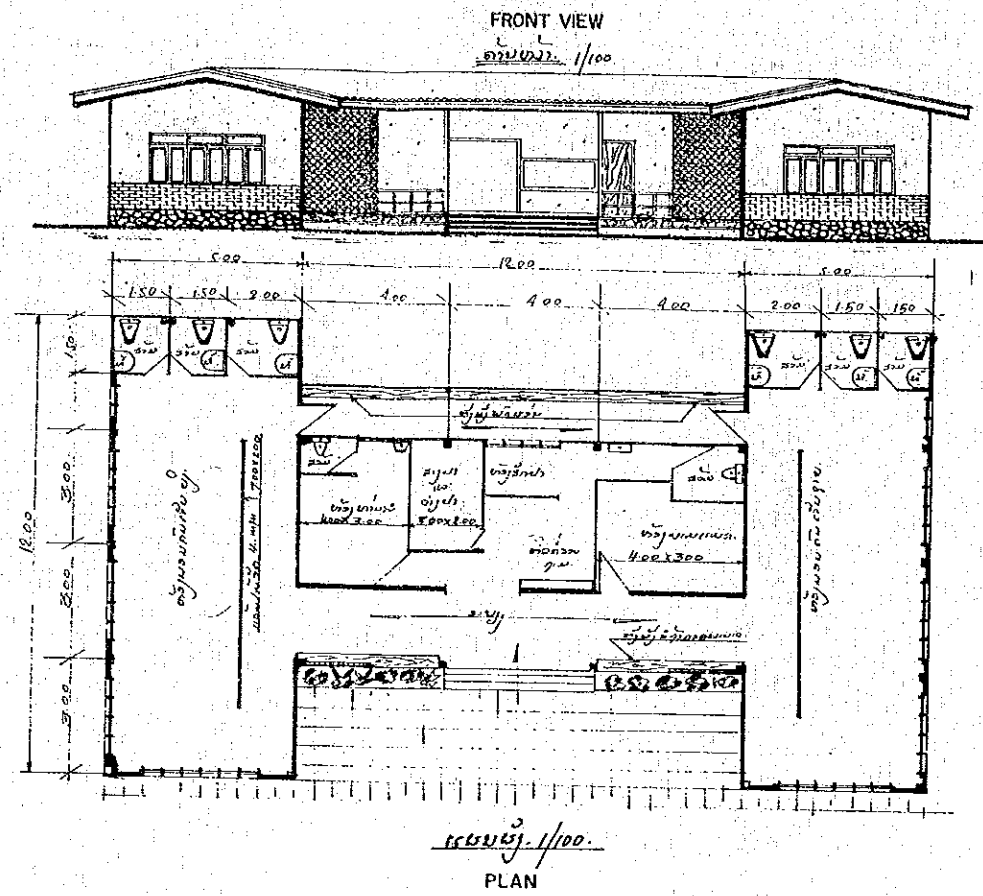
LEGEND

- PROJECT BOUNDARY
- FLOOD PROTECTION DIKE
- DIKE WITH GATED CULVERTS
- ⊕ PUMP STATION FOR IRRIGATION
- IRRIGATION CANAL
- BRIDGE
- RURAL ROAD
- STREAM
- ▨ PADDY
- ▧ MARSH AND SWAMP
- ▩ UPLAND
- ⊙ HAMLETS
- ⊙ SERVICE CENTRE
- ⊙ NUMBER OF FAMILIES FOR HAMLET
- NATIONAL AND PROVINCIAL ROAD



FIG. 1

VEUNE KHAM PROJECT
 EDUCATION, HEALTH AND SOCIAL SERVICES
 GENERAL MAP SHOWING
 MAJOR INFRASTRUCTURE AND
 SERVICE CENTRE AND OUTLYING HAMLETS



MINISTRY OF INTERIOR, WAR VETERANS
AND SOCIAL AFFAIRS, LAO PDR

PLAN OF HOSPITAL, VEUNE KHAM
RESETTLEMENT PROJECT

ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ		23
ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ		
ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ	ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ	10, 10, 10 10, 10, 10
ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ	ສາທາລະນະລາຍ: ສາທາລະນະລາຍ ສາທາລະນະລາຍ: ສາທາລະນະລາຍ	10, 10, 10 10, 10, 10

was estimated at 50,000 tons. The high frequency of drought spells and of floods is a major constraint for intensifying rice production during the rainy season. Therefore, the Government's first priority is to set forth a development programme for irrigation, drainage and flood control in the Vientiane plain.

The Vientiane province has an area of about 30,000 km², 75 per cent of which is level land; the remainder being mountainous (Fig. 1). The existing paddy lands are estimated at about 88,000 ha, and slash-and-burn (shifting) cultivation covers about 20,000 ha. The average yield is around 1.0 ton/ha. The low average yield is caused by the high frequency of floods and drought spells; although annual average rainfall in the lowlands is about 1,800 mm/year, it is irregular both at the onset of rainy season and in its distribution between June and October. At present, only 7 per cent of the existing paddies are irrigated by pumping or by gravity. Therefore, agricultural production has not kept pace with population growth in recent years. This is also due to instability, following 30 years of war and the displacement of some 40,000 families from their land. However, the implementation of irrigation and flood control projects on a provincial level is making with a number of difficulties. These are due mainly to the lack of construction equipment and materials, and to the inadequate institutions for operation and maintenance. Unless these shortcomings are remedied, the development programme cannot be implemented on schedule. Consequently the present request is for assistance in removing these constraints.

3. OBJECTIVES

- To bring the existing paddy land under irrigation in order to intensify rice production during the rainy season and to grow a dry season crop of paddy as well as diversified crops, so that the Vientiane province will be self-sufficient in food production within 3 years.
- To relocate slash and burn (shifting) farmers from the hilly regions to lowland regions so that they can have a permanent and ensured place to live and farm. At the same time, valuable forest can be conserved for the benefit of man and wildlife, and soil erosion can be reduced.
- To improve water control and management throughout the plains of the Vientiane province by making the best use of all streams and rivers for irrigation, supplemented by suitable flood control and surface drainage techniques.
- To reclaim all the swamps and marsh areas for crop cultivation and to clear more land on the plains, in order to provide young farmers' families

and relocated highland communities enough farmland to live and farm permanently in the lowland regions.

4. THE PROJECT

The proposed project comprises the construction of small retention dams along the foot of the mountain ranges; diversion dams in the plain region; and pumping stations and flood control structures, with road-dikes, along the Mekong and Nam Ngum rivers. There will be land clearing and land reclamation in the lowland region where irrigation, drainage and flood control systems are assured.

This project would provide landless rural families, displaced families, and highland or shifting families enough land to farm and live on. It would also lead to intensification of rice production twice a year through improved water management for the farmers in the proposed project areas. It is aimed at improving socio-economic conditions to achieve self-sufficiency within the shortest possible time.

4.1 Project features.

The major features of the proposed project components are as follows:

The retention dams will be earth-fill type with reinforced concrete spillways and intakes, including water gates for irrigation.

The diversion dams will be overflow reinforced concrete buttress weirs with check gates. There will be, however, some earth fill dams with diversion spillways at sites where buttress weirs cannot be constructed due to foundation conditions.

Pumping stations will comprise either pump units on pontoons or inclined axial pump units on the river banks, each with a stilling basin with flow measuring device.

The irrigation distribution systems will consist mainly of unlined earth canals with reinforced concrete structures and prefabricated water gates.

The flood control structures will be made of reinforced concrete with steel flap gates at the downstream end and steel sluice gates at the upstream end.

The road-dikes are mainly earth fill with laterite surface.

Land reclamation will be carried out in the swamp and marsh areas by surface drainage techniques. It is proposed that this will be done by swamp bulldozers.

Land clearing is proposed to be done by standard bulldozers.

4.2 Project components (Fif. 1)^{1/}

4.2.1 Reservoirs (Retention dams)

<u>Name of project</u>	<u>Irrigable area (ha)</u>		
	<u>Wet season</u>	<u>Dry season</u>	<u>Total</u>
Nam Moun	4,450	2,000	6,450
Houei Sai Moun	850	300	1,150
Nam Son	600	300	900
Nam Houn	3,800	2,000	5,800
Nam Souang	6,000	3,000	9,000
Nam Cheng	1,500	400	1,900
Nava	700	650	1,350
KM. 27	100	50	150
Total	18,000	8,700	26,700

4.2.2 Diversion weirs

<u>Name of District (6)</u>	<u>Irrigable area (ha)</u>		
	<u>Wet season</u>	<u>Dry season</u>	<u>Total</u>
Tourakhom	500	50	550
Vang Vieng	400	150	550
Kasi	750	400	1,150
Hom	250	50	300
Sanakham	500	200	700
Phone Hong	800	250	1,050
Total	3,200	1,100	4,300

4.2.3 Pumping stations

<u>Name of district (5)</u>	<u>Irrigable area</u>		
	<u>Wet season</u>	<u>Dry season</u>	<u>Total</u>
Sixattnak	800	400	1,200
Hatsaifong	13,300	6,600	19,900
Saitani	2,200	1,100	3,300
Phone Hong	250	100	350
Tourakhom	950	500	1,450
Total	17,500	8,700	26,200

^{1/} Detailed project data sheets are to be prepared for each project component or group of project components.

4.2.4 Flood control projects

<u>Name of project</u>	<u>Protected Deke length</u>		<u>Remarks</u>
	<u>area</u> (ha)	<u>(km)</u>	
Nam Ham	10,000	12	
Houei Iyot	3,000	8	under construction
Houei Sa Ngiew	2,000	6	under construction
*Vcuve Khem project Area			
Nam Khem	5,000	6	
*Houei Deua	2,000	14	completed
*Houei Mak Hiao	8,000	28	completed
Don Kalum Rehabilitation	5,000	6	
Total	35,000	80	
*On-going project			

4.2.5 Land reclamation of swamp and marsh area: approximately 10,000 for irrigation.

4.2.6 Summary of project components:

Irrigated area: 38,700 ha wet season, 18,500 ha dry season

Area protected from flooding: 35,000 ha

Area reclaimed from swamps and marshes : 10,000 ha

5. IMPLEMENTATION SCHEDULE

The implementation scheme is as follows (see also section 8 below):

5.1 1978

Construct four retention earth-fill dams and irrigation distribution systems, consisting of main canals and some lateral canals to serve about 15,700 ha during the rainy season and about 7,400 ha during the dry season. This programme will help about 10,000 families grow paddy rice twice a year.

Construct 32 pumping stations and irrigation distribution systems to irrigate about 17,500 ha during rainy season and 8,700 ha during dry season and to serve about 8,700 families.

Rehabilitate old diversion dam schemes and construct new ones totalling 15 schemes to irrigate about 3,200 ha during rainy season and 1,100 ha during dry season. This work will help some 2,000 families and intensify their rice production.

Carry out the preliminary study of a diversion in the Nam Lik river to

irrigate part of the Vientiane plain.

Continue studying new diversion dams and pumping schemes.

Carry out the study of reclaiming swamp and marsh areas along both sides of Nam Ngum river in the region of the Vientiane plain. This study would include flood control drainage and water conservation for irrigation.

Repair and maintenance of drainage flood control structures constructed formerly along Mekong river, with some improvement (Dong Kalum project).

5.2 1979

Continue constructing the distribution system, drainage canals, lateral canals and control structures of the four reservoirs built in the previous year; lateral canals; farm ditches and control structures of 32 pumping irrigation schemes and 15 diversion dam schemes.

Construct the four remaining retention earth-fill dams, main canals and some lateral canals to serve about 2,300 ha during rainy season and about 1,300 ha during dry season. This project will help about 1,500 families and intensify their rice production.

Rehabilitate old diversion dam schemes and construct new ones based on the 1978 plan.

Carry out the final study of Nam Lik diversion.

Continue studying new diversion dam and pumping schemes, and new reservoirs.

Start the first stage of reclaiming swamp and marsh area along the Nam Ngum river.

Construct one flood control structure at the Nam Ham river.

Study some more drainage and flood control structures.

Construct a road dike from Tha Deua to Mak Nao.

5.3 1980

Continue construction of the distribution systems, sublateral canals, farm ditches and control structures of the first 4 reservoirs; drains, lateral canals and control structures of the last 4 reservoirs; lateral canals, farm ditches and control structure of the new diversion dam and pumping schemes as constructed in 1979.

Construct new diversion and retention dam schemes, pumping schemes main canals some lateral canals and control structures as studied and planned in 1979.

Construct the first phase of Nam Lik project as studied and planned in

1979, and continue studying and planning the second phase of Nam Lik project. Construct the second stage of reclaiming swamp and marsh area along Nam Ngum river.

Construct drainage and flood control structures as planned in 1979.

Continue studying new diversion and retention dam schemes, and permanent pumping schemes.

Propose the next 3 year's development plan.

6. ESTIMATED PROJECT COST (1978-1980) (in US\$)

6.1 Construction cost (imported materials only)^{1/}

<u>Project</u>	<u>Cost</u>	<u>Remarks</u> (unit cost per ha.)
8 reservoirs	3,450,000	130 \$/ha
15 diversion weirs in 6 districts	1,720,000	400 \$/ha
32 pump irrigation stations in 5 districts	3,000,000	115 \$/ha
1 flood control structure with a dike of 12 km length (Nam Ham Project)	330,000	33 \$/ha
Total	8,500,000	125 \$/ha

6.2 Cost of heavy equipment and maintenance centre

Heavy equipment	2,300,000 ^{2/}
Maintenance centre (Motor Pool)	1,200,000 ^{3/}
Total	<u>3,500,000</u>

6.3 Grand total 12,000,000

^{1/} Annex 1

^{2/} Annex 2

^{3/} Estimated lump sum

7. SPECIAL PROJECTS

Projects in the Vientiane plain, for which assistance is already assured or being negotiated.

<u>Name of project</u>	<u>Area (ha)</u>	<u>Cost (US\$)</u>	<u>Remarks</u>
Casier Sud Pioneer Agriculture Project	3,200	6,400,000	Under negotiation with ADB
Veune Kham State Farm Project	3,500	295,000	Funds granted by the Government of the Netherlands (first stage). On-going
Pak Cheng Project (Nam Ngum resettlement)	2,000	1,200,000	Funds granted by the Government of the Netherlands. On-going
The Ngone			
a) completion of irrigation system	800	a) 500,000	a) Under negotiation with ADB
b) fish production station		b) 600,000	b) Funds granted by the Government of the Netherlands. On-going.
Mekong pump irrigation	5,000	1,120,000	Funds being sought by Mekong Committee

8. IMPLEMENTATION SCHEDULE (PLANNING AND CONSTRUCTION)

Project	1977	1978	1979	1980
1. Special projects				
Casier Sud				
Veune Kham				
Pak Cheng				
Tha Ngon				
Mekong Pump Irrigation				
2. Reservoir dam with irrigation and drainage system				
Nam Wong district				
Houei Sai Moun				
Nam Son				
Nam Houm				
Nam Souang				
Nam Cheng				
Nava				
KM.27				
3. Diversion with irrigation and drainage system				
Tourakhom district				
Vang Wong district				
Kasi district				
Hom district				
Sanakham district				
Phone Hong district				
4. Pump irrigation with irrigation and drainage system				
Sixattanak district				
Hatsaifong district				
Saithani district				
Phone Hong district				
Tourakhom district				
5. Flood control (gate structure and dike)				
Nam Ham			(gate)	(dike)
Houei Iyot				
Houei Sa Ngiew				
Nam Khem			(gate)	(dike)
Houei Deua	(gate)			
Houei Mak Hiao	(gate)		(dike)	
Dong Kalum (Rehabilitation)				
6. Land reclamation with irrigation and drainage system		Study	Construction	
7. New projects				
Nam Lik diversion weir	Preliminary	Study	Study	Construction
Reservoir	Final	Study	Construction	
Diversion dam		Study	Construction	
Pump irrigation		Study	Construction	
Flood control			Study	Construction
8. New projects for the next 3-year's programme				Proposing Study new project

ANNEX I

QUANTITIES OF MATERIALS FOR THE FIRST PHASE OF THE VIENTIANE PLAIN
AGRICULTURAL DEVELOPMENT PROGRAMME (1978-1980)

(1) Imported materials

Cement	5,300 tons
Round bar reinforcement	2,000 tons
Bending wire	23 tons
Nails	51 tons
Elastic	1,050 m ²
Prefabricated structures	740 sets
(Gate sets)	
Pump sets	90 sets
Gasoline	400 kl
Light Oil	7,000 kl
Oil # 30	40 kl
# 10	8 kl
# 90	10 kl
Brake oil	4 kl
Grease	7 tons

(2) Local materials (not included in cost estimate)

Timber	2,500 m ³
Sand	8,000 m ³
Gravel	16,000 m ³

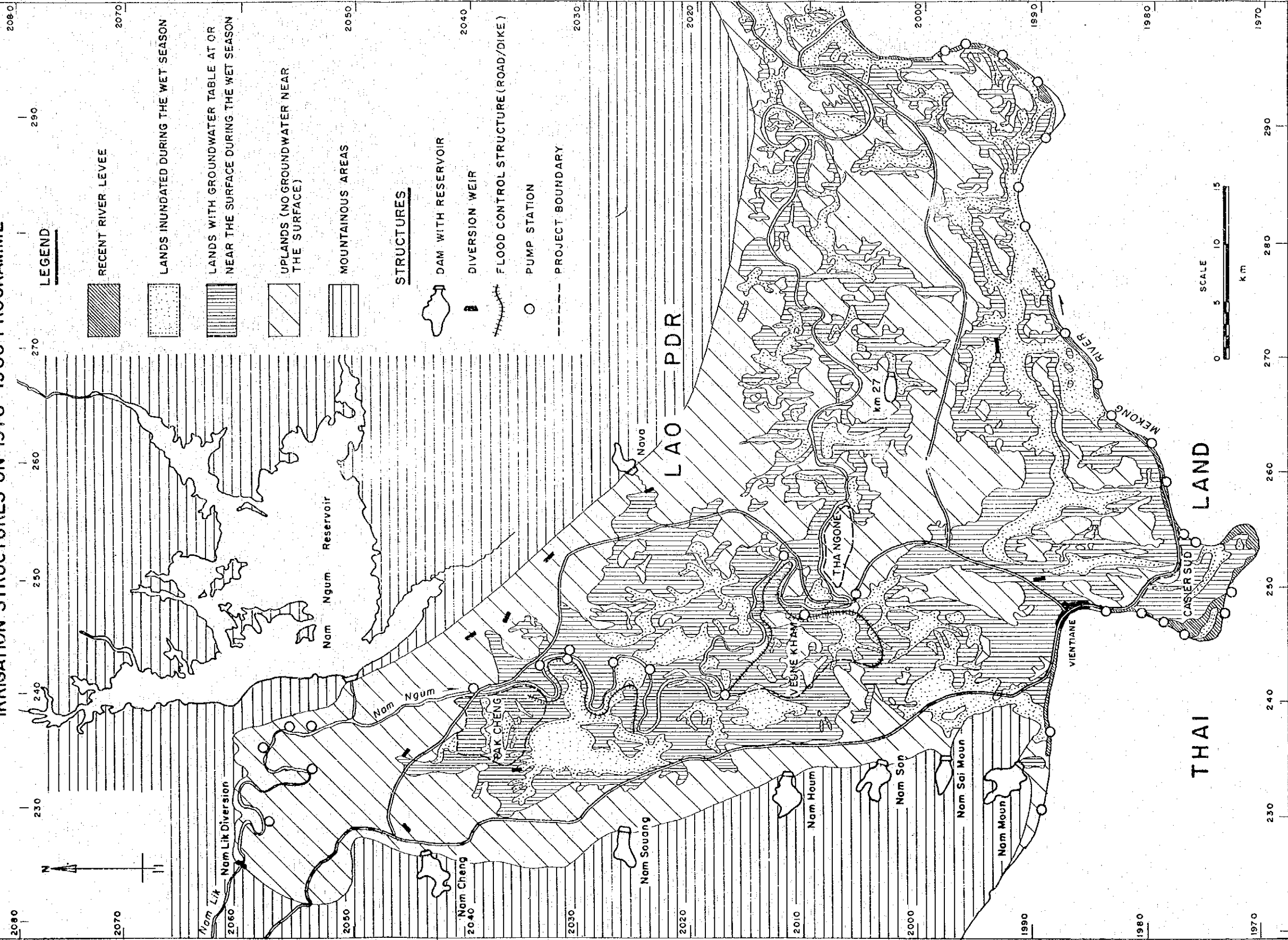
ANNEX II

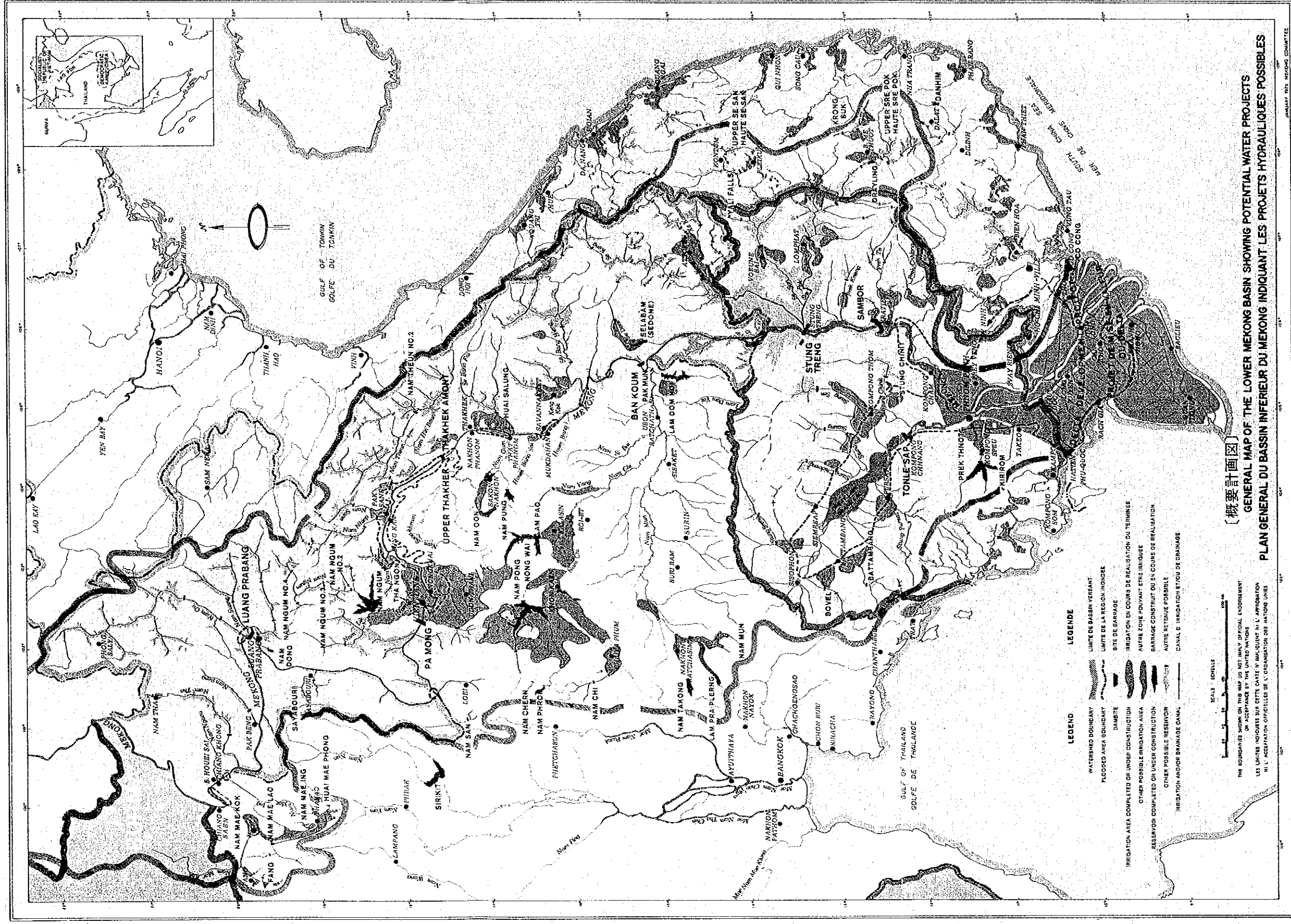
LIST OF EQUIPMENT FOR THE VIENTIANE PLAIN AGRICULTURAL
DEVELOPMENT PROGRAMME

<u>Item</u>	<u>Dimension</u>	<u>No.</u>	<u>Unit Price</u> (US \$)	<u>Cost</u> (US\$)
1. Bulldozer	180 HP, 22t, with ripper	6	81,200	487,200
2. Swampdozer	140 HP, 16 t	2	56,600	113,200
3. Dragline	0.8 m ³ , 100 HP	2	83,000	166,000
4. Back Hoe	0.35 m ³ , 75 HP	2	39,600	79,200
5. Motor scraper	6 m ³ , 210 HP × 2	4	85,800	343,200
6. Track type shovel	1.6 m ³ , 140 HP	1	52,400	52,400
7. Wheel type shovel	1.6 m ³ , 105 HP	1	45,200	45,200
8. Motor grader	3.7 m, 118 HP	2	43,200	86,400
9. Tired roller	8~20 t, 85 HP	2	28,600	57,200
10. Tamping roller	7.5~15 t	2	25,600	51,200
11. Dump truck	6 t, 140 HP	10	14,000	140,000
12. Cargo truck	6 t, 130 HP	2	12,900	25,800
13. Water tank truck	6500 l.	2	18,500	37,000
14. Trailor	20 t, low bed type	1	45,900	45,900
15. Truck with crane	3 t	1	8,300	8,300
16. Jeep		2	8,000	16,000
17. Pick-up type car		2	6,000	12,000
18. Concrete mixer	0.5 m ³	4	13,800	55,200
19. Concrete vibrator	60 mm, 5 HP	5	800	4,000
20. Generator	5 ~ 10 KVA	2	3,600	7,200
21. Plow	heavy duty	5	13,200	66,000
22. Harrow	heavy duty	5	8,300	41,500
23. Pump set	5 HP with gasoline engine	5	600	3,000
24. Diesel engine set (Sub-total)	15 ~ 20 HP, for boat	4	2,100	8,400 (1,951,500)
25. Spare parts	= 20 % of sub-total			348,500
TOTAL				<u>2,300,000</u>

VIENTIANE PROVINCE AGRICULTURAL DEVELOPMENT PROGRAMME

Fig. 1: MAP SHOWING WATER CONTROL AND IRRIGATION STRUCTURES ON 1978 - 1980 PROGRAMME





概要計圖

GENERAL MAP OF THE LOWER MEKONG BASIN SHOWING POTENTIAL WATER PROJECTS
 PLAN GENERAL DU BASSIN INFÉRIEUR DU MEKONG INDICANT LES PROJETS HYDRAULIQUES POSSIBLES

- LEGEND**
- WATERSHED BOUNDARY
 - LIMITES DE BASSIN VERSANT
 - FLOODED AREA BOUNDARY
 - LIMITES DE LA REGION INONDÉE
 - DAM SITE
 - SITE DE BARRAGE
 - IRRIGATION AREA COMPLETED OR UNDER CONSTRUCTION
 - IRRIGATION EN COURS DE RÉALISATION OU TERMINÉE
 - OTHER POSSIBLE IRRIGATION AREA
 - AUTRE ZONE POUVANT ÊTRE IRRIGUÉE
 - RESERVOIR COMPLETED OR UNDER CONSTRUCTION
 - BARRAGE CONSTRUIT OU EN COURS DE RÉALISATION
 - OTHER POSSIBLE RESERVOIR
 - AUTRE RÉSERVOIR POSSIBLE
 - IRRIGATION AND/OR DRAINAGE CANAL
 - CANAL D'IRRIGATION ET/OU DE DRAINAGE

SCALE 1:500,000

THE BOUNDARIES SHOWN ON THIS MAP DO NOT IMPLY OFFICIAL ENDORSEMENT OR ACCEPTANCE BY THE UNITED NATIONS
 LES LIMITES INDICÉES SUR CETTE CARTE N'IMPLIQUENT NI L'APPROBATION NI L'ACCEPTATION OFFICIELLES DE L'ORGANISATION DES NATIONS UNIES

