

Incremental Disposable Income US\$/1.5ha	Annual Water Charge	
	Per farm (US\$)	per ha (US\$)
821.885	63.6	28.5

Based on the above unit charge, total amount of water charge to be collected from all the farmers in the Project area is estimated at US\$75,240 per annum, an amount enough to cover the estimated annual operation, maintenance and replacement cost of the Project. Since it is considered impractical to include the allowances of amortization of the investment cost and payment of interest in the water charges, the Government will have to cover them.

### 8-3-3 Financial cost

The financial cost was estimated on the basis of the current market price as of October 1991 under the condition of the exchange rate of US\$1.00=kip 700.

The financial cost evaluated is US\$12,117 thousand for capital cost, US\$33,819 for annual operation cost, and US\$345,000 and US\$245,000 respectively for every ten years and 25 years of equipment replacement.

### 8-3-4 Repayment of Project Cost

The capital cost required for the implementation of the proposed Project were arranged under the following conditions :

- 1) Capital cost, exclusive of the land acquisition cost, is financed by grant aids of foreign governments;
- 2) Land acquisition cost in the Project is financed by the Government without repayment.

### 8-3-5 Financial Inflow and Outflow

The financial inflow and outflow of the executing organization are estimated assuming that the organization has an independent budget. The inflow is from the irrigation water charge collected from the Project

beneficiaries. The outflow consists of all the financial costs of the Project including the O/M cost and replacement cost of the equipment.

#### 8-4 Justification

The results of the economic and financial analyses on the cost and benefit for the proposed Project are summarized below.

	<u>Economic Value</u>	
Gross Production (ton)	Paddy	8,825
	Peanut	1,237.5
Gross Production Values (US\$)		2,248,170
Gross Production Cost (US\$)		690,930
Net Production Values (US\$)		1,557,240
Benefit (US\$)		1,195,893
Internal Rate of Return (%)		8.05

Farm Budget (Financial base US\$)		<u>Without</u>	<u>With</u>	<u>Increasing</u>
Farm size		<u>Project</u>	<u>Project</u>	<u>Rate</u>
1.0 ha	Gross income	205.2	604.89	2.95
	Disposable income	11.9	353.2	29.0
1.5 ha	Gross income	267,335	1,171.282	4.40
	Disposable income	9.385	821.851	85.7
2.0 ha	Gross income	340.22	1,536.132	4.5
	Disposable income	-1.36	1,076.966	1,007.0

Based on the above, the following justifies the project.

- The Project is economically feasible.
- On the other hand, it may be safe to say that the Project is desirable to the local farmers from the economic point of view. Because, as mentioned, the disposable income of the farmers will

certainly increase to about 20 to 1000 times compared with the present one due to the increase in the yield of crops per ha and cropping intensity as a result of irrigation farming. Therefore, it is not too much to say that the immediate implementation of the project should be furthered.

## **8-5 Socio-Economic Impact**

### **8-5-1 Socioeconomical Impact on a Nationwide Scale**

Paddy production will be increased to about 8825 tons per annum from 2780 tons, it is expected that marketable rice would be about 5600 tons after deducting local consumptions. It would also reduce the annual amount of imported rice. Therefore, the Project will contribute in the improvement of the national economy through:

### **8-5-2 Impact of the irrigation development**

- (1) Continued employment opportunities, as project construction and O/M shall require 30,000 man-days. Furthermore, employees will be able to gain experience, technical know-how, and skillfulness in various working fields. These accumulations could be applied to other future development projects in the country.
- (2) The local standard of living will be improved with the increase and stabilization of household income by improved quality of farm produce and market expansion.
- (3) Improvement and encouragement of cultivation techniques and farm management through the extension of modern farming practice in the demonstration farm.
- (4) Acceleration of farmer's activity with the establishment of the irrigators' association which shall be managed by farmers themselves.
- (5) Promotion of rural development projects as a result of developed standard of living and increased status.

### 8-5-3 Impact of the agro-infrastructure development

- (1) Expansion of radius of interaction and close communication ties among the villagers of the area through the improvement of rural roads, especially in the rainy season, and will contribute to brisking up economic activities in the rural area.
- (2) Improvement of the locals' public health and living environment through stable water supply.
- (3) The training and employment opportunities for women will increase and their status will be improved.

### 8-5-4 Impact of agricultural supporting center

- (1) Strengthening farmers' association

The Government promotes improvement of agricultural structure. In order to achieve it, a development of farmers' association for marketing is indispensable. the center will contribute much to this policy.

- (2) Impact of accumulation of farmers' funds

For activation of farmers' activities, funds accumulated by themselves are necessary. Accumulated funds will promote improvement of quantity and quality of their products, processing industries, machinerization, credit business, expansion of farm lands, etc.

- (3) Raising technology and status of farmers.

Farmers' knowledge, technology will be raised by the participation to the management of the center and training, and it will results the raising of farmers' status.

- (4) Impact of marketing informations

The quantity and quality of the marketing information will be improved, and it will make planned farming possible.

## 8-5-5 Environmental impact of construction of reservoir

### (1) Direct impact

- Creation of resort area
- Supply of return flow for the downstream areas by introducing irrigation during dry season
- Stable water supply for residents around the reservoir
- Creation of fish culture in reservoir
- Flood peak control downstream

### (2) Socio-economic impact

- Including river course, about 470 ha of land will be submerged. It is composed of a flatland along meandering rivers which is gently sloped toward the river course. It consists of a natural forest with scattered expensive tropical trees such as ebony, red sandalwood, and teak, etc., and arable lands with 100 ha of paddy.
- Migration of some residents whose land will be submerged
- Decrease of discharge during rainy season for downstream areas

## CHAPTER 9      RECOMMENDATIONS

The Project is technically sound and economically viable. Further, the implementation of the Project will increase farmers' income, and the establishment of the Center will enforce the farmers' activities, raise their volition for agricultural development and identify an optimum agricultural structure, crops, a method of marketing development. Extension effect for other districts is also expectable.

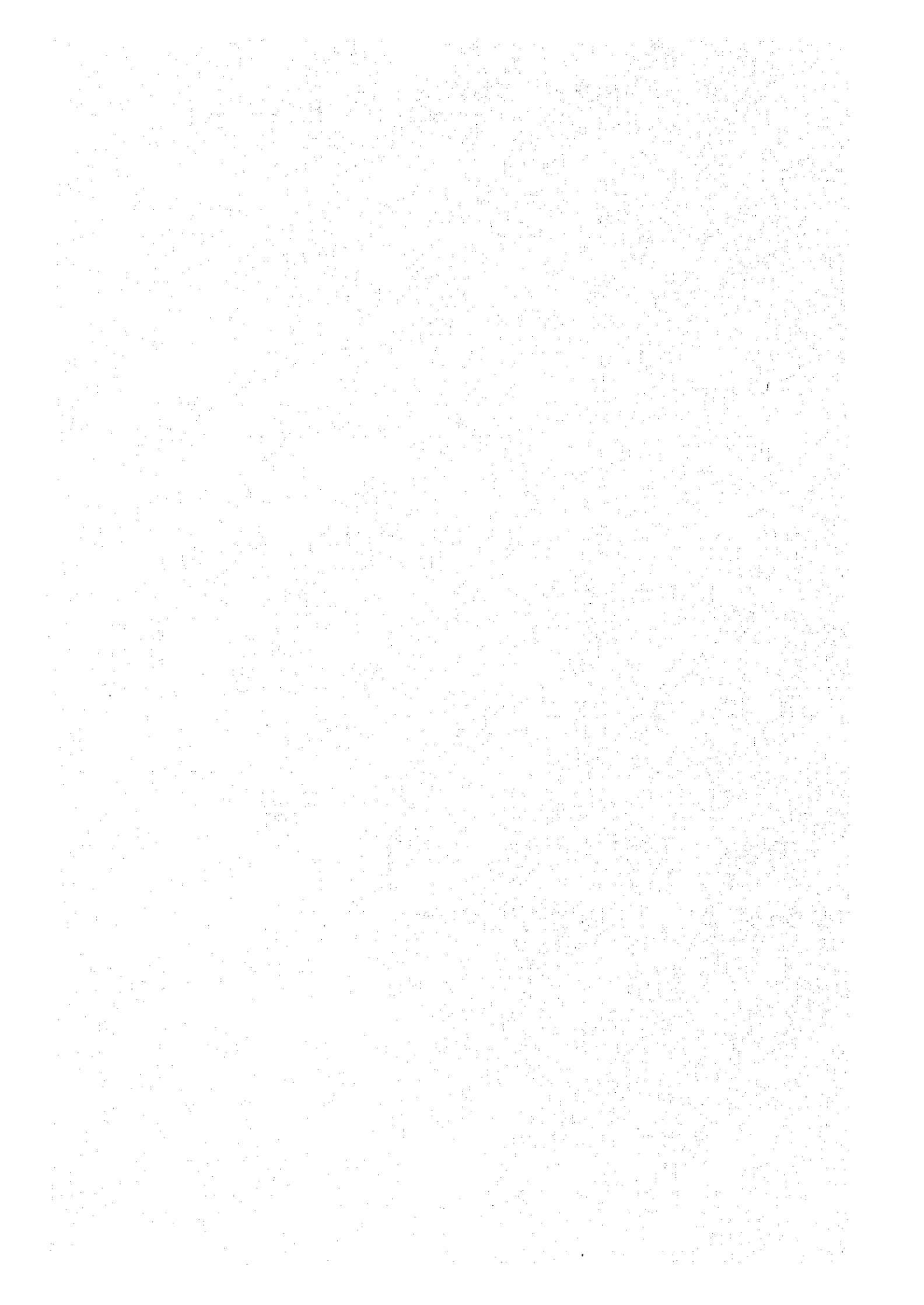
It is desirable to implement the Project and to reach its goal as quickly as possible, and it will promote the agricultural development for other wider areas. The following recommendations are, therefore, made to the Government of Lao PDR.

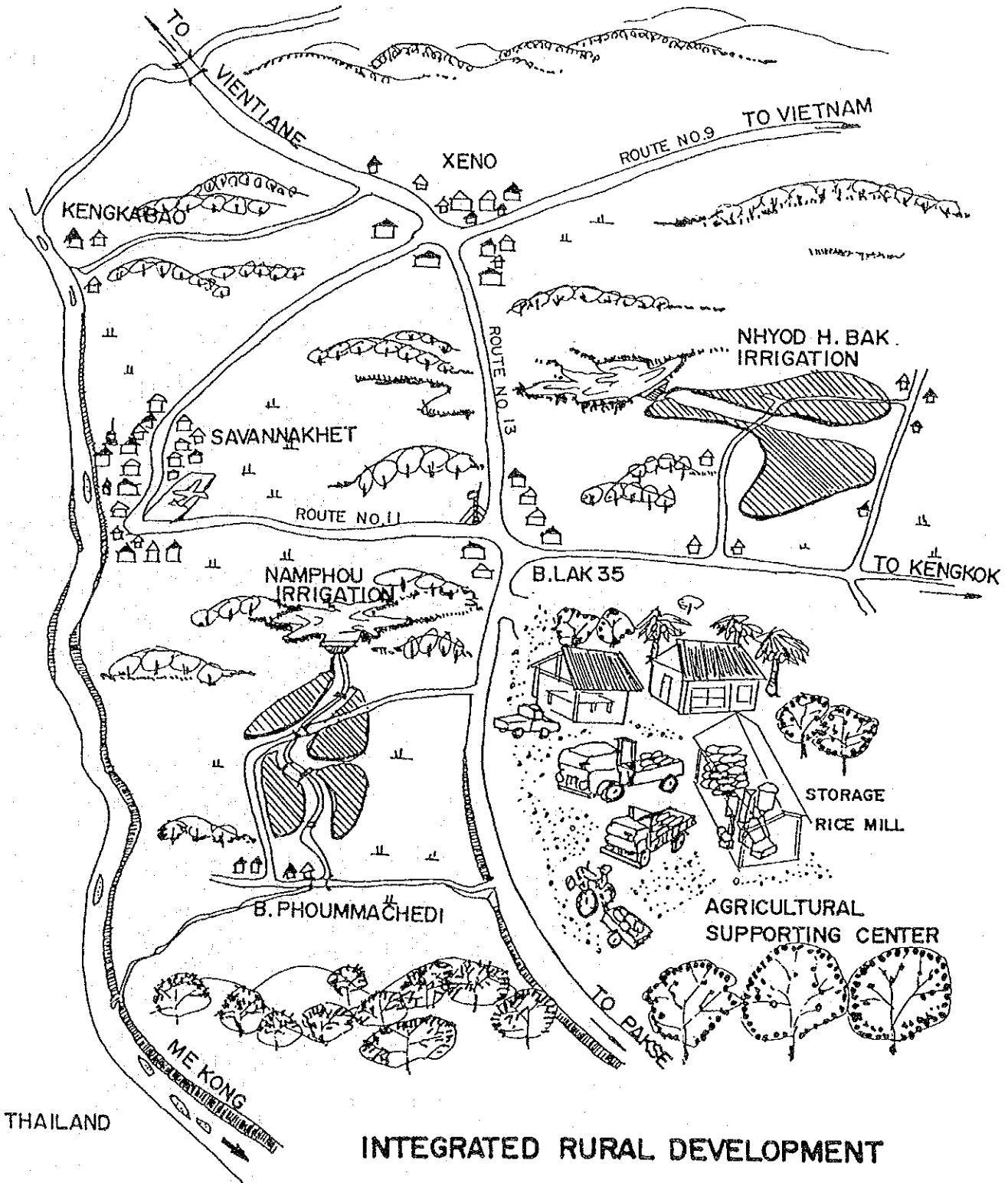
- (1) A study for the financial plan for the project implementation should be made taking into consideration of the foreign aids.
- (2) An organization which has functions of the project implementation should be prepared.
- (3) In order to carry out a smooth implementation and O/M of the project, it is essential to train engineers. Participation in the foreign training programs, etc. should be studied.
- (4) In order to raise the level of farmers' living, the quality and quantity of health and education system should be improved.
- (5) In order to preserve watershed areas of the reservoir, promotion of afforestation in the watershed areas with useful trees or fruit trees are recommendable.
- (6) Promotion of electrification for the project are is recommendable.
- (7) As for the management of the Agricultural Supporting Center, Special Measures shall be taken regarding the Government assistance, credit and taxes, until the center will be normally operational.



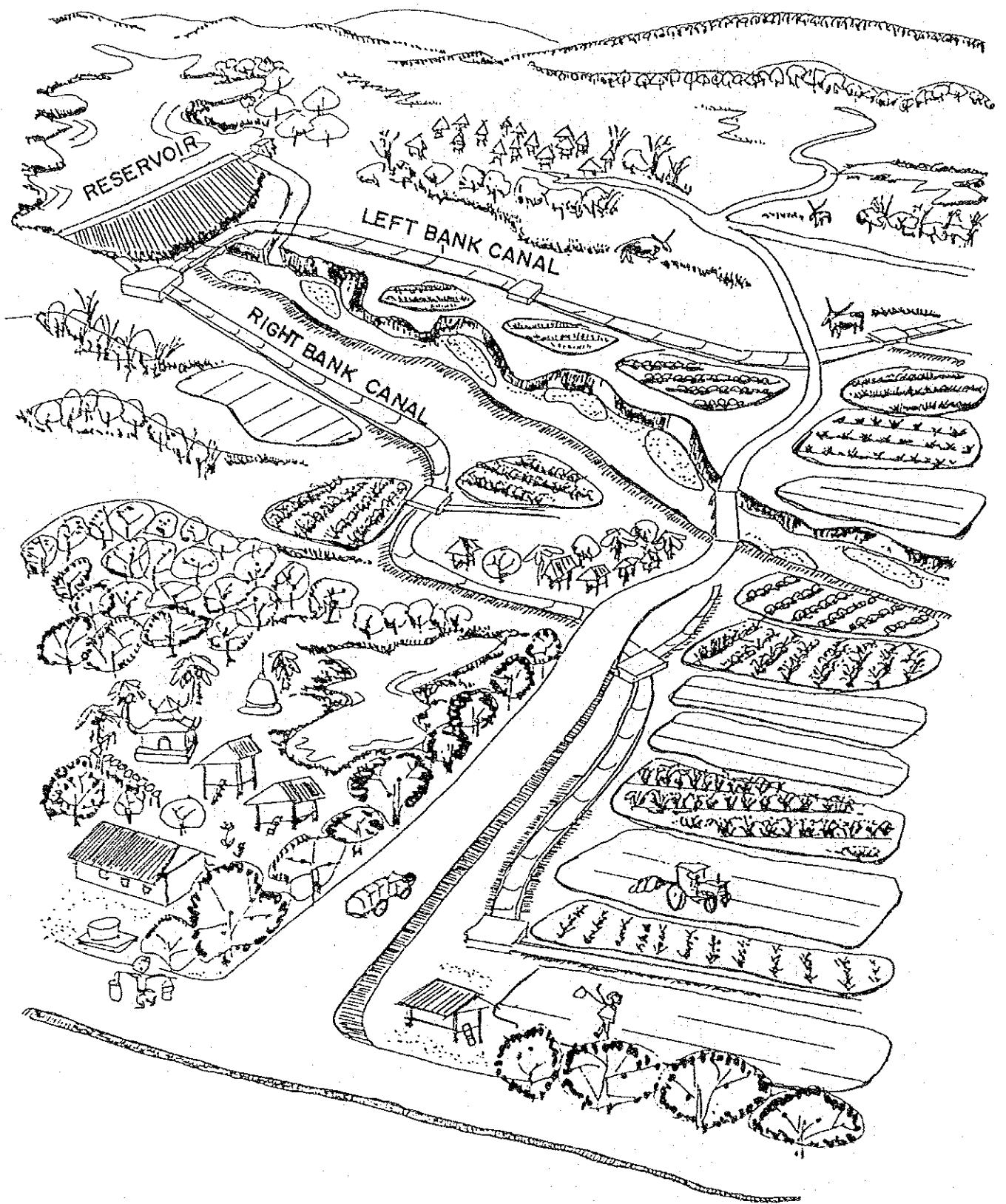
## Table and Figure



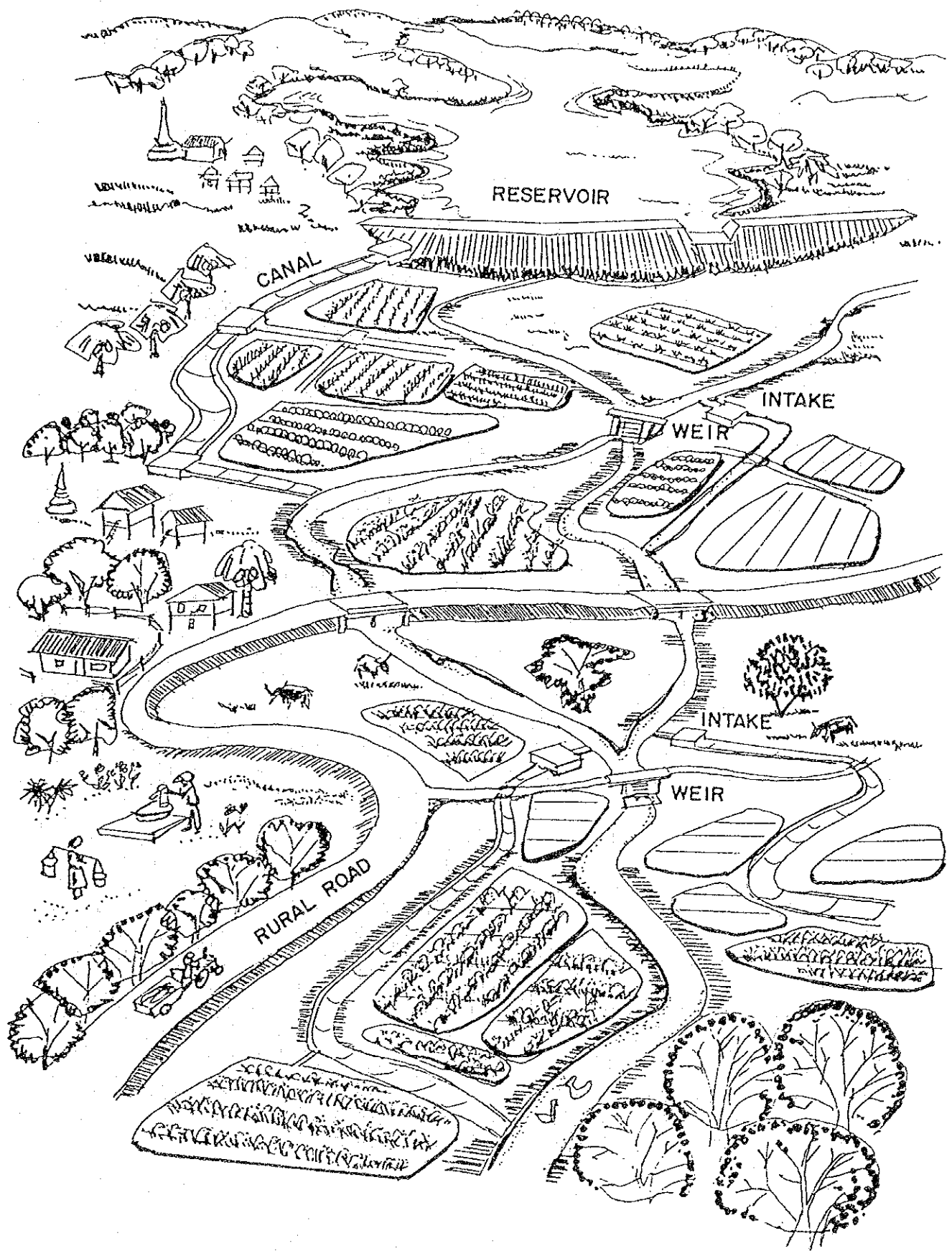




**INTEGRATED RURAL DEVELOPMENT**



NHYOD H. BAK IRRIGATION AREA



NAMPHOU IRRIGATION AREA



Table Monthly Rainfall at Savannakhet (1967~1989)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
1967	0.0	0.0	1.7	71.2	151.3	138.9	161.7	131.7	360.3	13.6	0.3	0.0	1031
1968	0.0	0.0	81.8	22.2	113.4	161.7	129.3	42.7	405.8	57.5	0.0	0.0	1014
1969	0.0	12.8	48.5	76.2	201.7	113.3	367.8	238.3	331.5	24.3	0.4	0.0	1415
1970	0.0	0.5	78.0	83.3	212.3	282.6	200.8	368.9	97.4	22.7	0.0	0.0	1347
1971	0.0	49.4	39.5	93.7	110.1	318.0	340.8	166.4	231.7	54.0	0.0	12.2	1416
1972	0.0	42.4	27.6	90.3	68.3	372.6	347.0	377.1	184.4	168.3	0.6	0.0	1679
1973	0.0	0.0	6.4	68.7	154.3	158.6	194.6	221.3	183.0	24.2	0.0	0.0	1011
1974	2.5	0.0	7.9	128.4	67.5	233.1	272.9	572.2	200.1	27.5	0.7	0.0	1513
1975	0.3	37.5	31.3	13.9	217.6	396.2	305.1	329.2	114.1	48.6	0.0	0.6	1494
1976	0.0	9.6	32.0	145.7	111.6	140.0	289.3	339.0	346.0	206.2	3.8	0.0	1623
1977	2.0	0.0	8.0	81.9	43.1	67.5	117.0	341.6	401.6	5.3	0.0	0.0	1068
1978	0.0	8.8	110.6	28.9	175.0	395.2	271.1	419.9	253.6	2.8	0.0	0.0	1666
1979	0.0	8.0	0.0	99.3	131.5	411.7	88.9	242.4	211.9	0.0	0.0	0.0	1194
1980	0.0	10.7	32.0	122.8	131.4	254.4	249.1	104.6	545.4	170.1	14.3	0.0	1635
1981	0.4	20.6	26.7	93.2	222.4	412.0	229.7	202.6	55.9	86.1	17.4	0.0	1367
1982	0.0	1.0	25.1	60.7	139.8	210.2	68.8	453.1	331.7	166.4	24.6	0.0	1481
1983	4.7	1.4	0.0	78.1	156.4	287.5	67.4	403.9	145.9	176.8	0.0	0.0	1322
1984	0.0	0.0	50.2	146.8	186.4	285.5	265.8	415.4	183.5	129.5	0.0	0.0	1663
1985	36.6	5.0	43.1	49.3	86.1	444.2	118.5	374.3	121.3	128.6	0.0	0.0	1407
1986	0.0	0.0	0.0	123.1	277.3	259.9	158.8	315.9	128.0	107.4	21.9	0.5	1393
1987	0.0	8.3	15.7	40.7	127.7	386.5	247.9	336.6	227.1	63.6	0.0	0.0	1454
1988	0.0	0.4	6.3	72.8	197.5	158.4	164.6	307.9	43.4	189.5	0.0	0.0	1141
1989	0.0	0.0	95.2	103.9	119.2	225.8	234.1	411.6	150.3	148.6	0.0	0.0	1489
	2.0	9.4	33.4	82.4	148.0	266.0	212.8	309.6	228.5	87.9	3.7	0.6	1384

Monthly rainfall at Xeno (1961~1988)

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
1961	0.0	0.0	17.9	32.2	355.8	630.0	178.1	466.1	477.2	146.4	0.0	0.0	2304
1962	0.0	0.9	24.2	58.9	104.6	174.8	402.2	458.8	356.8	27.6	7.8	0.0	1617
1963	0.0	0.0	26.3	14.4	175.1	520.6	272.1	322.2	169.0	44.3	15.7	0.0	1560
1964	0.0	0.0	45.5	82.3	378.8	354.4	142.2	302.4	517.5	122.2	2.8	0.0	1948
1965	0.0	18.5	107.9	108.8	184.7	447.7	301.4	421.5	207.9	108.3	0.0	0.0	1907
1966	0.0	3.6	45.1	195.3	339.2	123.0	268.6	321.3	123.9	25.9	3.9	20.0	1471
1967	0.0	0.0	8.5	125.1	196.8	194.5	411.3	167.1	438.0	10.2	3.8	0.0	1555
1968	0.0	12.7	27.2	65.9	139.0	234.4	110.7	226.2	344.9	31.0	0.0	0.0	1192
1969	4.0	0.0	40.9	39.5	229.1	146.2	520.0	157.3	285.5	48.0	0.0	0.0	1471
1970	0.0	18.1	8.9	90.3	215.2	318.0	156.7	427.7	183.1	27.6	0.0	0.0	1446
1971	0.0	87.5	13.0	37.4	129.1	417.1	330.1	258.5	193.2	41.3	0.7	14.1	1522
1972	0.0	34.9	68.6	106.0	90.9	252.3	614.8	776.2	196.3	321.6	0.2	0.0	2462
1973	0.0	0.0	0.0	37.4	409.9	733.1	818.9	501.9	682.8	67.6	0.0	0.0	3252
1975	12.6	60.4	93.7	49.5	811.9	256.6	269.9	399.8	187.9	215.7	0.0	0.0	2358
1976	0.0	2.0	86.7	121.0	104.5	141.0	436.3	317.9	232.1	55.9	0.0	0.0	1497
1978	0.4	0.8	52.0	41.2	115.5	274.9	232.4	678.0	386.3	3.5	0.5	0.0	1786
1979	0.0	0.0	0.0	55.4	260.8	246.4	86.4	323.9	250.7	0.0	0.0	0.0	1224
1980	0.0	3.7	57.0	44.0	197.7	249.8	220.5	145.3	640.9	77.8	4.4	0.0	1641
1981	0.0	21.2	27.0	64.8	224.2	397.7	242.3	395.5	40.3	147.5	8.8	0.0	1569
1984	0.0	0.0	8.8	68.7	138.6	284.8	372.8	563.2	122.6	193.1	34.5	0.0	1787
1985	17.1	5.0	14.5	49.2	116.0	323.8	203.9	303.0	100.6	118.6	0.0	0.0	1252
1986	0.0	0.0	28.4	39.2	272.7	386.2	189.3	343.5	96.4	145.9	0.0	0.0	1502
1987	0.0	11.9	10.0	26.6	152.9	213.2	346.8	211.7	216.9	45.3	1.9	0.0	1237
1988	0.0	4.0	3.8	131.1	168.3	286.1	179.9	502.6	53.2	154.8	0.0	0.0	1484
1989	0.0	0.0	133.6	190.8	145.7	100.9	445.3	268.7	287.8	134.4	0.0	0.0	1707
1990	5.8	158.3	14.8	41.9	111.3	379.3	361.8	369.4	270.2	77.7	4.9	0.0	1795
	1.5	17.1	37.1	73.7	221.9	311.1	312.1	370.4	271.6	92.0	3.5	1.3	1713

Table Population

	1985	1986	1987	1988	1989	1990
Khanthabouly	98068	100874	103023	106143	109327	113502
Champhon	100229	79467	81279	83078	84449	85383
Songkhone	60964	66742	68464	70244	72664	72657
Outhoumphone	79913	82085	50728	52047	53452	59153
Atsaphangthong	69690	72836	74351	76136		82047
Phine	43388	44897	45929	46985	34633	35263
Seipon	37999	39444	40190	40994	41814	41914
Nong	13736	14415	14694	14996	15456	15539
Thapangthong	21547	20290	21198	21622	21197	21599
Sonbouly	no data	28068	28773	29492	30912	31753
Saybouly	no data	no data	33423	34292	36028	37632
Nayon	no data	no data	no data	no data	13432	15019
Total						611461
Thakehk						55382
Nongbok						43195

Area, Population 1990

	AREA	%	POPULATION	%	FAMILY	%
A-KHANTHABOULY	1,278	5.8	113,502	18.6	17,315	19.7
B-CHAMPHONE	1,251	5.7	85,383	14.0	12,418	14.1
C-SONGKHONE	1,647	7.5	72,657	11.9	12,411	14.1
D-OUTHOUMPHONE	1,114	5.0	59,153	9.7	9,865	11.2
E-ATSAPANGTHONG	3,074	13.9	72,047	13.4	12,728	14.5
F-SAYBOULY	1,016	4.6	37,632	6.2	6,072	6.9
G-SONBOULY	1,240	5.6	31,753	5.2	4,505	5.1
H-OTHERS	11,460	51.9	129,334	21.2	12,728	14.5
TOTAL	22,050		611,461		88,042	

Table Rice Production

District	Harvested Area (ha)	Production (t)	Yeild (t/ha)
Khanthabouly	11,333	60,599	2.7
Champhon	17,227	39,622	2.3
Songkhone	11,330	28,326	2.5
Outhoumphone	16,276	40,689	2.5
Atsaphangtohng	11,662	27,988	2.4
Sonbouly	5,714	14,285	2.5
Saybouly		NO DATA	
Thakhek	6,180	16,233	2.6
Nongbok	10,273	29,278	2.9
Savannakhet	90,588	234,297	2.6
Khammouane	40,984	107,169	2.6
Lao PDR	641,632	1,450,266	2.3
(1987)			
Khanthabouly	11,004	31,363	2.8
Champhon	17,857	47,321	2.6
Songkhone	10,036	28,602	2.8
Outhoumphone	8,731	23,138	2.6
Atsaphangthong	12,522	32,420	2.5
Sonbouly	5,166	14,723	2.8
Saybouly		NO DATA	
Thakhek	6,925	18,005	2.6
Nongbok	7,128	19,959	2.8
Savannakhet	92,401	233,612	2.5
Khammouane	32,451	82,189	2.5
Lao PDR	556,437	1,215,511	2.2



Table Rice Production (Cont.)

District	Harvested Area (ha)	Production (t)	Yeild (t/ha)
Khanthabouly	6,500	10,573	1.1
Champhon	8,900	16,285	1.5
Songkhone	8,500	10,995	1.5
Outhoumphone	7,400	11,100	1.5
Atsaphangtohng	8,400	10,080	1.2
Sonbouly	3,500	5,950	1.7
Saybouly	5,700	8,550	1.5
Thakhek	4,884	7,211	1.5
Nongbok	7,705	10,787	1.4
Savannakhet	89,003	94,016	1.1
Khammouane	22,080	34,076	1.5
Lao PDR	544,828	1,003,383	1.8

(1989)

Khanthabouly	10,570	30,133	2.8
Champhon	16,285	47,063	2.8
Songkhone	10,995	31,885	2.9
Outhoumphone	8,964	25,188	2.8
Atsaphangthong	12,625	35,602	2.8
Sonbouly	5,176	15,010	2.9
Saybouly	8,240	22,248	2.7
Thakhek	7,663	19,158	2.5
Nongbok	11,750	30,550	2.6
Savannakhet	89,003	247,613	2.8
Khammouane	22,080	98,572	2.5
Lao PDR	544,828	1,404,103	2.4

Table Rice Production (Cont.)

(1990)

District	Harvested Area (ha)	Production (t)	Yeild (t/ha)	Production per capita (kg)
Khanthabouly	10,129	32,122	3.2	303
Champhon	15,074	47,138	3.1	610
Songkhone	9,740	29,570	3.0	431
Outhoumphone	8,970	26,015	2.9	473
Atsaphangtohng	12,287	31,011	2.5	392
Sonbouly	4,442	13,220	3.0	431
Saybouly	7,004	19,646	2.8	530
Thakhek	7,264	19,977	2.8	361
Nongbok	10,703	29,539	2.8	684
Savannakhet	85,840	235,877	2.8	420
Khammouane	45,010	117,868	2.6	441
Lao PDR	596,160	1,508,402	2.5	362

Table Cropping Are (ha)

District	Paddy				Maze	Cassava	Peanut
	Rainfed	Floating	Upland	Irrigated			
1989							
Khanthabouly	10,573	-	40	172	500	300	455
Champhon	16,285	-	-	700	200	90	50
Songkhone	10,995	-	-	195	200	90	6
Outhoumphone	8,964	-	-	-	100	90	35
Atsaphangthong	12,625	-	203	20	300	90	20
Sonbouly	7,686	-	26	55	60	100	55
Saybouly	8,240	-	-	62	500	250	70
Nongbok	10,046	150	-	75	-	-	-
1990							
Khanthabouly	10,985	-	13	215	55	30	150
Champhon	17,412	-	-	818	100	-	10
Songkhone	11,460	-	-	190	60	-	6
Outhoumphone	9,300	-	-	-	15	-	2
Atsaphangthong	12,850	-	128	60	20	10	10
Sonbouly	5,553	-	16	55	10	10	1
Saybouly	8,336	-	-	-	69	-	3
Nongbok	10,553	150	-	60	5	5	-

Table Cropping Are (ha)

District	Mungobean	Vegetable	Root Crops	Tobacco	Cotton	Sugar Cane	Sesame
1989							
Khanthabouly	35	100	50	50	20	35	-
Champhon	15	100	10	30	-	5	-
Songkhone	9	100	10	310	230	6	-
Outhoumphone	-	50	10	30	5	-	5
Atsaphangthong	-	50	10	10	-	-	-
Sonbouly	-	25	10	10	20	-	-
Saybouly	-	100	50	90	30	5	-
Nongbok	-	160	-	160	10	10	-
1990							
Khanthabouly	35	100	15	50	10	32	5
Champhon	5	75	20	-	-	4	-
Songkhone	9	120	90	310	200	6	138
Outhoumphone	-	50	2	-	3	5	4
Atsaphangthong	1	-	10	10	-	-	-
Sonbouly	-	10	2	90	10	5	-
Saybouly	2	30	2	100	10	5	-
Nongbok	-	121	2	63	-	10	-

Table Land Classification

Land category	Land Use	Factor Land capability class	*1										Area (ha)					
			t	d	g	p	i	r	w	(w)	f	n		i	s	d	r	
Dissected isolated hills. erosion surface and mountains	Paddy field	IV *2 gp fna *3	-	III	IV	IV	III	II	-	-	-	IV	IV	I	IV	-	-	112,100 (9%)
	Normal upland field	IV gp (w) fna se	-	III	IV	IV	-	-	III	IV	IV	IV	I	IV	IV	IV	IV	
High terraces of pleistocene deposit	Land under permanent crops	IV gp (w) fna se	-	III	IV	IV	-	-	III	IV	IV	I	IV	IV	IV	IV	IV	
	Paddy field	III l fna	II	I	I	I	III	-	-	-	III	III	I	III	-	-	-	
High reverine terrace old alluvium	Normal upland field	IV (w) e	III	II	I	I	-	-	III	IV	III	III	I	III	I	IV	194,100 (16%)	
	Land under permanent crops	III t w (w) fna se	III	II	I	I	-	-	III	III	III	III	I	I	I	III		
Lower riverine terraces of semi recent alluvium	Paddy field	III n	I	I	I	I	II	II	-	-	II	II	II	II	-	-		
	Normal upland field	IV (w)	I	I	I	I	-	-	III	IV	II	III	I	III	I	III	240,300 (20%)	
Flat Lowland at recent alluvium	Land under permanent crops	III w n	I	I	I	I	-	-	III	II	II	III	I	II	I	I		
	Paddy field	III n a	I	I	I	II	II	-	-	-	II	III	I	-	-	-		
Land under permanent crops	Normal upland field	IV w (w) a	I	I	I	II	-	-	IV	IV	II	III	I	IV	I	III	208,000 (17%)	
	Land under permanent crops	IV w a	I	I	I	II	-	-	IV	III	II	III	I	IV	I	I		

1,200,100

Remarks #1  
 t : thickness of topsoil  
 d : effective depth of soil  
 g : gravel content in topsoil  
 p : easiness of plowing  
 l : permeability under submerged condition  
 r : state of redox potential  
 w : wetness of land rainy season

\*2 IV is unsuitable land  
 \*3 gp fna are limiting factors

Table Existing Irrigation Facilities

No.	Project	Type	Water Source	Village	District	Survey Design	Comple. Year	Res.2) (ha)	Wet 3) (ha)	Dry 4) (ha)	Remark
1	H. Makmi	Dam	H. Makmi	Laonat	Champhon	80	80	100	-	50	inundation in rainy season
2	Khamsenkhek	Dam	Khamsenkhek	Bak	Champhon	79	83	2	3	-	for the use of daily life
3	Nongdeun	Dam	Nongdeun	Kengkong dong	Champhon	82	82	100	100	30	-
4	Koutkhene	Dam	Koutkhene	Taleao	Champhon	81	82	90	-	-	50inundation in rainy season
5	Nongkan	Dam	Nongkan	Kengkong	Champhon	77	78	2	-	-	for the use of daily life
6	Lambong	Dam	H. Lambong	Lambong	Champhon	77	78	1	-	-	for the use of daily life
7	H. Sangkhao	Dam	H. Sangkhao	Pakxong	Songkhone	84	85	10	-	-	for the use of daily life
8	H. Tamleum	Gate	H. Tamleum	Sabusai	Songkhone	77	78	-	-	-	-damaged, no use
9	H. Bo	Gate	H. Bo	Nake	Khanthabouly	76	77	-	-	-	-damaged, no use
10	H. Sompoy I	Gate	H. Sompoy	Naseng	Khanthabouly	81	82	-	50	20	-
11	H. Sompoy II	Gate	H. Sompoy	Naseng	Khanthabouly	82	84	-	-	-	-damaged, no use
12	Bungva	Dam	H. Bungva	Bungva	Khanthabouly	84	84	100	100	50	-
13	Naseng	Pump	H. Sompoy	Naseng	Khanthabouly	84	84	1	-	-	-damaged, no use
14	Nake	Pump	Mekong	Nake	Khanthabouly	79	87	1	100	50	-
15	Tasano	Pump	Mekong	Tasano	Khanthabouly	78	89	1	60	60	-
16	H. Chane	Gate	H. Chane	Muangphoum	Khanthabouly	77	78	1	-	-	-damaged, no use
17	H. Papak	Gate	H. Papk	Dongphao	Saybouly	78	78	1	100	50	-
18	H. Saleung	Gate	H. Saleung	Phonthon	Saybouly	78	79	1	100	50	-
19	H. Ke	Gate	H. Ke	Phakpheua	Saybouly	76	77	1	100	50	-
20	H. Phinh	Gate	H. Phinch	Tahbo	Saybouly	76	77	1	100	50	-
21	H. Kangpa	Gate	H. Kangpa	Kangpa	Saybouly	77	78	1	100	50	-
22	H. Souy	Dam	H. Souy	Donengeng	Champhon	86	87/90	1,600	-	-	600inundation in rainy season
23	H. Bak	Dam	H. Bak	Houamong	Champhon	77/78	89/1-2	400	-	-	200inundation in rainy season
24	Nong Lath	Dam	Nong Lath	Kengkong Cone	Champhon	87	89/2-3	200	-	-	100inundation in rainy season
25	H. Po	Dam	H. Po	Mayvangsung	Champhon	86	86/87	50	30	10	-
26	H. Makngao	Dam	H. Makngao	May	Champhon	86	87/2-6	100	80	30	-
27	H. Nokkok	Weir	H. Nokkok	Nokkok	Champhon	88	89/1-3	-	50	20	-
28	H. Sala	Gate	H. Sala	Songkhone	Songkhone	88	89/4-5	-	100	30	-
29	H. Ngang	Weir	H. Ngang	Pakxong	Songkhone	85	86/1-5	-	10	2(5ha) 5)	-
30	H. Kok	Weir	H. Kok	Nongbayatha	Songkhone	87	87/3-88	-	20	3(10ha) 5)	-
31	H. Mong	Weir	H. Mong	Sisavang	Songkhone	88	89/3-7	-	50	6(20ha) 5)	-
32	H. Lahang	Weir	H. Lahang	Nahangnoy	Atsaphanthong	87	87/12-8	-	70	7	-
33	Kengkong Bok	Weir	H. Chelamong	Nanokkhiane	Atsaphanthong	88	88/5-6	-	50	3(10ha) 5)	-
34	H. Chelamong	Weir	H. Chelamong	Chelamong	Atsaphanthong	88	89/2-3	-	70	6(20ha) 5)	-
35	H. Phung	Weir	H. Phung	Hineciau	Atsaphanthong	89	90/3-4	-	30	3(10ha) 5)	-
36	Nong Sim	Dam	Nong Sim	Nongphum	Sonbouly	86	87/2-4	100	-	-	50Inundation in rainy season
37	H. Xom	Weir	H. Xom	Nongsavang	Sonbouly	89	89/4-7	-	20	2(5ha) 5)	-
38	H. Bong	Weir	H. Bong	Ponetume	Outhomphone	90	90/5-6	-	30	4(15ha) 5)	-
39	Xe Bangfai	Pump	Xe Bangfai	Tonheng	Saybouly	86/87	89/90	-	550	550	-
40	H. Sikhai	Weir	H. Sikhai	Sikhai	Saybouly	86	87/12-8	-	100	50	-
41	Nongtao	Dam	Nongtao	Ponesim	Khanthabouly	86	87/1-4	100	200	150	-
42	H. Hauasang	Weir	H. Hauasang	Thahouasang	Khanthabouly	90	90/6-7	-	10	2(5ha) 5)	-
43	Kouthapo	Dam	H. Thong	Phonthan	Khanthabouly	87	88	50	50	30	-
44	Nabo	Pump	Mekong	Nabo	Thakhek 1)	85	86	-	-	-	-out of order, no use
45	Choumcheng	Pump	Mekong	Choumcheng	Thakhek 1)	85	86	-	-	-	-out of order, no use
46	Mouangkhaio	Pump	Mekong	Mouangkhaio	Thakhek 1)	86	87	-	600	340	-
47	Koutchap	Dam	Nongkout	Koutchap	Thakhek 1)	82	82	30	-	-	60for the use of daily life
48	H. Phou	Gate	H. Phou	Songmuang	Thakhek 1)	86	87	-	150	50	-
49	H. Khe	Gate	H. Khe	Sokbo	Thakhek 1)	86	87	-	200	70	-
(Total)								3,035	3,383	2,938	

Source : Department of Agriculture & Savannakhet and Khammouane Province

- Note 1) District of Khammouane Province  
 2) Reservoir Area  
 3) Irrigable Area in Wet Season for Paddy  
 4) Irrigable Area in Dry Season for Paddy  
 5) Irrigable Area in Dry Season for Vegetable by Manual Watering

Table Proposed Land Use (Study Area and Zone Area)

No.	Kind of land use	Study area total		Xe Bangfai Zone		Xe No Zone		Savanakhet Zone		B. Lak 35 Zone		Paxong Zone		Donghen Zone	
		Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed	Present	Proposed
1	Roined paddy field	33,948	85,645	19,455	5,998	9,250	7,060	7,196	1,913	25,741	8,547	11,200	10,430	12,803	0
2	Irrigated paddy field	2,106	66,853	753	14,210	50	2,240	127	5,410	869	18,063	260	1,030	47	25,900
2-1	Rainy paddy field	0	23,456	0	982	0	1,061	0	2,173	0	6,681	0	504	0	12,064
2-2	Paddy, double cropping field	1,679	33,388	673	11,757	0	879	87	2,337	733	8,182	140	226	46	10,007
2-3	Rainy paddy, Dry upland Crops field	427	10,000	80	1,471	50	300	40	900	136	3,200	120	300	1	3,829
3	Total paddy field	87,751	100,801	20,208	20,208	9,300	9,300	7,323	7,323	26,610	26,610	11,460	11,460	12,850	25,900
4	Rais field	143	0	0	0	6	0	7	0	0	0	0	0	130	0
5	Normal upland field	1,750	3,893	269	500	28	100	191	400	371	800	819	1,300	72	793
6	Land uner permanent crops field	600	3,600	100	300	100	700	75	300	225	800	50	300	50	500
7	Total upland field	2,493	7,493	369	800	128	800	272	700	603	1,600	869	2,300	252	1,293
8	Total cultivated land	90,244	108,294	20,577	21,008	9,428	10,100	7,595	8,023	27,213	28,210	12,329	13,760	13,102	27,193
9	Forest and other lands	1,109,856	1,091,806	219,123	218,692	101,972	101,300	62,905	62,477	279,187	278,190	152,321	150,940	294,298	280,207
10	General total	1,200,100	239,700	111,400	70,500	306,400	164,700	307,400	307,400	164,700	307,400	164,700	307,400	307,400	307,400
11	Ratio (%)	97.2	93.1	98.2	96.2	98.6	92.1	96.4	91.3	97.8	94.3	93.0	83.3	98.9	95.2
12	7/8 (%)	2.8	6.9	1.8	3.8	1.4	7.9	3.6	8.7	2.2	5.7	7.0	16.7	1.9	4.8
13	2/3 (%)	2.4	66.3	3.7	70.3	0.5	24.1	14.2	73.9	0.5	67.9	2.3	9.0	0.4	100.0
14	8/10 (%)	7.6	9.0	8.6	8.8	8.5	9.1	10.1	11.4	8.9	9.2	7.5	8.4	4.3	8.8

(Unit: ha %)

Table (1) Irrigation Planning

No.	Project	Type	Water Source	Village	District	Survey Design	Compl. Year	Res.2) (ha)	Wet 3) (ha)	Dry 4) (ha)	Remark *(constructio by E. or F.)
Small to Medium Scale Project											
1	H. Sakhen	Res.	H. Sakhen	Phummachedy	Khanthabouly	88/-	92	40	40	20 = H. Chanè, *(E)	
2	Koutapo (2)	Res.	H. Thong	Phongthang	Khanthabouly	88/-	91	150	200	100*(F)	
3	H. Nambo	Res.	H. Nambo	Chomcheng	Khanthabouly	88/-	95	360	650	330*(F)	
4	H. Kasen	Res.	H. Kasen	Khaokat	Khanthabouly	88/-	94	220	420	210*(E)	
5	Sopchiang	Weir	H. Phakkha	Phakkha	Khanthabouly	88/-	95	-	10	5*(F)	
6	H. Thapho	Weir	H. Thapho	Thapho	Khanthabouly	88/-	94	-	10	5*(F)	
7	Namphou	Res.	H. Xay, Namphu	Phummachedy	Khanthabouly	88/-	92	-	600	150*(E), Reservoir & 5 Weirs	
8	Phakkha	Pump	Mekong	Phakkha	Khanthabouly	89/90	91	-	250	250*(E)	
9	Thapho	Pump	Mekong	Thapho	Khanthabouly	89/90	91	-	200	200*(E)	
10	Phummachedy P.	Res.	H. Khamgong	1)	Khanthabouly	91/-	94	1,650	1,080	540survey plan, P. = Plain, *(E)	
11	H. Cheao	Res.	H. Cheao	Houy Xay	Champhon	88/-	91	550	0	440*(E)	
12	H. Kamsyda	Res.	H. Kamsyda	Kamsyda	Champhon	88/-	94	110	210	110 = H. Makmi, *(F)	
13	Sokkhambalay	Res.	Sokkhambalay	Nonging	Champhon	88/-	92	90	210	110 = H. Thaplae, *(F)	
14	H. Kadane	Weir	H. Kadane	Kadane	Champhon	88/-	93	-	50	20*(F)	
15	H. Xiangxoum	Weir	H. Xiangxoum	Xiambxoum	Champhon	88/90	95	-	25	10*(F)	
16	H. Takiang	Weir	H. Takiang	Taleo	Champhon	88/90	94	-	25	10 = H. Kateng, *(F)	
17	H. Taleo	Weir	H. Taleo	Taleo	Champhon	88/90	94	-	70	30*(F)	
18	H. Bong	Res.	H. Bong	Lao Soulinga	Champhon	88/-	95	120	50	30branch of H. Khao, *(E)	
19	H. Kalang (2)	Weir	K. Kalang	Donedeng	Champhon	88/90	95	-	50	20no intake, *(F)	
20	H. Phangvu	Res.	H. Phangvu	Mouangkhai	Champhon	88/-	91	130	210	110*(E)	
21	Nhyod H. Bak	Res.	H. Bak	Khamthao	Champhon	88/82	94	570	1,000	500*(E)	
22	Thongxakun	Pump	H. Souy	Xakhun	Champhon	89/90	92	1,200	300	300*(E)	
23	Thongbak	Pump	H. Bak	Kengkokdong	Champhon	88/90	91	400	210	210*(E) *(E)	
24	H. Louang	Res.	H. Louang	1)	Champhon	91/-	95	160	320	160 = H. Khanoun, survey Plan	
25	H. Thouat	Res.	H. Thouat	1)	Champhon	91/-	94	500	460	230survey plan, *(E)	
26	H. Phaleng	Res.	H. Phaleng	1)	Champhon	91/-	94	500	790	400survey plan, *(E)	
27	H. Kalang (2)	Weir	H. Kalang	Kalang	Champhon	-	-	-	50	205, *(F)	
28	H. Toumpang	Res.	H. Toumpang	Nongboua	Atsaphanthong	88/-	95	110	160	80*(F)	
29	H. Khambou	Res.	H. Khambour	Phonebok	Atsaphanthong	89/90	91	380	500	250dam, spillway only, *(E)	
30	H. Nga	Res.	H. Nga	Chelamong	Atsaphanthong	89/-	92	100	70	40*(E)	
31	H. Ka	Res.	H. Ka	Donepalay	Atsaphanthong	89/-	95	80	130	70*(E)	
32	H. Tabonghak	Res.	H. Tabonghak	Nongpaksong	Atsaphanthong	89/-	93	430	400	200*(E)	
33	H. Nalai	Res.	H. Nalai	Nalaikhok	Atsaphanthong	89/-	93	270	230	120*(E)	
34	H. Pongdeng	Res.	H. Pongdeng	Kalong	Atsaphanthong	89/-	94	290	570	290*(E)	
35	H. Sokkathoum	Res.	H. Sokkathoum	Phoxay	Atsaphanthong	89/-	94	50	120	60blanch of H. Hoy, *(E)	
36	H. Klong	Res.	H. Klong	Klong	Atsaphanthong	89/-	95	290	690	350*(E)	
37	H. Ngut	Res.	H. Ngut	Nalaidong	Atsaphanthong	89/-	95	270	310	160*(E)	
38	Vang. Khonh	Pump	Xe Champon	Donghen	Atsaphanthong	90/-	91	-	50	30Vanghouang Kohnh, *(F)	
39	H. Khene	Res.	H. Khene	Laykatha	Atsaphanthong	90/-	92	110	190	100*(E)	
40	H. Na	Weir	H. Na	Phonbok	Atsaphanthong	88/90	95	-	50	10*(F)	
41	H. Kasine	Weir	H. Kasine	Phon-ngam	Atsaphanthong	88/90	92	-	50	20no intake, *(F)	
42	H. Kok (2)	Weir	H. Kok	Nongbouatha	Songkhone	88/90	93	-	50	20*(G)	
43	H. Vay	Weir	H. Vay	Nabo	Songkhone	88/90	94	-	20	10 = H. Khop, H. Mong, *(F)	
44	H. Nonghy	Weir	H. Nonghy	Kouthy	Songkhone	88/90	95	-	60	20 = H. Sapheng, *(F)	
45	H. Tamleum	Res.	H. Tamleum	Sabouxai	Songkhone	88/-	93	310	720	360*(E)	
46	H. Xay (1)	Weir	H. Xay	Gnangkham	Saybouly	89/90	91	-	50	10under construction, *(F)	
47	H. Xay (2)	Gate	H. Xay	Gnangkham	Saybouly	89/-	91	-	50	20 = H. Nakoktan, *(F)	
48	H. Phe	Gat	H. Phe	Somsoat	Saybouly	89/-	93	-	70	30*(F)	
49	H. Salung	Gate	H. Salung	Phonthan	Saybouly	89/-	93	-	100	50rehabilitation, &(F)	
50	H. Sikhai (2)	Gate	H. Sikhai	1)	Saybouly	89/-	91	-	100	50*(F)	

(Continued)

Source : Department of Agriculture & Forestry in Savannakhet and Khammouane Province

- Note 1) Not yet identified  
 2) Res. = Reservoir  
 3) Irrigable Area in Wet Season for Paddy  
 4) Irrigable Area in Dry Season for Paddy  
 5) Proposed by Mekong Committee  
 \*(E) : Enterprise, \*(F) : Farmers



Table (2) Irrigation Planning

No.	Project	Type	Water Source	Village	District	Survey Design	Comple. Year	Res.2 (ha)	Wet3 (ha)	Dry 4 (ha)	Remark *(constructio by E, or F.)
51	H. Thamhiang	Gate	H. Tahmhiang	1)	Saybouly	89/-	91	-	100	508(E)	
52	H. Phiphut	Gate	H. Phiphut	Xiangkhai	Saybouly	89/90	91	-	100	70	under construction, *(E)
53	Pumping St.	Pump	Xe Bangfai	1)	Saybouly	90/91	91	-	3,500	3,500	P. Stations, 6), 7), *(E)
54	H. Hinelat	Res.	H. Hinelat	Xaya M. Khoun	Outhomphone	88/-	92	90	100	50*(E)	
55	H. Kipma	Res.	H. Kipma	Kipma	Outhomphone	88/-	91	60	140	70*(E)	
56	H. Xay	Res.	H. Xay	Dongtha	Outhomphone	88/-	95	160	400	200*(E)	
57	H. Xeno	Res.	H. Xeno	Nong Khanhet	Outhomphone	88/-	94	460	480	240*(E)	
58	H. Phanome	Res.	H. Phanome	Phonphang	Outhomphone	88/-	94	570	690	350*(E)	
59	H. Thahao (1)	Res.	H. Thahao	Nakham	Outhomphone	88/-	95	200	350	180*(E)	
60	H. Thahao (2)	Weir	H. Thahao	Phondua	Outhomphone	89/90	92	-	50	10	no intake, *(F)
61	H. Patdeng	Res.	H. Patdeng	Mouang Phong	Sonebouly	88/-	92	10	60	30*(E)	
62	H. Khe	Weir	H. Khe	Dongbone	Sonebouly	88/-	91	-	60	20	= Nong Kout Khe, *(F)
63	H. Xom	Res.	H. Xom	Xouy Xomkok	Sonebouly	88/-	92	40	90	50*(E)	
64	H. Gnang	Res.	H. Gnang	gnang-gnai	Thakhek	-	-	60	100	50*(E)	
65	H. Xeng	Res.	H. Xeng	Nakhomkao	Thakhek	-	-	40	90	50*(E)	
66	H. Sadu	Gate	H. Sadu	Phonsaoe	Nongbok	89/90	91	-	100	50	under construction, *(E)
67	H. Bangkak	Gate	H. Bangkak	Phakpao	Nongbok	89/90	91	-	100	50	under construction, *(E)
68	H. Tung	Res.	H. Tung	Tung	Nongbok	-	-	160	180	90*(E)	
69	Dangtai	Pump	Xe Bangfai	Dangtai	Nongbok	-	-	-	600	600*(E)	
70	Naphoktha	Pump	Xe Bangfai	Naphoktha	Nongbok	-	-	-	1,100	1,100*(E)	
71	Gangkham	Pump	Xe Bangfai	Gangham	Nongbok	-	-	-	450	450*(E)	
72	Namphou	Pump	Xe Bangfai	Namphou	Nongbok	89/90	91	-	300	300	under construction, 6), *(E)
73	Dongkasin	Pump	Xe Bangfai	Dongasin	Nongbok	89/-	91	-	400	400*(E)	
74	Hatxiandi	Pump	Xe Bangfai	Hatxiandi	Nongbok	89/90	91	-	300	300	under construction, 6), *(E)
75	Dongsangam	Pump	Xe Bangfai	Dongsangam	Nongbok	-	-	-	500	500*(E)	
76	Phakitou	Pump	Xe Bangfai	Phakitou	Nongbok	-	-	-	850	850*(E)	
77	Sokbo	Gate	H. Sokbo	Sokbo	Nongbok	89/90	91	-	100	50	under construction, 6), *(E)
78	H. Vay	Gate	H. Vay	Dongkasin	Nongbok	-	-	-	100	50*(E)	
79	H. Sayphay	Gate	H. Sayphay	Dongthai	Nongbok	-	-	-	100	50*(E)	
80	H. Lo	Gate	H. Lo	Dongsangan	Nongbok	-	-	-	100	50*(E)	
81	H. Maemang	Gate	H. Maemang	Hatxayfong	Nongbok	-	-	-	100	50*(E)	
82	H. Naphok	Gate	H. Naphok	Naphok	Nongbok	-	-	-	100	50*(E)	
83	H. Boun	Gate	H. Boun	Hatxiandi	Nongbok	-	-	-	100	50*(E)	
Total (Small to Medium Scale Project)									24,120	16,830	
Large Scale Project											
L.1	H. Sompoy	Res.	H. Sompoy	1)	Khanthabouly	91/-	94	2,200	3,350	1,680	survey plan, *(E)
L.2	H. Xevan	Res.	H. Xevan	Xevan	Champhon	-	-	1,440	2,550	1,280	5), *(E)
L.3	Xe Champhon (1)	Res.	Xe Champhon	1)	Atsaphangthon	91/-	94	1,950	4,780	2,390	survey plan, *(E)
L.4	Xe Xangxoy (1)	Res.	Xe Xangxoy	1)	Atsaphangthon	91/-	94	1,330	5,600	2,800	survey plan, *(E)
L.5	Xe Champhon (2)	Res.	Xe Champhon	1)	Atsaphangthon	-	-	9,600	11,780	5,890	Xe Banhieng No.6, 5), *(E)
L.6	X. Sikhai	Res.	H. Sikhai	Nadeng	Saybouly	89/90	95	710	2,290	1,150	*(E)
L.7	Xe Bangfai P.	Weir	Xe Banfai	1)	S.bouly/N.bok	91/-	94	12,400	11,400	11,400	survey plan, P. = Plain, *(E)
L.8	Xe Xangxoy (2)	Res.	Xe Xangxoy	1)	Sonebouly	-	-	5,100	9,020	4,510	Xe Banhieng No.5, 5), *(E)
Total (Large Scale Project)									50,770	31,100	8)

Source : Department of Agriculture & Forestry in Savannakhet and Khammouane Province

Note 1) Not yet identified

2) Res. = Reservoir

3) Irrigable Area in Wet Season for Paddy

4) Irrigable Area in Dry Season for Paddy

5) Proposed by Mekong Committee

6) Financed by the Ministry of Agriculture and Frestry

7) Under construction for Bungxe (500ha), Kengphousi (300ha)

8) Double counted, 9,420 ha for wet season and 8,720 ha for dry season

\*(E) : Enterprise, \*(F) : Farmers

Table Agricultural Output

(Unit: Million kips)

Study area	Xe Bangfai Zone		Xeno Zone		Savannakhet Zone		B. Lak 35 Zone		Pakxong Zone		Donghen Zone			
	Present	Plan	Present	Plan	Present	Plan	Present	Plan	Present	Plan	Present	Plan		
Rice	12,848	43,388	3,031	10,999	1,302	2,681	1,052	3,163	3,989	11,213	1,646	2,771	1,828	12,562
Field crop	350	934	54	136	6	28	38	110	74	220	164	358	14	218
Vegetables	85	2,700	17	397	10	81	8	243	27	864	24	81	0	1,034
Fruit	180	1,366	30	116	30	270	23	116	68	308	15	385	15	193
Water buffalo	6,048	15,121	818	3,780	748	756	376	756	1,861	4,536	993	2,268	1,252	3,024
Cattle	5,588	13,970	776	2,794	768	698	391	698	1,950	4,191	880	2,095	823	3,492
Pig	570	1,424	64	285	45	142	35	71	265	356	71	285	90	285
Chicken	10	48	1	11	1	5	1	2	4	11	1	10	1	10
Fish		2,737		920		40		154		722				902
Total	25,679	81,708	4,791	19,438	2,910	4,701	1,923	5,313	8,238	22,421	3,794	8,252	4,023	21,719
10 <sup>3</sup> \$	36,685	116,726	6,844	27,769	4,156	671	2,748	7,591	11,769	32,029	5,420	11,789	5,748	31,027
\$/person	70	166	85	230	70	71	33	69	79	170	75	128	70	286

Table Statistics on Population by Village

Nhyod H. Bak Area

		1986	1987	1988	1989	1990
Nateuy sub- district	B. Xianban	478	485	494	525	532
	B. Nonghong	420	425	445	450	457
	B. Sithong	300	320	400	500	560
Khamt hao sub- district	B. Kho	685	692	701	709	712
	B. Nongveng	324	352	374	385	392
	B. Dongdokmai	497	500	501	508	515
Vattha na sub- district	B. Vatthana	507	590	605	638	650
	B. Phailom	306	309	314	319	317
	B. Phonthan	211	218	220	225	225
	B. Nanokkhan	452	455	485	459	455
Nano- kkian sub- district	B. Dongkhankhou	797	782	786	887	913
	B. Nongkalong	587	594	608	623	640
	B. Gnangsoung	445	455	462	474	479
	B. Dongkhamkhen	409	411	414	421	426
TOTAL		6,418	6,588	6,809	7,123	7,273

Table Statistics on Population of Each Village

Namphou Area		1986	1987	1988	1989	1990
	B. Mouangkhai-Nua	857	899	920	942	965
	B. Mouangkhai-Tai	1,129	1,158	1,190	1,190	1,316
Mouan- gkhai sub- district	B. Dontoum	542	610	636	646	616
	B. Dongmakfai	1,102	1,059	1,074	1,155	1,151
	B. Donghouakham	179	187	190	213	227
	B. Hamphou-Nua	548	567	620	610	630
	B. Namphou-Tai	502	529	550	550	568
	B. Dongphosi	601	650	650	655	740
	B. Phoxai	252	265	288	288	267
TOTAL		5,712	5,924	6,118	6,249	6,480

Source, Farm Interview Survey 1991.

Table Results of Land Classification

Symbol of Factor for Assessment of Land Capability	Synthetical Assessment													Area (ha)			
	P	U	2	P	U	P	U	P	U	P	U	P	U				
Gleysols -1	II	II	I	I	I	I	I	I	I	III	IV	II	II	IV wa III fns II tpe	239	292	531
-2	II	II	I	I	I	I	I	I	I	III	IV	II	II	IV wa III (w) fns II tpe	13	15	28
Acrisols -1	II	II	I	I	I	I	I	I	I	III	IV	II	IV	IV ae III (w) wfn II ts	460	408	868
-2	II	II	I	I	I	I	I	I	I	III	IV	II	IV	IV ae III (w) wfn II ts	29	62	91
Combisols-1	II	II	I	I	I	I	I	I	I	III	IV	II	II	IV (w) III pfns II tae	135	358	493
-2	II	II	I	I	I	I	I	I	I	III	IV	II	II	IV (w) III pfns II tae	85	211	296
Fluvisols -1	II	II	III	IV	IV	IV	IV	IV	IV	III	IV	I	II	IV (w) III tgpae	-	125	125
-2	III	III	IV	IV	IV	IV	IV	IV	IV	III	IV	I	II	IV dgp (w) III fna III ae	-	111	111
Total													961	1,582	2,543		
Village, Stream, Pond													39	43	82		

Remark: /1: Paddy field, /2: Upland crop field, /3: Dry season, /4: Rainy season

Table Present Cropping Situation

Name of Village	Number of Farm family	Cultivate Paddy (ha)	Cultivate Rice (ha)	Cultivate Vegetables	Average of Paddy (ha)	Average of Total field
B, Sitong	89	170	28	12	1.91	2.36
B, Kho	103	178	30	9	1.73	2.11
B, Nongveng	58	81	16	6	1.40	1.78
B, Dongdokmai	88	112	22	7	1.27	1.60
B, Nanokkien	89	110	8	13	1.24	1.47
B, Dongkhankhou	155	172	0	10	1.11	1.17
B, Nongkalong	114	123	0	10	1.08	1.17
B, Gnangsoung	74	133	5	10	1.80	2.00
B, Dongkhamkhen	68	68	0	11	1.00	1.16
B, Nonnadi	45	32	2	2	0.71	0.80
B, Vatthana	129	136	2	11	1.05	1.16
B, Phailom	67	96	3	2	1.43	1.51
B, Phonthan	48	47	6	2	0.98	1.15
B, Mouangkhai Nua	175	194	0	34	1.11	1.30
B, Mouangkhai Tai	235	205	0	47	0.87	1.07
B, Dontoum	99	145	0	30	1.46	1.77
B, Dongmakfai	240	228	0	25	0.95	1.05
B, Donghouakham	42	43	33	8	1.02	2.00
B, Namphou Nua	112	108	4	2	0.96	1.02
B, Namphou Tai	92	59	3	5	0.64	0.73
B, Dongphosi	134	111	0	45	0.83	1.16
B, Phoxai	50	41	0	15	0.82	1.12
B, Xianban	104	87	0	6	0.84	0.89
B, Nonghong	75	67	0	3	0.89	0.93
<b>Total</b>	<b>2,485</b>	<b>2,746</b>	<b>162</b>	<b>325</b>	<b>1.11</b>	<b>1.30</b>

Source: Agriculture Data Office in the sub District 1991.

Table Present Number of Livestock and Poultry in the Study Area

Name of Village	Number of Total Household	Rear Buffalo Household	Rear Cattle Household	Buffalo Rear %	Cattle Rear %	Total Buffalo	Total Cattle	Total Pig	Total Poultry	Total Duck
B, Sithong	89	84	86	1.429	2.791	120	240	305	4,605	2,065
B, Kho	103	90	93	1.422	2.581	128	240	305	500	2,008
B, Nongveng	58	50	55	1.220	1.964	61	108	45	388	120
B, Dongdokmai	88	82	86	1.037	2.384	85	205	358	408	400
B, Nanokkhan	89	85	89	1.235	2.360	105	210	34	541	63
B, Dongkhankhou	155	140	145	1.157	2.400	162	348	105	820	61
B, Nongkalong	114	78	83	1.179	3.169	92	263	132	931	86
B, Gngangsoung	74	45	55	1.622	2.655	73	146	72	251	85
B, Dongkhamkhen	68	56	68	2.464	2.706	138	184	97	679	67
B, Nonnadi	45	32	44	2.313	2.091	74	92	30	12	13
B, Vatthana	129	83	93	1.157	1.430	96	133	75	1,050	118
B, Phailom	67	65	60	0.985	1.733	64	104	17	300	30
B, Phonthan	48	40	40	1.300	1.275	52	51	38	460	50
B, Mouangkhai Nua	175	170	172	1.347	1.831	229	315	110	1,100	99
B, Mouangkhai Tai	235	227	231	0.907	1.515	206	350	105	1,200	150
B, Dontoum	99	50	85	1.720	4.118	86	350	170	1,325	900
B, Dongmakfai	240	210	238	1.524	2.462	320	586	218	1,005	302
B, Donghouakham	42	40	40	2.125	5.125	85	205	358	408	132
B, Namphou Nua	112	100	112	1.380	1.473	138	165	92	362	68
B, Namphou Tai	92	90	92	1.644	2.076	148	191	43	694	267
B, Dongphosi	134	126	128	0.833	4.375	105	560	200	684	168
B, Phoxai	50	48	50	1.833	2.000	88	100	12	500	50
B, Xianban	104	100	103	1.030	1.922	103	198	79	1,650	350
B, Nonghong	75	70	75	1.457	2.057	102	188	84	1,654	560
	2,485	2,161	2,323	1.323	2.381	2,860	5,532	3,084	21,527	8,212

Table Proposed Land Use

	Present Land Use				Proposed Land Use							
	H. Bak (ha)	(%)	Namphou (ha)	(%)	Total (ha)	(%)	H. Bak (ha)	(%)	Namphou (ha)	(%)	TOTAL (ha)	(%)
Rainfed Paddy Field	1,170	72	835	83	2,005	76	110	7	45	5	155	6
Irrigated Paddy Field	-	-	-	-	-	-	-	-	45	4	45	2
Paddy/Upland Crop Field	-	-	-	-	-	-	950	58	660	66	1,610	61
Upland Crop Field	12	1	3	-	15	1	12	1	3	-	15	1
Grassland	230	14	59	6	289	11	200	12	52	5	252	9
Forest	102	6	18	2	120	5	89	5	16	2	105	4
Waste land	68	4	46	5	114	4	59	4	41	4	100	4
Pond and Stream	35	2	37	4	72	3	34	2	36	4	70	3
Village	8	1	2	-	10	-	8	1	2	-	10	-
Infra - Structure	-	-	-	-	-	-	163	10	100	10	263	10
Total	1,625	100	1,000	100	2,625	100	1,625	100	1,000	100	2,625	100



Table Irrigation Water Requirement

		Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
CROPPING PATTERN (PADDY)							
(1) ETo	(mm)	-	143	131	135	153	147
(2) KC		-	1.1	1.1	1.05	1.05	0.95
(3) ET crop = (1) * (2)	(mm)	-	157	144	142	161	140
(4) Percolation	(mm)	-	47	47	45	47	45
(5) Effective Rainfall	(mm)	-	165	220	83	100	0
(6) = (3) + (4) - (5)	(mm)	-	39	-29	104	108	185
(7) Area Factor		-	0.5	1	1	0.78	0.06
(8) = (6) * (7)	(mm)	-	19	-29	104	84	11
(9) Puddling Water	(mm)	30	150	0	0	0	0
(10) Nursery Water	(mm)	14	7	0	0	0	0
(11) NW = (8) + (9) + (10)	(mm)	44	176	0	104	84	11
(12) DW = (11) / EF	(mm)	73	294	0	173	140	18
	(lit/sec/ha)	0.28	1.10	0.00	0.67	0.52	0.07


Irrigation Water Requirement  
(Rainy Season Paddy)

Table Irrigation Water Requirement

		Dec.	Jan.	Feb.	Mar.	Apr.	May.
CROPPING PATTERN (PADDY)							
(1) ETo	(mm)	-	147	143	188	193	—
(2) KC		-	1.1	1.1	1.25	1.0	—
(3) ET crop = (1) * (2)	(mm)	-	162	157	235	193	—
(4) Percolation	(mm)	-	93	84	93	90	—
(5) Effective Rainfall	(mm)	-	13	0	12	43	—
(6) = (3) + (4) - (5)	(mm)	-	242	241	316	240	—
(7) Area Factor		-	0.52	1.0	0.95	0.24	—
(8) = (6) * (7)	(mm)	-	126	241	300	58	—
(9) Puddling Water	(mm)	30	150	0	0	0	—
(10) Nursery Water	(mm)	14	7	0	0	0	—
(11) NW = (8) + (9) + (10)	(mm)	44	283	241	300	58	—
(12) DW = (11) / EF	(mm)	73	471	402	500	96	—
	(lit/sec/ha)		0.27	1.76	1.66	1.87	0.37

Irrigation Water Requirement  
(Dry Season Paddy)

Table Irrigation Water Requirement

		Dec.	Jan.	Feb.	Mar.	Apr.	May.
CROPPING PATTERN (Peanut)							
(1) ETo	(mm)	138	147	143	188	193	172
(2) KC		0.5	1.0	1.05	1.05	0.6	0.6
(3) ET crop = (1) * (2)	(mm)	72	151	156	204	118	104
(4) Effective Rainfall	(mm)	0	13	0	12	43	90
(5) = (3) - (4)	(mm)	72	138	156	192	75	14
(6) Area Factor		0.05	0.78	1.0	1.0	0.92	0.5
(7) NW = (5)*(6)	(mm)	4	108	156	192	69	7
(8) DW = (7) / EF	(mm)	8	229	332	409	147	15
	(lit/sec/ha)	0.03	0.86	1.37	1.53	0.57	0.06

Irrigation Water Requirement  
(Dry season Field Crop = Peanut)

Table Water Balance (Nhyod H. Bak)

No.	R (mm)	Q (m <sup>3</sup> /D)	W.R (m <sup>3</sup> /D)	Balance (m <sup>3</sup> /D)	Capacity (m <sup>3</sup> )	(m <sup>3</sup> )
1/1/85	0	12,096	90,548	-78,452	-392,260	542,238
1/2/85	0	12,096	90,548	-78,452	-392,260	934,498
1/3/85	0	12,096	90,548	-78,452	-392,260	1,326,758
1/4/85	0	12,096	90,548	-78,452	-392,260	1,719,018
1/5/85	1.9	30,906	90,548	-59,642	-298,210	2,017,228
1/6/85	1.3	24,966	90,548	-65,582	-393,492	2,410,720
2/1/85	0.6	18,036	104,717	-86,681	-433,405	2,844,125
2/2/85	0.7	19,026	104,717	-85,691	-428,455	3,272,580
2/3/85	0	12,096	104,717	-92,621	-463,105	3,735,685
2/4/85	0	12,096	104,717	-92,621	-463,105	4,198,790
2/5/85	0	12,096	104,717	-92,621	-463,105	4,661,895
2/6/85	0.7	19,026	104,717	-85,691	-257,073	4,918,968
3/1/85	2.9	40,806	117,504	-76,698	-387,490	5,306,458
3/2/85	0	12,096	117,504	-105,408	-527,040	6,833,498
3/3/85	0	12,096	117,504	-105,408	-527,040	7,360,538
3/4/85	0	12,096	117,504	-105,408	-527,040	7,887,578
3/5/85	0	12,096	117,504	-105,408	-527,040	8,414,618
3/6/85	0	12,096	117,504	-105,408	-632,448	8,047,066
4/1/85	0	12,096	32,486	-20,390	-101,950	8,149,016
4/2/85	0	12,096	32,486	-20,390	-101,950	8,250,966
4/3/85	0	12,096	32,486	-20,390	-101,950	8,352,916
4/4/85	0.9	21,006	32,486	-11,480	-57,400	8,410,316
4/5/85	7.3	84,366	32,486	51,880	259,400	8,150,916
4/6/85	1.7	28,926	32,486	-3,560	-17,800	8,168,716
5/1/85	8.4	95,256	2,074	93,182	465,910	7,702,806
5/2/85	3.3	44,766	2,074	42,692	213,460	7,489,346
5/3/85	5.1	62,586	2,074	60,512	302,560	7,186,786
5/4/85	4.4	55,656	2,074	53,582	267,910	6,918,876
5/5/85	0.4	16,056	2,074	13,982	69,910	6,848,966
5/6/85	1.3	24,966	2,074	22,892	137,352	6,711,614
6/1/85	5.0	61,596	22,982	38,614	193,070	6,518,544
6/2/85	1.2	23,976	22,982	994	4,970	6,513,574
6/3/85	14.6	156,636	22,982	133,654	668,270	5,845,304
6/4/85	29.8	307,116	22,982	284,134	1,420,670	4,424,634
6/5/85	12.2	132,876	22,982	109,894	549,470	3,875,164
6/6/85	2.2	33,876	22,982	10,894	54,470	3,820,694
7/1/85	2.6	37,836	90,288	-52,452	-262,260	4,082,954
7/2/85	15.0	160,596	90,288	70,308	351,540	3,731,414
7/3/85	2.8	39,816	90,288	-50,472	-252,360	3,983,774
7/4/85	2.4	35,856	90,288	-54,432	-272,160	4,255,934
7/5/85	2.9	40,806	90,288	-49,482	-247,410	4,503,344
7/6/85	12.7	137,826	90,288	47,538	285,228	4,218,116
8/1/85	18.9	199,206	0	199,206	996,030	3,222,086
8/2/85	27.3	285,773	0	285,773	1,428,865	1,793,221
8/3/85	4.1	52,686	0	52,686	263,430	1,529,791
8/4/85	7.1	82,386	0	82,386	411,930	1,117,861
8/5/85	7.6	87,336	0	87,336	436,680	681,181
8/6/85	1.4	25,956	0	25,956	155,736	525,445
9/1/85	15.0	160,596	54,994	105,602	528,010	0
9/2/85	2.0	31,896	54,994	-23,098	-115,490	115,490
9/3/85	3.4	45,756	54,994	-9,238	-46,190	161,680
9/4/85	2.8	39,816	54,994	-15,178	-75,890	237,570
9/5/85	1.5	26,946	54,994	-28,048	-140,240	377,810
9/6/85	0.2	14,076	54,994	-40,918	-204,590	582,400
10/1/85	4.5	56,646	42,682	13,964	69,820	512,580
10/2/85	2.2	33,876	42,682	-8,806	-44,030	556,610
10/3/85	2.4	85,856	42,682	-6,826	-34,130	590,740
10/4/85	8.9	100,206	42,682	57,524	287,620	303,120
10/5/85	2.2	33,876	42,682	-8,806	-44,030	347,150
10/6/85	2.3	34,868	42,682	-7,816	-46,896	394,046
11/1/85	0	12,096	5,746	6,350	31,750	362,296
11/2/85	0	12,096	5,746	6,350	31,750	330,546
11/3/85	0	12,096	5,746	6,350	31,750	298,796
11/4/85	0	12,096	5,746	6,350	31,750	267,046
11/5/85	0	12,096	5,746	6,350	31,750	235,296
11/6/85	0	12,096	5,746	6,350	31,750	203,546
12/1/85	0	12,096	10,368	1,728	8,640	194,906
12/2/85	0	12,096	10,368	1,728	8,640	196,266
12/3/85	0	12,096	10,368	1,728	8,640	177,626
12/4/85	0	12,096	10,368	1,728	8,640	168,986
12/5/85	0	12,096	10,368	1,728	8,640	160,346
12/6/85	0	12,096	10,368	1,728	10,368	149,978

Table Water Balance Namphu

No.	No.1 Q (m <sup>3</sup> /D)	No.2 Q (m <sup>3</sup> /D)	No.3+4 Q (m <sup>3</sup> /D)	No.5 Q (m <sup>3</sup> /D)	No.6 Q (m <sup>3</sup> /D)	No.1 W.R. (m <sup>3</sup> /D)	No.2 W.R. (m <sup>3</sup> /D)	No.3+4 W.R. (m <sup>3</sup> /D)	No.5 W.R. (m <sup>3</sup> /D)	No.6 W.R. (m <sup>3</sup> /D)	Return Flow (m <sup>3</sup> /D) No.5
1/1/85	0	0	4,566	5,564	2,075	6,791	0	4,156	9,055	743	2,352
1/2/85	0	0	4,566	5,564	2,075	6,791	0	4,156	9,055	743	2,352
1/3/85	0	0	4,566	5,564	2,075	6,791	0	4,156	9,055	743	2,352
1/4/85	0	0	4,566	5,564	2,075	6,791	0	4,156	9,055	743	2,352
1/5/85	10,507	2,860	13,173	36,253	10,853	6,791	0	4,156	9,055	743	2,352
1/6/85	7,189	1,957	10,455	25,562	8,081	6,791	0	4,156	9,055	743	2,352
2/1/85	3,318	903	7,284	15,255	4,847	7,854	0	4,644	10,472	1,184	2,600
2/2/85	3,871	1,054	7,737	16,870	5,309	7,854	0	4,644	10,472	1,184	2,600
2/3/85	0	0	4,566	5,564	2,075	7,854	0	4,644	10,472	1,184	2,600
2/4/85	0	0	4,566	5,564	2,075	7,854	0	4,644	10,472	1,184	2,600
2/5/85	0	0	4,566	5,564	2,075	7,854	0	4,644	10,472	1,184	2,600
2/6/85	3,871	1,054	7,737	16,870	5,309	7,854	0	4,644	10,472	1,184	2,600
3/1/85	13,037	4,365	17,703	52,406	15,473	8,813	0	5,214	11,750	1,322	2,844
3/2/85	0	0	4,566	5,564	2,075	8,813	0	5,214	11,750	1,322	2,844
3/3/85	0	0	4,566	5,564	2,075	8,813	0	5,214	11,750	1,322	2,844
3/4/85	0	0	4,566	5,564	2,075	8,813	0	5,214	11,750	1,322	2,844
3/5/85	0	0	4,566	5,564	2,075	8,813	0	5,214	11,750	1,322	2,844
3/6/85	0	0	4,566	5,564	2,075	8,813	0	5,214	11,750	1,322	2,844
4/1/85	0	0	4,566	5,564	2,075	2,436	0	1,378	3,249	492	1,210
4/2/85	0	0	4,566	5,564	2,075	2,436	0	1,378	3,249	492	1,210
4/3/85	0	0	4,566	5,564	2,075	2,436	0	1,378	3,249	492	1,210
4/4/85	4,977	1,356	8,643	20,101	6,233	2,436	0	1,378	3,249	492	1,210
4/5/85	40,369	10,987	37,635	123,477	35,801	2,436	0	1,378	3,249	492	1,210
4/6/85	9,401	2,559	12,267	33,023	9,929	2,436	0	1,378	3,249	492	637
5/1/85	46,452	12,642	42,618	141,245	40,883	156	0	78	207	52	637
5/2/85	18,249	4,967	19,515	58,867	17,321	156	0	78	207	52	637
5/3/85	28,203	7,676	27,669	87,941	25,637	156	0	78	207	52	637
5/4/85	24,332	6,622	24,498	76,635	22,403	156	0	78	207	52	637
5/5/85	2,212	602	6,378	12,025	3,923	156	0	78	207	52	637
5/6/85	7,189	1,957	10,455	26,562	8,081	156	0	78	207	52	637
6/1/85	27,650	7,525	27,216	86,326	25,175	3,387	1,089	1,452	9,919	1,210	2,418
6/2/85	6,636	1,806	10,002	24,947	7,619	3,387	1,089	1,452	9,919	1,210	2,418
6/3/85	80,738	21,973	70,704	241,390	69,527	3,387	1,089	1,452	9,919	1,210	2,418
6/4/85	164,794	44,849	139,560	486,908	139,751	3,387	1,089	1,452	9,919	1,210	2,418
6/5/85	67,466	18,361	59,832	202,624	58,439	3,387	1,089	1,452	9,919	1,210	2,418
6/6/85	12,166	3,311	14,532	41,099	12,239	3,387	1,089	1,452	9,919	1,210	2,418
7/1/85	14,378	3,913	16,344	47,560	14,087	13,306	4,277	5,702	38,966	4,752	5,196
7/2/85	82,950	22,575	72,516	247,851	71,375	13,306	4,277	5,702	38,966	4,752	5,196
7/3/85	15,484	4,214	17,250	50,791	15,011	13,306	4,277	5,702	38,966	4,752	5,196
7/4/85	13,272	3,612	15,438	44,330	13,163	13,306	4,277	5,702	38,966	4,752	5,196
7/5/85	16,037	4,365	17,703	52,406	15,473	13,306	4,277	5,702	38,966	4,752	5,196
7/6/85	70,231	19,114	62,097	210,700	60,749	13,306	4,277	5,702	38,966	4,752	5,196
8/1/85	104,517	28,445	90,183	310,846	89,393	0	0	0	0	0	1,470
8/2/85	150,969	41,087	129,521	448,094	128,786	0	0	0	0	0	1,470
8/3/85	22,673	6,171	23,139	71,789	21,017	0	0	0	0	0	1,470
8/4/85	39,263	10,686	36,729	120,246	34,877	0	0	0	0	0	1,470
8/5/85	42,028	11,438	38,994	128,323	37,187	0	0	0	0	0	1,470
8/6/85	7,742	2,107	10,908	28,177	8,543	0	0	0	0	0	1,470
9/1/85	82,950	22,575	72,516	247,851	71,375	8,104	2,605	3,473	23,734	2,894	3,739
9/2/85	11,060	3,010	13,626	37,869	11,315	8,104	2,605	3,473	23,734	2,894	3,739
9/3/85	18,802	5,117	19,968	60,482	17,783	8,104	2,605	3,473	23,734	2,894	3,739
9/4/85	15,484	4,214	17,250	50,791	15,011	8,104	2,605	3,473	23,734	2,894	3,739
9/5/85	8,295	2,258	11,361	29,792	9,005	8,104	2,605	3,473	23,734	2,894	3,739
9/6/85	1,106	301	5,472	8,794	2,999	8,104	2,605	3,473	23,734	2,894	3,739
10/1/85	24,885	6,773	24,951	78,250	22,865	6,290	2,022	2,696	18,420	2,246	3,231
10/2/85	12,166	3,311	14,532	51,099	12,239	6,290	2,022	2,696	18,420	2,246	3,231
10/3/85	13,272	3,612	15,438	44,330	13,163	6,290	2,022	2,696	18,420	2,246	3,231
10/4/85	49,217	13,395	44,883	149,321	43,193	6,290	2,022	2,696	18,420	2,246	3,231
10/5/85	12,166	3,311	14,532	51,099	12,239	6,290	2,022	2,696	18,420	2,246	3,231
10/6/85	12,719	3,462	14,985	42,714	12,701	6,290	2,022	2,696	18,420	2,246	3,231
11/1/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
11/2/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
11/3/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
11/4/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
11/5/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
11/6/85	1,106	301	5,472	8,794	2,999	847	272	363	2,480	302	1,707
12/1/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805
12/2/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805
12/3/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805
12/4/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805
12/5/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805
12/6/85	0	0	4,566	5,564	2,075	778	0	506	1,037	26	805

Table Water Balance Namphu(cont.)

No.	Water Balance (m <sup>3</sup> /D)					H. Xay Dam Balance			No. 3+4 Balance	
	No.1	No.2	No.3+4	No.5	No.6	(m <sup>3</sup> /d)	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>	m <sup>3</sup>
1/1/85	-6,791	0	410	-5,295	1,332	-12,086	-60,430	84,548	2,050	0
1/2/85	-6,791	0	410	-5,295	1,332	-12,086	-60,430	144,978	2,050	0
1/3/85	-6,791	0	410	-5,295	1,332	-12,086	-60,430	205,408	2,050	0
1/4/85	-6,791	0	410	-5,295	1,332	-12,086	-60,430	265,838	2,050	0
1/5/85	3,716	2,860	9,017	18,603	10,110	3,716	18,580	247,258	45,085	0
1/6/85	398	1,957	6,299	8,912	7,338	398	2,388	244,870	37,794	0
2/1/85	-4,536	903	2,640	-579	3,663	-5,115	-25,575	270,445	13,200	0
2/2/85	-3,983	1,054	3,093	483	4,125	-3,983	-19,915	290,360	15,465	0
2/3/85	-7,854	0	-78	-6,874	891	-14,728	-73,640	364,000	-390	390
2/4/85	-7,854	0	-78	-6,874	891	-14,728	-73,640	437,640	-390	780
2/5/85	-7,854	0	-78	-6,874	891	-14,728	-73,640	511,280	-390	1,170
2/6/85	-3,983	1,054	3,093	483	4,125	-3,983	-11,949	523,229	9,279	0
3/1/85	7,224	4,365	12,489	29,473	14,151	7,224	36,120	487,109	62,445	0
3/2/85	-8,813	0	-648	-7,908	753	-16,721	-83,605	570,714	-3,240	3,240
3/3/85	-8,813	0	-648	-7,908	753	-16,721	-83,605	654,319	-3,240	6,480
3/4/85	-8,813	0	-648	-7,908	753	-16,721	-83,605	737,924	-3,240	9,720
3/5/85	-8,813	0	-648	-7,908	753	-16,721	-83,605	821,529	-3,240	12,960
3/6/85	-8,813	0	-648	-7,908	753	-16,721	-100,326	921,855	-3,888	16,848
4/1/85	-2,436	0	3,188	2,147	1,583	-2,436	-12,180	934,035	15,940	908
4/2/85	-2,436	0	3,188	2,147	1,583	-2,436	-12,180	946,215	15,940	0
4/3/85	-2,436	0	3,188	2,147	1,583	2,436	-12,180	958,395	15,940	0
4/4/85	2,541	1,355	7,265	14,248	5,741	2,541	12,705	945,690	36,325	0
4/5/85	37,933	10,987	36,257	117,624	35,309	37,933	189,665	756,025	181,285	0
4/6/85	6,965	2,559	10,889	27,170	9,437	6,965	34,825	721,200	54,445	0
5/1/85	46,296	12,642	42,540	141,441	40,831	46,296	231,840	489,720	212,700	0
5/2/85	18,093	4,967	19,437	59,063	17,269	18,093	90,465	399,255	97,185	0
5/3/85	28,047	7,676	27,591	88,137	25,585	28,047	140,235	259,020	137,955	0
5/4/85	24,176	6,622	24,420	76,831	22,351	24,176	120,880	138,140	122,100	0
5/5/85	2,056	602	6,300	12,221	3,871	2,056	10,280	127,860	31,500	0
5/6/85	7,033	1,957	10,377	26,758	8,029	7,033	42,198	85,662	62,262	0
6/1/85	24,263	6,436	25,764	72,897	23,965	24,263	121,315	0	128,820	0
6/2/85	3,249	717	8,550	11,518	6,409	3,249	13,245	0	42,750	0
6/3/85	77,351	20,884	69,252	227,961	68,317	77,351	386,755	0	346,260	0
6/4/85	161,407	43,760	138,108	473,479	138,541	161,407	807,035	0	690,540	0
6/5/85	64,079	17,272	58,380	189,195	57,229	64,079	320,395	0	291,900	0
6/6/85	8,779	2,222	13,080	27,670	11,029	8,779	43,895	0	65,400	0
7/1/85	0	0	10,642	-9,131	9,335	-9,131	-45,655	45,655	53,210	0
7/2/85	69,644	18,298	66,814	190,796	66,623	69,644	348,220	0	334,070	0
7/3/85	0	0	11,548	-3,201	10,259	-6,201	-31,005	31,005	57,740	0
7/4/85	-34	0	9,736	-12,026	8,411	-12,060	-60,300	91,305	48,680	0
7/5/85	0	88	12,001	-4,649	10,721	-4,649	-23,245	114,550	60,005	0
7/6/85	56,925	14,837	56,395	153,645	55,997	56,925	341,550	0	338,370	0
8/1/85	104,517	28,445	90,183	312,316	89,393	104,517	522,585	0	450,915	0
8/2/85	150,969	41,087	129,521	449,564	128,786	150,969	754,845	0	647,605	0
8/3/85	22,673	6,171	23,139	73,259	21,017	22,673	113,365	0	115,695	0
8/4/85	39,263	10,686	36,729	121,716	34,877	39,263	196,315	0	183,645	0
8/5/85	42,028	11,438	38,994	129,793	37,187	42,028	210,140	0	194,970	0
8/6/85	7,742	2,107	10,908	29,647	8,543	7,742	46,452	0	65,448	0
9/1/85	74,846	19,970	69,043	213,674	68,481	74,846	374,230	0	345,215	0
9/2/85	2,956	405	10,153	3,692	8,421	2,956	14,780	0	50,765	0
9/3/85	10,698	2,512	16,495	26,305	14,889	10,698	53,490	0	82,475	0
9/4/85	7,380	1,609	13,777	16,614	12,117	7,380	36,900	0	68,885	0
9/5/85	0	0	7,883	-4,038	6,111	-4,038	-20,190	20,190	39,440	0
9/6/85	-6,998	0	1,999	-16,081	105	-23,079	-115,395	135,585	9,995	0
10/1/85	18,595	4,751	22,255	52,053	20,619	18,595	92,975	42,610	111,275	0
10/2/85	5,876	1,289	11,836	14,902	9,993	5,876	29,380	13,230	59,180	0
10/3/85	6,982	1,590	12,742	18,133	10,917	6,982	34,910	0	63,710	0
10/4/85	42,927	11,373	42,187	123,124	40,947	42,927	214,635	0	210,935	0
10/5/85	5,876	1,289	11,836	14,902	9,993	5,876	29,380	0	71,016	0
10/6/85	6,429	1,440	12,289	16,517	10,455	6,429	38,574	0	61,445	0
11/1/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
11/2/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
11/3/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
11/4/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
11/5/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
11/6/85	259	29	5,109	6,539	2,697	259	1,295	0	25,545	0
12/1/85	-778	0	4,060	4,826	2,049	-778	-3,890	3,890	20,300	0
12/2/85	-778	0	4,060	4,826	2,049	-778	-3,890	7,780	20,300	0
12/3/85	-778	0	4,060	4,826	2,049	-778	-3,890	11,670	20,300	0
12/4/85	-778	0	4,060	4,826	2,049	-778	-3,890	15,560	20,300	0
12/5/85	-778	0	4,060	4,826	2,049	-778	-3,890	19,450	20,300	0
12/6/85	-778	0	4,060	4,826	2,049	-778	-4,668	24,118	24,360	0

Table

## Summary of Construction Cost

(Unit: '000\$)

Items	Foreign Currency	Local Currency	Total Cost
1. Land acquisition	0	226	226
2. Preparatory work	139	24	163
3. Irrigation and drainage facilities			
(1) N.H. Bak			
a. N.H. Bak Reservoir			
- Dam	1,823	250	2,073
- Intake/Spillway	320	88	408
b. Main Canals	1,058	106	1,164
c. Secondary Canals	1,071	95	1,166
d. Tertiary Canals	203	83	286
e. Field Canals	108	45	153
f. Secondary Drain	48	11	59
g. Tertiary Drains	95	18	113
h. Field Drains	7	1	8
i. Demonstration Farm	36	3	39
(2) Namphou Irrigation			
a. No. 1 (H.Xay Reservoir)			
- Dam	522	103	625
- Intake/Spillway	145	33	178
b. No. 2 (Banhang Weir)	131	31	162
c. No. 3 (Phou Noy Reservoir)	12	1	13
d. No. 4 (Phou Reservoir)	86	18	104
e. No. 5 (Xay Weir)	371	68	439
f. No. 6 (Pangha Weir)	238	61	299
g. Main canals	480	71	551
h. Secondary Canals	32	5	37
i. Tertiary Canals	95	31	126
j. Field Canals	64	28	92
k. Tertiary Drains	25	16	41
l. Field Drains	3	1	4
(Sub-total: 2+3)	7,112	1,191	8,303
4. Rural infrastructures			
(1) Rehabilitation of village road	846	466	1,312
(2) Rural water supply	110	58	168
(Sub-total: 4)	956	524	1,480
5. Project office/Supporting center			
(1) B.Lak 35 center office	504	228	732
(2) Demonstration farm office	61	31	92
6. Equipment			
(1) O & M equipment	1,288	0	1,288
(2) Equipment for center office	190	0	190
(3) Equipment for demonstration farm	206	0	206
7. Engineering services	1,123	177	1,300
8. Contingencies			
(1) Physical contingency	863	220	1,083
(2) Price contingency	114	24	138
<b>Total</b>	<b>12,417</b>	<b>2,621</b>	<b>15,038</b>

Table Disbursement Schedule of Construction Cost (1/2)

(Unit: '000\$)

Items	Total		1st Year		2nd Year		3rd Year		4th Year	
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.
1. Land acquisition	0	226	0	226	0	0	0	0	0	0
2. Preparatory work	139	24	0	0	139	24	0	0	0	0
3. Irrigation and drainage facilities										
(1) N.H. Bak										
a. N.H. Bak Reservoir										
- Dam	1,823	250	0	0	912	125	11	125	125	0
- Intake/Spillway	320	88	0	0	256	70	64	18	18	0
b. Main Canals	1,058	106	0	0	264	26	794	80	80	0
c. Secondary Canals	1,071	95	0	0	179	16	892	79	79	0
d. Tertiary Canals	203	83	0	0	0	0	102	42	42	41
e. Field Canals	108	45	0	0	0	0	54	23	23	22
f. Secondary Drain	48	11	0	0	0	0	24	6	6	5
g. Tertiary Drains	95	18	0	0	0	0	48	9	9	9
h. Field Drains	7	1	0	0	0	0	4	0	0	1
i. Demonstration Farm	36	3	0	0	0	0	18	2	2	1
(2) Namphou Irrigation										
a. No. 1 (H.Xay Reservoir)										
- Dam	522	103	0	0	522	103	0	0	0	0
- Intake/Spillway	145	33	0	0	145	33	0	0	0	0
b. No. 2 (Banhang Weir)	131	31	0	0	131	31	0	0	0	0
c. No. 3 (Phou Noy Reservoir)	12	1	0	0	6	1	6	0	0	0
d. No. 4 (Phou Reservoir)	86	18	0	0	43	9	43	9	0	0
e. No. 5 (Xay Weir)	371	68	0	0	371	68	0	0	0	0
f. No. 6 (Pangha Weir)	238	61	0	0	0	0	238	61	0	0
g. Main canals	480	71	0	0	160	24	320	47	0	0
h. Secondary Canal	32	5	0	0	11	2	21	3	0	0
i. Tertiary Canals	95	31	0	0	0	0	48	16	47	15
j. Field Canals	64	28	0	0	0	0	32	14	32	14
k. Tertiary Drains	25	16	0	0	0	0	13	8	12	8
l. Field Drains	3	1	0	0	0	0	2	1	1	0
4. Rural infrastructures										
(1) Rehabilitation of village road	846	466	0	0	282	156	282	155	282	155
(2) Rural water supply	110	58	0	0	0	0	73	39	37	19
5. Project office/Supporting center										
(1) B.Lak 35 center office	584	228	0	0	360	163	144	65	0	0
(2) Demonstration farm office	61	31	0	0	0	0	41	21	20	10



Table

Disbursement Schedule of Construction Cost (2/2)  
(Unit: '000\$)

Items	Total		1st Year		2nd Year		3rd Year		4th Year	
	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.	F.C.	L.C.
6. Equipment										
(1) O & M equipment	1,288	0	0	0	0	0	1,288	0	0	0
(2) Equipment for center office	190	0	0	0	0	0	190	0	0	0
(3) Equipment for demonstration farm	206	0	0	0	0	0	206	0	0	0
7. Engineering services	1,288	177	219	35	438	69	350	55	116	18
8. Contingencies										
(1) Physical contingency	863	220	0	23	478	85	417	82	68	30
(2) Price contingency	114	24	2	3	42	9	62	9	8	3
<b>Total</b>	<b>12,417</b>	<b>2,621</b>	<b>221</b>	<b>287</b>	<b>4,639</b>	<b>1,014</b>	<b>6,687</b>	<b>969</b>	<b>878</b>	<b>351</b>

Table Financial Production Cost of Crops Under With and Without Project Conditions

Description	Rainy Season Paddy				Dry Season Paddy				Peanut			
	Without Project		With Project		Without Project		With Project		Without Project		With Project	
	Q/ha	US\$/ha	Q/ha	US\$/ha	Q/ha	US\$/ha	Q/ha	US\$/ha	Q/ha	US\$/ha	Q/ha	US\$/ha
1. Farm Input: Seed	55 kg	0.10	40 kg	0.132	40 kg	0.132	75 kg	0.357	60 kg	0.357	60 kg	0.357
Fertilizer: Urea	5 kg	0.32	100 kg	0.32	100 kg	0.32	—	—	—	—	50 kg	0.32
DAP	25 kg	0.291	150 kg	0.291	200 kg	0.291	25 kg	0.291	150 kg	0.291	150 kg	0.291
Composed	5 kg	0.05	1000 kg	0.05	500 kg	0.050	—	—	—	—	1000 kg	0.05
Chemical Insecticide	5 kg (Seven)	2.571	10 kg (Dajimon)	2.75	5 kg	2.75	5 kg (Seven)	2.571	12.86	10 kg	2.75	27.50
Animal/Machinery	15 days	2.143	15 days	2.143	16 days	2.143	—	—	—	—	—	—
2. Labor Cost: Family	135 days	1.00	123 days	1.00	140 days	1.00	84 days	1.0	84.0	94 days	1.0	94.00
Hired	10 days	1.00	30 days	1.00	17 days	1.00	10 days	1.0	10.0	10 days	1.0	10.00
Sub Total		204.64		343.63		325.51		140.92		262.57		262.57
3. Others: Equipments	50 % of Sub Total		10.36	17.37		16.45		7.08		13.43		13.43
Total (US\$/ha)		215.00		361.0		342.0		148.00		276.00		276.00

Table Economic Production Cost and Benefit

(Unit: US\$)

Year in Order	Year	Benefit	Project Cost				Return	NPV	
			Capital Cost	O/M Cost	Replacement cost	Total		Discount rate 8%	9%
1	1993	—	509,000			509,000	-509,000	-509,000	-509,000
2	1994	—	4,425,500			4,425,500	-4,425,500	3,793,981	3,726,271
3	1995	—	4,880,400			4,880,400	-4,880,400	-3,874,061	3,767,668
4	1996	311,894	1,947,700	29,255		1,976,955	-1,665,061	-1,223,820	1,178,863
5	1997	584,826		29,255		29,255	555,571	378,344	361,121
6	1998	847,370		29,255		29,255	818,115	516,412	487,596
7	1999	1,035,367		31,639		31,639	1,003,728	585,173	549,039
8	2000	1,195,897		31,639		31,639	1,164,258	628,699	584,458
9	2001	1,195,897		31,639		31,639	1,164,258	582,129	535,559
10	2002	1,195,897		33,427		33,427	1,162,470	539,051	490,562
11	2003	1,195,897		33,427		33,427	1,162,470	498,700	451,038
12	2004	1,195,897		33,427		33,427	1,162,470	461,501	413,839
13	2005	1,195,897		33,427	345,000	378,427	817,470	300,829	266,495
14	2006	1,195,897		33,427		33,427	1,162,470	395,240	347,579
15	2007	1,195,897		33,427		33,427	1,162,470	366,178	319,679
16	2008	1,195,897		33,427		33,427	1,162,470	339,441	292,942
17	2009	1,195,897		33,427		33,427	1,162,470	313,867	268,531
18	2010	1,195,897		33,427		33,427	1,162,470	290,618	246,444
19	2011	1,195,897		33,427		33,427	1,162,470	269,693	225,519
20	2012	1,195,897		33,427		33,427	1,162,470	249,931	206,920
21	2013	1,195,897		33,427		33,427	1,162,470	231,332	190,645
22	2014	1,195,897		33,427		33,427	1,162,470	213,894	174,371
23	2015	1,195,897		33,427	345,000	378,427	817,470	138,970	112,811
24	2016	1,195,897		33,427		33,427	1,162,470	183,670	146,471
25	2017	1,195,897		33,427		33,427	1,162,470	169,721	134,846
26	2018	1,195,897		33,427		33,427	1,162,470	156,933	123,222
27	2019	1,195,897		33,427		33,427	1,162,470	145,309	113,922
28	2020	1,195,897		33,427	243,080	276,507	919,390	106,649	82,745
29	2021	1,195,897		33,427		276,507	1,162,470	124,384	95,323
30	2022	1,195,897		33,427		276,507	1,162,470	115,085	87,185
31	2023	1,195,897		33,427		276,507	1,162,470	106,959	80,382
32	2024	1,195,897		33,427		276,507	1,162,470	99,042	73,745
33	2025	1,195,897		33,427	345,000	378,427	817,470	64,482	47,577
34	2026	1,195,897		33,427		33,427	1,162,470	84,913	62,064
35	2027	1,195,897		33,427		33,427	1,162,470	78,623	56,945
36	2028	1,195,897		33,427		33,427	1,162,470	72,799	52,243
37	2029	1,195,897		33,427		33,427	1,162,470	67,407	47,928
38	2030	1,195,897		33,427		33,427	1,162,470	62,413	43,972
39	2031	1,195,897		33,427		33,427	1,162,470	57,790	40,337
40	2032	1,195,897		33,427		33,427	1,162,470	53,474	37,199
41	2033	1,195,897		33,427		33,427	1,162,470	49,545	33,944
42	2034	1,195,897		33,427		33,427	1,162,470	45,876	31,151
43	2035	1,195,897		33,427	345,000	378,427	817,470	29,877	20,092
44	2036	1,195,897		33,427		33,427	1,162,470	39,331	26,219
45	2037	1,195,897		33,427		33,427	1,162,470	36,417	24,054
46	2038	1,195,897		33,427		33,427	1,162,470	33,720	22,068
47	2039	1,195,897		33,427		33,427	1,162,470	31,222	20,230
48	2040	1,195,897		33,427		33,427	1,162,470	28,909	18,574
49	2041	1,195,897		33,427		33,427	1,162,470	23,724	17,040
50	2042	1,195,897		33,427		33,427	1,162,470	24,412	15,112
51	2043	1,195,897		33,427		33,427	1,162,470	22,949	14,298
52	2044	1,195,897		33,427		33,427	1,162,470	21,249	13,150
53	2045	1,195,897		33,427		33,427	1,162,470	19,675	12,071
								+ 54,699	-1,062,523

$$EIRR = \frac{9-r}{1} = \frac{1,062,523}{-1,062,523 - 54,699} = 0.95$$

$$r = 8.05\%$$

In case of Cost 10% increased

$$8-r = \frac{-885,387}{-885,387 - 699,335} = 0.55$$

$$r = 7.45\%$$

In case of Benefit 10% decreased

$$8-r = \frac{890,857}{-890,857 + 533,117} = 0.62$$

$$r = 7.38\%$$

Table Farm Budget

Items (Farm Land, Unit: ha)	1.0 ha Farm		1.5 ha Farm		2.0 ha Farm	
	WOP	WP	WOP	WP	WOP	WP
1. Operated Area - Paddy Field	1.0	1.0	1.5	1.5	2.0	2.0
2. Planted Area						
a. - Rainfed Paddy	0.8	—	1.2	—	1.6	—
- Irrigated paddy	—	0.89	—	1.34	—	1.79
b. - Rain season	—	0.28	—	0.44	—	0.57
c. - Dry season	—	—	—	—	—	—
d. - Rainfed Peanut	0.2	—	0.3	—	0.4	—
e. - Irrigated Peanut	—	0.29	—	0.45	—	0.58
Sub total						
Rainy season	1.0	0.89	1.5	1.34	2.0	1.79
Dry season	—	0.57	—	0.89	—	1.15
3. Gross Production (ton)	1.20	—	1.80	—	2.40	—
a	—	3.56	—	5.36	—	7.16
b	—	1.26	—	1.98	—	2.565
c	0.10	—	0.15	—	0.20	—
d	—	0.725	—	2.225	—	2.875
e	—	—	—	—	—	—
4. Gross Production Value (US\$)						
a	170.4	—	255.6	—	340.8	—
b	—	505.52	—	761.12	—	1,016.72
c	—	195.30	—	306.90	—	397.575
d	22.85	—	34.275	—	45.7	—
e	—	165.662	—	508.412	—	656.938
Sub total	193.25	866.482	289.875	1,576.432	386.5	2,071.233
5. Production Cost (US\$)						
a	1,720	—	258.0	—	344.0	—
b	—	321.29	—	483.74	—	464.19
c	—	95.76	—	150.48	—	194.94
d	29.6	—	44.4	—	59.2	—
e	—	80.04	—	124.20	—	160.08
Sub total	201.6	497.09	302.4	758.42	403.2	1,001.21
6. Net Production Value of Farm						
Without Project	-8.35	—	-12.525	—	-16.5	—
With Project	—	369.392	—	818.012	—	1,070.012
7. Income from non-project <: 1						
Agricultural Income	30.0	35.71	35.71	50.0	35.71	71.42
Livestock	24.3	21.42	21.42	28.57	35.71	42.86
Non-Agriculture	42.8	21.43	35.70	35.70	35.70	35.70
8. Total of Farm Income	+88.75	447.95	+80.135	932.282	90.62	1,220.02
9. Return of family						
man-day/year	124.8	175.93	187.2	268.7	249.6	354.5
US\$	124.8	156.94	187.2	239.034	249.6	316.112
10. Tax (5% of Rainy season paddy)	8.52	25.276	12.78	38.056	17.04	50.836
11. Irrigation water charge	—	41.61	—	66.405	—	83.79
12. Household Expenditure						
Food expenditure for own farm <: 2	156.2	156.2	342.82	242.82	315.24	315.24
Production cost of non-project area crops	21.43	21.43	—	—	5.0	5.0
Other expenditure	7.15	7.15	2.15	2.15	4.3	4.3
13. Disposable Income (US\$)						
Gross Farm Income	116.45	526.332	174.675	1,057.046	233.10	1,386.342
Gross Over all Income	205.20	604.89	267.335	1,171.282	340.22	1,536.132
Disposable Income	+11.9	353.224	9.585	821.851	-1.35	1,076.966

<: 1 Based on farm survey

<: 2 Family size: 5, 7, 9 P/Fa, Annual consumption of paddy per capita: 330 kg

<: 3 Based on farm survey



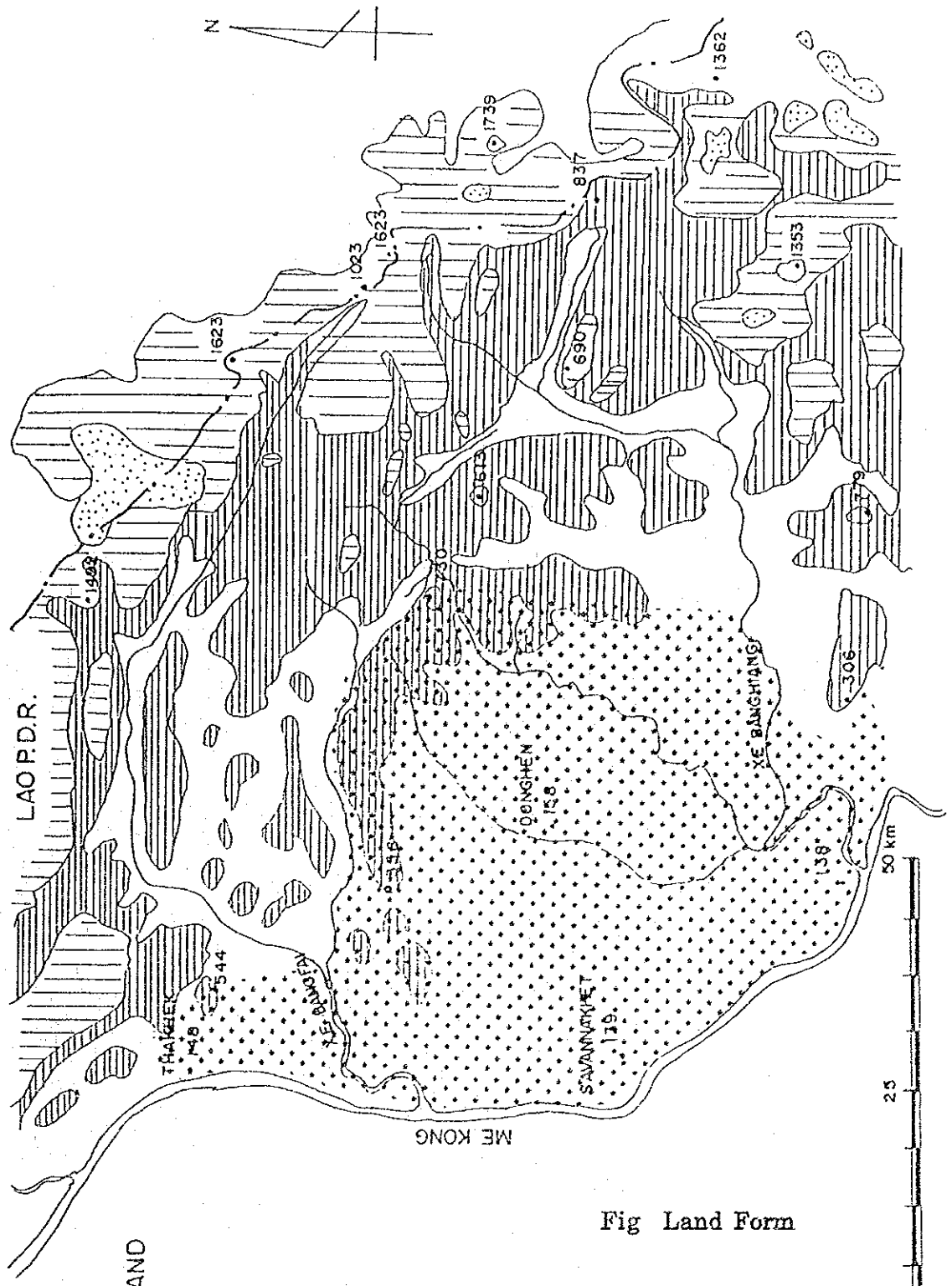
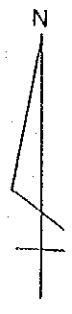


Fig Land Form

LEGEND

- < 200 m
- ▨ 200 - 500 m
- ▧ 500 - 1000 m
- ▩ > 1000 m
- ▤ STUDY AREA








- LEGEND**
-  ORTHIC ACRISOLS
  -  FERRIC ACRISOLS
  -  DISTRIC GLEYSOLS
  -  LOWLAND SOILS
  -  MOUNTAINOUS DISTRICT

Fig Soil Map

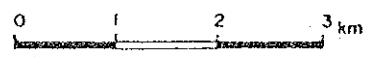







FIG.

LEGEND

	Paddyfield	Normal upland field	Land under Permanent crops	Area (ha)
	IVgpfna	IVgpw(w)fnase	IVgp(w)fnane	112,100
	IIIifna	IV(w)e	III tw(w) fne	194,100
	IIIifna	IV(w)e	III wn	445,500
	III n	IV(w)	III wn	240,300
	III na	IVw(w)a	IV wa	208,100
				1,200,100

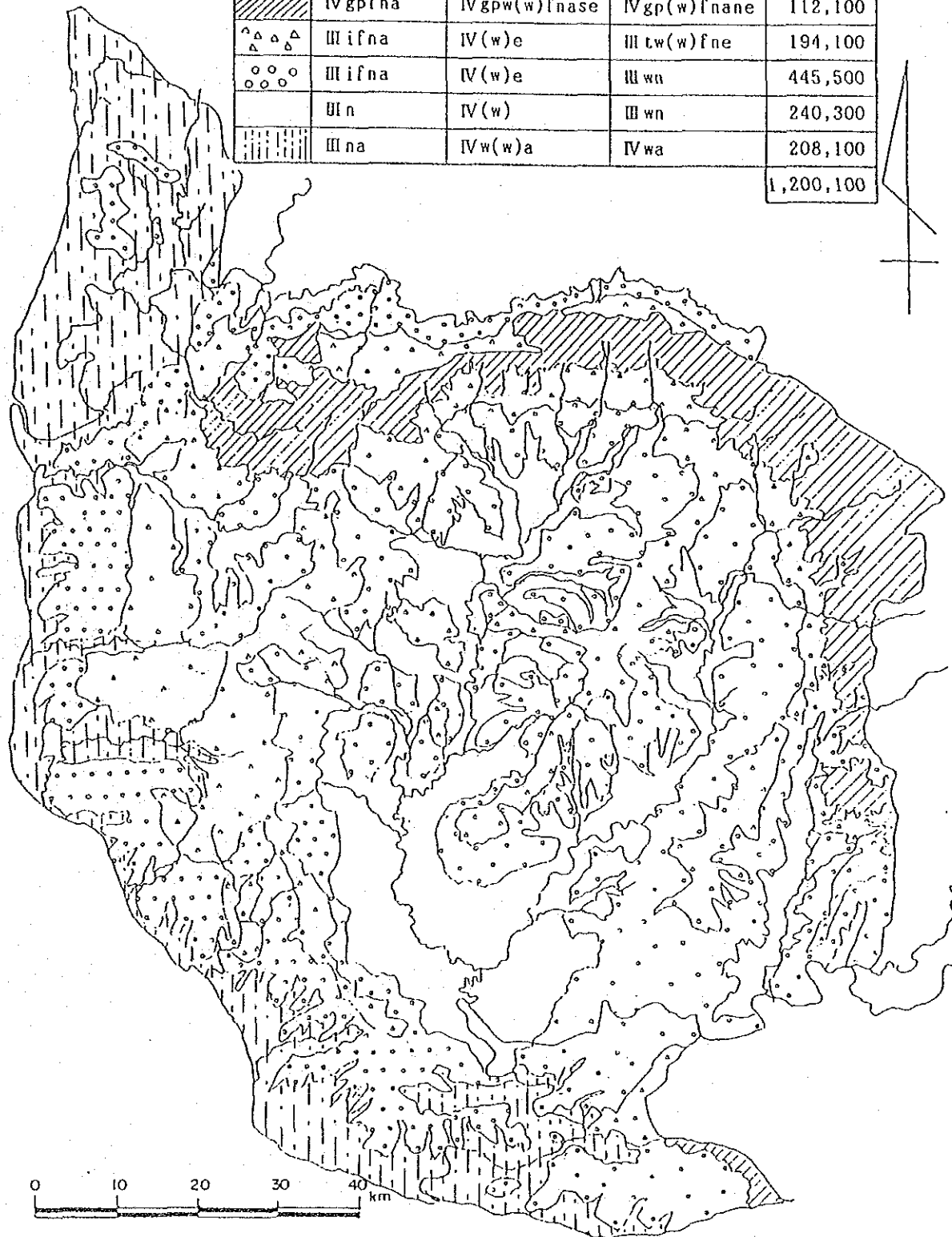


Fig Land Classification



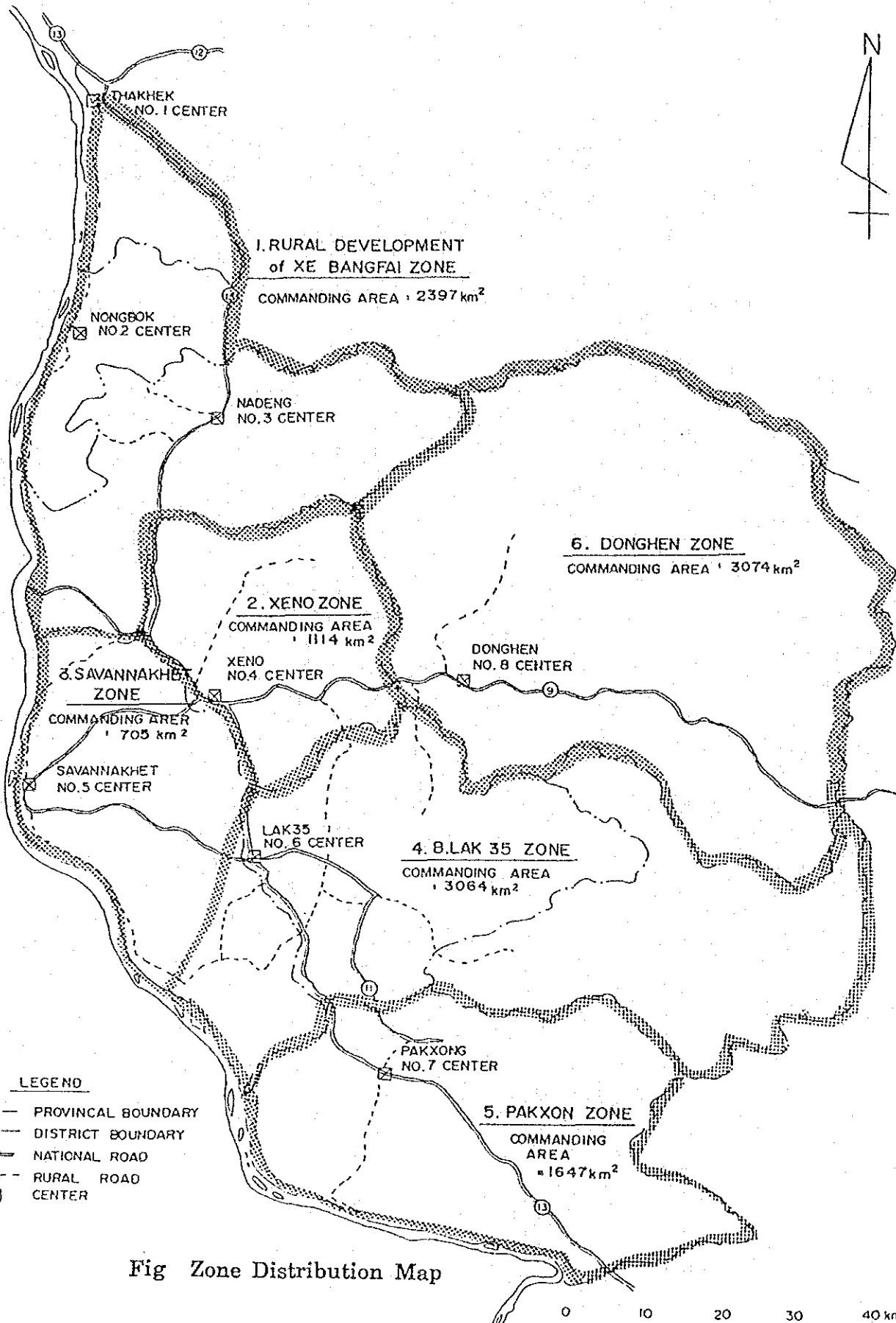
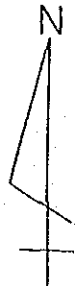
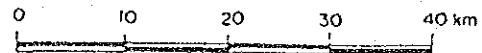
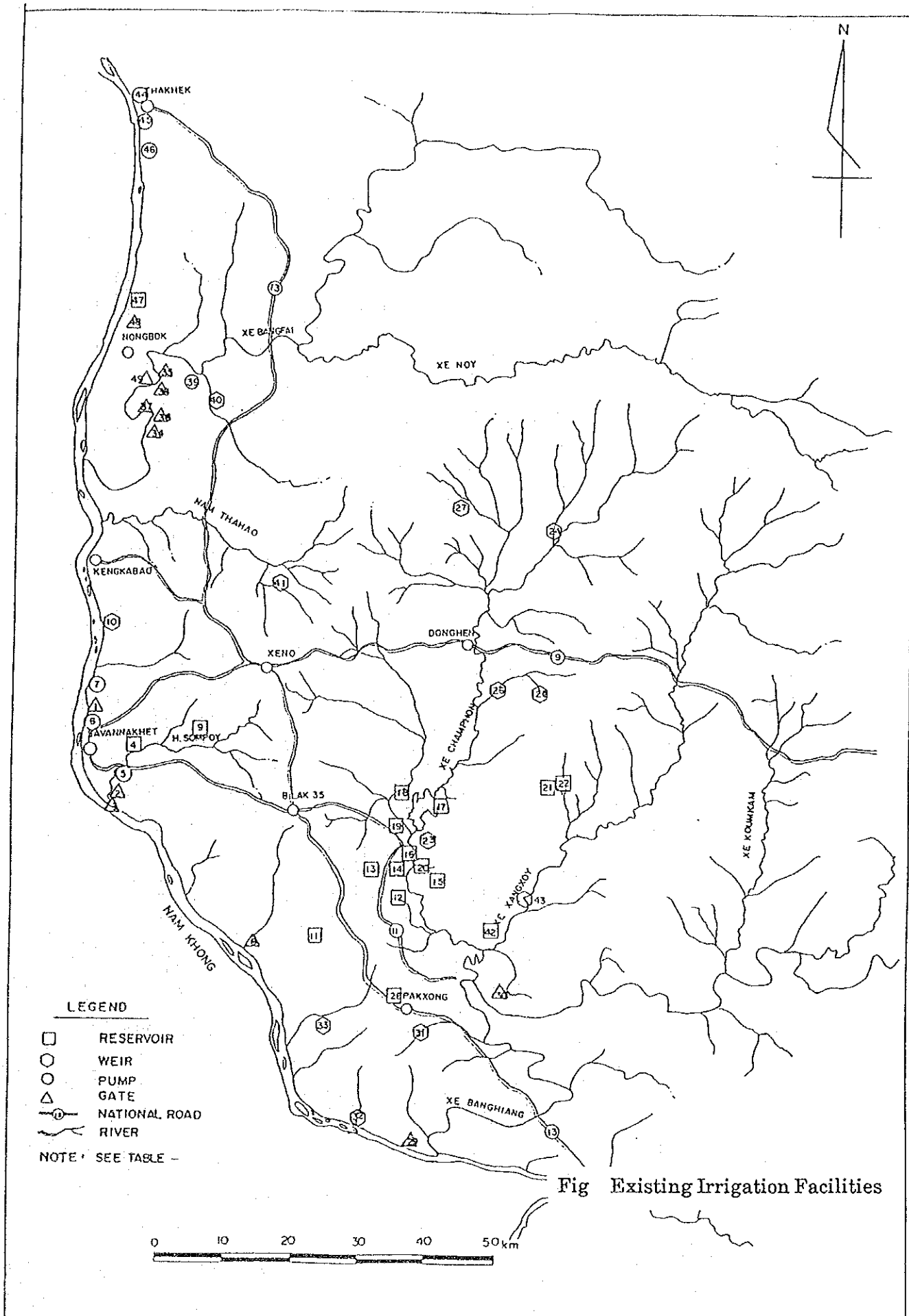
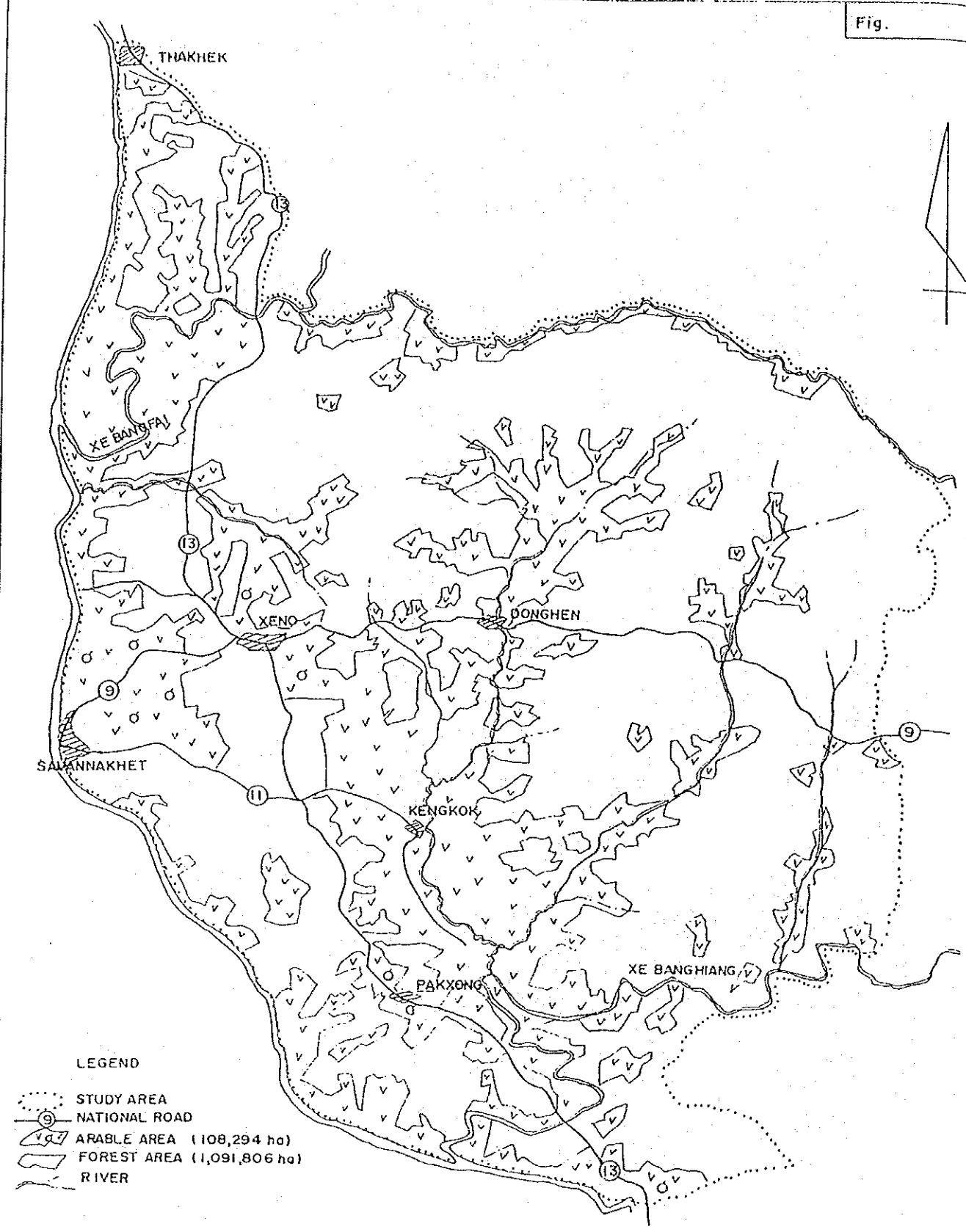


Fig Zone Distribution Map







LEGEND






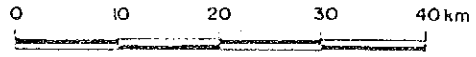
-  STUDY AREA
-  NATIONAL ROAD
-  ARABLE AREA (108,294 ha)
-  FOREST AREA (1,091,806 ha)
-  RIVER

Fig Land Use Plan



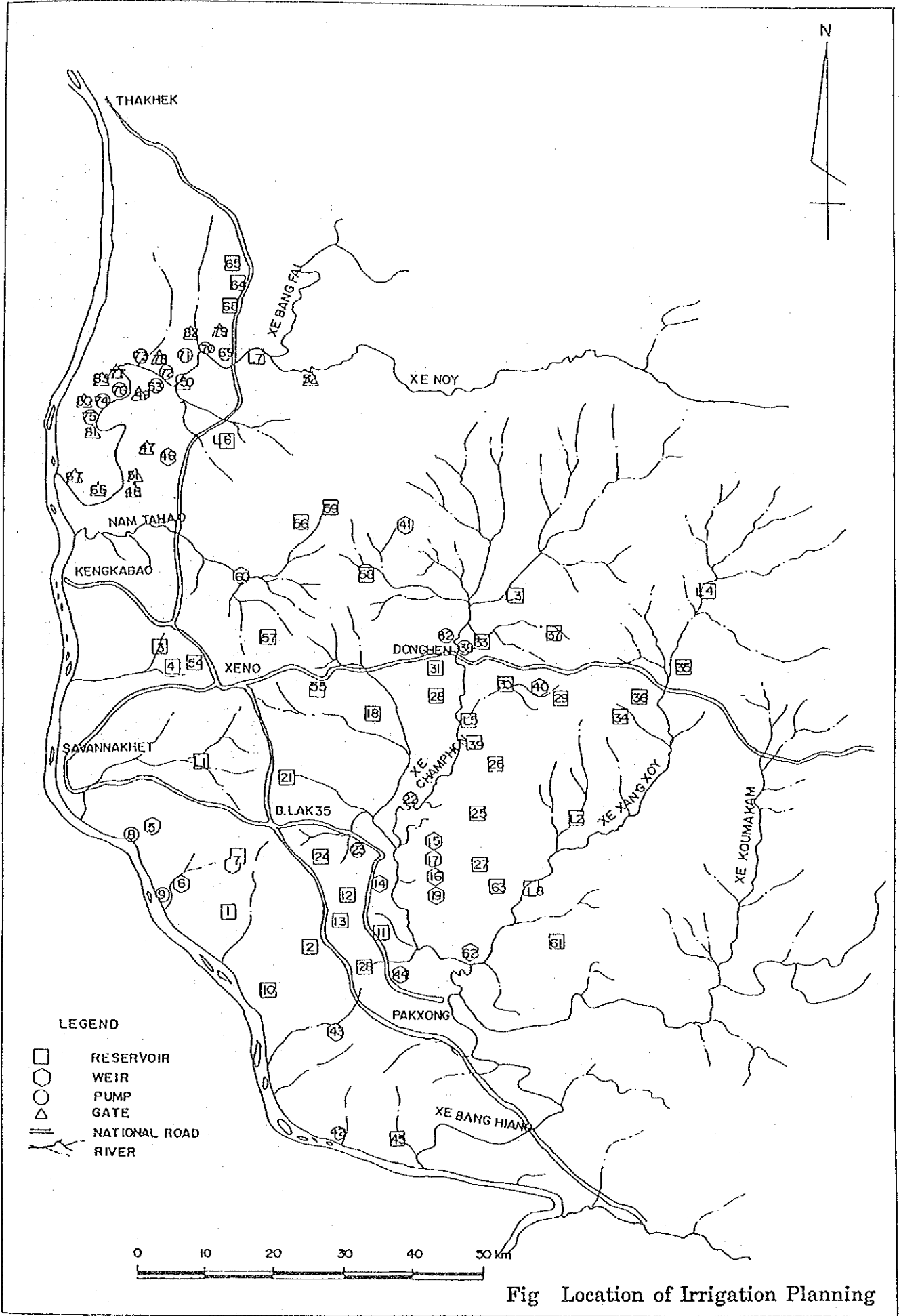


Fig Location of Irrigation Planning



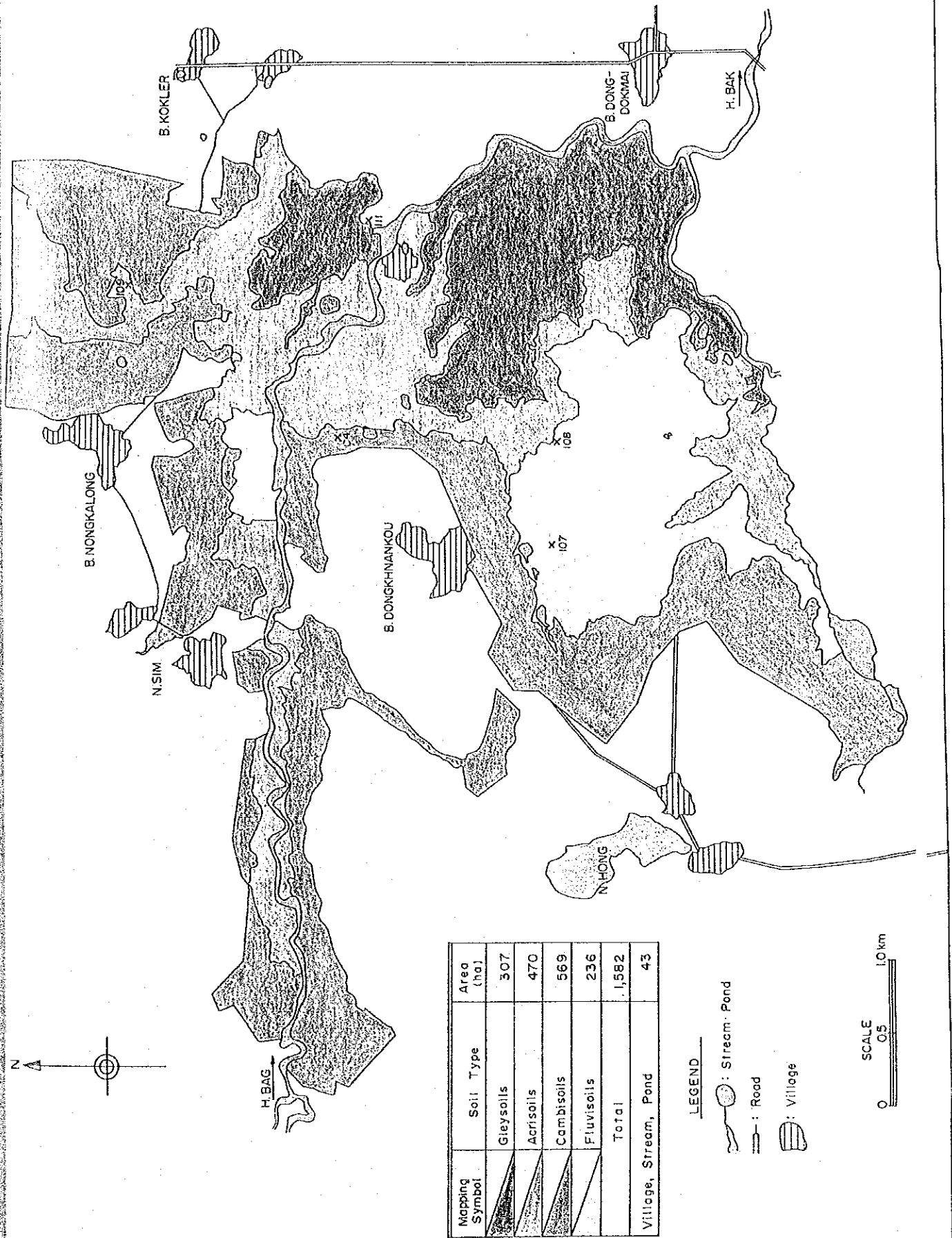
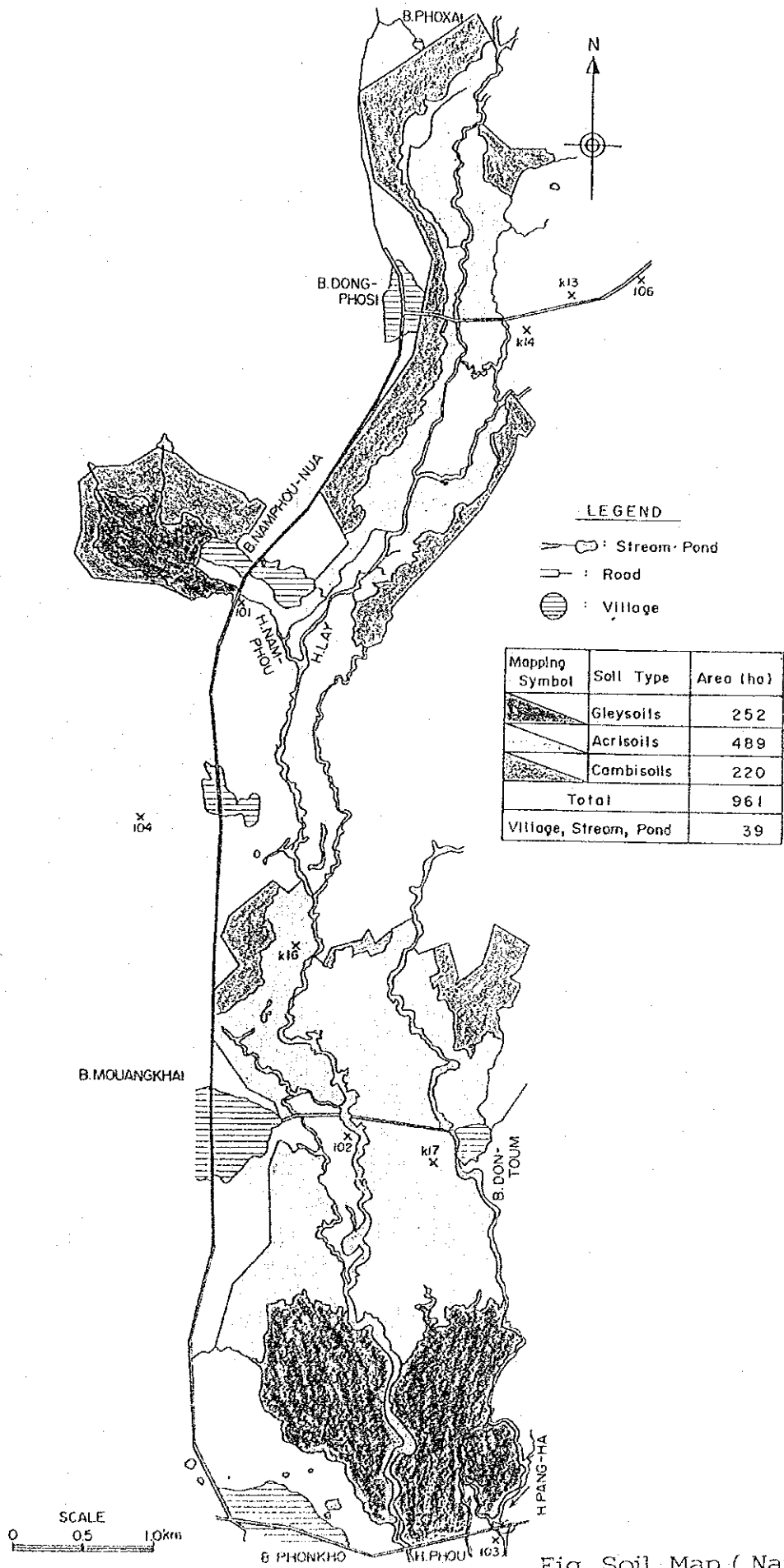


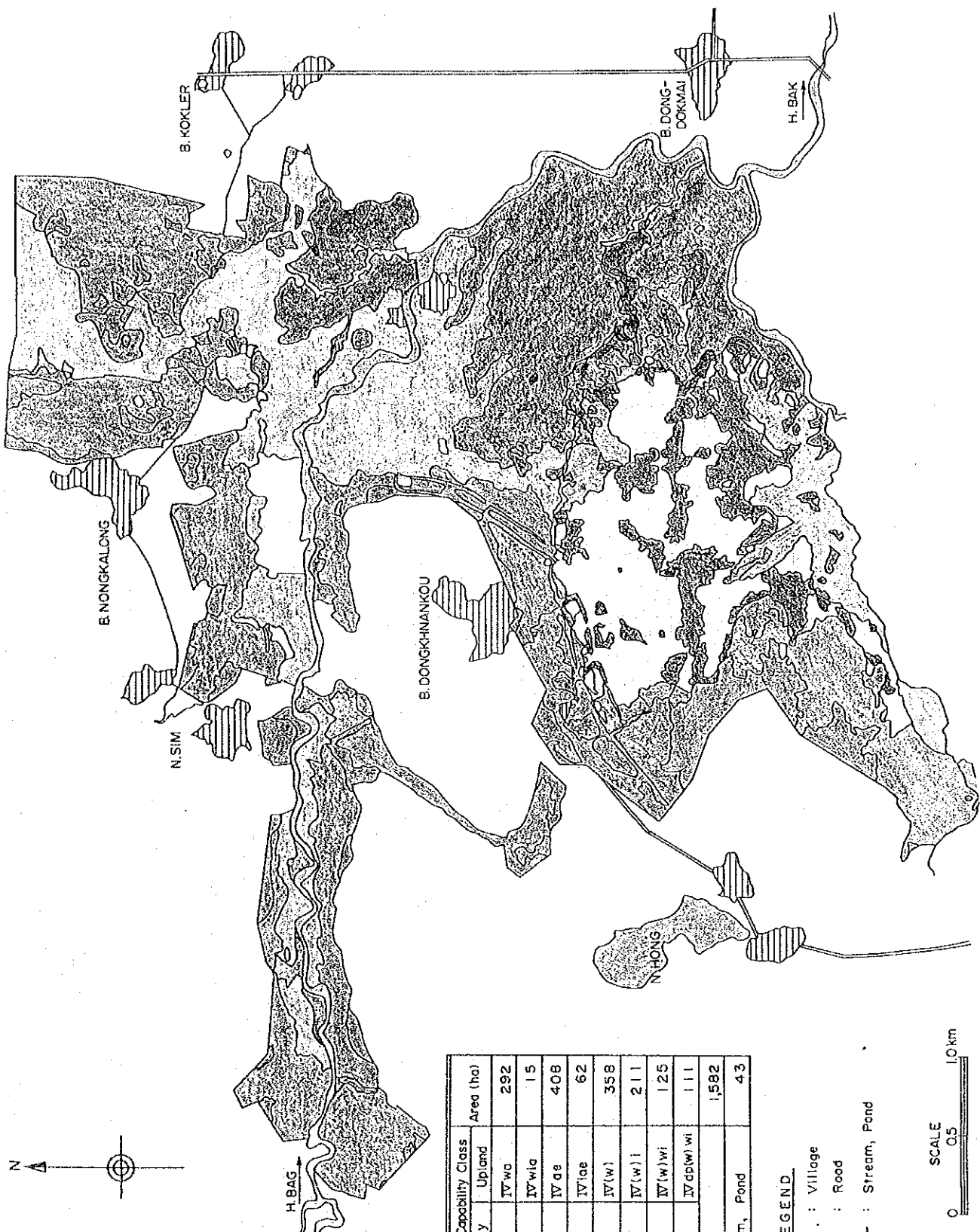
Fig Soil Map ( H. Bak Area )











Mapping Symbol	Land Capability Class		Area (ha)
	Paddy	Upland	
	III rna	IV wa	292
	IV ta	IV wa	15
	III na	IV ae	408
	IV i	IV ae	62
	III fa	IV (w)	358
	IV i	IV (w) l	211
	IV i	IV (w) wi	125
	IV dpi	IV dp(w) wi	111
Total			1,582
Village, Stream, Pond			43

**LEGEND**  
 : Village  
 : Road  
 : Stream, Pond

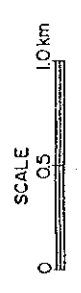
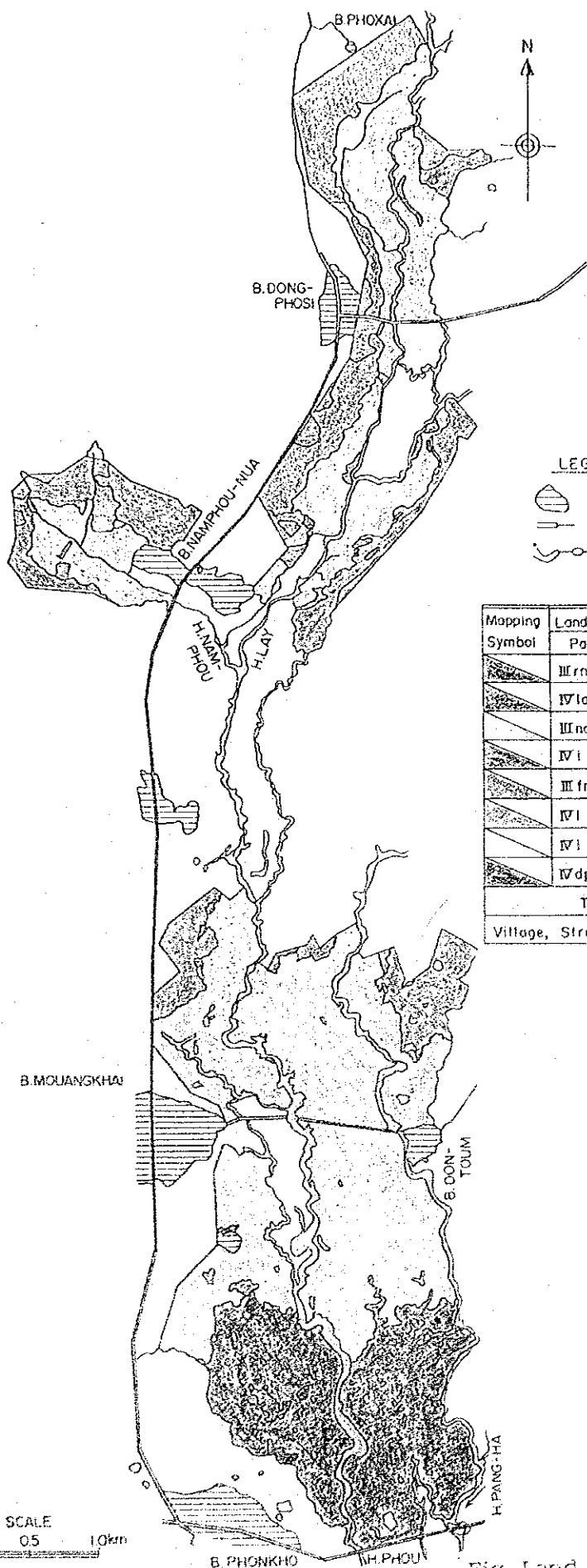





Fig Land Classification ( H. Bak Area )





LEGEND

-  : Village
-  : Road
-  : Stream, Pond








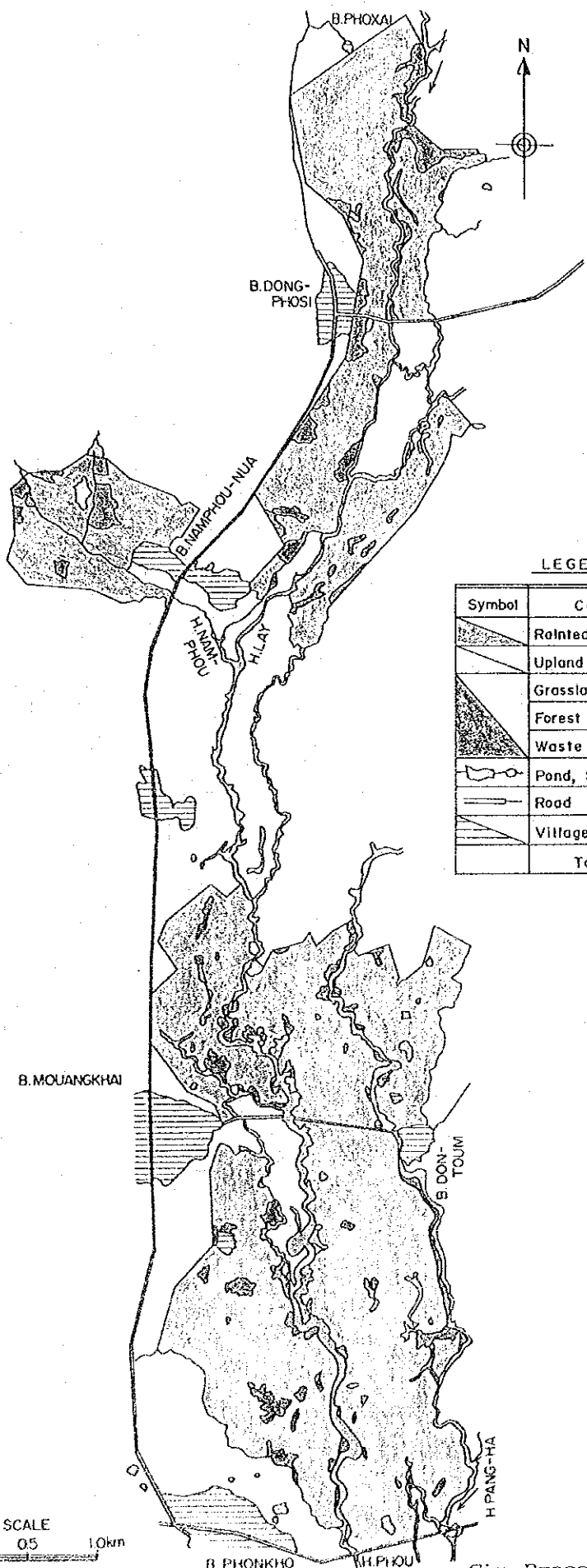
Mapping Symbol	Land Capability Class		Area (ha)
	Paddy	Upland	
	IIIrno	IVwa	239
	IVla	IVwla	13
	III no	IVae	460
	IV i	IVlae	29
	III fn	IV(w)	135
	IV l	IV(w)i	85
	IVdpi	IVop(w)i	—
Total			961
Village, Stream, Pond			39

Fig Land Classification ( Namphou Area )



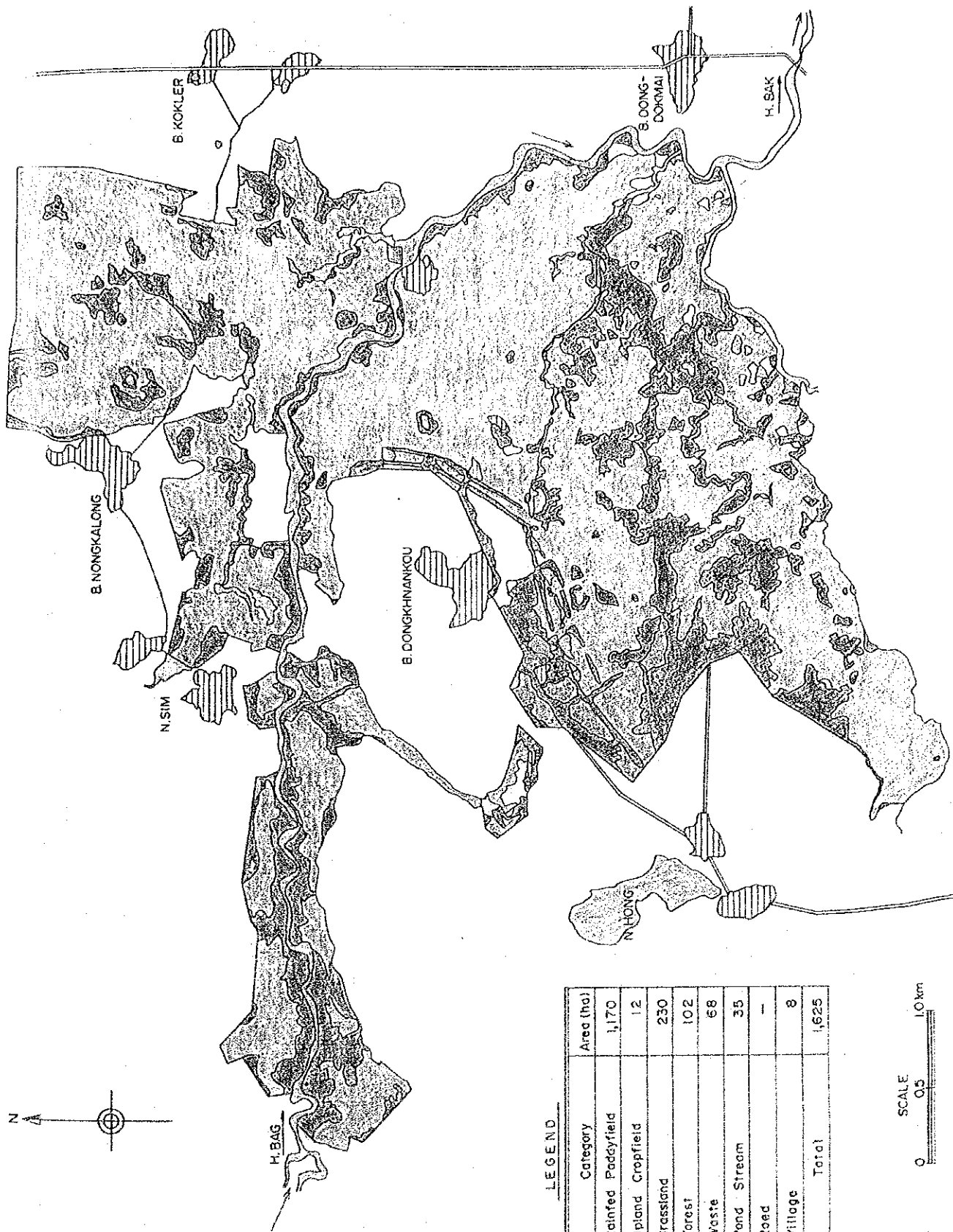


**LEGEND**

Symbol	Category	Area (ha)
	Rainfed Paddyfield	835
	Upland Cropland	3
	Grassland	59
	Forest	18
	Waste	46
	Pond, Stream	37
	Road	-
	Village	2
	<b>Total</b>	<b>1,000</b>

Fig Present Land Use ( H. Bak Area )





**LEGEND**

Symbol	Category	Area (ha)
	Rainfed Paddyfield	1,170
	Upland Cropfield	12
	Grassland	230
	Forest	102
	Waste	68
	Pond	35
	Stream	—
	Road	—
	Village	8
	Total	1,625

Fig Present Land Use ( Namphou Area )





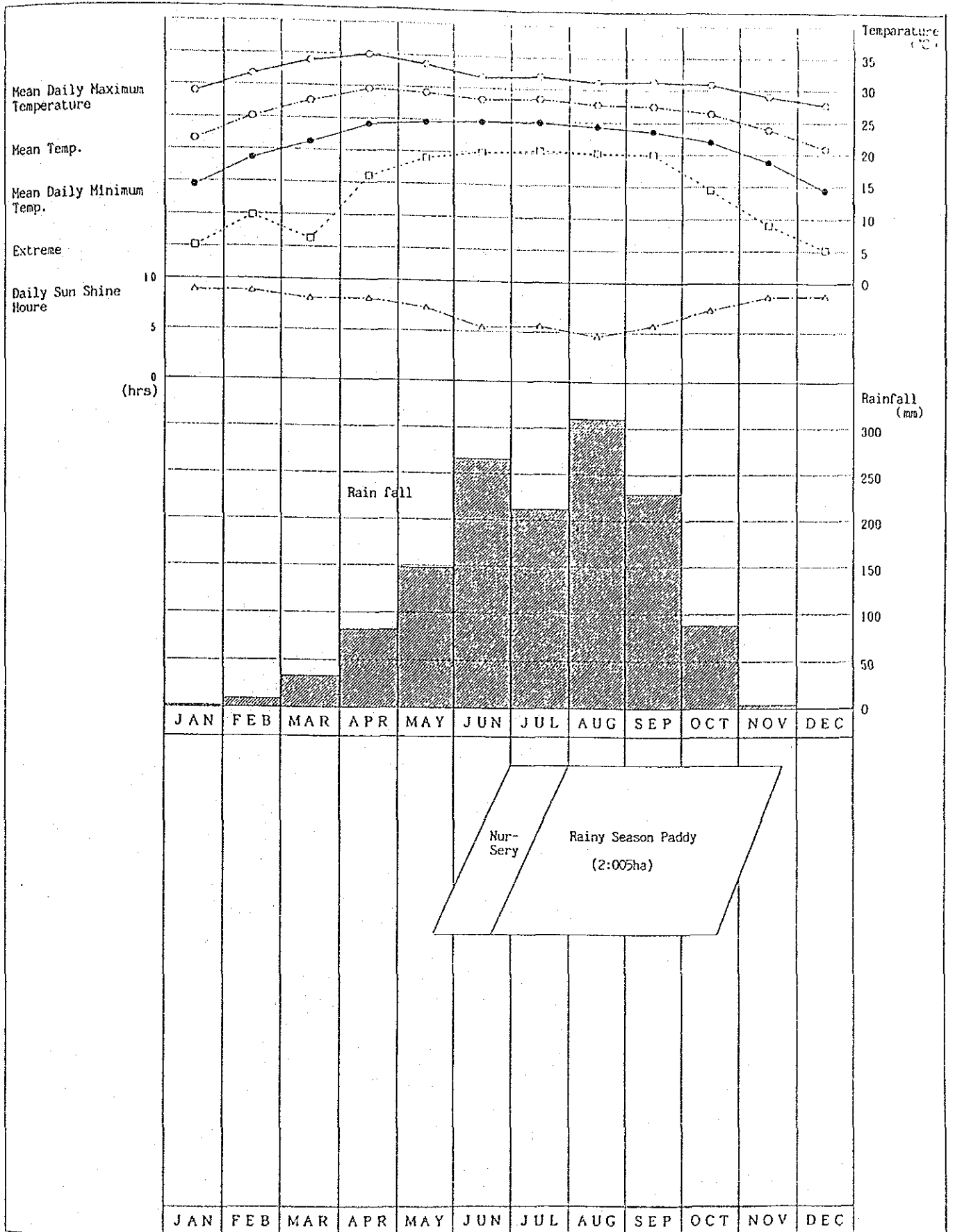
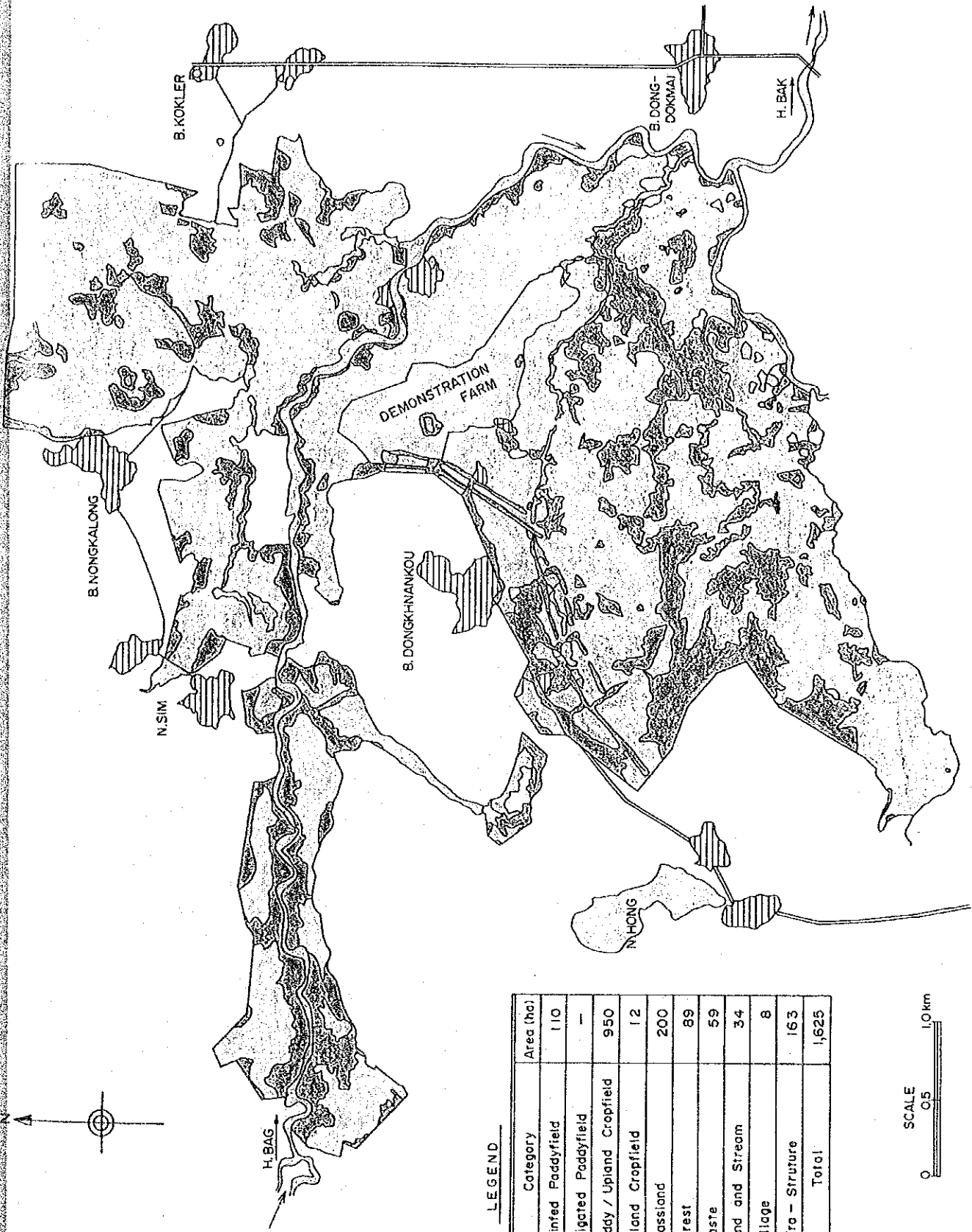


Fig. Present Cropping Pattern and Climatic Condition





LEGEND

Symbol	Category	Area (ha)
[Symbol: Diagonal lines /]	Rainfed Paddyfield	110
[Symbol: Diagonal lines \]	Irrigated Paddyfield	-
[Symbol: Stippled]	Paddy / Upland Cropfield	950
[Symbol: Dotted]	Upland Cropfield	12
[Symbol: Horizontal lines]	Grassland	200
[Symbol: Vertical lines]	Forest	89
[Symbol: Wavy lines]	Waste	59
[Symbol: Circle with dot]	Pond and Stream	34
[Symbol: Square with dot]	Village	8
[Symbol: Horizontal lines]	Infra - Structure	163
[Symbol: Stippled]	Total	1,625

Fig Proposed Land Use ( H. Bak Area )



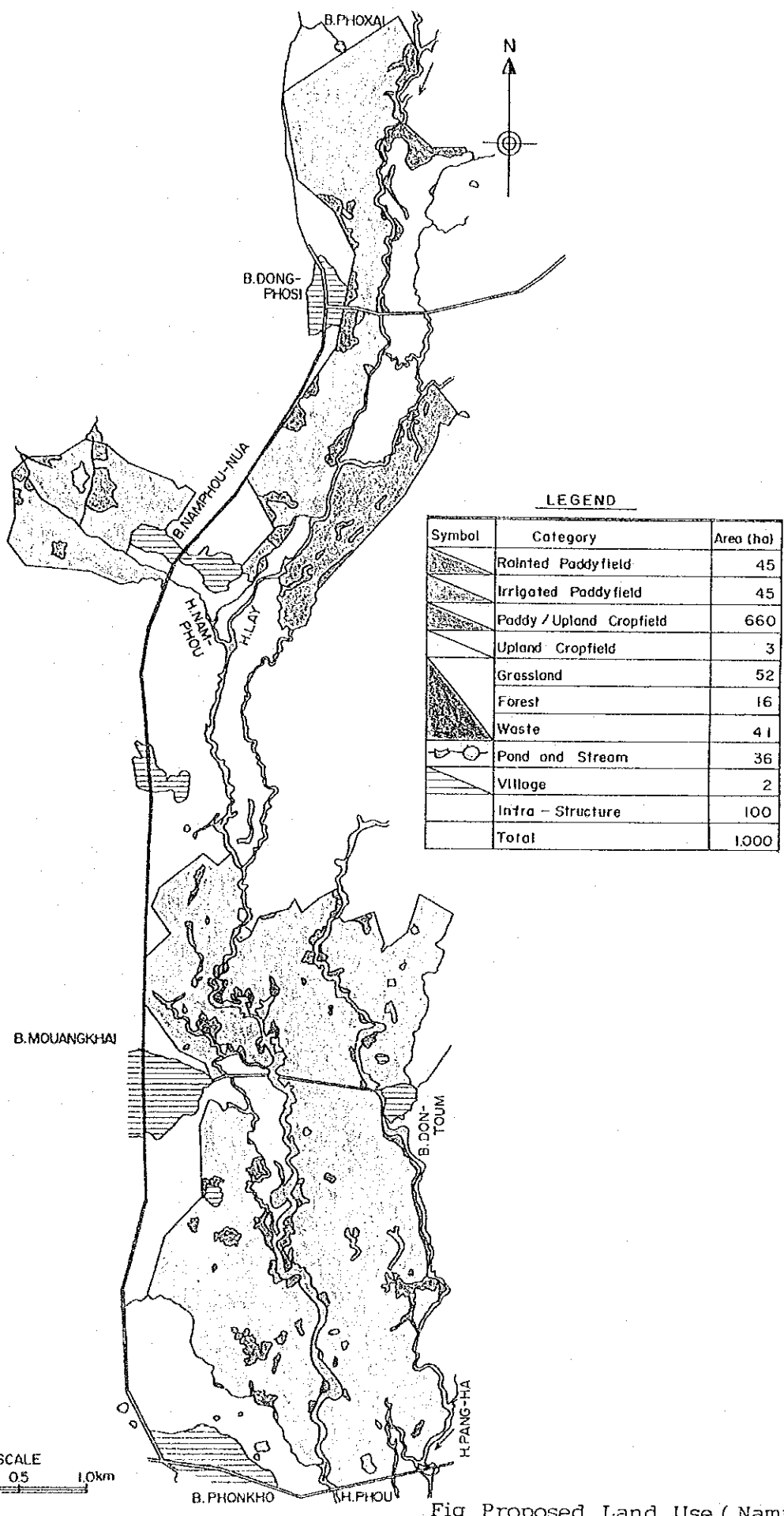


Fig Proposed Land Use ( Namphou Area )



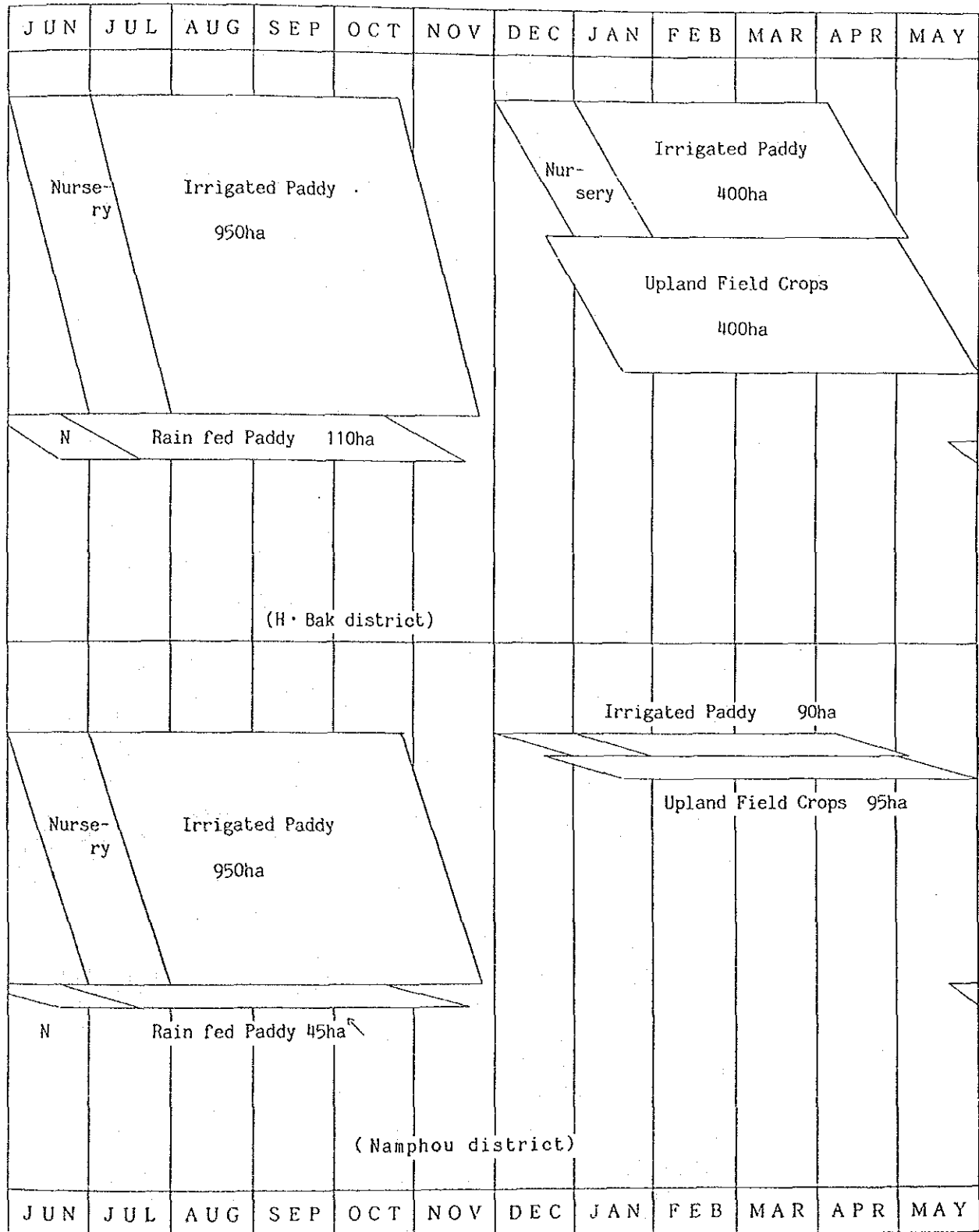


Fig Proposed Cropping Pattern



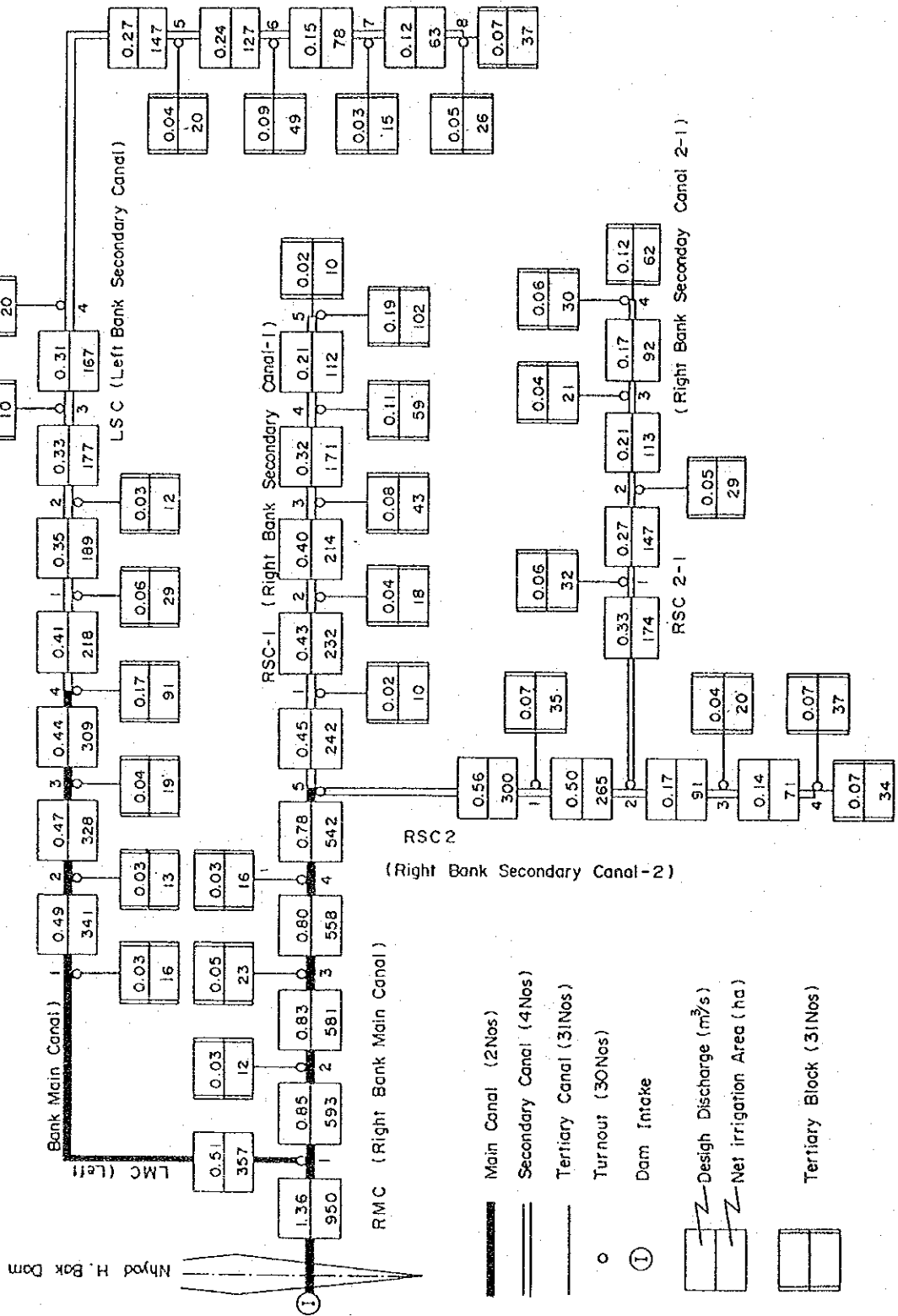


Fig Irrigation Flow Diagram (N. H. BAK)

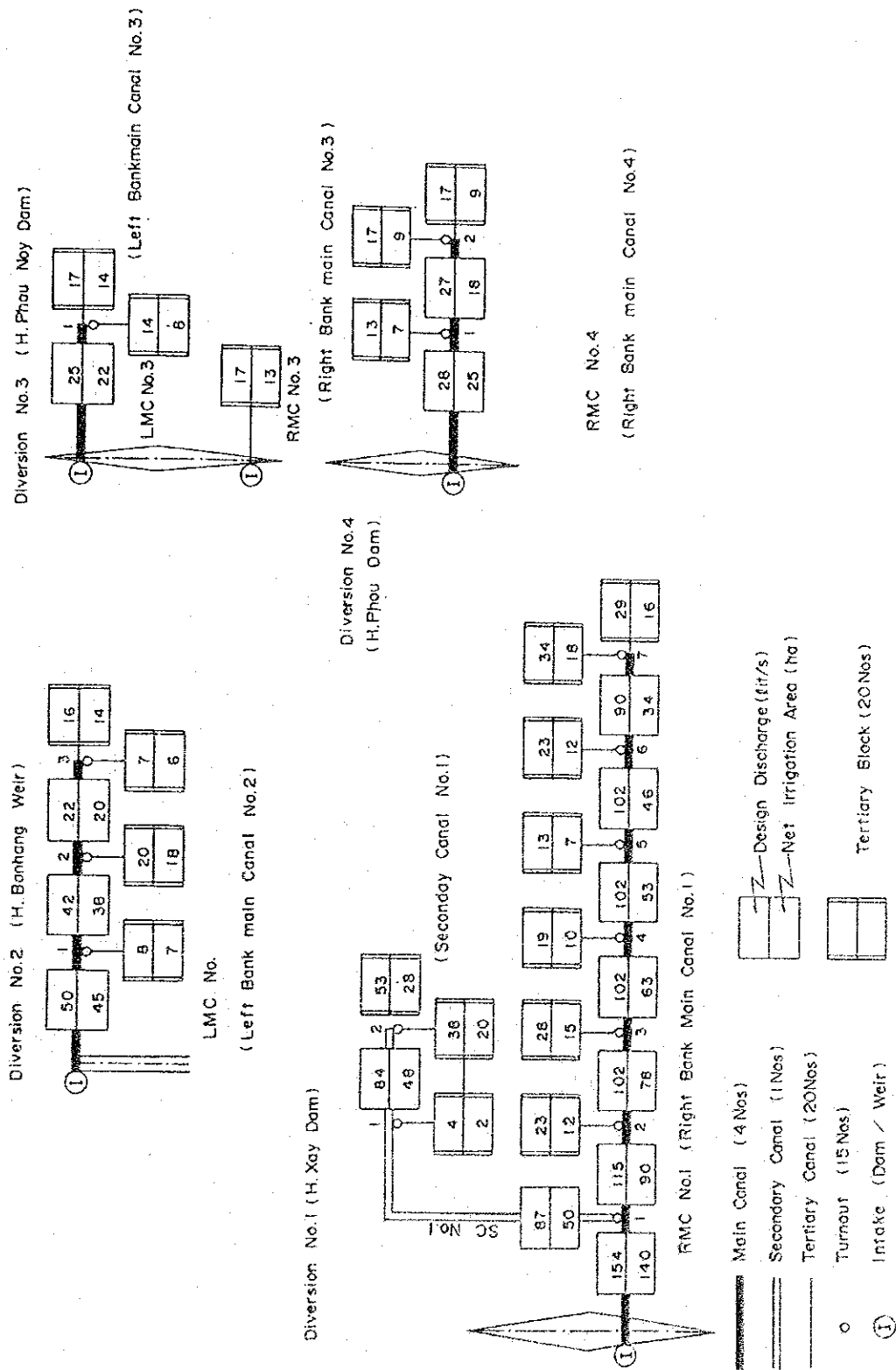


Fig Irrigation Flow Diagram (NAM. PHOU)

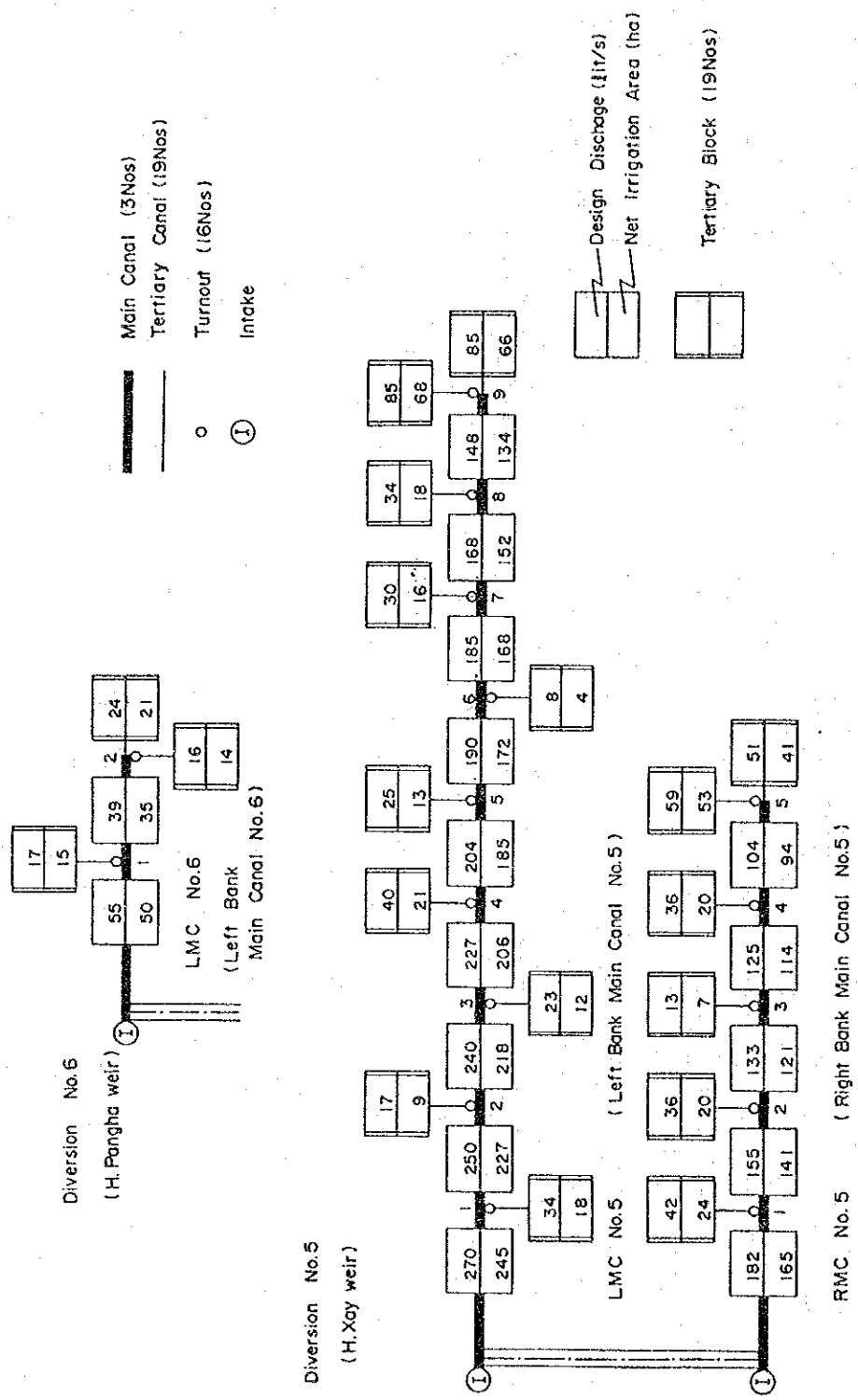
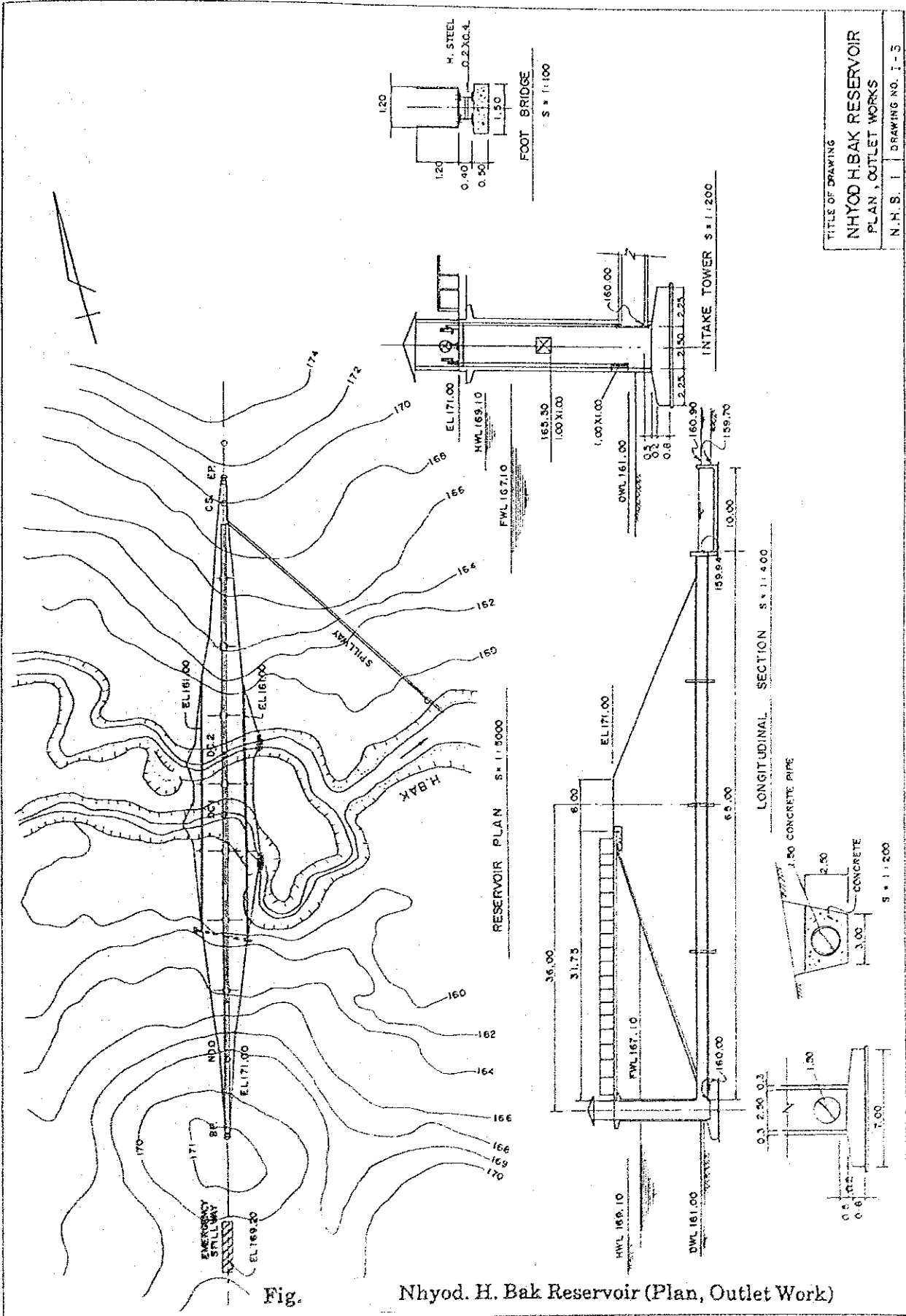
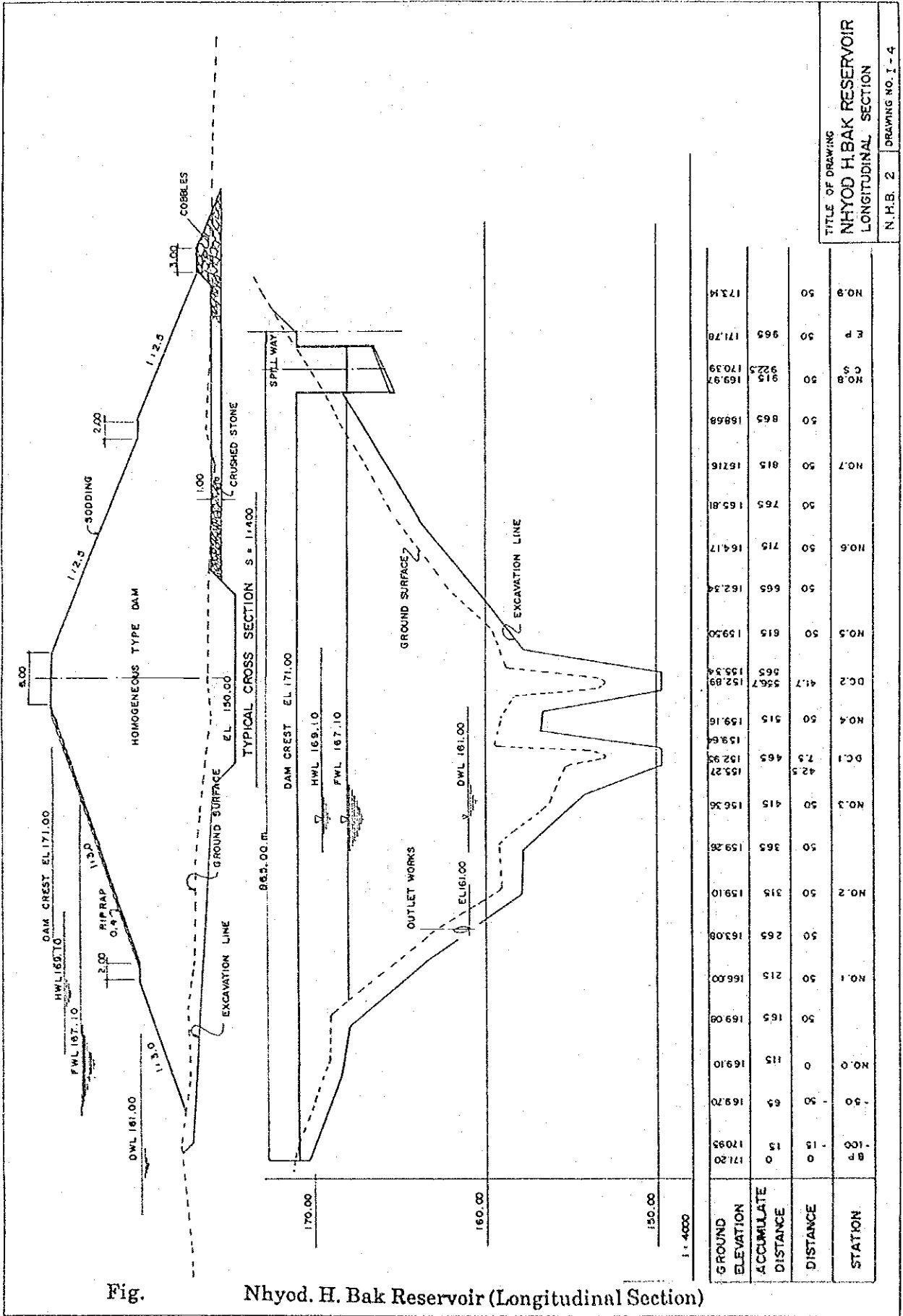


Fig Irrigation Flow Diagram (NAM, PHOU)



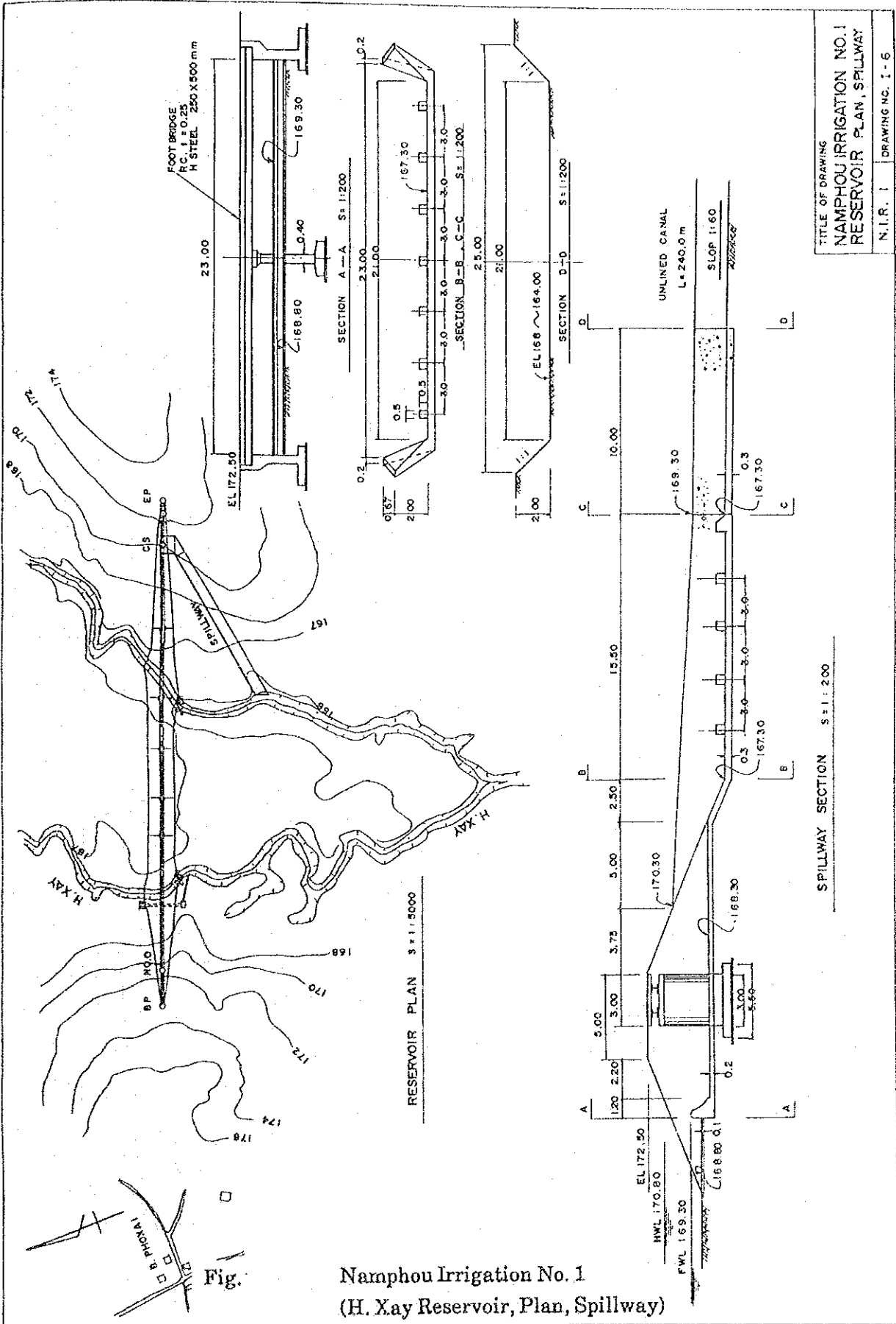
TITLE OF DRAWING  
**NHYOD H.BAK RESERVOIR**  
 PLAN, OUTLET WORKS  
 N.H.S. I DRAWING NO. I-5

Fig. Nhyod. H. Bak Reservoir (Plan, Outlet Work)



STATION	DISTANCE	ACCUMULATE DISTANCE	ELEVATION	GROUND
B 4	0	0	171.20	
100	15	15	170.95	
- 50	50	65	169.70	
NO. 0	0	115	169.10	
NO. 1	50	165	169.08	
NO. 2	50	215	166.00	
NO. 3	50	265	163.08	
NO. 4	50	315	159.10	
NO. 5	50	365	159.28	
NO. 6	50	415	156.26	
NO. 7	50	465	152.27	
NO. 8	50	515	148.64	
NO. 9	50	565	145.16	
DC. 1	41.7	606.7	132.89	
NO. 5	50	657.4	129.54	
NO. 6	50	707.4	126.34	
NO. 7	50	757.4	123.17	
NO. 8	50	807.4	120.16	
NO. 9	50	857.4	117.20	
F P	30	915	114.70	
NO. 9	50	965	112.34	

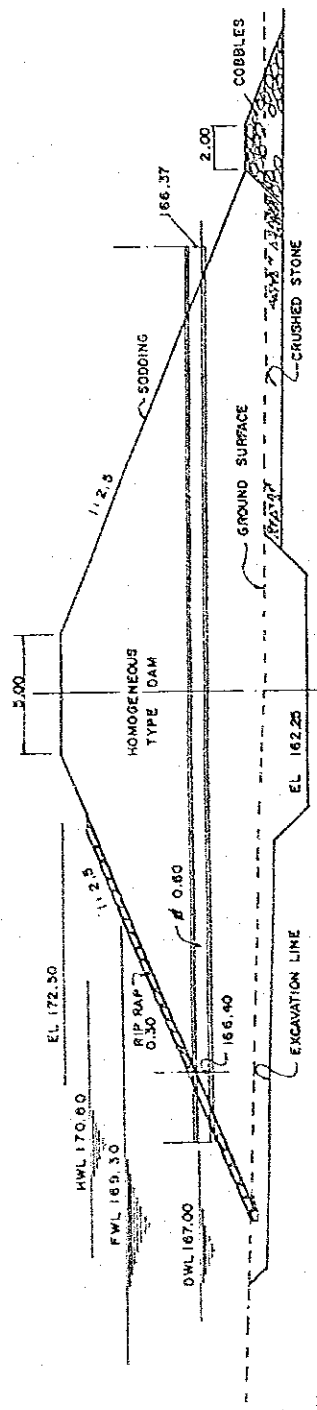
TITLE OF DRAWING  
**NHYOD H. BAK RESERVOIR**  
 LONGITUDINAL SECTION  
 N. H. B. 2 DRAWING NO. I - 4



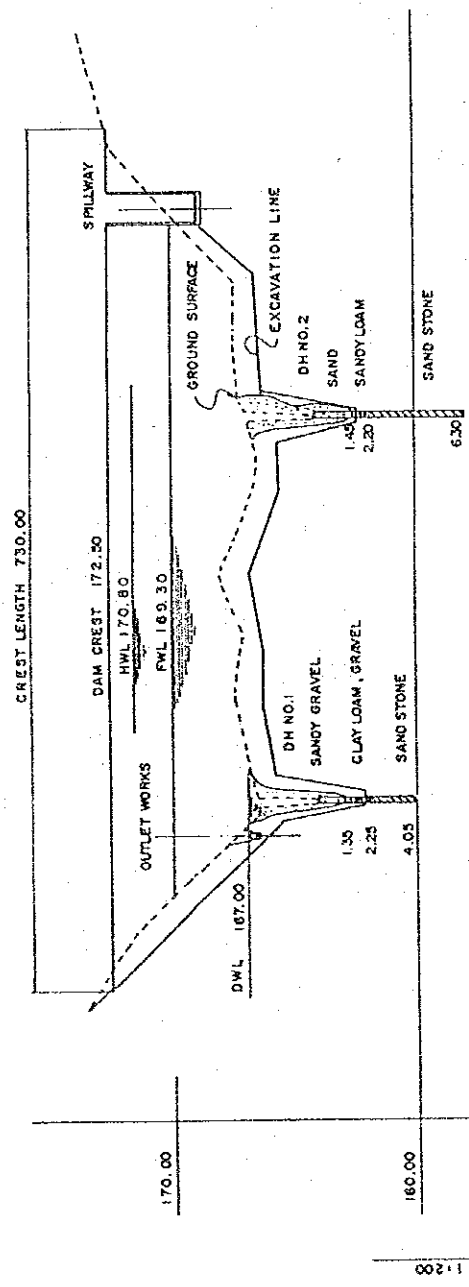
TITLE OF DRAWING  
**NAMPHOU IRRIGATION NO. 1**  
**RESERVOIR PLAN, SPILLWAY**

N. I. R. 1 | DRAWING NO. I - 6

Namphou Irrigation No. 1  
 (H. Xay Reservoir, Plan, Spillway)

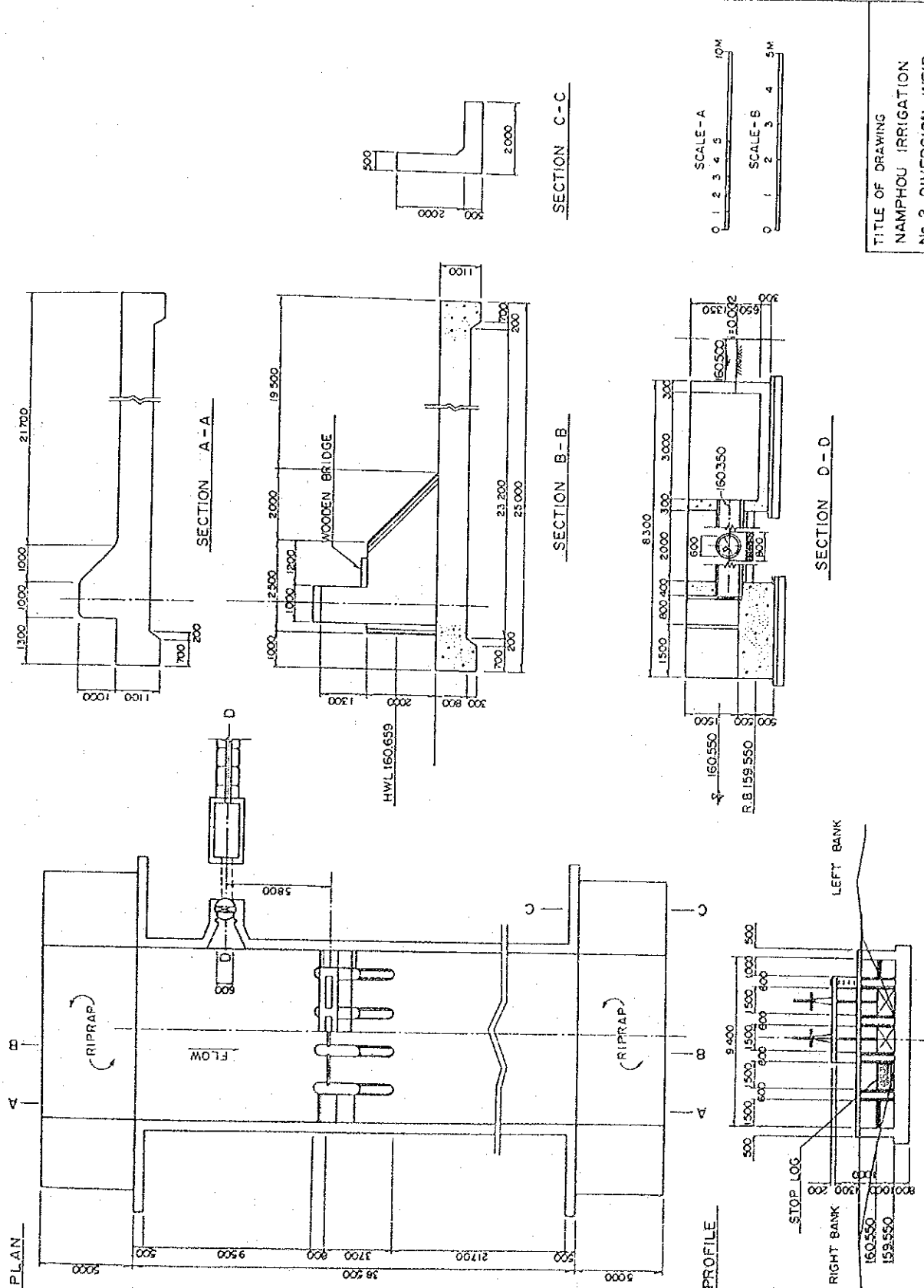


TYPICAL CROSS SECTION S = 1:200



GROUND ELEVATION	ACCUMULATE DISTANCE	DISTANCE	STATION
173.00	0	- 50	S.P.
172.70	50	0	N.0.0
172.27	50	171.45	
170.47	100	168.80	
169.86	150	166.53	N.0.1
167.50	200	167.00	
167.36	250	167.51	N.0.2
167.50	300	167.12	
167.50	350	168.00	N.0.3
167.50	400	167.17	
166.57	450	166.57	N.0.4
164.03	500	167.36	
163.27	550	167.50	N.0.5
167.50	600	167.50	
167.47	650	169.86	N.0.6
167.50	700	172.27	
173.00	750	172.70	E.P.

Fig. Namphou Irrigation No. 1  
 (H. Xay Reservoir, Longitudinal Section)



SCALE - A  
0 1 2 3 4 5  
10M

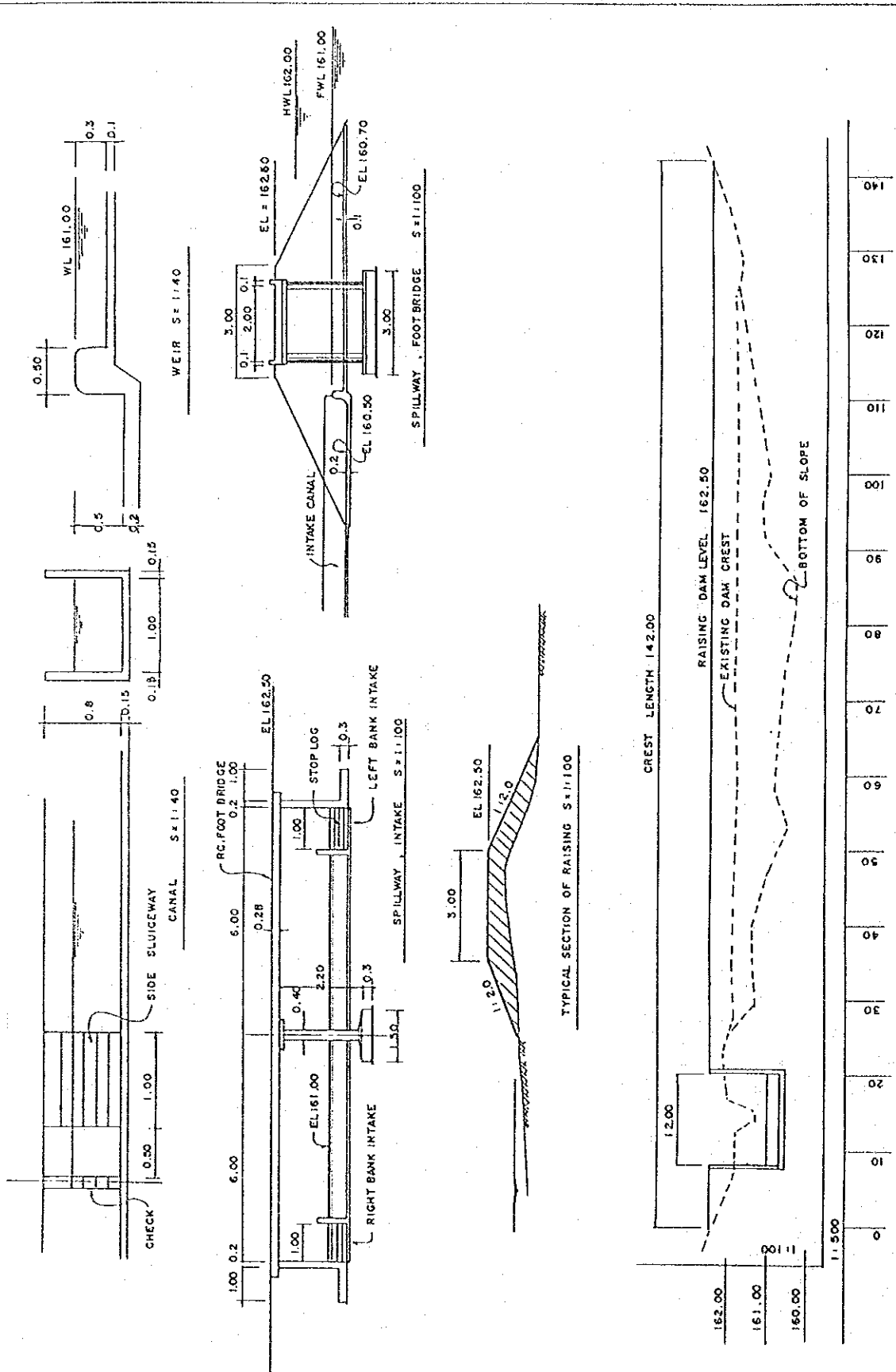
SCALE - B  
0 1 2 3 4 5  
5M

TITLE OF DRAWING  
NAMPHOU IRRIGATION  
NO. 2 DIVERSION WEIR

DRAWING NO. I-2

Fig. Namphou Irrigation No. 2 (H. Banhang Weir)





TITLE OF DRAWING  
**NAMPHOU IRRIGATION  
 NO. 3 RESERVOIR**  
 DRAWING NO. I-10

Fig. Namphou Irrigation No. 3 (H. Phou Noy Reservoir)

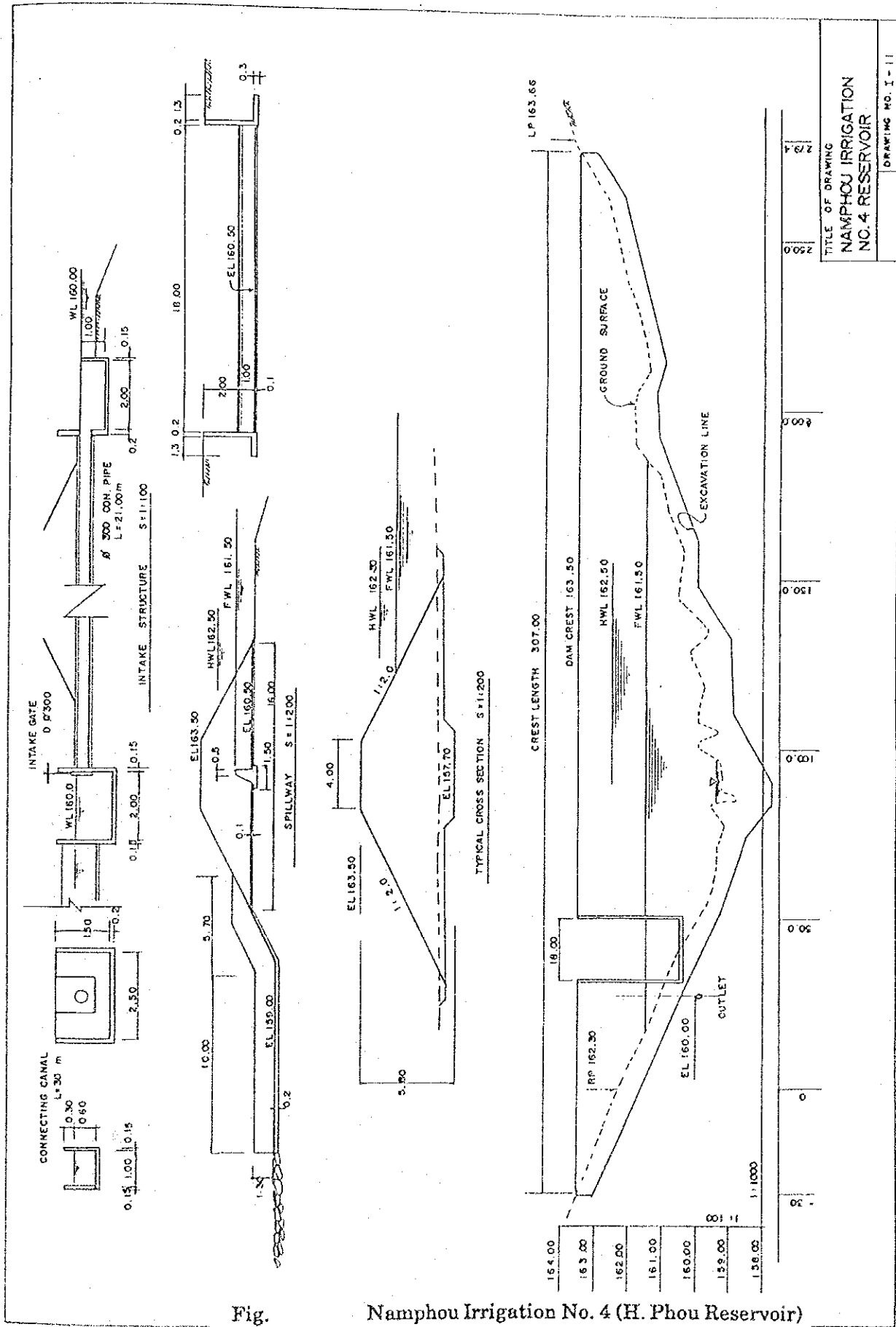


Fig.

Namphou Irrigation No. 4 (H. Phou Reservoir)

TITLE OF DRAWING  
 NAMPHOU IRRIGATION  
 NO. 4 RESERVOIR  
 DRAWING NO. I-11

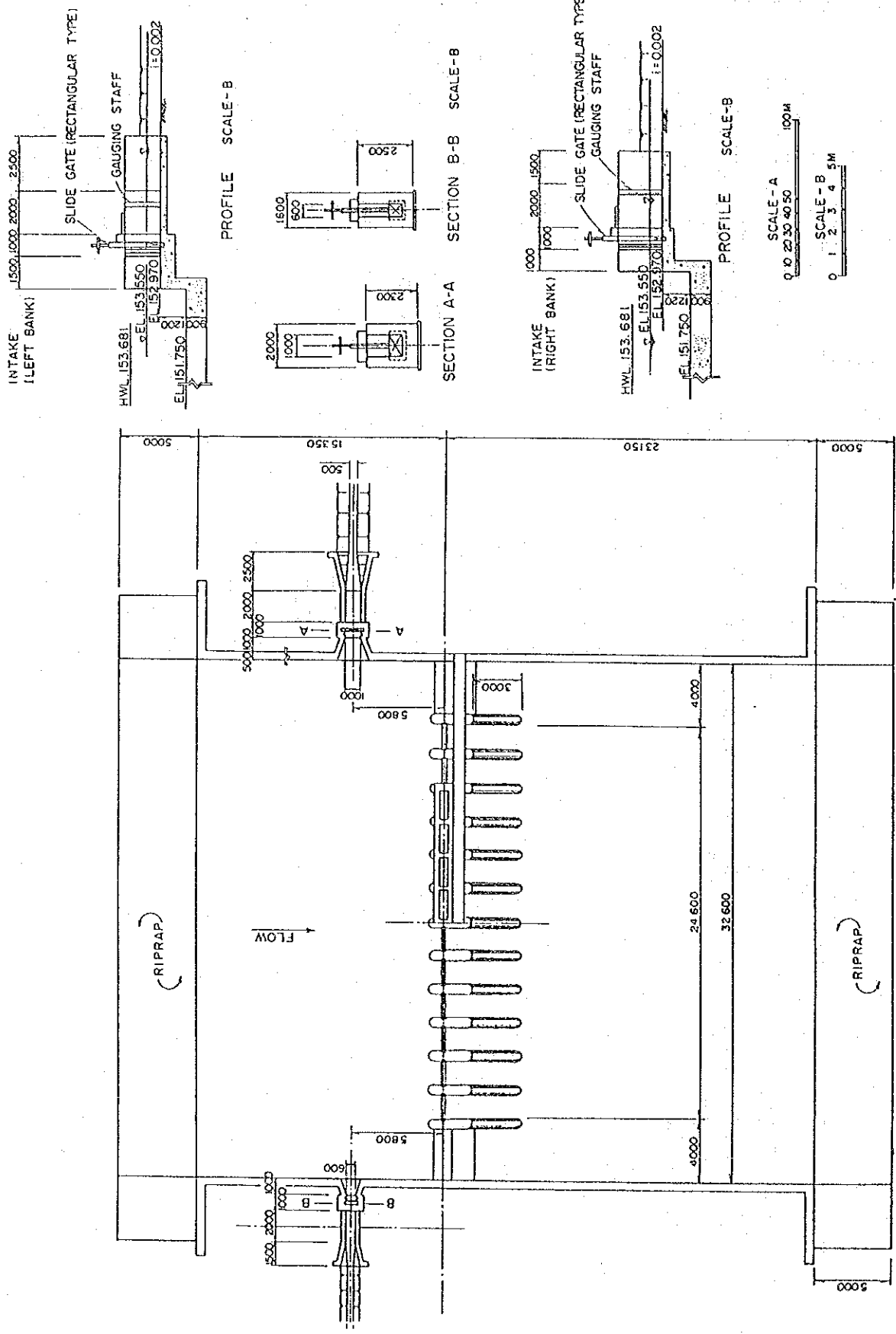
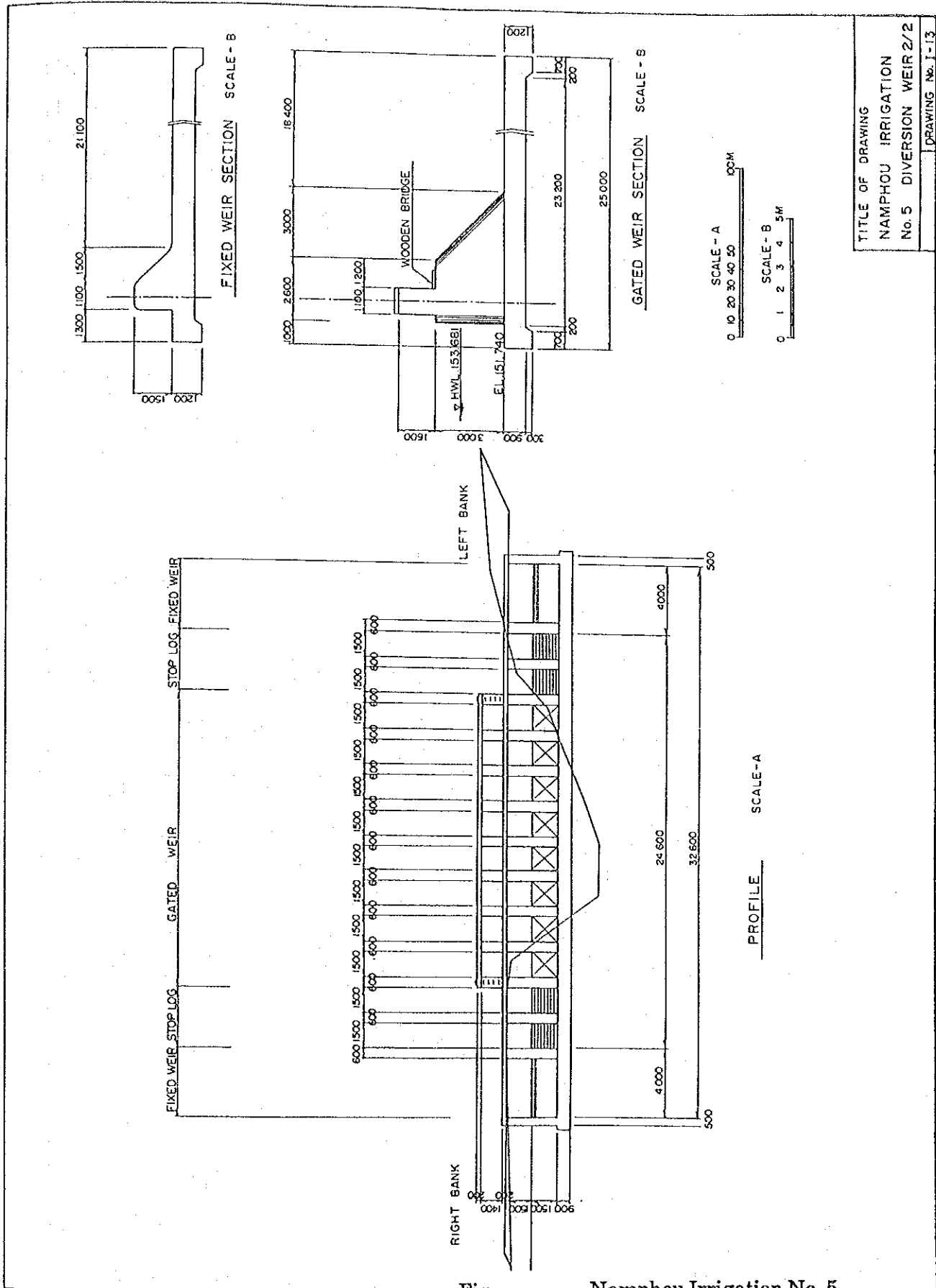


Fig. Namphou Irrigation No. 5 (H. Xay Weir, Plan)



TITLE OF DRAWING  
 NAMPHOU IRRIGATION  
 No. 5 DIVERSION WEIR 2/2  
 DRAWING No. I - 13

Fig. Namphou Irrigation No. 5  
 (H. Xay Weir, Profile, Section)  
 F-20

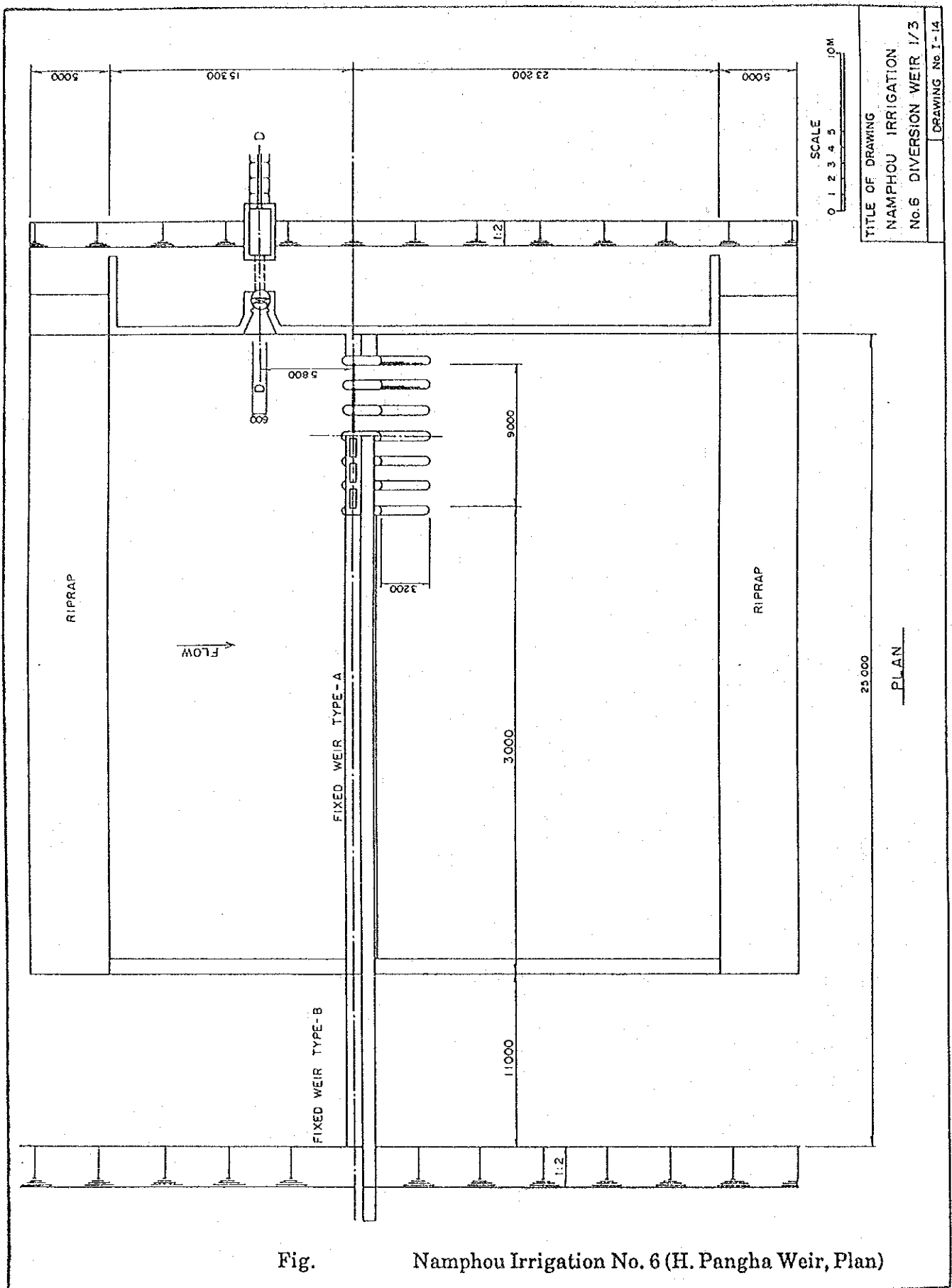
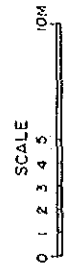
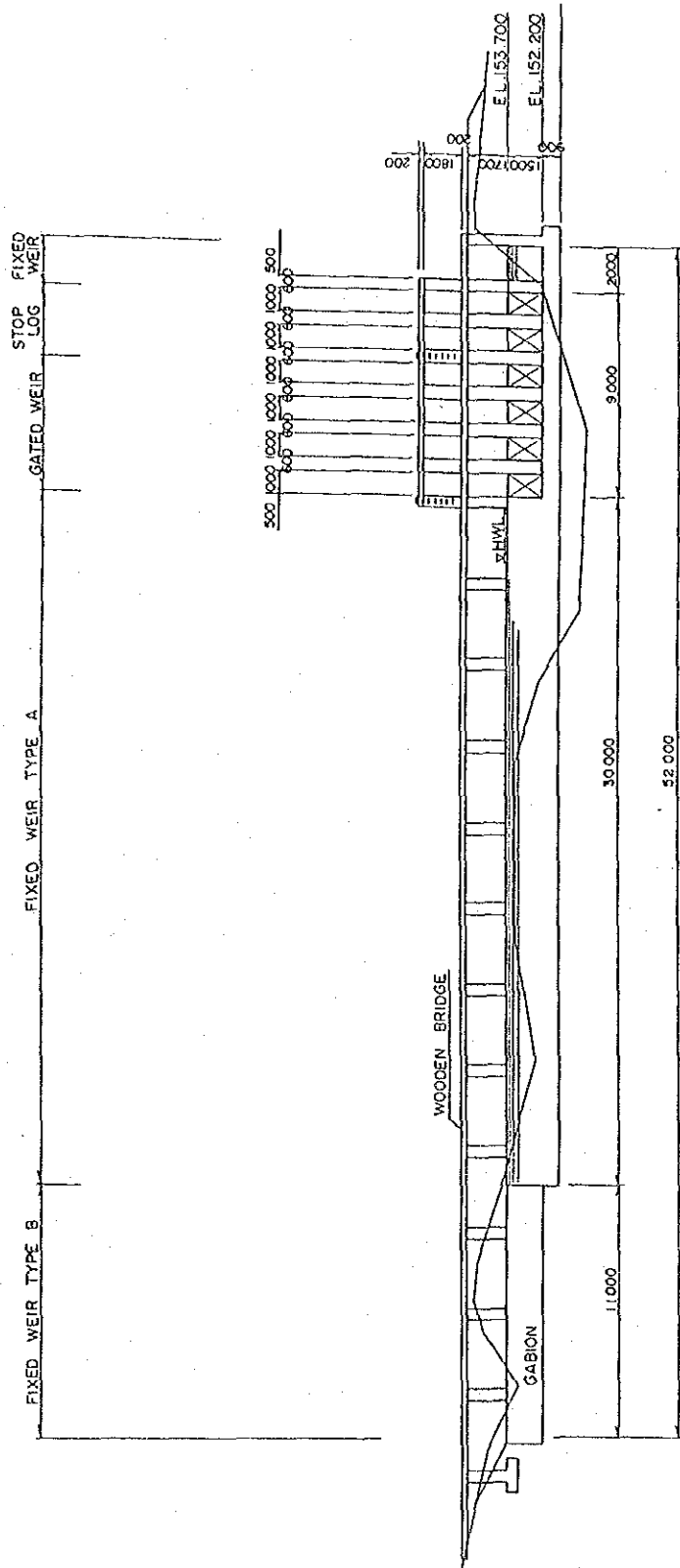


Fig. Namphou Irrigation No. 6 (H. Pangha Weir, Plan)



PROFILE

TITLE OF DRAWING  
 NAMPHOU IRRIGATION  
 No. 6 DIVERSION WEIR 2/3  
 DRAWING No. I-15

Fig. Namphou Irrigation No. 6 (H. Pangha Weir, Profile)

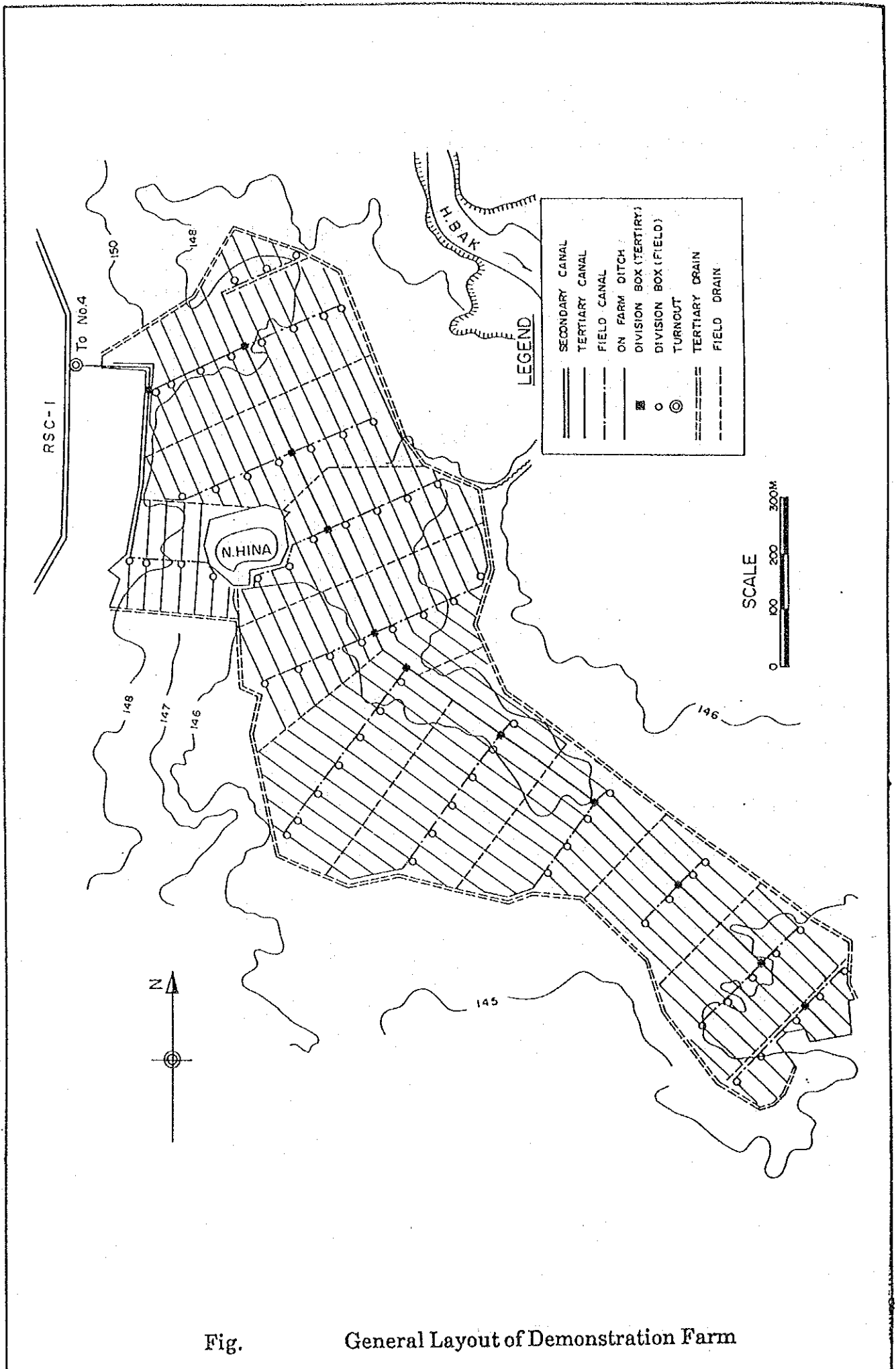
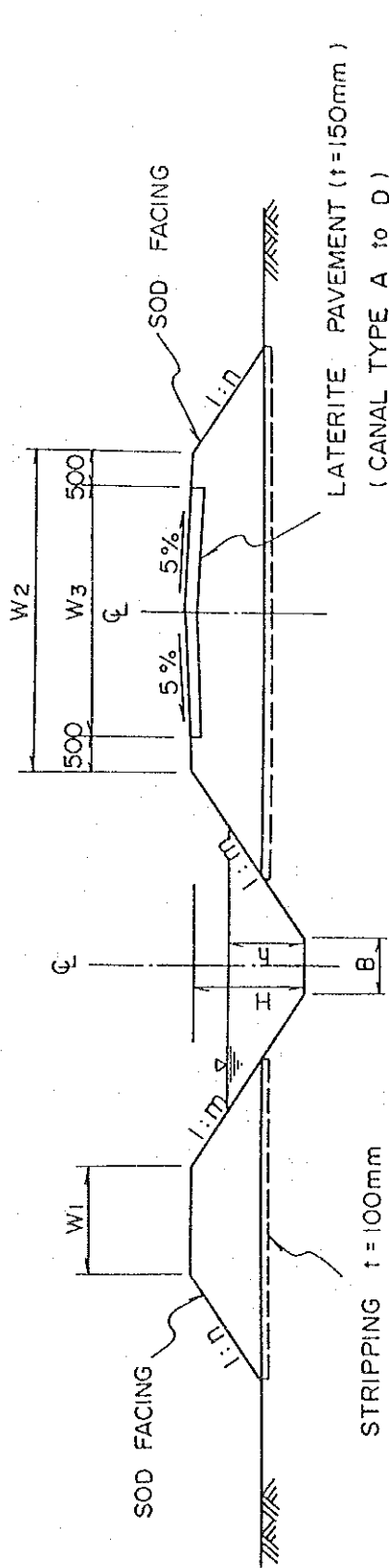


Fig. General Layout of Demonstration Farm

UNLINED CANAL FARM ROAD



DIMENSION

UNIT : mm

CANAL TYPE	B	H	h max	W1	W2	W3	m	n
A	800	1,600	1,300	1,500	4,500	3,500	1.5	1.5~2.0
B	600	1,300	1,000	1,500	4,500	3,500	1.5	1.5~2.0
C	500	1,100	800	1,500	4,500	3,500	1.5	1.5~2.0
D	400	900	600	1,000	4,500	3,500	1.5	1.5~2.0
E	400	800	600	400	3,000	—	1.0	1.5
F	300	600	400	400	3,000	—	1.0	1.5
G	300	500	300	300	3,000	—	1.0	1.5
H	200	350	300	300	800	—	1.0	1.5
I	200	300	250	300	600	—	1.0	1.5
J	100	200	180	200	300	—	1.0	1.5

SCALE

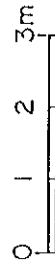


Fig Typical Cross Sections Canals and Farm Roads