

VIII. PROJECT IMPLEMENTATION

VIII-1 General

368. Cooperation and mutual understanding among agencies at the national (ministerial) and project level are indispensable in order to implement the project smoothly. At the same time there should be an adequate delegation of power and responsibility to the executing agency and the project management. Proposals along these lines are illustrated graphically in Fig. VIII-1.

VIII-2 Executing Agency

2-1 Government authorities

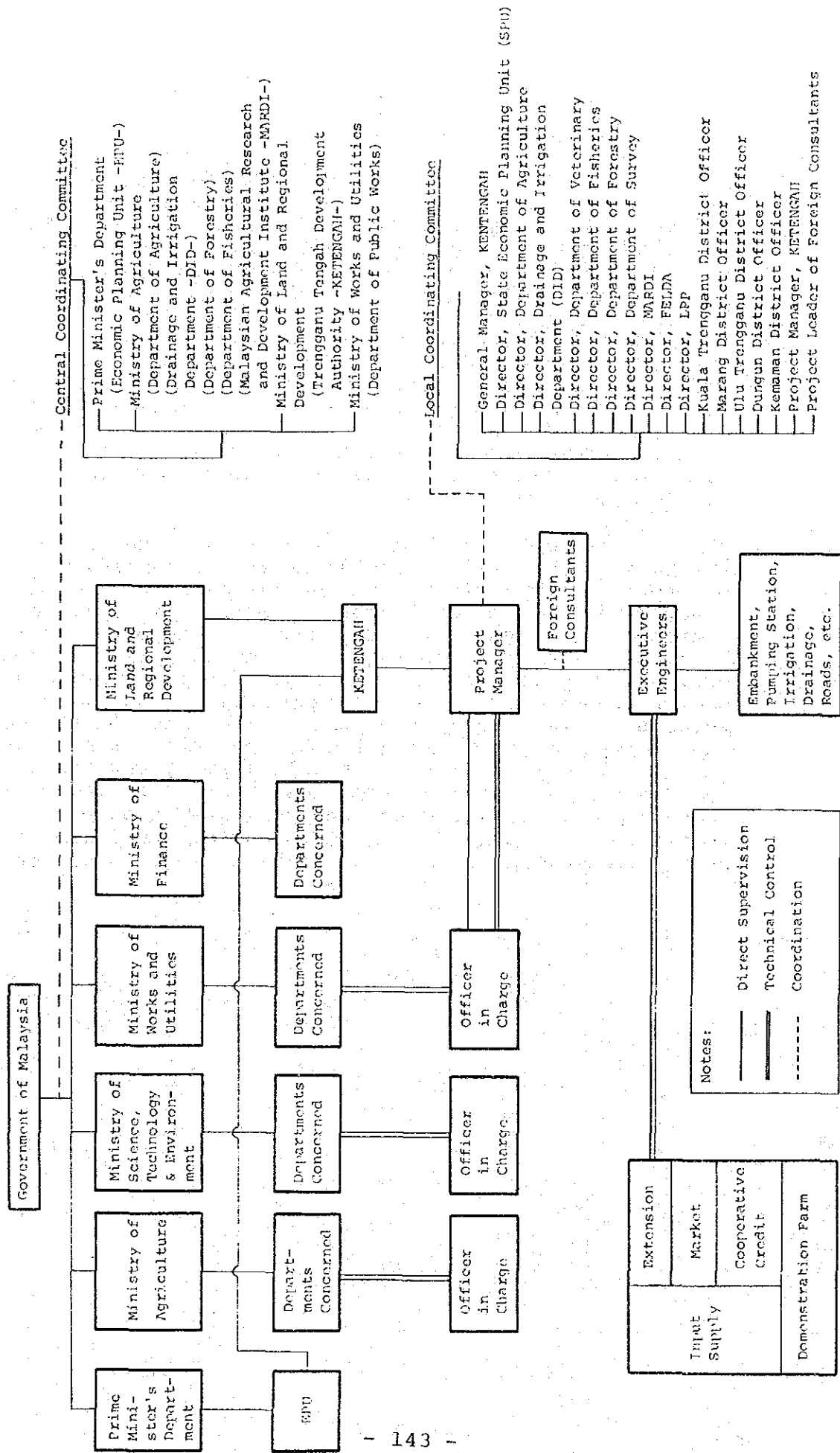
369. With regard to project execution the Ministry of Land and Regional Development will be the principal agency. EPU is normally responsible for those matters which are related to foreign aid technical assistance and loan projects in Malaysia. The office entrusts, however, other agencies with technical aspects, for example, actual construction of facilities such as irrigation and drainage systems, pump houses, transmission lines, and implementation of various projects in relation with agriculture, fisheries, forestry, settlement, credit, and distribution. The technical implementation of the master plan will be carried out by KETENGAH on behalf of Ministry of Land and Regional Development and EPU, who will work in close cooperation with other agencies involved.

370. Before proceeding to the release of the loan, EPU will make the necessary technical arrangements with the Ministry of Agriculture and the Ministry of Land and Regional Development and provide KETENGAH with detailed instructions in order to implement the development project smoothly.

2-2 Central coordinating committee

371. A steering committee has already been established on the federal government level for the Trengganu Swamp Development. Prior to the commencement of the master plan project, the existing committee will be replaced by a central coordinating committee in order to compensate for shortcomings of the former and to be more effective. The organization chart for the new committee is shown in Fig. VIII-1. The committee will be presided by a member of EPU.

Fig. VIII-1 Organization Chart for Implementation of the Project



2-3 Local coordinating committee

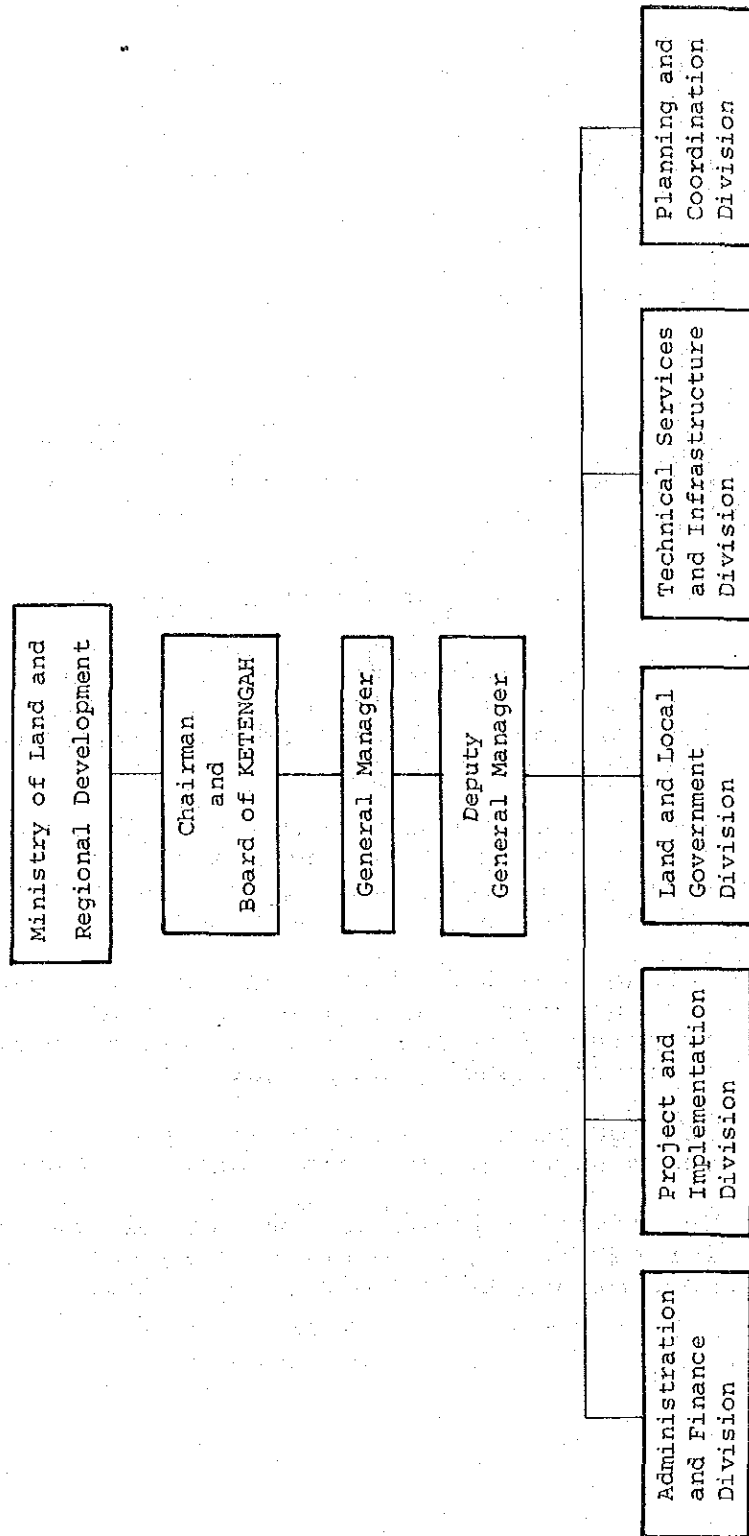
372. A local coordinating committee will be established within the State to coordinate agencies involved in the project to settle various matters. The committee will be organized by the replacement of the present technical committee. The organization chart is shown in Fig. VIII-1.

2-4 Project office and project manager

373. The master plan will be carried out under the management of KETENGAH whose organization chart is shown in Fig. VIII-2. A full-time project manager will be appointed when implementation is started. He will manage the project office which will be established in the master plan area.

374. During the construction period, the project office will consist of four departments, administration, engineering, agriculture and equipment. And a general manager will be selected among personnel in charge of construction. Meanwhile, the number of departments will be increased to five during the agricultural development period. They include engineering, extension work and demonstration farm, farmers' association, equipment and administration. The person who will be responsible for the entire implementation will be appointed as project manager. The project manager will also be responsible for coordinating the various agencies involved in the project through the local coordinating committee in order to settle various matters related to agriculture, extension work, research, marketing, distribution and environment.

Fig. VIII-2 Structure of Trengganu Tengah Development Authority



(Development period)

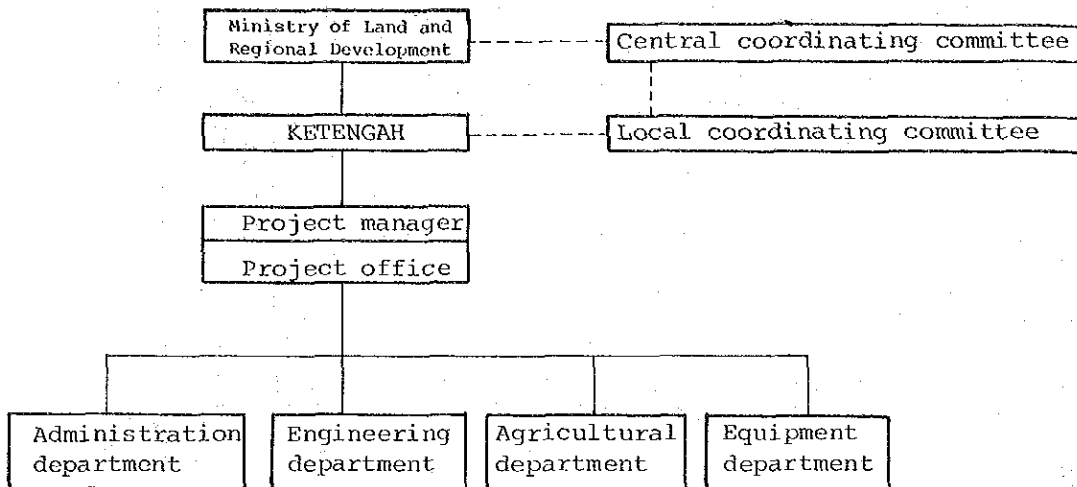


Fig. VIII-3 Organization Chart

- Note:
- 1) The above organization will be responsible for the construction of project facilities. The project manager will be selected among managers in charge of construction.
 - 2) The engineering department will be responsible for surveying, designing, estimation of construction costs, the right of way, supervising, computation of labor and others.
 - 3) The agricultural department will be responsible for the operation of the demonstration farm, training of farmers, settlement, management of farmers' association and others.
 - 4) The equipment department will be responsible for the management and maintenance of equipment.
 - 5) The administration department will be responsible for personnel, accounting, management and procurement of assets and office supplies.

(Agricultural development period)

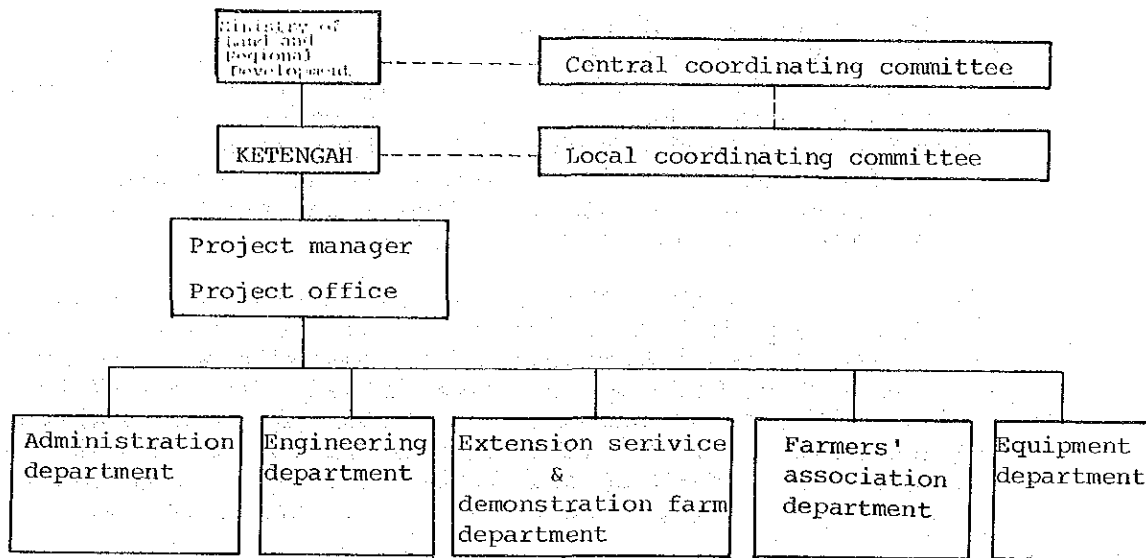


Fig. VIII-4 Organizational Chart

- Note:
- 1) The organization above will be responsible for the implementation of the agricultural development project. An agriculturalist will be appointed as project manager.
 - 2) The engineering department will be responsible for the operation and maintenance of irrigation and drainage systems and other small-scale engineering works.
 - 3) The extension service and demonstration farm department will be responsible for the operation of the demonstration farm and provision of extension services.
 - 4) The farmers' association department will be responsible for organizing and supervising the farmer's associations.
 - 5) The administration department will be responsible for general management and collection of water charges.

VIII-3 Project Implementation

3-1 Construction schedule

375. The period of development will be determined in consideration of various factors such as funds, engineering and supervising ability of staff, capacity of contractors, selection of settlers and their learning ability. In general, the longer the period, the better the outcome will be.

376. On the other hand, the period should be as short as possible in order to eradicate poverty. Each of the above factors will be studied in the feasibility study in consideration of the size of the KETENGAH staff and the federal budget. In this report, the entire development period is set at 20 years, the construction period including detailed design of 13 years, and the settlement period including the training period of 11 years.

3-2 Land acquisition

377. Swamps involved in the master plan area belong to the State of Trengganu. In the case of a large-scale federal project, such as of FELDA, the management of land is transferred to the state government as soon as construction and loan payments are completed. It is after the transfer that farming rights are granted to farmers from the State Government. Although farmers have the right to cultivate land, no ownership of land is granted. Land is always owned by the Federal or the State government.

378. The same principle applies to the master plan area. Since the swamps are the property of the State, their management is transferred to KETENGAH temporarily during the development period and then transferred to the State after the completion of implementation.

379. Therefore, no problems will be encountered as far as the acquisition of land is concerned. The only procedure required will be the transfer of management between the Federal and the State government. Some parts of the master plan area are already occupied by some farmers who were granted temporary occupation licenses. In such cases, the necessary appropriate procedures should be taken.

3-3 Implementation procedure

In order to implement the development plan efficiently, the total development area of 72,604 acres will be divided into work units. It will be important to evenly distribute work throughout the development period in order to prepare and utilize construction machinery and equipment and to train farmers constantly. It will be planned to develop 6,000 to 7,000 acres of farmland at the height of implementation period.

381. In order to use trunk roads and main drainage canals efficiently, the development will be implemented in work units respectively. The size of swamps varies from 234 to 11,741 acres. Their development will be completed in two to six years in accordance with their size. Detailed design work will be divided into four stages in consideration of each block and construction period.

Table VIII-1 Construction Schedule

Work unit	No.	Development Acreage	Farmland Acreage	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year	12th year	13th year	14th year
	7-3	11,741	9,393			425	2,300	2,900	2,900	1,293							
	S 12	531	425														
	7-2	10,000	8,000				1,600	2,400	2,400	1,600							
	8	855	684				584										
	9	950	760				760										
	7-4	10,176	8,141						1,600	2,200	2,200	2,141					
	7-5	3,193	2,554							800	800	954					
	11	1,725	1,380							400	980						
	2	1,125	900							450	450						
	3	2,625	2,100								1,000	1,000					
	S 11	389	311								311						
	4	815	652								652						
	5	1,765	1,412									700	712				
	7-1	2,500	2,000									800	1,200				
Sub-total		48,390	38,712			425	5,344	5,300	6,900	6,743	6,393	5,695	1,912				
	14	8,030	6,424									500	2,200	2,200	1,524		
	15	5,125	4,100										800	1,650	1,650		
Sub-total		13,155	10,524									500	3,000	3,850	3,174		
	17	655	524									524					
	S 20	234	187									187					
	18	975	780										780				
	19	1,015	812										400	412			
	S 24	313	250														
	20-4	2,381	1,905										250				
	20-5	5,486	4,389											900	1,005		
Sub-total		11,059	8,847											1,200	1,600	1,589	
Total		72,604	58,083			425	5,364	5,300	6,900	6,743	6,393	6,906	6,342	6,362	5,774	1,589	

Table VIII-2 Civil Work Schedule

Work unit	Item	Quantity	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year	12th year	13th year
1	Trunk drainage canal	129.2 km	16.1	19.4	19.4	19.4	19.4	19.4	19.4	16.1					
	Trunk road	155.5 km		19.5	23.3	23.3	23.3	23.3	23.3	23.3	19.5				
	Irrigation facilities	6,615 acre			1,320	1,300	1,300	835	460	660	740				
2	Trunk drainage canal	21.3 km							4.2	6.4	6.4	4.3			
	Trunk road	30.8 km								6.2	9.2	9.2	6.2		
	Irrigation facilities	2,005 acre									330	360	725	590	
3	Trunk drainage canal	19.5 km								3.8	5.9	5.9	3.9		
	Trunk road	22.7 km									4.5	6.8	6.8	4.6	
	Irrigation facilities	2,070 acre									310	310	390	530	530
Total	Trunk drainage canal	170.0 km		16.1	19.4	19.4	19.4	19.4	23.6	26.3	12.3	10.2	3.9		
	Trunk road	209.0 km		19.5	23.3	23.3	23.3	23.3	23.3	29.5	33.2	16.0	13.0	4.6	
	Irrigation facilities	10,690 acre			1,320	1,300	1,300	835	460	1,300	1,410	1,410	1,115	1,120	530

Construction period

=====
Detail design

VIII-4 Construction Cost

4-1 General

382. The project cost is estimated using figures provided by KETENGAH, DID and governmental departments on unit prices and costs as of 1979.

383. Physical contingency of the cost estimate is 7.5% of direct cost. Price contingency is calculated for each year of the construction period. Annual inflation rate is 5.0%. The price contingencies is, therefore, calculated assuming this rate for the initial year and the incremental rates for the ensuing years as follows:

	1st year	2nd year	3rd year	4th year	5th year
Inflation Rate (%)	5.0	10.3	15.8	21.6	27.6
	6th year	7th year	8th year	9th year	10th year
	34.0	40.7	47.7	55.1	62.9
	11th year	12th year	13th year		
	71.0	79.6	88.6		

4-2 Project cost

384. The project cost consists of (i) cost for the civil works including land reclamation and the construction of the settler's houses, (ii) cost for the facilities of sericulture, (iii) cost for the facilities of livestock rearing, (iv) cost for the construction of the technical service center.

385. The total cost for the development is M\$488 million. The cost for unit area is M\$6,718 per acre. Table VIII-3 shows the breakdown of the cost.

Table VIII-3 Breakdown of the Project Cost

(Unit: MSIO³)

Item	Work unit No.1			Work unit No.2			Work unit No.3			Total		
	F.C.	L.C.	Sub-total	F.C.	L.C.	Sub-total	F.C.	L.C.	Sub-total	F.C.	L.C.	Total
Civil works	111,478	74,319	185,797	29,459	19,640	49,099	23,678	15,785	39,463	164,615	109,744	274,359
Cooperative rearing houses for young silk worms	6,228	4,152	10,380	3,114	2,076	5,190	1,038	692	1,730	10,380	6,920	17,300
Livestock facilities	2,980	1,920	4,800	1,080	720	1,800	600	400	1,000	4,560	3,040	7,600
Technical center	600	400	1,000	-	-	-	600	400	1,000	1,200	800	2,000
Sub-total	121,186	80,791	201,977	33,653	22,436	56,089	25,916	17,277	43,193	180,755	120,504	301,259
Engineering services	6,059	4,039	10,098	1,682	1,122	2,804	1,295	864	2,159	9,036	6,025	15,061
Physical contingency	9,088	6,060	15,148	2,524	1,682	4,206	1,943	1,296	3,239	13,555	9,038	22,593
Price contingency	45,541	30,360	75,901	23,713	15,808	39,521	20,069	13,379	33,448	89,323	59,547	148,870
Sub-total	60,688	40,459	101,147	27,919	18,612	46,531	23,307	15,539	38,846	111,914	74,610	186,524
Total	181,874	121,250	303,124	61,572	41,048	102,620	49,223	32,816	82,039	292,669	195,114	487,783
(Unit cost per acre)			(6,264)			(7,800)			(7,418)			(6,718)

F.C. : Foreign currency

L.C. : Local currency

Table VIII-4. Annual Cost of the Project

(Unit: M\$)

Item	Total cost	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year	12th year	13th year
Work Unit No. 1	303,126,537	10,603,820	10,022,351	23,704,259	35,945,560	40,255,663	44,267,472	48,960,982	42,747,611	34,555,167	12,063,652			
Work Unit No. 2	102,621,949						3,757,965	4,597,183	11,377,412	12,249,467	23,229,368	27,489,380	19,921,174	
Work Unit No. 3	82,041,652							3,038,687	3,169,786	12,299,226	14,556,982	16,324,853	21,140,337	11,511,781
<u>Total</u>	<u>487,790,139</u>	<u>10,603,820</u>	<u>10,022,351</u>	<u>23,704,259</u>	<u>35,945,560</u>	<u>40,255,663</u>	<u>48,025,437</u>	<u>56,596,852</u>	<u>57,294,809</u>	<u>59,103,860</u>	<u>49,850,002</u>	<u>43,814,233</u>	<u>41,061,511</u>	<u>11,511,781</u>
Sericulture center	27,690,373	1,027,950	1,233,154	4,615,903	5,291,545	5,086,263	5,341,374	5,094,184						
<u>Grand-total</u>	<u>515,480,511</u>	<u>11,631,770</u>	<u>11,255,505</u>	<u>28,320,162</u>	<u>41,237,105</u>	<u>45,341,926</u>	<u>53,366,811</u>	<u>61,691,036</u>	<u>57,294,809</u>	<u>59,103,860</u>	<u>49,850,002</u>	<u>43,814,233</u>	<u>41,061,511</u>	<u>11,511,781</u>

Unit cost per acre: M\$6,718

(including sericulture center: M\$7,099)

IX ECONOMIC JUSTIFICATION AND FINANCIAL ANALYSIS

IX - 1 General

386. The proposed project aims to create both agricultural production and employment opportunities through the provision of irrigation and drainage facilities, and to examine how to make the master plan. The investment in the master plan area is justifiable in terms of the net value that will be added to the national economy, the benefits to farm families and other socio-economic benefits.

IX - 2 Economic Justification

2-1 Economic costs and benefits

387. The economic costs of the master plan are estimated at M\$338,917 thousand summing up M\$227,223 thousand for the Work Unit No.1, M\$63,100 thousand for the Work Unit No. 2 and M\$48,594 thousand for the Work Unit No. 3 at October 1979 prices in which allowance for price escalation is not included.

388. The major tangible benefits to evolve from the project will be a substantial paddy, upland crop, livestock, cocoon and fish production, and the resulting income and employment opportunities for about 40,000 farmers.

389. The economic benefits attributable to the master plan area are mainly in the form of incremental agricultural production including livestock rearing, freshwater pisciculture, sericulture and others less incremental costs, both of which are calculated on the basis of economic value from the viewpoint of the national economy.

390. The increase of agricultural production will be mainly due to: (i) application of the cropping patterns with 160% of cropping intensity for paddy cultivation farms at full development stage, and 100% at a minimum and 120% on an average for upland crop farms at full development stage; (ii) expectation of higher average unit yields of paddy (1.4 - 1.5 tons per acre) resulting in a paddy production of about 32 thousand tons per year when the master plan area is fully developed in 2000/01 and onwards; and (iii) expectation of higher annual yields of various crops resulting in upland crop production, for example, of about 7,900 tons of soybean, about 4,200 tons of maize, about 2,600 tons of groundnut, etc. when the master plan area is fully developed in 2000/01 and

onwards. The project will, when fully developed, generate incremental benefits of M\$62,141 thousand per year including incomes derived from the livestock rearing and sericulture.

2-2 Economic internal rate of return

391. On the basis of the economic costs and the direct tangible economic benefits from crop production, freshwater pisciculture, livestock rearing and sericulture, the economic internal rate of returns (EIRR) for the Work Unit No. 1, the Work Unit No. 2 and the Work Unit No. 3 of the project have been calculated at 14.0%, 14.8% and 16.7%, respectively. Tables IX-1, 2 and 3 show respective incomes with and without the project for the Work Unit No. 1, the Work Unit No. 2 and the Work Unit No. 3 and Tables IX-4, 5 and 6 show respective summaries of economic benefits and costs for the Work Unit No. 1, the Work Unit No. 2 and the Work Unit No. 3.

392. The EIRR has been calculated on the basic assumptions of: (i) a project price of M\$540 per ton for the improved variety of paddy based on the IBRD projection price, (ii) an average unit yield of 1.44 tons per crop per acre for improved paddy grown in the main season, and 1.52 tons per crop per acre for improved paddy grown in the off-season, (iii) an agricultural development period of five years after completion of respective works units as a rule, (iv) respective cropping intensities of 160% for paddy cultivation, and 120% on an average for upland crop cultivation, and (v) a project economic life of 50 years. In general, these assumptions are considered to be on the conservative side.

393. Sensitivity tests conducted for a variety of circumstances show that the project would be still economically justifiable. The results are as follows:

Table IX - 1
Income^{1/} With and Without the Project

Work Unit No. 1
(Unit: M\$ '000)

No.	Year	Without Project			With Project				Total	Difference
		Income	Income from Paddy Cultivation Farm	Income from Upland Crop Cultivation Farm	Income from Piscicultural Farm	Income from Livestock Rearing Farm	Sericultural Farm			
1	1981/82	0	0	0	0	0	0	0	0	0
2	1982/83	0	0	145	0	0	0	0	145	145
3	1983/84	0	342	450	160	0	0	0	952	952
4	1984/85	0	479	565	223	95	0	0	1,362	1,362
5	1985/86	0	520	622	342	105	0	0	1,589	1,589
6	1986/87	0	2,944	4,420	1,196	123	0	0	8,683	8,683
7	1987/88	0	4,104	6,578	1,667	127	476	0	12,952	12,952
8	1988/89	0	4,777	10,869	1,915	431	1,820	0	19,812	19,812
9	1989/90	0	5,856	13,253	2,442	1,032	4,429	0	27,012	27,012
10	1990/91	0	6,504	14,394	2,723	2,098	6,443	0	32,162	32,162
11	1991/92	0	7,015	15,742	3,234	2,699	8,178	0	36,868	36,868
12	1992/93	0	7,185	16,377	3,015	2,699	9,095	0	38,371	38,371
13	1993/94	0	7,305	16,976	3,073	3,227	9,214	0	39,795	39,795
14	1994/95	0	7,412	17,010	3,124	3,435	9,299	0	40,280	40,280
15	1995/96	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356
16	1996/97	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356
17	1997/98	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356
18	1998/99	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356
19	1999/00	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356
20	2000/01	0	7,412	17,010	3,124	3,511	9,299	0	40,356	40,356

1/: Incomes here represent value net from production cost.

Table IX - 2

Income ^{1/} With and Without the ProjectWork Unit No. 2
(Unit: M\$ '000)

No.	Year	Without Project			With Project				Total	Difference
		Income	Income from Paddy cultivation Farm	Income from Upland Crop Cultivation Farm	Income from Piscicultural Farm	Income from Livestock Rearing Farm	Sericultural Farm	Sericultural Farm		
1	1981/82	0	0	0	0	0	0	0	0	0
2	1982/83	0	0	0	0	0	0	0	0	0
3	1983/84	0	0	0	0	0	0	0	0	0
4	1984/85	0	0	0	0	0	0	0	0	0
5	1985/86	0	0	0	0	0	0	0	0	0
6	1986/87	0	0	0	0	0	0	0	0	0
7	1987/88	0	0	0	0	0	0	0	0	0
8	1988/89	0	0	0	0	0	0	0	0	0
9	1989/90	0	0	0	0	0	0	0	0	0
10	1990/91	0	0	0	0	0	0	0	0	0
11	1991/92	0	1,084	2,017	510	0	0	3,611	3,611	3,611
12	1992/93	0	1,518	2,824	714	0	0	5,056	5,056	5,056
13	1993/94	0	1,648	3,066	775	855	417	6,761	6,761	6,761
14	1994/95	0	1,843	3,429	867	948	1,666	8,753	8,753	8,753
15	1995/96	0	1,995	3,711	938	1,105	3,562	11,311	11,311	11,311
16	1996/97	0	2,168	4,034	1,020	1,145	4,242	12,609	12,609	12,609
17	1997/98	0	2,168	4,034	1,020	1,136	4,242	12,600	12,600	12,600
18	1998/99	0	2,168	4,034	1,020	1,136	4,242	12,600	12,600	12,600
19	1999/00	0	2,168	4,034	1,020	1,136	4,242	12,600	12,600	12,600
20	2000/01	0	2,168	4,034	1,020	1,136	4,242	12,600	12,600	12,600

^{1/}: Incomes here represent value net from production cost.

Table IX - 3 Income^{1/} With and Without the Project

Work Unit No. 3
(Unit: M\$ '000)

No.	Year	Without Project				With Project				Total	Difference
		Income	Income from Paddy Cultivation Farm	Income from Upland Crop Cultivation Farm	Income from Piscicultural Farm	Income from Livestock Rearing Farm	Income from Sericultural Farm	Sericultural Farm			
1	1981/82	0	0	0	0	0	0	0	0	0	0
2	1982/83	0	0	0	0	0	0	0	0	0	0
3	1983/84	0	0	0	0	0	0	0	0	0	0
4	1984/85	0	0	0	0	0	0	0	0	0	0
5	1985/86	0	0	0	0	0	0	0	0	0	0
6	1986/87	0	0	0	0	0	0	0	0	0	0
7	1987/88	0	0	0	0	0	0	0	0	0	0
8	1988/89	0	167	127	80	0	0	0	374	374	374
9	1989/90	0	234	630	111	0	0	0	975	975	975
10	1990/91	0	401	899	201	0	0	0	1,501	1,501	1,501
11	1991/92	0	518	1,742	246	0	0	0	2,506	2,506	2,506
12	1992/93	0	1,395	2,581	586	95	0	0	4,657	4,657	4,657
13	1993/94	0	1,786	2,941	741	105	60	0	5,633	5,633	5,633
14	1994/95	0	1,909	3,207	790	503	357	0	6,766	6,766	6,766
15	1995/96	0	2,086	3,401	860	548	986	0	7,881	7,881	7,881
16	1996/97	0	2,203	3,580	905	637	1,624	0	8,949	8,949	8,949
17	1997/98	0	2,336	3,650	956	655	1,820	0	9,417	9,417	9,417
18	1998/99	0	2,336	3,650	956	731	1,820	0	9,493	9,493	9,493
19	1999/00	0	2,336	3,650	956	731	1,820	0	9,493	9,493	9,493
20	2000/01	0	2,336	3,650	956	731	1,820	0	9,493	9,493	9,493

^{1/}: Incomes here represent value net from production cost.

Table IX-4 Summary of Economic Benefits and Costs of the Project/

(M\$ '000)

Work Unit No. 1

C O S T S

No.	Year	Benefits	Invest- ment Costs	O&M Cost	Total Costs	Net Flow (Incremental Costs)	Present Worth	
							Accounted at 13%	14%
1	1981/82	0	10,099		10,099	-10,099	-8,938	-8,809
2	1982/83	145	9,086		9,086	-8,941	-7,003	-6,880
3	1983/84	952	20,470		20,470	-19,518	-13,526	-13,175
4	1984/85	1,362	29,560		29,560	-28,198	-17,294	-16,696
5	1985/86	1,589	31,548		31,548	-29,959	-16,262	-15,561
6	1986/87	8,683	33,035		33,035	-24,397	-11,718	-11,115
7	1987/88	12,952	34,798		34,798	-21,846	-9,287	-8,730
8	1988/89	19,812	28,942		28,942	-9,130	-3,435	-3,201
9	1989/90	27,012	22,279		22,279	4,733	1,576	1,455
10	1990/91	32,162	7,406	120	7,526	24,636	7,258	6,644
11	1991/92	36,868		143	143	36,725	9,584	8,580
12	1992/93	38,371		165	165	38,206	8,814	7,932
13	1993/94	39,795		186	186	39,609	8,088	7,213
14	1994/95	40,280		210	210	40,070	7,241	6,399
15	1995/96	40,356		270	270	40,086	6,474	5,672
		↓	↓	↓	↓	↓	↓	↓
55	2035/36	40,356	270	270	270	40,086	53	28
Total						227,223	10,437	-486

$$E I R R = 13(\%) + \frac{10,437}{10,923} = 13.96(\%) \approx 14.0(\%)$$

1/ All in constant price in 1979.

Table IX-5

Summary of Economic Benefits and Costs of the Project^{1/}

(M\$ '000)

Work Unit No. 2

C O S T S

No.	Year	Benefits	Invest- ment Costs	O&M Cost	Total Costs	Net Flow (Incremental Costs)	Present Worth	
							Accounted at 14%	15%
1	1986/87	0	2,804		2,804	-2,804	-2,460	-2,438
2	1987/88	0	3,267		3,267	-3,267	-2,514	-2,470
3	1988/89	0	7,703		7,703	-7,703	-5,199	-5,065
4	1989/90	0	7,898		7,898	-7,898	-4,676	-4,516
5	1990/91	0	14,260		14,260	-14,260	-7,407	-7,090
6	1991/92	3,611	16,076		12,465	-12,465	-5,679	-5,389
7	1992/93	5,056	11,092	12	11,104	-6,048	-2,417	-2,273
8	1993/94	6,761		26	26	6,735	2,361	2,202
9	1994/95	8,753		40	40	8,713	2,679	2,477
10	1995/96	11,311		72	72	11,239	3,031	2,781
11	1996/97	12,609		86	86	12,523	2,925	2,691
12	1997/98	12,600		86	86	12,574	2,598	2,339
		↓		↓	↓	↓	↓	↓
55	2041/42	12,600		86	86	12,514	9	6
Total						63,100	7,648	-1,429

$$E I R R = 14(\%) + \frac{7,648}{9,077} = 14.8(\%)$$

1/: All in constant price in 1979.

Z/: Residual value of construction machinery was neglected.

C A S E

- i. 10% reduction in unit price per ton of paddy and upland crops
- ii. Cost over run of 5%
- iii. Delay in completion by one year
- iv. Combination of ii. and iii. above

Work Unit	Case	EIRR
I	i	12.7%
	ii	13.6%
	iii	14.2%
	iv	13.7%
II	i	13.8%
	ii	14.5%
	iii	14.9%
	iv	14.6%
III	i	15.7%
	ii	15.6%
	iii	16.7%
	iv	16.8%

2-3 Farmer's income

394. From the viewpoint of small-scale farmers as individual settlers, the project will generate a significant income for all of the settlers. The majority of these proposed settlers are very poor and are unable to earn sufficient income to support even a low standard of living. Income to farm households includes the net value of crops produced and off-farm income from paddy processing, freshwater pisciculture, live-stock rearing, sericulture, etc.

395. By utilizing irrigation and drainage facilities efficiently, combined with improved farming practices, a settler managing an average of 5 acres will be able to create a gross farm return of M\$10,810 per annum even if the return is limited to that from crop production only. On the other hand, most of upland crop settlers managing an average of 6 acres each will be able to create, on an average, a gross farm return of about M\$11,000 per annum.

2-4 Socio-economic impact

(1) General

396. In addition to creating agricultural production, the project will have a significant socio-economic impact on employment, environment and other direct benefits as follows:

(2) Employment opportunities

397. The population in the master plan area will benefit directly from the creation of employment opportunities in agriculture, transportation and marketing even during the construction period. Created production will result from the intensive agricultural land use. The agricultural labor requirements will increase gradually in parallel with development. While much of the increased farm labor requirements will come from the seasonal laborers living in the surrounding area who are under-employed, such laborers will also benefit significantly by the creation of more jobs. Employment opportunities in marketing and transport will also increase significantly as a result of the increased paddy and upland crop production, livestock rearing, freshwater pisciculture and sericulture. It should be noted that immediately after deforestation in the master plan area, employment opportunities will significantly increase.

(3) Environment impact

398. The project will enhance the environment of the master plan area by flood protection and improvement of land drainage. Completion of the engineering works will result in improved living conditions, village activities, road systems and fishing areas which will be able to be utilized year round.

(4) Other indirect benefits

399. The project will also generate other indirect benefits such as the possible expansion of agro-based industries like rice-milling, bran oil extraction, etc. Increased availability of farm by-products such as bran, broken rice and straw will also encourage settlers to provide more adequate sustenance for the draft animals, which in turn would result in more efficient draft cultivation at the initial stage of agricultural development.

IX - 3 Financial Analysis

3-1 General

400. Financial analysis of the master plan area is conducted from the viewpoint of small-scale farmers. In the study, several kinds of typical farm budgets are analyzed on the basis of the gross return and the expenses.

3-2 Paddy farmer

(1) Gross return

401. With irrigation and drainage, the annual gross return in farm production by the farmer is expected to increase due to the increase in unit yield of crops year by year. The return will be at its maximum starting from the fifth year and onwards after irrigation farming has completed.

402. Actual gross return from crop products on a standard farm of 5 acres on and after the fifth year and onwards after irrigation farming has completed.

403. Actual gross return from crop products on a standard farm of 5 acres on and after the fifth year of irrigation farming by rotation is estimated to be as shown in Table IX-7^{1/}.

^{1/}: Refer to cropping pattern illustrated in Fig. VI-1.

Table IX-7. Annual Gross Return from Paddy and Upland Crop Products on a Standard Farm of 5 Acres on and after the Fifth Year of Irrigation Farming Onwards

Kind of Crop Product	Acreage	Unit Yield	Total Yield	Unit Price	Total Value
	(acre)	(ton /acre)	(ton)	(M\$ /ton)	(M\$)
Paddy					
Improved (Main season)	3.5	1.55	5.04	520	2,620.8
(Off-season)	3.5	1.52	5.32	520	2,766.4
Upland Crops					
Maize	1.5	1.4	2.1	450	945
Groundnut	0.5	0.9	0.45	990	445.5
Chilli	0.6	4.2	2.52	1,600	4,032
	9.6				10,809.7
					(=10,810)

(Cropping intensity: 160%)

(2) Farming expenditure

404. On the standard irrigation farm, farming practices such as effective application of fertilizers and agro-chemicals, efficient use of farm implements, successive introduction of improved varieties and others should be introduced for profitable farm management.

405. Accordingly, the funds needed for the performance of such activities will necessary be more when compared to those needed for primitive methods. Farming expenditure increases with the advance of irrigation farming and is at a maximum on and after fifth year of irrigation farming. The outline of the estimated farming expenditure is as shown in Table IX-8.

Table IX-8 Annual Farming Expenditure on a Standard Farm (5 Acres) on and after the Fifth Year of Irrigation Farming Onwards

Item of Expenses	Amount
	(M\$)
Crop operation cost ^{1/}	5,250
Overheads ^{2/}	3,500
Total	8,750

1/: Labor charge was estimated at M\$9 per head per day on an average.

2/: Including taxes, expenses for clothes, housing, electricity, communication, education, medical treatment, etc.

(3) Annual return and expenditure

406. The annual net return on the "capacity to pay" can be estimated by deducting the annual expenditure from the annual gross return derived from crop products as shown in Table IX-9.

Table IX-9 Annual Budget on a Standard Farm (5 Acres) on and after the Fifth Year of Irrigation Farming Onwards

Item	Amount
	(M\$)
Gross return	10,810
Expense	8,750
Difference (capacity to pay)	2,060

(4) Net return

407. From the above capacity to pay, the farmer pays the annual O&M cost which is estimated at M\$115 per farmer on an average. Therefore, he can still reserve nearly M\$1,800 even after payment.

3-3 Upland crop farmer

(1) Gross return

408. After the land development, the annual gross return in farm production by farmers is expected to increase due to the increase in unit yield of crops year by year. The return will be at its maximum starting from the fifth year and onwards after land development has completed. Annual gross return from upland crop products on respective standards farms of 6 acres each on and after the fifth year of land development by rotation are estimated to be as shown in Table IX-10 - 15 ^{1/}.

Table IX-10 Annual Gross Return from Upland Crop Products on a Standard Farm of 6 Acres on and after the Fifth Year of Advanced Farming Onwards

(Type - 1)

Kind of Crop Product	Acreage	Unit Yield	Total Yield	Unit Price	Total Value
	(acre)	(ton /acre)	(ton)	(M\$ /ton)	(M\$)
Cassava	2	13	26	70	1,820
Maize	2	1.4	2.8	450	1,260
Soybean	2	0.7	1.4	800	1,120
Groundnut	1	0.9	0.9	990	891
Onion	1	8	8	1,200	9,600
	8				14,691

(Cropping Intensity: 133 %)

^{1/}: Refer to respective cropping patterns illustrated in Fig. VI-3

Table IX-11

Annual Gross Return from Upland Crop
Products on a Standard Farm of 6 Acres
on and after the Fifth Year of Advanced
Farming Onwards

(Type - 2)

Kind of Crop Product	Acreage	Unit Yield	Total Yield	Unit Price	Total Value
	(acre)	(ton /ton)	(ton)	(M\$ /tone)	(M\$)
Chilli	0.5	4.2	2.1	1,600	3,360
Groundnut	0.5	0.9	0.45	900	445.5
Maize	1	1.4	1.4	450	630
Soybean	1	0.7	0.7	800	560
Coffee	4	2	8	578	4,624
Ginger	0.5	5.4	2.7	1,100	2,970
	7.5				12,589.5
					(=12,590)

(Cropping Intensity: 125 %)

Table IX-12

Annual Gross Return from Upland Crop Products on a Standard Farm of 6 Acres on and after the Fifth Year of Advanced Farming Onwards

(Type - 3)

Kind of Crop Product	Acreage (acre)	Unit Yield (ton /ton)	Total Yield (ton)	Unit Price (M\$ /ton)	Total Value (M\$)
Sweet potatoes	1	4.0	4	700	2,800
Groundnut	1	0.9	0.9	990	891
Watermelon	1	4.0	4	250	1,000
Soybean	3	0.7	2.8	800	2,240
Coffee	2	2.0	4	578	2,312
	8				9,243

(Cropping Intensity: 133 %)

Table IX-13

Annual Gross Return from Upland Crop Products on a Standard Farm of 6 Acres on and after the Fifth Year of Advanced Farming Onwards

(Type - 4)

Kind of Crop Product	Acreage (acre)	Unit Yield (ton /acre)	Total Yield (ton)	Unit Price (M\$ /ton)	Total value (M\$)
Cabbage (Lowland English)	1	10	10	500	5,000
Watermelon	1	4	4	250	1,000
Soybean	3	0.7	2.1	800	1,680
Maize	1	1.4	1.4	450	630
Coffee	2	2	4	578	2,312
	8				10,622

(Cropping Intensity: 133 %)

Table IX-14

Annual Gross Return from Upland Crop Products on a Standard Farm of 6 Acres on and after the Fifth Year of Advanced Farming Onwards

(Type - 5)

Kind of Crop Product	Acreage (acre)	Unit Yield (ton /acre)	Total Yield (ton)	Unit Price (M\$ /ton)	Total Value (M\$)
Cassava	1	13	13	70	910
Sorghum	1.5	1.8	2.7	550	1,485
Chilli	0.5	4.2	2.1	1,600	3,360
Coffee	3	2	6	578	3,468
	6				9,223

(Cropping Intensity: 100 %)

Table IX-15

Annual Gross Return from Upland Crop Products on a Standard Farm of 6 Acres on and after the Fifth Year of Advanced Farming Onwards

(Type - 6)

Kind of Crop Product	Acreage (acre)	Unit Yield (ton /acre)	Total Yield (ton)	Unit Price (M\$ /ton)	Total value (M\$)
Pineapple	3				3,945
Chilli	0.5	4.2	2.1	1,600	3,360
Sorghum	2	1.5	3	550	1,650
Soybean	0.5	0.7	0.35	800	280
	6				9,235

(Cropping intensity: 100 %)

(2) Farming expenditure

409. On respective standard farms, farming practices should be introduced for profitable farm management like paddy farms.

410. Accordingly, the funds needed for the performance of such activities will necessarily be more when compared to those needed for primitive methods. The farming expenditures increase with the advanced farming and is at a maximum on and after the fifth year of advanced farming. The outlines of the estimated farming expenditures are shown in Table IX-10.

(3) Annual return and expenditure

411. The annual net return on the "capacity to pay" can be estimated by deducting the annual expenditure from the annual gross return derived from crop products as shown in Table IX-11.

(4) Net return

412. From the above capacity to pay, the farmer pays the annual O&M cost which is estimated at about M\$25 per upland crop farmer. The remaining amount after deducting O&M cost from capacity to pay can be reserved by the farmer.

Table IX-16

Annual Farming Expenditure on a Standard Farm (6 Acres) on and after the Fifth Year on Advanced Farming Onwards

Type	Item of Expenses	Amount (M\$)
I	Crop operation cost ^{1/}	8,298
	Overheads ^{2/}	3,800
	Total	12,098
II	Crop operation cost	6,676
	Overheads	3,500
	Total	10,176
III	Crop operation cost	4,531
	Overheads	3,200
	Total	7,731
IV	Crop operation cost	5,555
	Overheads	3,400
	Total	8,955
V	Crop operation cost	5,030
	Overheads	2,800
	Total	7,830
VI	Crop operation cost	5,115
	Overheads	2,700
	Total	7,815

^{1/}: Labor charge was estimated at M\$9 per head per day on an average.

^{2/}: Including taxes, expenses for clothes, housing, electricity, communication, education, medical treatment, etc.

Table IX-17 Annual Budget on a Standard Farm
(6 Acres) on and after the Fifth
Year of Advanced Farming Onwards

Type	Item	Amount (M\$)
I	Gross return	14,691
	Expenses	12,098
	Capacity to pay	2,593
II	Gross return	12,589
	Expenses	10,176
	Capacity to pay	2,413
III	Gross return	9,243
	Expenses	7,731
	Capacity to pay	1,512
IV	Gross return	10,622
	Expenses	8,955
	Capacity to pay	1,667
V	Gross return	9,223
	Expenses	7,830
	Capacity to pay	1,393
VI	Gross return	9,235
	Expenses	7,815
	Capacity to pay	1,420

3-4 Freshwater piscicultural farmer

(1) Gross return

413. After the land development including fish pond construction, the annual gross return in farm and fishing production by farmers is expected to increase due to the increase in unit yield of crops and fishes year by year. The return will be at its maximum starting from the fifth year and onwards after land development has completed. Annual gross return from paddy products and fish products on a standard farm of 5 acres including fish pond of 1 acre on and after the fifth year is estimated to be as shown in Table IX-18 ^{1/}:

Table IX-18 Annual Gross Return from Paddy on a Standard Farm of 5 Acres Including Fish Pond of 1 Acre on and after the Fifth Year of Irrigation Farming Onwards

Kind of Crop Product	Acreage	Unit Yield	Total Yield	Unit Price	Total Value
	(acre)	(ton /acre)	(ton)	(M\$ /ton)	(M\$)
Paddy					
Improved					
(Main season)	4.0	1.44	5.76	520	2,995.2
(Off-season)	4.0	1.52	6.08	520	3,161.6
Fish Product					
Fish	1.0				5,000
	9.0				11,156.8
					(=11,157)
(Cropping Intensity: 150 %)					

^{1/}: Refer to cropping pattern illustrated in Fig. VI-2.

(2) Farming expenditure

414. On the standard farm including fish pond, the advanced farming practices should be introduced for profitable farm management like paddy farm. For the performance of such activities, certain funds will be necessary. Therefore, farming expenditure increases with the advance of irrigation farming and pisciculture, and is at a maximum on and after fifth year of irrigation farming. The outlines of the estimated farming expenditure is as shown in Table IX-19.

Table IX-19

Annual Farming Expenditure on a Standard Farm (5 Acres) on and after the Fifth Year of Irrigation Farming and Advanced Pisciculture Onwards

Item of Expense	Amount (M\$)
Crop operation cost ^{1/}	5,777
Overheads ^{2/}	4,200
Total	9,977

^{1/}: Labor charge was estimated at M\$9 per head per day on an average.

^{2/}: Including taxes, expenses for clothes, housing, electricity, communication, education, medical treatment, etc.

(3) Annual return and expenditure

415. The annual net return on the "capacity to pay" can be estimated by deducting the annual expenditure from the annual gross return derived from crop and fish products as shown in Table IX-20.

Table IX-20

Annual Budget on a Standard Farm
(5 Acres) on and after the Fifth
Year of Irrigation Farming and
Advanced Pisciculture Onwards

Item	Amount
	(M\$)
Gross return	12,157
Expenses	9,977
Capacity to pay	2,180

(4) Net return

416. From the above capacity to pay, the farmer pays the annual O&M cost which is estimated at about M\$120 per farm. The remaining amount after deducting O&M cost from capacity to pay can be reserved by the farmer.

3-5 Livestock rearing farmer

(1) Gross return

417. After the land development, the annual gross return in crop and livestock production by farmers is expected to increase year by year. The return will be at its maximum starting from the fifth year and onwards after land development has completed. Annual gross return from livestock products on a standard farm of 9 acres on and after the fifth year is estimated at M\$8,850. The gross return is derived from selling 5 milk cows and 5 beef cows.

(2) Farming expenditure

418. On the standard farm, the advanced farming practices should be introduced for profitable farm management. For the performance of such activities, certain funds will be necessary. According to our study, the expenditure is estimated at M\$6,550 including M\$3,550 of overheads. In the overheads, taxes, expenses for clothes, housing, electricity, communication, medical treatment, etc. are included.

(3) Annual return and expenditure

419. The annual net return on the "capacity to pay" can be estimated by deducting the annual expenditure from the annual gross return derived from livestock rearing at M\$2,300. Table IX-21 shows the outline.

Table IX-21

Annual Budget on a Standard Farm
(9 Acres) on and after the Fifth Year
of Advanced Farming and Rearing Onwards

Item	Amount (M\$)
Cross return	8,850
Expenses	6,550
Capacity to pay	2,300

(4) Net return

420. From the above capacity to pay, the farmer pays the annual O&M cost. The remaining amount after deducting O&M cost from capacity to pay can be reserved by the farmer. According to our rough estimate, the amount will be about M\$1,860.

3-6 Sericultural farmer

(1) Gross return

421. After the land development, the annual gross return in farm production by farmers is expected to increase year by year. The return will be at its maximum starting from the fifth year and onwards after land development has completed. Annual gross return from sericulture on a standard farm of 2.5 acres on and after the fifth year is estimated at M\$12,113. This figure is calculated on the assumption that the cocoon production per acre is 285 kg, and the unit price is M\$17/kg.

(2) Farming expenditure

422. On the standard farm, the advanced farming practices should be introduced for profitable farm and silkworm rearing management. For the performance of such activities, certain funds will be necessary. According to our study, the expenditure is estimated at M\$9,713 including M\$3,700 of overheads. In the overheads, taxes, expenses for clothes, housing, electricity, communication, medical treatment, etc. are included.

(3) Annual return and expenditure

423. The annual net return on the "capacity to pay" can be estimated by deducting the annual expenditure from the annual gross return derived from sericulture at M\$2,400.

Table IX-22 shows the outline.

Table IX-22

Annual Budget on a Standard Farm
(2.5 Acres) on and after the Fifth
Year of Advanced sericulture Onwards

Item	Amount
	(M\$)
Gross return	12,113
Expenses	9,713
Capacity to pay	2,400

(4) Net return

424. From the above capacity to pay, the farmer pays the annual O&M cost. The remaining amount after deducting O&M cost from capacity to pay can be reserved by the farmer.

425. According to our rough estimate, the amount will be about M\$2,200.

3-7 Repayment of construction cost

426. The loan must be repaid either by public funds or by project beneficiaries. To meet the repayment obligation satisfactorily, a policy should be established by the government in the most feasible way.

427. Irrigation and/or drainage revenues as a financial source for the repayment of construction cost come from the incremental net returns in agricultural products derived from the project. In some developing countries, no charge is levied on farmers to recover the construction cost for such irrigation and/or drainage facilities according to the national policy to promote the advanced agriculture.

428. Also in Malaysia, presently, no charge is levied on the small-scale farmers even though they are project beneficiaries. In view of the difficulties of complete repayment by public funds in Malaysia, it might become necessary in the future that at least a half of the loan should be repaid from the project beneficiaries including small-scale farmers.

429. When the irrigation and/or drainage facilities come into operation, it will thus be declared that the water rate will be collected from farmers (settlers) through farmers' associations. Initially only a part of the operation and maintenance costs for such facilities will be charged. After the 6th year the full rate will be levied. The above-said charges for loan repayment will have to be levied in the form of enlarged operation and maintenance costs, carefully determined according to the respective capacity to pay of each farmer.

430. Besides construction costs, the initial farm input is required for smooth management of agricultural development. In general, it is impossible to expect a large amount of return from the agriculture during the initial stage even though it is advanced. In Malaysia, the entire cost incurrable for large-scale project implementation will be borne, usually, by the government and any international development banks or so. In the financial analysis on the part of farmers, therefore, the evaluation will need to treat such costs if it were due to a long term loan advanced instead of beneficial farmers.

431. Meantime, in the project, the initial input for agriculture is to be paid for year after year as the production cost and, accordingly, it does not necessarily require long term loans for their annual application. Under the financing system established in Malaysia to facilitate for small-scale farmers like paddy farmers and cash crop farmers, fertilizers, agro-chemicals, seeds, etc. are provided in kind as a part and parcel of loans for crop cultivation, livestock rearing and others.

432. Apart from the above-said financing systems, in Malaysia, the Agricultural Inputs and Diversification Subsidy Scheme has been applied since a decade. In our estimation of agricultural production cost, therefore, 10% of such costs have been appropriated for interest payable. Consequently, the works supposed to be undertaken by long term repayment on the part of farmers would be:

Construction cost

for Work Unit No. 1: M\$227,223 thousand

for Work Unit No. 2: M\$ 63,100 thousand

for Work Unit No. 3: M\$ 48,594 thousand

Initial input for agriculture

none

433. In securing the above-said amount of money required for the execution of the development work, the following loan facilitation will possibly be arranged.

Repayment Plan

<u>Case No.</u>	<u>Repayment Conditions</u>	<u>Average Annual Interest Rate</u>	<u>Repayment Period</u>
1.	Unredeemable for the first five years	3%	20 years
2.	- do -	3%	25 years
3.	- do -	3%	30 years
4.	- do -	3.5%	20 years
5.	- do -	3.5%	25 years
6.	- do -	3.5%	30 years

Under the above-said conditions, the average amounts for repaying per acre per annum will be as follows:

<u>Work Unit</u>	<u>Case</u>	<u>Average Amount for Repaying</u> (M\$/acre)
I	No. 1	303
	No. 2	243
	No. 3	208
	No. 4	322
	No. 5	261
	No. 6	225
II	No. 1	377
	No. 2	302
	No. 3	258
	No. 4	400
	No. 5	324
	No. 6	280
III	No. 1	366
	No. 2	294
	No. 3	251
	No. 4	389
	No. 5	315
	No. 6	272

434. Meantime, as shown in Table IX-9 on Page 167, even a standard paddy farm which earns the maximum return among various typical standard

farms of crops the annual capacity to pay is only M\$2,060 per five-acre unit farm. Consequently, it is considered that the entire repayment of construction costs by individual farmers is very difficult in case of swamp area agricultural development in which much money is necessary for the development.

435 Generally, the terms and conditions on long term loans available for capital cost would have considerable influences on the farmers' financial position. Marginal propensity to save among the Malaysian farmers would account for another important factor in this connection. For instance, in cases that the ratio of amortization to incremental net return should be less than marginal propensity to save, the type of agricultural development project would become less burdensome on the part of the individual farmers and, accordingly, more acceptable.

436. It should be noted that subsidies offerable by the government to farmers willing to undertake this type of development work will proportionately bring down the ratio of amortization to the incremental net return derived from the investment for development.

437. Table IX-23 - 25 show the results of trial calculation under the conditions of unredem-able for the first five years, 3.5% of average annual interest rate and 30 years of repayment period, and on the assumptions that a half each of the construction costs for respective work units should be repaid.

Table IX-23 Annual Repayment Schedule

Work Unit No. 1

(Unit : M\$ '000)

No.	Year	Capacity to Pay	O&M Cost	Net Profit	Construction Cost	Interest	Total Loan	Repayment	Surplus	Repayment per Acre	Accumulated Surplus	
(M\$)												
1	1981/82											
2	1982/83											
3	1983/84											
4	1984/85											
5	1985/86											
6	1986/87											
7	1987/88											
8	1988/89											
9	1989/90											
10	1990/91											
					Construction period							
					151,564							
11	1991/92	10,587	143	10,444		4,547	156,111	0	10,444	215	215	
12	1992/93	11,494	165	11,329		4,683	160,794	0	11,329	233	448	
13	1993/94	12,855	186	12,669		4,824	165,618	0	12,660	260	708	
14	1994/95	13,914	210	13,704		4,969	170,587	0	13,704	282	990	
15	1995/96	15,124	270	14,854		5,117	175,704	0	14,854	306	1,296	
16	1996/97	15,124	270	14,854		5,271	170,885	10,090	4,764	98	1,394	
17	1997/98	15,124	270	14,854		5,127	165,922	10,090	4,764	98	1,492	
18	1998/99	15,124	270	14,854		4,978	160,810	10,090	4,764	98	1,590	
19	1999/00	15,124	270	14,854		4,824	155,544	10,090	4,764	98	1,688	
20	2000/01	15,124	270	14,854		4,666	150,120	10,090	4,764	98	1,786	
21	2001/02	15,124	270	14,854		4,504	144,534	10,090	4,764	98	1,884	
22	2002/03	15,124	270	14,854		4,336	138,780	10,090	4,764	98	1,982	
23	2003/04	15,124	270	14,854		4,163	132,853	10,090	4,764	98	2,080	
24	2004/05	15,124	270	14,854		3,986	126,749	10,090	4,764	98	2,178	
25	2005/06	15,124	270	14,854		3,802	120,461	10,090	4,764	98	2,276	
26	2006/07	15,124	270	14,854		3,614	113,985	10,090	4,764	98	2,374	
27	2007/08	15,124	270	14,854		3,420	107,315	10,090	4,764	98	2,472	
28	2008/09	15,124	270	14,854		3,219	100,444	10,090	4,764	98	2,570	
29	2009/10	15,124	270	14,854		3,013	93,363	10,090	4,764	98	2,668	
30	2010/11	15,124	270	14,854		2,801	86,079	10,090	4,764	98	2,766	
31	2011/12	15,124	270	14,854		2,582	78,571	10,090	4,764	98	2,864	
32	2012/13	15,124	270	14,854		2,357	70,838	10,090	4,764	98	2,962	
33	2013/14	15,124	270	14,854		2,125	62,873	10,090	4,764	98	3,060	
34	2014/15	15,124	270	14,854		1,886	54,669	10,090	4,764	98	3,158	
35	2015/16	15,124	270	14,854		1,640	46,219	10,090	4,764	98	3,256	
36	2016/17	15,124	270	14,854		1,386	37,516	10,090	4,764	98	3,264	
37	2017/18	15,124	270	14,854		1,125	28,551	10,090	4,764	98	3,362	
38	2018/19	15,124	270	14,854		857	19,318	10,090	4,764	98	3,460	
39	2019/20	15,124	270	14,854		580	9,808	10,090	4,764	98	3,558	
40	2020/21	15,124	270	14,854		294	0	10,090	4,764	98	3,656	

1/: Capacity to pay and O&M cost during the construction period are excluded from the table due to the less value.

2/: The term "Capacity to Pay" means the amount remaining to operate after all costs except for water charge (O&M cost in narrow sense) have been met and after an allowance has been made for family living.

Table IX-24 Annual Repayment Schedule

Work Unit No. 2

(Unit : M\$ '000)

No.	Year	Capacity to Pay	O&M Cost	Net Profit	Construction Cost	Interest	Total Loan	Repayment	Surplus	Repayment per Acre	Accumulated Surplus
(M\$)											
1	1981/82										
2	1982/83										
3	1983/84										
4	1984/85										
5	1985/86										
6	1986/87										
7	1987/88										
8	1988/89										
9	1989/90										
10	1990/91										
11	1991/92										
12	1992/93										
Construction period											
51,311											
13	1993/94	3,378	12	3,366		1,539	52,850	0	3,366	255	255
14	1994/95	3,667	26	3,641		1,586	54,436	0	3,641	276	531
15	1995/96	4,101	40	4,061		1,633	56,069	0	4,061	308	839
16	1996/97	4,439	72	4,367		1,682	57,751	0	4,367	331	1,170
17	1997/98	4,825	86	4,739		1,733	59,484	0	4,739	360	1,530
18	1998/99	4,825	86	4,739		1,785	57,852	3,416	1,323	100	1,630
19	1999/00	4,825	86	4,739		1,736	56,172	3,416	1,323	100	1,730
20	2000/01	4,825	86	4,739		1,685	54,441	3,416	1,323	100	1,830
21	2001/02	4,825	86	4,739		1,633	52,658	3,416	1,323	100	1,930
22	2002/03	4,825	86	4,739		1,580	50,822	3,416	1,323	100	2,030
23	2003/04	4,825	86	4,739		1,525	48,931	3,416	1,323	100	2,130
24	2004/05	4,825	86	4,739		1,468	46,983	3,416	1,323	100	2,230
25	2005/06	4,825	86	4,739		1,409	44,976	3,416	1,323	100	2,330
26	2006/07	4,825	86	4,739		1,349	42,909	3,416	1,323	100	2,430
27	2007/08	4,825	86	4,739		1,287	40,780	3,416	1,323	100	2,530
28	2008/09	4,825	86	4,739		1,223	38,587	3,416	1,323	100	2,630
29	2009/10	4,825	86	4,739		1,158	36,329	3,416	1,323	100	2,730
30	2010/11	4,825	86	4,739		1,090	34,003	3,416	1,323	100	2,830
31	2011/12	4,825	86	4,739		1,020	31,607	3,416	1,323	100	2,930
32	2012/13	4,825	86	4,739		948	29,139	3,416	1,323	100	3,030
33	2013/14	4,825	86	4,739		874	26,597	3,416	1,323	100	3,130
34	2014/15	4,825	86	4,739		798	23,979	3,416	1,323	100	3,230
35	2015/16	4,825	86	4,739		719	21,282	3,416	1,323	100	3,330
36	2016/17	4,825	86	4,739		638	18,504	3,416	1,323	100	3,430
37	2017/18	4,825	86	4,739		555	15,643	3,416	1,323	100	3,530
38	2018/19	4,825	86	4,739		469	12,695	3,416	1,323	100	3,630
39	2019/20	4,825	86	4,739		381	9,660	3,416	1,323	100	3,730
40	2020/21	4,825	86	4,739		290	6,534	3,416	1,323	100	3,830
41	2021/22	4,825	86	4,739		196	3,314	3,416	1,323	100	3,930
42	2022/23	4,825	86	4,739		99	0	3,416	1,323	100	4,030

1/: Capacity to pay and O&M cost during the construction period are excluded from the table due to the less value.

2/: The term "Capacity to Pay" means the amount remaining to operate after all costs except for water charge (O&M cost in narrow sense) have been met and after an allowance has been made for family living.

Table IX-25 Annual Repayment Schedule

Work Unit No. 3

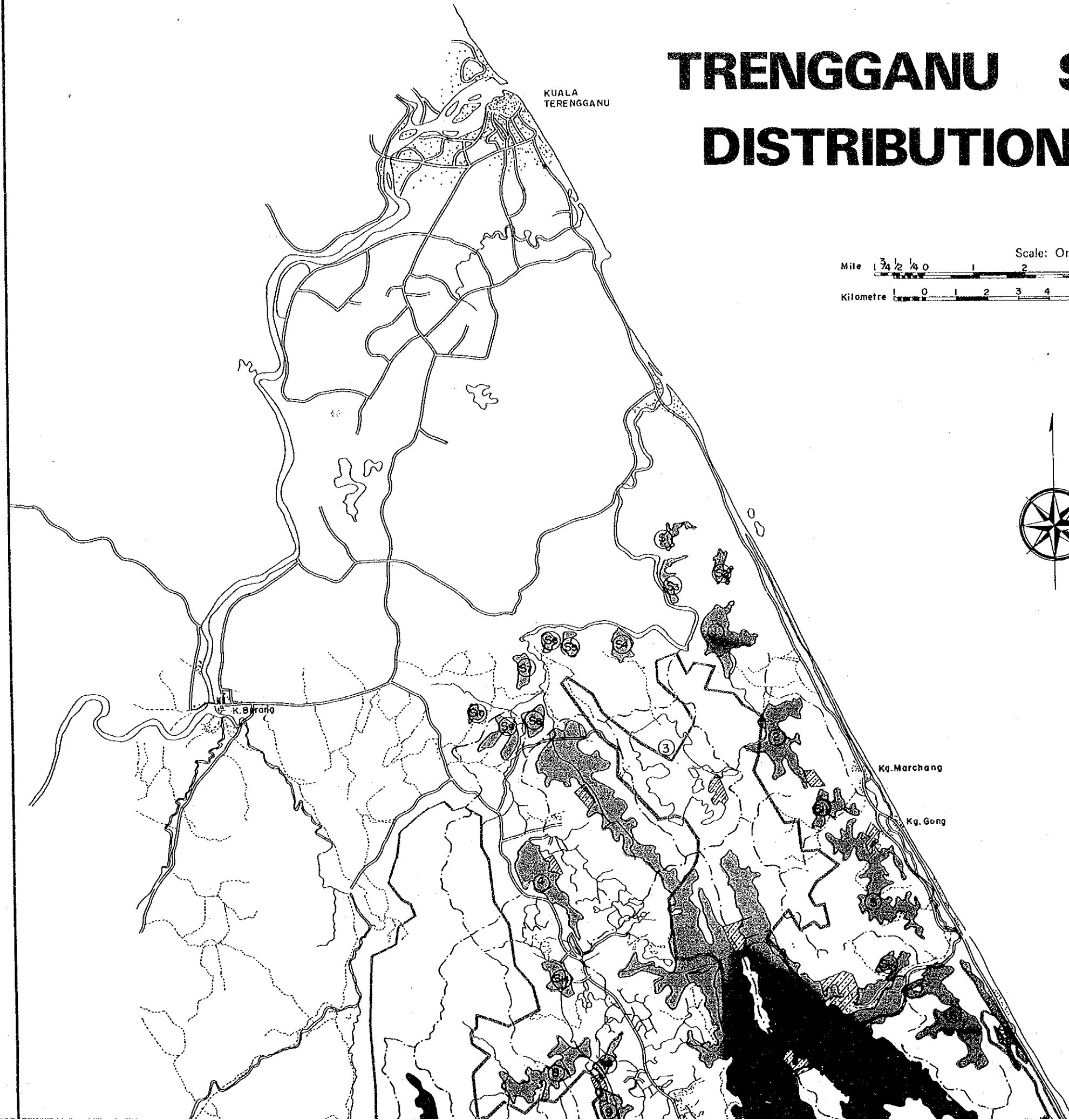
(Unit : M\$ '000)

No.	Year	Capacity to Pay	O&M Cost	Net Profit	Construction Cost	Interest	Total Loan	Repayment	Surplus	Repayment per Acre	Accumulated Surplus
(M\$)											
1	1981/82										
2	1982/83										
3	1983/84										
4	1984/85										
5	1985/86										
6	1986/87										
7	1987/88										
8	1988/89										
9	1989/90										
10	1990/91										
11	1991/92										
12	1992/93										
13	1993/94										
Construction period											
41,021											
14	1994/95	2,521	24	2,497		1,231	42,252	0	2,497	228	238
15	1995/96	2,738	32	2,706		1,268	43,519	0	2,706	248	476
16	1996/97	3,062	40	3,022		1,306	44,825	0	3,022	277	753
17	1997/98	3,314	62	3,252		1,345	46,169	0	3,252	298	1,051
18	1998/99	3,602	88	3,514		1,385	47,555	0	3,514	322	1,373
19	1999/00	3,602	88	3,514		1,427	46,250	2,731	783	72	1,445
20	2000/01	3,602	88	3,514		1,388	44,907	2,731	783	72	1,517
21	2001/02	3,602	88	3,514		1,347	43,523	2,731	783	72	1,589
22	2002/03	3,602	88	3,514		1,306	42,098	2,731	783	72	1,661
23	2003/04	3,602	88	3,514		1,263	40,630	2,731	783	72	1,733
24	2004/05	3,602	88	3,514		1,219	39,118	2,731	783	72	1,805
25	2005/06	3,602	88	3,514		1,174	37,561	2,731	783	72	1,877
26	2006/07	3,602	88	3,514		1,127	35,958	2,731	783	72	1,949
27	2007/08	3,602	88	3,514		1,079	34,306	2,731	783	72	2,021
28	2008/09	3,602	88	3,514		1,029	32,604	2,731	783	72	2,093
29	2009/10	3,602	88	3,514		978	30,851	2,731	783	72	2,165
30	2010/11	3,602	88	3,514		926	29,046	2,731	783	72	2,237
31	2011/12	3,602	88	3,514		871	27,186	2,731	783	72	2,309
32	2012/13	3,602	88	3,514		816	25,271	2,731	783	72	2,381
33	2013/14	3,602	88	3,514		758	23,478	2,731	783	72	2,453
34	2014/15	3,602	88	3,514		704	21,451	2,731	783	72	2,525
35	2015/16	3,602	88	3,514		644	19,364	2,731	783	72	2,597
36	2016/17	3,602	88	3,514		581	17,214	2,731	783	72	2,669
37	2017/18	3,602	88	3,514		516	14,999	2,731	783	72	2,741
38	2018/19	3,602	88	3,514		450	12,718	2,731	783	72	2,813
39	2019/20	3,602	88	3,514		382	10,369	2,731	783	72	2,885
40	2020/21	3,602	88	3,514		311	7,949	2,731	783	72	2,957
41	2021/22	3,602	88	3,514		238	5,456	2,731	783	72	3,029
42	2022/23	3,602	88	3,514		164	2,889	2,731	783	72	3,101
43	2023/24	3,602	88	4,514		87	0	2,731	783	72	3,173

1/: Capacity to pay and O&M cost during the construction period are excluded from the table due to the less value.

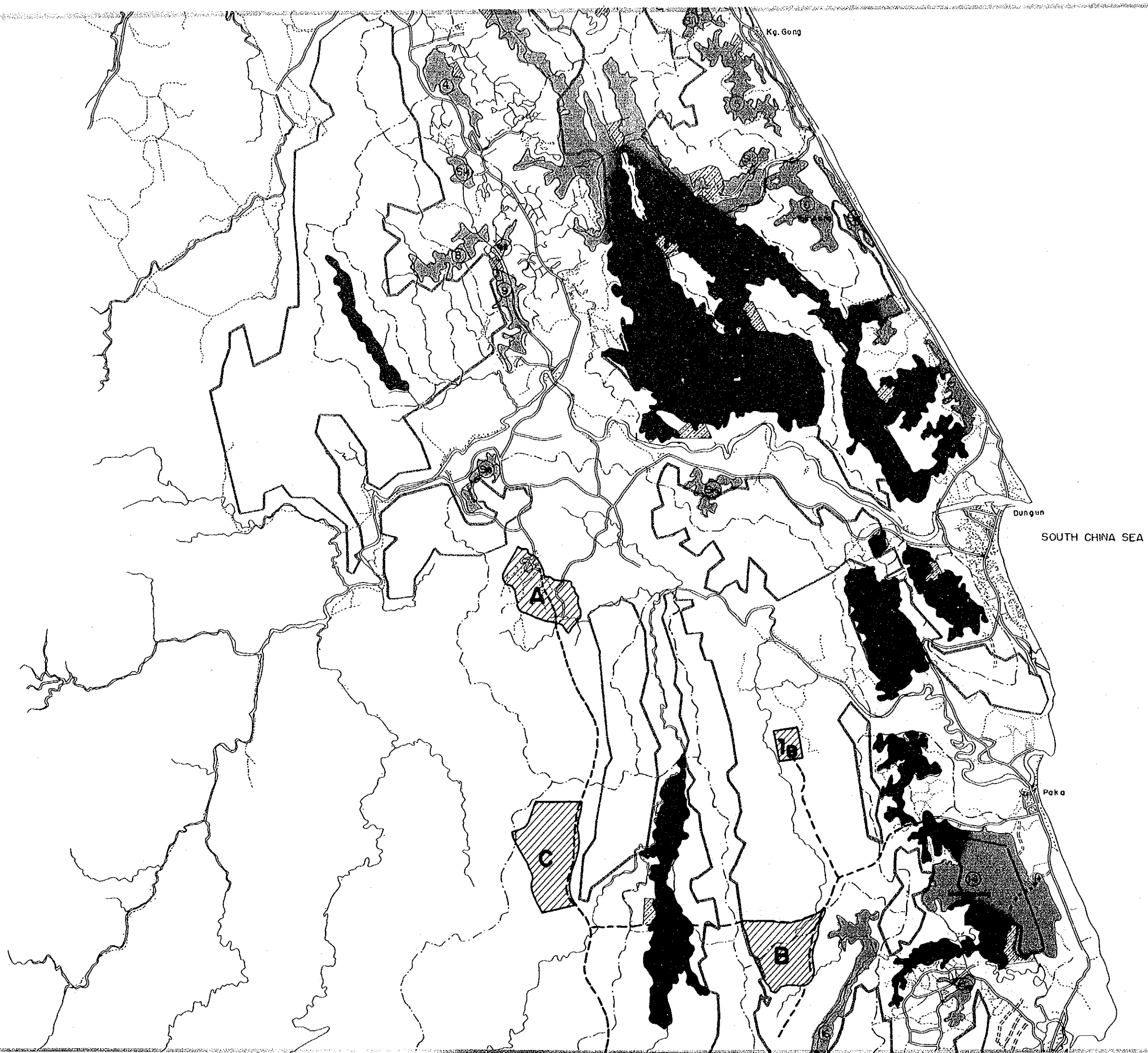
2/: The term "Capacity to Pay" means the amount remaining to operate after all costs except for water charge (O&M cost in narrow sense) have been met and after an allowance has been made for family living.

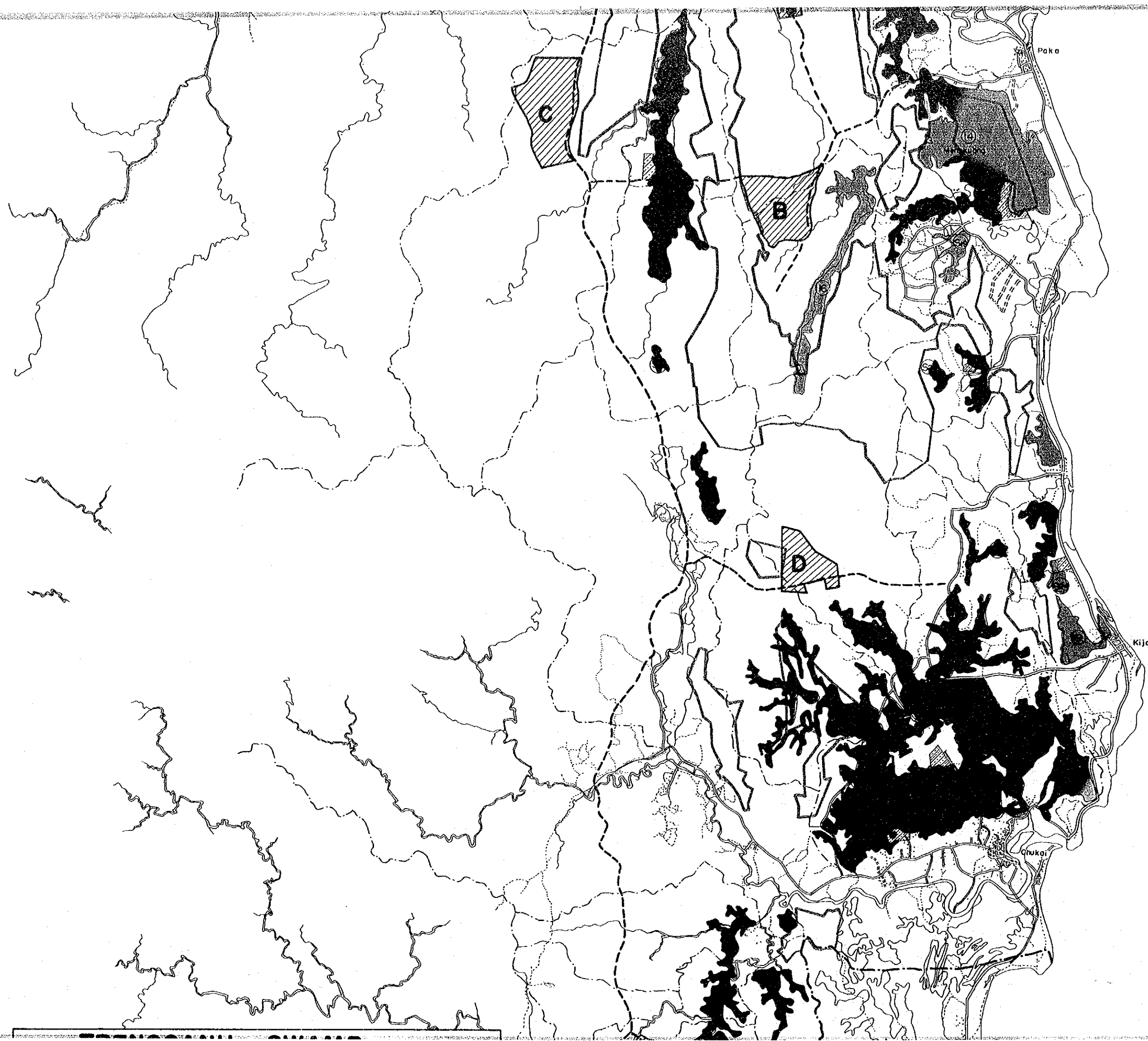
TRENGGANU SWAMP DISTRIBUTION MAP











Scale: One Inch to Three Miles or 1:190,000
Mile 1 1/4 1/2 3/4 0 1 2 3 4 5 6 Miles
Kilometre 1 0 1 2 3 4 5 6 7 8 Kilometres







TRENGGANU SWAMP DISTRIBUTION MAP

-  SWAMP
-  KETENGAH NEW TOWN
-  INLAND WATER LOGGED SWAMP
-  INLAND SEASONAL SWAMP
-  COASTAL SAND DUNE SWAMP
-  COASTAL TIDAL INFLUENCED SWAMP
-  COASTAL MANGROVE SWAMP
-  FOREST RESERVE BOUNDARY

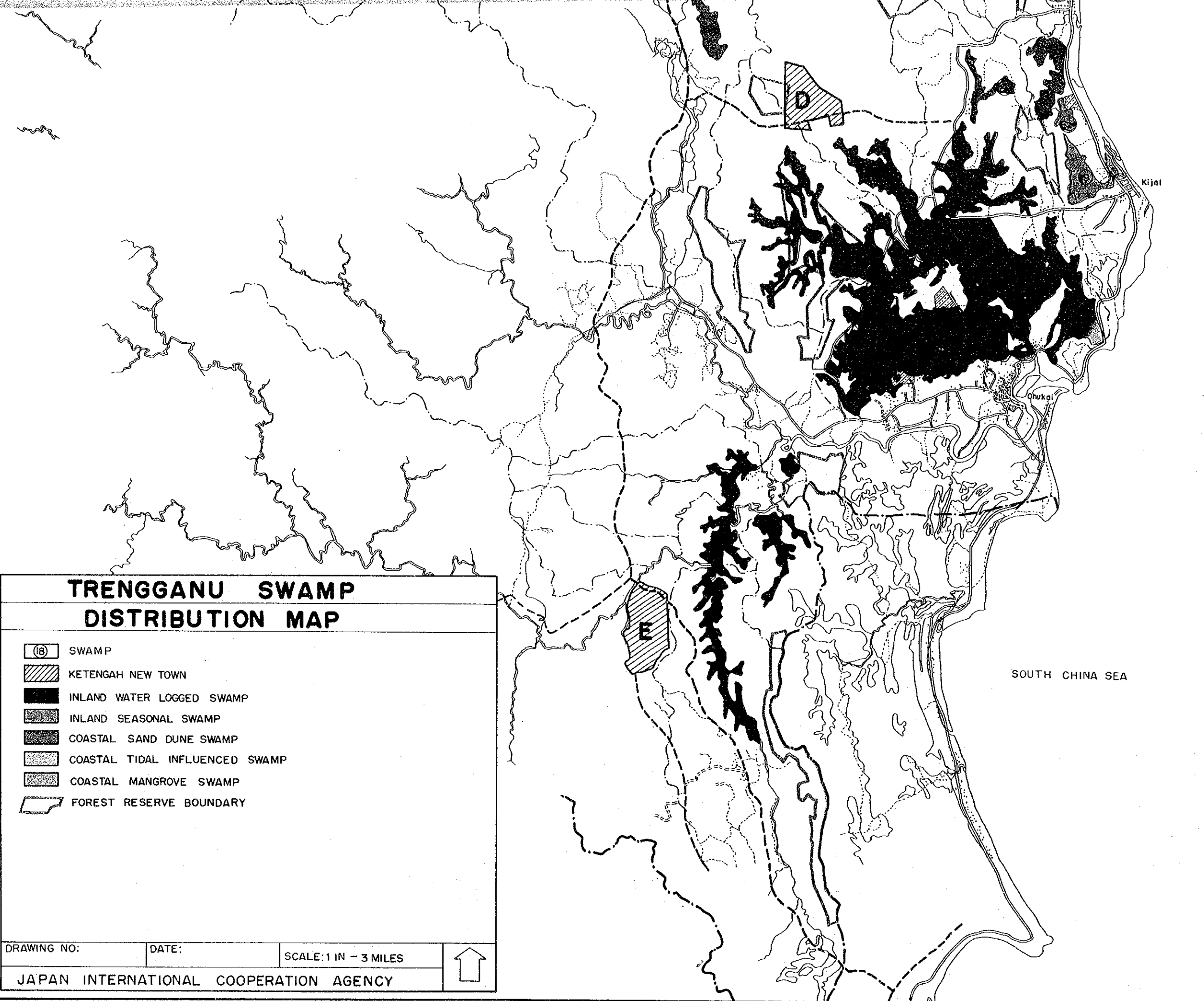
DRAWING NO:

DATE:

SCALE: 1 IN - 3 MILES



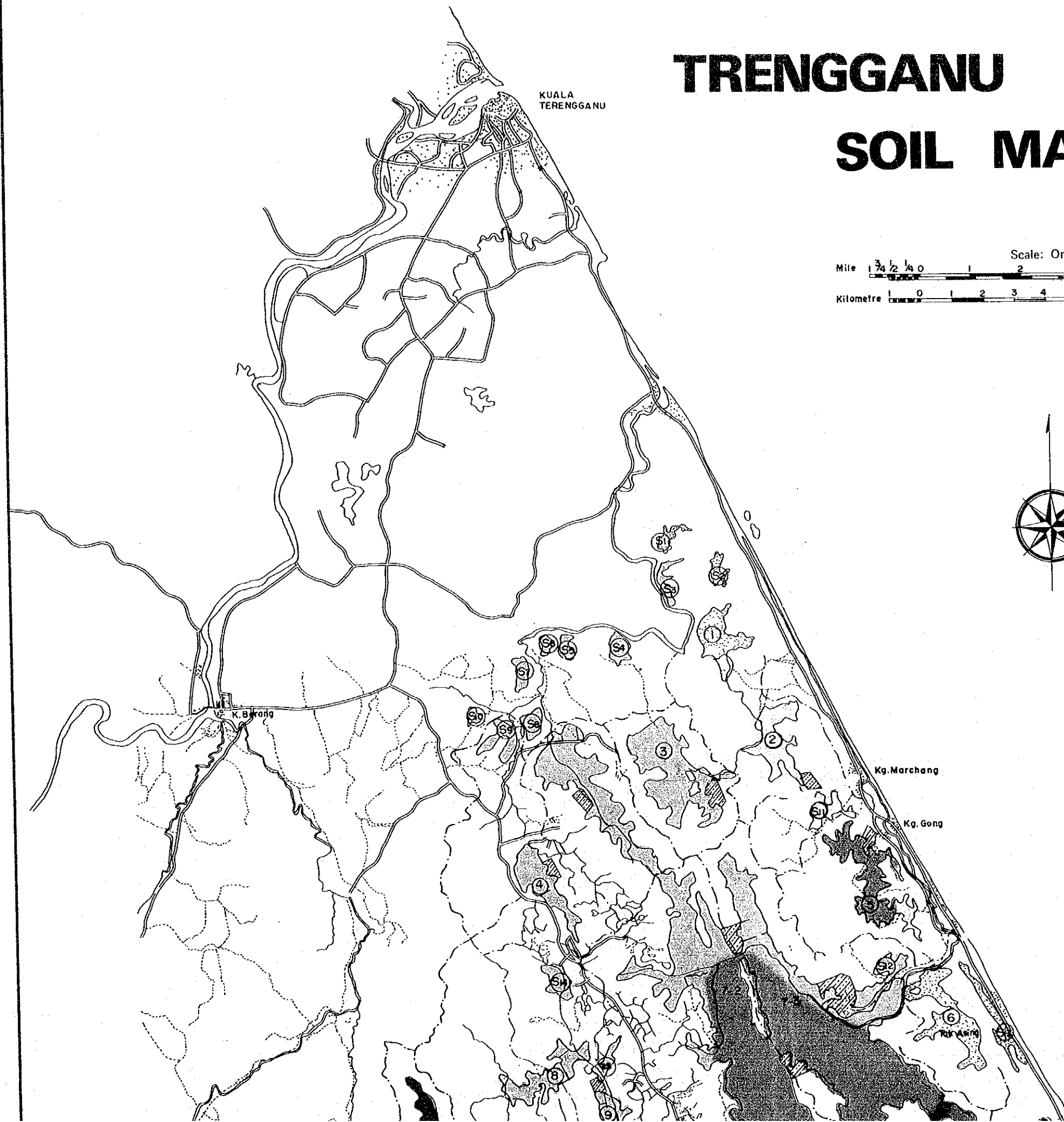
JAPAN INTERNATIONAL COOPERATION AGENCY

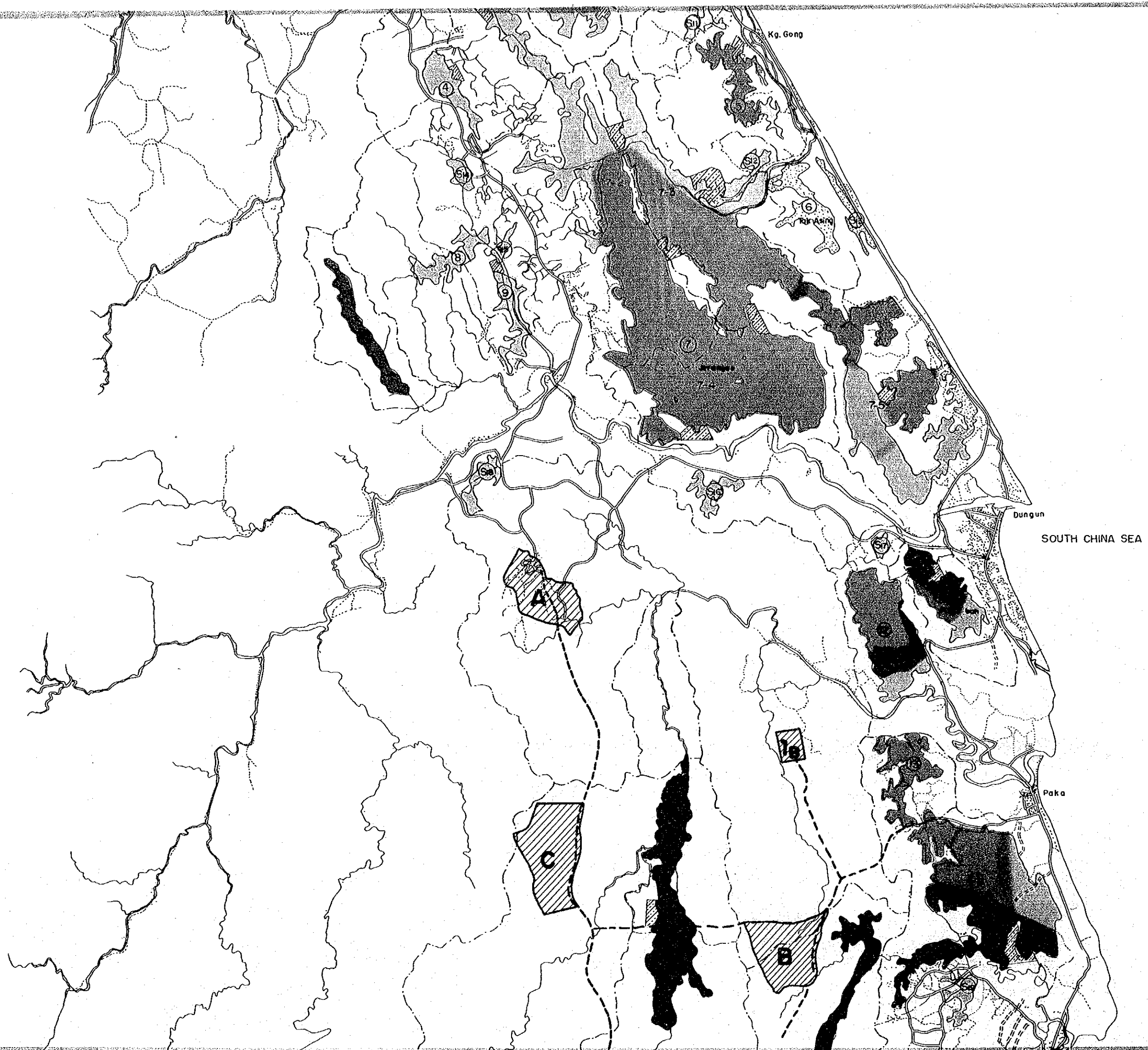


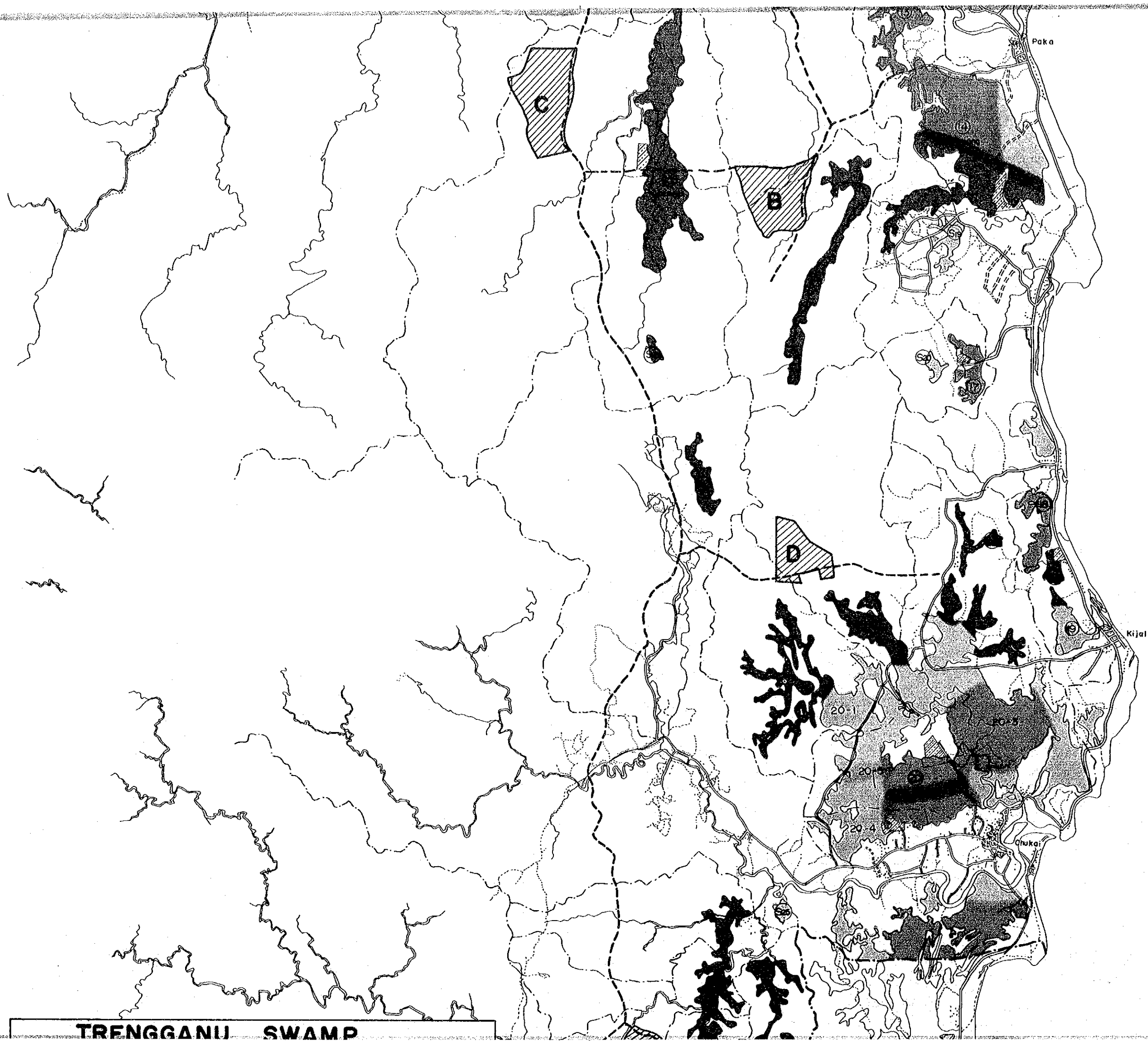
TRENGGANU SWAMP SOIL MAP

KUALA
TERENGGANU

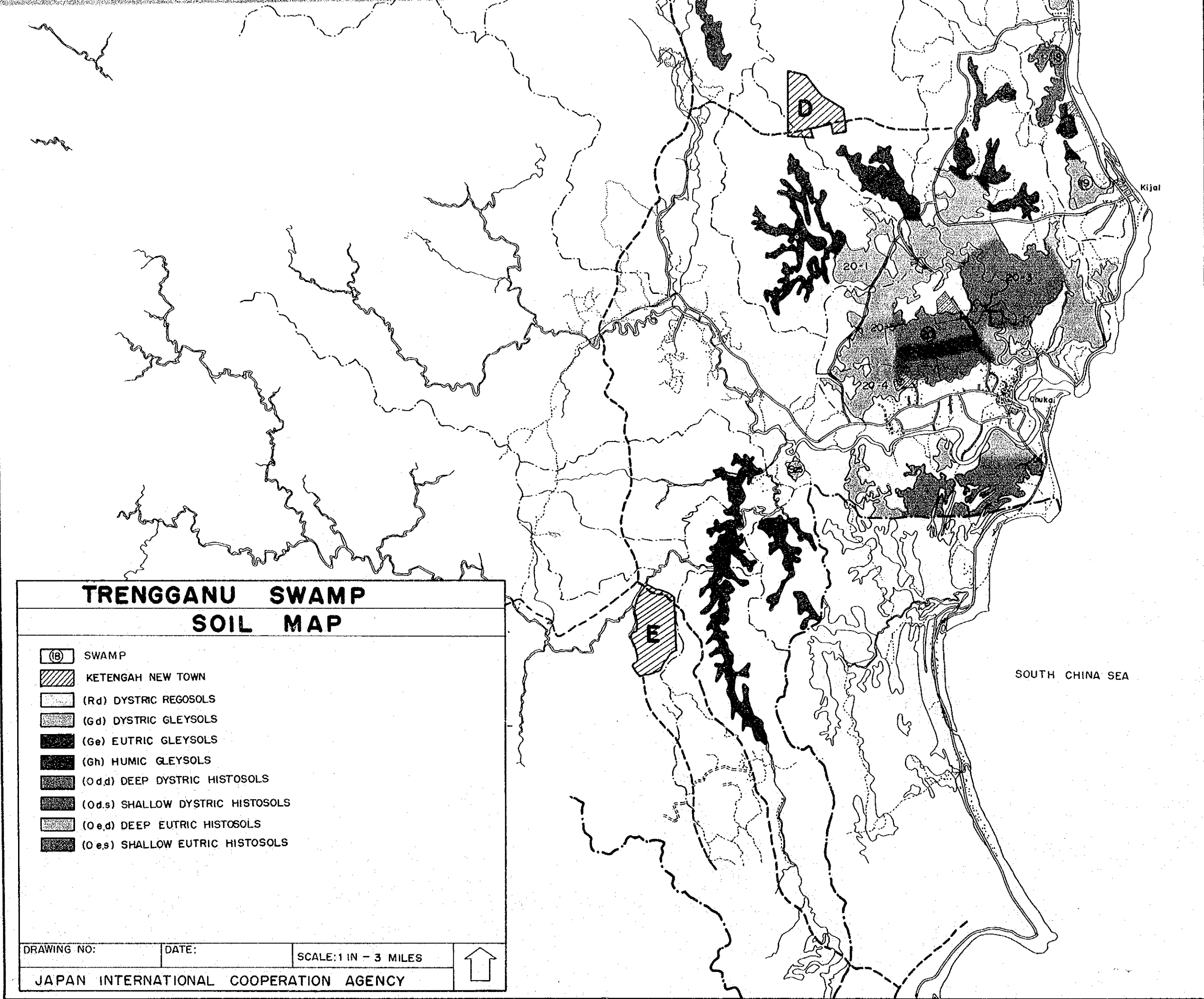
Scale: One Inch to Three Miles or 1:190,000
Mile 1 1/4 1/2 3/4 0 1 2 3 4 5 6 Miles
Kilometre 1 0 1 2 3 4 5 6 7 8 Kilometres







TRENGGANU SWAMP



TRENGGANU SWAMP SOIL MAP

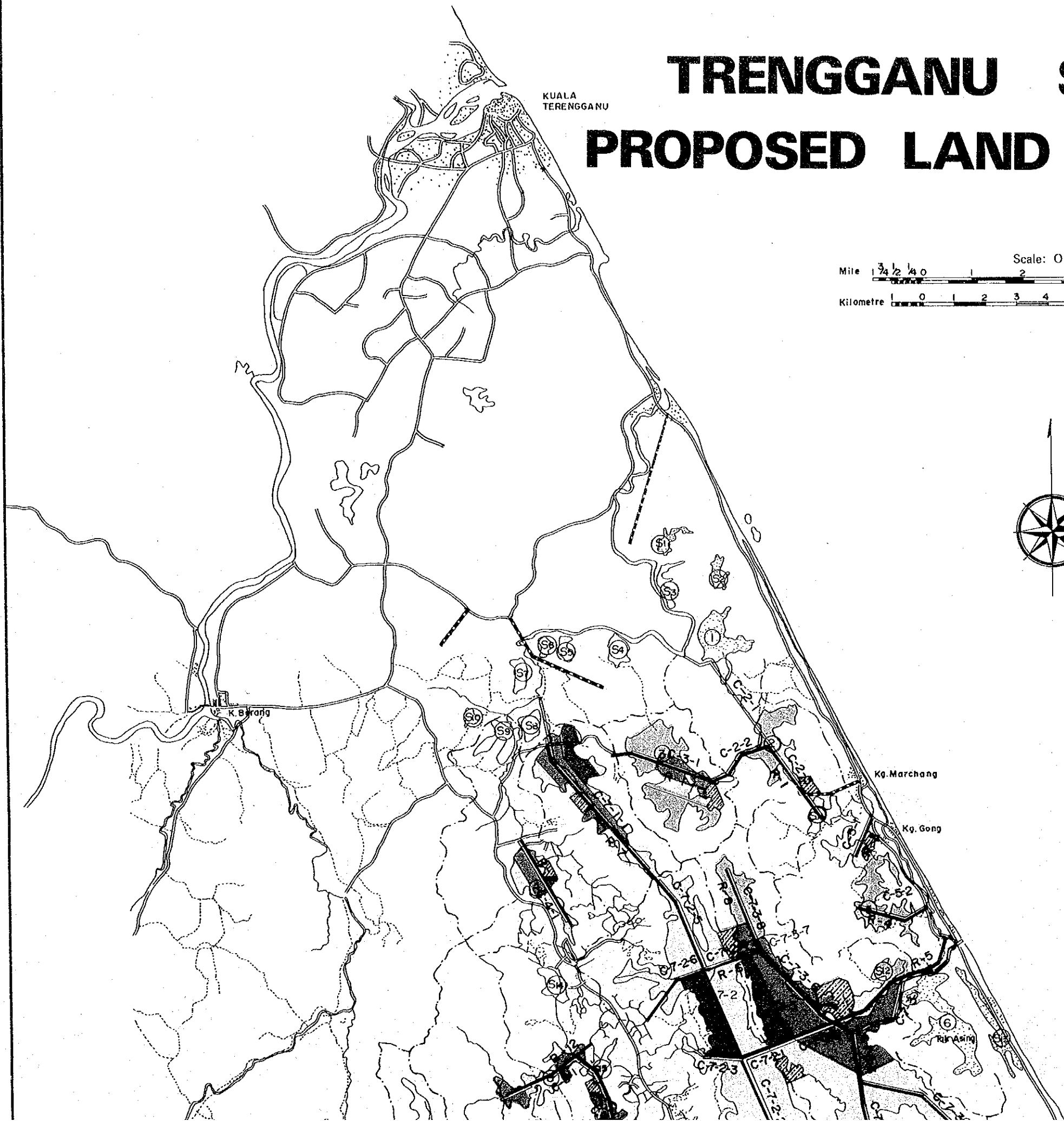
- (B) SWAMP
- KETENGAH NEW TOWN
- (Rd) DYSTRIC REGOSOLS
- (Gd) DYSTRIC GLEYSOLS
- (Ge) EUTRIC GLEYSOLS
- (Gh) HUMIC GLEYSOLS
- (Od.d) DEEP DYSTRIC HISTOSOLS
- (Od.s) SHALLOW DYSTRIC HISTOSOLS
- (Oe.d) DEEP EUTRIC HISTOSOLS
- (Oe.s) SHALLOW EUTRIC HISTOSOLS

DRAWING NO:	DATE:	SCALE: 1 IN - 3 MILES	↑
JAPAN INTERNATIONAL COOPERATION AGENCY			

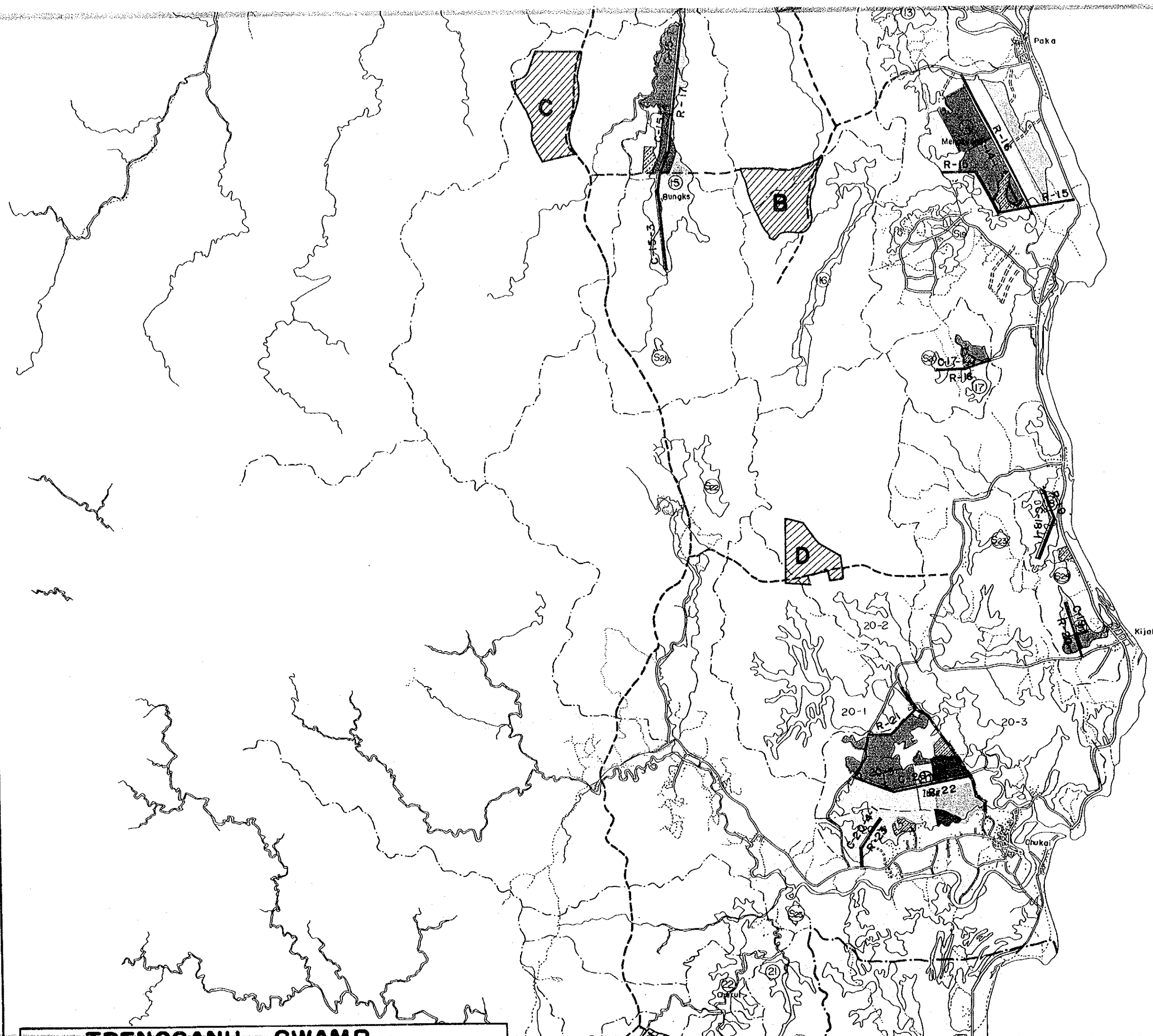
TRENGGANU SWAMP PROPOSED LAND USE MAP

KUALA
TERENGGANU

Scale: One Inch to Three Miles or 1:190,000
Mile 1 1/4 1/2 3/4 0 1 2 3 4 5 6 Miles
Kilometre 1 0 1 2 3 4 5 6 7 8 9 Kilometres


















TRENGGANU SWAMP

TRENGGANU SWAMP PROPOSED LAND USE MAP

- | | | | |
|-------------------------------------------------------------------------------------|-------------------|-------------------------------------------------------------------------------------|----------------------|
|  | SWAMP |  | JKR PLANED ROAD |
|  | KETENGAH NEW TOWN |  | PROPOSED TRUNK ROAD |
|  | PADDY FIELD |  | PROPOSED TRUNK CANAL |
|  | UPLAND FIELD | | |
|  | MULBERRY FIELD | | |
|  | GRASSLAND | | |
|  | FISH POND | | |
|  | PROPOSED NEW TOWN | | |

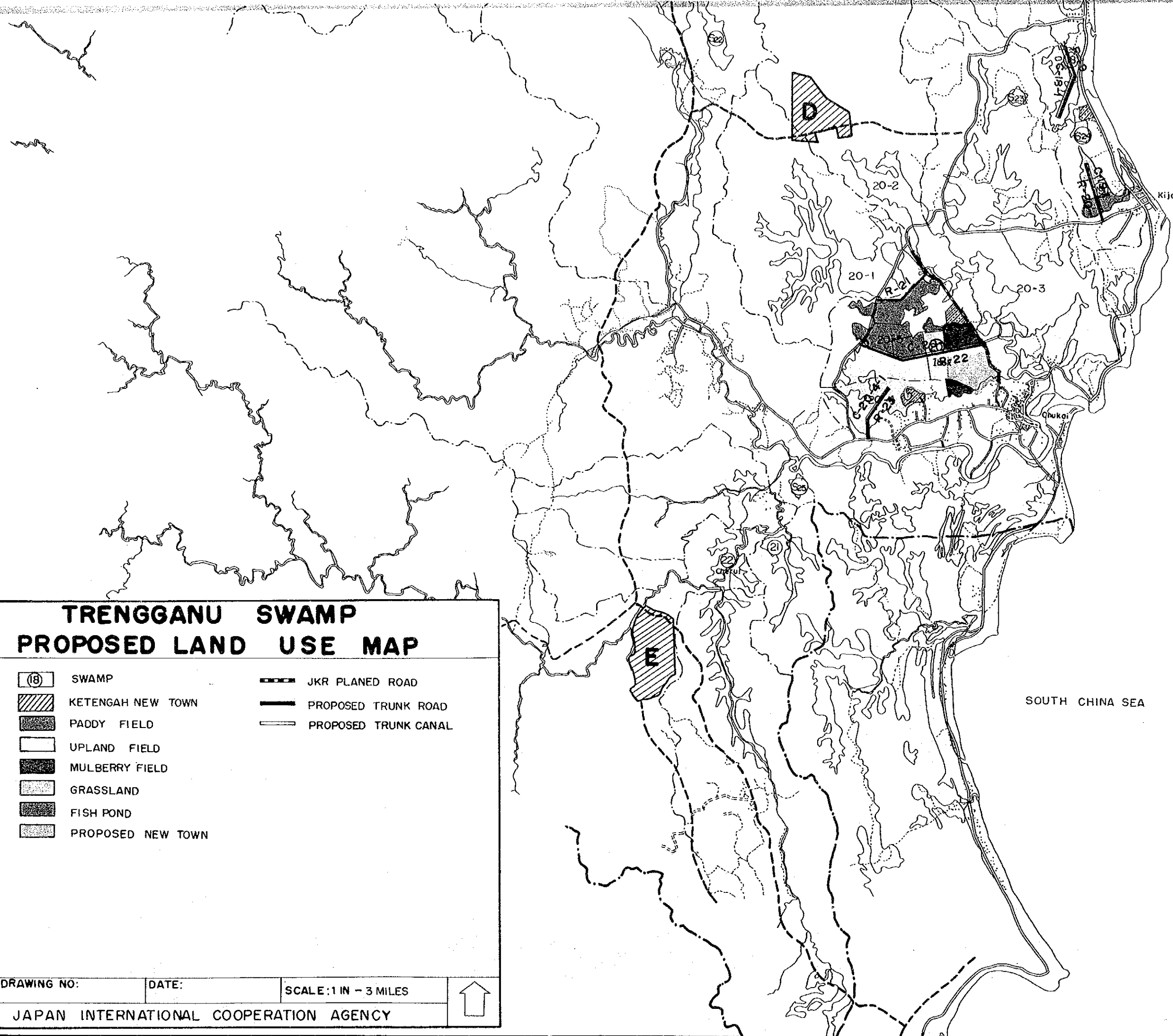
DRAWING NO:

DATE:

SCALE: 1 IN - 3 MILES



JAPAN INTERNATIONAL COOPERATION AGENCY



JICA