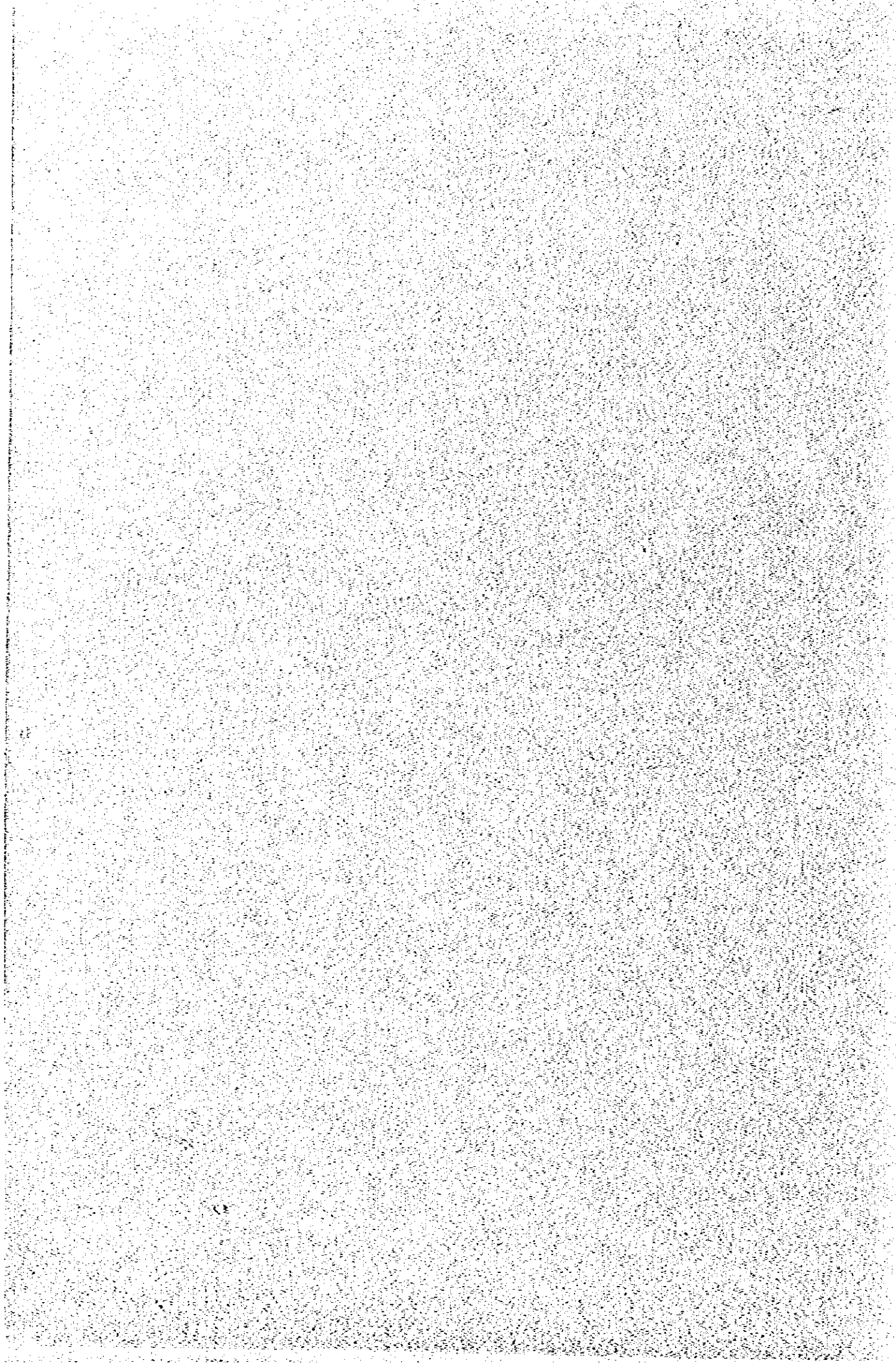


APPENDIX



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4. Climate and Soil Survey

4-1 Climate

Bengkoka Peninsula, lying in the tropical monsoon zone, has high temperatures and humidity all the year round. Rainfall is heaviest during the time of the monsoon coming from the north-east (from November to February), and least during the April - August period.

The annual rainfall in Pitas is 2013 - 3998 mm, with an average of 2863 mm (based on rainfall statistics for the past seventeen years). There are sharp fluctuations in rainfall levels between months—ranging from 0 to 1501 mm—but in general there is much rain, with only about three months having rainfall of less than 100 mm. Thirty-seven percent of annual rainfall occurs in December and January, the heaviest rainfall period. The rainfall records for Pitas, Taritipan and Langkon, the three Estates which are neighboring Division V, are shown below.

4-2 Soil Survey

4-2-1 Topography of the Bengkoka Peninsula (Sabah)

The state of Sabah is located in the northeastern part of Borneo, and can be generally divided geographically into four parts: western lowland, western mountains, central plateau and eastern lowland.

Bengkoka lies on the eastern lowland, and is typified by many gentle-sloping hills, small terraces, wide valleys and deltas.

At the middle reaches of the Bengkoka River there is a town called Pitas. To the south of Pitas, on the eastern side of the upper reaches of the river, lies the project site—Division

Table 4-1 Monthly Rainfall at TARITIPAN ESTATE

Year	(mm)												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1952	200	296	55	57	290	22	9	35	76	90	105	330	1565
1953	403	243	101	35	148	100	137	14	128	109	105	112	1635
1954	203	95	297	88	160	288	106	144	194	277	231	474	2557
1955	990	249	76	238	190	364	113	133	210	184	144	339	3220
1956	362	46	254	55	171	89	89	50	89	239	157	439	2040
1957	290	323	55	30	75	93	153	52	77	202	72	131	1553
1958	194	125	147	22	175	191	57	126	0	85	356	151	1629
1959	138	84	134	90	158	195	146	96	142	196	206	237	1882
1960	365	290	66	70	242	40	181	72	116	149	326	196	2113
1961	345	322	203	126	80	145	138	66	0	113	126	472	2137
1962	1242	326	210	139	197	227	71	20	455	452	233	428	4000
1963	1742	451	783	0	0	0	81	90	0	180	415	210	3962
1964	193	492	105	105	519	259	210	0	470	259	364	570	3545
1965	469	493	440	78	470	183	0	256	187	145	425	340	3487
1966	292	247	95	71	56	216	175	152	76	252	80	124	1846
1967	465	174	50	107	-	-	-	29	229	79	-	618	-
1969	117	94	-	72	148	115	141	220	161	163	287	408	-
1970	482	400	105	169	245	76	204	128	168	256	104	356	2694
1971	554	626	118	15	139	118	16	375	193	280	226	331	2996
Mean	476	284	183	82	194	151	113	108	157	195	212	330	2485

Table 4-2 Monthly Rainfall at LANGKON ESTATE

Year	(mm)												Annual
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug	Sep.	Oct.	Nov.	Dec.	
1952	267	401	161	50	240	79	51	46	221	252	162	337	2267
1953	402	298	107	104	223	135	73	96	101	152	79	88	1558
1954	70	115	201	75	115	102	118	101	116	207	193	541	1954
1955	1174	252	29	361	173	440	173	185	213	185	177	362	3724
1956	243	196	165	177	139	68	29	71	108	166	211	438	1961
1957	282	231	37	138	199	108	217	85	96	221	116	243	1978
1958	162	128	181	65	144	137	70	175	136	289	452	162	2104
1959	185	150	93	169	157	123	160	101	278	181	268	340	2210
1960	420	223	52	91	187	40	135	58	151	249	234	245	2086
1961	282	137	207	108	81	138	82	86	48	89	119	414	1791
1962	812	273	171	102	188	183	76	147	173	58	120	622	2925
1963	1736	567	323	55	177	16	103	84	107	174	183	161	3686
1964	83	267	79	69	153	160	250	41	214	91	244	315	1966
1965	483	275	303	97	210	109	108	95	91	108	216	162	2260
1966	269	108	160	97	69	102	93	159	81	219	84	178	1619
1967	652	597	190	247	150	31	92	20	83	99	195	229	2555
1969	71	96	52	26	167	176	95	193	182	179	270	382	1894
1970	213	152	128	147	247	140	184	30	75	191	131	411	2049
1971	701	1314	87	19	134	121	16	210	201	215	243	252	5548
1972	490	258	143	65	214	214	27	16	131	158	270	100	2092
1973	5	7	50	178	176	257	215	101	206	209	237	271	1912
1974	179	841	152	139	142	101	-	272	320	187	223	580	-
1975	274	742	208	7	63	90	51	183	205	123	375	615	2936
Mean	411	333	143	110	163	134	110	111	154	174	209	324	2376

Table 4-3 Monthly Rainfall at PITAS ESTATE

Year	(mm)												
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Annual
1961	581	624	178	80	185	38	194	25	246	245	244	691	3331
1962	238	343	83	61	245	44	133	245	74	241	133	633	2473
1963	712	567	285	59	461	256	183	25	199	95	103	565	3500
1964	312	134	306	65	160	279	185	160	113	180	247	859	3000
1965	821	193	50	408	225	334	151	190	112	301	195	594	3674
1966	453	161	264	167	295	35	88	82	138	147	264	315	2409
1967	394	179	124	73	34	215	98	49	130	103	124	522	2036
1968	253	187	77	4	69	143	55	119	66	118	577	345	2013
1969	129	118	246	118	44	234	153	219	186	297	408	255	2407
1970	518	558	49	89	167	76	161	0	148	258	390	569	2983
1971	257	273	36	178	179	190	74	87	69	135	165	677	2320
1972	1089	192	367	163	200	199	107	223	202	127	298	831	3938
1973	1501	157	326	47	67	60	225	144	30	157	373	108	3195
1974	147	521	164	62	59	273	275	0	180	85	252	626	2644
1975	479	381	400	84	188	69	44	181	118	244	319	554	3061
1976	351	68	311	135	116	115	208	259	88	242	-	259	-
1977	-	618	245	66	175	40	43	18	-	-	-	468	-
Mean	526	305	197	111	172	163	142	116	134	182	273	543	2863

V—at the watershed of the Mandamai River (a tributary of the Bengkoka), and the northern part of the watershed of the Meliau River, a tributary of the upper reaches of the Bengkoka. The area consists of moderate-sloping hills, some steep hills, wide valleys and small marshes.

4-2-2 Geology of the Bengkoka Peninsula

Borneo evolved geologically from a vast alluvium which was formed from sediments that came from the craton. The geological composition of the Sabah which is located in the northeastern part of Borneo, is typified by sedimentary rocks. The geological age of Sabah extended from the Eocene to the Pliocene periods with the bedrock consisting of sandstone, shale, mudstone, limestone and clay.

The eastern seashore of the Bengkoka Peninsula, the lowland on the estuary at the northern tip of the peninsula, and the low-lying land at the mouths of the Telaga and the Bengkoka rivers, which flow into Marudu Bay, are alluvial and peat moor. The lowland on the inner reaches of Marudu Bay is composed of volcanic deposits, while in the inland there is sandstone, mudstone, shale and clay, all formed from deposits (sand, mud and clay).

Division V of this project, a part of the geological structure of the Bengkoka Peninsula, is a typical inland region, having mostly sandstone, mudstone, shale and clay deposits. In the lowlands along the Bengkoka River and its tributaries (the Mandamai River and the Meliau River) alluvium is present.

4-2-3 Soil in the Bengkoka Peninsula

The Bengkoka Peninsula of Sabah belongs topographically to the eastern lowland. The geological structure is sedimentary, composed mostly of sandstone, mudstone, shale and clay. Alluvium can be seen in the lowlands on both sides of the river.

The major soils seen in these geological structures are outlined according to the landscape type as follows:

- Marsh areas where the tide reaches comprise alluvium or peat moor, and Fluvisol, Histosol and Gleysol are distributed.

- Regosol, Gleysol and Podzol can be seen in the seashore alluvium.
- In the alluvium of meander belts, flood plains and terraces at the foot of mountains, Fluvisol, Cambisol, Gleysol, Acrisol and Luvisol can be seen.
- The bedrock of valley floors and tablelands is composed of basic rocks; there are also Cambisol, Gleysol and Luvisol.
- Acrisol can be seen on gently-sloping hills (slope: 0°-20°).
- On steep and high hills (slopes of more than 25°), there are Acrisol and Cabisol.
- In mountains, Acrisol, Luvisol and Lithosol can be seen.

Depending on the amount of organic or inorganic substances in the soil and the process of soil formation, there are also many transitional soils between two or more other soils.

4-2-4 Soils on Division V

Division V lies in the center of the Bengkoka Peninsula, spreading from the plains on both sides of the upper reaches of the Bengkoka River—the southernmost tip of the project—to the hills and mountains. The geology of this region is mainly composed of deposits such as sandstone, mudstone, shale and clay.

The major soils classified by topography, based on the survey results, the FAO soil chart, "The Soils of Sabah" by the Land Resources Division and the soil survey result of Division I-II by SAFODA, are as follows:

◦ Meander belts

The geology is composed of alluvium, with Fluvisol, Cambisol and Gleysol well distributed. Fluvisol is formed in new alluvial deposits such as river plains, old lakes and seashores. Fluvisol in this region is eutric one formed from the deposits of non-calcareous substances. Cambisol is loamy and has a brownish black A horizon and a brown B horizon and usually has no special accumulated layers (clay, calcium, sodium, iron, etc.) or leached layers. The soil is generally young and highly productive. It is further sub-divided into Gleyic Cambisol possessing hydromorphic properties; Dystric Cambisol with less than 50 percent of base saturation; and Eutric Cambisol with more than 50 percent of base saturation.

Gleysol in lowlands and basins, where the underground water levels are high and the water is stagnant, has a layer of grayish blue, because iron is reduced due to the lack of oxygen. This is called gley horizon. Soil in which this layer is less than 50 centimeters is called Gleysol. In this area, if less than 50% of the soil is Humic Gleysol which has a dark A horizon is mainly distributed, and if the base saturation is less than 50%, such soil is called Dystric Gleysol, and if the level is more than 50%, such soil is called Eutric Gleysol.

o Flood plains

The geology is composed of alluvium, and Acrisol, Luvisol and gleysol are distributed. Acrisol, a red soil formed over a long time in a region where there are dry and rainy seasons, has a distinct layer with accumulated clay. Generally, the base is leached and the saturation degree is low. Its A horizon has a light color and contains little humus. The soil is exhausted and lacks nutrition. In addition, a layer with accumulated clay restricts the penetration of roots, resulting in inhibited growth.

Luvisol is formed in temperate, semi-tropical and tropical zones which have a distinct dry season. It has a clearly-defined layer with accumulated clay and a high base saturation. This soil is considered younger than Acrisol in the tropical zone. It contains minerals susceptible to weathering and is more productive than Acrisol. In this region Gleyic Acrisol and Gleyic Luvisol, which have hydro-morphic properties within 50 centimeters of the surface are distributed. Gleysol is subdivided into Humic Gleysol, Dystric Gleysol and Eutric Gleysol in the region.

o Pediments and Terraces

The geology is composed of alluvium and Acrisol and Podzol are distributed. Acrisol in these parts consists of the normal Orthic Acrisol, Gleyic Acrisol and Ferric Acrisol (which has ferric properties, or a cation exchange capacity (CEC) of less than 24m.e. per 100g of clay).

Podzol is characterized by the spodic B horizon, a layer accumulated with iron and/or alumina cemented by organic matter in the subsoil. Gleyic Podzol, which has hydromorphic properties, within 50 centimeters of the surface is also found.

o Gently-sloping hills and Valley Floors

The bedrock is composed of sandstone, mudstone and alluvium. Orthic Acrisol, Ferric Acrisol and Gleyic Acrisol are present.

- o High hills

The bedrock is composed of sandstone and mudstone. Orthic Acrisol and Dystric Cambisol can be seen.

- o Mountain (A)

The bedrock is composed of sandstone and mudstone. Orthic Acrisol, Dystric Cambisol, Chromic Cambisol with strong brown and red colors, and lithosol, which is a mineral soil less than 10 centimeters thick on the hard rock, are present.

- o Mountain (B)

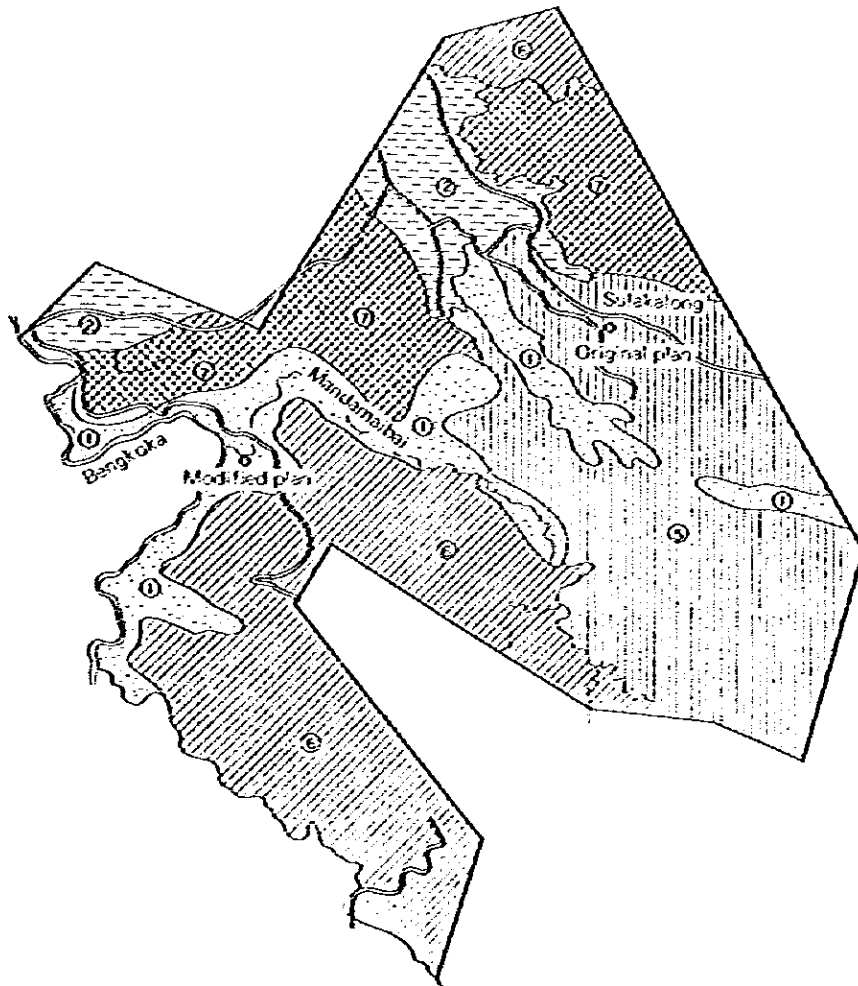
In the bedrock of sandstone and mudstone. Orthic Acrisol and Orthic Luvisol can be seen.

The above is summarized in Table 4-4 "Soils of Division V" and soil distribution is illustrated in Figure 4-1 "Soil Distribution of Division V."

Table 4-4 Soils of Division V

Landform	Parent materials	Main soil types
Meander belts	Alluvium	Eutric Fluvisol Gleyic Cambisol Dystric and Eutric Cambisol Humic Gleysol Dystric and Eutric Gleysol
Flood plains	Alluvium	Gleyic Acrisol Gleyic Luvisol Humic Gleysol Dystric and Eutric Gleysol
Terraces	Alluvium	Orthic Acrisol Ferric Acrisol Gleyic Acrisol Gleyic Podzol
Moderate hills and minor valley floors (Slopes 0° – 20°)	Sandstone, mudstone and alluvium	Orthic Acrisol Ferric Acrisol Gleyic Acrisol
Very high hills (Slopes >250°) Mountain (A)	Sandstone and mudstone Sandstone and mudstone	Orthic Acrisol Dystric Cambisol Orthic Acrisol Chromic Cambisol Dystric Cambisol
Mountain (B)	Sandstone and mudstone	Lithosol Orthic Acrisol Orthic Luvisol

Figure 4-1 Soil Distribution of Division V



No.	Landform	Parent Material's	Main Soils	④	Moderate hill and minor valley floors, 0 - 20°	Sandstone mudstone and alluvium	Acriso's
①	Meander belts	Alluvium	Fluvisols, Cambisols, Gleysols	⑤	Very high hills slopes > 25°	Sandstone and mudstone	Acriso's, Cambisols
②	Flood plains	Alluvium	Acriso's, Luvisols, Gleysols	⑥	Mountain Cuestas (A)	..	Acriso's, Cambisols, Lithosols
③	Terraces	Alluvium	Acriso's, Podzols	⑦	Mountain Cuestas (B)	..	Acriso's, Luvisols

4-2-5 Soil Profile Survey

Soil profile surveys were carried out in six places afforested with *Acacia mangium*, one location afforested with *Paraserianthes falcataria* (Agroforest) and eight locations within Division V. Among the *Acacia mangium*-afforested areas where soil profiles were examined, two were in Kolapis B near Sandakan, three in Brumas of Sabah softwoods Sdn. Bhd, and one in Langkon, belonging to the Sabah Forestry Development Authority.

As for the *Paraserianthes falcataria*-afforested area (Agroforest), one in Brumas of Sabah Softwoods Sdn. Bhd. And two each in the Mandamai Bay, Sosop and Kobon regions in Division V, and one each in Lokom darat and Rukomulu were surveyed.

Surveyed locations are shown in Figure 4-2 and results of the survey are shown in Table 4-5.

The results of the soil profile surveys for *Acacia mangium*-afforested areas and those of Division V were compared.

o Soil thickness (depth)

The thickness of A horizon is 3 - 20 centimeters in the afforested areas and 5 - 40 centimeters in Division V. The thickness of B horizon is 20 - 80 centimeters in the afforested areas and 26 - 85 centimeters in Division V. In the area with shallow A horizon, particularly, growth of planted trees is poor. In terms of soil thickness, most areas of Division V are suitable for plantation.

o Soil hardness (determined by the Yamanaka method)

The soil hardness in the afforested areas is 1.5 - 17.0 for the A horizon and 3.0 - 22.0 for the B horizon. In the afforested areas a maximum solidity of 32.0 can be seen. In Division V hardness is 5.0 - 16.0 for the A horizon and 12.0 - 23.0 for the B horizon. Comparisons of soil hardness with the thickness is shown in Fig. 4-3.

Figure 4-2 Locations of Soil Surveys

Surveyed Locations in Division I-V



Surveyed Locations in Division V

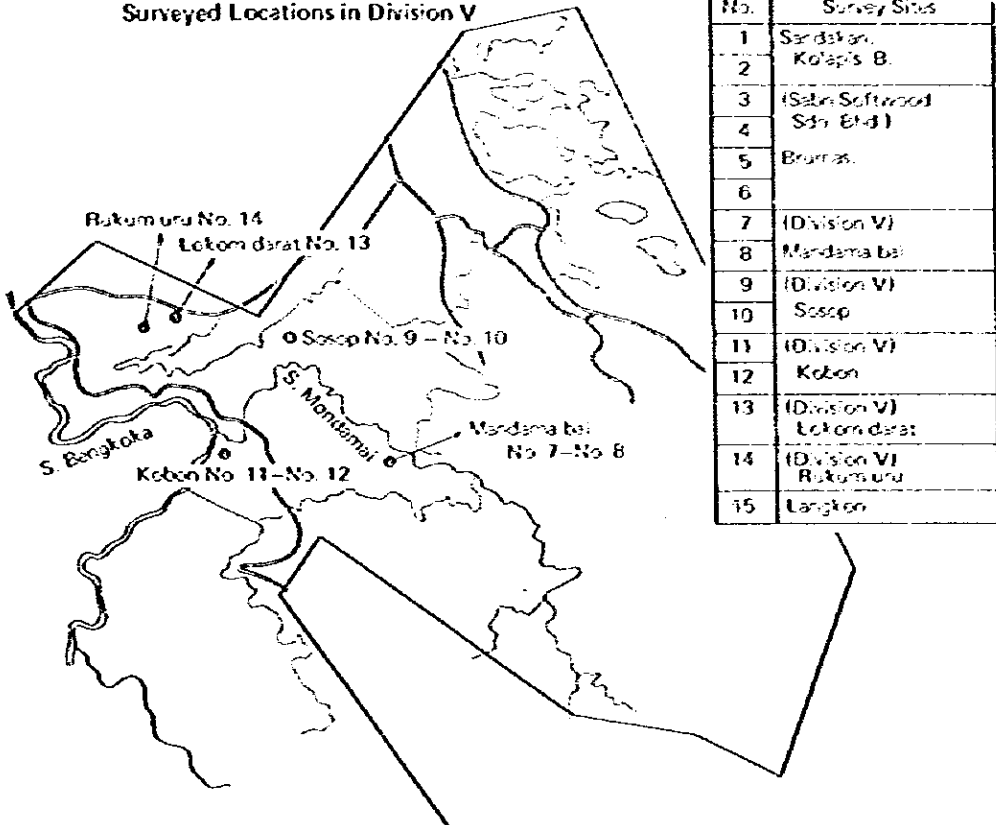


Table 4-5 Results of Soil Surveys (Profile, Simple Test)

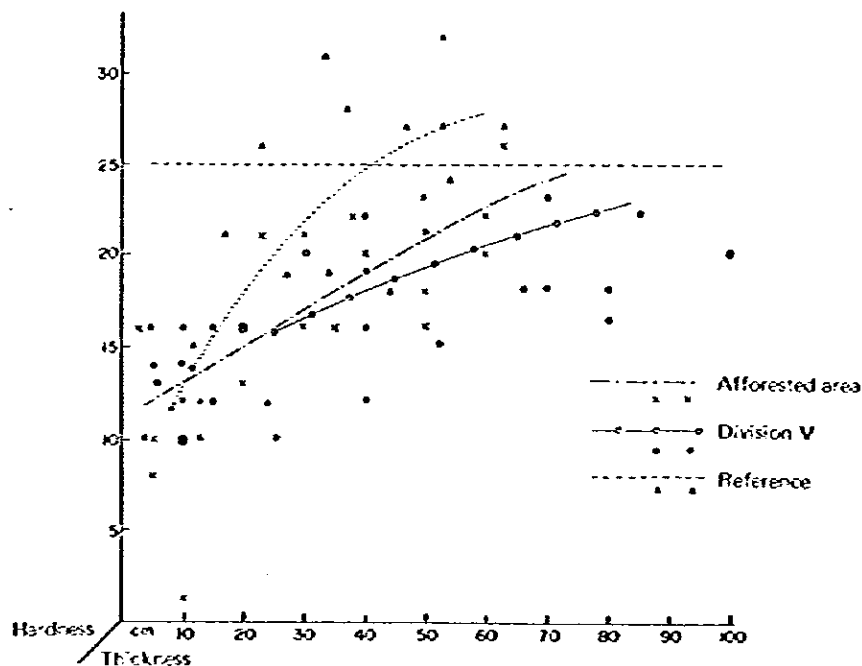
No.	Place	Vegetation (Altitude)	A horizon			B horizon			KC-type simple soil test						Others	
			Thick- ness (cm)	Acid- ity (pH)	Thick- ness (cm)	Acid- ity (pH)	Available phosphoric acid	Phosphoric acid absorp- tion	Substitut- able Ex- changeable Ca lime	Substitut- able Ex- changeable Mg	Iron		Hardness determined by Yamanaka method. av. height: good growth av. DBH:			
											Ferric oxide	Ferric suboxide		7m30		10m20
1	Sandakan Kolaris B 90 778	Acacia mangium (45 m) 2.7 yrs.	10	6.0	7	6.0	abundant average	average	700	abundant	abundant	little	little	poor	poor	Hardness determined by Yamanaka method. av. height: good growth av. DBH:
2	"	" (50 m)	20	6.0	80	5.0 5.4	little	high 2000	scarce	present	present	poor	poor	poor	poor	ridges some poor growth 6.75 7.20
3	Brumas	Acacia mangium (300 m) 8 yrs.	5	6.4	over 30	6.4	-	-	-	-	-	-	-	-	-	good growth 17.00 20.40
4	"	" (305 m)	5	5.8	45	5.6	little	high 2000	scarce	abundant	abundant	abundant	abundant	poor	poor	good growth 17.00 20.40
5	"	" (330 m) 7 yrs.	3	5.5	20	5.5	little	high 2000	scarce	abundant	abundant	poor	poor	poor	poor	good growth 8.10 9.05
6	"	Albizia falcataria Cocca 8 yrs (280 m)	10	4.8	50	5.5 5.8	some	high 1500	scarce	abundant	abundant	abundant	abundant	poor	poor	agroforest
7	Mandawai bay	2nd natural forest, burnt in '83 (98 m)	10	5.8 6.0	60	6.0 6.2	little	high 2000	scarce	present	present	abundant	abundant	poor	poor	afforestation site
8	"	" (80 m)	15	5.4 5.6	40	6.0 6.2	little	high 2000	scarce	scarce	scarce	abundant	abundant	poor	poor	A horizon afforestation site B horizon
9	Sosop	2nd natural shrubbery (50 m)	10	5.5	75	5.8 6.4	little	high 2000	scarce	abundant	abundant	abundant	abundant	poor	poor	afforestation site
10	"	Natural, 2 cuttings ended 10/'83 (50 m)	10	6.0 16.0	70	6.2 6.6	little	high 2000	scarce	scarce	scarce	poor	poor	abundant	abundant	
11	Kobon	2nd natural forest (50 m)	15	5.8 6.2	45	6.2	little	high 2000	scarce	little	little	poor	poor	poor	poor	afforestation site
12	Kobon	Terrace, grassland (30 m)	40	5.3 6.2	26	6.2 6.4	little	high 2000	scarce	little	little	poor	poor	poor	poor	afforestation site
13	Lokom darat	2nd natural shrubbery (30 m)	10	5.8	60	5.8	little	high 2000	scarce	little	little	abundant	abundant	poor	poor	afforestation site
14	Rukom ulu	Grassland shruberies (40 m)	5	5.2	85	6.2 6.6	little	high 2000	scarce	abundant	abundant	poor	poor	poor	poor	afforestation site
15	Langkun	Acacia mangium (40 m)	20	6.0 17.0	over 40	6.8 22.0	some	high 1500	scarce	present	present	abundant	abundant	poor	poor	good growth

Reference

Place	Vegetation	Top soil thickness	10cm layer except top soil			Other layers			Others		
			Thickness	Hardness	Acidity	Thickness	Hardness	Acidity			
SAFODA Nahaba, Kota Belud	Acacia mangium	13	14	24	26	5.6	25	43	27	5.8	Hardness determined by Yamahaka method. Survey: Feb. 1983 Tree height: 11 m DBH: 10 cm
SAFODA Nahaba, Kota Belud	Acacia mangium 5 yrs.	3	4	14	10	5.4	15	63	32	5.6	DBH: 12 16 cm Root grows down to 30 cm below top soil. No roots in the 40 cm section below that.
SAFODA Hobut, Kota Marudu	Acacia mangium 5 yrs.	12	13	23	17	5.2	24	62	18	5.2	5.6 Average tree height: 11 m DBH: 6 16 cm Marked growth of side roots in top soil. Marked root growth in 10 cm below top soil. Roots grow to 60 cm below top soil.
SAFODA Lingkon	Acacia mangium 3 yrs.	7	8	18	21	5.4	19	47	19	5.4	Tree height: 12 14 m DBH: 8 20 cm Numerous roots grow to 15 cm below top soil. Side roots to a depth of 40 cm below top soil.

Note: "Report on the Development of Forests in Sabah, Malaysia", Mar. 1983, JOFCA.

Figure 4-3 Soil Thickness & Hardness



- As shown in the above chart, there is little difference between the soil hardness of the afforested areas and that of Division V - both are less than 25. In the afforested areas shown for reference, however, a hardness of more than 25 can be seen in a considerable number of cases. Regarding the figures shown for reference, consideration must be given to the conclusions recorded previously in the report; namely, it is thought that the soil, which consists mainly of clay, showed a high degree of hardness because it had solidified temporarily due to little rain falling over a considerable period prior to the survey.

Soil hardness less than 25 is desirable for the growth of plants, because if it exceeds this level some plants cannot grow. Therefore, most of the soil in Division V can be considered suitable for afforestation in terms of hardness.

- Acidity (pH)

Soil acidity in the afforested areas is 4.8 - 6.4 for the A horizon and 5.0 - 6.8 for the B horizon. In Division V, the acidity is 5.3 - 6.2 for the A horizon and 5.8 - 6.2 for the B horizon. Soils in both areas are slightly acidic; it can be said they have the acidity suitable for afforestation.

o Results of simple soil tests

The soil was examined using the KC type simple soil testing kit gauge (results are shown in Table 4-2). Of the afforested areas, two locations were found to be richer in available phosphoric acid and one to be richer in exchangeable Ca. than in Division V, and the other afforested areas have similar values to those of Division V. Substitutable magnesia is generally abundant in the afforested areas, but scarce in Division V. As for iron, Division V tends to be a little richer than in the afforested areas.

From these results it can be said that the soil of Division V is virtually the same in quality to that of the existing afforested areas; therefore it can be said that Division V is a suitable site for planting *Acacia mangium* in this project.

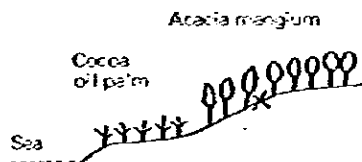
However, it is anticipated that a small portion of the Division V area has soil high in hardness and lacking in thickness; so especial care should be taken when planting in such places. Results of the soil surveys and the soil profiles showing the condition of vertical sections are given as follows (No. 1 - No. 15).

SOIL PROFILE No. 1

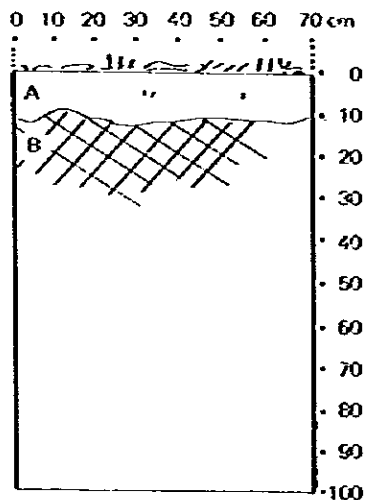
Record of soil profile

Horizon	: A	B
Thickness (cm)	: 10	
Color	: 7.5 YR 3/1 Brownish black	7.5 YR 6/4 Dull orange
Texture	: Clayey	Clayey
Structure	: Large grain	Powder
Hardness (using Yamanaka method)	: 1.5 Light	3.0 Light
Moisture	: 40%	60%
Acidity (pH)	: 6.0	6.0

- Others :
- KC-type simple soil test (FHK)
 - Rich in available phosphoric acid
 - Rich in exchangeable Ca lime: contains 150 mg per 100 g
 - Abounds in or contains exchangeable Mg: 35 - 20 mg per 100 g
 - Iron: Fe²⁺ somewhat scarce, Fe³⁺ scarce



West slope : 5° - 10°
 Hillside : (5° at the survey site)
 Hill 3 km from coast



Location : Sandakan
Kofaxis B 90-778

Altitude : 45 m

Planted tree : Acacia mangium

Date of planting : Jul. 13-15, '81

Average tree height : 7.30 m

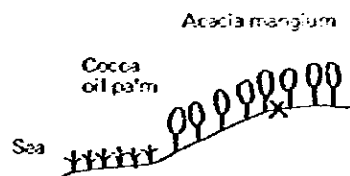
Average DBH : 10.20 cm

Date of survey : Feb. 13, '84

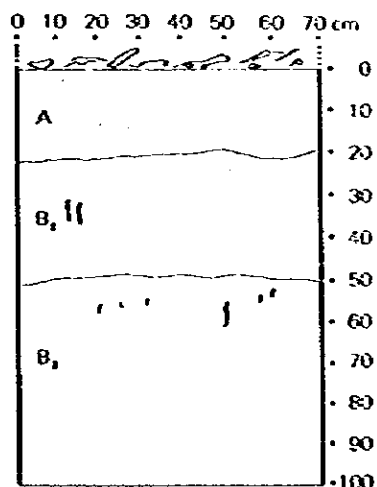
SOIL PROFILE No. 2

Record of soil profile

Horizon	: A	B ₁	B ₂	
Thickness (cm)	: 20	30	50	
Color	: 10 YR 7/6 Bright yellowish brown	10 YR 7/4 Dull yellowish orange	10 YR 7/2 Dull yellowish orange	7/1 Grayish white in places
Texture	: Clayey	Clayey	Clayey	
Structure	: Large grain	Powder	Well	
Hardness (using Yamazaki method)	: (16) Somewhat hard	(16) Somewhat hard	(20) Hard	
Moisture	: 80 %	100 %	100 %	
Acidity (pH)	: 6.0	5.4	5.0	
Others	: KC-type soil test (FIK)			
	o Contains some usable phosphoric acid			
	o Lacks substitutable lime less than 50 mg per 100 g			
	o Contains substitutable magnesia 20 mg per 100 g			
	o Iron: Fe ³⁺ scarce, Fe ²⁺ scarce			



West slope (5° - 10°)
Near top (2° at the survey site)
Hill 3 km from coast



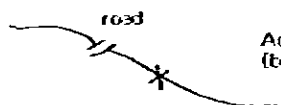
Location : Sandakan
Kotapis B 90-778
Altitude : 50 m
Planted tree : Acacia mangium
Date of planting : Jul. 13-15, '81
Average tree height : 6.75 m
Average DBH : 7.20 m
Date of survey : Feb. 13, '84

SOIL PROFILE No. 3

Record of soil profile

Horizon	: A	B
Thickness (cm)	: 5	over 30
Color	: 7.5 YR 6/4 Dull orange	7.5 YR 8/8 Yellowish orange
Texture	: Clayey	Clayey
Structure	: Powder	Powder
Hardness (using Yamanaka method)	: (8) Light	(8) Somewhat hard
Moisture	: 90%	68%
Acidity (pH)	: 6.4	6.4
Others	:	

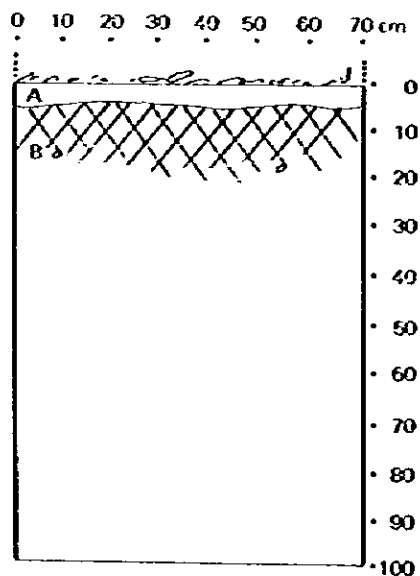
Paraserianthes falcataria
(above the road)



Acacia mangium
(below the road)

Afforested in 1977

Good growth



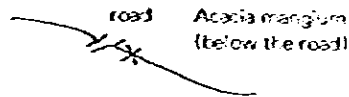
Location	: Brumas
Altitude	: 300 m
Slope	: 15°
Planted tree	: <i>Acacia mangium</i>
Average tree height	: 17.00 m
Average DBH	: 20.4 cm
Date of survey	: Feb. 17, '84

SOIL PROFILE No. 4

Record of soil profile

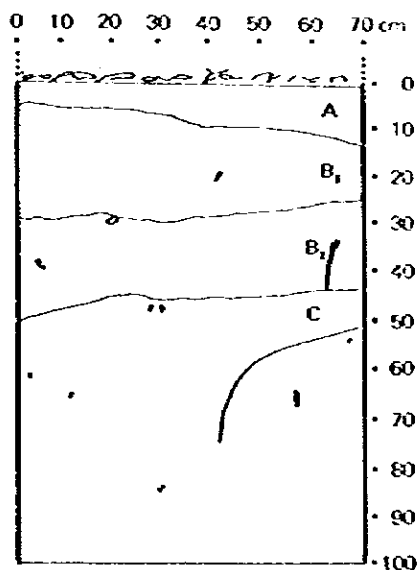
Horizon	A	B ₁	B ₂	C
Thickness (cm)	5	25	20	
Color	10 YR 6/6 Bright Yellowish brown	10 YR 5/6 Yellowish brown	10 YR 5/8 Yellowish brown	
Texture	Clayey	Clayey	Clayey	
Structure	Parasitic	Parasitic	Weak	
Hardness (using Yamazaki method)	(10) Soft	(16) Somewhat hard	(18) Hard	
Moisture	70%	60%	60%	
Acidity (pH)	5.8	5.6	5.6	
Others	KC-type soil test (FHK) <ul style="list-style-type: none"> ○ Contains a little usable phosphoric acid (0.1 mg per 100 g) ○ High phosphoric acid absorberency ○ Lacks substitutable lime (less than 50 mg per 100 g) ○ Abounds in substitutable magnesia (35 mg per 100 g) ○ Iron: Fe³⁺ abundant, Fe²⁺ scarce 			

Paraserianthes falcataria
(above the road)



Planted in 1977

Good growth



Location : Brumas

Altitude : 305 m

Slope : 15°

Planted tree : *Acacia mangium*

Average tree height : 17.00 m

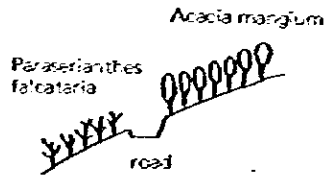
Average DBH : 20.40 cm

Date of survey : Feb. 17, '81

SOIL PROFILE No. 5

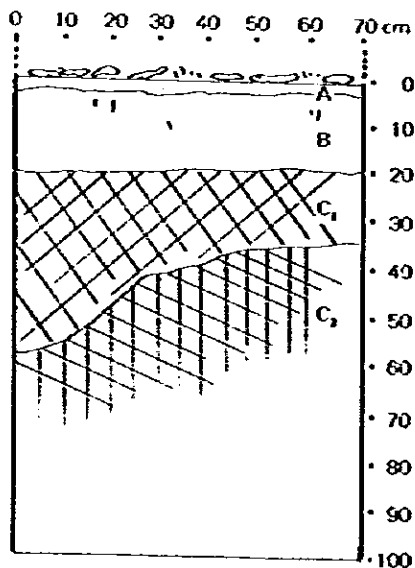
Record of soil profile

Horizon	: A	B	C ₁	C ₂
Thickness (cm)	: 3	20	15	25
Color	: 10 YR 7/6 Bright yellowish brown	10 YR 7/6 Bright yellowish brown	10 YR 7/4 Yellowish orange	4/6 Brown
Texture	: Clayey	Clayey	Clayey Sandstone	Clayey Clay slate
Structure	: Powder	Powder	Wall	Wall
Hardness (using Yamnaka method)	: (16) Somewhat hard	(20-22) Hard	(22) Very hard	(26) Solidified
Moisture	: 95 %	90 %		
Acidity (pH)	: 5.5	5.5	5.5	5.5
Others	: KC-type soil test (FHK)			
	o Contains a little usable phosphoric acid (0.1 mg per 100 g)			
	o High phosphoric acid absorbency			
	o Lacks substitutable lime (under 50 mg per 100 g)			
	o Abounds in substitutable magnesia (25 mg per 100 g)			
	o Iron: Fe ²⁺ scarce, Fe ³⁺ scarce			



Afforested in 1978

Poor growth

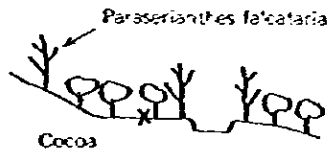


Location	: Brumas
Altitude	: 330 m
Slope	: 13° - 18°
Planted tree	: Acacia mangium
Average tree height	: 8.10 m (poor growth)
Average DBH	: 9.05 cm
Date of survey	: Feb. 17, '84

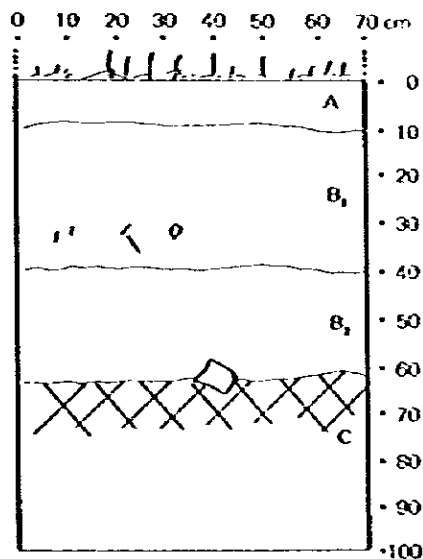
SOIL PROFILE No. 6

Record of soil profile

Horizon	: A	B ₁	B ₂
Thickness (cm)	: 10	30	20
Color	: 10 YR 7/4 Dull yellowish orange	10 YR 6/4 Bright yellowish orange	10 YR 6/4 Dull yellowish orange
Texture	: Clayey	Clayey	Clayey
Structure	: Powder	Powder	Wall
Hardness (using Yamanaka method)	: (10) Soft	(20) Hard	(20) Hard
Moisture	: 100%	90%	80%
Acidity (pH)	: 4.8	5.5	5.8
Others	: KC-type soil test (FITK)		
	o Contains usable phosphoric acid, low (1.0 mg per 100 g)		
	o Lacks substitutable lime (under 50 mg per 100 g)		
	o Abundant in substitutable magnesia (35 mg per 100 g)		
	o Iron: Fe ³⁺ abundant, Fe ²⁺ scarce		



Agroforest planted in 1977

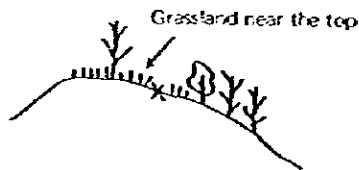


Location	: Brumas
Altitude	: 260 m
Slope	: 5°
Planted trees	: Albizia falcataria, cocoa
Date of agroforestry	:
Average tree height	:
Average DBH	:
Date of survey	: Feb. 17, '84

SOIL PROFILE No. 7

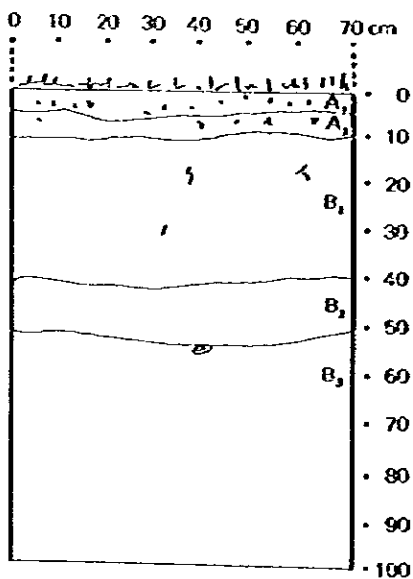
Record of soil profile

Horizon	: A ₁	A ₂	B ₁	B ₂	B ₃
Thickness (cm)	: 5	5	30	10	20
Color	: 7.5 YR 3/3 Dark brown	4/6 Brown	5/6 Bright brown	5/8 Bright brown	5 YR 6/8 Orange
Texture	: Sand loam	Sand loam	Clayey	Clayey	
Structure	: Powder	Powder	Powder	Wall	
Hardness (using Yamanaka method)	: (16) Somewhat hard	(16) Somewhat hard	(18) Hard	(21) Hard	(23) Very hard
Moisture	: 55%	55%	45%	55%	50%
Acidity (pH)	: 5.8	6.0	6.0	6.2	6.2
Others	: KC-type soil test (FHK)				
	o Acidity: 5.8				
	o Contains a little usable phosphoric acid (0.1 mg per 100 g)				
	o Lacks substitutable lime (under 50 mg per 100 g)				
	o Contains substitutable magnesia (20 mg per 100 g)				
	o Iron: Fe ³⁺ abundant, Fe ²⁺ scarce				



Sabsh suffered forest fires in Apr. - May, 1983 because of the unusually dry weather.

The affected area

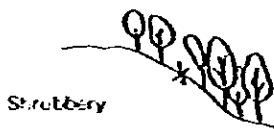


Location	: Mandamai Bay
Altitude	: 93 m (top)
Slope	: 3° to the north
Planted tree	: 2nd natural forest Area burned in Apr. - May, 1983
Date of planting	:
Average tree height	:
Average DBH	:
Date of survey	: Feb. 25, '84

SOIL PROFILE No. 8

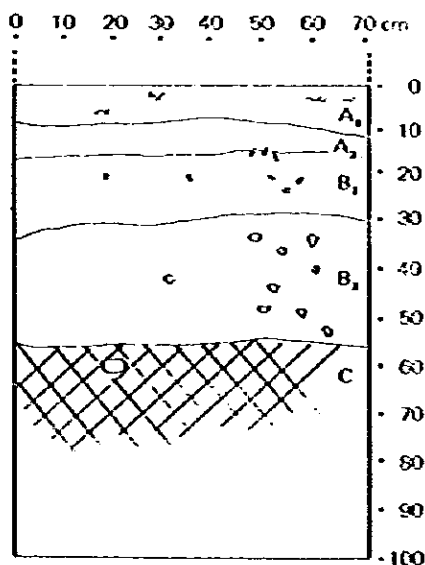
Record of soil profile

Horizon	A ₁	A ₂	B ₁	B ₂	C	
Thickness (cm)	10	5	15	25	20	
Color	7.5 YR 5/2 Grayish	7.5 YR 5/3 Brown	7.5 YR 7/6 Orange	7.5 YR 7/8 Yellowish orange	7.5 YR 7/8 Yellowish orange	10 YR 5/8 – 7/1 Yellowish brown grayish white
Texture	Sand loam	Sand loam	Clayey	Clayey	Sandstone	
Structure	Large grain	Powder	Powder	Powder	Well	
Hardness (using Yamanaka method)	(12) Soft	(12) Soft	(20) Hard	(23) Very hard		
Moisture	68%	68%	50%	35%		
Acidity (pH)	5.4	5.6	6.0	6.2		
Others	KC-type soil test (A horizon) o Acidity: 5.6 o Contains a little usable phosphoric acid (0.1 mg/100 g) o Lacks substitutable lime (50 mg/100 g) o Contains substitutable magnesia (20 mg/100 g) o Iron: Fe ³⁺ abundant, Fe ²⁺ scarce		(B horizon) o Acidity: 5.6 o Contains a little usable phosphoric acid (0.1 mg/100 g) o Lacks substitutable lime (50 mg/100 g) o Contains substitutable magnesia (5 mg/100 g) o Iron: Fe ³⁺ abundant, Fe ²⁺ scarce			



Sabah suffered forest fires in Apr. – May, 1983 because of the unusually dry weather.

The affected area

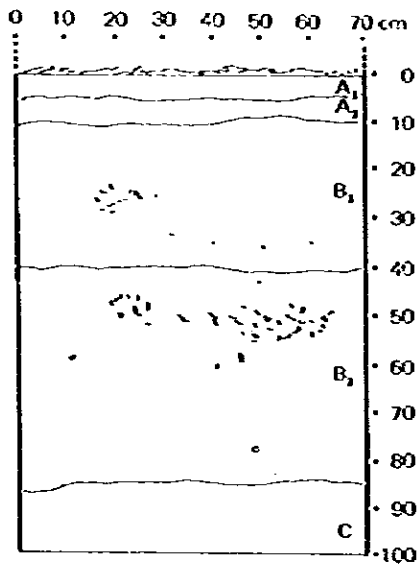
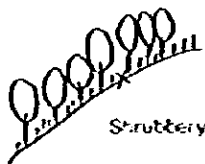


Location	: Mandamal Bay
Altitude	: 80 m (middle)
Slope	: 20° to NE
Planted tree	: 2nd natural forest Area burned in Apr. – May, 1983
Date of planting	:
Average tree height	: 9.0 m
Average DBH	: 14.2 cm
Date of survey	: Feb. 25, '84

SOIL PROFILE No. 9

Record of soil profile

Horizon	A ₁	A ₂	B ₁	B ₂	C
Thickness (cm)	5	5	30	45	
Color	7.5 YR 3/1 Brownish black	7.5 YR 4/1 Brownish gray	7.5 YR 5/6 Bright brown	7.5 YR 5/8 Bright brown	7.5 YR 5/6 Bright reddish brown
Texture	Sand loam	Sand loam	Clayey	Clayey	Clayey
Structure	Single-grained	Single-grained	Power	Powder	Wall
Hardness (using Yamaneka method)	(14) A little hard	(14) A little hard	(22) Very hard	(22) Very hard	(24) Very hard
Moisture	70 %	70 %	68 %	55 %	52 %
Acidity (pH)	5.5	5.5	5.8	6.4	6.6
Others	KC-type soil test (FHK) <ul style="list-style-type: none"> ○ Contains a little usable phosphoric acid (0.1 mg per 100 g) ○ High phosphoric acid sorbency (2,000) ○ Lacks substitutable lime (under 50 mg per 100 g) ○ Abunds in substitutable magnesia (50 mg per 100 g) ○ Iron: Fe³⁺ abundant, Fe²⁺ scarce 				

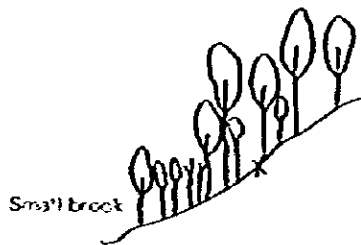


Location : Sosop
 Altitude : 50 m
 Slope : 5° to north
 Planted tree : Shrubbery, 2nd natural forest
 Average tree height : 5 - 8 m
 Average DBH : 3 - 5 cm
 Date of survey : Feb. 26, '84

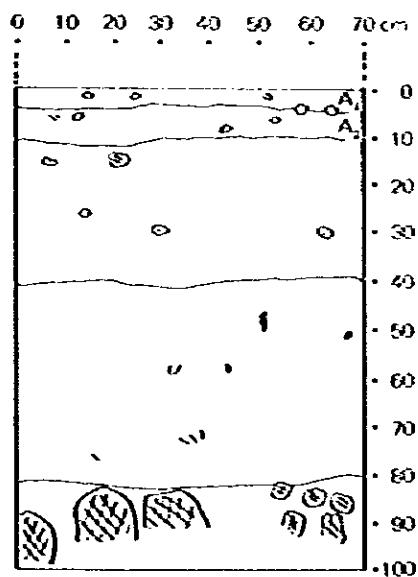
SOIL PROFILE No. 10

Record of soil profile

	A				
Horizon	A ₁	A ₂	B ₁	B ₂	C
Thickness (cm)	4	6	30	40	over 10
Color	10 YR 3/2 Brownish black	10 YR 5/4 Dull yellowish brown	10 YR 6/6 Bright yellowish brown	10 YR 6/8 Bright yellowish brown	10 YR 7/8 Yellowish orange
Texture	Loam	Sand loam	Sandy	Clayey	Clayey
Structure	Large grain	Single grained	Single grained	Powder	Powder
Hardness (using Yamanka method)	(10) Soft	(16) A little hard	(16) A little hard	(18) Hard	(18) Hard
Moisture	52%	58%	58%	30%	30%
Acidity (pH)	6.0	6.0	6.2	6.6	6.6
Others	: KC type soil test (FHK) ○ Contains a little usable phosphoric acid (0.1 mg per 100 g) ○ High phosphoric acid absorberency (2,000) ○ Lacks substitutable lime (under 50 mg per 100 g) ○ Contains a little substitutable magnesia (5 mg per 100 g) ○ Iron: Fe ³⁺ scarce, Fe ²⁺ abundant				



Small brook

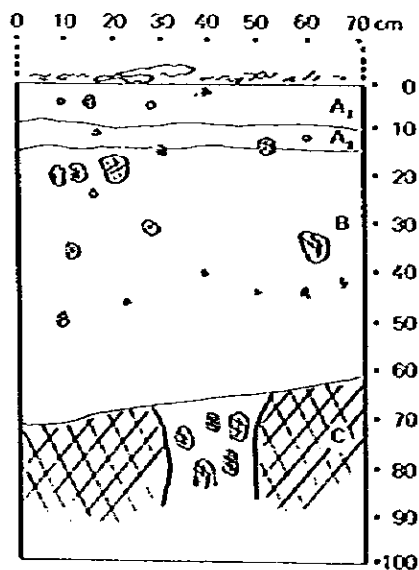


Location : Sasop
 Altitude : 50 m
 Slope : 20° to SW
 Planted tree : National forest cut for the
 2nd time in Oct., '83
 Date of planting :
 Average tree height :
 Average DBH :
 Date of survey : Feb. 26, '84

SOIL PROFILE No. 11

Record of soil profile

	A			
Horizon	A ₁	A ₂	B	C
Thickness (cm)	10	5	45	30
Color	7.5 YR 5/1 Brownish gray	7.5 YR 6/2 Grayish brown	7.5 YR 6/4 Dull orange	7.5 YR 5/4 Dull brown
Texture	Clayey loam	Clayey loam	Loam	Clayey
Structure	Large grain	Single- grained	Powder	Well
Hardness (using Yamanaka method)	(10) Soft	(16) Somewhat hard	(18) Hard	(20) Hard
Moisture	70 %	55 %	50 %	50 %
Acidity (pH)	5.8	6.2	6.2	6.2
Others	KC-type soil test (FHK) <ul style="list-style-type: none"> ○ Contains a little usable phosphoric acid (0.1 mg per 100 g) ○ High phosphoric acid absorbency (2,000) ○ Lacks substitutable lime (under 50 mg per 100 g) ○ Contains very little substitutable magnesia (5 mg per 100 g) ○ Iron: Fe²⁺ not abundant, Fe³⁺ scarce 			

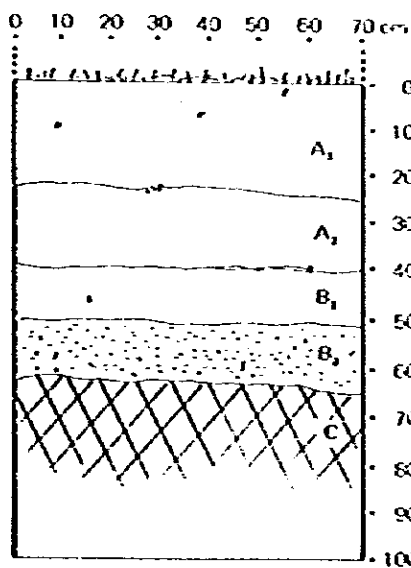
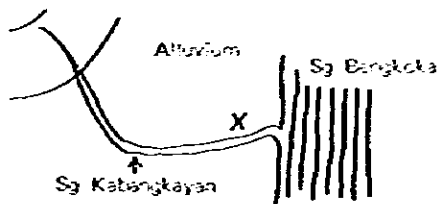


Location : Kobon
 Altitude : 50 m
 Slope : 25° to NNE
 Planted tree : 2nd natural forest
 Date of planting :
 Average tree height :
 Average DBH :
 Date of survey : Feb. 27, '84

SOIL PROFILE No. 12

Record of soil profile

		A				
Horizon	:	A ₁	A ₂	B ₁	B ₂	C
Thickness (cm)	:	25	15	12	14	14
Color	:	10 YR 4/1 Brownish gray	10 YR 4/1 Grayish yellow brown	7.5 YR 5/9 Dull brown	7.5 YR 7/1 Light brownish gray	5 YR 5/6 Bright reddish brown
Texture	:	Loam	Loam	Sandy	Clayey	Clayey
Structure	:	Large grain	Single-grained	Single-grained	Well	Notlike
Hardness (using Yamakata method)	:	(10) Soft	(12) Soft	(15) A little hard	(18) Hard	(16) A little hard
Moisture	:	78%	68%	56%	58%	60%
Acidity (pH)	:	5.3	6.2	6.2	6.4	5.5
Others	:	KC-type soil test (FHK) o Ph5.2: Use of calcium carbonate $200 \times 1 \times 1 + \frac{200}{1} = 4000 \text{ kg}$ o Contains a little usable phosphoric acid (0.1 mg per 100 g) o Lacks substitutable lime (under 50 mg per 100 g) o Contains a little substitutable magnesia (10 mg per 100 g) o Iron: Fe ²⁺ source, Fe ³⁺ source				

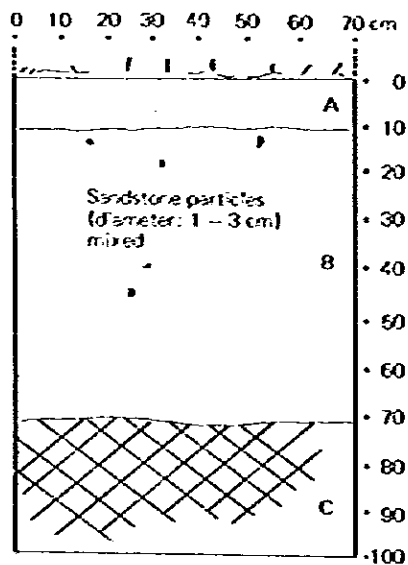
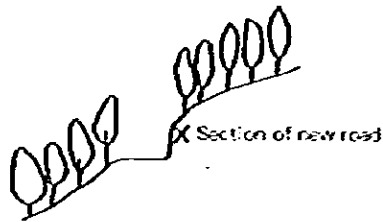


Location : Kobon
 Altitude : 30 m
 Slope : Plains
 Planted tree : Grassland (harvested)
 Date of planting :
 Average tree height :
 Average DSH :
 Date of survey : Feb. 27, '84

SOIL PROFILE No. 13

Record of soil profile

Horizon	: A	B	C
Thickness (cm)	: 10	60	30
Color	: 2.5 YR 4/6 Reddish brown	3/6 Dark reddish brown	3/6 Dark reddish
Texture	: Clayey loam	Clayey	Soft rock
Structure	: Large grain	Nutlike	Nutlike
Hardness (using Yamamoto method)	: (5) Low	(17) A little hard	(20) Hard
Moisture	: 68%	65%	64%
Acidity (pH)	: 5.8	5.8	6.0
Others	: KC-type soil test (FHK)		
	o Contains a little usable phosphoric acid (0.1 mg per 100 g)		
	o High phosphoric acid absorbcency (2,000)		
	o Lacks substitutable lime (under 50 mg per 100 g)		
	o Contains a little substitutable magnesia (10 mg per 100 g)		
	o Iron: Fe ³⁺ abundant, Fe ²⁺ scarce		

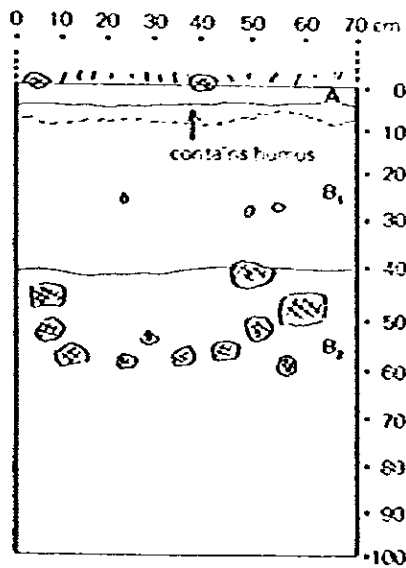
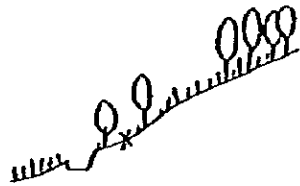


Location	: Lokomdara
Altitude	: 30 m
Slope	: 5° to N
Planted tree	: Shrubby, 2nd natural forest
Date of planting	:
Average tree height	:
Average DBH	:
Date of survey	: Mar. 3, '84

SOIL PROFILE No. 14

Record of soil profile

Horizon	: A	B ₁	B ₂
Thickness (cm)	: 5	35	50
Color	: 7.5 YR 2/3 Very dark brown	4/6 Brown	6/6 Orange
Texture	: Clayey	Clayey	Clayey
Structure	: Large grain	Large grain	Well
Hardness (using Yamanaka method)	: (10) Soft	(12) Soft	(20) Hard
Moisture	: 80%	50%	40%
Acidity (pH)	: 5.2	6.2	6.6
Others	: KC-type soil test (FHK)		
	o Contains a little usable phosphoric acid (0.1 mg per 100 g)		
	o High phosphoric acid absorbency (2,000)		
	o Lacks substitutable lime (under 50 mg per 100 g)		
	o Abounds in substitutable magnesia (35 mg per 100 g)		
	o Iron: Fe ²⁺ scarce, Fe ³⁺ scarce		

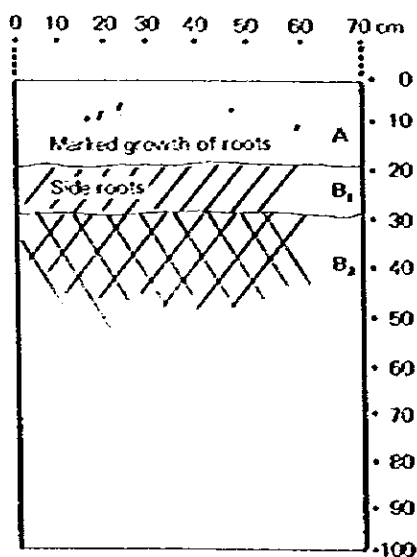
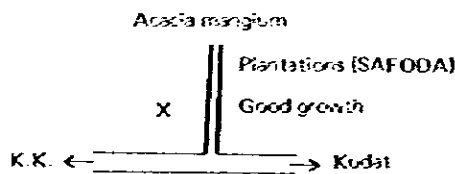


Location	: Rukomuna
Altitude	: 40 m
Slope	: 5° to N
Planted tree	: Glassland, several shrubberies
Date of planting	:
Average tree height	:
Average DBH	:
Date of survey	: Mar. 3, '84

SOIL PROFILE No. 15

Record of soil profile

Horizon	: A	B ₁	B ₂
Thickness (cm)	: 20	10	30
Color	: 7.5 YR 4/3 Brown	7.5 YR 6/6 Orange	7.5 YR 5/6 Bright brown
Texture	: Sand loam	Clayey	Clayey
Structure	: Large grain	Powder	Powder
Hardness (using Yamanaka method)	: (10-17) Soft- a little hard	(21) Hard	(22) Very hard
Moisture	: 50%	50%	50%
Acidity (pH)	: 6.0	6.8	6.8
Others	: KC-type soil test (FHK)		
	o Contains usable phosphoric acid (low) (0.1 mg per 100 g)		
	o High phosphoric acid absorbcency (1,500)		
	o Lacks substitutable lime (under 50 mg per 100 g)		
	o Contains substitutable magnesia (20 mg per 100 g)		
	o Iron: Fe ³⁺ very abundant, Fe ²⁺ scarce		



Location	: Langton
Altitude	: 40 m
Slope	: 0° - 1° on plains
Planted tree	: Acacia mangium
Date of planting	:
Average tree height	:
Average DBH	:
Date of survey	: Mar. 3 '84

5. Economic Analysis

5-1 Method to Determine the Contingency rate

5-1-1 Price Contingency (Domestic Portion)

The domestic portion of price contingencies is usually determined from the wholesale price indexes of the country concerned. In the case of Malaysia, however, because wholesale price statistics were not available, consumer price index figures were substituted. As shown in "International Financial Statistics" published by the International Monetary Fund, consumer price indexes (1980 = 100) of Malaysia are as follows:

1981 109.7 (9.7% increase over the previous year)

1982 116.1 (5.8%)

1983 120.4 (3.7%)

Source: IMF-IFS May 1984

The average growth rate for the past three years was 6.3 percent. For calculations a round figure (6 percent) is used.

5-1-2 Price Contingency (Foreign Portion)

The foreign portion of price contingencies is calculated using the wholesale and consumer price indexes of the past three years in five industrialized nations (Japan, the United States, Great Britain, Federal Republic of Germany and France).

Using the weights in these tables, the consumer price index rose by 6.4% and the wholesale price index by 4.8 percent. The average for these two figures was taken as 6%.

5-1-3 Physical Contingencies

Physical contingencies were projected at 10 percent. At the time of the feasibility

Table 5-1 Price Indexes of Five Industrialized Nations

Consumer Price

	Weight	1980	1981	1982	1983
U.S.	42.4	100.0	110.4	117.1	120.9
Japan	13.2	100.0	104.9	107.7	109.7
France	7.4	100.0	113.4	126.8	139.0
W. Germany	7.8	100.0	105.9	111.5	114.9
Great Britain	6.1	100.0	111.9	121.5	127.1
	76.9	100.0	109.4	116.2	120.6

Annual average 6.4%

Producer Prices

	Weight	1980	1981	1982	1983
U.S.	30.7	100.0	109.3	113.7	115.6
Japan	16.5	100.0	101.1	101.6	100.8
France	8.9	100.0	113.4	123.4	137.0
W. Germany	14.1	100.0	106.0	111.1	112.8
Great Britain	6.1	100.0	109.5	118.0	124.5
	76.3	100.0	107.4	112.1	115.1

Annual average 4.8%

Source: OECD "Main Economic Indicators" March 1982

study, the possibility of incurring additional costs during the project must be taken into consideration.

5-1-4 Exchange Rate

The exchange rate was calculated at US\$1 = M\$2.3, on the basis of recent exchange rates. For reference, the recent shifts in the exchange rates of the Malaysian ringgit are shown below.

Table 5-2 Malaysian Ringgit per U.S. dollar (Period Average)

Yearly Average		Monthly Average		
			1983	1984
1980	2.1769	Jan.	2.2831	2.3411
1981	2.3041	Feb.	2.2766	2.3367
1982	2.3354	Mar.	2.2908	2.2951
1983	2.3213	Apr.	2.3069	2.2910
		May	2.3009	2.3044
		Jun.	2.3260	2.3109
		Jul.	2.3342	
		Aug.	2.3534	
		Sept.	2.3521	
		Oct.	2.3454	
		Nov.	2.3454	
		Dec.	2.3412	

Source: IMF "International Financial Statistics"

Table 5-3 Comparison of Simulated Cases

	Standard Case										Safeco's Account					Settler Receive A Third of Profit			
	1984 Constant Price		Current Price		Outflow		Acum. Debt	Balance	Acum. Debt	Outflow At Current Prices	Balance	Acum. Debt	Outflow At Current Prices	Balance	Acum. Debt				
	Inflow	Outflow	Inflow	Outflow	Constant	Current													
																Debt.			
1	0.0	7840.3	0.0	8624.3	2185.6	2404.2	-2404.2	-2404.2	8624.3	-2404.2	-2404.2	8624.3	-2404.2	-8624.3	-8624.3				
2	746.5	4902.4	791.3	5716.2	3396.4	3660.2	-13549.2	-13549.2	5716.2	-3169.9	-5716.2	5716.2	-4924.9	-13549.2	-13549.2				
3	746.5	4533.4	838.8	5603.1	3937.4	4372.1	-18313.6	-18313.6	5603.1	-3533.3	-5603.1	5603.1	-4764.3	-18313.6	-18313.6				
4	746.5	4460.6	889.1	5843.9	3620.6	4743.9	-23268.4	-23268.4	5843.9	-3954.8	-5843.9	5843.9	-4954.8	-23268.4	-23268.4				
5	746.5	4825.2	942.4	6700.9	4090.2	5680.2	-29026.8	-29026.8	6700.9	-4737.7	-6700.9	6700.9	-5758.4	-29026.8	-29026.8				
6	746.5	4697.5	999.0	6782.5	4371.3	6414.4	-34810.3	-34810.3	6782.5	-5115.5	-6782.5	6782.5	-5783.5	-34810.3	-34810.3				
7	746.5	4674.4	1058.9	7293.3	4424.4	6903.7	-41045.2	-41045.2	7293.3	-5844.8	-7293.3	7293.3	-6234.9	-41045.2	-41045.2				
8	740.5	4216.4	1122.5	6973.9	3966.4	6973.9	-46896.6	-46896.6	6973.9	-5437.9	-6973.9	6973.9	-5851.4	-46896.6	-46896.6				
9	1187.5	4511.4	1892.7	7919.5	4011.4	7454.9	-58820.7	-58820.7	7919.5	-5913.2	-7919.5	7919.5	-5913.2	-58820.7	-58820.7				
10	1187.5	4261.4	2006.3	9656.6	4652.0	9164.1	-66396.7	-66396.7	9656.6	-7037.5	-9656.6	9656.6	-7530.0	-66396.7	-66396.7				
11	1187.5	4902.0	2126.6	9656.6	4652.0	9164.1	-66396.7	-66396.7	9656.6	-7037.5	-9656.6	9656.6	-7530.0	-66396.7	-66396.7				
12	2442.1	4759.9	2254.2	9656.6	4652.0	9164.1	-66396.7	-66396.7	9656.6	-7037.5	-9656.6	9656.6	-7530.0	-66396.7	-66396.7				
13	2442.1	4621.3	4914.0	10228.9	4371.3	9675.5	-79356.6	-79356.6	10228.9	-4761.5	-10228.9	10228.9	-5314.9	-79356.6	-79356.6				
14	2442.1	4380.3	5208.8	10277.2	4221.3	9690.6	-84424.9	-84424.9	10277.2	-4481.8	-10277.2	10277.2	-5068.3	-84424.9	-84424.9				
15	2442.1	4471.3	5521.4	11201.1	4221.3	10498.3	-90023.7	-90023.7	11201.1	-4977.0	-11201.1	11201.1	-5598.7	-90023.7	-90023.7				
16	2442.1	4579.4	5852.6	12072.3	4329.4	11413.2	-96243.3	-96243.3	12072.3	-5560.6	-12072.3	12072.3	-6219.6	-96243.3	-96243.3				
17	10875.6	3834.3	27627.8	10994.0	3684.3	10285.4	-108909.4	-108909.4	10994.0	17332.5	-62072.7	16538.6	-1089.3	-108909.4	-108909.4				
18	10875.6	3200.3	29285.5	9479.4	2950.3	8738.9	-115266.1	-115266.1	9479.4	20646.6	-41526.1	16081.5	-13204.0	-115266.1	-115266.1				
19	10875.6	3300.3	31042.6	10862.2	3950.3	9577.2	-122224.1	-122224.1	10862.2	21465.4	-20060.7	17255.7	-13787.0	-122224.1	-122224.1				
20	10875.6	3209.3	32990.5	10681.1	2959.3	9849.9	-128876.3	-128876.3	10681.1	23956.2	-2995.5	18089.1	-43346.9	-128876.3	-128876.3				
21	10875.6	8746.7	34879.5	30857.0	4041.8	14258.9	-135399.1	-135399.1	30857.0	20620.7	23616.1	32197.9	-2681.7	-135399.1	-135399.1				
22	10875.6	4341.3	36972.3	16234.4	3431.3	13831.4	-142859.5	-142859.5	16234.4	24140.9	47757.0	23147.0	13825.3	-142859.5	-142859.5				
23	10875.6	3804.3	39190.6	15079.8	3959.3	12126.7	-149866.6	-149866.6	15079.8	27063.9	74820.9	20404.5	16073.9	-149866.6	-149866.6				
24	10875.6	3695.3	41542.1	15226.6	26015.4	12386.6	-157397.9	-157397.9	15226.6	29145.7	103966.6	24198.4	17343.6	-157397.9	-157397.9				
25	10875.6	3949.3	44084.6	17589.5	26445.1	14371.4	-165003.4	-165003.4	17589.5	27663.2	133729.8	26404.5	17630.1	-165003.4	-165003.4				
26	10875.6	3717.5	46676.7	17590.5	29126.1	13359.1	-172594.7	-172594.7	17590.5	30306.4	164036.2	27239.2	19417.4	-172594.7	-172594.7				
27	10875.6	3775.3	49477.3	18882.8	30584.4	144143.5	-180133.2	-180133.2	18882.8	31835.5	195871.7	29089.6	20389.6	-180133.2	-180133.2				
28	10875.6	3200.3	52443.9	16976.2	35499.6	179613.2	-187922.6	-187922.6	16976.2	36795.8	232667.5	28799.5	23646.4	-187922.6	-187922.6				
29	10875.6	3459.3	55922.6	19451.1	36141.5	157594.7	-195794.7	-195794.7	19451.1	37547.2	270214.7	31488.3	24094.3	-195794.7	-195794.7				
30	10875.6	3200.3	59074.5	19074.5	39853.7	17584.4	-203408.3	-203408.3	19074.5	41343.7	311598.4	32359.1	26569.1	-203408.3	-203408.3				
31	10875.6	3808.5	62463.9	24081.5	38482.4	294010.7	-211399.1	-211399.1	24081.5	39981.9	351540.3	36862.3	25601.6	-211399.1	-211399.1				
32	10875.6	60211.7	24673.4	41538.3	335549.0	34343.3	-219218.0	-219218.0	41538.3	42121.5	394752.8	38519.5	30461.1	-219218.0	-219218.0				
33	10875.6	3450.3	70184.4	24492.7	45691.7	381240.7	-227180.0	-227180.0	24492.7	47466.4	442219.2	39723.3	37822.2	-227180.0	-227180.0				
34	10875.6	3200.3	74395.5	24081.1	50314.4	431355.1	-235000.0	-235000.0	24081.1	52195.5	494414.7	40852.6	33542.9	-235000.0	-235000.0				
35	10875.6	3369.3	78850.2	26395.4	52463.8	484018.9	-244011.4	-244011.4	26395.4	54457.9	548872.6	43883.3	34975.9	-244011.4	-244011.4				
36	10875.6	3708.5	82500.8	31354.2	52236.5	536255.5	-252406.6	-252406.6	31354.2	54350.2	603222.8	48766.2	34924.4	-252406.6	-252406.6				
37	10875.6	3825.3	86066.2	35178.4	53427.8	589883.3	-261753.9	-261753.9	35178.4	55668.3	658891.1	52987.7	35618.5	-261753.9	-261753.9				
38	10875.6	3209.3	93922.6	30487.4	63435.2	653118.3	-271254.5	-271254.5	30487.4	68810.2	742701.2	51632.4	42290.2	-271254.5	-271254.5				
39	10875.6	3300.3	99557.9	32232.0	66325.0	719443.5	-28112.4	-28112.4	32232.0	69342.4	793543.6	55341.3	44216.7	-28112.4	-28112.4				
40	10875.6	3200.3	105311.4	34159.5	71371.9	790815.4	-29050.3	-29050.3	34159.5	74040.3	867584.0	57950.2	47581.3	-29050.3	-29050.3				
41	10875.6	8755.7	111863.3	90064.5	71798.8	803614.2	-300114.2	-300114.2	90064.5	66031.4	936151.4	103330.7	8332.5	-300114.2	-300114.2				
42	10875.6	4341.3	118575.1	52065.8	66599.3	870123.5	-31152.1	-31152.1	52065.8	74230.0	1011038.4	74235.6	44339.5	-31152.1	-31152.1				
43	10875.6	3704.3	125899.6	49917.3	83133.7	1030878.1	-32777.6	-32777.6	49917.3	86912.0	1097950.4	76062.3	51677.3	-32777.6	-32777.6				
44	10875.6	3949.3	141224.8	56411.9	84812.9	1115691.1	-33776.6	-33776.6	56411.9	93352.9	1191303.3	77688.5	5542.5	-33776.6	-33776.6				
45	10875.6	3708.5	149098.3	56150.6	93347.7	1209238.7	-3458.5	-3458.5	56150.6	99454.5	1286757.8	84632.9	56542.0	-3458.5	-3458.5				
46	10875.6	3784.3	158690.2	60736.2	97944.0	1307182.7	-3593.4	-3593.4	60736.2	101956.4	1604056.2	93364.2	711712.9	-3593.4	-3593.4				
47	10875.6	3200.3	168201.0	54445.1	113755.9	1420388.6	-3950.3	-3950.3	54445.1	118006.0	1604056.2	92363.7	75837.3	-3950.3	-3950.3				
48	10875.6	3450.3	178233.1	62220.1	116073.0	1537011.6	-3200.3	-3200.3	62220.1	120581.3	1724637.4	100911.1	77382.0	-3200.3	-3200.3				
49	10875.6	3209.3	188990.6	61346.5	127644.1	1664655.7	-3295.3	-3295.3	61346.5	132422.9	1857060.3	103894.6	85096.1	-3295.3	-3295.3				
50	389514.3	208776.0	2914790.0	1250134.4	1664655.7	174594.5	105729.7	1857060.3	1250134.4	105729.7	1857060.3	1250134.4	105729.7	1857060.3	105729.7				
Total																			

Table 5-3 Comparison of Simulated Cases (Cont'd)

	Cost +5%			Cost +10%			Income -5%			Accumulated Debt/Surplus
	Outflow Const. Price	Outflow Current Price	Balance	Outflow Const. Price	Outflow Current Price	Balance	Inflow Const. Price	Inflow Current Price	Balance	
1	8232.3	9055.5	-9055.5	8524.3	9486.8	-9486.8	0.0	0.0	-8524.3	-8524.3
2	5147.5	6002.0	-5210.7	5324.6	6287.8	-5496.5	709.2	751.7	-4964.5	-13558.8
3	4760.1	5883.3	-5044.5	4986.7	5163.4	-5324.6	709.2	796.8	-4964.5	-18395.1
4	4683.6	6136.1	-5247.0	4906.7	5387.0	-5457.2	709.2	844.6	-4993.3	-23344.3
5	5066.5	7035.9	-6093.5	5307.7	7371.0	-6428.5	709.2	895.3	-5805.6	-29199.9
6	4837.9	7121.6	-6122.6	5088.3	7460.7	-6481.7	709.2	949.0	-5833.4	-35033.3
7	4908.1	7588.5	-6599.6	4834.4	8023.2	-6964.3	709.2	1006.0	-6237.9	-41321.1
8	4737.0	7322.6	-6200.1	4638.0	7671.3	-6543.8	709.2	1066.3	-5907.6	-47238.7
9	4474.5	8305.0	-8305.0	4687.5	8700.5	-6807.8	1128.1	1798.1	-6111.5	-53340.2
10	5147.1	8315.5	-8300.2	5392.2	8711.4	-6705.2	1128.1	1905.9	-6013.6	-59553.7
11	4997.9	10139.4	-8182.0	5235.9	10833.2	-7425.9	2320.0	2020.3	-7797.8	-66990.0
12	4252.4	10740.2	-8182.0	5083.4	11304.0	-7425.9	2320.0	2141.5	-7636.3	-74737.8
13	4599.3	10791.0	-5582.2	4818.3	11251.7	-6337.8	2320.0	2202.3	-5560.6	-80348.4
14	4604.9	11676.1	-6154.7	4918.4	12232.1	-6710.8	2320.0	2468.3	-5378.8	-85677.2
15	4808.4	12675.9	-6823.3	5037.3	13279.5	-7426.9	10331.8	2524.6	-5874.8	-91552.0
16	4584.4	11543.7	-6684.2	4327.7	12093.3	-15334.5	10331.8	2624.6	-6512.3	-98064.2
17	3260.3	9952.4	-6740.1	3520.3	10427.4	-1885.1	10331.8	2782.1	-8281.7	-106469.9
18	3465.3	10880.3	-7267.8	3630.3	11398.4	-1964.2	10331.8	2949.0	-8541.6	-115341.6
19	3869.8	11215.1	-7507.7	3530.2	11749.2	-21156.0	10331.8	31259.9	-20578.9	-124762.7
20	3984.1	12399.9	-8201.6	3621.4	13042.7	-936.8	10331.8	33135.5	-2278.5	-133644.2
21	4584.4	17046.1	-10926.2	4775.4	17857.8	-1914.5	10331.8	35123.7	-18889.3	-142594.9
22	3994.5	15833.8	-23356.8	4184.7	16587.8	-3201.6	10331.8	37231.1	-18556.3	-151151.7
23	3880.1	16302.0	-25239.1	4084.8	17079.3	-24462.8	10331.8	38463.0	-23983.3	-160494.6
24	4146.8	18469.0	-25505.6	4344.2	19348.4	-24656.1	10331.8	41832.9	-24243.4	-167358.0
25	3902.4	18428.1	-28248.6	4080.3	19305.0	-27371.1	10331.8	44342.5	-26792.3	-173540.3
26	3994.1	19837.4	-29639.8	4152.8	19305.0	-28095.2	10331.8	47003.4	-28110.6	-180446.8
27	3360.3	17825.1	-34620.8	3805.2	18673.9	-28095.2	10331.8	49825.6	-32847.3	-187950.1
28	3522.3	20423.7	-35168.9	3520.3	21396.2	-34196.4	10331.8	52913.0	-33361.9	-194757.4
29	3508.9	20028.2	-38900.0	3520.3	20682.0	-37946.2	10331.8	55981.8	-35279.2	-200036.6
30	3508.9	25264.6	-37193.3	4188.4	26467.0	-35996.3	10331.8	59340.7	-38227.7	-208264.3
31	3869.8	25907.1	-40304.6	4052.7	27140.8	-39071.0	10331.8	62901.1	-42132.5	-216446.8
32	3869.8	25717.4	-44467.1	3795.3	26942.0	-45242.4	10331.8	66675.2	-46684.6	-224704.4
33	3360.3	25285.2	-49110.3	3520.3	28489.2	-47906.2	10331.8	70675.7	-48520.9	-233562.2
34	3474.8	27715.2	-51144.1	4070.4	29064.9	-49824.3	10331.8	74916.3	-48057.0	-242446.8
35	3869.8	32921.9	-50668.8	4317.8	34489.6	-49101.1	10331.8	79411.2	-48987.5	-251316.7
36	4121.6	36937.3	-51698.9	4070.4	38696.3	-49009.0	10331.8	84175.9	-502816.7	-260366.6
37	3360.3	37011.7	-51910.9	3530.2	35336.1	-60386.5	10331.8	89226.5	-53279.2	-269306.6
38	3465.3	24894.0	-64663.3	3630.3	36596.2	-63001.7	10331.8	94580.0	-56134.7	-278264.3
39	3508.9	35867.5	-68663.9	3520.3	37575.5	-67955.9	10331.8	100254.8	-60095.3	-287199.9
40	4121.6	104017.7	-7845.6	9531.3	108970.9	-2892.4	10331.8	106270.1	-72051.7	-296036.9
41	4584.4	54569.1	-63906.0	4775.4	108970.9	-61302.7	10331.8	112646.5	-60580.5	-304964.8
42	3869.8	50661.0	-75028.5	4174.8	53073.5	-72616.1	10331.8	119405.1	-65774.0	-314446.8
43	3869.8	52413.1	-80817.8	4074.7	54909.0	-78322.0	10331.8	126969.4	-76652.1	-323964.8
44	4148.8	56232.5	-81992.3	4344.2	60953.1	-79171.7	10331.8	134163.6	-77751.7	-333446.8
45	3869.8	58956.2	-90740.1	4070.4	67657.7	-87332.6	10331.8	142213.4	-86032.8	-342964.8
46	3973.5	63773.0	-94907.2	4162.7	68909.0	-91870.4	10331.8	150746.2	-90010.0	-352446.8
47	3360.3	57107.3	-110333.7	3520.3	59889.0	-108311.4	10331.8	159790.9	-105345.9	-361964.8
48	3622.8	64413.9	-124576.3	3705.3	69442.1	-109851.0	10331.8	169378.4	-107158.3	-371446.8
49	3309.8	131264.1	-1602149.0	229653.6	1375147.8	-1539642.2	37038.6	2769050.5	-1518916.2	-1518916.2
Total										

Table 5-3 Comparison of Simulated Cases (Cont'd)

	Inflow Const. Price	Income - 10%		Balance	Accumulated Debt/Surplus
		Inflow Current Price			
1	0.0	0.0		-8624.3	-8624.3
2	671.9	712.2		-5004.0	-13628.4
3	671.9	754.9		-4848.2	-18476.6
4	671.9	800.2		-5043.7	-23520.3
5	671.9	848.2		-5852.7	-29373.0
6	671.9	899.1		-5883.4	-35256.4
7	671.9	953.0		-6340.8	-41597.1
8	671.9	1010.2		-5963.7	-47560.8
9	1068.8	1703.4		-6206.1	-53766.9
10	1068.8	1805.6		-6113.9	-59880.8
11	1068.8	1914.0		-7742.6	-67623.4
12	1068.8	2028.8		-7910.3	-75533.9
13	2197.9	4422.0		-5806.8	-81340.2
14	2197.9	4687.9		-5589.2	-86929.4
15	2197.9	4969.2		-6150.9	-93080.3
16	2197.9	5267.4		-6804.9	-99885.2
17	9788.0	24865.1		13871.1	-86014.1
18	9788.0	26357.0		16877.5	-69136.5
19	9788.0	27938.4		17576.2	-51560.4
20	9788.0	29614.7		18933.6	-32626.7
21	9788.0	31391.6		534.5	-32092.2
22	9788.0	33275.1		17040.7	-15051.5
23	9788.0	35271.6		20191.7	5140.2
24	9788.0	37387.9		21861.2	27001.4
25	9788.0	39631.1		22041.6	49043.1
26	9788.0	42009.0		24458.5	73501.5
27	9788.0	44529.5		25636.7	99138.2
28	9788.0	47201.3		30225.1	129363.3
29	9788.0	50033.4		30582.2	159945.5
30	9788.0	53033.4		33960.9	193906.4
31	9788.0	56217.5		32156.0	226062.4
32	9788.0	59590.5		34917.1	260979.5
33	9788.0	63166.0		38673.3	299652.8
34	9788.0	66955.9		42874.8	342527.6
35	9788.0	70973.3		44577.9	387105.5
36	9788.0	75231.7		43877.5	430983.0
37	9788.0	79745.6		44567.2	475550.1
38	9788.0	84530.3		54043.0	529593.1
39	9788.0	89602.1		56369.2	585962.3
40	9788.0	94978.3		60818.7	646781.1
41	9788.0	100677.0		1612.5	648393.5
42	9788.0	106717.6		54651.8	703045.3
43	9788.0	113120.6		64872.0	767917.3
44	9788.0	119907.8		69990.6	837907.9
45	9788.0	127102.3		70690.5	908598.4
46	9788.0	134728.5		78577.8	987176.2
47	9788.0	142812.2		82076.0	1069252.2
48	9788.0	151380.9		96935.8	1166188.0
49	9788.0	160463.8		98243.7	1264431.6
50	9788.0	170091.6		108745.0	1373176.7
Total	350562.9	2623311.0		1373176.7	

Table 5-4 Input Information - Forest Road

Seq.	Item	Unit	Unit Cost	For. Exeg	No.	Total
1	1. Construction Cost					
2	Forest Roads	KM	70,000	0.500	101	
3	Forest Tracks	KM	10,000	0.500	102	
4	Total Construction Cost				103	101 102
5						
6	2. Maintenance & Operation					
7	Vehicle Purchase					
8	Motor Grader	NO.	230,000	1,000	104	
9	Front Loader	NO.	150,000	1,000	105	
10	Quip Truck	NO.	75,000	1,000	106	
11	Bulldozer	NO.	270,000	1,000	107	
12	Total Vehicle Purchase				108	104 105 106 107
13						
14	Vehicle O & M					
15	Motor Grader	NO.	48,000	1,000	110	
16	Front Loader	NO.	54,000	1,000	111	
17	Dump Truck	NO.	34,000	1,000	112	
18	Bulldozer	NO.	90,000	1,000	113	
19	Total Vehicle Maintenance				114	110 111 112 113
20						
21	Other Purchase	Lump Sum	25,000	1,000	115	
22						
23	Laborers					
24	Supervisors	NO.	4,320	0.0	116	
25	Laborers	NO.	3,840	0.0	117	
26	Operators	NO.	4,320	0.0	118	
27	Total Labor Cost				119	116 117 118
28						
29	Total Maintenance Cost				120	108 114 115 119
30						
31	Investment Cost				121	103 108 115
32	Recurrent Cost				122	114 119
33	Total Forest Road				123	103 120

Table 5-5 Input Information - Nursery

Slid.	Item	Unit	Unit Cost	For. Exco	No.	Total
34	1. Investment Cost					
35	Buildings					
36	Land Clearing					
37	Watering Facilities					
38	Nursery Equipments (1)					
39	Buildings etc. (2)					
40	Total Buildings					
41						
42	Vehicle Purchase					
43	Truck					
44	Wagon (4WD)					
45	Tractor					
46	Total Vehicle Purchase					
47						
48	Investment Cost					
49						
50	2. Maintenance Cost					
51						
52	3. Operation Cost					
53						
54	Laborers I					
55	Laborers II					
56	Casual Workers					
57	Total Labor Cost					
58						
59	Materials					
60	Recurrent Cost					
61						
62	Total Nursery					
		Lump Sum	6.032	0.200	201	203
		Lump Sum	10.301	1.000	202	204
			8.141	0.200	203	
			220.000	0.300	204	
					205	202
					206	207
		NO.	50.000	1.000	206	208
		NO.	35.000	1.000	207	
		NO.	25.000	1.000	208	
					209	207
					210	209
		Lump Sum	39.600	0.300	211	
		Man-Day	0.018	0.0	212	
		Man-Day	0.016	0.0	213	
		Man-Day	0.016	0.0	214	
					215	213
		1000	0.015	1.000	216	214
					217	215
					218	216
					219	217

(1) Sowing beds, potted seedling beds, shading facilities

(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-6 Input Information - Afforestation Work

Seq.	Item	Unit	Unit Cost	For. Excg	No.	Total
63	1. Investment Cost	Lump Sum	103,000	0.300	301	
64	Buildings (1)					
65	Vehicle Purchase	NO.	50,000	1,000	302	
66	Truck	NO.	35,000	1,000	303	
67	Tractor	NO.	35,000	1,000	304	
68	Wagon (4WD)					
69	Vehicle Total				305	302 303 304
70					306	
71	Equipments	Lump Sum	20,000	1,000		
72						
73	Investment Cost				307	301 305 306
74						
75	2. O & M Cost	Lump Sum	10,300	0.200	308	
76	Buildings	Lump Sum	103,300	1,000	309	
77	Vehicles	HA	0,040	1,000	310	
78	Fertilizer					
79	Sub-Total				311	303 309 310
80						
81	3. Labor Cost	Man-Day	0,018	0.0	312	
82	Laborers I	Man-Day	0,016	0.0	313	
83	Laborers II	NO.	4,320	0.0	314	
84	Drivers					
85	Total Labor Cost				315	312 313 314
86						
87	Recurrent Cost				316	311 315
88						
89	Total Afforestation Work				320	307 316
90						
91	Charcoal Production Cost					
92						
93	Laborer for Pottery Work	Man-Day	0,018	0.0	351	
94	Laborer for Charcoal	Man-Day	0,018	0.0	352	
95	Total Labor Cost				353	351 352
96						
97	Materials	Ton	0,031	0.0	354	
98	Total Charcoal Production				355	353 354

(1) Office, warehouse, garage, workshops

Table 5-7 Input Information - Administration

Seq.	Item	Unit	Unit Cost	For Exec	No.	Total
99	1. Staff					
100	Technical Advisor	NO.	150,000	1,000	400	
101	Project Manager	NO.	50,000	0.0	401	
102	Senior Research Officer	NO.	45,000	0.0	402	
103	B Class Staff	NO.	35,000	0.0	403	
104	C Class Staff	NO.	30,000	0.0	404	
105	D Class Staff	NO.	25,000	0.0	405	
106	Typist	NO.	10,000	0.0	406	
107	Total Staff Salary				407	400 401 402 403 404 405 406
108						
109	2. Casual Workers for Adm.	NO.	3,840	0.0	408	
110						
111	3. Staff Hours					
112	For A Class Staff	NO.	100,000	0.300	409	
113	For B Class Staff	NO.	80,000	0.300	410	
114	For C Class Staff (1)	NO.	50,000	0.300	411	
115	For D Class Staff & Typist	NO.	30,000	0.300	412	
116	Total Staff Hours Const.				413	409 410 411 412
117	O & M of Staff Houses	Lump Sum	50,000	0.200	414	
118	Total Staff Houses				415	413 414
119						
120	4. Administration Facilities					
121	Land Clearing	Lump Sum	80,000	0.200	416	
122	Construction (2)	Lump Sum	250,000	0.300	417	
123	Equipments etc.	Lump Sum	40,000	0.0	418	
124	Sub-Total				419	416 417 418
125	O & M of Admin. Facilities		10,000	0.0	420	
126	Total Admin. Facilities				421	419 420
127						
128	5. Vehicle					
129	Purchase Wagon (4WD)	NO.	35,000	1,000	422	
130	Maintenance & Operation		80,000	1,000	423	
131	Total Vehicle Cost				424	422 423
132						
133	7. Fire Protection					
134	Watching Tower	NO.	2,000	0.300	425	
135	Equipment for Communication	NO.	5,000	1,000	426	
136	Motor Bike	NO.	3,000	1,000	427	
137	Total Equipment				428	425 426 427
138	Operation Cost	Lump Sum	2,700	1,000	429	
139	Labor Cost	NO.	3,840	0.0	430	
140	Total Fire Protection				431	428 429 430
141						
142	Investment Cost				431	400 413 419 422 428
143	Recurrent Cost				432	401 402 403 404 405 406 408 414 420 423 429 430
144	Total Administration				433	431 432

(1) Including 2 teacher's houses
(2) Office, garage, repair shop, shop, warehouse

Table 5-8 Input Information - Community Facilities

Seq.	Item	Unit	Unit Cost	For. Exec	No.	Total
145	1. Facilities					
146	Construction Cost					
147	Electricity	Lump Sum	500,000	0.800	501	
148	Water Supply	Lump Sum	900,000	0.500	502	
149	Drainage	Lump Sum	500,000	0.500	503	
150	Other Construction (1)	Lump Sum	400,000	0.300	504	
151					505	501 502 503 504
152	Sub-Total					
153	Maintenance & Operation					
154	Electricity		150,000	1.000	506	
155	Others		40,000	0.200	507	
156					508	506 507
157	Sub-Total					
158	Total Facilities				509	505 508
160	2. Settler's Houses					
161	Construction	NO.	15,000	0.300	510	
162	Road Around Houses	NO.	1,500	0.300	511	
163					512	
164	Maintenance	Lump Sum	60,000	0.200	513	
165					514	510 511 512
166	Total Settler Houses				514	505 510 511
167	Investment Cost				515	508 512
168	Recurrent Cost				516	514 515
169	Total Community Facilities					
170						

(1) Guest house, chapel & surau, school, clinic, playground

Table 5-9 Input Information - Ground Total

Seq.	Item	Unit	Unit Cost	For. Exec	No.	Total
171	Total Vehicle Purchase				1001	108 209 305 422 427
172	Total Payment to The Settlers				1002	119 215 315 353 408 430
174	Afforestation Portion				1003	123 218 320 355
175	Safoda				1004	433 1003
177	Total Investment Cost				1005	121 210 307 431 514
178	Total Recurrent Cost				1006	122 217 316 355 432 515
179	Grand Total				1500	123 218 320 355 433 516

Table 5-10 Detailed Cost Table - Value - Forest Road

	Unit Cost	Total	1	2	3	4	5	6	7	8
1. Construction Cost										
Forest Roads	70,000	3220.0	280.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
Forest Tracks	10,000	1350.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Construction Cost		4570.0	370.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0
2. Maintenance & Operation										
Vehicle Purchase										
Motor Grader	230,000	2300.0	0.0	0.0	0.0	0.0	0.0	230.0	0.0	0.0
Front Loader	150,000	1950.0	0.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Dump Truck	75,000	1875.0	0.0	0.0	75.0	0.0	75.0	0.0	75.0	0.0
Bulldozer	270,000	2700.0	0.0	0.0	0.0	0.0	0.0	270.0	0.0	0.0
Total Vehicle Purchase		8825.0	725.0	0.0	75.0	0.0	225.0	500.0	75.0	0.0
Vehicle O & M										
Motor Grader	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Dump Truck	34,000	3332.0	34.0	34.0	68.0	68.0	68.0	68.0	68.0	68.0
Bulldozer	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Maintenance		12932.0	226.0	226.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase	25,000	625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Labors										
Supervisors	4,320	799.2	8.6	8.6	8.6	8.6	8.6	13.0	13.0	13.0
Labors	3,840	3552.0	38.4	38.4	38.4	38.4	38.4	57.6	57.6	57.6
Operators	4,320	1071.4	17.3	17.3	21.6	21.6	21.6	21.6	21.6	21.6
Total Labor Cost		5422.4	64.3	64.3	68.6	68.6	68.6	92.2	92.2	92.2
Total Maintenance Cost		27804.5	1040.3	290.3	428.6	328.6	578.6	852.2	452.2	352.2
Investment Cost		14020.0	1120.0	300.0	400.0	300.0	550.0	900.0	400.0	300.0
Recurrent Cost		18354.5	290.3	290.3	328.6	328.6	328.6	352.2	352.2	352.2
Total Forest Road		32374.5	1410.3	590.3	728.6	628.6	878.6	1152.2	752.2	652.2
Foreign Exchange Portion		24687.0	1161.0	376.0	510.0	410.0	660.0	910.0	510.0	410.0

Table 5-11 Detailed Cost Table - Value - Forest Road

	Unit Cost	Total	9	10	11	12	13	14	15	16
1. Construction Cost										
Forest Roads	70,000	3220.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	0.0
Forest Tracks	10,000	1350.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	0.0
Total Construction Cost		4570.0	300.0	300.0	300.0	300.0	300.0	300.0	300.0	0.0
2. Maintenance & Operation										
Vehicle Purchase	230,000	2300.0	0.0	0.0	230.0	0.0	0.0	0.0	0.0	230.0
Motor Grader	150,000	1950.0	150.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Front Loader	1875.0	75.0	75.0	0.0	0.0	0.0	75.0	0.0	75.0	0.0
Dump Truck	270,000	2700.0	0.0	0.0	270.0	0.0	0.0	0.0	0.0	270.0
Bulldozer										
Total Vehicle Purchase		8825.0	225.0	0.0	575.0	0.0	225.0	0.0	75.0	500.0
Vehicle O & M										
Motor Grader	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Dump Truck	34,000	3332.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Bulldozer	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Maintenance		12332.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase	25,000	625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Laborers	4,320	799.2	13.0	13.0	17.3	17.3	17.3	17.3	17.3	17.3
Supervisors	3,940	3552.0	57.6	57.6	76.8	76.8	76.8	76.8	76.8	76.8
Operators	4,320	1071.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Total Labor Cost		5422.4	92.2	92.2	115.7	115.7	115.7	115.7	115.7	115.7
Total Maintenance Cost		27804.5	602.2	352.2	975.7	375.7	625.7	375.7	475.7	875.7
Investment Cost		14020.0	550.0	300.0	900.0	300.0	550.0	300.0	400.0	500.0
Recurrent Cost		18354.5	352.2	352.2	375.7	375.7	375.7	375.7	375.7	375.7
Total Forest Road		32374.5	902.2	652.2	1275.7	675.7	925.7	675.7	775.7	875.7
Foreign Exchange Portion		24667.0	660.0	410.0	1010.0	410.0	660.0	410.0	510.0	760.0

Table 5-12 Detailed Cost Table - Value - Forest Road

	Unit Cost	Total	17	18	19	20	21	22	23	24
1. Construction Cost										
Forest Roads	70,000	3320.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forest Tracks	10,000	1350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Construction Cost		4570.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Maintenance & Operation										
Vehicle Purchase	230,000	2300.0	0.0	0.0	0.0	0.0	250.0	0.0	0.0	0.0
Motor Grader	150,000	1500.0	150.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Front Loader	75,000	1875.0	75.0	0.0	75.0	0.0	75.0	0.0	75.0	0.0
Dump Truck	270,000	2700.0	0.0	0.0	0.0	0.0	270.0	0.0	0.0	0.0
Bulldozer										
Total Vehicle Purchase		8825.0	225.0	0.0	75.0	0.0	725.0	0.0	75.0	0.0
Vehicle O & M										
Motor Grader	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Dump Truck	34,000	3332.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Bulldozer	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Maintenance		12932.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase	25,000	625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Laborers	4,320	799.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Supervisors	3,840	3552.0	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8
Laborers Operators	4,320	1071.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Total Labor Cost		5422.4	115.7	115.7	115.7	115.7	115.7	115.7	115.7	115.7
Total Maintenance Cost		27804.5	925.7	375.7	475.7	375.7	1125.7	375.7	475.7	375.7
Investment Cost		14020.0	250.0	0.0	100.0	0.0	750.0	0.0	100.0	0.0
Recurrent Cost		18354.5	375.7	375.7	375.7	375.7	375.7	375.7	375.7	375.7
Total Forest Road		32374.5	625.7	375.7	475.7	375.7	1125.7	375.7	475.7	375.7
Foreign Exchange Portion		24667.0	510.0	260.0	360.0	260.0	1010.0	260.0	360.0	260.0

Table 5-13 Detailed Cost Table -- Value -- Forest Road

	Unit Cost	Total	25	26	27	28	29	30	31	32
1. Construction Cost										
Forest Roads	70,000	3220.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forest Trucks	10,000	1390.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Construction Cost		4670.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Maintenance & Operation										
Vehicle Purchase										
Motor Grader	230,000	2300.0	0.0	230.0	0.0	0.0	0.0	0.0	230.0	0.0
Front Loader	150,000	1500.0	150.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Dump Truck	75,000	1875.0	75.0	0.0	75.0	0.0	75.0	0.0	75.0	0.0
Bulldozer	270,000	2700.0	0.0	270.0	0.0	0.0	0.0	0.0	270.0	0.0
Total Vehicle Purchase		8825.0	225.0	500.0	75.0	0.0	225.0	0.0	575.0	0.0
Vehicle O & M										
Motor Grader	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Dump Truck	34,000	3332.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Bulldozer	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Maintenance		12932.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase										
Other Purchase	25,000	625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Laborers										
Supervision	4,320	799.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Laborers	3,840	3552.0	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8
Operators	4,320	1071.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Total Labor Cost		5422.4	115.7	115.7	115.7	115.7	115.7	115.7	115.7	115.7
Total Maintenance Cost		27804.5	625.7	875.7	475.7	375.7	625.7	375.7	975.7	375.7
Investment Cost										
Investment Cost		14020.0	250.0	500.0	100.0	0.0	250.0	0.0	600.0	0.0
Recurrent Cost		18254.5	375.7	375.7	375.7	375.7	375.7	375.7	375.7	375.7
Total Forest Road		32474.5	625.7	875.7	475.7	375.7	625.7	375.7	975.7	375.7
Foreign Exchange Portion		24667.0	510.0	780.0	360.0	260.0	510.0	260.0	860.0	260.0

Table 5-14 Detailed Cost Table - Value - Forest Road

	Unit Cost	Total	33	34	35	36	37	38	39	40
1. Construction Cost										
Forest Roads	70,000	3220.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forest Tracks	10,000	1350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Construction Cost		4570.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Maintenance & Operation										
Vehicle Purchase	230,000	2300.0	0.0	0.0	0.0	230.0	0.0	0.0	0.0	0.0
Motor Grader	150,000	1950.0	150.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Front Loader	75,000	1875.0	75.0	0.0	75.0	0.0	75.0	0.0	75.0	0.0
Dump Truck	270,000	2700.0	0.0	0.0	0.0	270.0	0.0	0.0	0.0	0.0
Bulldozer			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Vehicle Purchase		8825.0	225.0	0.0	75.0	500.0	225.0	0.0	75.0	0.0
Vehicle O & M	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Motor Grader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Front Loader	34,000	3332.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0	68.0
Dump Truck	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Bulldozer			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Vehicle Maintenance		12932.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase	25,000	625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Laborers	4,320	799.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Supervisors	3,840	3552.0	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8
Laborers	4,320	1071.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Operators			115.7	115.7	115.7	115.7	115.7	115.7	115.7	115.7
Total Labor Cost		5422.4	115.7	115.7	115.7	115.7	115.7	115.7	115.7	115.7
Total Maintenance Cost		27804.5	625.7	375.7	475.7	875.7	625.7	375.7	475.7	375.7
Investment Cost		14020.0	250.0	0.0	100.0	500.0	250.0	0.0	100.0	0.0
Recurrent Cost		18354.5	375.7	375.7	375.7	375.7	375.7	375.7	375.7	375.7
Total Forest Road		32374.5	625.7	375.7	475.7	875.7	625.7	375.7	475.7	375.7
Foreign Exchange Portion		24667.0	510.0	260.0	360.0	760.0	510.0	260.0	360.0	260.0

Table 5-15 Detailed Cost Table -- Value -- Forest Road

	Unit Cost	Total	41	42	43	44	45	46	47	48
1. Construction Cost										
Forest Roads	70,000	3220.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Forest Tracks	10,000	1350.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Construction Cost		4570.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2. Maintenance & Operation										
Vehicle Purchase										
Motor Grader	230,000	2300.0	230.0	0.0	0.0	0.0	0.0	230.0	0.0	0.0
Front Loader	150,000	1950.0	150.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Dump Truck	75,000	1875.0	75.0	0.0	75.0	0.0	75.0	0.0	75.0	0.0
Bulldozer	270,000	2700.0	270.0	0.0	0.0	0.0	0.0	270.0	0.0	0.0
Total Vehicle Purchase		8925.0	725.0	0.0	75.0	0.0	225.0	500.0	75.0	0.0
Vehicle O & M										
Motor Grader	48,000	2400.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0	54.0
Dump Truck	34,000	3332.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Bulldozer	90,000	4500.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Maintenance		12032.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0	260.0
Other Purchase		625.0	25.0	0.0	25.0	0.0	25.0	0.0	25.0	0.0
Laborers										
Supervisors	4,320	709.2	17.3	17.3	17.3	17.3	17.3	17.3	17.3	17.3
Laborers	3,840	9552.0	76.8	76.8	76.8	76.8	76.8	76.8	76.8	76.8
Operators	4,320	1071.4	21.6	21.6	21.6	21.6	21.6	21.6	21.6	21.6
Total Labor Cost		5422.4	115.7	115.7	115.7	115.7	115.7	115.7	115.7	115.7
Total Maintenance Cost		27804.5	1125.7	375.7	475.7	375.7	625.7	875.7	475.7	375.7
Investment Cost		14020.0	750.0	0.0	100.0	0.0	250.0	500.0	100.0	0.0
Recurrent Cost		18354.5	375.7	375.7	375.7	375.7	375.7	375.7	375.7	375.7
Total Forest Road		92374.5	1125.7	375.7	475.7	375.7	625.7	875.7	475.7	375.7
Foreign Exchange Portion		24667.0	1010.0	260.0	360.0	260.0	510.0	760.0	360.0	260.0

Table 5-16 Detailed Cost Table -- Value -- Forest Road

	Unit Cost	Total	49	50
1. Construction Cost				
Forest Roads	70,000	3220.0	0.0	0.0
Forest Tracks	10,000	1350.0	0.0	0.0
Total Construction Cost		4570.0	0.0	0.0
2. Maintenance & Operation				
Vehicle Purchase	230,000	2300.0	0.0	0.0
Motor Grader	150,000	1950.0	150.0	0.0
Front Loader	75,000	1875.0	75.0	0.0
Dump Truck	270,000	2700.0	0.0	0.0
Bulldozer				
Total Vehicle Purchase		9825.0	225.0	0.0
Vehicle O & M				
Motor Grader	48,000	2400.0	48.0	48.0
Front Loader	54,000	2700.0	54.0	54.0
Dump Truck	34,000	3320.0	68.0	68.0
Bulldozer	90,000	4500.0	90.0	90.0
Total Vehicle Maintenance		12920.0	260.0	260.0
Other Purchase	25,000	625.0	25.0	0.0
Labors				
Supervisors	4,320	799.2	17.3	17.3
Laborers	3,840	3552.0	76.8	76.8
Operators	4,320	1071.4	21.6	21.6
Total Labor Cost		5422.4	115.7	115.7
Total Maintenance Cost		27804.5	625.7	375.7
Investment Cost		14020.0	250.0	0.0
Recurent Cost		18354.5	375.7	375.7
Total Forest Road		32374.5	625.7	375.7
Foreign Exchange Portion		24667.0	510.0	260.0

Table 5--17 Detailed Cost Table -- Value -- Nursery

	Unit Cost	Total	1	2	3	4	5	6	7	8
1. Investment Cost										
Buildings	6,032	6,0	6,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Land Clearing	10,301	30,9	10,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Watering Facilities	8,141	81,4	8,1	0,0	0,0	0,0	0,0	8,1	0,0	0,0
Nursery Equipments (1)	220,000	650,0	220,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Buildings etc. (2)										
Total Buildings		778,3	244,5	0,0	0,0	0,0	0,0	8,1	0,0	0,0
Vehicle Purchase										
Truck	50,000	500,0	0,0	50,0	0,0	0,0	0,0	0,0	50,0	0,0
Wagon (4WD)	35,000	350,0	0,0	35,0	0,0	0,0	0,0	0,0	35,0	0,0
Tractor	25,000	250,0	0,0	25,0	0,0	0,0	0,0	0,0	25,0	0,0
Total Vehicle Purchase		1,100,0	0,0	110,0	0,0	0,0	0,0	0,0	110,0	0,0
Investment Cost										
		1,878,3	244,5	110,0	0,0	0,0	0,0	8,1	110,0	0,0
2. Maintenance Cost										
	30,000	1940,4	0,0	39,0	39,0	39,0	39,0	39,0	39,0	39,0
3. Operation Cost										
Laborers I	0,018	4637,4	0,0	47,8	95,6	95,6	95,6	95,6	95,6	95,6
Laborers II	0,016	5109,9	0,0	52,7	105,4	105,4	105,4	105,4	105,4	105,4
Casual Workers	0,016	64,0	1,3	1,3	1,3	1,3	1,3	1,3	1,3	1,3
Total Labor Cost		9811,1	1,3	101,8	202,3	202,3	202,3	202,3	202,3	202,3
Materials										
	0,015	666,2	0,0	0,9	13,7	13,7	13,7	13,7	13,7	13,7
Recurrent Cost										
		12417,8	1,3	148,2	255,6	255,6	255,6	255,6	255,6	255,6
Total Nursery										
		14200,2	245,8	258,2	255,6	255,6	255,6	263,7	365,6	255,6
Foreign Exchange Portion										
		2594,7	79,1	128,7	25,6	25,6	25,6	27,2	155,6	25,6

(1) Sowing beds, potted seedling beds, shading facilities

(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-18 Detailed Cost Table -- Value -- Nursery

	Unit Cost	Total	9	10	11	12	13	14	15	16
1. Investment Cost										
Buildings	6.032	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Clearing	10.301	30.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Watering Facilities	8.141	81.4	0.0	0.0	8.1	0.0	0.0	0.0	0.0	8.1
Nursery Equipments (1)		660.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings etc. (2)	220.000									
Total Buildings		778.3	0.0	0.0	8.1	0.0	0.0	0.0	0.0	8.1
Vehicle Purchase										
Truck	50.000	500.0	0.0	0.0	0.0	90.0	0.0	0.0	0.0	0.0
Wagon (4WD)	35.000	350.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0	0.0
Tractor	25.000	250.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0	0.0
Total Vehicle Purchase		1100.0	0.0	0.0	0.0	110.0	0.0	0.0	0.0	0.0
Investment Cost		1878.3	0.0	0.0	8.1	110.0	0.0	0.0	0.0	8.1
2. Maintenance Cost		39.600	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
3. Operation Cost		4637.4	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Laborers I	0.018	5109.9	105.4	105.4	105.4	105.4	105.4	105.4	105.4	105.4
Laborers II	0.016	64.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Casual Workers	0.015	9811.1	202.3	202.3	202.3	202.3	202.3	202.3	202.3	202.3
Total Labor Cost		666.2	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Materials		12417.8	255.6	255.6	255.6	255.6	255.6	255.6	255.6	255.6
Recurrent Cost		14296.2	255.6	255.6	263.7	365.6	255.6	255.6	255.6	263.7
Total Nursery		2594.7	25.6	25.6	27.2	135.6	25.6	25.6	25.6	27.2
Foreign Exchange Portion										

(1) Sowing beds, potted seeding beds, shading facilities
(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-19 Detailed Cost Table -- Value -- Nursery

	Unit Cost	Total	17	18	19	20	21	22	23	24
1. Investment Cost										
Buildings	6.032	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Clearing	10.301	30.9	0.0	0.0	0.0	0.0	10.3	0.0	0.0	0.0
Watering Facilities	8.141	81.4	0.0	0.0	0.0	0.0	8.1	0.0	0.0	0.0
Nursery Equipments (1)	220.000	660.0	0.0	0.0	0.0	0.0	220.0	0.0	0.0	0.0
Buildings etc. (2)										
Total Buildings		778.3	0.0	0.0	0.0	0.0	238.4	0.0	0.0	0.0
Vehicle Purchase										
Truck	50.000	500.0	50.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0
Wagon (4WD)	35.000	350.0	35.0	0.0	0.0	0.0	0.0	35.0	0.0	0.0
Tractor	25.000	250.0	25.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0
Total Vehicle Purchase		1100.0	110.0	0.0	0.0	0.0	0.0	110.0	0.0	0.0
Investment Cost		1878.3	110.0	0.0	0.0	0.0	238.4	110.0	0.0	0.0
2. Maintenance Cost	39.600	1940.4	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
3. Operation Cost										
Laborers I	0.018	4037.4	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Laborers II	0.016	5109.0	105.4	105.4	105.4	105.4	105.4	105.4	105.4	105.4
Casual Workers	0.016	64.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total Labor Cost		9811.1	202.3	202.3	202.3	202.3	202.3	202.3	202.3	202.3
Materials	0.015	666.2	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Recurrent Cost		12417.8	255.6	255.6	255.6	255.6	255.6	255.6	255.6	255.6
Total Nursery		14296.2	365.6	255.6	255.6	255.6	494.0	365.6	255.6	255.6
Foreign Exchange Portion		2594.7	135.6	25.6	25.6	25.6	103.5	135.6	25.6	25.6

(1) Sowing beds, potted seedling beds, shading facilities

(2) Office, warehouse, garage, resthouse, workshop, soil burning pliner, burnt soil storage

Table 5-20 Detailed Cost Table - Value - Nursery

	Unit Cost	25	26	27	28	29	30	31	32
1. Investment Cost									
Buildings	6.032	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Clearing	10.301	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Watering Facilities	8.141	0.0	8.1	0.0	0.0	0.0	0.0	8.1	0.0
Nursery Equipments (1)	220.000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings etc. (2)									
Total Buildings	778.3	0.0	8.1	0.0	0.0	0.0	0.0	8.1	0.0
Vehicle Purchase									
Truck	50.000	0.0	0.0	50.0	0.0	0.0	0.0	0.0	50.0
Wagon (4WD)	35.000	0.0	0.0	35.0	0.0	0.0	0.0	0.0	35.0
Tractor	25.000	0.0	0.0	25.0	0.0	0.0	0.0	0.0	25.0
Total Vehicle Purchase	110.0	0.0	0.0	110.0	0.0	0.0	0.0	0.0	110.0
Investment Cost	1878.3	0.0	8.1	110.0	0.0	0.0	0.0	8.1	110.0
2. Maintenance Cost	39.600	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
3. Operation Cost									
Laborers I	0.018	95.0	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Laborers II	0.016	105.4	105.4	105.4	105.4	105.4	105.4	105.4	105.4
Casual Workers	0.016	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total Labor Cost	9811.1	202.3	202.3	202.3	202.3	202.3	202.3	202.3	202.3
Materials	0.015	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Recurrent Cost	12417.8	255.6	255.6	255.6	255.6	255.6	255.6	255.6	255.6
Total Nursery	14296.2	255.6	263.7	365.6	255.6	255.6	255.6	263.7	365.6
Foreign Exchange Portion	2594.7	25.6	27.2	135.6	25.6	25.6	25.6	27.2	135.6

(1) Sowing beds, potted seedling beds, shading facilities
(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-21 Detailed Cost Table - Value - Nursery

	Unit Cost	Total	33	34	35	36	37	38	39	40
1. Investment Cost										
Buildings	6,032	6.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Clearing	10,301	30.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Watering Facilities	8,141	81.4	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0
Nursery Equipments (1)	220,000	660.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings etc. (2)		773.3	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0
Total Buildings										
Vehicle Purchase										
Truck	50,000	500.0	0.0	0.0	0.0	0.0	50.0	0.0	0.0	0.0
Wagon (4WD)	35,000	350.0	0.0	0.0	0.0	0.0	35.0	0.0	0.0	0.0
Tractor	25,000	250.0	0.0	0.0	0.0	0.0	25.0	0.0	0.0	0.0
Total Vehicle Purchase		1100.0	0.0	0.0	0.0	0.0	110.0	0.0	0.0	0.0
Investment Cost		1878.3	0.0	0.0	0.0	8.1	110.0	0.0	0.0	0.0
2. Maintenance Cost										
	20,800	1040.4	39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
3. Operation Cost										
Laborers I	0.018	4637.4	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Laborers II	0.016	5109.0	105.4	105.4	105.4	105.4	105.4	105.4	105.4	105.4
Casual Workers	0.010	84.0	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total Labor Cost		9811.1	202.3	202.3	202.3	202.3	202.3	202.3	202.3	202.3
Materials	0.015	666.2	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Recurrent Cost		12417.8	255.6	255.6	255.6	255.6	255.6	255.6	255.6	255.6
Total Nursery		14296.2	255.6	255.6	255.6	263.7	365.6	255.6	255.6	255.6
Foreign Exchange Portion		2594.7	25.6	25.6	25.6	27.2	135.6	25.6	25.6	25.6

(1) Sowing beds, potted seedling beds, shading facilities

(2) Office, warehouse, garage, misthouse, workshop, soil burning place, burnt soil storage

Table 5-22 Detailed Cost Table -- Value -- Nursery

	Unit Cost	41	42	43	44	45	46	47	48
1. Investment Cost									
Buildings	6.032	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Land Clearing	10.301	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Watering Facilities	81.4	8.1	0.0	0.0	0.0	0.0	8.1	0.0	0.0
Nursery Equipments (1)	220.000	220.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Buildings etc. (2)									
Total Buildings		238.4	0.0	0.0	0.0	0.0	8.1	0.0	0.0
Vehicle Purchase									
Truck	50.000	0.0	50.0	0.0	0.0	0.0	0.0	50.0	0.0
Wagon (4WD)	35.000	0.0	35.0	0.0	0.0	0.0	0.0	35.0	0.0
Tractor	25.000	0.0	25.0	0.0	0.0	0.0	0.0	25.0	0.0
Total Vehicle Purchase		0.0	110.0	0.0	0.0	0.0	0.0	110.0	0.0
Investment Cost		238.4	110.0	0.0	0.0	0.0	8.1	110.0	0.0
2. Maintenance Cost		39.6	39.6	39.6	39.6	39.6	39.6	39.6	39.6
3. Operation Cost									
Laborers I	0.018	95.6	95.6	95.6	95.6	95.6	95.6	95.6	95.6
Laborers II	0.016	105.4	105.4	105.4	105.4	105.4	105.4	105.4	105.4
Casual Workers	0.016	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Total Labor Cost		202.3	202.3	202.3	202.3	202.3	202.3	202.3	202.3
Materials	0.015	13.7	13.7	13.7	13.7	13.7	13.7	13.7	13.7
Recurrent Cost		255.6	255.6	255.6	255.6	255.6	255.6	255.6	255.6
Total Nursery		494.0	365.6	255.6	255.6	255.6	263.7	365.6	255.6
Foreign Exchange Portion		103.5	135.6	25.6	25.6	25.6	27.2	135.6	25.6

(1) Sowing beds, potted seeding beds, shading facilities

(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-23 Detailed Cost Table - Value - Nursery

	Unit Cost	Total	49	50
1. Investment Cost				
Buildings				
Land Clearing	6.022	6.0	0.0	0.0
Watering Facilities	10.301	30.9	0.0	0.0
Nursery Equipments (1)	8.141	81.4	0.0	0.0
Buildings etc. (2)	220.000	660.0	0.0	0.0
Total Buildings		778.3	0.0	0.0
Vehicle Purchase				
Truck	50.000	500.0	0.0	0.0
Wagon (AWD)	35.000	350.0	0.0	0.0
Tractor	25.000	250.0	0.0	0.0
Total Vehicle Purchase		1100.0	0.0	0.0
Investment Cost		1878.3	0.0	0.0
2. Maintenance Cost	30.600	1040.4	30.0	39.6
3. Operation Cost				
Laborers I	0.018	4637.4	95.6	95.6
Laborers II	0.010	5109.9	105.4	105.4
Casual Workers	0.016	64.0	1.3	1.3
Total Labor Cost		9811.1	202.3	202.3
Materials	0.015	680.2	13.7	13.7
Recurrent Cost		12417.8	255.6	255.6
Total Nursery		14296.2	255.6	255.6
Foreign Exchange Portion		2594.7	25.6	25.6

(1) Sowing beds, potted seedling beds, shading facilities

(2) Office, warehouse, garage, resthouse, workshop, soil burning place, burnt soil storage

Table 5-24 Detailed Cost Table -- Value -- Afforestation Work

	Unit Cost	Total	1	2	3	4	5	6	7	8
1. Investment Cost										
Buildings (1)	103.000	369.0	103.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50.000	1500.0	0.0	150.0	0.0	0.0	0.0	0.0	150.0	0.0
Tractor	25.000	750.0	0.0	75.0	0.0	0.0	0.0	0.0	75.0	0.0
Wagon (4WD)	35.000	1400.0	0.0	140.0	0.0	0.0	0.0	0.0	140.0	0.0
Vehicle Total		3050.0	0.0	365.0	0.0	0.0	0.0	0.0	365.0	0.0
Equipments	20.000	980.0	0.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4939.0	103.0	385.0	20.0	20.0	20.0	20.0	385.0	20.0
2. O & M Cost										
Buildings	10.300	504.7	0.0	10.3	10.3	10.3	10.3	10.3	10.3	10.2
Vehicles	109.500	5395.5	0.0	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0.040	1164.0	0.0	12.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	0.0	131.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborers I	0.018	41562.6	0.0	312.1	496.8	502.2	653.4	653.4	653.4	761.4
Laborers II	0.016	3220.8	0.0	14.4	48.0	67.2	67.2	67.2	67.2	67.2
Drivers	4.320	1218.2	0.0	8.6	8.6	17.3	17.3	25.9	25.9	25.9
Total Labor Cost		46001.5	0.0	335.2	553.4	586.7	737.9	746.5	746.5	854.5
Recurrent Cost		53035.8	0.0	487.0	697.2	730.5	881.7	890.3	890.3	998.3
Total Afforestation Work		57974.9	103.0	852.0	717.2	750.5	901.7	910.3	1275.3	1018.3
Charcoal Production Cost										
Laborer for Pottery Work	0.018	1037.6	0.0	69.2	69.2	69.2	69.2	69.2	69.2	69.2
Laborer for Charcoal	0.018	5981.7	0.0	373.2	373.2	373.2	373.2	373.2	373.2	373.2
Total Labor Cost		6636.3	0.0	442.4	442.4	442.4	442.4	442.4	442.4	442.4
Materials	0.031	6428.2	0.0	428.5	428.5	428.5	428.5	428.5	428.5	428.5
Total Charcoal Production		13064.4	0.0	871.0	871.0	871.0	871.0	871.0	871.0	871.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, garage, workshops

Table 5-25 Detailed Cost Table -- Value -- Afforestation Work

	Unit Cost	Total	9	10	11	12	13	14	15	16
1. Investment Cost										
Buildings (1)	103,000	309.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50,000	1500.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0	0.0
Tractor	25,000	750.0	0.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0
Wagon (4WD)	35,000	1400.0	0.0	0.0	0.0	140.0	0.0	0.0	0.0	0.0
Vehicle Total		3650.0	0.0	0.0	0.0	365.0	0.0	0.0	0.0	0.0
Equipments	20,000	980.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4839.0	20.0	20.0	20.0	385.0	20.0	20.0	20.0	20.0
2. O & M Cost										
Buildings	10,300	504.7	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Vehicles	109,500	5365.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0.040	1164.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborer I	0.018	41562.0	815.4	815.4	815.4	815.4	815.4	815.4	815.4	815.4
Laborer II	0.016	3220.8	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Drivers	4.320	1218.2	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Labor Cost		46001.5	908.5	908.5	908.5	908.5	908.5	908.5	908.5	908.5
Recurrent Cost		53035.8	1052.3	1052.3	1052.3	1052.3	1052.3	1052.3	1052.3	1052.3
Total Afforestation Work		57974.9	1072.3	1072.3	1072.3	1437.3	1138.7	1138.7	1138.7	1138.7
Charcoal Production Cost										
Laborer for Pottery Work	0.018	1037.6	69.2	69.2	69.2	69.2	69.2	69.2	69.2	69.2
Laborer for Charcoal	0.018	598.7	373.2	373.2	373.2	373.2	373.2	373.2	373.2	373.2
Total Labor Cost		6636.3	442.4	442.4	442.4	442.4	442.4	442.4	442.4	442.4
Materials	0.031	6428.2	428.5	428.5	428.5	428.5	428.5	428.5	428.5	428.5
Total Charcoal Production		13064.4	871.0	871.0	871.0	871.0	871.0	871.0	871.0	871.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, arrange, workshops

Table 5-26 Detailed Cost Table - Value - Afforestation Work

	Unit Cost	Total	17	18	19	20	21	22	23	24
1. Investment Cost										
Buildings (1)	103.000	309.0	0.0	0.0	0.0	0.0	103.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50.000	150.0	150.0	0.0	0.0	0.0	0.0	150.0	0.0	0.0
Tractor	25.000	75.0	75.0	0.0	0.0	0.0	0.0	75.0	0.0	0.0
Wagon (AWD)	35.000	140.0	140.0	0.0	0.0	0.0	0.0	140.0	0.0	0.0
Vehicle Total		365.0	365.0	0.0	0.0	0.0	0.0	365.0	0.0	0.0
Equipments	20.000	980.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4939.0	385.0	20.0	20.0	20.0	123.0	385.0	20.0	20.0
2. O & M Cost										
Buildings	10.300	504.7	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Vehicles	109.500	5365.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0.040	1164.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborers I	0.018	41562.6	901.8	901.8	901.8	901.8	901.8	901.8	901.8	901.8
Laborers II	0.016	3220.8	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Drivers	4.320	1218.2	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Labor Cost		46001.5	994.9	994.9	994.9	994.9	994.9	994.9	994.9	994.9
Recurrent Cost		53035.8	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7
Total Afforestation Work		57974.9	1523.7	1158.7	1158.7	1158.7	1261.7	1523.7	1158.7	1158.7
Charcoal Production Cost										
Laborer for Pottery Work	0.018	1037.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laborer for Charcoal	0.018	5898.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Labor Cost		6936.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials	0.031	6428.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Charcoal Production		13064.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, garage, workshops

Table 5-27 Detailed Cost Table - Value - Afforestation Work

	Unit Cost	Total	25	26	27	28	29	30	31	32
1. Investment Cost										
Buildings (1)	103.000	309.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50.000	1500.0	0.0	0.0	150.0	0.0	0.0	0.0	0.0	150.0
Tractor	25.000	750.0	0.0	0.0	75.0	0.0	0.0	0.0	0.0	75.0
Wagon (4WD)	35.000	1400.0	0.0	0.0	140.0	0.0	0.0	0.0	0.0	140.0
Vehicle Total		3650.0	0.0	0.0	365.0	0.0	0.0	0.0	0.0	365.0
Equipments	20.000	980.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4939.0	20.0	20.0	385.0	20.0	20.0	20.0	20.0	385.0
2. O & M Cost										
Buildings	10.300	504.7	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Vehicles	109.500	5365.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0.040	1164.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborers I	0.018	41562.6	901.8	901.8	901.8	901.8	901.8	901.8	901.8	901.8
Laborers II	0.016	3220.8	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Drivers	4.320	1218.2	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Labor Cost		46001.5	994.9	994.9	994.9	994.9	994.9	994.9	994.9	994.9
Recurrent Cost		53035.8	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7
Total Afforestation Work		57074.0	1158.7	1158.7	1523.7	1158.7	1158.7	1158.7	1158.7	1523.7
Charcoal Production Cost										
Laborer for Pottery Work	0.018	1037.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laborer for Charcoal	0.018	5398.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Labor Cost		6630.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials	0.031	6428.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Charcoal Production		13058.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, garage, workshops

Table 5-28 Detailed Cost Table -- Value -- Afforestation Work

	Unit Cost	Total	33	34	35	36	37	38	39	40
1. Investment Cost										
Buildings (1)	103.000	309.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50.000	150.0	0.0	0.0	0.0	0.0	150.0	0.0	0.0	0.0
Tractor	25.000	75.0	0.0	0.0	0.0	0.0	75.0	0.0	0.0	0.0
Wagon (4WD)	35.000	140.0	0.0	0.0	0.0	0.0	140.0	0.0	0.0	0.0
Vehicle Total		365.0	0.0	0.0	0.0	0.0	365.0	0.0	0.0	0.0
Equipments	20.000	980.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4039.0	20.0	20.0	20.0	20.0	385.0	20.0	20.0	20.0
2. O & M Cost										
Buildings	10.300	504.7	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Vehicles	109.500	5365.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0.040	1164.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborers I	0.018	41562.6	901.8	901.8	901.8	901.8	901.8	901.8	901.8	901.8
Laborers II	0.016	3220.8	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Drivers	4.320	1218.2	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Labor Cost		46001.5	994.9	994.9	994.9	994.9	994.9	994.9	994.9	994.9
Recurrent Cost		53035.8	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7
Total Afforestation Work		57974.0	1158.7	1158.7	1158.7	1158.7	1523.7	1158.7	1158.7	1158.7
Charcoal Production Cost										
Laborer for Pottery Work	0.018	1037.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laborer for Charcoal	0.018	5598.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Labor Cost		6636.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials	0.031	6428.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Charcoal Production		13064.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, garage, workshops

Table 5-29 Detailed Cost Table - Value - Afforestation Work

	Unit Cost	Total	41	42	43	44	45	46	47	48
1. Investment Cost										
Buildings (1)	103,000	309.0	103.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Vehicle Purchase										
Truck	50,000	150.0	0.0	150.0	0.0	0.0	0.0	0.0	150.0	0.0
Tractor	25,000	75.0	0.0	75.0	0.0	0.0	0.0	0.0	75.0	0.0
Wagon (4WD)	35,000	140.0	0.0	140.0	0.0	0.0	0.0	0.0	140.0	0.0
Vehicle Total		365.0	0.0	365.0	0.0	0.0	0.0	0.0	365.0	0.0
Equipment	20,000	880.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Investment Cost		4939.0	123.0	385.0	20.0	20.0	20.0	20.0	385.0	20.0
2. O & M Cost										
Buildings	10,300	504.7	10.3	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Vehicles	109,500	5365.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5	109.5
Fertilizer	0,040	1164.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8	143.8	143.8	143.8	143.8	143.8	143.8
3. Labor Cost										
Laborers I	0,018	41562.6	901.8	901.8	901.8	901.8	901.8	901.8	901.8	901.8
Laborers II	0,016	3220.8	67.2	67.2	67.2	67.2	67.2	67.2	67.2	67.2
Drivers	4,320	1218.2	25.9	25.9	25.9	25.9	25.9	25.9	25.9	25.9
Total Labor Cost		46001.5	994.9	994.9	994.9	994.9	994.9	994.9	994.9	994.9
Recurrent Cost		53035.9	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7	1138.7
Total Afforestation Work		57974.0	1261.7	1523.7	1158.7	1138.7	1158.7	1158.7	1523.7	1158.7
Charcoal Production Cost										
Laborer for Pottery Work	0,018	1037.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Laborer for Charcoal	0,018	5588.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Labor Cost		6626.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Materials	0,031	6428.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Charcoal Production		13054.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Foreign Exchange Portion		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

(1) Office, warehouse, garages, workshops

Table 5-30 Detailed Cost Table - Value - Afforestation Work

	Unit Cost	Total	49	50
1. Investment Cost				
Buildings (1)	103,000	309.0	0.0	0.0
Vehicle Purchase				
Truck	50,000	1500.0	0.0	0.0
Tractor	25,000	750.0	0.0	0.0
Wagon (4WD)	35,000	1400.0	0.0	0.0
Vehicle Total		3650.0	0.0	0.0
Equipments	20,000	980.0	20.0	20.0
Investment Cost		4939.0	20.0	20.0
2. O & M Cost				
Buildings	10,300	504.7	10.3	10.3
Vehicles	109,500	5365.5	109.5	109.5
Fertilizer	0,040	1164.0	24.0	24.0
Sub-Total		7034.0	143.8	143.8
3. Labor Cost				
Laborers I	0,018	41562.6	901.8	901.8
Laborers II	0,016	3220.9	67.2	67.2
Drivers	4,320	1218.2	25.9	25.9
Total Labor Cost		46001.5	994.9	994.9
Recurrent Cost		53035.8	1138.7	1138.7
Total Afforestation Work		57974.9	1158.7	1158.7
Charcoal Production Cost				
Laborer for Pottery Work	0,018	1037.6	0.0	0.0
Laborer for Charcoal	0,018	5598.7	0.0	0.0
Total Labor Cost		6636.3	0.0	0.0
Materials	0,031	6428.2	0.0	0.0
Total Charcoal Production		13064.4	0.0	0.0
Foreign Exchange Portion		0.0	0.0	0.0

(1) Office, warehouse, garage, workshops

Table 5-31 Detailed Cost Table -- Value -- Administration

	Unit Cost	1	2	3	4	5	6	7	3
1. Staff									
Technical Advisor	150,000	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Project Manager	50,000	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	0.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	105.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	180.0	240.0	300.0	420.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	50.0	75.0	150.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		545.0	780.0	945.0	1095.0	1115.0	1115.0	1115.0	1115.0
2. Casual Workers for Adm.	3,840	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses									
For A Class Staff	100,000	200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For B Class Staff	80,000	480.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	500.0	150.0	150.0	50.0	0.0	0.0	0.0	0.0
For D Class Staff & Typist	30,000	120.0	90.0	60.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	1300.0	240.0	210.0	50.0	0.0	0.0	0.0	0.0
Total Staff Houses		1300.0	270.0	250.0	100.0	50.0	50.0	50.0	50.0
4. Administration Facilities									
Land Clearing	80,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	150.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total O&M of Admin. Facilities	10,000	270.0	100.0	10.0	0.0	0.0	0.0	0.0	0.0
Total Admin. Facilities		270.0	110.0	10.0	10.0	10.0	10.0	10.0	10.0
5. Vehicle									
Purchase Wagon (AWD)	35,000	70.0	210.0	0.0	0.0	0.0	70.0	210.0	0.0
Maintenance & Operation	80,000	20.0	90.0	90.0	90.0	90.0	90.0	90.0	90.0
Total Vehicle Cost		90.0	290.0	90.0	90.0	90.0	150.0	290.0	90.0
6. Fire Protection									
Watching Tower	2,000	0.0	6.0	0.0	0.0	4.0	0.0	0.0	0.0
Equipment for Communication	5,000	0.0	20.0	0.0	0.0	10.0	0.0	0.0	0.0
Motor Bike	3,000	0.0	9.0	0.0	0.0	9.0	0.0	0.0	9.0
Total Equipment	2,700	0.0	35.0	0.0	0.0	23.0	0.0	0.0	9.0
Operation Cost		132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost	3,840	917.8	11.5	11.5	11.5	19.2	19.2	19.2	19.2
Total Fire Protection		1263.1	49.2	14.2	14.2	44.9	21.9	21.9	30.9
Investment Cost		1790.0	735.0	360.0	200.0	175.0	220.0	360.0	159.0
Recurrent Cost		55621.0	775.7	950.7	1100.7	1139.4	1138.4	1138.4	1138.4
Total Administration		428.5	925.0	965.0	1115.0	1183.3	1160.3	1160.3	1169.3
Foreign Exchange Portion		20.0	122.2	93.4	95.4	95.4	95.4	95.4	104.4

(1) Including 2 teacher's houses
(2) Office, garage, repair shop, warehouse

Table 5-32 Detailed Cost Table -- Value -- Administration

	Unit Cost	Total	9	10	11	12	13	14	15	16
1. Staff										
Technical Advisor	150,000	3750.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Project Manager	50,000	2500.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	2205.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	10395.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	21870.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	9675.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		50995.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0
2. Casual Workers for Adm.	3,840	576.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses										
For A Class Staff	100,000	600.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For B Class Staff	80,000	1440.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	2550.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For D Class Staff & Typist	30,000	810.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	5400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses		7820.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
4. Administration Facilities										
Land Clearing	80,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		870.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O&M of Admin. Facilities	10,000	490.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Admin. Facilities		1360.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
5. Vehicle										
Purchase Wagon (AWD)	35,000	2800.0	0.0	0.0	70.0	210.0	0.0	0.0	0.0	70.0
Maintenance & Operation	80,000	3940.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Total Vehicle Cost		6740.0	80.0	80.0	150.0	290.0	80.0	80.0	80.0	150.0
6. Fire Protection										
Watching Tower	2,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Bike	3,000	153.0	0.0	0.0	9.0	0.0	0.0	9.0	0.0	0.0
Total Equipment		213.0	0.0	0.0	9.0	0.0	0.0	9.0	0.0	0.0
Operation Cost	2,700	132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost	3,840	917.8	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Total Fire Protection		1253.1	21.9	21.9	30.9	21.9	21.9	30.9	21.9	21.9
Investment Cost		13033.0	150.0	150.0	229.0	360.0	150.0	150.0	150.0	220.0
Recurrent Cost		55621.0	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4
Total Administration		58884.0	1160.3	1160.3	1160.3	1160.3	1160.3	1160.3	1160.3	1160.3
Foreign Exchange Portion		4890.6	95.4	95.4	104.4	95.4	95.4	104.4	95.4	95.4

(1) Including 2 teacher's houses
 (2) Office, garage, repair shop, shop, warehouse

Table 5-33 Detailed Cost Table - Value - Administration

	Unit Cost	Total	17	18	19	20	21	22	23	24
1. Staff										
Technical Advisor	150,000	5750.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Project Manager	50,000	2500.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	2205.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	10395.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	21870.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	9675.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		50895.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0	1115.0
2. Casual Workers for Adm.	3,840	576.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses										
For A Class Staff	100,000	000.0	0.0	0.0	0.0	0.0	200.0	0.0	0.0	0.0
For B Class Staff	80,000	1440.0	0.0	0.0	0.0	0.0	480.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	2550.0	0.0	0.0	0.0	0.0	500.0	150.0	150.0	50.0
For D Class Staff & Typist	30,000	910.0	0.0	0.0	0.0	0.0	120.0	90.0	60.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	5400.0	0.0	0.0	0.0	0.0	1300.0	240.0	210.0	50.0
		2420.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Staff Hours		7820.0	50.0	50.0	50.0	50.0	1350.0	290.0	260.0	100.0
4. Administration Facilities										
Land Clearing	80,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	750.0	0.0	0.0	0.0	0.0	150.0	100.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total O&M of Admin. Facilities	10,000	870.0	0.0	0.0	0.0	0.0	150.0	100.0	0.0	0.0
		400.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Admin. Facilities		1360.0	10.0	10.0	10.0	10.0	160.0	110.0	10.0	10.0
5. Vehicle										
Purchase Wagon (4WD)	35,000	2800.0	210.0	0.0	0.0	0.0	70.0	210.0	0.0	0.0
Maintenance & Operation	80,000	3040.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Total Vehicle Cost		6740.0	290.0	80.0	80.0	80.0	150.0	290.0	80.0	80.0
6. Fire Protection										
Watching Tower	2,000	30.0	0.0	0.0	0.0	0.0	0.0	6.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Bike	3,000	150.0	0.0	0.0	0.0	9.0	0.0	0.0	9.0	0.0
Total Equipment	2,700	213.0	0.0	0.0	0.0	9.0	0.0	6.0	9.0	0.0
Operation Cost		132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost	3,840	917.8	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Total Fire Protection		1263.1	30.9	21.9	21.9	30.9	21.9	27.9	30.9	21.9
Investment Cost		13033.0	369.0	150.0	150.0	159.0	1070.0	706.0	369.0	200.0
Recurrent Cost		56821.0	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4
Total Administration		56884.0	1169.3	1160.3	1160.3	1169.3	1160.3	1166.3	1169.3	1160.3
Foreign Exchange Portion		4880.6	104.4	95.4	95.4	104.4	95.4	97.2	104.4	95.4

(1) Including 2 teacher's houses
(2) Office, garage, repair shop, shop, warehouse

Table 5-34 Detailed Cost Table - Value - Administration

	Unit Cost	Total	25	26	27	28	29	30	31	32
1. Staff										
Technical Advisor	150,000	3750.0	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Project Manager	50,000	2500.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	2205.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	10395.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	21370.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	9675.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		50895.0	1115.0	965.0	965.0	965.0	965.0	965.0	965.0	965.0
2. Casual Workers for Adm.	3,840	576.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses										
For A Class Staff	100,000	600.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For B Class Staff	80,000	1440.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	2550.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For D Class Staff & Typist	30,000	810.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	5400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses		7320.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
4. Administration Facilities										
Land Clearing	90,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total O&M of Admin. Facilities	10,000	870.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Admin. Facilities		1360.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
5. Vehicle										
Purchase Wagon (4WD)	35,000	2300.0	0.0	70.0	210.0	0.0	0.0	0.0	70.0	210.0
Maintenance & Operation	80,000	3940.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Total Vehicle Cost		6740.0	80.0	150.0	290.0	80.0	80.0	80.0	150.0	290.0
6. Fire Protection										
Watching Tower	2,000	30.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Bike	3,000	153.0	0.0	9.0	0.0	0.0	9.0	0.0	0.0	9.0
Total Equipment	2,700	213.0	4.0	9.0	0.0	0.0	9.0	0.0	0.0	9.0
Operation Cost		132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost	3,840	917.8	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Total Fire Protection		1263.1	25.9	30.9	21.9	21.9	30.9	21.9	21.9	30.9
Investment Cost		13033.0	154.0	79.0	210.0	0.0	9.0	0.0	70.0	219.0
Recurrent Cost		55621.0	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4
Total Administration		56894.0	1164.3	1160.3	1160.3	1160.3	1169.3	1160.3	1160.3	1169.3
Foreign Exchange Portion		4860.6	96.6	104.4	95.4	95.4	104.4	95.4	95.4	104.4

(1) Including 2 teacher's houses
 (2) Office, garage, repair shop, shop, warehouse

Table 5-35 Detailed Cost Table - Value - Administration

	Unit Cost	Total	33	34	35	36	37	38	39	40
1. Staff										
Technical Advisor	150,000	3750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Project Manager	50,000	2500.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	2250.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	10395.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	21870.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	9675.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		50895.0	965.0	965.0	965.0	965.0	965.0	965.0	965.0	965.0
2. Casual Workers for Adm.	3.840	576.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses										
For A Class Staff	100,000	600.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For B Class Staff	80,000	1440.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	2550.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For D Class Staff & Typist	30,000	810.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	5400.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Staff Houses		7820.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
4. Administration Facilities										
Land Clearing	80,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		870.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
O&M of Admin. Facilities	10,000	400.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Admin. Facilities		1300.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
5. Vehicle										
Purchase Wagon (4WD)	35,000	2800.0	0.0	0.0	0.0	70.0	210.0	0.0	0.0	0.0
Maintenance & Operation	80,000	3040.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Total Vehicle Cost		6740.0	80.0	80.0	80.0	150.0	290.0	80.0	80.0	80.0
6. Fire Protection										
Watching Tower	2,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Bike	3,000	150.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Equipment		210.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Operation Cost	2,700	132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost	3,840	017.8	10.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Total Fire Protection		1203.1	21.0	21.9	30.9	21.9	21.9	30.9	21.9	21.9
Investment Cost		1303.0	0.0	0.0	0.0	70.0	210.0	0.0	0.0	0.0
Recurrent Cost		5682.0	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4
Total Administration		56894.0	1100.3	1160.3	1160.3	1160.3	1160.3	1160.3	1160.3	1160.3
Foreign Exchange Portion		4880.6	95.4	95.4	104.4	95.4	95.4	104.4	95.4	95.4

(1) Including 2 teacher's houses
 (2) Office, garage, repair shop, shop, warehouse

Table 5-36 Detailed Cost Table - Value - Administration

	Unit Cost	Total	41	42	43	44	45	46	47	48
1. Staff										
Technical Advisor	150,000	3750.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Project Manager	50,000	2500.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Senior Research Officer	45,000	2205.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0	45.0
B Class Staff	35,000	10395.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0	210.0
C Class Staff	30,000	21870.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
D Class Staff	25,000	9675.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Typist	10,000	500.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Staff Salary		50895.0	905.0	905.0	905.0	905.0	905.0	905.0	905.0	905.0
2. Casual Workers for Adm.	3,840	576.0	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
3. Staff Houses										
For A Class Staff	100,000	600.0	200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For B Class Staff	80,000	1440.0	480.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
For C Class Staff (1)	50,000	2550.0	500.0	150.0	150.0	50.0	0.0	0.0	0.0	0.0
For D Class Staff & Typist	30,000	810.0	120.0	90.0	60.0	0.0	0.0	0.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	5400.0	1300.0	240.0	210.0	50.0	0.0	0.0	0.0	0.0
Total Staff Houses		2420.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Total Staff Houses		7820.0	1350.0	280.0	260.0	100.0	50.0	50.0	50.0	50.0
4. Administration Facilities										
Land Clearing	80,000	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction (2)	250,000	750.0	150.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total O&M of Admin. Facilities	10,000	870.0	150.0	100.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Admin. Facilities		490.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Admin. Facilities		1360.0	160.0	110.0	10.0	10.0	10.0	10.0	10.0	10.0
5. Vehicle										
Purchase Wagon (4WD)	35,000	2800.0	70.0	210.0	0.0	0.0	0.0	70.0	210.0	0.0
Maintenance & Operation	80,000	3940.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Total Vehicle Cost		6740.0	150.0	290.0	80.0	80.0	80.0	150.0	290.0	80.0
6. Fire Protection										
Watching Tower	2,000	30.0	0.0	6.0	0.0	0.0	4.0	0.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Motor Bike	3,000	153.0	9.0	0.0	0.0	9.0	0.0	0.0	9.0	0.0
Total Equipment	2,700	213.0	9.0	6.0	0.0	9.0	4.0	0.0	9.0	0.0
Operation Cost	3,840	132.3	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Labor Cost		917.9	19.2	19.2	19.2	19.2	19.2	19.2	19.2	19.2
Total Fire Protection		1263.1	30.9	27.9	21.9	30.9	25.9	21.9	30.9	21.9
Investment Cost		13033.0	1520.0	556.0	210.0	59.0	4.0	70.0	210.0	0.0
Recurrent Cost		55621.0	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4	1138.4
Total Administration		56894.0	1169.3	1166.3	1169.3	1169.3	1164.3	1160.3	1169.3	1169.3
Foreign Exchange Portion		4859.5	104.4	97.2	95.4	104.4	96.6	95.4	104.4	95.4

(1) Including 2 teacher's houses
 (2) Office, garage, repair shop, shop, warehouse

Table 5-37 Detailed Cost Table - Value - Administration

	Unit Cost	Total	49	50
1. Staff				
Technical Advisor	150,000	37500.0	0.0	0.0
Project Manager	50,000	25000.0	50.0	50.0
Senior Research Officer	45,000	22050.0	45.0	45.0
B Class Staff	35,000	103950.0	210.0	210.0
C Class Staff	30,000	219700.0	450.0	450.0
D Class Staff	25,000	96750.0	200.0	200.0
Typist	10,000	5000.0	10.0	10.0
Total Staff Salary		508950.0	965.0	965.0
2. Casual Workers for Adm.	3,840	576.0	11.5	11.5
3. Staff Houses				
For A Class Staff	100,000	6000.0	0.0	0.0
For B Class Staff	80,000	14400.0	0.0	0.0
For C Class Staff (1)	50,000	29500.0	0.0	0.0
For D Class Staff & Typist	30,000	8100.0	0.0	0.0
Total Staff Houses Const. O & M of Staff Houses	50,000	94000.0	0.0	0.0
Total Staff Houses		24200.0	50.0	50.0
Total Staff Houses		78200.0	50.0	50.0
4. Administration Facilities				
Land Clearing	80,000	80.0	0.0	0.0
Construction (2)	250,000	7500.0	0.0	0.0
Equipments etc.	40,000	40.0	0.0	0.0
Sub-Total		870.0	0.0	0.0
O&M of Admin. Facilities	10,000	4000.0	10.0	10.0
Total Admin. Facilities		13600.0	10.0	10.0
5. Vehicle				
Purchase Wagon (AWD)	35,000	28000.0	0.0	0.0
Maintenance & Operation	80,000	30400.0	80.0	80.0
Total Vehicle Cost		67400.0	80.0	80.0
6. Fire Protection				
Watching Tower	2,000	30.0	0.0	0.0
Equipment for Communication	5,000	30.0	0.0	0.0
Motor Bike	3,000	1530.0	0.0	0.0
Total Equipment		2130.0	0.0	0.0
Operation Cost	2,700	1323.0	2.7	2.7
Labor Cost	3,840	917.8	19.2	19.2
Total Fire Protection		1263.1	21.9	30.9
Investment Cost		13033.0	0.0	0.0
Recurrent Cost		58621.0	1138.4	1138.4
Total Administration		56884.0	1160.3	1160.3
Foreign Exchange Portion		4880.0	95.4	104.4

(1) Including 2 teacher's houses
 (2) Office, garage, repair shop, shop, warehouse

Table 5-38 Detailed Cost Table - Value - Community Facilities

	Unit Cost	Total	1	2	3	4	5	6	7	8
1. Facilities										
Construction Cost	500,000	500.0	220.0	40.0	220.0	20.0	0.0	0.0	0.0	0.0
Electricity	800,000	800.0	600.0	100.0	50.0	50.0	0.0	0.0	0.0	0.0
Water Supply	500,000	500.0	340.0	70.0	50.0	40.0	0.0	0.0	0.0	0.0
Drainage	460,000	460.0	0.0	460.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)										
Sub-Total		2260.0	1160.0	670.0	320.0	110.0	0.0	0.0	0.0	0.0
Maintenance & Operation	150,000	7250.0	0.0	100.0	100.0	150.0	150.0	150.0	150.0	150.0
Electricity	40,000	1920.0	0.0	30.0	30.0	30.0	30.0	40.0	40.0	40.0
Others										
Sub-Total		9170.0	0.0	130.0	130.0	180.0	180.0	190.0	190.0	190.0
Total Facilities		11430.0	1160.0	800.0	450.0	290.0	180.0	190.0	190.0	190.0
2. Settler's houses										
Construction	15,000	18000.0	4050.0	600.0	450.0	450.0	450.0	0.0	0.0	0.0
Wood Around Houses	1,500	1800.0	405.0	60.0	45.0	45.0	45.0	0.0	0.0	0.0
Maintenance	60,000	2952.0	40.0	46.0	51.0	55.0	60.0	60.0	60.0	60.0
Total Settler Houses		22752.0	4495.0	706.0	546.0	550.0	555.0	60.0	60.0	60.0
Investment Cost		22060.0	5615.0	1330.0	815.0	605.0	495.0	0.0	0.0	0.0
Recurrent Cost		12122.0	40.0	176.0	181.0	235.0	240.0	250.0	250.0	250.0
Total Community Facilities		34182.0	9655.0	1506.0	996.0	840.0	735.0	250.0	250.0	250.0
Foreign Exchange Portion		15712.2	2071.5	580.2	499.7	385.5	325.5	170.0	170.0	170.0

(1) Guest house, chapel & surau, school, clinic, playground

Table 5-39 Detailed Cost Table -- Value -- Community Facilities

	Unit Cost	Total	9	10	11	12	13	14	15	16
1. Facilities										
Construction Cost										
Electricity	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	800,000	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)	460,000	460.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		2200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance & Operation										
Electricity	150,000	7250.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Others	40,000	1920.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Sub-Total		9170.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
2. Settler's houses										
Construction	15,000	18000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hold Around Houses	1,500	1800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance	60,000	2952.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Settler Houses		22752.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Investment Cost		2200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recurrent Cost		12122.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Total Community Facilities		34182.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Foreign Exchange Portion		15712.2	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0

(1) Guest house, chapel & surau, school, clinic, playground

Table 5-40 Detailed Cost Table - Value - Community Facilities

	Unit Cost	Total	17	18	19	20	21	22	23	24
1. Facilities										
Construction Cost	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	800,000	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	460,000	460.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		2260.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance & Operation	150,000	7250.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Electricity	40,000	1920.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Others			190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Sub-Total		9170.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
2. Settler's Houses										
Construction	15,000	18000.0	0.0	0.0	0.0	0.0	4050.0	600.0	450.0	450.0
Road Around Houses	1,500	1800.0	0.0	0.0	0.0	0.0	405.0	60.0	45.0	45.0
Maintenance	60,000	2852.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Settler Houses		22752.0	60.0	60.0	60.0	60.0	4515.0	720.0	555.0	555.0
Investment Cost		22060.0	0.0	0.0	0.0	0.0	4455.0	660.0	495.0	495.0
Recurrent Cost		12122.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Total Community Facilities		34182.0	250.0	250.0	250.0	250.0	4705.0	910.0	745.0	745.0
Foreign Exchange Portion		15712.2	170.0	170.0	170.0	170.0	1587.5	350.0	327.5	327.5

(1) Guest house, chapel & surau, school, clinic, playground

Table S-41 Detailed Cost Table - Value - Community Facilities

	Unit Cost	Total	25	26	27	28	29	30	31	32
1. Facilities										
Construction Cost										
Electricity	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	800,000	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)	460,000	460.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		2260.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance & Operation										
Electricity	150,000	7250.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Others	40,000	1920.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Sub-Total		9170.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
2. Settler's House										
Construction	15,000	18000.0	450.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hold Around House	1,500	1800.0	45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance	60,000	2052.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Settler House		22752.0	555.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Investment Cost		22000.0	405.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recurrent Cost		12122.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Total Community Facilities		34182.0	745.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Foreign Exchange Portion		15712.2	327.5	170.0	170.0	170.0	170.0	170.0	170.0	170.0

(1) Guest house, church & clinic, school, clinic, playground

Table 5-42 Detailed Cost Table -- Value -- Community Facilities

	Unit Cost	Total	33	34	35	36	37	38	39	40
1. Facilities										
Construction Cost	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Electricity	800,000	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	500,000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	400,000	400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		2200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance & Operation										
Electricity	150,000	7250.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Others	40,000	1920.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Sub-Total		9170.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
2. Settler's Houses										
Construction	15,000	18000.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Road Around Houses	1,500	1800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance	60,000	2952.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Settler Houses		22752.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Investment Cost		22060.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recurrent Cost		12122.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Total Community Facilities		34182.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Foreign Exchange Portion		15712.2	170.0	170.0	170.0	170.0	170.0	170.0	170.0	170.0

(1) Guest house, chapel & surau, school, clinic, playground

Table 5-43 Detailed Cost Table - Value - Community Facilities

	Unit Cost	Total	41	42	43	44	45	46	47	48	
1. Facilities											
Construction Cost											
Electricity	500.000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Supply	800.000	800.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drainage	500.000	500.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Construction (1)	400.000	400.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sub-Total		2200.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maintenance & Operation											
Electricity	150.000	7250.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0	150.0
Others	40.000	1920.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Sub-Total		9170.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0	190.0
2. Settler's Houses											
Construction	15.000	18000.0	4050.0	600.0	450.0	450.0	450.0	450.0	0.0	0.0	0.0
Hold Around Houses	1.500	1800.0	405.0	60.0	45.0	45.0	45.0	45.0	0.0	0.0	0.0
Maintenance	60.000	2952.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0	60.0
Total Settler Houses		22752.0	4515.0	720.0	555.0	555.0	555.0	555.0	60.0	60.0	60.0
Investment Cost		22000.0	4400.0	660.0	495.0	495.0	495.0	495.0	0.0	0.0	0.0
Recurrent Cost		1212.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0	250.0
Total Community Facilities		34182.0	4705.0	910.0	745.0	745.0	745.0	745.0	250.0	250.0	250.0
Foreign Exchange Portion		19712.2	1587.5	380.0	527.5	527.5	527.5	527.5	170.0	170.0	170.0

(1) Guest house, chapel & kuru, school, clinic, playground

Table 5-44 Detailed Cost Table - Value - Community Facilities

	Unit Cost	Total	49	50
1. Facilities				
Construction Cost				
Electricity	500,000	500.0	0.0	0.0
Water Supply	900,000	800.0	0.0	0.0
Drainage	500,000	500.0	0.0	0.0
Other Construction (1)	460,000	460.0	0.0	0.0
Sub-Total		2260.0	0.0	0.0
Maintenance & Operation				
Electricity	150,000	7250.0	150.0	150.0
Others	40,000	1920.0	40.0	40.0
Sub-Total		9170.0	190.0	190.0
Total Facilities		11430.0	190.0	190.0
2. Settler's Houses				
Construction	15,000	18000.0	0.0	0.0
Road Around Houses	1,500	1800.0	0.0	0.0
Maintenance	60,000	2952.0	60.0	60.0
Total Settler Houses		22752.0	60.0	60.0
Investment Cost		22060.0	0.0	0.0
Recurrent Cost		12122.0	250.0	250.0
Total Community Facilities		34182.0	250.0	250.0
Foreign Exchange Portion		15712.2	170.0	170.0

(1) Guest house, chapel & surau, school, clinic, playground

Table 5-45 Detailed Cost Table -- Value -- Grand Total

Unit Cost	Total	1	2	3	4	5	6	7	8
Total Vehicle Purchase	16528.0	795.0	694.0	75.0	0.0	234.0	570.0	760.0	9.0
Total Payment to The Settlers	69363.6	77.1	966.7	1289.8	1323.0	1481.9	1514.1	1514.1	1622.1
Attornestation Portion	117708.6	1759.1	2571.5	2572.4	2505.7	2906.9	3197.2	3264.0	2797.0
Safoda	174592.1	2185.6	3396.4	3337.4	3620.6	4090.2	4357.5	4424.4	5966.4
Total Investment Cost	44160.3	7082.0	2174.2	1249.2	939.2	1109.9	850.0	916.9	350.9
Total Recurment Cost	164612.3	758.1	2282.2	3284.2	3521.4	3715.3	3757.5	3757.5	3365.5
Grand Total	208774.1	7840.6	4902.4	4533.4	4460.6	4925.2	4607.5	4674.4	4216.4
Foreign Exchange Portion	59207.4	3362.5	1715.7	1284.3	1072.1	1282.3	1353.2	1431.6	965.6

Table 5-46 Detailed Cost Table -- Value -- Grand Total

Unit Cost	Total	9	10	11	12	13	14	15	16
Total Vehicle Purchase	16528.0	225.0	0.0	654.0	685.0	225.0	9.0	75.0	570.0
Total Payment to The Settlers	69363.6	1670.1	1676.1	1699.6	1699.6	1786.0	1786.0	1786.0	1786.0
Attornestation Portion	117708.6	3101.0	2851.0	3482.7	3349.6	3211.0	2961.0	3061.0	3169.1
Safoda	174592.1	4281.4	4011.4	4052.0	4599.9	4371.3	4130.3	4221.3	4329.4
Total Investment Cost	44160.3	591.9	341.9	959.0	816.9	591.9	350.9	441.9	550.0
Total Recurment Cost	164612.3	3919.5	3919.5	3943.0	3943.0	4029.4	4029.4	4029.4	4029.4
Grand Total	208774.1	4511.4	4261.4	4902.0	4739.9	4621.5	4380.3	4471.3	4579.4
Foreign Exchange Portion	59207.4	1106.6	856.6	1467.2	1331.6	1106.6	865.6	956.6	1208.2

Table 5-47 Detailed Cost Table - Value - Grand Total

	Unit Cost	Total	17	18	19	20	21	22	23	24
Total Vehicle Purchase		16528.0	919.0	0.0	75.0	9.0	795.0	685.0	84.0	0.0
Total Payment to The Settlers		69363.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6
Afforestation Portion		117798.6	2515.0	1790.0	1890.0	1790.0	2881.4	2265.0	1890.0	1790.0
Safede		174592.1	3694.3	2950.3	3690.3	2959.3	4041.8	3431.3	3059.3	2950.3
Total Investment Cost		44160.3	775.9	41.9	141.9	50.9	558.3	1182.9	645.9	536.9
Total Recurrent Cost		164612.3	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4
Grand Total		208774.1	3934.3	3200.3	3300.3	3209.3	3746.7	4341.3	3804.3	3695.3
Foreign Exchange Portion		59207.4	1440.6	796.6	906.6	715.6	2982.9	1393.4	973.1	864.1

Table 5-48 Detailed Cost Table - Value - Grand Total

	Unit Cost	Total	25	26	27	28	29	30	31	32
Total Vehicle Purchase		16528.0	225.0	579.0	760.0	0.0	234.0	0.0	645.0	694.0
Total Payment to The Settlers		69363.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6
Afforestation Portion		117798.6	2040.0	2298.1	2865.0	1790.0	2040.0	1790.0	2398.1	2265.0
Safede		174592.1	3204.3	3487.5	3525.3	2950.3	3209.3	2950.3	3558.5	3434.3
Total Investment Cost		44160.3	790.9	599.0	616.9	41.9	300.9	41.9	680.0	525.9
Total Recurrent Cost		164612.3	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4
Grand Total		208774.1	3959.3	3717.5	3775.3	3200.3	3459.3	3200.3	3808.5	3694.3
Foreign Exchange Portion		59207.4	1115.3	1217.2	1281.6	706.6	965.6	706.6	1388.2	1190.6

Table 5-49 Detailed Cost Table -- Value -- Grand Total

Unit Cost	Total	33	34	35	36	37	38	39	40
Total Vehicle Purchase	16528.0	225.0	0.0	84.0	570.0	910.0	9.0	75.0	0.0
Total Payment to The Settlers	69303.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6
Allorentation Portion	117708.0	2040.0	1790.0	1890.0	2298.1	2515.0	1790.0	1890.0	1790.0
Safoda	174592.1	3200.3	2950.3	3059.3	3458.5	3675.3	2959.3	3050.3	2950.3
Total Investment Cost	44160.3	291.9	41.9	150.9	550.0	766.9	50.9	141.9	41.9
Total Recurrent Cost	164612.3	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4
Grand Total	208774.1	3450.3	3200.3	3309.3	3708.5	3925.3	3209.3	3300.3	3200.3
Foreign Exchange Portion	59207.4	956.0	706.0	815.6	1208.2	1431.6	715.6	906.6	706.6

Table 5-50 Detailed Cost Table -- Value -- Grand Total

Unit Cost	Total	41	42	43	44	45	46	47	48
Total Vehicle Purchase	16528.0	304.0	685.0	75.0	9.0	225.0	570.0	769.0	0.0
Total Payment to The Settlers	69303.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6	1343.6
Allorentation Portion	117708.0	2881.4	2265.0	1890.0	1790.0	2040.0	2298.1	2365.0	1790.0
Safoda	174592.1	4050.8	3431.3	3050.3	2959.3	3204.3	3458.5	3534.3	2950.3
Total Investment Cost	44160.3	5597.3	1182.9	636.9	545.9	790.9	550.0	625.9	41.9
Total Recurrent Cost	164612.3	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4	3158.4
Grand Total	208774.1	9755.7	4341.3	3795.3	3704.3	3949.3	3708.5	3784.3	3200.3
Foreign Exchange Portion	59207.4	2991.9	1393.4	964.1	873.1	1115.3	1208.2	1290.6	706.6

Table 5-51 Detailed Cost Table — Value — Grand Total

	Unit Cost	Total	49	50
Total Vehicle Purchase		16528.0	225.0	9.0
Total Payment to The Settlers		69363.6	1343.6	1343.6
Afforestation Portion		117708.6	2040.0	1790.0
Safoda		174592.1	3200.3	2959.3
Total Investment Cost		44160.3	291.9	50.9
Total Recurrent Cost		164812.3	3158.4	3158.4
Grand Total		208774.1	3450.3	3209.3
Foreign Exchange Portion		59207.4	956.6	715.6

6. Investigation Report on Social Development in Division V

6-1 Population Composition

According to a report by McGowan International, Division V contains sixteen communities, of which statistics are available for thirteen. These thirteen communities have a total population of 1655, representing 381 households. It is estimated that the remaining three communities have 131 households, with the total population of Division V reaching 2100.

Of the 381 households, 185 (48.6%) are the *Runggus*, and 166 (43.6%) consist of the *Kimaragang*, *Sunsozon*, *Tembanuoh*, and *Kadusan* tribes, which, like the *Runggus*, are of Dusun origin. In other words, Division V is occupied overwhelmingly by agricultural people dependent on conventional shifting cultivation. (The remaining thirty households (7.9%) are Orang Sungei).

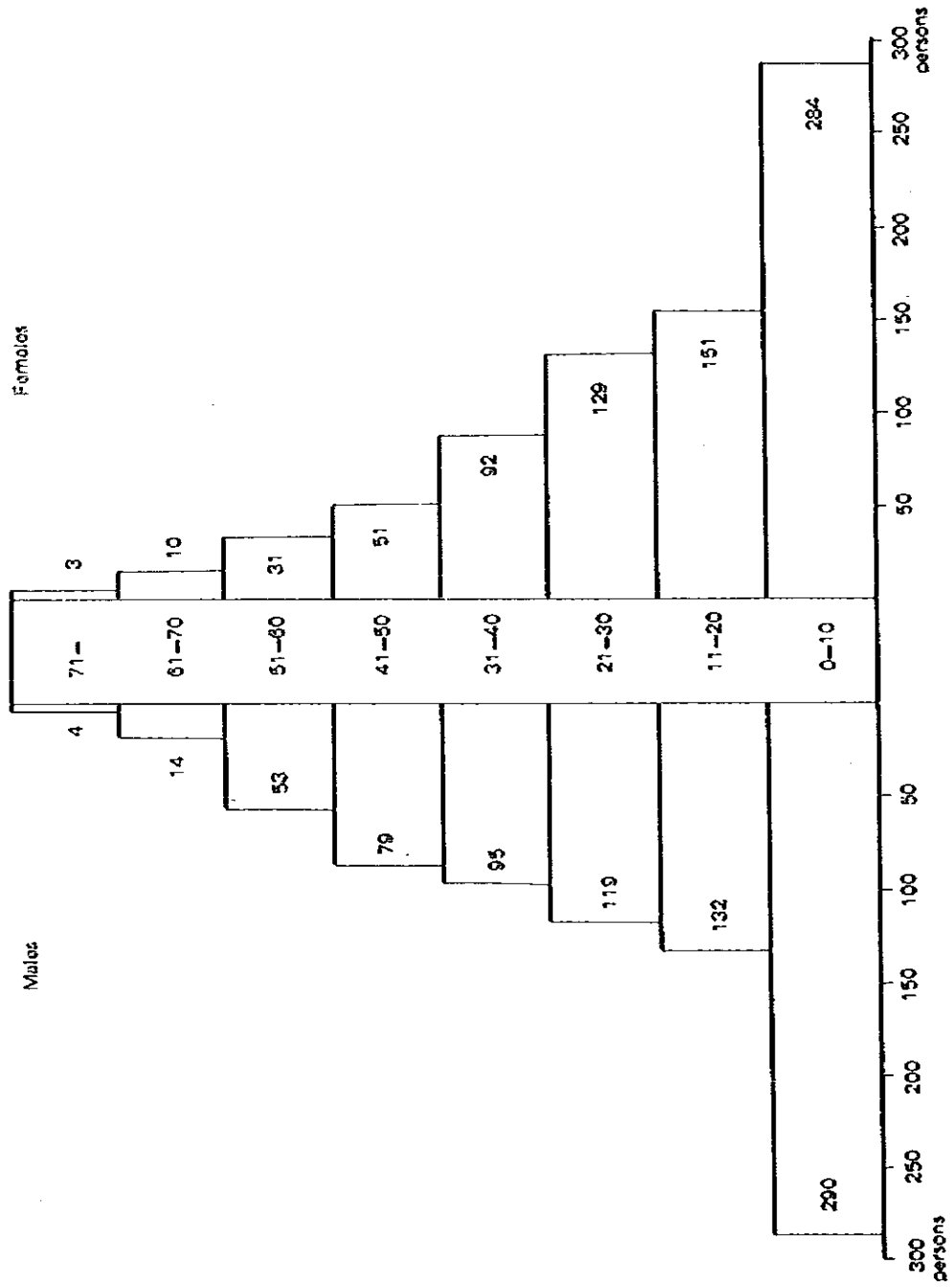
Figure 6-1 shows the population composition by age. The structure of each community is different. Some communities have predominantly middle-aged groupings, while others are characterised by the presence of many elderly people. This variation is due to the different stages of community development, as well as geographical location. Newer communities, which were recently established separately, tend to have higher proportions of middle-aged people and infants than those of older communities. It is said that young people in areas adjoining Pitas become workers in towns or work in places as far away as Kota Kinabalu.

In Pandan and Pinapak, where there are elementary schools, some children stay with their relatives, depending upon kin network.

The age structure of Division V is highlighted by the large number of infants. Children aged ten or less account for 37.3% of the total population, of which 60% are aged five and below. This suggests that infant mortality is very high in this district.

Medical and educational facilities need to be improved as soon as possible; moreover,

Figure 6-1 Population Composition by Age in Division V



there seems to be a scarce possibility of a labor shortage affecting the implementation of the project.

6-2 Occupational Classification

The total area under shifting cultivation in Division V is 225.6 ha, and the average holding per household is 0.59 ha. According to the typological classification in Section 2-2-1 "Background to the Bengkoka Project", five communities are dependent chiefly on shifting cultivation, three on a combination of both shifting and sedentary cultivation, and the remaining five on sedentary cultivation. In comparison with the whole of Bengkoka Peninsula, dependency on shifting cultivation is relatively high.

Shifting cultivation operations in Division V are as follows:

August	Clearing ("tagod")
September to early October	Burning ("tumutod")
End of October	Sowing ("magosok")
from November to March	Weeding ("manginsakot")
April	Harvesting ("mongomot")

Note: Words in brackets are *Runggis* language equivalents.

There is little care of fields taken in the period between sowing and harvesting, although weeding is carried out several times. At the beginning of harvesting, the fertility ceremony known as "mogondi" is held to give thanks to God. After harvesting, cassava and maize are cultivated in the fields.

The total area under sedentary cultivation is 1,335.6 ha and 3.51 ha per household. The main crop is palm, while some paddy rice and fruits are cultivated along with rubber. Around the homes, taro, yam, cassava and bananas are grown. There is also noncommercial small-scale livestock farming and river fishing to provide daily needs, though they are not the main economic activities.

6-3 Household and Family

The basic unit of social life in the *Runggus* is one household living in a single detached house. The average number of household members in Division V is 4.3, and many households are composed of a nuclear family, i.e. a couple and their unmarried children. There are some cases of stem families which have a married child living with his or her parents, and extended families where several couples of the same generation live together are seldom found.

The household has a single fireplace and it is a unit of co-eating, substantial activities and consumption. It is also a place for property and wealth accumulation. Males (a husband in the case of the nuclear family) have traditionally dominated the social unit. Although there is some collaboration among neighbors and relatives in the shifting cultivation season (that is, at the time of clearing, burning, sowing and harvesting), it is not organized into continuous groups. From the socioeconomic viewpoint, the household may be regarded as the smallest and most unique social unit.

Previous studies of the *Runggus* have treated the long house as one of the characteristics of the society. In fact, long houses were seen, some of which have walkways connecting two or three of the housing units, and others which were deserted two or three years ago. At present, however, there are no long houses in Division V with multiple compartments. A Compartment which each domestic family occupies has been turned into a detached house to form a household unit.

There are several possible explanations for this. Many local people surveyed complained of the poor sanitation of long houses (e.g. neighbors leave garbage in shared walkways), and the lack of definition of private activities (e.g. feed one person gives to his own hens is eaten by his neighbors' hens). There is obviously an increasing awareness of the sense of privacy.

Regarding the land utilization for shifting cultivation, despite the existence of restrictions from both customary laws and relationships with neighboring communities, the choice of land seems to have been made quite freely by tradition. Recently the sense of territory has been strengthened by designating the boundaries between villages as administration units. At the same time, the introduction of palm and paddy rice cultivation have in-

creased the sense of land rights and ownership. However, up until now very few people have had titles to their land.

Profits from agriculture and the raising of livestock are accumulated as family wealth, while at the same time playing an important role as the bride wealth. The main items of wealth have been gongs, china, brass goods, and accessories such as bracelets and wedding costumes. In many houses visited during the local survey, these goods are cherished. On the other hand, the cash economy is becoming entrenched. Rice is the first thing people want to buy with cash, while clothes and daily necessities are also bought. There are a few families which own outboard engines or bicycles. There is, however, actually no roads for bicycle riding, and it seems that bicycles are more valued as a symbol of wealth than as a means of transport.

6-4 Kinship

The *Runggus* kinship system in Division V is cognatic: that is, kinship recognition is bilateral without any unilineal descent groups. As shown in Figure 6-2, the kinship terminology is typical of the Eskimo type (that is, siblings are distinguished from cousins, but no distinction is made for cousins between the paternal and maternal sides, or between parallel and cross cousins) and generation type (that is, the reference terms vary from generation to generation).

This system is the same as the Kudat Peninsula Runggus, but there are some differences in terminology in comparison with previous reports. In particular, the consonant "t" is added to the beginning of many words.

Examples are:

Kudat		Bengketa	Meaning
aki	→	taki	grandfather and men of his same generation
odu	→	tedu	grandmother and women of her same generation
opinai	→	topinai	siblings
anak	→	tanak	child

Figure 6-2 Kinship terminology — reference

Generation					
?	(m) takiaki				
+3	(f) todudu				
	(m) taki				
+2	(f) todu				
	(m) kamaman (f) kominan		(m) tama (f) indi		
+1	pisan haring	topinai	< ego >	savo	(m) ipag (f) longuon
0	kamanakon		anak	nokotekin	kamanakon
-1	(m) mutaki				
-2	(f) mutodu				
?	collateral		lineal	lineal	collateral
	consanguinity			affinity	

(m) : Males
(f) : Females

Although the terms of kinship address is also generation type, it is usual for people to use names when speaking to people of their own or younger generation.

It is taboo to utter the names of one's parents-in-law, and in the survey interviews, people had someone else answer the question about the names.

There is no functionally cooperative descent group in any sense of the word, but there is a strong feeling among close relatives that they should cooperate with one another. They help one another in everyday life, at times of illness, at funeral and wedding ceremonies and in certain farming activities which require a lot of man-power. The strongest bond is that between the parent and child, followed by that between siblings; from these central relationships, kinship extends vertically and horizontally. It seems, however, that the people have no fixed kindred concept, because for any event or occasion that takes place, the same people do not always participate. Despite of the significance of the distance or genealogy, other factors such as proximity of homes, age, sex, and personal tastes reflect their relationship. Although bilateral kinship is important, dyadic relations determine the choice or the preference in an actual situation. Such relations are always changing in the course of time.

6-5 Marriage

Traditionally, the married couple lives with the wife's parents until the beginning of the first farming season, after which they are given a room in the long house of the wife's parents. It seems, however, that the couple actually had the option to choose either ux-ori-local or virilocal. It is now common to form a neo-local and build a new house within one year of marriage. In choosing where to live, the wishes of the bride's parents are respected, but the final decision depends on the availability of land suitable for shifting cultivation, human relationship and other factors. In the case where an only daughter or the youngest daughter enters marriage, some husbands continue to stay at the wife's parents house to care for them.

At present cash is used as the bridewealth (it is said to be not less than MS2000), as well as such conventional items as gongs, plates, dishes, and betel containers.

A marriage among the first cousins is thought to be incest; the second or farther cousins are allowed to marry, and indeed, some already are. There are also some cases of two or three-fold linkage between close affinity, for example, a marriage between the siblings of a conjugal couple. One of the reasons for such a close marriage is their preference to local endogamy. Many people choose their spouses from their own community or specially selected communities.

In the case of the Kg. of Kobon, for example, eleven of the seventeen married couples who reported their place of origin in the survey were both from Kobon. In the case of the Kg. of Sosop, which separated from Kobon in the first half of the 1970's, twelve of the seventeen married couples come from Kobon. In Bai, comprised mostly of *Sunsogon* people many spouses are given, and taken, to *Melijau*. A marriage network is so limited in certain communities that day-to-day contact with other communities is poor. Instead the intra-family networks within the same community are intricately interwoven.

It is rare, but not unheard of, for people of different ethnolinguistic groups to marry. In such cases, to which group the children belong to depends on the place where they are raised, regardless of their parents birthplace. That is, when the marriage occurs between a *Runggus* and a *Kimarogan*, children of the couple, once they have grown up and acquired the language and customs of, for example, the *Runggus* community, are recognized as

Runggus. The *Runggus*, the *Kimaragang*, the *Sunsogon*, and the *Tembanuoh* are all of *Dusun* origin, and differences in culture, especially language, contribute greatly to their sense of identity.

6-6 Community Structure

The traditional community consists of several long houses, with a common territory including land for shifting cultivation. Government-administrated villages (*Kampung*) are today established in accordance with the traditional models, and incorporated into the *Kampung* system.

Most community inhabitants have kinship ties, and since their kinship system is bilateral, the kinship recognition over the past three generations are not clear. They do possess, however, a feeling of closeness stemming from the common ancestry. As a whole, they do not form an ambilateral decent group, or function as a corporate group.

In the typical community, there are some groupings of families, originating in a few married couples, that date back two or three generations. Despite a lack of autonomy, the unique characteristics of each grouping and the clear distinctions between the groupings, these families play an important role as neighbors in their day-to-day interaction and on ritual occasions.

These networks are, however, based on dyadic relationships, with some families usually moving from one grouping to another, not only to another community but also within the same community. (These movements are chiefly due to marriage, but other factors are also responsible.) As a result, while these groupings of families play an important social role at any one time, from the diachronic point of view, there has been a continuous movement of people, which constantly reproduces new groupings. Moreover, the groupings of families, when the local community is affected by population pressure and decreases in the land suitable for shifting cultivation, become a core of splitting up and creating a new community.

Some currently government-administrated villages (*kampung*) have plural ethno-linguistic groups. In many cases, also, each community contains the above-mentioned

groupings of families. It is said that those who do not share a common kinship and who want to become the member of a community are required to obtain the consent of “ketua kampung”, the community leader.

6-7 Leader

There is traditionally no formal political or social leader in the community. People called “tosukod” were once responsible for settling internal and external disputes through negotiation, and for the maintenance of social order. (“tosukod” refers to old people, who are expected to be kind and generous to others, but more importantly, to be familiar with the customary laws (adat) of their community. It was essential for “tosukod” to have knowledge about their enemies, about evil spirits and, in addition, to know how to deal with them. They required the support of the village community, and could not act purely on their own initiative). Thus, they possessed no strong power, authority or special privileges over villagers. In a sense, they presided over the council of elders when a crisis was taking place.

At present, each administrated village has a leader called “ketua kampung”, and although he is appointed by the government, his position is similar to that of the “tosukad”. Maintaining the social order is an important role which the leader should play. Although his role has changed as a result of the decrease in conflicts between communities, and less concern with the spiritual world, his role as a mediator between the local administration and the inhabitants has become more important. The leader, however, must have the support and trust of the villagers, and old people and influential persons are sometimes consulted.

In comparison with other Southeast Asian countries, Malaysia is successfully integrating modern-day administration procedures within the traditional political body. The influence of the administration on inhabitants, however, varies among “ketua kampung”, and their ability to motivate people in a certain direction seems, on the whole, to be weak.

6-8 Commitment of the Local Inhabitants and Possible Problems

The local people seem to be highly conscious of the Bengkoka Afforestation and Settlement Project. According to the survey by McGowan International, 376 out of 381 households in Division V expressed their willingness to participate in the project. In the actual interviews, all the inhabitants spoke of their anxiety about continuing the status quo, their hopes for a new life, and expectations and aspirations related to the project. They know that the SAFODA Project has commenced in Division I, and look forward to the start of the project in Division V.

To conclude this chapter, some social aspects in the implementation of this project will be discussed. Firstly, asked about the reasons for their commitment to this project, a majority of 201 households (37.0%) said that they wanted the infrastructure involving power and water supply, school and medical facilities to be provided. It can be easily imagined that any delay in providing these components of the infrastructure will disappoint them. Further, 150 households (27.2%) are motivated by the concept of common shared profits from the project, 112 households (20.3%) expect employment opportunities as wage workers, and 85 households (15.4%) expect a new house.

Secondly, human beings encounter more difficulties in adopting themselves to rapid changes in society and human relationships than to rapid economic changes. Accordingly, the people involved in the implementation of this settlement project must create an environment for human relationships by removing as much as possible any anxieties about possible changes in the traditional social system. For this purpose, various factors should be taken into consideration: for example, (1) the household composed of the nuclear family is the basic producing and consuming entity; (2) the married couple forms a neolocal household; (3) there is a high frequency of local endogamy; (4) the aggregation of people by close kinship and neighborliness is the core of daily interactions; (5) social mobility is high; and (6) the community leader functions to maintain social order through conciliation and negotiation but has no compulsory power.

The order of priority for choosing people for future settlement is: firstly, the existing relationships in Kampung, followed by ethno-linguistic groupings and then religious affiliations.

As already mentioned, the local people are very enthusiastic about this project, and it is certain that this project will succeed if their desires and aspirations for the project are satisfied by appropriate implementation and management operations.

7. Projections of Timber Demand

7-1 Project Figures

To consider the marketability of the timber to be produced in this project it is essential to have a projection of timber demands on a world-wide basis, as well as by region.

Examples of such projections include "World Forestry Products Demand and Supply 1990 and 2000"(FAO Forestry Paper 29, 1982) "The Global 2000, Report to the President" (U.S. Government), and "An Analysis of the Timber Situation in the United States, 1952-2030", (U.S. Forestry Service). In Japan, JICA reported the projection of timber demand estimated by JOFCA. Among them, the projections by FAO and JOFCA are shown in Table 7-1 and 7-2 (respectively). These will form the basis of the following discussion on the background of the market for the timber to be produced in this project.

(1) Hardwood Sawntimber

Table 7-1-1 (FAO) and Table 7-2-1 (JOFCA) show projected demands for hardwood sawntimber.

As can be seen from these tables, in developed countries such as Japan, the United States, Canada, western, eastern European, and Oceanian countries, demand will increase slowly, and exceed 10% in a few cases, whereas Asian countries (excluding Japan), and Latin American countries, are likely to have strong demand. The reason for this disparity between the developed and developing countries is seen to lie mainly in the differences in hardwood resources and the development of their wood industries.

In the global view, sawntimber demand will increase slower (16-44%), compared with that for plywood, particle board and pulpwood (to be discussed below).

(2) Plywood

Table 7-1-2 shows the FAO demand projections for non-conifer plywood, and Table 7-2-2 the JOFCA projection for conifer and non-conifer plywood demand.

Looking at these tables, trends in the demand for such plywood as sawntimber until the year 2000 show a relatively low increase by a factor of 1.5 or less in Japan, North America and western Europe, while in the Middle and Near East, Asia (especially tropical Asia) and Latin America, the increase will be a factor of two or more.

The difference can be attributed to increased demand in the oil producing countries, the expanding wood industry in the developing countries, and the higher availability of raw materials.

On a world-wide basis, demand for plywood will increase faster than that for sawntimber, but slower than that for particle board and pulpwood.

(3) Particle Board

Table 7-1-3 shows the FAO demand projections for hardwood fiber board, and Table 7-2-3 shows the JOFCA Projections for softwood and hardwood particle board.

Demand for these items in the year 2000 is projected to increase by a factor of 1.5 or more in the developed countries (except Japan), and to be particularly high in North America. In the developing Latin American countries, substantial increases can be expected. One reason for the lower demand for fiber and particle boards in Japan is probably that plywood is more suitable for the Japanese climate, and therefore preferred by the Japanese consumer. Among many kinds of timber products, fiber and particle boards will show the highest increases in demand (1.5-2 times by the year 2000).

(4) Pulpwood and Woodchips

Table 7-1-4 (FAO) shows the demand projections for non-conifer pulpwood, and Table 7-2-4 (JOFCA) the demand projections for conifer and non-conifer pulpwood, and woodchip.

Among forest products, pulpwood and woodchip show the highest increases in demand, with demand for hardwood, in particular, expected to rise by a factor of two by the year 2000.

By region, demand in Japan, North America and western Europe will be relatively low (a 200% or less increase). However, in eastern Europe, the Asian region (except Japan), Oceania, Latin America and Middle East, demand is expected to increase sharply

by 2.5 times, due largely to the expected rapid increase of paper consumption in the developing countries.

Demand projections for paper and pulp in Japan were issued by the Ministry of International Trade and Industry in 1983, through the Industrial Structure Council, Paper and Pulp Section under the title, "The Long-term Demand Outlook for Paper and Paperboard" (See Table 7-3). According to this report, demand will increase annually by 2.6%, both for paper and paperboard, between 1981 and 1990. Printing paper and container board will show increases of 3.0% and 2.7%, respectively, while packing paper and cardboard will show low increases of 0.3% and 1.8%, respectively. As shown in Figure 7-1, these estimates are seen as virtually a continuation of the increases of the 1970's.

Tropical hardwood is mainly used for making paper for corrugated cardboard, as well as wrapping paper, and paperboard for making containers. Figure 7-2 illustrates the flow chart of paper, pulp and their materials in Japan in 1982.

7-2 Considerations of Marketability Based on the Demand Projections

The timber to be produced in this project (mainly *Acacia mangium*) could provide to some extent the raw material for all the above-mentioned products, i.e. sawntimber, plywood, boards and pulpwood.

As the raw material for sawntimber, *Acacia mangium* is deficient in terms of quality because of the existence of cracks, curves or warp, as well as being disadvantaged in the marketplace because of its unfamiliarness and low supplies.

As seen in the previous section, against the background of low increases in demand for sawntimber products in Japan and other developed countries, sawntimber from *Acacia mangium* is expected to be less competitive than existing popular tree species produced in natural forests.

On the other hand, considerable increases in demand for sawn-timber are predicted in the Far East and the centrally planned Asian countries. It will therefore be possible to

establish an export market by developing and improving the processing technology :such as the treating of *Acacia mangium* by scheduled drying in mills.

If *Acacia mangium* is used for plywood, its qualitative and economic disadvantages could be compensated to a considerable extent. Moreover, demand projections are favorable because of the substantial increases expected in tropical Asia, the centrally planned Asian economies and the Middle and Near East; also, high consumption is expected to continue in Japan and North America. It is apparent that *Acacia mangium*, as a material for plywood, would be very competitive.

Since the required diameter of logs for commercial purposes is now at least 50 cm or more in the case of plywood, the final cutting age of *Acacia mangium* for plywood should be when the diameter has reached 50 cm.

There are few problems in the processing of *Acacia mangium* to produce particle board. As already mentioned, demand for particle board, in particular, is expected to show strong increases. There is a strong likelihood of producing particle board with small logs or logs by thinning (though there exist the problems of handling efficiency and the need to remove the bark) and from wastewood in mills.

Regarding the production of particle board in Sabah State, it should be emphasized that the particle board mills require high-level technology and a continuous and stable supply of raw materials.

Acacia mangium could be sufficient to be used as material for pulp and woodchip because of its high pulp yield and singularity of species. Further, based on the high-demand projections for pulpwood as already mentioned, the woodchip industry using *Acacia mangium* can be considered economically very feasible.

The price of pulpwood should basically be low. In other words, the profitability of the pulp industry is dependent on low-grade and low-cost logs which are unsuitable for sawntimber or plywood. Therefore, logs that have been thinned and small trees that have undergone final cutting will be used as pulpwood.

From the above considerations, the distribution of logs to be produced under this project can be illustrated in Figure 7-3.

Table 7-1-1 FAO Projections of Timber Demand Sawntimber (non-conifer)

(1,000 m³: log volume)

Region/Country	Annual consumption 1980	Projected demand		Remarks
		1990	2000	
Japan	7,500	6,100	5,300	
North America	13,500	14,200	14,700	
Western Europe	16,900	19,000	20,800	
Centrally Planned European Countries	20,200	22,000	23,000	Including the USSR
Centrally Planned Asian Countries	8,000	9,600	11,300	China, Vietnam, Burma, etc.
Oceania	3,100	2,600	2,300	
Far East	15,200	29,800	40,100	Republic of Korea
Latin America	10,300	14,700	17,800	
Other	4,600	5,600	7,800	
World Total	99,300	123,900	143,100	

Source: FAO, Forestry Paper 29. World Forest Products, Demand and Supply 1990 and 2000, 1982

Table 7-1-2 FAO Projections of Timber Demand Plywood (non-conifer)

(1,000 m³: log volume)

Region/Country	Annual consumption 1980	Projected demand		Remarks
		1990	2000	
Japan	7,300	6,900	6,500	
North America	4,900	5,200	5,500	
Western Europe	5,100	6,200	6,600	
Centrally Planned European Countries	1,500	1,800	2,100	Including the USSR
Middle East & North Africa	1,000	1,800	2,500	
Far East	1,600	2,800	4,400	
Latin America	1,300	2,500	4,400	
Other	1,400	2,400	3,000	
World Total	24,100	29,600	35,000	

Table 7-1-3 FAO Projections of Timber Demand Reconstructed Wood (non-conifer)

Region/Country	Annual consumption 1980	Projected demand		Remarks
		(1,000 m ³ : log volume)		
		1990	2000	
Japan	2,600	2,700	2,900	Including the USSR
North America	8,600	11,700	15,500	
Western Europe	13,400	18,100	22,400	
Centrally Planned European Countries	4,000	5,500	6,800	
Latin America	1,400	2,000	2,300	
Other	2,900	4,100	5,300	
World Total	32,900	44,100	55,200	

Table 7-1-4 FAO Projections of Timber Demand Pulpwood (non-conifer)

Region/Country	Annual consumption 1980	Projected demand		Remarks
		(1,000 m ³ : log volume)		
		1990	2000	
Japan	21,500	29,500	41,900	Including the USSR
North America	54,500	76,100	107,100	
Western Europe	34,100	45,500	57,600	
Centrally Planned European Countries	7,900	13,100	16,500	
Oceania	1,100	1,800	3,200	
Far East	700	1,300	3,600	
Latin America	6,100	9,900	16,400	
Other	6,100	9,900	17,300	
World Total	132,000	187,100	263,600	

Table 7-2-1 JOFCA Projections of Timber Demand Sawntimber (non-conifer)

Region/Country	Annual consumption 1978-80 average	Projected demand				Remarks
		1990		2000		
		High	Low	High	Low	
Japan	6,797	6,947	6,872	7,084	6,941	
North America	18,302	19,327	18,708	20,321	19,078	USA, Canada
Western Europe	16,112	19,544	17,543	22,678	18,446	
Centrally Planned Asian Countries	7,978	10,594	9,772	14,044	11,705	China, Burma, Vietnam, etc.
Centrally Planned European Countries	18,307	19,332	18,713	20,327	19,083	Including the USSR
Latin America	12,082	15,244	14,164	18,423	16,053	Countries south of Mexico
Tropical Asia	7,116	10,502	8,916	14,114	10,659	Excluding centrally planned economies
Other	14,265	16,291	15,033	16,395	15,011	Oceania, Africa, Middle and Near East, Republic of Korea, Israel, South Africa
World Total	100,959	117,781	109,721	133,386	116,976	

Source: JICA, Report for the Study Related to the Regional Development Plan of the Great Carajas Program of the F.R. BRAZIL, 1983.

Table 7-2-2 JOFCA Projections of Timber Demand Plywood (conifer + non-conifer)

Region/Country	Annual consumption 1978-80 average	Projected demand				Remarks
		1990		2000		
		High	Low	High	Low	
Japan	8,239	9,994	9,196	11,596	10,159	
North America	20,665	27,537	24,272	34,231	27,623	USA, Canada
Western Europe	4,521	4,621	4,571	4,712	4,616	
Middle and Near East	741	1,113	929	1,569	1,100	
Centrally Planned European Countries	2,632	2,361	2,105	2,347	1,817	Including the USSR
Latin America	1,319	1,714	1,485	2,082	1,696	Countries south of Mexico
Tropical Asia	1,458	3,639	2,496	7,289	3,801	Excluding centrally planned economies
Other	1,741	3,022	2,611	3,991	3,178	Oceania, Africa, Republic of Korea, Israel, South Africa, socialist Asian countries
World Total	41,336	54,001	47,665	67,817	54,020	

Table 7-2-3 JOFCA Projections of Timber Demand Particle Board (conifer + non-conifer)

Region/Country	Annual consumption 1978-80 average	Projected demand				Remarks
		1990		2000		
		High	Low	High	Low	
Japan	974	1,464	1,240	2,026	1,512	
North America	8,573	33,239	19,292	44,316	31,120	USA, Canada
Western Europe	19,430	29,640	24,918	42,221	31,307	
Oceania	628	1,104	857	1,714	1,108	
Middle and Near East	634	1,189	914	1,810	1,126	
Centrally Planned European Countries	8,551	14,709	11,926	22,629	16,659	Including the USSR
Latin America	1,226	2,608	1,858	4,732	2,730	Countries south of Mexico
Other	561	912	660	1,392	719	Africa, socialist Asian countries, Republic of Korea, Israel, South Africa
World Total	40,636	84,665	61,695	120,750	86,281	

Table 7-2-4 JOFCA Projections of Timber Demand Pulpwood & Wood Chips (conifer + non-conifer)

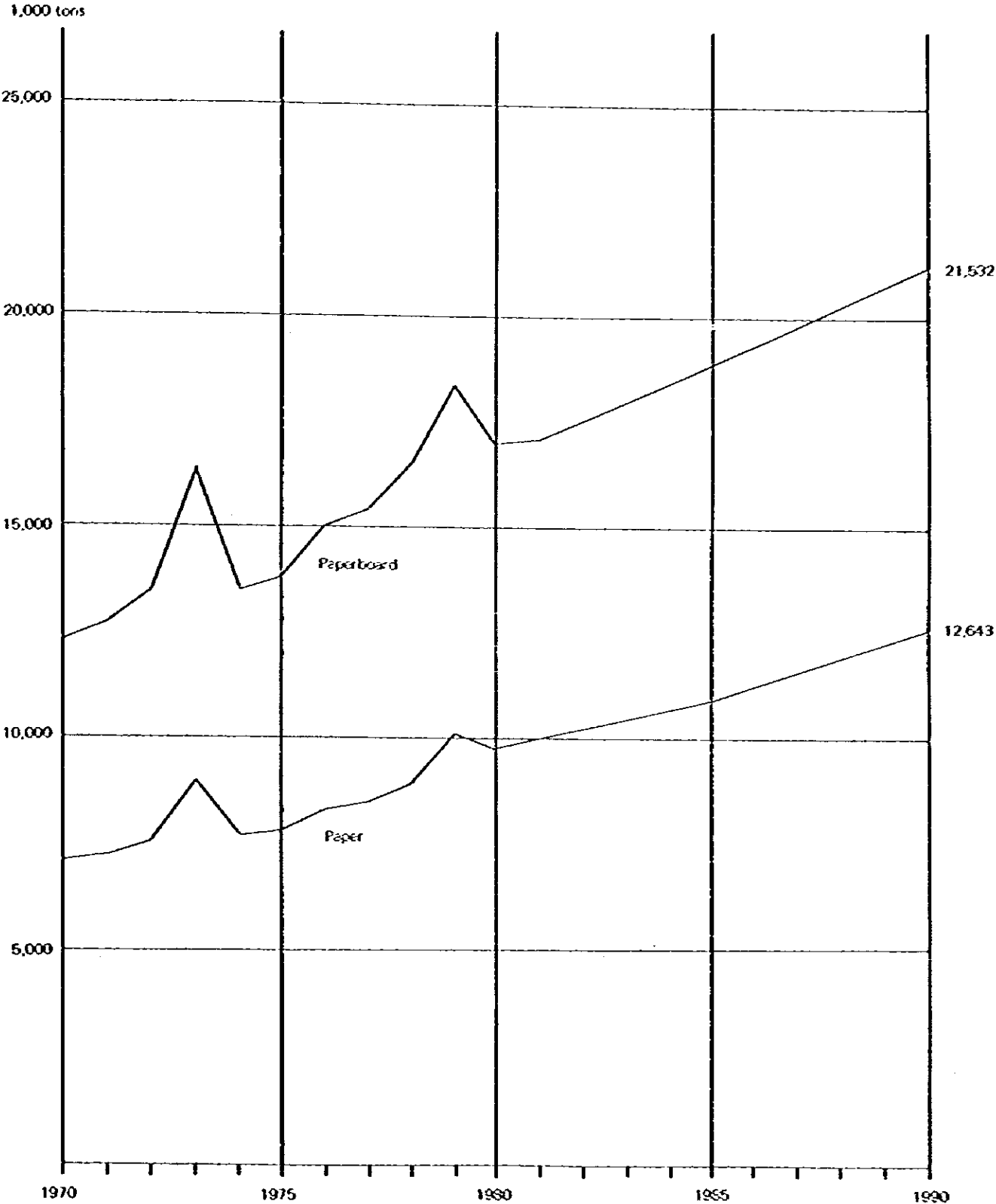
Region/Country	Annual consumption 1978-80 average	Projected demand				Remarks
		1990		2000		
		High	Low	High	Low	
Japan	23,229	29,638	24,964	32,740	26,506	
North America	138,457	206,760	154,542	250,845	170,715	USA, Canada
Western Europe	91,276	132,352	100,845	153,571	109,246	
Centrally Planned Asian Countries	5,291	8,329	6,645	11,534	7,789	China, Burma, Vietnam and other socialist Asian countries
Centrally Planned European Countries	44,666	69,696	51,101	93,667	59,294	Including the USSR
Latin America	16,658	22,373	19,639	27,813	22,677	Countries south of Mexico
Other	12,070	14,763	13,068	17,623	14,666	Oceania, Africa, Middle and Near East, Republic of Korea, Israel, South Africa
World Total	331,817	482,911	370,824	587,793	410,912	

Table 7-3 Projections for Domestic Demand of Paper and Paperboard in Japan in 1990

	1981 (1,000 tons)	Ann. growth 1981-86 (%)	1990 (1,000 tons)	Ann. growth 1981-90 (%)
Newsprint	2,576	2.5	3,222	2.5
Printing paper	4,832	3.1	6,279	3.0
Packaging paper	965	0.4	991	0.3
Other	1,647	2.9	2,151	3.0
Total paper	10,020	2.7	12,643	2.6
Container board	4,621	2.9	5,874	2.7
Boxboard	1,557	1.8	1,834	1.8
Other	879	3.1	1,181	3.3
Total paperboard	7,057	2.7	8,889	2.6
Total paper and paperboard	17,077	2.7	21,532	2.6

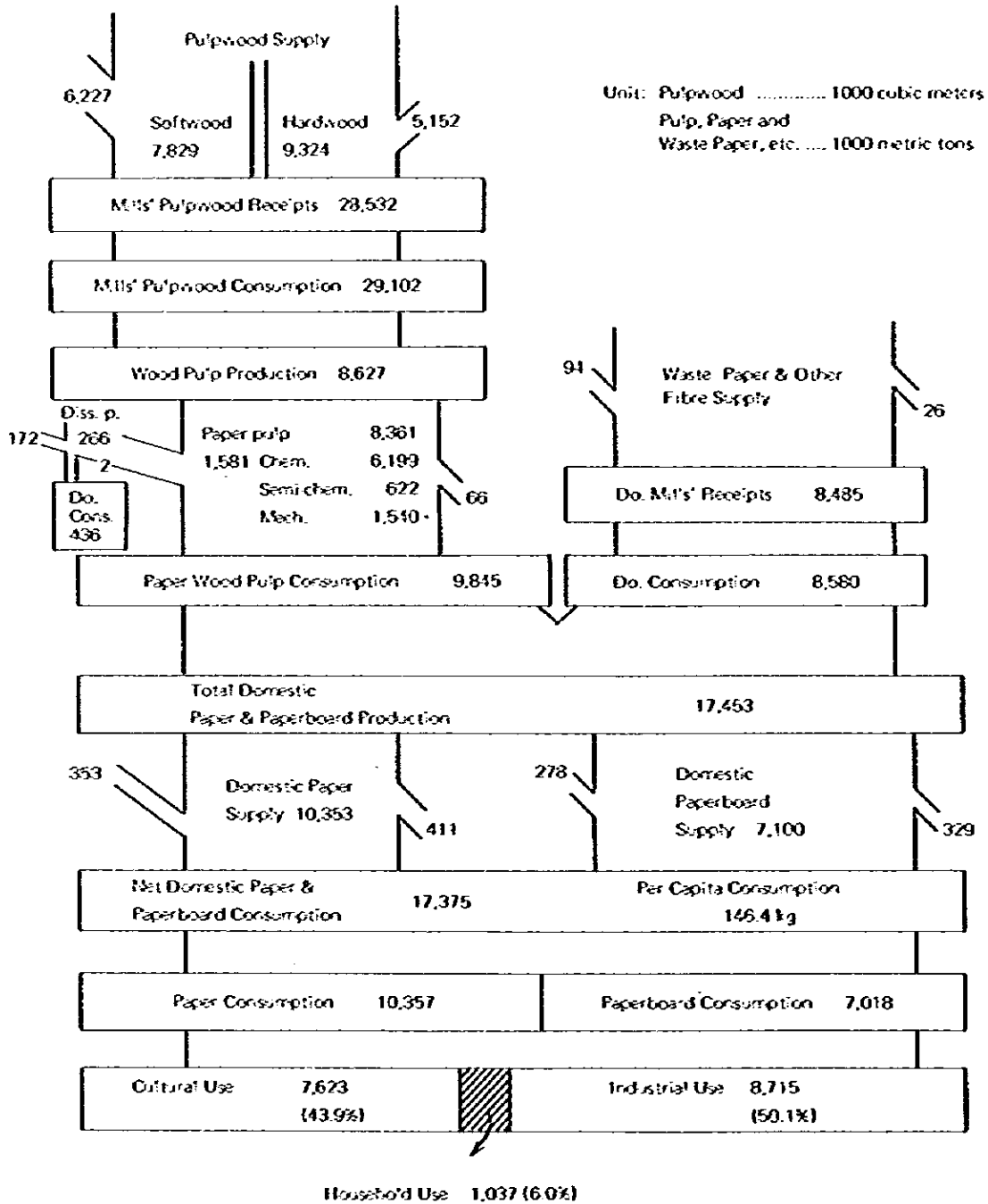
Source: Industrial Structure Council (Jan. 1983)

Figure 7-1 Past and Future Demand of Paper and Paperboard in Japan (1970 - 1990)



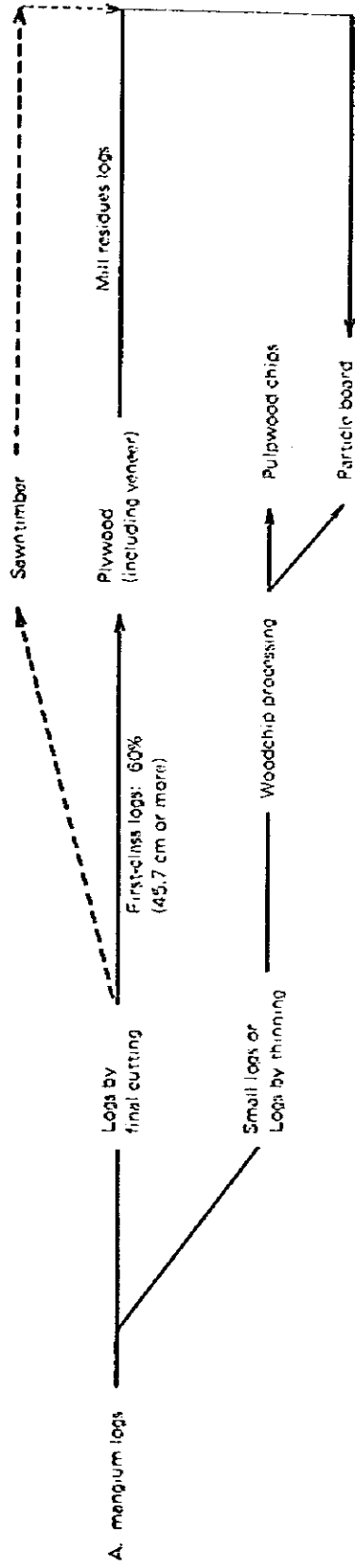
Source: Industrial Structure Council (Jan. 1983)

Figure 7-2 Flowchart of Pulp and Paper Productions in Japan, 1982



Source: Japan Paper Association

Figure 7-3 Flowchart *Acacia mangium* Log Distribution



Bibliography

Seed

Bowen, M.R. "Acacia mangium, a note on seed collection, handling and storage technique including some experimental data and information on *A. auriculiformis* and probable *A. mangium* X *A. auriculiformis* hybrid"

_____ "Gmelina arborea, a note on fruit collection handling and seed storage techniques with data on nuts and seeds"

Bowen, M.R., and Eusebio, T.V. "Acacia mangium, seed harvests 1982"

_____ "Information on seed collection, handling and germination testing"

Anonymous "Eucalyptus deglupta, A note on seed collection, handling and storage techniques"

Afforestation

Bowen, M.R., and Eusebio, T.V. "Possible Acacia species for use in Sabah plantations"

Nicholson, D. I. "The national occurrence and conservation status of *Acacia mangium* Willd in Australia"

Tham Chee Keong "Introduction to a plantation species - *Acacia mangium* Willd"

Tham Chee Keong "*Acacia mangium* Willd - A plantation species for *Imperata cylindrica* (L.) Beauv. grassland in Sabah"

Tham Chee Keong "Trials of *Acacia mangium* Willd as a plantation species in Sabah"

_____ "Mangium and other Acacia of the humid tropics"

Lai K. K. and Phang, C. "Reforestation research on shifting cultivation sites in Sarawak"

Uses

Logan, A. F. and Balodis, V. "The pulping and paper making characteristics of *Acacia mangium*."

_____ (1982) "Pulping and paper making characteristics of plantation-grown *Acacia mangium* from Sabah."

Peh, T. B., Khoo, K. C. and Lee, T. W. (1982) "Sulphate pulping of *Acacia mangium* and *Cleistopholis glauca* from Sabah."

Phillips, F. H., Logan, A. F. and Balodis, V. (1979) "Suitability of tropical forest for pulpwood mixed hardwoods, residues and reforestation species."

Tan, Y. K. "The properties of *Acacia mangium* from Sabah research plantation"

Agriculture

Forest Department "Agro-Forestry"

Hatch, T. "Shifting cultivation in Sarawak and its effect on soil fertility"

Bengkoka Project

McGowan Int'l "Bengkoka Settlement Planning Study"

McGowan Int'l "Bengkoka-Kudat In-situ development project. Vol. 1-3."

Raja dan Gabongan (1983) "Bengkoka water supply strategy study."

SEPU, Sabah "Bengkoka afforestation/resettlement project"

Others

Dept. of Statistics "Annual bulletin of statistics, Sabah, 1982"

Forest Department "Annual report of the forest department for the year 1977"

Forest Department "Annual report of the forest department for the year 1978"

Ministry of Agriculture and Fishery "Hydrological records for Sabah to 1968"

Ministry of Agriculture and Fishery "Hydrological records for Sabah 1969 - 1975"

Forest enactment, 1968

Brief notes on the Sabah Forestry Development Authority as of at 31, December 1983

The Sabah State Government Centenary Publications Committee "Commemorative History of Sabah 1881 - 1981"

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