

T A B L E



Table V-1 SOIL SUITABILITY CLASSIFICATION AND MAIN SOIL UNITS (SOIL GROUPS 2&3)

Soil Suitability Group	Landform	Parent Material	Soil Association	Key No.	Main Soil Units
Group 2	Gently slopping hills; Slopes 0-15°	Sedimentary Rocks	Rumidi	26	Gleyic, Ferric and Orthic Acrisols, Gleyic, Ferric, Chromic and Orthic Luvisols
			Silabukan	25	
	Terraces: Slopes 0-5°	Coral limestone and Alluvium	Lungmandis	22	Xanthic Ferrasols, Orthic Acrisol, Orthic Luvisols, Eutric Gleysol
			Tapang	20	
Group 3	Riverine plains	Alluvium	Semporna	21	Calcic and Chromic Luvisols, Rendzina
			Tungku	17	
	Riverine plains and Terraces	Alluvium	Tuaran	4	Eutric Fluvisol, Gleyic, Dystric and Eutric Cambisols, Humic, Dystric and Eutric Gleysols
			Labau	10	Gleyic and Dystric Cambisols, Dystric and Eutric Fluvisols, Gleyic and Orthic Acrisols
Strongly sloping hills; Slopes 0-20°	Sedimentary Rocks	Karamuak	9	Gleyic, Chromic and Orthic Luvisols, Gleyic and Eutric Cambisols, Eutric Fluvisol	
		Dalit	31	Orthic Ferric and Gleyic Acrisols	
		Tengah Nipah	32		
		Kalabakan	29	Ferric and Orthic Acrisols, Ferric, Chromic and Orthic Luvisols	
Slopes 15-25° Terraces Riverine plains* Stranded beaches	Alluvium	Kretam	33		
		Dagat	35	Chromic and Orthic Luvisols, Orthic Acrisol	
		Sinarun	16	Orthic Acrisol, Dystric Gleysol, Dystric Cambisol	
		Brantian	12	Orthic, Ferric and Gleyic Acrisols, Gleyic Podzol	
		Kinabatangan	5	Gleyic Acrisol, Gleyic Luvisol, Humic, Dystric and Eutric Gleysols	
		Usakan	2	Calcaric Regosol, Humic Gleysol	

* Flood plains

Source: Compiled from the land capability classification of Sabah, Vol. 2, The Sandakan Residency and Soil Sheet Sandakan NB50-II.

Table. V-2 SOIL SUITABILITY CLASSIFICATION AND MAIN SOIL UNITS (SOIL GROUPS 4&5)

Soil Suitability Group	Land Forms	Parent Materials	Soil Association	Key No.	Main Soil Units
Group 4	Terraces	Ironstone and alluvium	Tawai	19	Dystric Histosol, D. Gleysol, D. Cambisol
		Alluvium	Kepayan	13	Gleyic and Orthic Acrisols, Gleyic Podzol
			Sook	14	Dystric Gleysol
	Swamp	Peat & Siliceous Sand	Sipitang	15	Dystric Histosol, Gleyic Podzol
	Fresh Water Swamp	Alluvium	Sapi	6	Humic, Dystric Gleysol, Dystric Histosol
	Tidal Swamp		Weston	1	Thionic Fluvisol, D. Histosol, Thionic Gleysol
	Standed Beaches	Siliceous Sand	Tanjong Aru	3	Dystric & Eutric Regosols, Humic, D & E. Gleysol
	Mountains & Steeplands	Sedimentary & Igneous Rocks	Serudong	49	Gleyic Podzol, Orthic Acrisol
			Maliau	48	Orthic Acrisol, Dystric Cambisol, Gleyic Podzol
			Croker	47	Chromic & Dystric Cambisols
Group 5			Lokan	39	
	slopes above 25° above 1,200m		Trus Madi	50	
			Gumpal	46	
	slopes above 25°		Gomantong	38	Caleic Luvisol, Rendzina
			Malubok	44	
			Bidu-Bidu.	41	Cambiso, Lithosol, Eutric Cambisol etc.
			Mentapok	42	
	Alluvial Fans & Terrace	Alluvium	Binalik	8	Gleyic, Ferric, Orthic Luvisols etc.
	Swamps	Peat & Alluvium	Klias	7	Dystric Histosol, Humic Gleysol

Source: Compiled from the land capability classification of Sabah, Vol.2, The Sandakan Residency and Soil Sandakan NBSO-11
* Flood plains

Table V-3 PLANTING AREA OF MAJOR CROPS

Unit: 1,000 ha

Crops	1956	1961	1966	1970	1975	1976	1978	1979
Rubber	51.4	75.0	101.8	106.0	104.8	108.1	104.0	105.6
Coconuts	18.0	31.5	41.8	55.1	54.5	53.8	51.5	53.0
Wet paddy	17.7	26.4	27.2	31.0	30.7	31.3	29.4	29.9
Dry paddy	11.2	10.8	11.1	10.9	10.8	17.9	13.6	11.8
Oil palm	-	0.8	19.1	38.4	38.0	69.4	77.3	85.7
Cocoa	-	1.5	2.6	4.0	4.0	11.7	22.2	37.5

Source: Compiled from Statistical Informations in the Department of Agriculture

Table V-4 EXPORTS OF PRIMARY AGRICULTURAL PRODUCTS

Unit: ton

Year	Palm Oil	Palm Kernel	Cocoa(bean)	Rubber	Copra
1975	124,563	24,248	5,423	32,029	30,483
1976	121,005	23,864	6,270	35,802	39,054
1977	111,037	15,593	6,998	38,823	37,086
1978	126,866	18,260	8,240	36,804	36,216
1979	136,366	15,774	9,688	33,205	30,425
1980	143,604	22,879	12,358	30,824	43,167

Source: Compiled from Statistical Informations in the Department of Agriculture

Table V-5 IMPORTS OF SELECTED AGRICULTURAL PRODUCTS 1971-1980

Products	1971		1972		1973		1974		1975		1976		1977		1978		1979		1980		
	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	Ton	MS'000	
Maize and Products																					
Maize unshelled	5,019	1,317	4,216	1,013	3,610	1,148	3,832	1,744	2,569	1,094	3,221	1,324	1,909	1,095	1,500	555	6,889	2,047	4,641	4,578	
Maize meal flour	6	12	21	42	21	46	44	84	42	68	150	153	86	75	64	101	152	185	384	264	
Maize meal & groats	30	13	70	23	78	24	36	31	33	15	111	58	17	36	1,058	429	674	284	1,035	476	
Maize for Animals feeding	6,357	1,550	400	1,329	5,088	1,736	5,948	2,823	4,430	1,994	6,293	2,682	9,431	3,520	8,768	3,550	11,193	4,724	10,726	5,220	
Maize - other purposes	180	46	75	21	30	11	96	50	778	349	132	53	100	100	131	57	135	60	5	3	
Ground nuts																					
Groundnuts - green unshelled	51	73	67	122	97	198	140	208	112	214	101	220	108	108	197	557	225	565	609	612	
Groundnuts - green shelled	507	410	523	496	475	491	543	721	528	776	479	671	527	527	899	966	1,132	1,124	1,442	1,798	
Roasted groundnuts canned	139	259	82	166	170	264	106	348	61	176	116	313	100	100	78	340	160	478	260	715	
Roasted groundnuts - not canned	39	68	147	157	134	139	72	77	16	42	31	78	26	26	62	82	682	214	3,067	275	
Groundnuts - unroasted for immediate consumption	4	8	3	5	1	0.4	2	6	0.1	0.2	0.24	1	0.60	0.60	12	28	1	5	3	7	
SUGAR																					
Sugar refined	16,956	7,904	16,715	10,224	18,358	12,143	29,408	27,810	27,063	31,219	22,044	16,613	18,035	18,035	20,682	22,199	20,096	21,904	27,734	36,510	
Sugar not refined	-	-	0.37	0.211	-	-	-	-	-	-	-	-	-	-	2	3	14	18	22	44	
Other sugar	365	209	142	117	108	93	81	114	159	246	195	161	224	224	687	296	971	334	326	685	
Pineapples & Products																					
Pineapple canned	197	147	163	148	267	208	294	266	130	113	137	88	95	95	121	136	199	41	90	152	
Pineapple not canned	19	21	13	14	38	82	9	14	15	34	9	1	3	3	311	326	100	21	603	33	
Pineapple Juice, canned	4	3	8	7	8	6	12	9	9	8	19	15	14	14	21	24	9	15	44	57	
Soya Beans & Products																					
Soya beans	511	243	633	330	504	351	584	470	603	461	771	699	600	600	763	601	1,855	623	1,288	1,047	
Soya beans flour	3	2	20	6	6	4	0.1	0.1	1	2	0.5	0.1	0.2	0.2	73	0.3	22	14	36	29	
Chillies																					
Chillies Dried	47	60	45	52	57	60	56	80	93	159	-	-	-	-	-	-	-	-	-	-	
Chillies Ground	13	15	14	15	18	25	16	20	18	31	-	-	-	-	-	-	-	-	-	-	

Source: Department of Statistics

Table V-6 IMPORTS OF FERTILIZERS BY TYPES 1971 - 1980

Year	Nitrogenous Fertilizers		Phosphatic Fertilizers		Potassic Fertilizers		Other Fertilizers complex, mixed or compound		Other not elsewhere specified (Animals or Vegetables)		Total Quantity and Value	
	Ton	M\$'000	Ton	M\$'000	Ton	M\$'000	Ton	M\$'000	Ton	M\$'000	Ton	M\$'000
1971	4,188	897	1,807	343	6,503	1,482	5,547	1,365	10	4	18,055	4,091
1972	2,789	779	1,425	295	5,935	1,332	7,492	2,032	33	7	17,678	4,445
1973	3,333	776	1,739	343	5,300	1,085	7,082	1,786	-	-	17,454	3,990
1974	5,105	3,314	810	217	8,270	3,088	10,398	5,614	-	17	24,583	12,250
1975	5,007	1,983	2,469	848	8,552	4,199	6,809	4,217	11	7	20,848	11,254
1976	2,611	1,032	5,336	1,544	5,384	2,024	6,986	3,362	-	-	20,327	7,962
1977	7,685	2,265	2,451	680	6,979	2,070	12,543	5,309	9	6	29,667	10,330
1978	3,323	1,565	3,519	1,050	7,476	2,037	19,727	9,501	9	9	34,054	14,162
1979	7,133	3,522	2,371	757	3,728	1,105	31,216	16,384	36	17	44,484	21,785
1980	10,343	6,579	2,068	901	7,607	4,523	47,333	31,516	117	107	67,468	43,626

Source : Department of Statistics

Table V-7 IMPORTS INSECTICIDES AND HERBICIDES 1971 - 1980

Type	Liquid Insecticides etc.		Non-liquid Insecticides Incl. Fungicides etc.		Liquid weed killers		Non-liquid weed killers	
	Litre	M\$'000	Ton	M\$'000	Litre	M\$'000	Ton	M\$'000
1971	124,469	344	66	238	90,497	587	114	413
1972	138,530	446	66	190	157,910	785	144	693
1973	189,559	677	140	279	52,588	292	74	285
1974	212,607	863	109	277	-	-	51	209
1975	147,288	923	165	802	736,471	1,564	64	353
1976	131,098	916	56	295	227,786	1,626	47	325
1977	240,694	1,655	56	307	342,782	2,393	74	778
1978	226,094	1,782	95	650	534,760	4,073	175	1,267
1979	306,462	2,639	158	851	794,095	7,591	219	1,775
1980	1,203,840	6,580	271	2,525	1,460,779	14,938	731	4,338

Source : Department of Statistics

Table V-8 IMPORTS OF AGRICULTURAL MACHINERY 1971 - 1980

Year	Agricultural Tractors Pedestrian controlled		Agricultural Tractors non-Pedestrian controlled		Agricultural Machinery for soil preparation		Harvesting & Threshing Machinery	
	No.	M\$	No.	M\$	No.	M\$	No.	M\$
1971	9	24,133	107	1,993,047	-	414,372	-	382,294
1972	5	12,300	104	3,045,826	-	1,220,620	-	110,871
1973	1	73,107	24	248,440	-	78,837	-	55,428
1974	16	84,794	71	1,286,753	-	155,101	-	124,697
1975	12	42,815	63	1,107,901	-	378,153	-	215,605
1976	3	8,323	46	2,478,916	16	306,842	35	59,223
1977	13	116,631	149	2,340,831	119	368,268	149	159,693
1978	16	158,984	228	5,115,774	12,373	34,996	18	681,695
1979	71	240,521	460	9,073,141	41,793	115,696	130	72,708
1980	49	535,791	474	11,255,030	38,153	134,960	523	818,109

Source : Department of Statistics

Table V-9 SABAH LIVESTOCK POPULATION SURVEY (1979)

1. Buffalo	
Male	20,444
Female	37,479
Calves <u>/1</u>	
<u>Total</u>	<u>74,707</u>
2. Cattle	
Male	9,023
Female	12,166
Piglet <u>/2</u>	3,443
<u>Total</u>	<u>30,782</u>
3. Pig	
Male	8,873
Female	17,305
Piglet <u>/3</u>	14,112
Porker	21,886
<u>Total</u>	<u>68,877</u>
4. Poultry	
Broiler	482,261
Layer	285,593
<u>Total</u>	<u>819,785</u>
5. Sheep	
Male	425
Female	1,783
Kids	572
<u>Total</u>	<u>3,634</u>
6. Goat	
Male	5,226
Female	7,073
Kids	4,889
<u>Total</u>	<u>19,086</u>
7. Duck	21,643
8. Pony	5,530

/1 less than one year
/2 less than one year
/3 less than two months

Source : Department of Veterinary
service and Animal Industry

Table V-10 NUMBER OF LIVESTOCK SLAUGHTERED BY DISTRICT, 1979

District Residency	Buffaloes	Cattle	Pig
Tawau	278	646	11,792
Semporna	-	-	732
Lahad Datu	22	90	2,608
Tawau Residency	300	736	15,132
Sandakan	192	1,857	32,251
Kinabatangan	-	-	-
Labuk/Sugut	-	-	-
Sandakan Residency	192	1,857	32,251
Kudat	98	178	3,423
Kota Marudu	-	106	-
Kota Belud	111	163	-
Ranau	99	56	-
Tuaran	578	22	2,420
Kota Kinabalu	1,580	3,449	29,840
Penampang	44	4	1,721
Papar	397	-	2,080
West Coast Residency	2,907	3,978	39,484
Beaufort	503	-	795
Membakut	57	-	62
Kuala Penyu	54	-	-
Sipitang	25	-	6
Tenom	125	18	971
Keningau	290	273	1,893
Tambunan	53	23	171
Menumbok	32	-	-
Interior Residency	1,139	316	3,898
Labuan Residency	328	68	3,000
Sahah State	4,866	6,955	93,765

Note: The figures relate to slaughter in Government slaughter houses only.
The actual total number of livestock slaughter is not known.

Source: Department of Veterinary service and Animal Industry

Table V-11 DISTRIBUTION OF FISH FRY BY DISTRICT IN SABAH, 1979

District	Lampam Jawa	Common carp	Big Head	Silver carp	Grass carp	Tilapia	Cat fish	Total
Papar	19,300	3,670	2,000	2,000	1,600	2,900	-	31,470
Kata Kinabalu	1,400	744	6,250	300	29,700	15,668	-	54,062
Tuaran	1,050	1,249	500	-	4,700	2,000	-	9,499
Beaufort	6,400	955	500	-	800	4,350	-	13,005
Labuan	4,500	800	350	500	300	-	-	6,450
Tawau	750	50	50	-	500	-	-	1,350
Sandakan	5,250	1,050	2,240	450	1,250	10,265	-	20,505
Tenom	1,100	500	-	200	-	-	-	1,800
Kudat	6,600	1,350	100	200	1,450	350	-	10,050
Penampang	2,270	812	-	-	-	860	-	3,942
Kota Belud	400	3,980	1,402	145	3,200	9,000	-	18,127
Semporna	200	50	-	-	-	-	-	250
Lahad Datu	1,600	480	341	250	220	400	-	3,291
Ranau	-	7,880	800	250	1,150	18,440	-	28,520
Membakut	1,400	600	-	-	-	1,600	-	3,600
Keningau	3,181	5,901	2,500	2,500	2,700	4,366	682	21,830
Tambunan	500	600	-	-	-	1,700	-	2,800
TOTAL	55,901	30,671	17,033	6,795	47,570	71,899	682	230,551

Source : Department of Fisheries

Table V-12 DISTRIBUTION OF FRESHWATER FISH PONDS, SABAH

Year	West Coast & Kudat		Sandakan		Tawau		Labuan and Interior		Total	
	No. of Ponds	Surface Area (ha)	No. of ponds	Surface Area (ha)	No. of Ponds	Surface Area (ha)	No. of Ponds	Surface Area (ha)	No. of Ponds	Surface Area (ha)
1961 & Before	217	8.97	16	0.93	20	0.61	462	12.63	715	23.14
1962	42	0.82	3	0.10	-	-	-	-	45	0.92
1963	36	1.22	2	0.08	2	0.57	7	0.42	47	2.29
1964	39	0.74	-	-	1	0.23	12	1.06	52	2.03
1965	70	8.71	13	0.83	2	0.16	10	0.15	95	9.85
1966	18	1.71	-	-	1	0.11	34	3.49	53	5.31
1967	60	6.91	5	0.50	11	0.96	58	6.14	134	14.51
1968	94	9.94	8	0.67	27	4.50	30	5.56	159	20.67
1969	112	17.15	8	1.00	2	1.26	72	8.19	194	27.60
1970	144	20.99	18	1.36	2	5.26	55	5.23	219	32.84
1971	208	28.32	26	1.60	-	-	30	4.45	264	34.37
1972	163	21.34	3	0.14	-	-	38	7.01	204	28.49
1973	138	17.94	30	2.45	8	1.62	65	6.75	241	28.76
1974	80	8.64	16	18.69	2	0.05	15	2.01	113	29.39
1975	105	11.81	24	2.54	16	10.95	99	6.33	164	31.63
1976	246	36.44	38	3.46	12	1.87	41	9.01	337	50.78
1977	161	20.79	33	3.14	8	1.66	58	6.27	260	31.86
1978	195	39.84	-	-	8	1.14	33	3.35	236	44.33
1979	149	25.46	21	6.03	1	0.32	58	3.44	229	35.25
TOTAL	2,277	287.74	264	43.52	123	31.27	1,097	91.49	3,761	454.02

Source : Department of Fisheries

Table V-13 DISTRIBUTION OF FISH FRY BY SPECIES, SABAH, 1963 - 1979

Year	Tilapia	Lampam Jawa	Common Carp	Big Head	Silver Carp	Grass Carp	Cat Fish	Kaluf	Total
1963	3,540	50	2,850	1,100	-	4,000	-	-	11,540
1964	220	2,000	90	1,700	400	8,000	-	-	12,410
1965	120	11,465	2,645	1,200	700	4,000	-	-	20,130
1966	100	13,920	4,711	3,100	-	9,109	-	-	30,940
1967	-	58,410	8,973	3,945	1,770	6,925	-	-	80,023
1968	800	69,657	12,585	14,588	8,539	14,715	-	-	120,884
1969	90	89,855	13,900	8,200	6,616	22,605	-	-	141,266
1970	-	88,380	25,960	15,830	9,813	14,357	-	-	154,340
1971	-	103,610	34,380	8,953	6,460	14,435	-	-	167,838
1972	-	118,279	22,411	4,678	4,094	4,788	-	300	154,550
1973	-	93,530	35,750	12,083	10,550	24,250	-	1,550	177,713
1974	-	118,045	35,835	6,635	5,660	17,776	-	-	183,951
1975	-	122,485	32,388	9,690	7,995	11,950	-	-	184,508
1976	7,725	157,495	13,920	17,412	8,275	31,883	-	-	236,710
1977	9,775	120,778	23,505	9,866	9,135	15,937	-	-	188,996
1978	14,509	128,738	29,893	19,846	13,812	30,895	-	-	237,693
1979	71,899	55,901	30,671	17,033	6,795	47,570	682	-	230,551

Source : Department of Fisheries

Table V-14 EXISTING FISH BREEDING STATION (1981)

No.	Name	District	Area (acre)	Established
1.	Babagon	Penampang	0.75	1965
2.	Keningan	Keningau	0.50	1974
3.	Kabayan	Kota Belud	0.94	1978
4.	Gum-Gum	Sandakan	1.05	1974
5.	Marakan	Ranan	0.26	1971
6.	Telupid	Sandakan		under construction
7.	Beaufort	Beaufort		under construction

Source : Department of Fishries

Table V-15 FOREST AREA IN SABAH, 1978

Item	Area	
	Million ha	Million acres
Total area of Sabah	7.308	18.271
Forested Area:		
Mangrove	5.295	13.238
Transitional beach and freshwater	0.346	0.866
Swamp	0.190	0.476
Undisturbed high forest	2.508	6.271
Montane forest	0.763	1.907
Other (immature and disturbed forest)	1.486	3.715

Source: Forest Department

Table V-16 PRODUCTION OF LOGS AND WOOD PRODUCTS, SABAH

(1970 - 1978)

Year	Logs		Sawnwood (million cuft)	Ply, veneer (1,000 cuft)	Mangrove chips (1,000 tons)
	Production (million Hft)	Percentage exported			
1970	181.5	94	2.6	955	nil
1971	192.8	94	3.3	866	3.2
1972	236.5	90	3.3	846	99.4
1973	308.0	91	2.9	1,399	175.0
1974	275.2	98	3.6	1,527	281.0
1975	252.9	98	4.8	1,381	257.6
1976	350.5	95	3.8	1,562	193.6
1977	360.0	95	6.3	1,112	170.3
1978	363.6	94	5.4	976	170.8

Note : 1 cubic meter = 27.7362 Hoppus cubic feet (Hft).

Source: Forest Department

Table V-17 PRESENT LAND USE SURVEY IN KINABATANGAN, 1970

LAND USE CATEGORY	ACREAGE (acre)	%	LAND USE (acre)	%	AGRICULTURAL USE	
					MAJOR CATEGORIES	SUB- CATEGORIES
Urban	924	0.02	Urban and Associated Areas	1,270	0.03	
Estate Building	346	0.02				
Mining and Quarrying	-	-				
Mixed Horticulture	2,810	0.06	Horticulture		16.14	
Agricultural Stations	8	-		2,818	0.06	16.19
Young Rubber	620	0.01				3.56
Mature Rubber	224	-				1.29
Old Rubber	1,149	0.02				6.60
Oil Palm	4,197	0.09	Tree, Palm and Permanent Crops			24.11
Coconuts	2,627	0.06				15.09
Cocoa	-	-		8,817	0.19	50.66
Paddy	26	-				0.15
Diversified Crops	-	-	Cropland			-
Shifting Cultivation	5,744	0.13		5,770	0.13	33.15
Grassland/Scrub Grassland	20,808	0.46				
Erosion Scars & Landslides	462	0.01		21,270	0.47	100 %
Forest	3,530,743	77.82				Total Acreage under Agriculture Use
Scrub Forest	359,365	7.92	Forest	3,890,108	85.74	17,405 acres
Recently Cleared Land	3,872	0.08				Percentage of Kinabatangan area under Agricultural Use
Swamp/Wetland Forest	552,670	12.18				0.38%
Unused Land	1,546	0.03				
Unclassified	48,884	1.08				
Total	4,537,025	100 %				

Source: Compiled from the Present Land Use of
The Sandakan Residency, Sabah 1970

Table V-18 ESTIMATED CROP AREA IN KINABATANGAN, 1979

Unit: acre

Crops	Small- holder	Minor Scheme	Private		Total (A)	% (A/B)	Sabah	
			Estate	Private			Total (B)	Total (B)
Rubber	114	-	1,269	-	1,383	0.53	262,362	262,362
Oil Palm	-	-	12,457	-	12,457	5.82	214,190	214,190
Coconut	1,721	530	-	-	2,251	1.70	132,374	132,374
Cocoa	30	40	1,004	-	1,074	1.15	93,784	93,784
Wet Paddy	110	-	-	-	110	0.15	74,735	74,735
Hill Paddy	3,200	-	-	-	3,200	10.89	29,398	29,398
Maize	460	13	-	-	473	2.84	16,627	16,627
Tapioca	1,200	75	-	-	1,275	9.47	13,460	13,460
Fruits	170	10	-	-	180	1.34	13,408	13,408
Bananas	550	30	-	-	580	5.01	11,573	11,573
Coffee	130	175	-	-	305	5.07	6,007	6,007
Citrus	15	-	-	-	15	0.44	3,405	3,405
Sweet Potato	200	-	-	-	200	6.72	2,978	2,978
Vegetables	50	6	-	-	56	2.06	2,721	2,721
Pineapples	6	-	-	-	6	0.23	2,623	2,623
Groundnuts	50	9	-	-	59	2.56	2,302	2,302
Others	-	-	-	-	-	-	7,963	7,963
Total	8,006	888	14,730	-	23,624	2.65	889,910	889,910

Source: Compiled from Crop Acreage Sabah, 1979

Table V-19 GROWTH OF ESTIMATED CROPPED AREA, KINABATANGAN

Unit : Acre

Crops	1970	1975	1979
Rubber	1,993	2,226	1,383
Oil Palm	4,197	8,382	12,457
Coconut	2,627	2,220	2,251
Cocoa	0	0	1,074
Paddy (Wet)	26	305	110
Paddy (Hill)	-	3,280	3,200
Maize	-	500	473
Ground Nuts	-	10	59
Sweet Potato	-	150	200
Mixed Horticulture	2,810	2,800	-
Agricultural Land	11,661*	18,375	23,624

* Except shifting cultivation area

Source: The Present Land Use of the Sandakan Residency, 1970
 Agricultural Statistics 1975
 Crop Acreage Sabah 1979

Table V-20 ESTIMATED AVERAGE YIELD PER ACRE, KINABATANGAN

Crops	Sabah ^{/1}	Kinabatangan	Acreage ^{/2} (acre)	Production	(ton)
Wet Paddy	2,486 lb	1,740	110	191,400 lb	(86)
Hill Paddy	1,200 lb	1,100	3,200	3,520,000 lb	(1,584)
Maize ^{/3}	2,400 lb	1,800	475	851,400 lb	(383)
Tapioca	215 pikuls	190	1,275	242,250 pikuls	(14,777)
Sweet Potato	80 pikuls	65	200	13,000 pikuls	(793)
Ground Nuts	15 pikuls	12	59	708 pikuls	(43)
Vegetables ^{/4}	100 pikuls	80	56	4,480 pikuls	(273)
Rubber	900 katis	800	1,383	1,106,400 katis	(373)
Oil Palm	8 tons	7	12,457	87,199 tons	(87,199)
Coconut ^{/5}	10 pikuls	8	2,251	18,008 pikuls	(1,098)
Cocoa	14,000 pods	--	1,074 ^{/6}	--	(--)
Coffee ^{/7}	6 pikuls	5	305	1,525 pikuls	(93)
Citrus ^{/8}	6,750 katis	6,000	15	90,000 katis	(30)
Fruits ^{/9}	5,000 katis	4,000	180	720,000 katis	(243)
Pineapple	25,410 katis	20,000	6	120,000 katis	(41)
Banana ^{/10}	200 pikuls	150	580	87,000 pikuls	(5,307)

- /1 Estimated by the Dept. of Agriculture
/2 Crop Acreage Sabah, 1979
/3 Grain
/4 Represented by chilly
/5 Copra
/6 Almost all area is immature
/7 Dry beans
/8 Represented by lime
/9 Represented by rambutan
/10 Over 3 years

Table V-21 ESTIMATED NUMBER OF DOMESTIC ANIMALS

Livestock		Poultry	
Buffalo	100	Chicken	12,000
Cattle	100	Duck	2,000
Hog	60		

Table V-22 FOREST RESERVE AREA

Unit : Area

District	Total	Protection Forest (Class I)	Commercial Forest (Class II)
Lamag	1,577,726 (22.6)	1,280 (0.1)	1,576,446 (27.8)
Sabah	6,992,638 * (100.0)	1,060,665 (100.0)	5,660,715 (100.0)

Note : * Including other classes

Source : Forest Department

Table V-23 TIMBER PRODUCTION FROM
LAMAG FOREST DISTRICT^{/1}

Year	Volume Produced Hoppus, Cuft
1970	29,793,941
1971	33,435,326
1972	40,333,061
1973	51,022,802
1974	47,443,184
1975	47,501,832
1976	37,680,848
1977	24,714,286
1978	22,958,297
1979	13,978,465
1980 ^{/2}	13,825,056

1981 ^{/3}	6,000,000
1982	4,500,000
1983	2,000,000
1984	2,000,000
1985	1,500,000
1986	1,500,000
1987	1,000,000
1988	---
1989	---
1990	---

^{/1} This boundary of this district, though determined by the Forest Department, is almost same as the administrative boundary of Kinabatangan District.

^{/2} Up to September only

^{/3} Estimated volume from 1981 to 1990

Table V-24(1) BREAKDOWN OF FLOOD PRONE AREA

No. of Area	Name of Area	Gross Area (ha)		Net Area (ha)
		<u>/ 1</u>	<u>/ 2</u>	
<u>LOKAN AREA</u>				
1	Balat	1,070		860
2	Padulan	1,200		960
3	Pintasan	3,440		2,750
4	Lamag-L <u>/ 3</u>	4,720		3,780
5	Pintasan	1,410		1,130
6	Lokan-R	2,770		2,220
7	Lokan-L	2,350		1,880
8	Lokan-D	1,550		1,240
9	Lamag-M.R.	1,010		810
Sub Total		(19,520)		(15,630)
<u>LAMAG AREA</u>				
10	Labaong	2,330		1,860
11	Lamag-D.R	3,700		2,960
12	Western Bt. Garam	5,300		4,240
13	Eastern Bt. Garam	3,480		2,780
14	Batu Puteh-U	2,650		2,120
15	Lamag	3,700		2,960
16	Pin	1,550		1,240
1	Pin-L		1,260	
Sub Total		(22,710)	(1,260)	(18,160)

/ 1 Suitable area for paddy cultivation

/ 2 Unsuitable area for agricultural development due to peaty soil.

/ 3 R: Right bank side D: Down stream side
L: Left bank side U: Up stream side

Table V-24(2) BREAKDOWN OF FLOOD PRONE AREA

(Continued)

No. of Area	Name of Area	Gross Area (ha)		Net Area (ha)
		<u>/ 1</u>	<u>/ 2</u>	
<u>KOYAH AREA</u>				
17	Subak	2,700		2,160
18	Subak	1,260		1,010
19	Koyah-L	1,260		1,000
20	Koyah-R	2,320		1,860
21	Bilit-U	1,480		1,180
22	Tenegang	2,010		1,610
23	Tenegang	1,740		1,390
2	Supu		2,720	
3	Batangan		11,560	
4	Bt. Mati		910	
5	Tenegang		4,690	
6	Singa Mata		1,880	
Sub Total		(12,770)	(21,760)	(10,210)
<u>ABAI AREA</u>				
7	Sukau		860	
8	Sapasidom		3,200	
9	Abai-L		9,130	
10	Abai-R		7,150	
11	Abai-D		2,140	
Sub-Total			(22,480)	
Total		(55,000)	(45,500)	(44,000)
River course and protection green belt			6,500 ha.	
Grand Total			107,000 ha	

Table V-25 SOILS IN THE PROJECT AREA

No.	Soil Classification *	Area (ha)
1	Thionic Fluvisol; Dystric Histisol; Thionic Gleysol	1,950
3	Dystric and Eutric Regosols; Gleyic Podsol; Humic, Dystric and Eutric Gleysols	1,520
4	Eutric, Fluvisol; Gleyic, Dystric and Eutric Cambisols; Humic, Dystric and Gleysols	4,000
5	Gleyic Acrisol; Gleyic Luvisol; Humic, Dystric and Eutric Gleysols	36,460
6	Humic, Dystric and Eutric Gleysols; Dystric Histisol	29,250
7	Dystric Histisol; Humic Gleysol	13,050
12	Orthic, Ferric and Gleyic Acrisols; Gleyic Podsol	4,390
22	Gleyic, Ferric and Orthic Acrisols; Gleyic, Ferric; Chromic and Orthic Luvisols	2,870
25	Gleyic, Ferric and Orthic Acrisols; Gleyic, Ferric, Chromic and Orthic Luvisols	7,370
26	Gleyic, Ferric and Orthic Acrisols; Gleyic, Ferric, Chromic and Orthic Luvisols	1,790
29	Ferric and Orthic Acrisols; Ferric, Chromic and Orthic Luvisols	2,060
33	Ferric and Orthic Acrisols; Ferric, Chromic and Orthic Luvisols	160
38	Calcic Luvisols; Rendzina	380
39	Orthic Acrisol; Dystric Cambisol	1,750
	Total	107,000

* Based on the FAO UNESCO Classification.

Table V-26 EXISTING LAND USE PLAN IN THE PRESENT FLOOD PRONE AREA

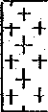



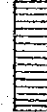


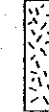
	Proposed/On-going Project	Area (ha)	
		Flood	Proposed Paddy Development
	Settlement Scheme (FELDA and SLDB)	1,500	1,240
	Small Holders Scheme	7,300	5,200
	Small Holders Project	5,400	5,400
	Experimental Paddy Project (Sabah Paddy Board)	1,200	1,200
	Rattan Development Project (SAFODA)	7,400	7,400
	State Land (Unallocated)	49,700	16,900
	Joint Venture or Private Estate, etc.	20,700	12,060
	Forest Reserve	7,300	5,600
	River and Green Belt	6,500	0
	Total	107,000	55,000

Table V-27 PROPOSED ROAD AND CANAL DENSITY

Items	Density (meters/ha)
Road	
Farm road (gravel metaled)	11.5
On-farm road (uon metaled)	17.0
Over all	28.5
Irrigation Canal	
Convey canal	0.2
Main canal	2.9
Secondary canal	8.4
Tertiary canal	40.8
Over all	52.2
Drainage Canal	
Existing canal improvement	1.6
Lateral drain	4.2
Sub lateral drain	20.4
Over all	26.3

Note ; Details of above irrigation and drainage facilities are discussed in later part of this report.

All figures are obtained as follows

Total length of each facility/Gross Project Area (55,000ha)

Table V-28(1) SEMI-MONTHLY DIVERSION WATER REQUIREMENT IN 1978

Month	Jan		Feb		Mar		Apr		May		Jun	
	15	16	15	15	15	16	15	15	15	16	15	15
Number of day	kc=1.4		kc=1.1		kc=1.1		kc=1.2		kc=1.2		kc=1.4	
	Dry up $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
	Land Preparation $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
	Ew - Sowing $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
	Inundation $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
	150mm $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
	100mm $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$											
Semi Monthly Rainfall (mm) 1978	84.5	90.1	55.9	48.5	20.4	21.8	36.1	36.1	63.5	67.8	71.0	71.0
Semi Monthly Effective Rainfall (mm) (=Re)	--	--	--	--	0.17	0.5	0.83	1.0	0.83	0.5	0.17	--
Adjusted Crop Coefficient	--	--	--	--	--	--	--	--	--	0.2	0.6	0.6
1. Open Water Evap.	--	--	--	--	--	--	--	--	--	--	0.23	0.7
2. Crop I (kc=1.2)	--	--	--	0.73	0.55	0.18	--	--	--	--	--	--
3. Crop I (kc=1.4)	1.4	1.17	0.7	0.23	--	--	--	--	--	--	--	--
4. Crop II (kc=1.1)	1.4	1.35	1.25	0.96	0.72	0.68	0.83	1.0	1.03	1.1	1.2	1.3
5. Crop II (kc=1.4)	1.00	1.09	1.00	0.83	0.67	0.67	0.83	1.0	1.0	1.0	1.0	1.0
6. Overall Adjusted Crop Coefficient	50.4	53.7	50.6	43.8	53.7	57.3	66.8	66.8	67.1	71.5	64.5	64.5
7. Total Cropped Area (%)	70.6	72.5	63.3	42.0	38.7	39.0	55.4	66.8	69.1	78.7	77.4	83.9
8. Ew(=0.9 x Pan Evaporation)	--	--	--	--	48.9	52.2	48.9	--	32.6	34.8	32.6	--
Semi Monthly Field Requirement (mm)	30.0	32.0	30.0	21.6	20.1	21.4	24.9	30.0	30.0	32.0	30.0	30.0
9. Et. Crop	100.6	104.5	93.3	63.6	107.7	112.6	129.2	96.8	131.7	145.5	140.0	113.9
10. Land Preparation & Inundation	84.5	90.1	55.9	40.3	13.7	14.6	30.0	36.1	63.5	67.8	71.0	71.0
11. Parcolation (7.x dia.2mm)	16.1	14.4	37.4	23.3	94.0	98.0	99.2	60.7	68.2	77.7	69.0	42.9
12. Total	1.073	0.9	2.49	1.792	6.267	6.125	6.613	4.047	4.547	4.856	4.6	2.86
13. Effective Rainfall (7.x Re)	0.124	0.104	0.288	0.207	0.725	0.709	0.765	0.468	0.526	0.562	0.532	0.331
14. Field Requirement (mm/day)	0.189	0.524	0.524	0.376	1.318	1.289	1.391	0.851	0.956	1.022	0.967	0.602
15. Net Water Requirement for 1000 ha (m ³ /s)	9.90	8.32	23.06	16.54	57.99	56.72	61.20	37.44	42.06	44.97	42.55	26.49
16. Diversion Water Requirement for 1000ha(m ³ /s)												
17. Diversion W.R. for 44,000ha (m ³ /s)												

Table V-28(2) SEMI-MONTHLY DIVERSION WATER REQUIREMENT IN 1978

Month	Jul		Aug		Sep		Oct		Nov		Dec	
	15	16	15	16	15	16	15	16	15	16	15	16
Number of day	kc=1.2		kc=1.2		kc=1.2		kc=1.1		kc=1.1		kc=1.4	
	Dry up Harvest		Ev and Preparation		150mm		Soiling		Inundation		100mm	
Semi Monthly Rainfall (mm) 1978	66.6	71.0	46.2	49.2	65.9	65.9	56.2	60.0	68.7	68.7	77.7	82.9
Semi Monthly Effective Rainfall (mm) (=Re)												
Adjusted Crop Coefficient												
1. Open Water Evap.	--	--	--	0.17	0.5	0.83	1.0	0.83	0.5	0.17	--	--
2. Crop I (kc=1.2)	0.4	0.6	0.8	0.6	0.2	--	--	--	--	--	--	--
3. Crop I (kc=1.4)	0.93	0.7	0.23	--	--	--	--	0.18	0.55	0.73	0.55	0.18
4. Crop II (kc=1.1)	--	--	--	--	--	--	--	--	--	0.23	0.7	1.19
5. Crop II (kc=1.4)	--	--	--	--	--	--	--	--	--	1.13	1.25	1.35
6. Overall Adjusted Crop Coefficient	1.33	1.3	1.03	0.77	0.7	0.83	1.0	1.01	1.05	1.0	1.0	1.0
7. Total Cropped Area (A)	1.0	1.0	0.83	0.67	0.67	0.83	1.0	1.0	1.0	1.0	1.0	1.0
8. E_w (=0.9 x Pan Evaporation)	58.8	62.8	55.3	59.0	64.3	64.3	63.4	67.6	57.4	57.4	50.3	53.7
Semi Monthly Field Requirement (mm)												
9. Et. Crop	78.2	81.6	57.0	45.4	45.0	53.4	63.4	68.3	60.3	64.9	62.9	72.5
10. Land Preparation & Inundation	--	--	--	52.2	48.9	48.9	--	34.8	32.6	32.6	--	--
11. Parcolation (7 x dia. 2mm)	30.0	32.0	24.9	21.4	20.1	24.9	30.0	32.0	30.0	30.0	30.0	30.0
12. Total	108.2	113.6	81.9	119.0	114.0	127.2	93.4	135.1	122.9	127.5	92.9	104.5
13. Effective Rainfall (7. x Re)	66.6	71.0	38.3	33.0	44.2	54.7	56.2	60.0	68.7	68.7	77.7	82.9
14. Total	41.6	42.6	43.6	86.0	69.8	72.5	37.2	75.1	54.2	58.8	15.2	21.6
15. Field Requirement (mm/day)	2.773	2.663	2.907	5.375	4.653	4.833	2.68	4.694	3.613	3.92	1.013	1.35
16. Net Water Requirement for 1000 ha (m ³ /s)	0.321	0.308	0.336	0.622	0.539	0.559	0.287	0.543	0.418	0.454	0.117	0.156
17. Diversion Water Requirement for 1000ha m ³ /s)	0.584	0.560	0.611	1.131	0.980	1.016	0.522	0.987	0.760	0.825	0.213	0.284
18. Diversion W.R. for 44,000ha (m ³ /s)	25.70	24.64	26.88	49.76	43.12	44.70	22.97	43.43	33.44	36.30	9.37	12.50

Table V-29 AVERAGE SEMI-MONTHLY DIVERSION REQUIREMENT

Year	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Unit: m ³ /s	
														Annual Discharge	x10 ⁶ m ³
1970	1-15	8.74	7.13	43.96	49.55	56.49	43.70	33.34	21.79	40.97	5.00	31.22	12.70	892.61	
	16-	7.12	3.46	42.67	22.90	59.35	27.56	32.31	45.68	41.76	25.51	34.05	15.80		
1971	1-15	8.37	0	46.69	70.61	38.34	26.54	28.83	12.26	55.94	19.63	20.97	6.40	871.67	
	16-	6.83	0	45.39	48.70	41.17	10.40	27.80	38.00	60.62	40.15	23.80	9.55		
1972	1-15	14.42	15.03	30.35	51.81	31.67	55.43	33.15	13.28	32.45	12.22	31.90	24.18	831.49	
	16-	12.79	7.31	29.03	26.05	34.52	39.29	32.14	38.82	31.52	32.74	34.73	27.31		
1973	1-15	36.70	46.51	40.86	42.74	46.00	48.27	23.52	29.11	39.32	20.37	33.07	13.07	1,051.42	
	16-	35.07	36.16	39.53	15.12	48.87	32.12	22.48	51.61	40.02	40.90	35.90	16.26		
1974	1-15	28.37	0	47.35	39.46	40.87	53.46	30.37	16.72	54.62	23.46	30.66	20.97	1,006.38	
	16-	26.73	0	46.05	11.17	43.78	37.31	29.36	41.65	58.98	43.97	33.50	24.13		
1975	1-15	21.15	11.76	33.33	54.73	68.40	59.63	26.36	19.64	43.08	16.05	49.43	4.92	1,023.25	
	16-	19.56	7.31	32.05	29.57	71.27	43.49	25.37	43.98	44.68	36.56	52.26	8.10		
1976	1-15	0	23.55	50.04	48.22	43.03	73.33	38.64	13.39	45.52	20.93	23.13	15.35	1,004.44	
	16-	0	14.93	48.76	21.73	45.92	57.19	37.58	38.93	47.71	41.48	25.96	18.52		
1977	1-15	16.89	0	42.02	54.16	41.12	45.62	20.13	14.51	54.74	12.78	34.30	14.37	906.48	
	16-	15.27	0	40.74	28.89	43.95	29.48	19.06	39.83	59.13	33.55	37.14	17.53		
1978	1-15	9.91	23.06	58.02	61.28	42.11	42.59	25.68	26.86	43.12	22.96	33.44	9.37	1,055.25	
	16-	8.33	16.65	56.71	37.47	44.94	26.45	24.68	49.83	44.74	43.45	36.27	12.50		
1979	1-15	13.56	21.88	41.89	46.63	50.13	37.16	27.66	33.93	49.70	18.52	12.82	0	903.10	
	16-	11.98	15.70	40.62	19.81	52.98	21.02	26.59	55.53	52.88	39.05	15.66	1.73		
Average	1-15	20.49	19.30	49.72	64.12	58.58	63.08	37.28	22.13	51.87	22.16	39.00	15.72	9,526.11	
	16-	19.86	9.29	51.06	33.88	67.30	42.03	38.35	53.11	58.51	52.17	42.67	20.93		

Table V-30 ESTIMATED LOW FLOW DISCHARGE OF MINOR RIVER

Estimated based on the specification discharge as $1.5 \text{ m}^3/\text{sec}/100 \text{ km}^2$

Name of River	Catchment Area (km ²)	Low flow Discharge (m ³ /sec)	No. of Irrigation Block	Total Irrigable Area (ha)	Diversion Water Reg't (m ³ /sec)
Tabalin Besar	160	2.4	1	860	1.5
Lokan	820	12.3	6 7 8	5,340	9.5
Lamag	160	2.4	9	810	1.4
Pin	160	2.4	16	1,240	2.2
Koyah	330	5.0	19 20	2,860	5.1
Tenegang Besar	390	5.9	22 23	3,000	5.3
Total	2,020	30.4		14,110	25.0

* Unit Diversion Water requirement is 1,772 litres/sec/ha.

Table V-31 COMPARISON STUDY ON DIVERSION METHOD

1. Construction Cost

1) Dam Irrigation	Q'ty	Cost (million US\$)
Incremental Dam height / 1	5.5 m	43.5
Trunk Convey Canal (open, lined)	86.4 km	44.4
Tunnel	2.0 km	11.3
Inverted Syphone	8.6 km	16.1
Total		115.3

(Despreciation Cost: 21.7 million US\$)

2) Pump Irrigation

Pumping Station (including Civil & Mechanical works and convey canal)	11 stns.	14.0
---	----------	------

(Depreciation Cost: 2.6 million US\$)

2. Operation and Maintenance Cost (Annually)

Pump Irrigation

Operator & Labour Cost	11 stns.	0.3
Fuel		2.5
Total		2.3

3. Annual Cost

	Million US\$
Dam Irrigation	21.7
Pump Irrigation	4.9

/ 1 5.5 meters of additional Dam height required to irrigate 11 blocks by the trunk convey canal which overall gradient estimated at 1/8000.

/ 2 According to preliminary estimation, annual electric charge for pumping station estimated at 3.5 million US\$ which is expensive than Diesel engine drive.

Table V-32 MAIN FEATURES OF PUMP

Block No.	Net Irrigation Area (ha)	Design Discharge (m ³ /sec)	Total Head (m)	Dia-meter (mm)	Req'd Unit (Nos)	Engine Capacity (H.P)	Machine Cost (x 10 ³ US\$)
<u>LOKAN AREA</u>							
1.	860	1.52	15.0	500	3	160	325
2.	960	1.70	15.5	500	3	190	381
3.	2,750	4.87	17.5	700	4	450	837
4.	3,780	6.70	16.5	900	4	590	1,112
5.	1,130	2.00	15.0	500	3	210	398
6.	2,220	3.93	15.5	700	3	430	570
7.	1,880	3.33	17.5	700	3	410	562
8.	1,240	2.20	15.0	500	3	230	385
9.	810	1.44	15.0	500	3	150	320
S.Total (15,630)	(27.70)	-	-	(29)	-	(4,890)	
<u>LAMAG AREA</u>							
10.	1,860	3.30	13.5	600	3	320	483
11.	2,960	5.25	14.0	700	4	390	761
12.	4,240	7.51	14.5	900	4	580	1,064
13.	2,780	4.93	16.0	700	4	420	783
14.	2,120	3.76	13.5	700	3	360	561
15.	2,960	5.25	14.0	700	4	390	761
16.	1,240	2.20	13.5	500	3	210	361
S.Total (18,160)	(32.20)	-	-	(25)	-	(4,774)	
<u>KOYAH AREA</u>							
17.	2,160	3.83	12.0	700	3	290	522
18.	1,010	1.79	10.0	500	3	130	436
19.	1,000	1.77	10.0	500	3	130	312
20.	1,860	3.33	11.0	600	3	260	435
21.	1,180	2.09	10.0	600	3	150	376
22.	1,610	2.85	12.0	600	3	240	418
23.	1,390	2.46	12.0	500	3	210	361
S.Total (10,210)	(18.12)	-	-	(21)	-	(2,860)	
TOTAL	44,000	78.02	-	-	75	-	12,524

Table V-33 MAIN COMPONENT OF IRRIGATION PROJECT

1. Pumping Stations (Inclined Mixed Flow Type)		23 places
Dia. 500mm x3 units - Dia. 900mm x4 units	(130-590 H. P.)	
2. Irrigation Canal		
Convey Canal (Steel Pipe Line Dia .1200mm- Dia. 1,800mm)		10 km
Main Canal	(50-160 cusec.)	158 km
Secondary Canal	(32 cusec.)	461 km
Tertiary Canal	(1.2 cusec.)	2,244 km
(Total 2,830 km)		
Related Structures		
Check Gate	(50-160 cusec.)	70 nos.
Offtake	(32 cusec.)	161 nos.
Turn out (Type I & II)	(1.2 cusec.)	2,200 nos.
End check	(1.2 cusec.)	2,200 nos.
Division Box		28,600 nos.
Main Syphon	(50-160 cusec.)	12 nos.
Secondary Syphon	(32 cusec.)	13 nos.
Secondary Crossing Structures	(32 cusec.)	550 nos.
Tertiary Crossing Structures	(1.2 cusec.)	13,200 nos.
3. Drainage Canal		
Existing Channel Improvement		88 km
Lateral Drain	(210 cusec.)	231 km
Sub Lateral Drain	(20 cusec.)	1,122 km
(Total 1,455 km)		
Related Structure		
End Sluice	(210 cusec.)	95 nos.
Drainage Conduit	(210 cusec.)	550 nos.
4. Road & Bridge		
Farm Road (gravel metaled)		635 km
On-farm Road		935 km
Bridge		27 nos.
5. Land Acquisition		4,700 ha

Table V-34 OPERATION AND MAINTENANCE EQUIPMENT
FOR IRRIGATION PROJECT

Name of Equipment	Q'ty	Total	(1% for Demarage & Inland Transport)	
1. Dredger (380 PS)	1 Nos.	97,570	96,600	970
2. Bull Dozer (D 40)	2 Nos.	20,910	20,700	210
3. Back How (0.6 m ³)	2 Nos.	27,880	27,600	280
4. Dragline/Crane (25 ton)	1 Nos.	29,090	28,800	290
5. Spare Parts & Workshop Equipment, etc.	L.S	20,200	20,000	200
6. Vehicle (1 No./2 stn.)	12 Nos.	30,300	30,000	300
7. Motor Cycle	23 Nos.	5,860	5,800	600
8. Truck	2 Nos.	8,080	8,000	80
9. Office Equipment etc.	L.S	20,200	20,000	200
Total		260,000	257,500	2,500
(US\$)		(1,130,000)	(1,120,000)	(10,000)

Table V-35 ANNUAL OPERATION AND MAINTENANCE COST

1. Operation Cost for Pumping Stations

Fuel charge = HR x HP x C x A = M\$5.86 million

where

C : 0.0678 \$/HP.HR

driven from current actual diversion in DID Projects

HP : Total Pump Capacity in Horse Power : 25,200 H.P. for 23 stations

HR : Annual average running hours : 3,394 hrs.

$$= \frac{\text{Annual average diversion requirement}}{\text{Total design capacity}} = \frac{953 \times 10^6 \text{ m}^3}{78 \text{ m}^3/\text{sec}}$$

2. Required Personnel for Operation and Maintenance of Irrigation System (estimated based on the current practice in DID Projects)

22 stns. x M\$5,250 x 12 months = M\$1.45 million

<u>Personnel per 1 stn.</u>	<u>No.</u>	<u>Monthly Rate (M\$)</u>	<u>Total Cost (M\$)</u>
Operator	2	500	1,000
Assistant	2	300	600
Overseer	1/3	600	200
Irrigation Inspector	1/9	900	100
Mandor	1	350	350
Labourer (Gate keeper)	10	300	3,000
<u>Total</u>			<u>5,250</u>

3. Total

Above 1 + 2 M\$7.31 million

Maintenance and Miscellaneous (10%) 0.73

Total M\$8.04 million

4. Unit O/M Cost per hectare : 8.04/44,000ha = M\$183/ha = US\$80/ha

Table V-36 COMPARISON FOR CROP SELECTION

Crops	Soils	Yield	Mechanized			Productivity
			Harvesting	Marketability		
Paddy	Alluvial	+++	++	+++		+++
Soya bean	Peat & Alluvial	+	+	+		+ -
Groundnuts	Peat & Alluvial	+ -	-	+ -		+
Mangobeans	Peat & Alluvial	+	+ -	+ -		+ -
Taploca	Peat & Alluvial	+++	-	++		+++
Maize	Peat & Alluvial	++	++	++		+ -
Ginger	Peat & Alluvial	+	-	++		+
Red chilly	Peat & Alluvial	+	-	++		+++
Pineapple	Peat & Alluvial	+++	-	-		+ +

+++ Very suitable, Very good

+ + Suitable, good

+ Moderate

+ - Limited

- Not suitable, difficult

Table V-37 ESTIMATED YIELD AND PRODUCTION VALUE IN THE PEAT SOIL AREA

Crops	Crop cycle (months)	Yield/acre (ton)	Yield/ha (ton)	Yield/41,000ha (1,000ton)	Purchase price (M\$/kati) *	Purchase price (M\$/ton)	Total production value (M\$10 ³)
G'nuts	4	1.1	2.8	114,800	0.55	916.7	105,237
Mangobeans	4	0.6	1.5	61,500	0.55	916.7	56,377
Tapioca	6-9	10.0	25.0	1,025,000	0.10	166.7	170,868
Maize	4	1.3	3.3	135,300	0.28	466.7	63,145
Ginger	9	4.5	11.3	463,300	0.50	833.3	386,068
Chilly (red)	9	7.3	18.3	750,300	1.30	2,166.7	1,625,675
Soy bean	4	0.6	1.5	61,500	0.60	1,000.0	61,500
Pineapple	30	15.4	38.5	1,578,500	0.30	500.0	789,250

* Applied SAMA purchase price (per kati) valid between 15 December 1980 to 21 December 1980

1 kati = 0.0006 ton

Table V-38 ESTIMATED PRODUCTION COST AND PROFIT

Crops	Labour cost (M\$/acre)	O&M cost (M\$/acre)	Others ¹ (M\$/acre)	Unit cost (M\$/acre)	Total cost ² (M\$10 ³)	Production Value ³ (M\$10 ³)	Profit (M\$10 ³)
G'nuts	160	612	77	849	63,690	105,237	41,547
Mangobeans	70	260	33	363	27,225	56,377	29,152
Tapioca	180	344	52	576	43,200	170,868	127,668
Maize	50	461	51	562	42,150	63,145	20,995
Ginger	110	1,520	163	1,793	134,475	386,068	251,593
Chilly (red)	680	1,410	209	2,299	172,425	1,625,675	1,453,250
Soy bean	70	422	49	541	40,575	61,500	20,925
Pineapple	500 ⁴	980	148	1,628	122,100	789,250	667,150

¹ Contingency 10%

² 41,000ha

³ See Table V-37

⁴ For 30 months

Table V-39 B/C RATIO ON UPLAND CROP

Assumption

- Land Development Cost on Peat Soil Area M\$11,000/ha
- Production Value of Maize (two crops)/1 M\$3,076/ha
- Production Cost (two crops)/2 M\$2,810/ha
- Adjustment of Production Value (B) M\$2,999/ha

Flood damage will be reduced at 2.5%=1/40 Say M\$3,000/ha
 by flood of 20-year probability with two
 crops per annum.

(n = 50 years

r = 12% $(1+r)^n = 289$ $F_R = 0.12$

r = 8% $(1+r)^n = 46.9$ $F_R = 0.082$

	<u>Depreciation Cost</u>	<u>Production Cost</u>	<u>Annual Cost (C)</u>	<u>B/C ratio</u>
r = 12%	$0.12 \times 11,000$	$+ 2,810$	$= 4,130$	0.73
r = 8%	$0.008 \times 11,000$	$+ 2,810$	$= 3,712$	0.81

/1 see Table V-37

/2 see Table V-38

Table V-40 PADDY CROPPING SEASON IN SABAH

Area	Wet Paddy		Hill Paddy
	Main Season	Off Season	
Bandau	Oct. - Mar.	-	
	Dec. - Apr.	Jun. - Oct.	Sep. - Feb.
Tam Darat	Sep. - Feb.	-	Aug. - Jan.
	Oct. - Mar.	Apr. - Sep.	
Tuaran	Aug. - Jan.	-	-
	Aug./Sep. - Jan.	Mar. - Jul.	
Penampang	Aug. - Dec.	-	
Papar	Aug. - Dec.	-	
	Oct. - Mar.	Apr. - Sep.	-
Kuala Penyu	Sep. - Feb.	-	-
Sipitang	Sep. - Feb.	-	-
Ranau	Oct. - Mar.	-	Jul. - Dec.
Tambunan	Sep. - Feb.	-	Sep. - Feb.
Keningau	Aug. - Jan.	-	Aug. - Jan.
	Sep. - Feb.	Apr. - Aug.	

Source: Sabah Paddy Board

Table V-41 PADDY CULTIVATION SCHEDULE AT
 BUKIT GARAM PILOT FARM (1981)

Operation	Date
1. Satulation of Soil	10 June
2. 1st Ploughing	15 June - 1 July
3. Set Up Nursery	17 June - 3 July
4. 2nd Ploughing	1 July - 9 July
5. Transplanting	2 July - 18 July
6. Harvesting	2 November - 18 November
7. Threshing	3 November - 23 November

Variety : Jaya only

Fertilizer : Urea, 1 bag (20 kg)/acre

Planting Acreage : Actually 50 acres, target was 200 acres

Table V-42 RICE GROWING STAGES, FARMING PRACTICES
AND TIMING OF WORKS REQUIRED BY THE STAGES
(1st Cropping)

Farm Operation	Major Equipment	Farm Inputs	Timing (days before or after seeding)
(1) Plowing	Disc plough	-	-45
(2) 1st harrowing	Offset disc harrow	-	-45
(3) 2nd harrowing	- do -	-	-15
(4) Basic fertilizing		Urea: 50kg/ha T.S.P.: 75kg/ha	-12
(5) Rotorvating	Rotorvater	-	-10
(6) Ridging	Ridzer	-	- 7
(7) Final levelling	Grader	-	- 5
(8) Seeding	Drill seeder	Seeds: 80kg/ha	0
(9) 2nd fertilizing	Power duster	Urea: 30kg/ha	+30
(10) 3rd fertilizing	- do -	Urea: 45kg/ha	+70
(11) Plant protection	- do -	Insecticides: 30kg/ha	+65
(12) 4th fertilizing	- do -	Urea: 30kg/ha	+90
(13) Harvesting	Combine harvester	-	+110

Table V-43 RICE GROWING STAGES, FARMING PRACTICES
AND TIMING OF WORKS REQUIRED BY THE STAGES

(2nd Cropping)

Farm Operation	Major Equipment	Farm Inputs	Timing (days before or after seeding)
(1) Plowing	Disc. plough	-	-45
(2) 1st harrowing	Offset disc harrow	-	-45
(3) 2nd harrowing	- do -	-	-45
(4) Basic fertilizing	Broadcaster	Urea: 60kg/ha T.S.P.:100kg/ha	-42
(5) Rotarvating	Rotarvater	-	-40
(6) Ridging	Ridger	-	-15
(7) Final levelling	Grader	-	-10
(8) Seeding	Drill seeder	Fungicides: 1kg/ha Seeds: 80kg/ha	0
(9) Weeding	Power duster	Herbicides: 30kg/ha	+10
(10) 2nd fertilizing	- do -	Urea: 40kg/ha	+40
(11) 1st protection	- do -	Fungicides:30kg/ha	+60
(12) 3rd fertilizing	- do -	Urea: 60kg/ha	+70
(13) 2nd protection	- do -	Insecticides: 30kg/ha	+80
(14) 4th fertilizing	- do -	Urea: 40kg/ha	+100
(15) Harvesting	Combine harvester	-	+135

Table V-44 PROPOSED FARN INPUT

Crop	Inputs	Quantity (kg/ha)	Amount (tons/400ha)	Amount (tons/44,000ha)
1st crop (Apr. - Sept.)				
	- Seeds	80	32	3,520
	- Urea	150	60	6,600
	- Triple-super phosphate	75	30	3,300
	- Fungicide *	0.1	0.14	
	- Insecticides	30	12	1,320
2nd crop (Oct. - May)				
	- Seeds	80	32	3,520
	- Urea	200	80	8,800
	- Triple-super phosphate	100	40	4,400
	- Fungicides *	30	12	1,320
	- Insecticides	30	12	1,320
	- Herbicides	30	12	1,320

* To be used for seed treatment

Table V-45 PROPOSED TOTAL FARM INPUTS

Item	Quantity (kg/ha)		Double Cropping (kg/ha)	Total (ton/44,000ha)
	1st Crop	2nd Crop		
Seeds	80	80	160	7,040
Urea	150	200	350	15,400
TSP	75	100	175	7,700
Fungicide *	0.1	0.1	0.2	8.8
Fungicide	-	30	30	1,320
Insecticide	30	30	60	2,640
Herbicide	-	30	30	1,300

* For seed treatment, estimated by commercial name "Benlate"

Table V-46 PADDY YIELD BY SOWING METHOD (1967)

Unit: lbs/acre (ton/ha)			
Bahagia (Sown Date)	Broad Casting	Drilling	Transplanting
Off season (31 March)	3,149 (3.5)	3,654 (4.1)	3,654 (4.1)
Main season (30 September)	2,438 (2.7)	2,456 (2.8)	2,184 (2.5)

Source: Tuaran experiment station

Table V-47(1) ESTIMATION OF WORKABLE DAYS

(Kuamut Station)

YEAR	J			F			M			A			M			J		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1970	24	4	3	23	4	1	28	2	1	26	3	1	28	3	0	26	3	1
1971	26	4	1	17	2	9	29	2	0	30	0	0	27	4	0	23	4	3
1972	25	4	2	24	4	1	25	4	2	28	1	1	27	2	2	28	2	0
1973	29	2	0	28	0	0	27	3	1	24	5	1	29	1	1	25	5	0
1974	29	2	0	16	11	1	29	2	0	23	6	1	28	2	1	28	2	0
1975	27	2	2	23	5	0	24	5	2	29	0	1	31	0	0	27	3	0
1976	24	5	2	26	2	1	29	2	0	27	2	1	28	2	1	30	0	0
1977	26	3	2	19	7	2	28	3	0	28	1	1	25	6	0	27	2	1
2978	23	8	0	27	0	1	30	1	0	29	1	0	27	4	0	26	4	0
1979	26	3	2	27	1	0	28	2	1	24	5	1	27	4	0	25	4	1
Total	259	37	14	230	36	16	277	26	7	268	24	8	277	28	5	265	29	6
<u>Average</u>	25.9	3.7	1.4	23	3.6	1.6	27.7	2.6	0.7	26.8	2.4	0.8	27.7	2.8	0.5	26.5	2.90	0.6
Workable days /2		27.75		24.8			29.0			28.0			29.1			27.95		
Sunday & Holiday		5.0		5.0			5.0			5.0			5.0			5.0		
Net workable days /3		22.0		19.0			24.0			23.0			24.0			22.0		

/1 Rainfall classification; I = less than 20mm, II = 21-50mm, III = above 51mm.

/2 Workable day will be counted according to rainfall occurring during that day, for example, less than 20mm will be fully accounted and between 21mm and 50mm will be 50%, and above 51mm will be non-workable days.

/3 Total 271 days per annum.

Table V-47(2) ESTIMATION OF WORKABLE DAYS

(Kuamut Station)

YEAR	Month			J			A			S			O			N			D		
	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III	I	II	III
1970	28	3	0	27	4	0	27	2	1	25	3	3	25	5	0	26	4	1	26	4	1
1971	27	4	0	25	6	0	28	2	0	28	1	2	25	3	2	27	2	2	27	2	2
1972	27	4	0	24	7	0	24	3	3	25	6	0	26	4	0	29	2	0	29	2	0
1973	26	5	0	29	2	0	26	3	1	29	2	0	25	4	1	26	4	1	26	4	1
1974	28	2	1	27	2	2	29	1	0	27	4	0	25	4	1	29	2	0	29	2	0
1975	27	3	1	28	3	0	27	3	0	27	4	0	29	1	0	27	3	1	27	3	1
1976	29	2	0	26	4	1	27	3	0	28	2	1	25	4	1	27	4	0	27	4	0
1977	25	5	1	26	5	0	27	3	0	24	7	0	27	2	1	25	6	0	25	6	0
1978	26	5	0	28	3	0	26	4	0	28	3	0	28	5	0	27	3	1	27	3	1
1979	27	3	1	30	0	1	28	2	0	28	2	1	24	2	4	23	6	2	23	6	2
Total	270	36	4	270	36	4	269	26	5	269	34	7	256	34	10	266	36	8	266	36	8
<u>Average</u>	27	3.6	0.4	27	3.6	0.4	26.9	2.6	0.5	26.9	3.4	0.7	25.6	3.4	1	26.6	3.6	0.8	26.6	3.6	0.8
Workable days /2	28.8			28.8			28.2			28.6			27.3			28.4			28.4		
Sunday & Holiday	5.0			5.0			5.0			5.0			5.0			5.0			5.0		
Net workable days /3	23.0			23.0			23.0			23.0			22.0			23.0			23.0		

/1 Rainfall classification; I = less than 20mm, II = 21-50mm, III = above 51mm.

/2 Workable day will be counted according to rainfall occurring during that day, for example, less than 20mm will be fully accounted and between 21mm and 50mm will be 50%, and above 51mm will be non-workable days.

/3 Total 271 days per annum.

Table V-48 FARM MACHINERY REQUIREMENT FOR ONE OPERATION UNIT (400ha)

Operation	Type of Equipment	Working Capacity (ha/hr)	Duration of Operation (days)	Working Capacity (ha/day)	Duration of Operation (days)	Working Capacity (ha/day)	Duration of Operation (days)	Covering Area / ¹ (ha)	Number of Equipment	Required Number of Equipment	Hauling Equipment
1) Plowing	Disc plow	0.35	45	4.2	45	4.2	35	147	3	3	Tractor 75ps class
2) 1st Harrowing	Disc harrow	1.0	45	12	45	12	35	420	1	1	"
3) 2nd Harrowing	Disc harrow	1.0	45	12	45	12	35	420	1	1	"
4) Basic Fertilizing	Broad caster	1.5	45	18	45	18	35	630	1	1	"
5) Rotavating	Rotavater	0.32	45	3.8	45	3.8	35	134	3	3	"
6) Ridging	Ridger	5.8	10	70	10	70	6	420	1	1	"
7) Final Levelling	Grader	1.2	45	14	45	14	35	490	1	1	Crawler 60ps class
8) Seeding	Drill seeder	1.0	45	12	45	12	35	420	1	1	Tractor 75ps class
9) Weeding	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	Self propelled
10) 2nd Fertilizing	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	"
11) 1st Pest Control	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	"
12) 3rd Fertilizing	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	"
13) 2nd Pest Control	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	"
14) 4th Fertilizing	Power duster	4.2	45	50	45	50	8 ² / ₂	400	1	1	"
15) Harvesting	Combine harvester	1.0	45	6 ³ / ₃	45	6 ³ / ₃	35	210	2	2	"
16) Paddy transportation	Dump truck (4 ton)	0.5	45	6	45	6	35	210	2	2	Self propelled
17) Transportation	Dump trailer (5 ton)	0.9	45	11	45	11	35	385	1	1	Tractor 75ps class

¹ Estimated based on Table V-47

² One operation requires net 8 days each

³ Net operation will be 6 hours per day

Table V-49 FARM MACHINERY SELECTED AND REQUIRED NUMBER

Machinery & Equipment	Type	Required Number	
		One Operation Unit (400 ha)	Whole Project Area (44,000 ha)
1) Tractor			
Wheel tractor	75 Hp Class	5	550 + $\frac{50}{1}$ = 600
Crawler tractor	60 Hp Class	1	110 + 40 = 150
2) Combine harvester	100 Hp Class	2	220 + 30 = 250
3) Equipment & Attachment			
Disc plough	26' x 5	2	220 + 30 = 250
Disc harrow	24" x 9 x 9	2	220 + 30 = 250
Broad caster	440 litre	1	110 + 40 = 150
Rotavator	2 m	3	330 + 20 = 350
Ridger	1 row	1	110 + 40 = 150
Drill seeder	5 m	1	110 + 40 = 150
Power duster	360 litre	2	220 + 30 = 250
Sprayer	13 litre	3	330 + 20 = 350
Dump trailer	5 ton	1	110 + 40 = 150
Dozer blade <u>/2</u>	2.5 m	1	110 + 40 = 150
4) Dump truck	5 ton	2	220 + 30 = 250
5) Spare parts	-	L. S.	L. S.

/1 Standby units

/2 To be attached to crawler type tractor

Table V-50 FUEL CONSUMPTION (ONE OPERATION UNIT FOR 400 ha/year)

1. Tractors		
	$6,150 \text{ hr/year} \times 9 \text{ litre/hr} \times 0.5 \overset{/1}{\text{litre.f}}$	$= 27,675 \text{ litre/year}$
2. Power dusters		
	$1,300 \text{ hr/year} \times 2.5 \text{ litre/hr} \times 1.0 \text{ litre.f}$	$= 3,251 \text{ litre/year}$
3. Combine harvester		
	$2,000 \text{ hr/year} \times 15 \text{ litre/hr} \times 0.75 \text{ litre/f}$	$= 22,500 \text{ litre/year}$
4. Dump truck		
	$20,000 \text{ kg/year} \div 8 \text{ kg/litre}$	$= 2,500 \text{ litre/year}$
5. Knapsack sprayer		
	$100 \text{ hr/year} \times 0.5 \text{ litre/hr} \times 1.0 \text{ litre.f}$	$= 50 \text{ litre/year}$
<hr/>		
T O T A L		55,975 litre/year
	(Say	56,000 litre/year)

/1 Load factor

/2 Gasoline

Table V-51(1) RICE - SUMMARY OF WORLD PRODUCTION, CONSUMPTION AND TRADE BY ECONOMIC REGION

Unit: million tons

	Actual						Prelim. Est.		Projected	
	1961	1965	1970	1974/76	1977	1978	1979	1980	1985	1990
Production										
Industrialized Countries	13.7	14.1	14.9	15.9	15.8	16.9	16	16.0	17.0	18.0
Developing Countries	85.2	87.1	110.1	121.0	134.1	130.9	135	138.0	158.0	180.0
Centrally Planned Economics	63.3	70.1	80.8	88.5	94.5	99.9	101	102.0	117.0	133.0
WORLD TOTAL	162.2	171.3	205.9	225.4	244.5	248.4	252	256.0	292.0	332.0
Consumption										
Industrialized Countries	13.2	14.0	12.8	14.2	14.0/a	14.5	14	14.0	14.0	14.5
Developing Countries	83.5	84.8	109.3	120.6	127.5/a	131.7	136	140.0	163.0	186.0
Centrally Planned Economics	64.9	71.9	83.4	89.9	100.1/a	101.8	102	102.0	115.0	131.0
WORLD TOTAL	161.6	170.7	205.5	224.7	241.6/a	248.0	252	256.0	292.0	332.0
Exports										
Industrialized Countries	1.26	1.87	2.98	2.90	3.29	3.2	3.7	3.9	4.2	5.0
Developing Countries	4.65	4.79	3.72	3.14	6.09	4.0	4.1	4.0	4.0	4.0
Centrally Planned Economics	0.99	1.73	2.18	2.31	1.45	2.1	2.2	2.5	3.5	4.4
WORLD TOTAL	6.90	8.39	8.88	8.35	10.82	9.3	10.0	10.4	11.7	13.4
Imports										
Industrialized Countries	0.79	1.75	0.90	1.17	1.58	1.1	1.1	1.1	1.3	1.5
Developing Countries	5.13	5.18	5.86	5.34	7.28	7.1	7.4	7.3	8.1	9.2
Centrally Planned Economics	0.67	1.33	2.28	2.25	1.37	1.1	1.5	2.2	2.3	2.7
WORLD TOTAL	6.59	8.26	9.04	8.76	10.23	9.3	10.0	10.6	11.7	13.4

/a Preliminary

/b 1961-76

/c 1976-80

Source: FAO Production and Trade Yearbooks (actual),
 USDA, Foreign Agricultural Service (estimated),
 World Bank, Economic Analysis and Projections
 Department (projected).

Table V-51(2) RICE-SUMMARY OF WORLD PRODUCTION, CONSUMPTION
AND TRADE BY ECONOMIC REGION

Unit: % per annum

	Growth Rates				
	1961-77	1977-80	1980-85	1985-90	1974/76-90
<u>Production</u>					
Industrialized Countries	0.6	1.3	0.6	1.3	0.8
Developing Countries	2.9	1.1	2.7	2.7	2.7
Centrally Planned Economics	2.5	2.5	2.8	2.7	2.8
WORLD TOTAL	2.7	1.6	2.6	2.6	2.6
<u>Consumption</u>					
Industrialized Countries	0.3 /b	0.7 /c	0.1	0.3	0.2
Developing Countries	2.8 /b	2.5 /c	3.0	2.7	2.9
Centrally Planned Economics	2.3 /b	2.7 /c	2.5	2.6	2.5
WORLD TOTAL	2.5 /b	2.5 /c	2.7	2.6	2.6
<u>Exports</u>					
Industrialized Countries	6.0	6.2	1.1	3.8	3.7
Developing Countries	-1.7	-13.1	0.0	0.0	1.6
Centrally Planned Economics	2.7	20.0	7.3	4.4	4.4
WORLD TOTAL	1.5	1.5	2.4	2.8	2.7
<u>Imports</u>					
Industrialized Countries	1.3	-11.1	2.5	3.2	1.5
Developing Countries	1.5	0.3	2.0	2.6	3.7
Centrally Planned Economics	2.8	17.0	1.1	3.3	1.3
WORLD TOTAL	1.6	1.3	2.0	2.8	2.9

/a Preliminary

/b 1961-76

/c 1976-80

Source: FAO Production and Trade Yearbooks (actual),
USDA, Foreign Agricultural Service (estimated),
World Bank, Economic Analysis and Projections
Department (projected).

Table V-52 AREA, YIELD AND PRODUCTION OF PADDY, SABAH 1968-1980

Year	Wet Paddy				Hill Paddy				Kendinga Paddy				Total			
	Main Season		Off Season		Area		Yield		Production		Area		Yield		Production	
	Area (acre)	Yield (lb)	Production (ton)	Area (acre)	Yield (lb)	Production (ton)	Area (acre)	Yield (lb)	Production (ton)	Area (acre)	Yield (lb)	Production (ton)	Area (acre)	Yield (lb)	Production (ton)	Paddy (ton)
1968	71,015	2,289	72,375	4,021	1,865	3,348	25,830	640	7,380	2,790	1,600	1,993	85,296	51,178		
69	74,555	2,195	73,077	6,366	2,211	6,284	27,845	640	7,956	2,800	1,600	2,000	89,317	53,590		
70	75,364	2,362	79,461	4,548	2,280	4,629	24,069	640	6,877	2,972	1,600	2,123	93,090	55,854		
71	76,689	2,582	88,490	6,210	2,615	7,250	24,335	640	6,291	2,380	1,600	1,700	104,361	62,596		
72	80,927	2,550	92,141	11,322	2,701	13,652	24,203	640	6,915	2,266	1,600	1,619	114,327	68,596		
73	80,290	2,968	84,867	14,048	2,368	14,851	22,779	640	6,508	2,250	1,600	1,607	107,833	64,700		
74	81,056	2,709	98,027	8,519	2,709	10,303	29,364	640	8,390	2,638	1,600	1,884	118,604	71,162		
75	83,251	2,976	110,605	9,157	2,976	12,166	34,583	640	9,881	1,375	1,600	982	133,634	80,180		
76	71,915	2,330	74,564	5,111	2,330	5,316	42,948	640	12,271	1,273	1,600	909	93,060	55,836		
77	67,763	2,531	76,462	5,262	2,531	5,946	45,095	640	12,884	1,273	1,600	909	96,201	57,721		
78	67,562	2,576	77,820	3,300	2,576	3,795	33,854	640	9,673	2,160	1,600	1,543	92,831	55,699		
79	76,899	2,490	85,488	10,340	2,790	12,879	29,398	640	8,399	1,972	1,600	1,409	108,175	64,905		
80	78,198	2,486	86,795	8,645	3,329	12,848	30,000	640	8,571	2,000	1,600	1,429	109,643	65,786		
																(1.79ton/ha)*
																(0.71ton/ha)*

Source: Sabah Paddy Board, 1980

* : All figures in parentheses are of 1980.

Table V-53 CONSUMPTION, PRODUCTION AND IMPORTS OF RICE, 1968 - 1980

Year	Population	Consumption (tons)	Rice Production (tons)	Rice Imports (tons)	% of rice requirement Imported
1968	606,270	72,752	51,178	26,062	36
1969	633,821	76,059	53,590	29,745	39
1970	668,604	80,232	55,854	35,733	45
1971	704,971	84,597	62,617	41,863	49
1972	758,050	90,966	68,596	44,141	49
1973	808,371	97,005	64,700	52,387	54
1974	849,958	101,995	71,162	42,253	41
1975	891,373	106,965	80,180	40,025	37
1976	942,392	113,087	55,836	38,095	34
1977	993,182	119,182	57,721	47,950	40
1978	1,045,904	125,508	55,699	64,500	51
1979	1,100,645	132,077	64,905	66,184	50
1980	1,152,706*	138,325	65,786	68,266	49

* 1,098,000, population census 1980.

Source: Sabah Paddy Board, 1980.

Table V-54 FARMING SCALE AND BENEFIT

Case	I	II	III
1. Farming Form	Small Scale	Medium Scale	Large Scale
2. Operation Unit	15 ha/group	35 ha/group	400 ha/group
3. Manpower	1.2 ha/man (0.87 man/ha)	4.5 ha/man (0.23 man/ha)	16 ha/man (0.06 man/ha)
4. Planting Method	Transplanting	Drill sowing	Drill sowing
5. Main Machinery	Power tiller x 3 Binder x 3 Thresher x 3	Tractor (25HP) x 2 Small combine x 2	Tractor (75HP) x 5 Clawler x 1 Big combine x 2
6. Machinery Investment (M\$/ha)	2,210	2,380	2,638
7. Yield			
Paddy (ton/ha)	8.0	8.0	8.0
Rice (x 65%)	5.2	5.2	5.2
Bran (x 9%)	0.72	0.72	0.72
8. Production Value			
Rice M\$1,242/ton	6,458	6,458	6,458
Bran M\$417/ton	300	300	300
Total	6,758	6,758	6,758
9. Production Cost (M\$/ha)	4,156	3,822	2,854
Labour cost	2,150	1,610	300
OM - machinery*	457	663	1,005
Farm inputs etc.	1,549	1,549	1,549
10. Net Benefit (M\$/ha)	2,602	2,936	3,904

* excluding depreciation cost of farm machinery

Table V-55 RICE AND FERTILIZER PRICES AND PRICE PROJECTION IN 1980 CONSTANT DOLLARS
Unit : US\$/ton

Commodity	Actual				Estimated				Projected		Average		
	1975	1976	1977	1978	1979	1980	1981	1982	1985	1990	1965/69		
Rice	604	419	412	271	370	434	478	487	557	575	525	650	685
Phosphate	112	59	46	37	37	47	47	47	53	53	46	45	53
Urea	331	184	192	185	193	222	216	222	268	282	239	280	295
TSP	338	150	147	125	163	180	188	191	227	230	-	90	292
DAP	406	197	202	179	216	222	225	230	324	333	528	438	344
Potashium	135	90	77	72	86	116	113	109	106	114	114	93	105

Source: Mid-Year Updating of Commodity Price Forecasts, IBRD, June 1981

Table V-56 RICE AND FERTILIZER PRICES AND PRICE PROJECTION IN 1980 CURRENT DOLLARS
Unit : US\$/ton

Commodity	Actual				Estimated				Projected		Average		
	1975	1976	1977	1978	1979	1980	1981	1982	1985	1990	1960/64	1965/69	1970/74
Rice	363	255	272	368	331	434	510	560	797	1100	139	179	262
Phosphate	67	36	31	29	33	47	50	54	76	101	12	12	20
Urea	198	112	127	145	173	-222	230	255	383	539	63	77	113
TSP	202	91	97	98	146	180	200	220	325	44	-	25	112
DAP	243	120	133	140	193	222	240	265	463	637	140	120	132
Potashium	81	55	51	56	77	116	120	125	152	217	30	26	40

Source: Mid-Year Updating of Commodity Price Forecasts, IBRD, June 1981

TableV-57 ESTIMATED AND PROJECTED WORLD POPULATION, 1965- 1985

	mid-1975 (million)	1965-1975 (% per annum)	1975-1985/ ¹ (% per annum) (growth)
Developed Countries ²	739.5	0.92	0.92
Developing	1,974.3	2.58	2.69
Centrally Planned Economics	1,253.2	1.46	1.36
World	3,967.0	1.90	1.96

¹ The projection represents the medium variant series produced by the Population Division of the U.N. Secretariat.

² Developed countries here include Greece, Portugal and Spain.

Source: U.N. Secretariat, Population Division: "Single-Year Population Estimates and Projections for Major Areas, Regions and Countries of the World, 1950-2000," October 6, 1975.

TableV-58 ECONOMIC PRICE OF RICE AND FERYILIZERS

	Unit	Rice	Urea	T.S.P.
Projected 1990 World Market Price ¹	US\$/t	575	282	230
Quality Adjustment ²	%	90	100	100
Projected Price	US\$/t	518	282	230
Shipping & Handling	US\$/t	+ 33	+ 36	+ 42
CIF Price, Sandakan	US\$/t	551	318	272
Equivalent in M\$ (x 2.3)	M\$/t	1,267	731	626
Domestic Transport/Handling	M\$/t	- 25	+ 25	+ 25
Farm Gate Economic Price	M\$/t	1,242	756	651

¹ Mid-Year Updating of Commodity Price Forecast, IBRD, Jun. 1981

² The produced rice in the project has a little high percentage of brokens, its price is assumed to be 10% lower than their 5% broken rice.

Table V-59 PRICES OF OUTPUT AND INPUTS
(1980 Constant Value)

		Unit : M\$/ton	
		Financial Price	Economic Price
(1)	OUTPUT		
	Rice	1,040	1,242
(2)	INPUTS		
	<u>Fertilizer</u>		
	Urea	637	756
	TSP	582	651
	<u>Chemicals</u>		
	Fungicide	2,457	3,022
	Insecticide	2,020	2,485
	Harbicide/ <u>1</u>	76,676	94,311
	<u>Seed</u>		
	Paddy/ <u>2</u>	672	825

/1 For seed treatment

/2 Seed would be provided in the project

Table V-60 AGRICULTURAL DEVELOPMENT COST

Unit: 10³ US\$

Work Item	Foreign Currency	Local Currency	Total
1. Main Work			
Jungle Clearing & Levelling	38,000	33,600	71,600
Irrigation, Drainage, Farm Road, Related Structures	63,400	75,500	138,900
Preparatory Work	10,100	10,900	21,000
Sub Total	111,500	120,000	231,500
2. Agricultural Production Facilities			
Buildings & Equipment for Office, Workshop and Pilot Farm	14,400	2,500	16,900
Rice Mill & Farm Machinery	99,300	15,300	114,600
Sub Total	113,700	17,800	131,500
3. Resettlement Scheme	-	16,400	16,400
4. Land Acquisition	-	2,500	2,500
5. Engineering Service	29,000	7,300	36,300
6. Physical Contingency	25,400	16,400	41,800
Total	279,600	180,400	460,000

Table V-61 ECONOMIC COST FOR AGRICULTURAL DEVELOPMENT

Unit: 10³ US\$

Work Item	Foreign Currency	Local Currency	Total
1. Main Work			
Jungle Clearing & Levelling	38,000	33,600	71,600
Irrigation, Drainage, Farm Road, Related Structures	63,400	77,100	140,500
Preparatory work	10,100	11,100	21,200
Sub Total	111,500	121,800	233,300
2. Agricultural Production Facilities			
Buildings & Equipment for Office, Workshop and Pilot Farm	14,400	2,500	16,900
Rice Mill & Farm Machinery	99,300	15,300	114,600
Sub Total	113,700	17,800	131,500
3. Resettlement Scheme	-	16,400	16,400
4. Land Acquisition	-	2,500	2,500
5. Engineering Service	29,000	7,300	36,300
6. Physical Contingency	25,400	16,600	42,000
Total	279,600	182,400	462,000

Table V-62(1) CONSTRUCTION COST OF LAND DEVELOPMENT

Work Item	Unit : M\$		
	Foreign Currency	Local Currency	Total
Jungle Clearing and Levelling	87,405,000	77,360,000	164,765,000
Irrigation System			
Convey Canal I	1,902,000	909,000	2,811,000
II	4,261,000	2,029,000	6,290,000
III	7,091,000	3,349,000	10,440,000
Sub Total	13,254,000	6,287,000	19,541,000
Main Canal I	1,080,000	1,886,000	2,966,000
II	1,991,000	3,476,000	5,467,000
III	592,000	1,029,000	1,621,000
IV	993,000	1,718,000	2,711,000
Sub Total	4,656,000	8,109,000	12,765,000
Secondary Canal	11,617,000	20,200,000	31,817,000
Tertiary Canal	5,090,000	9,209,000	14,299,000
Related Structure			
Head Regulator	1,053,000	1,095,000	2,148,000
Irrigation Culvert	4,944,000	9,459,000	14,403,000
Turn Out	1,198,000	2,535,000	3,733,000
Invert Syphon	237,000	299,000	536,000
On Farm Cross	5,528,000	8,577,000	14,105,000
Check Gate	376,000	441,000	817,000
End Check	247,000	909,000	1,156,000
Division Box	3,880,000	7,345,000	11,225,000
Sub Total	17,759,000	30,799,000	48,558,000
Irrigation System Total	(52,376,000)	(74,604,000)	(126,980,000)
Drainage System			
Lateral Drain	7,135,000	9,694,000	16,829,000
Sub-Lateral Drain	8,965,000	19,604,000	28,569,000
Existing Canal Improvement			
I	1,080,000	1,052,000	2,132,000
II	2,115,000	2,022,000	4,137,000
III	3,252,000	3,080,000	6,332,000
Sub Total	6,447,000	6,154,000	12,601,000
Related Structure			
Drainage Culvert	5,641,000	7,941,000	13,582,000
Sluice	1,105,000	1,404,000	2,509,000
Sub Total	6,746,000	9,345,000	16,091,000
Drainage System Total	(29,293,000)	(44,797,000)	(74,090,000)

Continued

Table V-62(2) CONSTRUCTION COST OF LAND DEVELOPMENT

Unit : M\$

Work Item	Foreign Currency	Local Currency	Total
Farm Road			
Farm Road	17,211,000	27,596,000	44,807,000
On-Farm Road	10,838,000	19,115,000	29,953,000
Bridge	750,000	843,000	1,593,000
Farm Road Total	(28,799,000)	(47,554,000)	(76,353,000)
Pumping Station	(35,430,000)	(6,690,000)	(42,120,000)
Operation and Maintenance Equipment	(2,575,000)	(25,000)	(2,600,000)
Irrigation, Drainage & Road Total	145,898,000	173,645,000	319,543,000
Total	235,878,000	251,030,000	486,908,000

Table V-63 CONSTRUCTION COST OF RICE MILL, OFFICES, WORKSHOP etc.

Description	Unit	Quantity	Unit Cost (M\$/m ²)	Amount per Unit Tract (1,000M\$)	Number of Unit Tract	Total Amount (1,000M\$)
1. Project office						
1) Head office	(m ²)	1,500	500	750	1	750
2) Branch office	(m ²)	600	500	300	10	3,000
2. Pilot Farm Bldg.	(m ²)	1,500	500	750	1	750
3. Warehouse	(m ²)	2,500	300	750	11	8,250
4. Workshop						
1) Central w.s.	(m ²)	2,000	350	700	1	700
2) Branch w.s.	(m ²)	1,000	350	350	10	3,500
5. Tractor shade	(m ²)	2,000	200	400	11	4,400
6. Rice Mill Bldg.						
1) Milling	(m ²)	600	350	210	11	2,310
2) Recieving/Dryer	(m ²)	2,800	350	980	11	10,780
3) Storage	(m ²)	1,900	300	570	11	6,270
4) Generator	(m ²)	680	350	238	11	2,618
7. Shipping wharf	(m ²)	50	200	10	11	110
<u>Sub total</u>						<u>43,438</u>
8. Rice Mills*	L.S.			11,414	11	125,554
9. Equipment of Workshop	L.S.			200	11	2,200
10. Equipment of Pilot Farm	L.S.			12,500	1	12,500
11. Physical Contingency (10%)						18,369
Total						202,061

*The breakdown of the cost of rice mill is shown in Table V-64.

Table V-64 COST OF RICE MILL FACILITIES FOR ONE PLANT

Unit: 1,000M\$

Facilities	Required Number	F.C.	L.C.	Total
1. Receiving Section				
20 tons bucket & Others	8	495	15	510
2. Drying Section				
20 tons dryer & storage bins etc.	12	1,737	38	1,775
3. Storage Section				
storage tanks etc.	40	5,808	58	5,866
4. Milling section				
3 ton/hr mills & Others	2	1,195	-	1,195
5. Power Supply				
Generator & engines, etc.	4	560	8	568
6. Erection Cost		1,240	260	1,500
Total		11,035	379	11,414

Table V-65 PROCUREMENT COST OF FARM MACHINERY

Machinery	Unit Price (M\$)	Required Number	Total Cost (M\$1,000)
1. Tractor			
Wheel tractor	30,000	600	18,000
Crawler tractor	45,000	150	6,750
2. Combine harvester	245,000	250	61,250
3. Equipment & Attachment			
Disc plough	4,770	250	1,193
Disc lough	5,540	250	1,385
Broad-caster	3,600	150	540
Rotavator	9,050	350	3,168
Ridger	2,200	150	330
Drill seeder	17,000	150	2,550
Power duster	8,000	250	2,000
Sprayer	1,440	350	504
Trailer	2,500	150	375
Dozer blade	4,420	150	663
4. Dump truck	27,250	250	6,813
5. Spare parts	(10%)	L.S.	10,552
<u>Sub-total</u>			<u>116,073</u>
6. Physical contingency	(10%)		11,607
<u>Total</u>			<u>127,680</u>

Note: Refer to Table V-49

Table V-66 ANNUAL DISBURSEMENT OF AGRICULTURAL
DEVELOPMENT COST

Unit : 10⁶ US\$

Development Year	F.C.	L.C.	Total
1982 1st	-	-	-
1983 2nd	3.19	0.80	3.99
1984 3rd	4.79	1.33	6.12
1985 4th	5.60	4.29	9.89
1986 5th	21.87	17.56	39.43
1987 6th	34.38	26.81	61.19
1988 7th	44.31	28.34	72.65
1989 8th	44.31	28.34	72.65
1990 9th	44.31	28.34	72.65
1991 10th	44.31	27.90	72.21
1992 11th	32.55	16.67	49.22
Total	279.62	180.38	460.00

Table V-67 ECONOMIC PRODUCTION COST

Unit: 1,000M\$

Item	FC.	LC.	Total
1. i) Farming expenditures			
- Seeds (7,040 ton)	-	4,731	4,731
- Fertilizer			
Urea (15,400 ton)	11,642	-	11,642
TSP (7,700 ton)	5,013	-	5,013
- Agro-chemicals			
Fungicide/1 (8.8 ton)	830	-	830
Fungicide (1,320 ton)	3,989	-	3,989
Insecticide (2,640 ton)	6,560	-	6,560
Herbicide (1,320 ton)	5,301	-	5,301
(Sub-total)	(33,335)	(4,731)	(38,066)
ii) O & M cost of farm machinery /2	2,240	55,160	57,400
2. O & M cost of irrigation	-	8,096	8,096
3. O & M cost of rice mills	6,800	10,810	17,610
4. Administration cost /3	-	4,400	4,400
Total	42,375	83,197	125,572 /4

/1 For seed treatment

/2 O & M cost of work shop is included

/3 In-direct personnel cost and office cost etc.

/4 M\$2,854/ha

Table V-68 GROSS PRODUCTION VALUE (GPV)

Construction Year	Outputs /1	Production (ton)/2	GPV (1,000M\$)	Total/3 (1,000M\$) (1,000US\$)	
1987 6th	Rice	3,536	4,392	4,587	1,994
	Bran	468	195		
1988 7th	R	16,456	20,438	21,346	9,281
	B	2,178	908		
1989 8th	R	31,280	38,850	40,576	17,642
	B	4,140	1,726		
1990 9th	R	48,008	59,626	62,276	27,077
	B	6,354	2,650		
1991 10th	R	66,640	82,767	86,445	37,585
	B	8,820	3,678		
1992 11th	R	86,632	107,597	112,378	48,860
	B	11,466	4,781		
1993 12th	R	204,612	254,128	265,421	115,400
	B	27,081	11,293		
1994 13th	R	218,892	271,864	283,945	123,454
	B	28,971	12,081		
1995 14th	R	229,364	284,870	297,529	129,360
	B	30,357	12,659		
1996 15th	R	236,028	293,147	306,174	133,119
	B	31,239	13,027		
1997 16th	R	239,360	397,285	310,496	134,998
	B	31,680	13,211		

/1 Unit Price : Rice M\$1,242/ton
: Bran M\$ 417/ton

/2 Refer to Table V-70

/3 Rice and Bran

Table V-69 NET PRODUCTION VALUE (NPV) BUILD UP PERIOD

Construction		Gross Production	Total Production	Net Production	
Year		Value/1 (1,000M\$)	Cost/2 (1,000M\$)	Value (1,000M\$)	(1,000US\$)
1987	6th	4,587	2,854	1,733	753
1988	7th	21,346	12,843	8,503	3,697
1989	8th	40,576	22,832	17,744	7,715
1990	9th	62,276	32,821	29,455	12,807
1991	10th	86,445	42,810	43,635	18,972
1992	11th	112,378	52,799	59,579	25,904
1993	12th	265,421	125,576	139,845	60,802
1994	13th	283,945	125,576	158,396	68,856
1995	14th	297,529	125,576	171,953	74,762
1996	15th	306,174	125,576	180,598	78,521
1997	16th	310,496	125,576	184,920	80,400

/1 Refer to Table V-68.

/2 Refer to Table V-71.

Table V-70 PADDY PRODUCTION IN THE BUILD-UP PERIOD

Development Group	Area (ha)	Construction Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1995	1996	
			6th	7th	8th	9th	10th	11th	12th	13th	14th	15th	16th	
I	2,000	(Paddy)	5,200	6,000	6,800	7,600	8,400	8,400	16,000	16,000	16,000	16,000	16,000	16,000
		(Rice)	3,536	4,080	4,624	5,168	5,712	5,712	10,880	10,880	10,880	10,880	10,880	10,880
		(Rice bran)	468	540	612	684	756	756	1,440	1,440	1,440	1,440	1,440	1,440
II	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
III	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
IV	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
V	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
VI	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
VII	7,000		18,200	21,000	23,800	26,600	29,400	29,400	56,000	56,000	56,000	56,000	56,000	56,000
			12,376	14,280	16,184	18,088	19,992	19,992	38,080	38,080	38,080	38,080	38,080	38,080
			1,638	1,890	2,142	2,394	2,394	2,394	5,040	5,040	5,040	5,040	5,040	5,040
Total	44,000	(Paddy)	5,200	24,200	46,000	70,600	98,000	127,400	300,900	321,900	337,300	347,100	352,000	
		(Rice)	3,536	16,456	31,280	48,008	66,640	86,632	204,612	218,892	229,364	236,028	239,360	
		(Rice bran)	468	2,178	4,140	6,354	8,820	11,466	27,081	28,971	30,357	31,239	31,680	

Note: Build-up Period Yield

	1st year	2nd	3rd	4th	5th
Off season	2.6	3.0	3.4	3.8	4.2
Main season	2.4	2.8	3.2	3.5	3.8
Total	5.0	5.8	6.6	7.3	8.0

Milling Ratio: rice is 68% of paddy and bran is 9% of paddy

Table V-71 PRODUCTION COST IN THE BUILD-UP PERIOD

Construction		New Planting	Harvesting	Total Production
Year		Area (ha)	Area (ha)	Cost / <u>1</u> (1000M\$)
1987	6th	2,000	2,000	2,854
1988	7th	7,000	9,000	12,843
1989	8th	7,000	16,000	22,832
1990	9th	7,000	23,000	32,821
1991	10th	7,000	30,000	42,810
1992	11th	7,000	37,000	52,799
1993	12th	7,000	44,000	125,576 / <u>2</u>

1 M\$ 1,427 /ha /one crop (6th-11th)

2 M\$ 2,854 /ha /two crops (after 12th)

