L. Soil Survey and Soil Map Preparation

(1) Survey Concept

In order to clarify soil distribution in the Project Area necessary for formulation of the Social Forestry Development Project, a soil survey was conducted and soil map preparation carried out. Also, technical transfer was carried out.

① A flexible survey method was employed based on the ground landscape classification which reflects the differences of the soil formation factors involved.

② When observing the soil profiles, priority was given to elements that can be relatively easily judged without any specialist knowledge. In carrying out soil classification, too, a practical method of subdivision was introduced with consideration given to these elements.

③ In the soil profile survey in and around coffee cultivation areas, farmers were particularly questioned about pests and other obstacles to growth in the hearing survey, and methods used to carry out tree management were observed.

(2) Topographical Survey

In land other than national forest which occupies most of the Project Area, there is little distribution of natural vegetation and most land is farmland. Much farmland has been converted to coffee fields in recent years. As a result, it is thought that land use and vegetation divisions are not greatly reflected in the soil distribution. Surface landscape divisions that place priority on topographical divisions and surface form were set and examination was carried out into soil generation factors that dictate the soil distribution.

(3) Soil Profile Survey

The soil profile survey was conducted by selecting sample pits (approximately 56 pits), taking into consideration the elevation and microtopography based on the classified topography. The observations and descriptions under the soil profile survey basically followed the FAO Guidelines for Soil Profile Description (Second Edition, 1977). However, some observation items were omitted where deemed appropriate in view of the soil profile survey principles [(1)② above].

In addition to the soil profile survey, the field soil textural classes (see Table L-1) were observed as these could be judged by finger assessment. Moreover, the soil hardness,

which could be judged by finger assessment and which is believed to be related to root swelling, was measured using a Yamanaka soil hardness meter (see Table L-2 for the results). The quantities of allophane (non-crystalline clay mineral special to volcanic ash-based soil) and others were checked using 1-mol sodium fluoride solution as a supplementary method of making judgements on volcanic soil.

(4) Measurement of Physical and Chemical Properties of Soil

The physical and chemical properties of the soil were measured using soil samples collected from typical profiles and sample pits where a severe growth impediment to coffee was observed (only typical profiles in the case of soil samples collected by cylinder). The actual measuring/analysis was commissioned to the Soil Laboratory of the Faculty of Agriculture, University of Bengkulu. The measuring items and methods were restricted to those which could be handled by the Soil Laboratory (see Table L-3).

(5) Soil Classification and Preparation of Soil Map

1) Soil Classification

The locally found soil was classified into great soil groupings and soil units employed by the FAO-Unesco Soil Map of the World (Revised Legend; 1990) (see Table L-4). In accordance with the soil survey principles described in (1)-②, the classified soil units were further detailed, mainly in terms of the gravel level and effective soil depth based on the degree of hardness.

2) Preparation of Soil Map

In addition to the sample pit survey findings, the observation findings at the cut surfaces of roads and sand pits, etc. were used to establish the rules of correspondence between the soil distribution and topographical categories to produce a draft soil map on the topographical map (scale: 1/25,000).

In most parts of the Project Area, more than two soil units are distributed in patches in correspondence with the microtopography, the state of cover by volcanic sediment and the state of secondary sedimentation, etc. There is a general tendency that the area of each soil unit is rather too small to be clearly indicated on the topographical map with the predetermined scale. Consequently, it was decided to use the soil complexes as the mapping units. Using the observation results from the field survey based on the soil units that appeared, soil complexes were set based on the following kinds of viewpoint.

① Classification can be made using elements that can easily be judge from the form of soil profiles.

② Differences exist in base materials, etc. that are considered to reflect cultivation limiting conditions and suitability.

③ Compatibility with topographical divisions that can be relatively easily made on site is high.

Under the guidance and supervision of the Study Team members, the staff members of PT. Aerokarto Indonesia traced the base map to produce the original soil map.

(6) Evaluation of Soil Conditions

Using the results of measurement of the physical and chemical properties of soil to judge limiting factors and the degree of limitations, an attempt was made to evaluate soil productivity (potential for production in soil) (see Table L-5).

The level of factors required for each type of use - the thinking behind land evaluation and land capability classification as conducted by FAO and USDA - was used.

① Of limiting conditions, those relating to climate, topographical factors, potential for suffering from natural disaster and insect susceptibility, etc. were omitted from the evaluation. The evaluation method is described below.

② Regarding factors that are required for each mode of use, investigation was carried out by classifying land into farmland (production of grass crops), agricultural forest land (production of tree crops and non-timber forest products) and forest land (production of timber). Inhabitants of the Project Area are aware of the shortage of farmland, so grassland and pasture which require wide areas were omitted from the study.

③ The physical and chemical properties of soil were divided into roughly suitable values (I) and values that exceed suitability (II) and the degree of limitations was judged. Concerning factors that cannot easily altered by artificial methods (permanent factors), a third classification of values that greatly exceed suitability (III) was added (see Table L-5).

④ The physical properties of soil were investigated in the surface layer and under layer regardless of the mode of land use. However, concerning agricultural forest land and forest land, factors relating to the ease or difficulty of cultivation were omitted.

⑤ Concerning the chemical properties of soil, the surface layer was targeted in the case of farmland and the under layer was targeted as a factor for latent productive capability in the case of agricultural forest land which has a long growth period. In the case of forest land, the study targeted only the existence of latent nutrients in the under layer, soil reaction and physical properties.

⑥ From the number of classifications of the degree of limitations for each mode of use (the most numerous of the judgment classifications given in 2.), the following 3 classifications of soil productivity were set and evaluation carried out.

a. Productivity is high (soil productivity class I)

b. Productivity is medium and care is required in selecting crops and tree species and managing cultivation (soil productivity class II)

c. Productivity is low, intensive cultivation management is required to maintain productivity, and suitable crops and tree species are limited (soil productivity class III)

Table L-1 Field Soil Textural Class Judgement Criteria

Symbol	Field Soil Textural Class	Finger Assessment (Sand Content and Stickiness of Clay)
S	sand	almost all sand
SL	sandy loam	sand content: 1/3 - 2/3
L	loam	sand content < 1/3
SiL	silty loam	little sand and mainly non-sticky clay
CL	clayey loam	little sand with sticky clay
C	clay	almost totally sticky clay
G	gravel	mainly gravel

Notes 1) This table is prepared based on the "Forest Soils" jointly published by the Forestry Training Institute of the Forestry Agency in Japan and JICA in 1992.

2) Judgement is made by adding a small amount of water to the soil sample.

Table L-2 Field Judgement Criteria for Soil Hardness

Hardness Class	Judgement Made by Pressing the Profile with the Fingers (1)	Value by Yamanaka's Standard Soil Hardness Tester (2)	Root Distribution (3)
Very Friable	Soil particles are separated with little coherence	0 - 8	Good ↑
Friable	Soil mass can be crushed under very weak pressure and the fingers can penetrate deep into the soil profile due to weak coherence and high porosity	9 - 13	
Soft	Soil particles are comparatively coherent but clear and deep finger marks remain after pressing the soil profile with the fingers	14 - 17	
Firm	Soil particles show high coherence and the finger marks are very shallow even when the soil is pressed hard	18 - 21	↓ Normal
Very Firm	Soil particles show very high coherence and finger marks do not show when the soil is pressed hard	22 - 25	Poor
Indurated	Soil particles show extremely high coherence and even a trowel finds it difficult to get into the soil profile	26 -	None

Notes (1) Forestry Training Institute of Forestry Agency in Japan - JICA (1992): Forest Soils

(2) Mashita (1973)

(3) Estimated state of root distribution without considering crop type, species or soil type, etc. (based on examples of similar areas)

Table L-3 Outline of Measuring Methods for Physical and Chemical Properties of Soil

Measuring Item		Unit	Method
< Physical Properties >		%	
Particle Size Classification/Soil Texture			Pipette method; USDA method
Saturated Permeability	●[1]	cm/hr	Constant water level method; calculation using cm/sec (USLE application unit)
Bulk Density o	●	g/cc	Soil sampler method
< Chemical Properties >			
Acidity pH (H_2O)		-	1 fine soil: 2.5 water; glass electrode method
Acidity pH ($KC\ell$)		-	1 fine soil: 2.5 extracting liquid; glass electrode method
Total Acidity		meq [2]/100g [3]	Calculated by adding exchangeable $A\ell$ to exchangeable H
Organic Carbon (C)		%	Walkley & Black method
Total Nitrogen (N)		%	Kjeldahl method
C/N Ratio		-	Calculated by dividing organic carbon by total nitrogen
Organic Matter		%	Estimated from amount of organic carbon
Available Phosphoric Acid (P_2O_5)		ppm	Olsen method
Cation Exchange Capacity (CEC)		meq/100g	Extraction by 1N ammonium acetate solution
Exchangeable:		meq/100g	
Aluminium ($A\ell$)			Titration method
Hydrogen (H)			Simultaneous measuring with exchangeable $A\ell$ measuring
Potassium (K)			Flame analysis method
Calcium (Ca)			EDTA titration method
Magnesium (Mg)			EDTA titration method
Base Saturation		%	Calculated using exchangeable K, Ca, Mg and CEC

Notes 1) ● : only cylinder samples

2) meq : milliequivalent (mg x molecular weight/valence)

3) 100 g : 100 g of dried soil (oven dried)

Table L-4 Classification Categories of Local Soil Observed in the Project Area

Great Soil Grouping	Classification Characteristics (1) (Prominent Horizon and Typical Properties, etc.)	Soil Unit	Classification Characteristics (1) (Prominent Horizon and Typical Properties, etc.)	Parent Material (2) (Major Soil Forming Process)
Acrisols (AC)	poor base content of lower horizon; has a clay accumulation layer (argic B, base saturation ≤ 50%, cation exchange capacity ≤ 24 cml (+) kg -1) (3)	Humic Acrisols (ACu)	dark, thick surface horizon with poor base content (Umbric A)	tuff breccia (residual volcanic ash/secondary sedimentation)
		Ferric Acrisols (ACf)	reddish brown mottle or coarse grains (ferric properties)	tuff/tuff breccia
		Haplic Acrisols (ACh)	(other Acrisols)	Andesitic tuff
Cambisols (CM)	formed by slightly weathered parent materials and no strong weathering takes place (Cambric B)	Humic Cambisols (CMu)	dark, thick surface horizon with poor base content (Umbric A)	tuff breccia/lava flow deposits (residual volcanic ash)
		Dystric Cambisols (CMd)	light coloured thin surface horizon with poor base content (Ochric A and B, base saturation <50%)	tuff/tuff breccia/mudflow deposits/piedmont clastic deposits (erosion)
		Chromic Cambisols (CMx)	reddish brown lower horizon (hue value of 7.5 YR or redder with saturation of less than 4)	Andesitic tuff
Andosols (AN)	only special characteristic lies with its parent material of new volcanic deposits (andic properties) (4)	Gleyic Andosols (ANg)	lower horizon affected by groundwater (gleyic properties below 50 cm from ground surface)	coarse volcanic ejecta (secondary sedimentation)
		Vitric Andosols (ANv)	dry feeling with coarse grains (5) (no smeary consistence and more coarse than silt loam)	coarse volcanic ejecta
		Umbric Andosols (ANu)	dark, thick surface horizon with poor base content (Umbric A)	fine volcanic ejecta; tuff breccia for lower horizon
		Haptic Andosols (ANh)	(other Andosols)	fine volcanic ejecta; tuff breccia for lower horizon
Leptosols (LE)	consists of shallow soil on bedrock with overwhelming proportion of gravel (depth of less than 30 cm above solid bedrock; fine soil ratio of less than 20% within 75 cm in depth from ground surface)	Lithic Leptosols (LPl)	hardly any soil on top of bedrock (soil thickness on bedrock <10 cm)	tuff breccia/volcanic body constituents (erosion)
		Dystric Leptosols (LPq)	soil with poor base content (base saturation <50%)	coarse volcanic ejecta (residual/erosion)/tuff breccia
Regosols (RE)	mainly consists of unconsolidated parent materials	Dystric Regosols (REd)	soil with poor base content (base saturation ≤50% 20 - 50 cm below ground surface)	weathered andesitic tuff (residual/erosion)
Gleisols (GL)	shallow layer affected by groundwater (gleyic properties upto 50 cm below ground surface)	Andic Gleisols (GLa)	originates from new volcanic deposits (andic properties)	secondary deposits (on top of impermeable bedrock/spring water)
Hisotols (HS)	has thick organic layer (thickness of H/O horizon exceeding 40 cm from ground surface)	-	-	(high elevation with low temperature and high rainfall) (on top of impermeable bedrock)
Fluvisols (FL)	only special characteristic is its parent material of new fluvial deposits (fluvic properties)	Dystric Fluvisols (FLd)	soil with poor base content (base saturation <50% 20 - 50 cm below ground surface)	river deposits (flooding or rising of river, etc.)
Anthrosols (AT)	strongly affected by human activities (original soil layers transformed or buried by human activities)	Paddy Soils	-	(paddy field development)
		Man-Made Immature Soils	-	(settlement/road construction)

Notes (1) The description of the classification categories indicates the typical reference point(s) based on the FAO-UNESCO (1990) "Soil Map of the World (Revised Legend)".
(2) Estimated on the basis of the on-site investigation findings.
(3) May be classified as either Nitisols (NT) or Alisols (AL) if the measurement results of the physical and chemical properties (such as clay content, CEC and base saturation, etc.) are used for classification purposes.
(4) The base saturation is low compared to the CEC but the level of acidity is not high. Has the characteristics of soil with allophane and imogolite.
(5) The description on Page 40 of the above "Soil Map of the World" is used here (from Page 70 onward, the description changes to "fine grains").

Table L-5 Evaluation Criteria for Physical and Chemical Properties of Soil

< Property > Item	Evaluation	Document No.	Classification Unit	Factor		Category for Rough Evaluation of Soil Productivity Potential		
				Changeable	Unchangeable	I (High)	II (Medium)	III (Low)
< Physical >								
Root Area/Nutrition Absorption Area	Effective soil depth	1	Depth (m) of soil hardness ≥25 mm		○	① >1.0: very deep ② 1.0-0.75: deep	③ 0.5-0.75: slightly deep ④ 0.25-0.5: slightly shallow	⑤ 0.25-0.1: shallow ⑥ 0.1>: very shallow
	Thickness of A horizon	3	A horizon (cm)		○	① 18≤	② 18>	
Ease of Cultivation	Gravel volume of A horizon	4	Area ratio in profile (%)		○	① <5: very low ② 5-15: low	③ 15-40: high ④ 40-80: very high	⑤ 80<: gravel-mixed soil
	Soil texture of A horizon	3			○	① coarse-grained [1]	② medium-grained [2]	③ fine-grained [3]
Air Permeability	Soil hardness (maximum value)	2	mm		○	① 0-80 ② 9.0-13.0	③ 14.0-17.0 ④ 18.0-21.0	⑤ 22.0-25.0 ⑥ 26.0<
Oxidation-Reduction Potential	Drainability	4	presence of Mn/Fe nucleus		○	① extremely good (Class 6) ② very good (Class 5) ③ good (Class 4)	④ fair (Class 3) ⑤ slightly bad (Class 2)	⑥ bad (Class 1) ⑦ very bad (Class 0)
Water Supply	Soil texture	3			○	① fine-grained [3]	② medium-grained [2]	③ coarse-grained [1]
< Chemical >								
Nutrient Supply	CEC	3	meq/100g	○		① 24>: large ① ≥50%: high	② <24: small ② <50: low	
	Base saturation	3	%	○				
	Soil texture (weatherable mineral volume)	3			○	① coarse-grained [1]	② medium-grained [2]	③ fine-grained [3]
	Organic content	3	%	○		① >1%: high	② 1%≥ low	
Nutrient Level	K content	1	meq/100g	○		① >1.0: very high ② 0.6-1.0: high ③ 0.3-0.5: medium	④ 0.1-0.2: low ⑤ <0.1: very low	
	P2O5 content	1	ppm	○		① >22: high ② 12.0-22.0: medium	③ 5.0-11.0: low ④ <5.0: very low	
	Ca content	5	meq/100g	○		① >10: high	② 10-7: medium ③ <7: low	
	Mg content	5	meq/100g	○		① >2.2: high	② 1.0-2.2: medium ③ <1.0: low	
Soil Reaction	Acidity	1	pH (KCℓ)	○		① 6.6-7.3: neutral ② 6.1-6.5: slightly acid ③ 5.6-6.0: acid	④ 5.1-5.5: fairly strong acid ⑤ 4.6-5.0: strong acid ⑥ 3.5-4.5: very strong acid ⑦ <3.5: extremely strong acid	
<Biological Feature>	C/N ratio				○	② 10-20: medium	① >20: large ③ <10: small	

Notes (1) The document numbers represent the following documents referred to for compilation of the table.
1) Pusat Penelitian Tanah dan Agroklimat (1990): Buku Keterangan Peta Satuan Lahan dan Tanah Lember Bengkulu, Sumatera
2) Forest soil hardness classification using Yamanaka's standard soil hardness meter (Mashita, 1973)
3) FAO-UNESCO (1990): Soil Map of the World (Revised Legend)
4) FAO (1977): Guidelines for Soil Profile Description (Second Edition)
5) USLE classification (Wischmeier & Smith)
6) As the appropriate quantity or content varies from one crop to another, it is difficult to determine the criterion applicable to the Project Area. Here, examples of application to soil at Japanese sites which show similar conditions to those of the Project Area are summarised to establish the classification categories.

(2) Soil Texture Categories
1) Coarse-grained: sand (S); loamy sand (LS); sandy loam (clay <15%, sand >70%) (SL)
2) Medium-grained: sandy loam (clay <15%, sand >70%) (SL); loam (L); sandy clay loam (SCL); silt loam (SiL); silt (Si); silty clay loam (SiCL); clay loam (clay <35%, sand >70%) (CL)
3) Fine-grained: clay (C); silty clay (SIC); sandy clay (SC); clay loams (CL); silty clay loams (clay ≥35%)

(3) The total acid is used to estimate the quantity of lime to correct the acidity.

(4) Al is not evaluated in the table as the resistance to Al varies from one crop/tree species to another. In general, the level of 1 ppm could be harmful. The classification categories of Al saturation are as follows.
① <20% : very low
② 20 - 40% : low
③ 41 - 60% : medium
④ 61 - 80% : high
⑤ 80%< : very high

Profile description and analytical data of the representative profiles in the Project Area(1/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-2 **Map sheet No.:D-2**

Soil class: Acrisols complex(AC)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Haplic Alisols (ALh)

Location: Near the Bt. Daun Protection Forest, Tabapadang Village, Kepahiang County,
Elevation: 590m
Position/form of slope/ micro-topography: Tradition of gentle-steep slope, small-relief, mountainous
Landform (topography of surrounding profile): Mountainous
Slope (on which profile is sited): 12°
Parent Material: Tuff breccia
Land-use/vegetation: Coffee field (crown density of shade trees>=11%)
-Man-made forests(Acacia mangium)

Profile description A0 horizon: 7.8cm with mycelial strand

ApE 0- 10cm: Brown(7.5YR4/3); clay(clay loam in field soil texture); strong fine subangular blocky and angular blocky; soft hardness; very few rock and mineral fragments; very few fine and coarse roots; clear smooth boundary; pH 4.46.

Bt1 10- 30cm: Brown(7.5YR4/4); clay(clay loam in field soil texture); week fine subangular blocky; very firm hardness; very few rock and mineral fragments; very few ironstone nodules; very few fine and medium roots; gradual smooth boundary; pH 4.60.

Bt2 30- 70cm: Brown(7.5YR4/6); clay(clay in field soil texture), strong fine angular blocky; firm hardness; continuous thin cutans; very few rock and mineral fragments; very few fine and medium roots; gradual smooth boundary; pH 4.56.

BC 70-100cm(+): Brown(7.5YR4/6); dull brown mottles(7.5YR5/4); clay(clay loam in field soil texture), week fine angular blocky; firm hardness; very few rock and mineral fragments; very few fine and medium roots; pH 4.33.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, —: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
ApE	5.33	20.5	29.69	44.47	C	0.21	0.88	4.46	3.76	4.35	×
Bt1	0.56	6.36	22.94	69.49	C	0.17	0.90	4.60	3.86	4.75	×
Bt2	0.20	1.91	15.56	82.32	C	—	—	4.56	3.78	6.10	—
BC	1.40	3.95	16.71	77.93	C	—	—	4.33	3.76	6.35	—

	Organic matter				Available	CEC	Base	Exchangeable					Al/CEC
				Organic	P2O5	(meq/100g)	saturation	cation (meq/100g)					(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
ApE	5.39	0.45	11.98	9.29	4.73	27.66	10.05	3.65	0.70	0.20	1.90	0.68	13.20
Bt1	3.67	0.19	19.32	6.33	4.38	24.91	6.02	4.05	0.70	0.14	0.80	0.56	16.26
Bt2	1.31	0.15	8.73	2.26	3.68	39.92	1.35	5.40	0.70	0.04	0.12	0.38	13.53
BC	1.10	1.12	0.98	1.90	3.68	30.41	1.78	5.50	0.85	0.06	0.14	0.34	18.09

Profile description and analytical data of the representative profiles in the Project Area(2/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-23 **Map sheet No.:D-3**

Soil class: Acrisols-Cambisols complex I(ACCI)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Humic Alisols (ALu)

Location: Mahoni (Swietenia macrophylla) trees, Peny. Panjang Village, Kepahiang County,
Elevation: 450m
Position/form of slope/ micro-topography: Concave part, lava flow , volcanic hills, volcanic
Landform (topography of surrounding profile): Rolling
Slope (on which profile is sited): 0°
Parent Material: Tuff breccia with newly deposited volcanic ash
Land-use/vegetation: Coffee field (crown density of shade trees=<10%)

Profile description A0 horizon: 3.0cm with mycelial strands

A 0- 4cm: Black(7.5YR1.7/1); Silty loam(Silt loam in field soil texture); strong fine subangular blocky and angular blocky; very friable hardness; very few rock and mineral fragments; few fine roots; abrupt smooth boundary; pH 6.36.

AB 4-18cm: Brownish black(7.5YR2/2); silty clay loam(clay loam in field soil texture), strong coarse subangular blocky; friable hardness; very few rock and mineral fragments; very few fine and medium roots; gradual smooth boundary; pH 6.33.

Bt1 18- 38cm: Brownish black(7.5YR3/2); silty clay(clay in field soil texture); strong very coarse subangular blocky; very firm hardness; week clay cementation; very few rock and mineral fragments; very few fine and medium roots; gradual smooth boundary; pH 6.23.

Bt2 38-66cm(+): Very dark brown(7.5YR2/3); silty clay loam(clay in field soil texture); massive; firm hardness; patchy thin clay cutans; very few rock and mineral fragments; very few small soft manganese and iron nodules; very few fine and medium roots; pH 6.29.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, —: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H2O	KCl	(meq/100g)	
A	2.78	8.2	77.87	11.15	SiL	—	—	6.36	6.14	0.20	×
AB	1.58	6.7	52.37	39.35	SiCl	—	—	6.33	5.91	0.25	×
Bt1	2.33	5.4	45.62	46.65	SiC	—	—	6.23	5.78	0.10	△
Bt2	2.60	5.9	51.64	39.86	SiCl	—	—	6.29	5.66	0.15	—

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	2.8	0.58	4.84	4.84	3.38	55.9	16.26	0.10	0.10	0.39	4.20	4.50	0.18
AB	2.89	0.41	7.05	4.98	19.76	36.3	10.20	0.10	0.15	0.60	1.75	1.35	0.28
Bt1	1.20	0.16	7.48	2.06	24.16	31.81	8.47	0.05	0.05	0.54	0.10	2.05	0.16
Bt2	0.62	0.13	4.75	1.07	6.41	48.45	28.24	0.10	0.05	0.68	11.20	1.80	0.21

Profile description and analytical data of the representative profiles in the Project Area(3/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-6 **Map sheet No.:A-1**

Soil class: Acrisols-Cambisols complex II(ACCII)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Ferric Alisols (ALf)

Location: Young coffee field, Selamat Sudiardjo Village, Curup County,
Elevation: 920m
Position/form of slope/ micro-topography: Concave part, hills, mountainous
Landform (topography of surrounding profile): Undulating
Slope (on which profile is sited): 0°
Parent Material: Andesitic tuff
Land-use/vegetation: Coffee field (crown density of shade trees>=11%) with maize cultivation

Profile description No A0 horizon, charcoal fragments(Bt horizon)

A 0- 6cm: Dark brown(7.5YR3/4); Silty clay loam(loam in field soil texture); strong very fine subangular blocky; friable hardness; very few small subangular gravels; few fine roots; abrupt smooth boundary; pH 4.42.

AB 6-20cm: Brown(7.5YR4/4); sandy loam(clay in field soil texture); week medium angular blocky; friable hardness; very few rock and mineral fragments; very few medium roots; gradual smooth boundary; pH 4.70.

Bt 20- 60cm: Dull reddish brown(5YR4/4); sandy loam(clay in field soil texture); strong very coarse angular blocky; firm hardness; patchy thin clay cutans; very few small gravels; very few fine roots; gradual smooth boundary; pH 4.66.

BC 60-120cm(+): Reddish brown(5YR4/8); sandy loam(silt loam in field soil texture); massive; firm hardness; patchy thin clay cutans; very few rock and mineral fragments; very few small soft iron stone nodules; very few roots; pH 5.88.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, --: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
A	3.87	10.80	45.02	40.31	SiCl	0.26	0.74	4.42	3.82	3.80	×
AB	2.44	13.20	60.84	23.51	SL	0.76	0.85	4.70	3.80	2.20	–
Bt	3.34	9.40	49.52	37.74	SL	–	–	4.66	3.70	4.90	–
BC	5.45	22.30	60.75	11.50	SL	–	–	5.88	5.48	0.20	–

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	2.31	0.24	9.63	3.98	1.73	23.69	18.75	2.35	1.45	0.19	2.00	2.25	2.35
AB	1.36	0.12	11.34	2.35	14.28	30.90	7.53	1.90	0.30	0.13	1.90	0.30	1.90
Bt	0.54	0.12	4.46	0.92	0.70	43.30	7.39	4.20	0.70	0.20	2.60	0.40	4.20
BC	0.41	0.12	3.43	0.71	1.34	31.74	15.74	0.10	0.10	0.25	1.75	3.00	0.10

Profile description and analytical data of the representative profiles in the Project Area(4/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-24 **Map sheet No.:C-2**

Soil class: Cambisols complex I(CM I)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Dystric Cambisols (CMd)

Location: Young coffee field, Surobali Village, Curup County,

Elevation: 620m

Position/form of slope/ microtopography:Upper-part, convex steep slope, small-relief, mountainous

Landform (topography of surrounding profile): Steeply dissected

Slope (on which profile is sited): 25°

Parent Material: Tuff breccia

Land-use/vegetation: Coffee field (crown density of shade trees>=11%) near the shrub

Profile description A0 horison: 1.0cm, charcoal fragments(A1 horizon)

A 0- 10cm: Brownish black(7.5YR3/1); silty loam(silt in field soil texture); strong very fine angular blocky; friable hardness; very few rock and mineral fragments; frequent fine and very few medium roots; abrupt wavy boundary; pH 5.04.

Bw1 10-50cm: Brown(10YR4/4); silty loam(clay loam in field soil texture); strong fine subangular blocky; firm hardness; very few large subangular gravels; very few fine, medium and coarse roots; gradual smooth boundary; pH 5.02.

Bw2 50- 100cm(+): Dull yellowish brown(10YR4/3); silty loam(clay in field soil texture); strong very fine subangular blocky; soft hardness; very few rock and mineral fragments; very few fine and medium roots; pH 5.46.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, −: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
A	4.52	10.1	55.86	29.52	SiL	2.61	0.51	5.04	4.39	0.50	△
Bw1	2.46	15.4	70.81	11.33	SiL	2.00	0.67	5.02	4.63	0.30	○
Bw2	1.82	13.8	55.86	25.52	SiL	−	−	5.46	5.11	0.20	−

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	5.33	0.59	9.03	9.18	2.79	32.30	22.18	0.30	0.20	0.29	3.00	3.85	0.93
Bw1	1.36	0.26	5.24	2.35	1.32	29.50	5.49	0.20	0.10	0.12	0.25	1.25	0.68
Bw2	0.66	0.13	5.07	1.14	0.01	36.09	6.06	0.10	0.10	0.19	0.10	1.90	0.28

Profile description and analytical data of the representative profiles in the Project Area(5/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-27 **Map sheet No.:D-3**

Soil class: Cambisols complex II(CM II)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Dystric Cambisols (CMd)

Location: Young coffee field, Air Selimang Village, Kepahiang County,

Elevation: 550m

Position/form of slope/ microtopography:Lower-part, convex steep slope, large-relief, mountainous

Landform (topography of surrounding profile): Mountainous

Slope (on which profile is sited): 16°

Parent Material: Andesitic tuff with newly deposited basalt lava

Land-use/vegetation: Coffee field (crown density of shade trees>=11%)
near a Kemiri tree(Aleurites moluccana)

Profile description A0 horison: 1.0cm with mycelia strands, volcanic glasses(2Bu1 horizon)
very stony surface boulders(basaltic lava)

A 0- 9cm: Brownish black(7.5YR3/2); loam(silt loam in field soil texture); strong fine subangular blocky; friable hardness; very few small gravels; few fine and very few medium roots; abrupt smooth boundary; pH 5.06.

Bw1 10-50cm: Brown(7.5YR4/3.5); brownish black mottling; clay(clay in field soil texture), massive; very firm hardness; frequent large subangular gravels; very few small soft iron nodules; very few fine and medium roots; clear wavy boundary; pH 4.87.

Bw2 50- 78cm(+): Brown(7.5YR4/3) in upper part and brownish gray(7.5YR 5/1) in lower part ; clay loam(clay loam in field soil texture); massive; very firm hardness; frequent large subangular gravels; very few fine roots; pH 4.95.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, —: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
A	5.76	28.30	46.32	21.62	L	--	—	5.06	4.37	0.30	×
Bw1	5.30	10.10	35.80	48.78	C	—	—	4.87	3.85	0.40	×
Bw2	1.72	19.40	20.80	38.08	CL	—	--	4.95	3.61	4.20	—

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					AlCEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	1.14	0.35	3.25	1.96	3.94	36.95	21.71	0.20	0.10	0.17	6.20	1.65	0..54
Bw1	0.70	0.12	5.83	1.21	0.44	31.32	6.93	0.30	0.10	0.17	0.45	1.55	0.96
Bw2	0.41	0.71	2.28	0.71	--	28.34	28.03	4.00	0.20	0.15	5.90	1.90	14.11

Profile description and analytical data of the representative profiles in the Project Area(6/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-21 **Map sheet No.:D-3**

Soil class: Cambisols complex III(CM III)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Dystric Cambisols (CMd)

Location: Kemiri trees(Aleurites moluccana), Talangpito Village, Kepahiang County,

Elevation: 330m

Position/form of slope/ microtopography:Lower-part, convex steep slope, convex part, mudflow, volcanic hills, volcanic

Landform (topography of surrounding profile): Rolling

Slope (on which profile is sited): 27°

Parent Material: Mudflow deposits

Land-use/vegetation: Coffee field (crown density of shade trees>=11%) near the Kemiri stands

Profile description A0 horison: 0.2-5cm, charcoal fragments(A horizon)

Au1 0- 6cm: Very dark brown(7.5YR2/3); silty loam(clay loam in field soil texture); strong fine angular blocky; soft hardness; very few rock and mineral fragments; very few fine, medium and coarse roots; clear smooth boundary; pH 6.89.

Au2 6-22cm: Brownish black(7.5YR3/2); silty loam (clay loam in field soil texture); strong fine angular blocky; very firm hardness; few small subangular gravels; very few fine and medium roots; gradual smooth boundary; pH 5.07.

AB 22- 53cm: Dark brown (10YR3/3.5); silty loam(clay loam in field soil texture); massive; very firm hardness; frequent large subangular gravels; very few fine roots; clear wavy boundary; pH 5.21.

Bw 53- 85cm(+): Dull yellowish brown(10YR4/3); Clay(Silt loam in field soil texture); massive, very firm hardness; few small angular blocky gravels; very few medium roots; pH 5.18.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, −: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine	Silt	Clay	Texture	(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
Au1	0.20	8.31	56.29	25.20	SiL	−	−	6.89	6.49	3.60	×
Au2	4.45	5.40	61.08	29.07	SiL	−	−	5.07	4.15	0.20	×
AB	3.50	10.70	45.63	40.16	SiL	−	−	5.21	4.03	0.30	−
Bw	3.18	9.30	33.47	54.04	C	−	−	5.18	3.92	0.25	−

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
Au1	3.07	0.30	10.22	5.29	2.51	34.17	26.81	2.70	0.30	0.41	7.00	1.75	7.90
Au2	1.53	0.15	10.17	2.63	0.32	30.53	11.06	0.15	0.05	0.38	0.90	2.10	0.49
AB	1.40	0.19	7.38	2.42	1.20	27.24	38.07	0.20	0.10	0.22	7.40	2.75	0.73
Bw	0.37	0.18	2.07	0.64	2.03	37.05	36.49	0.15	0.10	0.17	11.10	2.25	0.40

Profile description and analytical data of the representative profiles in the Project Area(7/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-4 **Map sheet No.:D-2**

Soil class: Cambisols complex IV(CM IV)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Dystric Cambisols (CMd)

Location: Lubuksaung Village, Kepahiang County,

Elevation: 480m

Position/form of slope/ microtopography: Flat part, lower plane, diluvial upland, mountainous,

Landform (topography of surrounding profile): flat

Slope (on which profile is sited): 0°

Parent Material: Diluvial deposits(old colluvial and aluvial deposits)

Land-use/vegetation: Coffee field (crown density of shade trees>=11%)

Profile description No A0 horison, charcoal fragments(A horizon)

A 0- 15cm: Brownish black(7.5YR3/2); loam(clay loam in field soil texture); strong very fine and fine angular blocky; very firm hardness; very few rock and mineral fragments; abundant fine roots; gradual smooth boundary; pH 4.58.

Bwgt1 15-60cm: Brown(7.5YR4/4); blackish mottling; clay(clay loam in field soil texture); strong very fine angular blocky and moderate medium subangular blocky; very firm hardness; patchy thin cutans; very few rock and mineral fragments; very frequent small hard manganese-iron nodules; very few roots; clear smooth boundary; pH 4.74.

Bwgt2 60- 80cm: Dull yellowish brown(10YR5/4); reddish mottling; clay loam(silt loam in field soil texture); moderate coarse angular blocky; very firm hardness; very few rock and mineral fragments; very few small hard manganese-iron nodules; very few roots; clear smooth boundary; pH 4.45.

BC 80-100cm: Brownish black(10YR3/2); Silty loam(clay loam in field soil texture); strong coarse platy; idurated; very few rock and mineral fragments; broken platy pans; very few roots; clear smooth boundary; pH 5.36.

C 100-110cm(+): Olive black(5YR3/1); indurated;

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, —: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine	Silt	Clay	Texture	(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
A	6.66	42.40	29.06	21.87	L	0.22	0.83	4.58	3.70	6.25	×
Bwgt1	0.56	2.74	37.52	59.18	C	0.17	0.90	4.74	3.83	5.55	△
Bwgt2	4.36	8.67	39.35	47.67	C	—	—	4.45	3.76	7.70	—
BC	5.10	10.52	54.86	26.52	SiL	—	—	5.36	4.20	0.90	—

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	4.49	0.27	16.63	7.74	5.08	55.24	2.79	5.55	0.70	0.14	1.04	0.36	10.05
Bwgt1	0.84	0.14	6.00	1.45	4.38	28.64	4.68	4.70	0.85	0.04	1.14	0.16	16.41
Bwgt2	0.41	0.16	2.75	0.76	4.20	19.20	11.46	6.80	0.90	0.14	1.76	0.30	35.42
BC	0.43	0.18	2.39	0.74	4.38	43.03	13.76	0.70	0.20	0.52	4.72	0.68	1.63

Profile description and analytical data of the representative profiles in the Project Area(8/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-1 **Map sheet No.:C-1**

Soil class: Andosols-Cambisols complex (ANC)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Umbric Andosols (Anu)

Location: in the Bt. Daun Protection Forest, Air Lanang Village, Curup County,

Elevation: 820m

Position/form of slope/ microtopography: Upper-part, gentle slope, small-relief, mountainous,

Landform (topography of surrounding profile): Steeply dessected

Slope (on which profile is sited): 4°

Parent Material: Volcanic ejecta(coarse grains) with tuff breccia

Land-use/vegetation: Natural forest (crown density =31-70%)

Profile description A0 horison :4.5cm with fermented coffee leafs, charcoal and brick fragments(Ap horizon)

Ap 0- 12cm: Black(10YR2/1); sandy loam(silt loam in field soil texture); strong fine crumb and fine subangular blocky; very friable hardness; very few rock and mineral fragments; abundant fine and frequent medium roots; clear smooth boundary; pH 5.18.

AB 12-30cm: Brownish black(10YR2/3); sandy loam(silt loam in field soil texture); strong medium subangular blocky; soft hardness; very few rock and mineral fragments; few fine and very few medium roots; gradual smooth boundary; pH 5.46.

B 30- 50cm: Dark brown(10YR3/4); loamy sand(clay loam in field soil texture); moderate coarse subangular blocky; firm hardness; very few rock and mineral fragments; very few fine roots; gradual smooth boundary; pH 5.39.

Bg 50-130cm(+): Dull yellowish brown(10YR4/3); loamy sand(clay loam in field soil texture); strong coarse subangular; firm hardness; very few rock and mineral fragments; very few soft small iron nodules, very few roots; pH 5.31.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, −: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine	Silt	Clay	Texture	(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
A	6.98	61.50	18.93	12.59	SL	0.42	0.77	5.18	4.58	0.30	○
AB	6.10	65.80	16.65	11.44	SL	0.20	0.80	5.46	4.80	0.30	○
Bu	8.18	66.10	17.98	7.73	LS	−	−	5.39	5.44	0.20	−
Bg	7.60	60.00	22.88	9.46	LS	−	−	5.31	4.70	0.25	−

	Organic matter				Available	CEC	Base	Exchangeable					Al/CEC
				Organic	P2O5	(meq/100g)	saturation	cation (meq/100g)					(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
A	11.31	0.65	17.40	19.50	4.73	38.22	6.23	0.25	0.05	0.14	1.56	0.68	0.65
AB	6.92	0.23	30.09	11.93	4.03	37.03	13.10	0.20	0.10	0.24	4.01	0.60	0.54
B	4.46	0.32	13.94	7.69	3.50	27.36	9.14	0.15	0.05	0.76	1.40	0.34	0.55
Bg	2.47	0.24	10.29	4.26	5.08	32.87	7.79	0.20	0.05	0.76	1.46	0.34	0.61

Profile description and analytical data of the representative profiles in the Project Area(9/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-8 **Map sheet No.:B-1**

Soil class: Andosols complex I(AN I)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Vitric Andosols (Anv)

Location: Near coffee (Coffea arabica) plantation of PT. Sahid Sembada Nabrocom, Sentral Baru Village, Curup County,

Elevation: 1,160m

Position/form of slope/ microtopography: Upper-part, explosive ejection deposition, gentle slope, stratovolcano, volcanic

Landform (topography of surrounding profile): Mountainous

Slope (on which profile is sited): 13°

Parent Material: Volcanic ejecta(coarse grains)

Land-use/vegetation: Coffee field (crown density of shade trees =<10%) - dry crop land (without terraces)

Profile description: Very thin A0 horison

Au1 0- 14cm: Black(10YR1.7/1); loam(silt loam in field soil texture); strong fine crumb and fine subangular blocky; friable hardness; very few rock and mineral fragments; frequent fine roots; abrupt smooth boundary; pH 5.64.

Au2 14-26cm: Brownish black(10YR3/2); loamy sand(silt loam in field soil texture); week medium subangular blocky; soft hardness; very few rock and mineral fragments; frequent fine roots; gradual smooth boundary; pH 5.56.

Bw 26-37cm: Dark brown(7.5YR3/3); brown(7.5YR4/6) of sand grains; sandy loam(loam in field soil texture); week coarse subangular blocky; friable hardness; very few rock and mineral fragments; very few roots; abrupt smooth boundary; pH 5.48.

BC 37-65cm(+): Brown(7.5YR4/6); sandy loam(silt loam in field soil texture); single grain; very firm hardness; very frequent large subangular gravels; very few roots; pH 5.01.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, —: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H2O	KCl	(meq/100g)	
Au1	9.34	35.60	44.89	12.16	L	--	—	5.64	4.88	0.15	○
Au2	6.57	73.40	13.78	6.24	LS	—	—	5.56	5.04	0.25	○
B	5.58	67.30	18.24	8.88	SL	--	--	5.48	5.23	6.30	—
BC	5.93	56.20	27.92	9.94	SL	—	—	5.68	5.50	0.10	—

	Organic matter				Available	CEC	Base	Exchangeable					Al/CEC
				Organic	P2O5	(meq/100g)	saturation	cation (meq/100g)					(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
Au1	11.01	0.58	18.98	18.98	5.43	39.56	18.35	0.10	0.05	0.14	6.48	0.64	0.25
Au2	6.60	0.72	9.17	11.38	3.85	30.34	3.92	0.20	0.05	0.10	0.80	0.29	0.66
B	5.36	0.53	10.11	9.24	5.08	41.15	0.97	5.55	0.75	0.10	0.22	0.08	13.49
BC	1.89	0.14	13.50	3.26	5.43	39.87	1.20	0.05	0.05	0.04	0.34	0.10	0.13

Profile description and analytical data of the representative profiles in the Project Area(10/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-7 **Map sheet No.:C-2**

Soil class: Andosols complex II(AN II)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Vitric Andosols (Anv)

Location: Salak field (Zalacca edulis), Pasarujung Village, Kepahiang County,

Elevation: 500m

Position/form of slope/ microtopography: Flat part, volcanic ejection deposition, flat plane, volcanic plateau, volcanic

Landform (topography of surrounding profile): Mountainous

Slope (on which profile is sited): 0°

Parent Material: Volcanic ejecta(coarse grains)

Land-use/vegetation: Salak field-coffee field(crown density of shade trees>=11%)

Profile description A0 horison: 15cm, charcoal fragments(Ap horizon)

Ap1 0- 20cm: Brownish black(10YR2/3); silty loam(silt loam in field soil texture); strong very fine angular blocky; soft hardness; very few rock and mineral fragments; frequent fine roots; clear wavy boundary; pH 5.33.

Ap2 20-26cm: Brownish black(10YR2/2); silty loam(silt loam in field soil texture); strong medium angular blocky; very few angular small gravels; gradual smooth boundary.

AB 26-43cm: Dark brown(10YR3/3); silty loam(loam in field soil texture); week very fine angular blocky; firm hardness; very few rock and mineral fragments; few fine and very few medium roots; gradual smooth boundary; pH 5.61.

B 43-85cm: Dark brown(10YR3/4); silty loam(clay loam in field soil texture); massive; firm hardness; very few small subangular and angular blocky gravels; few fine roots; gradual smooth boundary; pH 5.76.

BC 85-130cm(+): Brown(10YR4/6); (loam and gravels in field soil texture); massive and single grains; very frequent small angular gravels and very few small angular stones; few fine roots.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, −: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine	Silt	Clay	Texture	(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
Ap1	2.90	9.70	78.12	9.28	SiL	3.28	0.41	5.33	4.75	0.30	○
Ap2	−	−	−	−	−	−	−	−	−	−	−
AB	−(26.62)	−	69.04	4.28	SiL	0.19	0.52	5.61	5.20	0.15	−
B	3.14	23.70	68.88	4.28	SiL	−	−	5.76	5.36	0.30	−

	Organic matter				Available	CEC	Base	Exchangeable					Al/CEC
				Organic	P2O5	(meq/100g)	saturation	cation (meq/100g)					(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
Ap1	4.02	0.69	5.82	6.93	3.08	50.05	15.98	0.20	0.10	0.25	4.20	3.55	0.40
Ap2	−	−	−	−	−	−	−	−	−	−	−	−	−
AB	2.71	0.46	5.89	4.67	0.01	36.90	9.21	0.10	0.05	0.15	0.95	2.30	0.27
B	2.04	0.12	16.97	3.51	0.01	45.72	6.83	0.20	0.10	0.12	2.50	0.50	0.44

Profile description and analytical data of the representative profiles in the Project Area(11/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: EP-3 **Map sheet No.:D-2**

Soil class: Leptosols-Regosols complex (LPR)

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Distric Regosols (REd)

Location: in the Bt. Daun Protection Forest, Tabapadang Village, Kepahiang County,

Elevation: 800m

Position/form of slope/ microtopography: Upper-part, escarpment, large-relief, mountain, mountainous

Landform (topography of surrounding profile): Mountainous

Slope (on which profile is sited): 8°

Parent Material: Andesitic tuff

Land-use/vegetation: Ex-pine plantation(Pinus merkusii)- secondary forest

Profile description Very thin A0 horison

C 0- 120cm(+): Brown(10YR4/6) in the upper part; dark reddish brown (5YR3/6) in the lower part; reddish, greyish, mottling; clay loam(clay in field soil texture); massive; soft - firm hardness; frequent small gravels; frequent fine and few medium roots in the upper part; pH 4.47.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, –: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
C	6.43	12.30	49.94	31.33	CL	--	--	4.47	3.56	8.60	×

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					Al/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
C	0.56	0.18	3.61	1.12	0.01	25.54	11.70	7.30	1.30	0.09	1.15	1.75	28.58

Profile description and analytical data of the representative profiles in the Project Area(12/12)

Rejang Lebon, Bengkulu, Indonesia

Profile No.: OP-16 **Map sheet No.:B-1**

Soil class: Wettish soils or Swampy soils(WS) [Paddy soils]

Soil taxonomic classification (soil unit, FAO-Unesco 1990): Cumulic Anthrosols (ATc)

Location: Rice field, Tebatpulau Village(formerly in Dusun Sawah Village), Kepahiang County,

Elevation: 820m

Position/form of slope/ microtopography: Flat part of the micro-relief, waste-filled valley, explosive ejection deposition, stratovolcano, volcanic

Landform (topography of surrounding profile): Flat

Slope (on which profile is sited): 0°

Parent Material: Silty sediments from the irrigation channels and rivers

Land-use/vegetation: Irrigated rice field

Profile description A0 horison: 1cm[grass leaves(Graminaea)], charcoal fragments(Ap horizon) water tabe: -0.43m

Ap 0- 10cm: Brownish black(7.5YR3/2); silty loam(silt loam in field soil texture); strong very fine angular blocky; soft hardness; very few rock and mineral fragments; very few fine and medium roots; abrupt smooth boundary; pH 5.70.

Bg1 10-24cm: Yellowish brown(2.5Y5/3.5); dark reddish brown(5YR3/6) mottling; silty clay loam(clay loam in field soil texture); moderate coarse subangular blocky; firm hardness; very few rock and mineral fragments; very few medium roots; gradual smooth boundary; pH6.27.

Bg2 24-43cm(+): Dark grayish yellow(2.5Y5/2.5); very dark reddish brown (5YR2/4) mottling; silty clay loam(silt loam in field soil texture); week medium subangular blocky; friable hardness; very few rock and mineral fragments; very few soft spherical manganese nodules; very few roots; pH 6.24.

Analytical data (○: Reaction, △: Week reaction, ×: No reaction, --: No analysis)

	Particle size analysis(%)					Saturated	Bulk	pH		Total acidity	1M NaF
	Sand		Silt	Clay	Texture	permeability	density				reaction
Horison	Coarse	Fine				(cm/hour)	(g/cc)	H20	KCl	(meq/100g)	
Ap	2.44	23.10	61.68	12.78	SiL	--	--	5.70	5.14	0.50	△
Bg1	6.44	7.20	27.14	27.14	SiCL	--	--	6.27	5.37	0.10	△
Bg2	2.18	4.20	63.41	34.30	SiCL	--	--	6.24	5.19	0.15	--

	Organic matter				Available	CEC	Base	Exchangeable cation (meq/100g)					AL/CEC
				Organic	P2O5	(meq/100g)	saturation						(%)
Horison	C(%)	N(%)	C/N	contents(%)	(ppm)		(%)	Al	H	K	Ca	Mg	
Ap	0.29	0.65	0.44	0.49	7.68	31.39	10.11	0.35	0.15	0.42	1.10	1.65	1.12
Bg1	0.89	0.25	3.56	1.53	3.23	7.68	41.32	0.05	0.05	0.27	0.95	1.95	0.65
Bg2	0.95	0.23	4.13	1.64	4.99	36.40	12.52	0.10	0.05	0.21	2.15	2.20	0.27

M. Decision of Minister of Forestry Concerning Social Forestry Guidance

NUMBER : 622/Kpts-II/95
CONCERNING
SOCIAL FORESTRY GUIDANCE
MINISTER OF FORESTRY

Considering:

a. that forest as natural resources is a gift from One Supreme God so that it should be managed and utilized optimally for the highest welfare of the people, and its existence and sustainable function should be kept forever.

b. that one of many efforts for gaining the objective as stated in point (a) above mentioned, and in order to improve the welfare and participation of the people who live inside and in the surrounding forest area, therefore it's necessary to arrange Social Forestry.

c. that in line with the subject above mentioned, it is necessary to issue Decision of Minister of Forestry regarding Social Forestry Guidance.

Remembering:

1. Act Number 5 of 1967;
2. Act Number 5 of 1990;
3. Act Number 24 of 1994;
4. Government Regulation Number 64 of 1957;
5. Government Regulation Number 21 of 1970;
6. Government Regulation Number 33 of 1970;
7. Government Regulation Number 28 of 1985;
8. Government Regulation Number 7 of 1990;
9. Presidential Decision Number 15 of 1984;
10. Presidential Decision Number 96/M of 1993;
11. Minister of Forestry Decision Number 677/Kpts-II/1993.

Decides:

Determines: Minister of Forestry Decision Concerning Social Forestry Guidance.

SECTION I

GENERAL REGULATION

Article 1

As defined under this decision:

1. Social Forestry is a system of forest management based on its function implemented through involving the society.
2. Social Forestry Area is forest area determined for Social Forestry activity.
3. Participants are people whose their daily life depend on forest or forest area and who participated actively and voluntarily in Social Forestry activity.
4. Forest products coming from Social Forestry area are forest products (non-wood) commodity.
5. Multipurpose trees or trees for life are perennial trees which produce non-wood forest products that give benefit to the people.
6. Utilization plan is a plan of an activity done inside Social Forestry are which covers planting, maintenance, protection/safeguarding, exploitation, processing and marketing plan.
7. Head of Regional Office is Head of Forestry Office at Provincial Level.

SECTION II

AIMS OF SOCIAL FORESTRY

Article 2

Social forestry aimed at:

a. Improving the welfare of society who live inside or in the surrounding forest area.
b. Increasing quality and productivity of forest according to its appropriate function.
c. Obtaining and keeping forest and life-environment sustainability.

SECTION III

FOREST AREA FOR SOCIAL FORESTRY ACTIVITY

Article 3

(1) Forest area which can be implemented/used for Social Forestry activity is forest area which has a function as protection forest and/or production forest but it is in critical condition and necessary to be rehabilitated.

(2) Whereas forest area which has a function as natural preserve, wildlife preserve, natural tourism park, hunting park, national park, forest park can not be used for Social Forestry activity.

(3) Forest area/production forest are which has been burdened with Forest Utilization Right and/or Forest Utilization Right for Timber Estate (HTI) can not be determined as a location of Social Forestry activity.

(4) Minister of Forestry determines protection forest area and/or production forest for Social Forestry activity based on proposal of Regional Office (Kanwil) and after considering suggestions from Provincial Forest Services (Dinas Kehutanan Dati I).

(5) Determination procedure of forest area for Social Forestry activity area will be further regulated by Directorate General of Reforestation and Land Rehabilitation.

SECTION IV

SOCIAL FORESTRY ACTIVITY IMPLEMENTATION

Article 4

(1) Social Forestry activity, principally, implemented by society or part of society who live inside and/or in the surrounding forest area and that its forest area determined as Social Forestry activity area.

(2) Social Forestry activity as mentioned in Paragraph (1) covers planning, planting, maintenance, protection, exploitation, processing and marketing.

Article 5

(1) Trees/plantation species planted in Social Forestry area are multipurpose trees/plantation or trees for life which are suitable for its soil condition and environment as well as produce fruits, sap which can give benefit to the participants.

(2) Trees/Plantation species as mentioned in Paragraph (1) further regulated by Directorate General for Reforestation and Land Rehabilitation.

SECTION V

SOCIAL FORESTRY ACTIVITY PARTICIPANTS

Article 6

(1) Social Forestry activity participants can be in a group, individual or in the form of Cooperative.

(2) Determination of individual, group or Cooperative as participants of Social Forestry activity executed by Provincial Forest Services (Dinas Kehutanan Dati I) based on proposal of Village Head or Leader Group, and its Concerned Cooperative Board known by Village Head.

(3) Determinated participants as mentioned in Paragraph (2) arrange and sign the agreement with Forestry Offices at Regional Level regarding their participation in Social Forestry activity and their willingness to obey the available regulation.

(4) The agreement model determined by Directorate General of Reforestation and Land Rehabilitation.

Article 7

(1) Social Forestry activity participants as mentioned in Article 6 Paragraph (1) and Paragraph (2) which is proposed by Village Head or Group Leader or Cooperative Board, known by Village Head and submitted to Provincial Forest Services (Kepala Kehutanan Dati I) through Head of District Forest Services (Dinas Kehutanan Dati II) or concerned Head of Forestry and Soil Conservation Services (Dinas Perhutanan dan Konservation Tanah Dati II).

(2) Participant requirements as mentioned in Paragraph (1) completed with:

a. Identification Card "KTP" (copy of Identification Card for individual and group, copy of Cooperative establishment certificate and copy of "KTP" of Cooperative members).

b. Map and location sketch of working area of proposed participation.

c. Letter of statement which states that their participation in Social Forestry activity based on their willingness/voluntary workers.

d. Letter of statement of proposed participants which states that they will fulfill all obligation as mentioned in Article 6 Paragraph (3) and they can understand if the agreement can be null and void as mentioned in Article 13.

SECTION VI

SOCIAL FORESTRY PARTICIPANT RIGHT

Article 8

(1) Participants who have arranged and signed the agreement as mentioned in Article 6 Paragraph (3) have the right to implement Social Forestry activity in their determined working area.

(2) Each participant can be given forest area as his/her working area as follows:

a. For individual, the maximum size is 4 (four) ha.

b. For a group, the maximum size is 4 (four) ha multiplied with total members of the group.

c. For each cooperative, the maximum size is 4 (four) ha multiplied with total members of each cooperative.

Article 9

Participants of Social Forestry activity have the right to exploitate and utilize non-wood forest product on their working area according to the agreement and based on exploitation license published by authorized forestry office.

Article 10

(1) All of forest products that will be sent from the exploitation location to the other location must be completed with a document regarding the forest product based on the available regulation.

(2) All of forest products harvested from Social Forestry area will be levied with forest product royalty according to the available regulation.

SECTION VII

OBLIGATION OF SOCIAL FORESTRY PARTICIPATION

Article 11

Social Forestry participants have certain obligations as follows:

a. Involving directly in planning and implementing Social Forestry Activity.

b. Keeping the safety condition inside or in the surrounding forest area.

c. Increasing plantation through enrichment, planting in bare land with multipurpose trees/trees for life.

d. Arranging/determining their working area boundary according to the statement of the agreement.

e. Taking certain actions for forest fire control.

f. Preventing from the damage of the trees and other forest products in Social Forestry area caused by irresponsible people, animals, etc.

g. Implementing all statement in the agreement and paying attention to guidance, assistance, extension given by Field Extension Workers and taking into account the other regulation.

h. Paying non-wood forest product royalty according to the available regulation.

i. Reporting to the concerned institution in case there is wildlife and protected wildlife illegal hunting.

SECTION VIII

FINANCE

Article 12

All of social forest activity funded by the Government.

SECTION IX

AGREEMENT ABROGATION

Article 13

(1) The participation in Social Forestry activity can be revoked by Ministry of Forestry if:

a. Social forestry participants obviously can not implement their activity 6 (six) months at the latest since the agreement signed.

b. The participants abandon their working area and/or obviously and continuously do not implement their activity for 2 (two) years in sequences.

c. The participants do not pay forest product royalty and other contribution fees according to the available regulation.

d. Assessment done by Ministry of forestry states that 5 (five) years since the agreement signed and the activity shows bad performance caused by neglect of the participants.

(2) Void condition as circumstances of Paragraph (1) after the participants got written warning 3 (three) times in sequences.

SECTION X

GUIDANCE, CONTROL, AND ADVISORY OF SOCIAL FORESTRY

Article 14

(1) Guidance of social forestry activity done by Head of Regional Office.

(2) Control of Social Forestry activity in the field done by Head of Forestry Services at Provincial and District Level.

(3) Advisory for Social Forestry participants done by Director General of Reforestation and Land Rehabilitation.

(4) Guidance, Control, and advisory as mentioned in Paragraph (1), (2) and (3) and technical guidance for Social forestry activity determined by Director General and Land Rehabilitation.

SECTION XI

TRANSITIONAL PROVISION

Article 15

Social forestry activity which has been implemented before this Decision determined remains continuously implemented insofar it adjusted to the soul of this Decision.

SECTION XII

CLOSING PROVISION

Article 16

This decision shall enter into force as of the date of promulgation.

Done in Jakarta
on 20 of November 1995
Ministry of Forestry
DJAMALUDIN SURYOHADIKUSUMO

N. S/W and M/M

N-1 Scope of Works (S/W)

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY
ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT
IN THE UPPER MUSI WATERSHED
IN INDONESIA

AGREED UPON BETWEEN

MINISTRY OF FORESTRY

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Jakarta, November 14, 1995

Ir. Soewardi
Secretary,
Directorate General of Reforestation
and Land Rehabilitation
Ministry of Forestry

Mr. Hideki Miyakawa
Team Leader,
The Preparatory Study Team
Japan International Cooperation Agency

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to conduct a Feasibility Study on the Social Forestry Development Project in the Upper Musi Watershed (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of Japan, will undertake the Study in close cooperation with the authorities concerned of the Government of the Republic of Indonesia.

The present document sets forth the scope of work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are :

(1) to formulate a social forestry development plan in the Upper Musi Watershed in order to improve the community's capability, income and their participation in sustaining forest resources, and

(2) to transfer technology during the course of the Study to the Indonesian counterpart personnel,

thus preventing forest degradation and soil erosion, and contributing to the conservation of natural resources in the Upper Musi Watershed.

III. SCOPE OF THE STUDY

1. Study Area.

The Study Area, the total area of which covers approximately 220,000 ha, covers the Upper Musi Watershed in Bengkulu Province (see appendix 1).

2. Project Area.

The Project Area, the total area of which will cover approximately 50,000 ha, will be set up in the Study Area for the Feasibility Study after collecting general information about the Study Area.

3. Outline of the Study.

In order to achieve the objectives mentioned above, the Study consists of the following two (2) phases.

Work in phase I

(1) Aerial photographing in the Study Area (approximately 220,000 ha; scale 1/20,000).

(2) Collection of general information on the Study Area.
a) Natural conditions
b) Socio-economic and cultural conditions

(3) Preparation of Land-use and vegetation maps for the Study Area (scale 1/50,000)

(4) Selection of the Project Area.

Work in phase II

(1) Preparation of topographic maps for the Project Area (scale 1/25,000)

(2) Collection and analysis of the data and information through a field survey on the following items in the Project Area.

(a) Natural condition:
- Topography
- Land-use and vegetation including local species
- Soil
- Climate/Hydrology
- Soil erosion
- Others

(b) Socio-economic and cultural condition:
- Land/Forest use condition
- Living conditions
- Local needs
- Local custom/Customary Law
- Gender issue
- Agriculture/Livestock
- Forestry/Forest industry
- Local/Farmer groups
- Others

(3) Preparation of the following thematic maps for the Project Area (scale 1/25,000)

(a) Land-use and vegetation maps
(b) Soil maps

(4) Formulation of the Social Forestry Development Plan including the following components for the Project Area.

(a) Sustainable utilization of forest products
(b) Agricultural/forest land conservation
(c) Watershed conservation
(d) Improvement of infrastructure
(e) Local participation
(f) Extension
(g) Improvement of organization/institution
(h) Monitoring and evaluation method.

(5) Feasibility Study on the Social Forestry Development Plan.

(a) Technical analysis
(b) Social analysis
(c) Institutional analysis
(d) Financial and economic analysis
(e) Environmental impact assessment (AMDAL)

(6) Preparation of Social Forestry Development Planning Map for the Project Area (scale 1/25,000)

(7) Selection of trial plots and formulation of Implementation Plan for the plots.

IV. STUDY SCHEDULE

The study shall be carried out in accordance with the attached tentative study schedule (see appendix 2).

V. REPORTS

JICA shall prepare and submit the following reports in English to the Government of the Republic of Indonesia.

1. Inception Report.
Thirty (30) copies at the commencement of the Study.

2. Progress Report
Thirty (30) copies at the beginning of Phase II of the Study.

3. Interim Report
Thirty (30) copies at the middle of Phase II of the Study.

4. Draft Final Report
Thirty (30) copies at approximately three (3) months before submission of the Final Report. The Government of the Republic of Indonesia will provide JICA with its comments on the Draft Final Report within one (1) months after the receipt of the Draft Final Report.

5. Final Report.
Fifty (50) copies within two (2) months after the receipt of the comments of the Government of the Republic of Indonesia on the Draft Final Report.
In addition to the above reports, one set each of the following are to be submitted to the Government of the Republic of Indonesia with relevant reports.

(1) Monochrome aerial photographs in the Study Area (scale 1/25,000; 1 set)
- Negative film
- Contact prints

(2) Maps:
(a) Study Area (scale 1/50,000 1 set of original, 2 sets of copy)
• Land-use and vegetation maps

(b) Project Area (scale 1/25,000 1 set of original, 2 sets of copy)
• Topographic maps
• Land-use and vegetation maps
• Soil maps
• Social Forestry Development Planning maps

VI. UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF INDONESIA

1. To facilitate the smooth conduct of the Study, the Government of the Republic of Indonesia shall take necessary measures:

(1) to secure the safety of the Japanese study team;
(2) to permit the members of the Japanese study team to enter, leave and sojourn in Indonesia for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees;

(3) to exempt the members of the Japanese study team from taxes, duties and other charges on equipment, machinery and other materials brought into Indonesia for the conduct of the Study;
(4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study;
(5) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Indonesia from Japan in connection with the implementation of the Study;
(6) to secure permission for entry into private properties or restricted areas for the conduct of the Study;
(7) to secure permission for the Japanese study team to take all data and documents (including maps and photographs) related to the Study out of Indonesia to Japan; and
(8) to provide medical services as needed. Its expenses will be chargeable to members of the Japanese study team.

2. The Government of the Republic of Indonesia shall bear claims, if any arise against members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Japanese study team.

3. Ministry of Forestry (hereinafter referred to as "MOF") shall act as a counterpart agency to the Japanese study team and also as a coordinating body in relations with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4. MOF shall, at its own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:
(1) available data and information related to the study,
(2) counterpart personnel,
(3) suitable office spaces with necessary equipment in Jakarta and Bengkulu, and
(4) credentials or identification cards.

VII. UNDERTAKING OF JICA

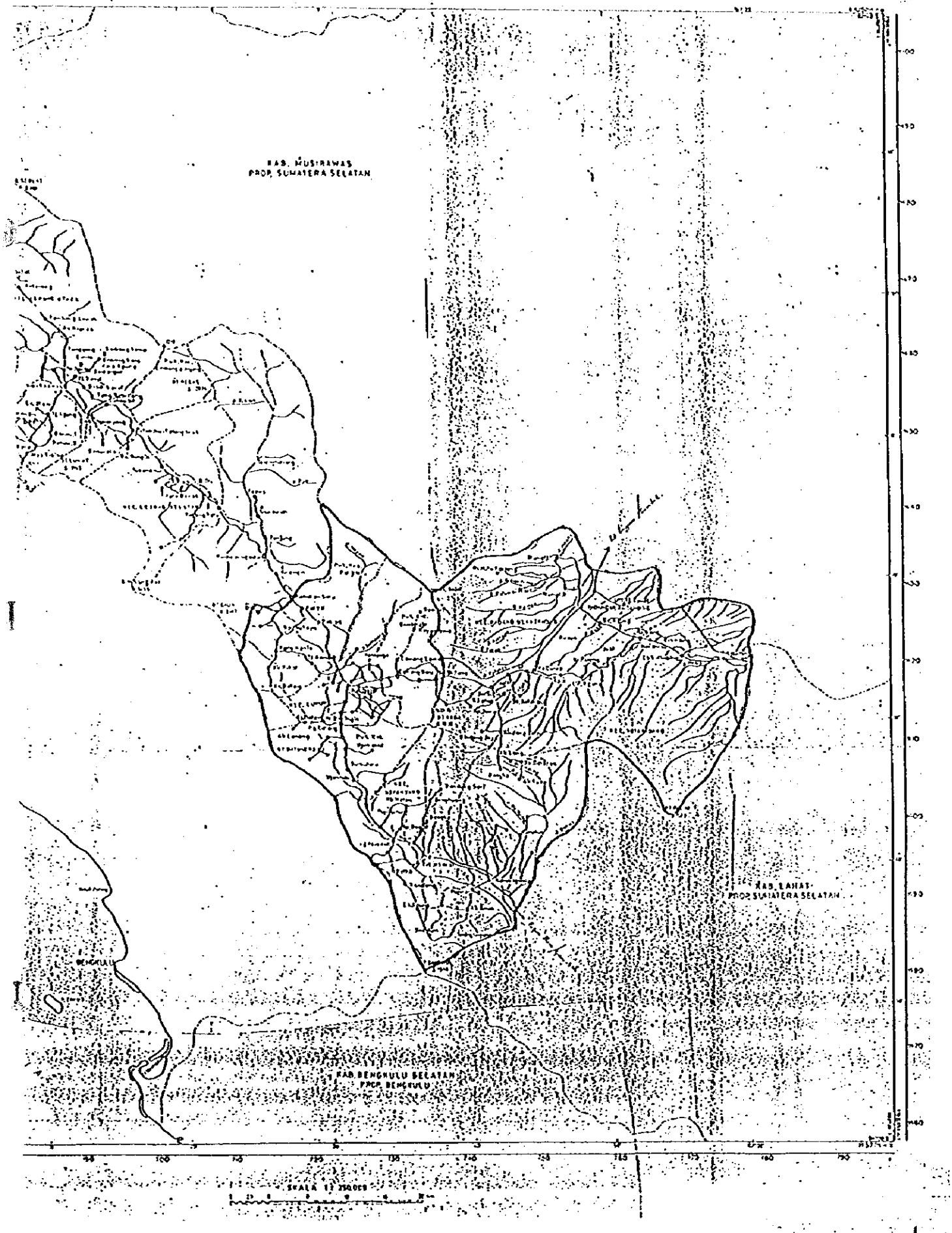
For the implementation of the Study, JICA shall take the following measures :

(1) to dispatch, at its own expense, the study teams to Indonesia, and

(2) to pursue technology transfer to the Indonesian counterpart personnel in the course of the Study.

VIII. OTHERS

JICA and MOF shall consult with each other in respect of any matters that may arise from or in connection with the Study.


KAB. MUSIRAWAS
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KAB. LAHAT
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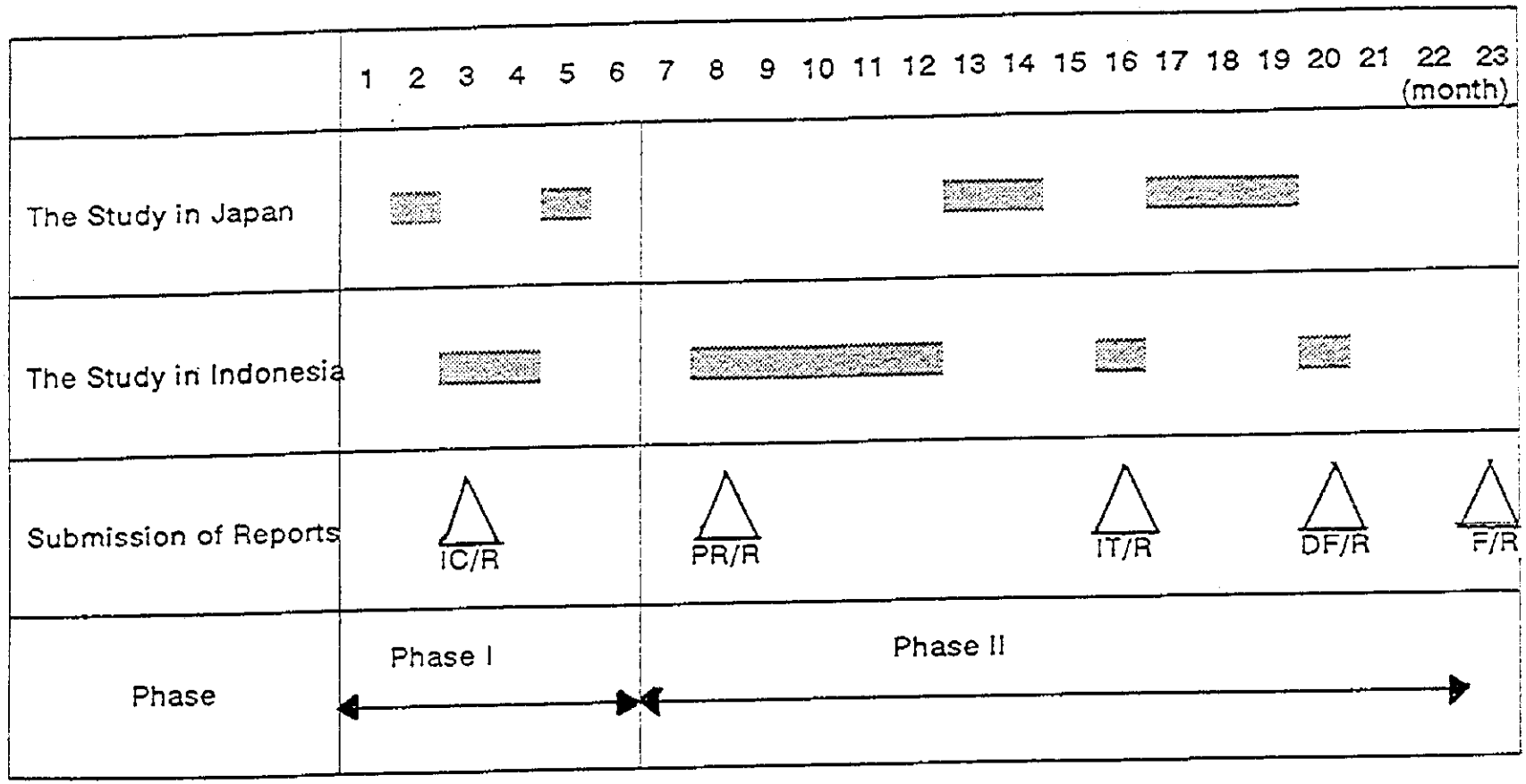
TENTATIVE STUDY SCHEDULE



(Remarks)

IC/R : Inception Report
PR/I : Progress Report
IT/R : Interim Report
DF/I : Draft Final Report
F/R : Final Report

MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE FEASIBILITY STUDY ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT IN THE UPPER MUSI WATERSHED IN INDONESIA

The preparatory study team (hereinafter referred to as "the Team") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"),and headed by Mr. Hideki Miyakawa, visited the Republic of Indonesia from November 1 to November 14,1995 for the purpose of discussing and confirming the Scope of Work for the Feasibility Study on the Social Forestry Development Project in the Upper Musi Watershed in Indonesia (hereinafter referred to as "the Study").

The Team has a series of discussion with the officials concerned of the Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry (hereinafter referred to as "MOF") on the Scope of Work for the Study.

As a result of the discussion, MOF and the Team agreed upon the Scope of Work for the Study.

The main issues discussed by both sides in relation to the Scope of Work for the Study are shown in the ANNEX as attached hereto.

Jakarta, November 14, 1995

Ir. Soewardi
Secretary,
Directorate General of Reforestation
and Land Rehabilitation
Ministry of Forestry

Mr. Hideki Miyakawa
Team Leader,
The Preparatory Study Team
Japan International Cooperation
Agency

The followings are the main issues discussed in relation to the Scope of Work for the Study.

1. Both sides agreed that the Project title would be "Feasibility Study on the Social Forestry Development Project in the Upper Musi Watershed".

2. Both sides agreed that the Study should promote local participation and should emphasize socio-economic and cultural aspects of social forestry, considering the role and impact of forestry in rural development.

3. Both sides agreed on establishment of two (2) types of trial plots (i.e. Type A and Type B) within the Project Area, which would serve as model and demonstration plots for social forestry development. The main objective of establishment of Type A plot would be to conserve the protection forest, especially to protect the catchment area of Musi Dam, without excluding the utilization of forest products and/or land by local people. The main objective of establishment of Type B plot would be to improve welfare of local people and to mitigate land deterioration and forest degradation through introduction of more efficient land use on private land. Specific components of the trial plots would be determined based on the results of the studies on natural and socio-economic and cultural conditions. One plot, covering the area of approximately 300 ha, and two plots, covering the area of approximately 50 ha each, would be identified for Type A and Type B respectively.

4. Both sides agreed that the Study should include a workshop with local communities at the stage of explanation of the Interim Report to discuss social forestry development in the area, for the purpose of encouraging the participation of local people and obtaining their ideas and views; and a seminar at the stage of explanation of the Draft Final Report to disseminate the results of the Study. The workshop and the seminar are to be jointly organized by MOF and Japanese study team.

5. The Team requested that MOF take necessary permission from the authorities concerned for taking aerial photographs of the Study Area, and MOF accepted this request.

6. The Team confirmed MOF to arrange necessary procedure about taking aerial photographs and topographic maps of the Study Area out of Indonesia.

7. MOF requested the Team that JICA consider setting up necessary equipment for conducting the Study, such as four-wheel drive cars, a photocopy machine, an air-conditioner and one set of computer. The Team promised to convey its request to the Government of Japan.

8. MOF will provide at least one counterpart personnel for each JICA expert for effective transfer of technology.

9. Both sides agreed that the Study would be conducted as long as possible in Indonesia, for the effective technical transfer to the Indonesian counterpart personnel.

N-2 Minutes for the Inception Report

MINUTES OF MEETING
ON
THE INCEPTION REPORT
OF
THE FEASIBILITY STUDY ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT IN THE UPPER MUSI WATERSHED IN INDONESIA

In pursuance to the objectives of the Scope of Work for the Feasibility Study on The Social Forestry Development Project in the Upper Musi Watershed in Indonesia (hereinafter referred to as "the Study") signed on November 14th,1995, Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched the Study Team headed by Dr. Yutaka TAGUCHI from February 29th to June 7th,1996 (hereinafter referred to as "the Team") and the Advisory Team headed by Dr. Hideki HIRANO from March 3rd to March 12th.1996.

The Team submitted thirty (30) copies of the Inception Report to the Indonesian side and held a series of discussions with the Indonesian authorities and counterparts headed by Ir. Hoesodo Sudarisman, Director of Programme Development, Directorate General of Reforestation and Land Rehabilitation, Ministry of Forestry.

The salient results of the discussions are as follows :

1. The Team and Indonesian side discussed the Inception Report and both sides agreed upon the contents of the report thereof and the note of discussion is attached.

2. The Team and Indonesian side are on the same opinion that it is necessary to have another discussion in finalizing the selection of project area after having detailed assesment of the location and analyzing aerial photographs prior to the implementation of the second field survey.

Jakarta, March 12th,1996

Yutaka Taguchi

Dr. Yutaka TAGUCHI
Team Leader, JICA Study Team

Ir. Sutarjo Suriamihardja
For, Director of Programme Development,
Directorate General of RLR, Ministry of Forestry

Witnessed by,

平野秀樹

Dr. Hideki HIRANO
Team Leader, JICA Advisory Team

The following are results of discussions in relation to the Inception Report of the Study.

1. The Team agreed to make a transfer of technology plan together with the Indonesian Counterparts before leaving for Japan.

2. MOF requested the Team, during the course of the Study, to consider the possibility of developing the economic capability of local people.

3. MOF requested the Team to involve local experts, local NGOs and local universities.

4. MOF requested the Team to deeply study the possibility of developing local species.

5. MOF requested the Team to organize a workshop in Curup and prepare the workshop material in Indonesian language. The Team is going to convey the request to JICA.

6. MOF recommended the Team to conduct a comparative study to Solo (Central Java) and Madiun (East Java).

7. MOF recommended the Team to use the existing spatial plans as references for the Study.

8. MOF suggested the Team to consult with the MOF's AMDAL Commission when formulating the TOR for the AMDAL.

9. MOF requested the Team to submit Study Reports at least two weeks prior to the coming of respective Study Teams. The Team is going to convey the request to JICA.

10. MOF recommended the Team to consult with the Dinas Perhutanan dan Konservasi Tanah under District Local Government in implementing the Study.

N-3 Minutes for the Progress Report

MINUTES OF MEETING
ON THE PROGRESS REPORT
OF THE FEASIBILITY STUDY ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT
IN THE UPPER MUSI WATERSHED IN INDONESIA

In accordance with the Scope of Work for the Feasibility Study on the Social Forestry Development Project in the Upper Musi Watershed in Indonesia (hereinafter referred to as "the Study") signed by the Government of the Republic of Indonesia (hereinafter referred to as "the Government") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), the JICA Study Team has been conducting the Study starting in February 1996. As a result of the Phase I Study, the Progress Report was prepared and presented to the Government.

The Study Team submitted thirty (30) copies of the Progress Report to the Indonesian side and held a series of discussions with the Indonesian authorities and counterpart headed by Ir. Hoesodo Sudarisman, Director of Programme Development, Directorate General of Reforestation and Land Rehabilitation.

The salient results of the discussion are as follows :

1. The Study Team and Indonesian side discussed the Progress Report and both sides agreed upon the contents of the report thereof, and the note of discussions is attached.

2. Both sides agreed to relocate of the Project Area of approximately 50,000 ha, based on suggestion of MOF which was drawn on the map attached as Appendix.

Jakarta, July 23, 1996

Yutaka Taguchi

Dr. Yutaka TAGUCHI
Leader of JICA Study Team

Ir. Hoesodo Sudarisman
Director of Programme Development
Directorate General of RLR
Ministry of Forestry

Witnessed by,

Hiroaki Okubo

Mr. Hiroaki OKUBO
JICA Advisory Team

1. Both sides agreed that the study should be completed with a rainfall map.

2. Both sides agreed to establish trial plot plan i.e. :

   (1) type A: trial plot established within the forest area.

   (2) type B: trial plot established outside of the forest area.

3. Both sides agreed in formulation of trial plot plan, the team should consider the following aspects:

   (1) development of community forestry plan within the forest area.

   (2) development of private forest plan outside of the forest area.

   (3) development plan of improved coffee plantation.

4. Both side agreed to set up TOR for ANDAL or UKL/UPL based on the recommendation of the MOF-AMDAL Committee.

N-4 Minutes for the Interim Report

MINUTES OF MEETING
ON THE INTERIM REPORT
OF THE FEASIBILITY STUDY ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT
IN THE UPPER MUSI WATERSHED IN INDONESIA

In accordance with the Scope of Work for the Feasibility Study on the Social Forestry Development Project in the Upper Musi Watershed in Indonesia (hereinafter referred to as "the Study") signed by the Government of the Republic of Indonesia (hereinafter referred to as "the Government") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), the JICA Study Team has been conducting the Study since February 1996. As the result of the first and second year study, the Interim Report was prepared and presented to the Government.

The Study Team submitted thrity (30) copies of the Interim Report to the Indonesian side and held a series of discussions with the Indonesian authorities and counterparts in the meetings in Jakarta headed by Mr. Mursidin, Director of Regreening and Social Forestry and in Bengkulu headed by Mr. Enang Zainal Abidin, Head of the Regional Forestry Office of Bengkulu respectively.

The salient results of the discussion are as follows :

1. The Study Team and Indonesian side discussed the Interim Report and both sides agreed upon the contents of the report.

2. Both sides agreed that in setting up the Social Forestry Project, the Study Team must refer to the Ministry of Forestry Decree No:622/KPTS-II/95 dated November 20,1995 and other regulation concerned.

3. Both sides agreed that a technical meeting would be held in order to discuss the social forestry development plan, especially referring to the planting and tending in the national forest.

4. Both sides agreed upon the location of trial plots:
   - Type A plot (approximately 300 ha) is established within the national forest area located in Desa Suro Bali, Desa Tanjung Alam and Desa Air Lanang.
   - One of two Type B plots (approximately 50 ha) is established within private land located in Dusun Tebat Pulau (Desa Dusun Sawah).
   - The other Type B plot (approximately 50 ha) is established within private land located in Desa Suro Bali.

Jakarta, June 23, 1997

Yutaka Taguchi

Dr. Yutaka TAGUCHI
Leader of JICA Study Team

Drs. MURSIDIN
Director of Regreening and Social Forestry
Directorate General of RLR, Ministry of Forestry.

Witnessed by,

Mr. Yukihide KATSUTA
JICA Advisory Team

MINUTES OF MEETING
ON THE LOCATION OF TRIAL PLOTS
FOR THE FEASIBILITY STUDY ON THE SOCIAL FORESTRY DEVELOPMENT PROJECT
IN THE UPPER MUSI WATERSHED IN INDONESIA

In accordance with the Scope of Work for the Feasibility Study on The Social Forestry Development Project in The Upper Musi Watershed in Indonesia (hereinafter referred to as "the Study") signed by the Government of the Republic of Indonesia (hereinafter referred to as "the Government") and Japan International Cooperation Agency (hereinafter referred to as "JICA"), the JICA Study Team has been conducting the Study starting in February 1996. As a result of the first and second year study, the Interim Report has been prepared and presented to the Government. The Study Team and the Government concluded the minutes of meeting on the Interim Report on June 23, 1997.

After the Study Team conducted the field verification working together with KANWIL Kehutanan, Dinas Kehutanan and Sub BRLKT, the Study Team and the Government agreed to amend the above minutes on the Interim Report concerning the location of trial plots as follows:

- Type A plot (approximately 300ha) is established within the national forest area located in Desa Suro Bali, Desa Tanjung Alam and Desa Air Lanang.
- One of two Type B plots (approximately 50ha) is established within private land located in Desa Tebat Pulau.
- The other Type B plot (approximately 50ha) is established within private land located in Desa Tanjung Alam.

Jakarta, August 12, 1997

Ryoya Shimada

Mr. Ryoya SHIMADA
Assistant team leader of JICA Study Team

Drs. MURSIDIN
Director of Regreening and Social Forestry
Directorate General of RLR,
Ministry of Forestry