H-3 Financial Analysis (Analytical Basis for the Without-Project Case)

Without Project Case　　Financial Analysis　　(Unit: Rupiah)

	Cost Estimation			Benefit Estimation		Net Cash flow
	Cost Eatimation(A)	Total Cost (A)+Tax	Inflated at7%p.a.	Benefit Eatimation	Inflated at7%p.a.	
1	47,242,607,500	47,910,796,804	50,549,590,025	111,364,884,000	119,160,425,880	68,610,835,855
2	47,242,607,500	47,910,796,804	54,088,061,327	111,364,884,000	127,501,655,692	73,413,594,365
3	47,242,607,500	47,904,328,954	57,874,225,620	110,286,909,000	135,106,205,862	77,231,980,242
4	47,242,607,500	47,900,017,054	61,925,421,413	109,568,259,000	143,621,636,720	81,696,215,307
5	47,242,607,500	47,895,705,154	66,260,200,912	108,849,609,000	152,667,207,489	86,407,006,577
6	46,284,407,500	46,931,037,304	69,460,415,153	107,771,634,000	161,736,162,212	92,275,747,060
7	46,284,407,500	46,931,037,304	74,322,644,213	107,771,634,000	173,057,693,567	98,735,049,354
8	46,284,407,500	46,747,322,014	79,525,229,308	77,152,419,000	132,562,220,066	53,036,990,758
9	46,284,407,500	46,624,845,154	85,091,995,360	56,739,609,000	104,313,456,875	19,221,461,515
10	46,284,407,500	46,502,368,294	91,048,435,035	36,326,799,000	71,460,311,959	-19,588,123,076
11	112,040,171,500	112,493,560,036	235,827,973,718	75,564,756,000	159,052,624,192	-76,775,349,526
12	75,057,704,000	75,511,092,536	169,044,329,636	75,564,756,000	170,186,307,885	1,141,978,250
13	49,932,307,000	50,211,506,224	120,329,120,372	46,533,204,000	112,137,809,002	-8,191,311,370
14	49,932,307,000	50,333,983,084	128,752,158,798	66,946,014,000	172,622,583,319	43,870,424,521
15	49,932,307,000	50,456,459,944	137,764,809,914	87,358,824,000	241,025,750,776	103,260,940,862
16	49,932,307,000	50,578,936,804	147,408,346,608	107,771,634,000	318,159,511,018	170,751,164,411
17	49,932,307,000	50,578,936,804	157,726,930,870	107,771,634,000	340,430,676,790	182,703,745,920
18	49,932,307,000	50,578,936,804	168,767,816,031	107,771,634,000	364,260,824,165	195,493,008,134
19	49,932,307,000	50,578,936,804	180,581,563,153	107,771,634,000	389,759,081,857	209,177,518,703
20	49,932,307,000	50,578,936,804	193,222,272,574	107,771,634,000	417,042,217,587	223,819,945,013
21	49,932,307,000	50,578,936,804	206,747,831,654	107,771,634,000	446,235,172,818	239,487,341,163
22	49,932,307,000	50,578,936,804	221,220,179,870	107,771,634,000	477,471,634,915	256,251,455,045
23	49,932,307,000	50,578,936,804	236,705,592,461	107,771,634,000	510,894,649,359	274,189,056,898
24	49,932,307,000	50,578,936,804	253,274,983,933	107,771,634,000	546,657,274,814	293,382,290,881
25	49,932,307,000	50,578,936,804	271,004,232,808	107,771,634,000	584,923,284,051	313,919,051,243
26	49,932,307,000	50,578,936,804	289,974,529,105	107,771,634,000	625,867,913,935	335,893,384,830
27	49,932,307,000	50,578,936,804	310,272,746,142	107,771,634,000	669,678,667,910	359,405,921,768
28	49,932,307,000	50,395,221,514	331,991,838,372	77,152,419,000	512,973,963,304	180,982,124,931
29	49,932,307,000	50,272,744,654	355,231,267,058	56,739,609,000	403,660,163,298	48,428,896,240
30	49,932,307,000	50,150,267,794	380,097,455,752	36,326,799,000	276,528,858,872	-103,568,596,881
	1,553,514,476,500	1,570,030,332,274	5,186,092,197,195	2,752,642,629,000	9,060,755,946,186	3,874,663,748,991

ANNUAL BENEFIT PLAN

WITHOUT PROJECT

(Unit: Rupiah)

	Ichi-B1	Ichi-B2	Ichi-B3	B1 + B2 + B3	Income Tax
Item	National Forest	Private Land	Farm Land	Grand Total	20%
					3%
					Grand Ttl*3%*20%
1	3,593,250,000	102,064,050,000	5,707,584,000	111,364,884,000	668,189,304
2	3,593,250,000	102,064,050,000	5,707,584,000	111,364,884,000	668,189,304
3	2,515,275,000	102,064,050,000	5,707,584,000	110,286,909,000	661,721,454
4	1,796,625,000	102,064,050,000	5,707,584,000	109,568,259,000	657,409,554
5	1,077,975,000	102,064,050,000	5,707,584,000	108,849,609,000	653,097,654
6	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
7	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
8	0	71,444,835,000	5,707,584,000	77,152,419,000	462,914,514
9	0	51,032,025,000	5,707,584,000	56,739,609,000	340,437,654
10	0	30,619,215,000	5,707,584,000	36,326,799,000	217,960,794
11	0	69,857,172,000	5,707,584,000	75,564,756,000	453,388,536
12	0	69,857,172,000	5,707,584,000	75,564,756,000	453,388,536
13	0	40,825,620,000	5,707,584,000	46,533,204,000	279,199,224
14	0	61,238,430,000	5,707,584,000	66,946,014,000	401,676,084
15	0	81,651,240,000	5,707,584,000	87,358,824,000	524,152,944
16	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
17	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
18	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
19	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
20	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
21	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
22	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
23	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
24	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
25	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
26	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
27	0	102,064,050,000	5,707,584,000	107,771,634,000	646,629,804
28	0	71,444,835,000	5,707,584,000	77,152,419,000	462,914,514
29	0	51,032,025,000	5,707,584,000	56,739,609,000	340,437,654
30	0	30,619,215,000	5,707,584,000	36,326,799,000	217,960,794
Total	12,576,375,000	2,568,838,734,000	171,227,520,000	2,752,642,629,000	16,515,855,774

WITHOUT PROJECT
ANNUAL INVESTMENT ESTIMATION

		Ichi-C1	Ichi-C1	Ichi-C2	Ichi-C2	Ichi-C3	Ichi-C3	C1 - C3
		1 ha	1.597	1 ha	25.201	1 ha	1.468 ha	Grand Total
MATERIALS	1	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	2	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	3	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	4	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	5	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	6	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	7	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	8	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	9	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	10	0	0	394,000	9,929,194,000	809,750	1,188,713,000	11,117,907,000
	Total	0	0	3,940,000	99,291,940,000	8,097,500	11,887,130,000	111,179,070,000
		Ichi-C1	Ichi-C1	Ichi-C2	Ichi-C2	Ichi-C3	Ichi-C3	C1 - C3
		1 ha		1 ha		1 ha		Grand Total
LABOR	1	600,000	958,200,000	1,440,000	36,289,440,000	1,720,000	3,154,480,000	40,402,120,000
	2	600,000	958,200,000	1,440,000	36,289,440,000	1,720,000	3,154,480,000	40,402,120,000
	3	600,000	958,200,000	1,440,000	36,289,440,000	1,720,000	3,154,480,000	40,402,120,000
	4	600,000	958,200,000	1,440,000	36,289,440,000	1,720,000	3,154,480,000	40,402,120,000
	5	600,000	958,200,000	1,440,000	36,289,440,000	1,720,000	3,154,480,000	40,402,120,000
	6	0	0	1,440,000	36,289,440,000	1,720,000	3,154,480,000	39,443,920,000
	7	0	0	1,440,000	36,289,440,000	1,720,000	3,154,480,000	39,443,920,000
	8	0	0	1,440,000	36,289,440,000	1,720,000	3,154,480,000	39,443,920,000
	9	0	0	1,440,000	36,289,440,000	1,720,000	3,154,480,000	39,443,920,000
	10	0	0	1,440,000	36,289,440,000	1,720,000	3,154,480,000	39,443,920,000
	Total	3,000,000	4,791,000,000	14,400,000	362,894,400,000	17,200,000	31,544,800,000	399,230,200,000
		Ichi-C1	Ichi-C1	Ichi-C2	Ichi-C2	Ichi-C3	Ichi-C3	C1 - C3
		1 ha		1 ha		1 ha		Grand Total
TOTAL	1	600,000	958,200,000	1,834,000	46,218,634,000	2,529,750	65,773,500	47,242,607,500
	2	600,000	958,200,000	1,834,000	46,218,634,000	2,529,750	65,773,500	47,242,607,500
	3	600,000	958,200,000	1,834,000	46,218,634,000	2,529,750	65,773,500	47,242,607,500
	4	600,000	958,200,000	1,834,000	46,218,634,000	2,529,750	65,773,500	47,242,607,500
	5	600,000	958,200,000	1,834,000	46,218,634,000	2,529,750	65,773,500	47,242,607,500
	6	0	0	1,834,000	46,218,634,000	2,529,750	65,773,500	46,284,407,500
	7	0	0	1,834,000	46,218,634,000	2,529,750	65,773,500	46,284,407,500
	8	0	0	1,834,000	46,218,634,000	2,529,750	65,773,500	46,284,407,500
	9	0	0	1,834,000	46,218,634,000	2,529,750	65,773,500	46,284,407,500
	10	0	0	1,834,000	46,218,634,000	2,529,750	65,773,500	46,284,407,500
	Total	3,000,000	4,791,000,000	18,340,000	462,186,340,000	25,297,500	657,735,000	467,635,075,000

WITHOUT PROJECT – ANNUAL INVESTMENT ESTIMATION

Cost Estimation from 11th Year to 30th Year

Unit: Rupiah

	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7	Ichi-7
	Seedling	Seed	Fertilizer	Chemicals	Maint-cfe	Harve-C&I	Plate-cfe	Plant-tree	Intercrop	Total	25,201 ha
11	900,000	91,500	744,000	287,000	360,000		476,000	0	1,440,000	4,298,500	108,326,498,500
12			744,000	287,000	360,000				1,440,000	2,831,000	71,344,931,000
13			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
14			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
15			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
16			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
17			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
18			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
19			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
20			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
21			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
22			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
23			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
24			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
25			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
26			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
27			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
28			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
29			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
30			261,000	133,000	360,000	1,080,000				1,834,000	46,218,634,000
Total		91,500	6,186,000	2,968,000	7,200,000	19,440,000	476,000	0	2,880,000	40,141,500	1,011,605,941,500

	Ichi-15	Ichi-15	Ichi-15	Ichi-15	Materials	Ichi-15	Ichi-15	Ichi-15	Labor	Ichi-15	7 + 15
	Seed	Fertilizer	Chemicals	Total	1,468 ha	Sep-Feb	Apr-Aug	Total	1,468 ha	Total (M + L)	Grand Total
11	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	112,040,171,500
12	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	75,057,704,000
13	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
14	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
15	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
16	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
17	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
18	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
19	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
20	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
21	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
22	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
23	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
24	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
25	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
26	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
27	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
28	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
29	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
30	134,750	520,000	155,000	809,750	1,188,713,000	640,000	1,080,000	1,720,000	2,524,960,000	3,713,673,000	49,932,307,000
Total	2,695,000	10,400,000	3,100,000	16,195,000	23,774,260,000	12,800,000	21,600,000	34,400,000	50,499,200,000	74,273,460,000	1,085,879,401,500

H-4 Cash Flow Analysis for an Average Farmer

INDIVIDUAL HOUSEHOLD INFORMATION

Desa: Tebat Pulau

Unit: Rp 1,000

Name	A		B		C		D		E		F		G		H		I		J		Total	Average
	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Details	Amount	Amount	
Family members																						
Husband (age)	75		27		35		50		30		35		65		20		55		54		446	44.6
Wife (age)	60		23		25		40		25		30		47		18		45		45		358	35.8
Number of Children	7		1		4		6		1		2		5		1		7		6		40	4.0
Grand father (age)	0		0		0				70		65				40						175	58.3
Grand Mother (age)	0		0		55				47		55				40		80		80		357	59.5
																					0	0.0
																					0	0.0
Land Ownership																						
Own land area (Ha)	3		1		1		1		1								3		2		12	1.2
Rented Land area (Ha)	0				0.5				0.5				0.5		0.25						2	0.2
																					0	0.0
																						0.0
Land Utilization																						
Rice					0.5				0.5				0.5		0.25						1.75	0.2
Coffee	3		1		1		0.5		1								2		2		10.50	1.1
Semusim							0.5														0.50	0.1
Tobacco																	1				1.00	0.1
Total (Ha)	3		1		1.5		1		1.5		0		0.5		0.25		3		2		13.75	1.4
																						0.0
																						0.0
Annual Income																						
Rice					525kg	630				612				300		153					1,695	169.5
Coffee (kg)	2000kg	6,000	3 YEAR TREES				300kg	900		2,400							1500kg	4,500		2,400	16,200	1,620.0
Soybeans			60kg	54	400kg	360															414	41.4
Chili (Cabe)			500kg	1000	90kg	225	100kg	300		150											1,675	167.5
Tobacco							3 x 150	450									7 x 200	1,400			1,850	185.0
Wage (husband)						540		540		540		720		576		720	30 x 12	360	42 x 12	504	4,500	450.0
Wage (wife)												180		540					21 x 12	252	972	97.2
Kayu Manis																			800kg	2,000	2,000	200.0
Total (Rp 1,000)		6,000		1054		1,755		2,190		3,702		900		1416		873		6,260		5,156	29,306	2,930.6
																						0.0
																						0.0
Annual Expenditure																						
Food	100x 12	1,200		1,080	120x 12	1,440	132x 12	1,584	112x 12	1,344	65 x 12	780		1,044		972		2,446	168x 12	2,016	13,906	1,390.6
Clothes		100		50		0	15 x 4	60		25		60		50		50		150		150	695	69.5
Fertilizers		0		50		0															50	5.0
Other Agriculture cost		500				0				90											590	59.0
Transpotation						96		192		200		10		10		10		45	15 x 12	180	743	74.3
Education						30		20						10				50		100	210	21.0
Housing						0															0	0.0
Social activities						30		30		30		30		30		30		30		30	240	24.0
Total (Rp 1,000)		1,800		1,180		1,596		1,886		1,689		880		1,144		1,062		2,721		2,476	16,434	1,643.4
																						0.0
Savings (Rp 1,000)		4,200		-126		159		304		313		20		272		-189		3,539		2,680	12,872	1,287.2

CASH FLOW OF AN AVERAGE FARMER

FINANCIAL ANALYSIS (Private Farm Land)

1.375 ha

Unit: Rupiah

	Cost Estimation for 50 ha						Benefit Estimation for 50 ha		Net Cash Flow for Project	Cash Flow of an average farmer (1.375 ha)								
	Farmer' A/C		Project (Government) A/C		Total Cost		Farmer' A/C			Project Cost	Living Expenses		Tax Payment	Project Benefit	Family Labor	Payment fr. Govt	Net Cash Flow	Accummulative NCF
	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.			Original	Inflated						
1	82,000,000	87,740,000	4,154,000	4,444,780	86,154,000	92,184,780	202,500,000	216,675,000	124,490,220	2,412,850	1,643,400	1,758,438	35,751	5,958,562	4,925,700	100,045	6,677,268	6,677,268
2	83,600,000	95,713,640	36,786,250	41,658,618	119,986,250	137,372,258	202,500,000	231,942,250	94,469,992	2,632,125	1,643,400	1,881,529	38,254	6,375,682	5,234,250	0	7,068,004	13,745,272
3	110,200,000	134,999,739	0	0	110,200,000	134,999,739	202,500,000	248,071,209	113,071,469	2,712,493	1,643,400	2,013,236	40,992	6,821,958	5,574,944	0	6,580,242	20,345,514
4	110,200,000	144,449,720	0	0	110,200,000	144,449,720	202,500,000	265,436,192	120,986,472	2,972,367	1,643,400	2,154,162	43,797	7,299,495	5,911,690	0	7,040,859	27,386,373
5	110,200,000	154,561,201	0	0	110,200,000	154,561,201	202,500,000	284,016,725	129,455,525	4,250,432	1,643,400	2,304,954	46,883	7,810,460	6,325,509	0	7,533,719	34,920,092
6	115,200,000	172,884,137	4,154,000	6,234,024	119,354,000	179,118,170	249,550,000	374,507,259	195,389,089	4,756,314	1,643,400	2,466,300	61,794	10,298,950	7,190,995	140,318	10,337,855	45,257,947
7	115,557,500	185,560,093	0	0	115,557,500	185,560,093	251,250,000	403,452,596	217,892,503	5,102,903	1,643,400	2,638,941	66,570	11,094,946	7,609,505	0	10,926,038	56,183,985
8	114,700,000	197,075,955	0	0	114,700,000	197,075,955	289,375,000	462,836,402	265,760,447	5,419,589	1,643,400	2,823,667	76,568	12,729,001	8,174,271	0	12,582,648	68,766,633
9	115,200,000	211,790,501	0	0	115,200,000	211,790,501	231,750,000	426,062,922	214,272,421	5,824,239	1,643,400	3,021,324	70,300	11,716,730	8,797,027		11,597,895	80,364,528
10	115,200,000	225,615,836	0	0	115,200,000	225,615,836	199,375,000	392,299,802	165,584,965	6,231,935	1,643,400	3,232,517	64,713	10,785,522	9,412,619		10,668,876	91,033,404
11	124,871,500	262,836,021	0	0	124,871,500	262,836,021	177,825,000	374,295,298	111,459,278	7,227,991	1,643,400	3,459,114	61,759	10,293,121	10,606,180		10,152,438	101,185,842
12	223,973,750	504,431,796	0	0	223,973,750	504,431,796	313,250,000	705,499,015	201,067,219	13,871,874	1,643,400	3,701,252	116,407	19,401,223	16,041,235		17,752,924	118,938,766
13	222,916,250	537,193,611	0	0	222,916,250	537,193,611	314,625,000	758,197,483	221,003,872	14,772,924	1,643,400	3,960,339	125,103	20,850,431	17,137,613		19,129,727	138,068,543
14	136,526,250	352,037,598	0	0	136,526,250	352,037,598	200,000,000	515,706,830	163,669,232	9,881,034	1,643,400	4,237,563	85,092	14,191,938	12,827,389		14,005,639	152,074,182
15	136,526,250	376,680,230	0	0	136,526,250	376,680,230	245,000,000	675,962,727	299,282,498	10,358,706	1,643,400	4,534,192	111,534	18,598,975	14,795,307		18,379,849	170,454,031
16	142,680,250	421,215,462	0	0	142,680,250	421,215,462	297,587,500	878,527,030	457,311,568	11,583,425	1,643,400	4,851,586	144,957	24,159,493	16,151,237		23,740,762	194,194,793
17	134,278,750	424,161,758	0	0	134,278,750	424,161,758	328,125,000	1,036,486,241	612,324,483	11,664,448	1,643,400	5,191,197	171,020	28,503,372	16,504,809		27,981,518	222,176,309
18	133,108,750	449,898,560	0	0	133,108,750	449,898,560	328,125,000	1,109,040,278	659,141,718	12,372,210	1,643,400	5,554,581	182,992	30,498,606	17,660,146		30,048,971	252,225,280
19	133,108,750	481,391,460	0	0	133,108,750	481,391,460	328,125,000	1,186,672,097	705,281,638	13,238,265	1,643,400	5,943,401	195,801	32,633,510	18,896,356		32,152,399	284,377,679
20	133,108,750	515,088,662	0	0	133,108,750	515,088,662	328,125,000	1,269,740,214	754,651,352	14,164,944	1,643,400	6,359,479	209,507	34,917,856	20,219,101		34,403,067	318,780,746
21	139,362,750	577,040,159	0	0	139,362,750	577,040,159	341,825,000	1,415,347,734	838,307,575	15,868,604	1,643,400	6,804,600	233,532	38,922,063	22,120,416		38,135,742	356,916,488
22	133,957,500	593,485,541	0	0	133,957,500	593,485,541	328,125,000	1,453,725,571	860,240,030	16,320,852	1,643,400	7,280,922	239,865	39,977,453	23,148,849		39,294,563	396,201,151
23	133,100,000	630,984,525	0	0	133,100,000	630,984,525	328,125,000	1,555,486,361	924,521,837	17,351,524	1,643,400	7,790,587	256,655	42,775,975	24,769,269		42,146,277	438,347,428
24	133,100,000	675,132,041	0	0	133,100,000	675,132,041	328,125,000	1,664,370,407	989,238,365	18,566,131	1,643,400	8,335,928	274,621	45,770,186	26,503,117		45,096,623	483,444,151
25	133,100,000	722,391,284	0	0	133,100,000	722,391,284	328,125,000	1,780,876,335	1,058,485,051	19,865,760	1,643,400	8,919,443	293,845	48,974,099	28,358,335		48,253,287	531,697,439
26	142,671,500	828,543,753	0	0	142,671,500	828,543,753	341,900,000	1,985,533,965	1,156,990,212	22,784,953	1,643,400	9,543,804	327,613	54,602,184	31,791,599		53,737,413	585,434,851
27	137,375,000	853,630,066	0	0	137,375,000	853,630,066	332,250,000	2,064,557,520	1,210,927,454	23,474,827	1,643,400	10,211,870	340,652	56,775,332	33,321,665		56,069,848	641,504,799
28	136,517,500	907,682,791	0	0	136,517,500	907,682,791	333,625,000	2,218,218,699	1,310,535,908	24,961,277	1,643,400	10,928,701	366,006	61,001,014	35,654,396		60,401,426	701,906,225
29	136,517,500	971,220,587	0	0	136,517,500	971,220,587	249,750,000	1,769,671,441	798,450,854	26,708,566	1,643,400	11,691,570	291,996	48,665,965	38,150,203		48,124,038	750,030,261
30	136,517,500	1,039,206,028	0	0	136,517,500	1,039,206,028	191,250,000	1,455,843,777	416,637,749	28,579,166	1,643,400	12,509,980	240,214	40,035,704	40,920,718		39,528,062	789,558,322
Total	3,955,376,000	13,795,622,953	44,594,250	52,337,432	4,000,070,250	13,787,960,384	8,176,687,500	29,178,661,781	15,390,900,997	377,729,631	49,302,000	66,103,436	4,914,512	802,418,688	535,546,851		789,558,322	

(Note) The net cash flow for an average farmer has been obtained in the following way:

NCF=(Project Benefit+Family Labor+Payment from the Government)-(Farmer's Project Cost+Inflated Living Expenses+Tax Payment)

CASH FLOW OF A SMALL FARMER

FINANCIAL ANALYSIS (Private Farm Land)

0.3 ha

Unit: Rupiah

	Cost Estimation for 50 ha						Benefit Estimation for 50 ha		Net Cash Flow for Project	Cash Flow of a Small Farmer (0.3 ha)									Special Assistance to a Small Farmer		
	Farmers' A/C		Project (Government) A/C		Total Cost		Farmer' A/C			Project Cost	Living Expenses		Tax Payment	Project Benefit	Family Labor	Payment fr. Govt	Net Cash Flow ①	Accummulative Net Cash Flow	Benefits from Animal & Bees	Net Cash Flow ②	Accumulative Net Cash Flow
	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.	Original Estim.	Inflated Estim.			Original	Inflated									
1	82,000,000	87,740,000	4,154,000	4,444,780	86,154,000	92,184,780	202,500,000	216,675,000	124,490,220	526,440	1,643,400	1,758,438	7,800	1,300,050	1,052,880	21,929	82,080	82,080		82,080	82,080
2	83,600,000	95,213,640	36,386,250	41,658,618	119,986,250	137,372,258	202,500,000	231,842,250	94,469,992	576,282	1,643,400	1,881,529	8,346	1,391,054	1,148,564	0	75,480	157,560	522,450	647,910	729,990
3	110,200,000	134,999,739	0	0	110,200,000	134,999,739	202,500,000	246,071,208	113,071,469	809,998	1,643,400	2,013,236	8,931	1,488,427	1,205,442	0	-136,295	19,245	612,522	474,226	1,204,216
4	110,200,000	144,449,720	0	0	110,200,000	144,449,720	202,500,000	265,428,192	120,978,472	866,698	1,643,400	2,154,167	9,556	1,592,617	1,289,823	0	-147,976	-128,731	655,398	507,422	1,711,639
5	110,200,000	154,561,201	0	0	110,200,000	154,561,201	202,500,000	284,018,725	129,455,525	927,367	1,643,400	2,304,954	10,225	1,704,100	1,380,111	0	-158,334	-287,065	701,276	542,942	2,254,580
6	115,200,000	172,884,137	4,154,000	6,234,034	119,354,000	179,118,170	249,550,000	374,507,259	195,389,089	1,037,305	1,643,400	2,466,300	13,482	2,247,044	1,566,762	30,615	327,334	40,269	750,365	1,077,699	3,332,279
7	115,557,500	185,560,093	0	0	115,557,500	185,560,093	251,250,000	403,452,596	217,892,503	1,113,361	1,643,400	2,638,941	14,524	2,420,716	1,656,801	0	320,691	360,959	802,891	1,123,581	4,455,861
8	114,700,000	197,075,955	0	0	114,700,000	197,075,955	289,375,000	462,836,402	265,760,447	1,182,456	1,643,400	2,823,667	16,862	2,777,018	1,783,477	0	537,711	898,670	859,093	1,368,804	5,852,664
9	115,200,000	211,790,501	0	0	115,200,000	211,790,501	231,750,000	428,062,922	214,272,421	1,270,743	1,643,400	3,021,324	15,338	2,556,378	1,919,351		168,324	1,066,994	919,230	1,087,553	6,940,218
10	115,200,000	226,615,836	0	0	115,200,000	226,615,836	199,375,000	392,200,802	165,584,965	1,359,695	1,643,400	3,232,917	14,119	2,353,205	2,053,706		-199,720	867,274	983,576	783,856	7,724,074
11	124,871,500	262,836,021	0	0	124,871,500	262,836,021	177,625,000	374,795,298	111,959,278	1,577,016	1,643,400	3,459,114	13,475	2,245,772	2,314,512		-489,321	377,953	1,052,426	563,105	8,287,179
12	223,973,750	504,431,796	0	0	223,973,750	504,431,796	313,250,000	705,499,015	201,067,219	3,026,591	1,643,400	3,701,252	25,398	4,232,994	3,499,906		979,659	1,357,613	1,120,090	2,105,755	10,392,934
13	222,916,250	537,193,611	0	0	222,916,250	537,193,611	314,625,000	758,197,463	221,003,873	3,223,162	1,643,400	3,960,339	27,295	4,549,185	3,729,116		1,077,504	2,435,117	1,204,923	2,282,427	12,675,361
14	136,526,250	352,037,598	0	0	136,526,250	352,037,598	200,000,000	515,706,830	163,669,232	2,112,226	1,643,400	4,237,562	18,565	3,094,241	3,018,885		-257,228	2,177,889	1,289,267	1,032,039	13,707,400
15	136,526,250	376,680,230	0	0	136,526,250	376,680,230	245,000,000	675,962,727	299,282,498	2,260,081	1,643,400	4,534,192	24,335	4,055,776	3,228,007		466,235	2,643,124	1,379,516	1,844,751	15,552,150
16	142,680,250	421,215,462	0	0	142,680,250	421,215,462	297,587,500	878,527,030	457,311,568	2,527,293	1,643,400	4,851,586	31,627	5,271,182	3,526,088		1,398,745	4,029,868	1,476,082	2,862,826	18,414,977
17	134,278,750	424,161,758	0	0	134,278,750	424,161,758	328,125,000	1,026,486,241	512,324,483	2,544,971	1,643,400	5,191,197	37,314	6,218,917	3,601,049		2,046,486	6,076,354	1,579,408	3,625,893	22,040,870
18	133,108,750	449,898,560	0	0	133,108,750	449,898,560	328,125,000	1,109,040,278	659,141,718	2,699,391	1,643,400	5,554,581	39,925	6,654,242	3,853,123		2,213,467	8,289,821	1,689,966	3,903,459	25,944,329
19	133,108,750	481,391,460	0	0	133,108,750	481,391,460	328,125,000	1,186,673,097	705,281,638	2,888,349	1,643,400	5,943,401	42,720	7,120,039	4,122,841		2,366,410	10,656,231	1,808,264	4,176,673	30,120,977
20	133,108,750	515,088,862	0	0	133,108,750	515,088,862	328,125,000	1,269,740,214	754,651,353	3,090,533	1,643,400	6,359,439	45,711	7,618,441	4,411,440		2,534,198	13,192,429	1,934,842	4,469,041	34,590,017
21	139,362,750	577,040,159	0	0	139,362,750	577,040,159	341,825,000	1,415,347,734	838,307,575	3,462,241	1,643,400	6,804,000	50,953	8,492,088	4,826,273		3,000,585	16,192,994	2,070,281	5,070,847	39,660,864
22	133,957,500	593,485,541	0	0	133,957,500	593,485,541	328,125,000	1,452,725,571	860,240,030	3,560,913	1,643,400	7,280,922	52,334	8,722,353	5,050,658		3,094,751	19,071,826	2,215,201	5,094,042	44,754,907
23	133,100,000	630,964,525	0	0	133,100,000	630,964,525	328,125,000	1,555,486,361	924,521,837	3,785,787	1,643,400	7,790,587	55,998	9,332,918	5,404,204		3,322,083	22,176,587	2,370,265	5,475,016	50,229,922
24	133,100,000	675,132,041	0	0	133,100,000	675,132,041	328,125,000	1,664,370,407	989,238,365	4,050,792	1,643,400	8,335,928	59,917	9,986,222	5,782,498		3,554,629	25,731,216	2,536,163	5,858,267	56,088,189
25	133,100,000	722,391,284	0	0	133,100,000	722,391,284	328,125,000	1,780,876,335	1,058,485,051	4,334,348	1,643,400	8,919,443	64,112	10,685,258	6,187,273		3,803,007	29,534,223	2,713,716	6,268,345	62,356,535
26	142,671,500	828,543,753	0	0	142,671,500	828,543,753	341,900,000	1,985,533,965	1,156,990,212	4,971,263	1,643,400	9,543,804	71,479	11,913,204	6,936,349		4,269,596	33,803,819	2,903,678	7,166,684	69,523,218
27	137,375,000	853,630,066	0	0	137,375,000	853,630,066	332,250,000	2,064,557,520	1,210,927,454	5,121,780	1,643,400	10,211,670	74,324	12,387,345	7,270,225		4,635,799	42,201,702	3,324,419	7,960,219	84,839,966
28	136,517,500	907,682,791	0	0	136,517,500	907,682,791	333,625,000	2,218,218,699	1,310,535,908	5,446,097	1,643,400	10,926,201	79,856	13,309,312	7,779,141		4,959,106	43,560,809	3,557,129	4,916,236	89,756,202
29	136,517,500	971,220,587	0	0	136,517,500	971,220,587	248,750,000	1,769,671,441	798,450,854	5,827,324	1,643,400	11,691,570	93,708	15,618,029	8,323,681		-1,159,225	42,404,584	3,806,128	2,649,902	92,406,105
30	136,517,500	1,039,206,028	0	0	136,517,500	1,039,206,028	191,250,000	1,455,843,777	416,637,749	6,235,236	1,643,400	12,509,980	52,410	8,735,083	8,906,338		-1,159,225	42,404,584		50,001,521	92,406,105
Total	3,955,376,000	13,735,622,953	44,694,250	52,337,432	4,000,070,250	13,787,960,384	8,176,687,500	29,176,861,381	15,390,900,997	82,413,736	49,302,000	106,103,426	1,050,439	175,073,168	116,846,586	52,443	42,404,584				

(Note) The net cash flow for a small farmer has been obtained in the following way:

NCF①=(Project Benefit+Family Labor+Payment from the Government)-(Farmer's Project Cost+Inflated Living Expenses+Tax Payment)

Net Cash Flow ② has been preprared to analyze the net cash flow in case the government supports are given to this type of a small famer.

Net Cash Flow ② has been produced by adding to Net Cash Flow ① benefits from animal husbandry and bee keeping.

CASH FLOW OF AN AVERAGE FAMILY

NATIONAL FORESTRY

FINANCIAL ANALYSIS

1.4 ha

Unit: Rupiah

Year	Cost Estimation for 140 ha						Benefit Estimation for 140 ha				Project Net Cash Flow	Farmer's Net Cash Flow	Cash flow of an average family (1.4ha)									
	Project a/c		Farmers' a/c		Total Cost		Farmers a/c						Project Cost	Living Expenses		Tax Payment	Project Benefit	Family Labor inflated	Payment fr. Govt.	Previous Income		Net Cash Flow w/ (a)	Accumulative Net Cash Flow
	Original est.	Inflated est.(a)	Original est.	Inflated est.(b)	Original est.	Inflated est.(c)	Original est.	Inflated est.(d)			(d)-(c)	(d)-(b)		Original est.	Inflated est.					%	Amount		
1	0	0	0	0	0	0	0	0	0	0	0	0	0	1,190,000	1,273,300	17,976	0	0		100%	2,995,000	1,704,724	1,704,724
2	110,934,000	127,008,337	35,000,000	40,071,500	145,934,000	167,079,837	0	0	-167,079,837	-40,071,500	400,715	-40,071,500	400,715	1,190,000	1,362,431	15,387	0	561,001	192,340	90%	2,564,676	1,539,787	3,244,511
3	0	0	32,800,000	37,731,324	32,800,000	37,731,324	0	0	-37,731,324	-37,731,324	377,313	-37,731,324	377,313	1,190,000	1,457,601	12,948	0	678,239		60%	2,058,072	738,848	3,982,959
4	0	0	35,880,000	47,021,361	35,880,000	47,021,361	45,600,000	59,772,298	12,750,937	12,750,937	470,314	12,750,937	470,314	1,190,000	1,559,847	14,157	597,723	658,439		48%	1,761,710	973,594	4,956,553
5	0	0	39,600,000	55,541,049	39,600,000	55,541,049	129,600,000	181,770,704	126,229,656	126,229,656	565,410	126,229,656	565,410	1,190,000	1,669,037	16,446	1,817,707	777,575		32%	1,256,686	1,609,975	6,566,528
6	0	0	42,760,000	64,171,230	42,760,000	64,171,230	228,200,000	342,466,666	278,295,436	278,295,436	641,712	278,295,436	641,712	1,190,000	1,795,869	20,548	3,424,667	896,057				1,874,934	8,440,522
7	0	0	36,480,000	58,578,908	36,480,000	58,578,908	291,100,000	451,385,173	392,806,265	392,806,265	585,799	392,806,265	585,799	1,190,000	1,910,880	27,083	4,513,852	820,105				2,810,204	11,250,727
8	0	0	47,680,000	81,923,117	47,680,000	81,923,117	331,300,000	569,735,081	487,811,964	487,811,964	819,291	487,811,964	819,291	1,190,000	2,044,642	34,154	5,692,351	1,146,924				3,941,248	15,191,974
9	0	0	66,800,000	122,809,075	66,800,000	122,809,075	413,600,000	760,202,884	637,393,809	637,393,809	1,228,091	637,393,809	1,228,091	1,190,000	2,187,766	45,612	7,602,029	1,719,322				5,859,887	21,051,861
10	0	0	69,600,000	126,913,734	69,600,000	126,913,734	441,600,000	859,087,470	732,173,735	732,173,735	1,269,137	732,173,735	1,269,137	1,190,000	2,340,910	52,145	8,690,875	1,916,752				6,845,474	27,897,335
11	0	0	104,582,400	270,130,469	104,582,400	270,130,469	495,560,000	1,040,080,433	822,949,965	822,949,965	2,701,305	1,190,000	2,504,774	62,585	10,430,804	2,805,347						8,467,488	36,364,822
12	0	0	105,542,400	297,701,706	105,542,400	297,701,706	543,400,000	1,223,840,909	986,139,204	986,139,204	2,977,017	1,190,000	2,680,108	73,430	12,238,409	3,031,990						10,139,844	46,504,667
13	0	0	105,542,400	254,340,825	105,542,400	254,340,825	565,660,000	1,363,104,726	1,108,763,901	1,108,763,901	2,543,408	1,190,000	2,867,716	81,786	13,631,047	3,244,230						11,282,367	57,887,034
14	0	0	105,542,400	272,144,583	105,542,400	272,144,583	597,880,000	1,515,868,656	1,243,723,974	1,243,723,974	2,721,447	1,190,000	3,058,456	90,952	15,158,687	3,471,326						12,749,158	70,636,191
15	0	0	105,542,400	291,194,810	105,542,400	291,194,810	596,040,000	1,644,493,160	1,353,298,349	1,353,298,349	2,911,948	1,190,000	3,283,248	98,670	16,444,932	3,714,319						13,865,285	84,501,476
16	0	0	105,542,400	311,578,447	105,542,400	311,578,447	569,000,000	1,679,781,173	1,368,202,726	1,368,202,726	3,115,784	1,190,000	3,513,075	100,787	16,797,812	3,974,321						14,047,486	98,548,962
17	0	0	76,560,000	243,102,419	76,560,000	243,102,419	532,800,000	1,686,176,560	1,443,073,141	1,443,073,141	2,431,024	1,190,000	3,758,990	101,171	16,861,756	3,120,404						13,690,575	112,235,038
18	0	0	70,560,000	228,488,021	70,560,000	228,488,021	503,800,000	1,804,207,849	1,565,719,827	1,565,719,827	2,284,880	1,190,000	4,022,119	106,252	18,042,078	3,238,832						14,865,699	127,100,696
19	0	0	70,560,000	255,182,182	70,560,000	255,182,182	499,600,000	1,806,817,157	1,551,634,974	1,551,634,974	2,551,822	1,190,000	4,303,668	108,405	18,068,172	3,572,551						14,676,824	141,777,520
20	0	0	70,560,000	273,044,936	70,560,000	273,044,936	476,800,000	1,845,065,552	1,572,020,616	1,572,020,616	2,730,449	1,190,000	4,604,925	110,704	18,450,656	3,822,629						14,827,207	156,604,727
21	0	0	70,560,000	292,158,081	70,560,000	292,158,081	454,000,000	1,879,815,318	1,587,657,237	1,587,657,237	2,921,581	1,190,000	4,927,269	112,789	18,798,163	4,090,213						14,926,727	171,531,454
22	0	0	69,168,000	279,859,617	69,168,000	279,859,617	419,800,000	1,859,882,651	1,580,023,034	1,580,023,034	2,798,596	1,190,000	5,272,178	111,599	18,598,827	3,980,020						14,296,782	185,828,236
23	0	0	62,560,000	296,567,548	62,560,000	296,567,548	419,800,000	1,990,074,436	1,693,506,888	1,693,506,888	2,965,675	1,190,000	5,641,231	119,404	19,900,744	4,151,946						15,226,380	201,154,616
24	0	0	70,560,000	357,906,212	70,560,000	357,906,212	465,400,000	2,360,679,580	2,002,773,368	2,002,773,368	3,579,062	1,190,000	6,036,117	141,641	23,606,796	5,010,687						18,860,563	220,015,279
25	0	0	70,560,000	382,959,647	70,560,000	382,959,647	511,000,000	2,770,418,079	2,390,458,432	2,390,458,432	3,829,596	1,190,000	6,458,645	166,405	27,724,181	5,361,435						22,640,969	242,656,248
26	0	0	105,542,400	612,921,965	105,542,400	612,921,965	561,960,000	3,263,500,050	2,650,578,084	2,650,578,084	6,129,220	1,190,000	6,910,750	195,810	32,635,000	7,818,091						27,217,312	269,873,560
27	0	0	105,542,400	555,826,503	105,542,400	555,826,503	576,040,000	3,579,436,307	2,923,609,806	2,923,609,806	5,558,265	1,190,000	7,394,502	214,760	35,794,363	8,365,357						29,992,187	299,865,747
28	0	0	105,542,400	701,734,358	105,542,400	701,734,358	590,120,000	3,923,612,495	3,221,878,137	3,221,878,137	7,017,344	1,190,000	7,912,119	235,417	39,236,125	8,950,932						33,072,179	332,887,926
29	0	0	105,542,400	750,855,763	105,542,400	760,855,763	520,710,000	3,704,464,788	2,953,609,025	2,953,609,025	7,508,558	1,190,000	8,465,966	222,268	37,046,648	9,577,497						30,475,354	363,313,280
30	0	0	105,542,400	803,415,667	105,542,400	803,415,667	465,050,000	3,540,079,209	2,736,663,541	2,736,663,541	8,034,157	1,190,000	9,058,584	212,405	35,400,792	10,247,920						28,343,569	391,656,849
Total	110,934,000	127,008,337	2,190,654,400	8,275,865,159	2,301,588,400	8,502,893,496	12,256,500,000	47,721,218,366	39,218,424,870	39,345,433,207	82,758,852	35,700,000	120,276,919	2,927,101	477,213,184	110,527,150	192,340	10,637,046				391,656,849	3,715,325,841

(Note) The net cash flow for an average farmer has been obtained in the following way:

NCF=(Project Benefit+Family Labor+Payment from the Government+Previous Income)-(Farmer's Project Cost+Inflated Living Expenses+Tax Payment)

CASH FLOW OF A SMALL FARMER
NATIONAL FORESTRY
FINANCIAL ANALYSIS

0.6 ha

Unit: Rupiah

Year	Cost Estimation for 140 ha						Benefit Estimation for 140 ha		Project Net Cash Flow	Farmers' Net Cash Flow	Cash flow of a Small Farmer (0.6ha)												Special Assistance to a Small Farmer		
	Project a/c		Farmers' a/c		Total Cost		Farmers' a/c				Project Cost[(a)-(b)]	Living Expenses		Tax Payment	Project Benefit	Family Labor Inflated	Payment fr. Govt.	Previous Income		NCF ①	Accumulative Net Cash Flow	Benefits from Animal & Bees	NCF ②	Accumulative Net Cash Flow
	Original est.	Inflated est.(a)	Original est.	Inflated est.(b)	Original est.	Inflated est.(c)	Original est.	Inflated est.(d)	(d)-(c)	(d)-(b)		Original est.	Inflated est.					%	Amount				① + ②	
0	0	0	0	0	0	0	0	0	0	0	0	1,190,000	1,272,300	7,704	0	0		100%	1,284,000	2,996	2,996		2,996	2,996
1	0	0	0	0	0	0	0	0	0	0	0	1,190,000	1,272,300	7,704	0	0		100%	1,284,000	2,996	2,996		2,996	2,996
2	110,934,000	127,008,937	35,000,000	40,071,500	145,934,000	167,079,837	0	0	-167,079,837	-40,071,500	171,735	1,190,000	1,367,401	5,595	0	240,429	82,423	80%	1,095,104	-118,795	-115,799	572,450	453,655	456,651
3	0	0	32,600,000	37,331,324	32,600,000	37,331,324	0	0	-37,331,324	-37,331,324	161,706	1,190,000	1,457,801	5,292	0	226,388		60%	882,031	-516,380	-632,179	512,522	96,141	552,793
4	0	0	35,880,000	47,031,361	35,880,000	47,031,361	45,600,000	59,777,298	12,740,937	12,740,937	201,569	1,190,000	1,559,847	6,067	256,167	282,188		48%	755,019	-474,104	-1,106,283	655,398	181,294	734,087
5	0	0	39,600,000	55,541,049	39,600,000	55,541,049	129,600,000	181,770,704	126,229,656	126,229,656	238,033	1,190,000	1,669,007	7,906	779,017	333,746		32%	528,580	-264,132	-1,370,414	701,276	437,144	1,171,231
6	0	0	42,760,000	64,171,290	42,760,000	64,171,290	228,200,000	342,466,666	278,295,376	278,295,376	276,020	1,190,000	1,785,969	8,806	1,457,714	385,027				-216,353	-1,587,068	750,365	533,412	1,704,643
7	0	0	36,480,000	58,578,909	36,480,000	58,578,909	281,100,000	451,285,173	392,806,265	392,806,265	251,052	1,190,000	1,910,880	11,607	1,934,508	351,473				-112,442	-1,474,926	802,891	915,333	2,619,975
8	0	0	47,680,000	81,923,117	47,680,000	81,923,117	331,300,000	569,235,081	487,311,964	487,311,964	351,099	1,190,000	2,044,642	14,637	2,439,579	491,539				529,740	-954,196	859,093	1,379,833	3,999,808
9	0	0	66,800,000	122,809,075	66,800,000	122,809,075	413,600,000	760,202,884	637,393,809	637,393,809	576,323	1,190,000	2,187,766	19,548	3,258,017	736,854				1,261,228	307,041	919,220	2,180,457	6,180,265
10	0	0	69,600,000	136,913,794	69,600,000	136,913,794	441,800,000	869,087,470	732,173,735	732,173,735	586,773	1,190,000	2,340,916	22,348	3,724,661	921,492				1,595,112	1,903,153	982,576	2,579,687	8,759,953
11	0	0	69,600,000	139,130,469	69,600,000	139,130,469	495,560,000	1,043,080,433	822,949,965	822,949,965	943,416	1,190,000	2,504,774	25,822	4,470,345	1,207,291				2,197,624	4,100,777	1,052,475	3,252,050	12,010,003
12	0	0	104,582,400	220,130,469	104,582,400	220,130,469	495,560,000	1,043,080,433	822,949,965	822,949,965	943,416	1,190,000	2,680,108	31,470	5,245,007	1,299,424				2,814,157	6,914,934	1,126,996	3,940,253	15,950,256
13	0	0	105,542,400	237,701,706	105,542,400	237,701,706	543,400,000	1,223,840,909	986,139,204	986,139,204	1,018,722	1,190,000	2,867,716	35,051	5,841,827	1,390,384				3,229,462	10,144,397	1,204,927	4,444,286	20,294,541
14	0	0	105,542,400	254,340,825	105,542,400	254,340,825	565,640,000	1,363,104,726	1,109,763,901	1,109,763,901	1,090,032	1,190,000	3,067,856	38,979	6,496,580	1,487,711				3,710,522	13,854,919	1,289,267	4,999,789	25,294,429
15	0	0	105,542,400	272,144,683	105,542,400	272,144,683	587,880,000	1,515,868,666	1,243,723,974	1,243,723,974	1,166,324	1,190,000	3,282,248	42,287	7,047,828	1,591,851				4,066,166	17,921,085	1,379,516	5,445,682	30,840,112
16	0	0	105,542,400	291,194,810	105,542,400	291,194,810	595,040,000	1,644,493,160	1,353,298,349	1,353,298,349	1,247,978	1,190,000	3,513,075	43,194	7,199,062	1,703,280				4,010,737	21,941,822	1,476,087	5,486,819	35,326,931
17	0	0	105,542,400	311,578,447	105,542,400	311,578,447	569,000,000	1,679,781,173	1,368,202,726	1,368,202,726	1,335,336	1,190,000	3,758,990	43,359	7,226,467	1,337,316				3,719,566	25,661,388	1,579,408	5,298,974	41,625,905
18	0	0	70,560,000	243,102,419	70,560,000	243,102,419	533,800,000	1,686,175,660	1,443,073,141	1,443,073,141	1,041,858	1,190,000	3,758,990	43,359	7,226,467	1,337,316				4,072,643	29,734,031	1,689,966	5,762,609	47,388,513
19	0	0	70,560,000	238,488,021	70,560,000	238,488,021	533,800,000	1,804,207,849	1,565,719,827	1,565,719,827	1,022,092	1,190,000	4,022,119	46,394	7,732,319	1,430,978				3,930,829	33,664,859	1,808,264	5,629,092	53,027,606
20	0	0	70,560,000	255,182,183	70,560,000	255,182,183	499,600,000	1,806,817,157	1,551,634,974	1,551,634,974	1,093,638	1,190,000	4,303,668	46,461	7,743,502	1,531,093				3,722,137	37,387,991	1,934,842	5,657,974	58,685,580
21	0	0	70,560,000	273,044,936	70,560,000	273,044,936	476,800,000	1,845,065,552	1,572,020,616	1,572,020,616	1,170,193	1,190,000	4,604,925	47,445	7,907,424	1,638,270				3,581,586	40,969,578	2,070,281	5,651,868	64,337,447
22	0	0	70,560,000	292,158,081	70,560,000	292,158,081	454,000,000	1,879,815,318	1,587,657,237	1,587,657,237	1,252,106	1,190,000	4,927,769	48,098	8,016,351	1,752,948				3,114,519	44,984,097	2,215,201	5,329,720	69,667,167
23	0	0	63,168,000	279,859,617	63,168,000	279,859,617	419,800,000	1,869,887,651	1,589,028,034	1,589,028,034	1,199,398	1,190,000	5,272,178	47,826	7,970,926	1,662,996				3,344,888	47,228,985	2,370,266	5,715,153	75,382,320
24	0	0	62,560,000	296,567,648	62,560,000	296,567,648	419,800,000	1,999,574,436	1,693,506,888	1,693,506,888	1,271,004	1,190,000	5,641,201	51,173	8,528,890	1,779,405				4,033,937	51,962,917	2,536,183	7,170,115	87,552,436
25	0	0	70,560,000	357,906,212	70,560,000	357,906,212	465,400,000	2,360,679,580	2,002,773,368	2,002,773,368	1,533,884	1,190,000	6,036,117	60,703	10,117,198	2,147,437				6,012,618	57,975,535	2,712,716	8,726,335	91,278,770
26	0	0	70,560,000	382,959,647	70,560,000	382,959,647	611,000,000	2,773,418,079	2,390,458,432	2,390,458,432	1,641,256	1,190,000	6,458,645	71,316	11,886,077	2,297,768				7,715,562	65,691,097	2,903,676	10,619,239	101,898,009
27	0	0	105,542,400	612,921,965	105,542,400	612,921,965	561,960,000	3,262,500,050	2,650,578,084	2,650,578,084	2,626,808	1,190,000	6,910,750	83,919	13,986,429	2,250,610				8,628,354	74,319,462	3,106,934	11,735,288	113,633,307
28	0	0	105,542,400	655,826,503	105,542,400	655,826,503	576,040,000	3,579,426,209	2,923,599,806	2,923,599,806	2,810,695	1,190,000	7,394,502	92,043	15,340,441	3,695,163				9,531,152	83,850,614	3,374,419	12,955,577	126,588,879
29	0	0	105,542,400	701,734,358	105,542,400	701,734,358	590,120,000	3,923,612,495	3,221,878,137	3,221,878,137	3,007,431	1,190,000	7,912,118	100,893	16,815,482	3,826,114				8,701,745	92,152,357	3,557,129	11,758,871	138,347,750
30	0	0	105,542,400	750,855,763	105,542,400	750,855,763	620,710,000	3,704,464,788	2,953,609,025	2,953,609,025	3,217,959	1,190,000	8,465,966	95,258	15,876,278	4,104,642				8,970,911	99,123,267	3,806,128	10,777,038	149,124,788
31	0	0	105,542,400	803,415,667	105,542,400	803,415,667	465,050,000	3,540,079,208	2,736,663,541	2,736,663,541	3,443,210	1,190,000	9,058,584	91,031	15,171,768	4,391,967						50,001,521	149,124,788	
Total	110,934,000	127,008,937	2,190,654,400	8,375,886,159	2,301,588,400	8,502,895,096	12,266,500,000	47,791,318,066	39,288,423,070	39,345,423,207	35,896,651	35,700,000	120,276,919	1,254,472	204,519,926	47,999,207	82,423		4,559,793	99,123,267				

(Note) The net cash flow for a small farmer (Net Cash Flow①)has been obtained in the following way:
NCF①=(Project Benefit+Family Labor+Payment from the Government+Previous Income)-(Farmer's Project Cost+Inflated Living Expenses+Tax Payment)
Net Cash Flow ② has been preprared to analyze the net cash flow in case the government supports are given to this type of a small famer.
Net Cash Flow ② has been produced by adding to Net Cash Flow ① government cash subsidies and benefits from animal husbandry and bee keeping.

H-5 Results of Economic Analysis

Economic Analysis

Project Effect

With Project – Without Project Estimation

(Unit 1,000,000 Rupiah)

	Cost estimation			Benefit Estimation			Incremental NCF
	Project Plan(a)	Without project(b)	Difference(c)=(a)−(b)	Project Plan(d)	Without project(e)	Difference(f)=(d)−(e)	(f)−(c)
1	5,545	49,582	−44,037	5,377	119,160	−113,783	−69,746
2	20,746	53,053	−32,307	31,803	127,502	−95,698	−63,391
3	36,664	56,766	−20,102	57,141	135,106	−77,965	−57,862
4	53,328	60,740	−7,412	85,890	143,622	−57,732	−50,320
5	72,341	64,992	7,349	118,554	152,667	−34,113	−41,462
6	92,733	68,103	24,630	160,380	161,736	−1,356	−25,986
7	111,208	72,871	38,337	207,491	173,058	34,433	−3,904
8	114,417	77,972	36,445	233,529	132,562	100,967	64,521
9	122,903	83,430	39,474	259,848	104,313	155,535	116,061
10	132,004	89,270	42,734	281,025	71,460	209,565	166,830
11	144,353	230,667	−86,314	301,575	159,053	142,522	228,836
12	175,659	163,522	12,137	338,712	170,186	168,526	156,388
13	210,464	117,937	92,527	380,270	112,138	268,132	175,605
14	230,823	126,192	104,630	397,842	172,623	225,219	120,589
15	252,649	135,026	117,623	433,238	241,026	192,212	74,588
16	277,864	144,478	133,386	494,087	318,160	175,928	42,541
17	296,045	154,591	141,453	569,415	340,431	228,984	87,530
18	288,334	165,412	122,921	612,775	364,261	248,514	125,593
19	281,654	176,991	104,662	656,679	389,759	266,920	162,258
20	298,915	189,381	109,535	737,003	417,042	319,961	210,426
21	320,274	202,637	117,636	816,431	446,235	370,196	252,560
22	339,560	216,822	122,738	880,072	477,472	402,601	279,863
23	360,804	231,999	128,804	939,250	510,895	428,356	299,551
24	386,005	248,239	137,766	1,002,535	546,657	455,878	318,112
25	413,019	265,616	147,403	1,072,366	584,923	487,442	340,039
26	449,034	284,209	164,825	1,164,841	625,868	538,973	374,148
27	481,232	304,104	177,128	1,242,624	669,679	572,945	395,817
28	518,668	325,391	193,276	1,339,025	512,974	826,051	632,775
29	559,470	348,169	211,301	1,397,127	403,660	993,467	782,166
30	603,442	372,540	230,902	1,408,242	276,529	1,131,713	900,811
Total	7,650,157	5,080,703	2,569,454	17,625,148	9,060,756	8,564,392	5,994,938

	Inflation rate	7%	
	Discount Rate(nominal)	18%	(Unit: Mil. Rp)
1	Present Values of benefits in nominal terms (Without Project)		878,698
	Present Values of costs in nominal terms (Without Project)		460,753
	Net Present Values (Without Project) (1)		417,945
	Cost Benefit Ratio		1.91
2	Present Values of benefits in nominal terms (With Project)		997,138
	Present Values of costs in nominal terms (With Project)		510,719
	Net Present Values (With Project) (2)		486,419
	Cost Benefit Ratio		1.95
3	Incremental Net Present Value (2)−(1)		68,473
	Internal Rate of Return		21.0%

H-6 The Basis for Preliminary Calculations of Benefits with a Positive Impact on the Environment

The aim of the social forestry development plan is to improve the welfare of the region's inhabitants and ensure the preservation of forests. The positive impact on the welfare of the inhabitants can be evaluated quantitatively through an estimation of increases in income increments. The benefit of forestry preservation is difficult to gauge quantitatively because no regular market indicators exist with which relevant calculations can be made. However, the main benefit of preserving the forest is the maintenance and augmentation of the natural environment's assets. The aim of this study is to avoid a project analysis which emphasizes only the monetary benefits of the programme; a preliminary calculation of the positive environmental impact of the plan will be discussed.

(1) An evaluation of environmental benefits.

The following table shows examples of functions which forests perform and the methods by which these functions can be appraised when the forest is preserved.

Table H-1 The Classification of Functions which Forests Perform and Methods to Appraise these Functions when Forests are Preserved

Forest function[1]	Value evaluated[1]	Evaluation of market	Evaluation other than by market	
			-by vicarious markets	-by preservation costs
Production functions	Value of lumber	△	×	×
	Value of non-lumber forest products	△	×	×
	Value of land	△	×	×
Preservation functions	Function of water maintenance of the eco-system – water resources –	△	△	○
	Function of water preservation – water quality –	×	△	○
	Preservation function of soil resources (soil productivity)	×	×	○
	Preservation function of air quality (carbon dioxide)	×	×	×
Functions of the forest's existence	Existence value of animals and plants	△	△	×
	Value for recreation	×	△	×
	Aesthetic value of scenery	×	△	×

Notes: 1) The main functions and values of forests are indicated.
2) These functions and values are judged comprehensively based on an application of evaluation methods:
○ It is easy to obtain information necessary for appropriate evaluation methods and the evaluation itself.
△ It is easy to obtain information necessary for appropriate evaluation methods and the evaluation itself. The methods are, however, not applicable in an appropriate way to the actual situation of the Project Area.
× Information necessary for appropriate evaluation and the evaluation itself is difficult to obtain.

It is not appropriate to evaluate production functions of forests and the values derived from their existence in themselves without regard to laws and regulations which apply to the social forestry development project must be taken into account in evaluating the characteristics of the land in question. The evaluation of costs based on costs necessary to maintain the preservation of water and soil functions (water - soil preservation functions) which a forest's eco -system carries out will be made. Among the water - soil preservation functions is the function to reduce the volume of water flowing out with floods (the maximum flux) during rainy seasons and a function to increase the flux during dry seasons. For estimating increases and decreases in the water volume which flows, it is necessary to compile data measuring the special characteristics of the flux and on data on river basins. A model equation should also be set up, though under present conditions it is difficult to make appropriate estimates. Cost estimates with respect to soil preservation functions will be made hereafter.

① Using market prices to evaluate production functions has certain limitations. It is not permissible to fell trees within protection forest. The cutting down of shelter trees growing on private lands is allowed, but currently no clear cut markets have been established for their sale. Collecting forest products other than lumber is permitted under certain conditions. Non-lumber forest products from various parts of the tree are collected by the local population for daily use. These include *Rotan* and leaves which are used as medicine. The market for such products is very limited, however, except in social forestry plantation project areas *(Hutan Kemasyarakatan)* in the state forest. It is thus difficult to makes estimates of resource quantities and market prices for non-lumber forestry products.

② It is not appropriate to appraise the functions arising from the existence of forests and evaluate the maintenance of the forest's ecosystem through the setting up of a market hypothetically. Because of the existence of a forest, animals and plants can flourish and the forest has a recreation and scenic value. Infrastructure is, however, necessary. If access to the Project Area is not satisfactorily developed, city dwellers who could visit the forest to enjoy themselves, observing animals and plants and the scenery, are denied access. It is not realistic to evaluate potential demand for a forest's values though hypothetical conjectures. On the other hand, there is a national part, the Kerinci Seblat National Park, in the northeast part of the Project Area. This park has sufficient resources to display its value as a place where animals and plants exist and recreation and scenery enjoyed. The functions which the forest's existence play in reserve areas designated for water - soil preservation and private lands surrounding these areas are of secondary importance.

(2) Methods to calculate on a trial basis the maintenance and effect to improve soil productivity.

The loss of soil and the loss of nutritious substances caused by soil erosion result in the lowering of soil productivity. This effect can be calculated.

1) The basis for calculation of costs necessary to maintain and recover nutritious substances lost from the original soil.

Based on estimates of expenditure to reinforce nutritious substances through the application of fertilizer, the effect of maintaining and improving the chemical nature of the soil's productivity, along with carrying out the social forestry plan, were calculated. The calculation arrived at was, experimentally, the prime cost of replacing the soil's nutritious substances. Calculating the main elements which were lost from forest and farm lands by erosion, including nitrogen, phosphoric acid and potassium, the recovery cost for lost substances was estimated for units of soil zones which were presumed to have experienced nutritional drainage.

Moreover, the nutrient enrichment co-efficient[1] is assumed to be 2[2].

$F = E \times f$

F : fertilizing volume
[F (N): nitrogen, F (P): phosphoric acid, F(K): potassium...]

f : the quantity of fertilizer necessary to supply 1 kg. of elements
[f (N): nitrogen, f (P): phosphoric acid, f (K): potassium...]
(refer to Table II-2)

E : decreased quantity of lost nutritious substances
[E (N): nitrogen, E (P): phosphoric acid, E (K): potassium...]

---

[1] Nutrient enrichment: The phenomena whereby the content of nutritious substances included in soil flowing away due to erosion tends to increase from content levels of nutrients included in the original soil. This occurs because nutritious substances dissolved from rich surface soils enrich soils as they flow along. The ICRAF formula (Anthony Young, 1989) is used to estimate decreases in nutritious substances in the original soil.
- The quantity of lost soil x the volume of nutritious substances which are included x the rate of increment due to nutrient enrichment (the nutrient enrichment co-efficient).

[2] As discussed by Anthony Young in Agroforestry for Soil Conservation (1989), the lowest co-efficient is used for organic matter and main elements (2 - 4 - 10).

E + S x n x C

S : the quantity of lost soil for each soil zone (estimated figures based on the USLE formula)

n : the nutritious substance content included in surface soil units (A layer) of each soil zone [n (N): nitrogen, n (P): phosphoric acid, n (K): potassium...] , (calculated using an average figure for the A layer indicated by the results of an analysis of soil; refer to Table II-3)

C : the nutrient co-efficient, 2.0. Fertilizers used are supposed to be single element fertilizers including urea, SP - 36 and Kel

Table H-2 Types and nutritional content of fertilizers used for calculations of fertilizer classifications

Element Name of fertilizer	Nitrogen urea	Phosphoric Acid SP-36	Potassium Kel
Elements included[1]	N	P	K
Ratio of included elements (%) [1]	36	36	60
Quantity of effective elements included in one kilogram of fertilizer (kg)	0.36	0.36	0.60
Fertilizer volume required to supply one kg of the element (kg) [2]	f (N) 2.78	f (P205) [3] 0.61	f (K) 1.67

Note 1) based on oral surveys of inhabitants in the Project Area

2) Counting fractions of 0.5 and over as a whole number and rounding off other fractions to three decimal points

3) P/P 205 = 31 / 141.9 = 0.22

Table II-3 Quantities of essential nutrients in surface soils

	Carbon	Nitrogen	Phosphoric	Potassium	Calcium	Magnesium
	C 1)	N 2)	P2O5 3)	K 4)	Ca 5)	Mg 6)
Area of soil sample	n(C)	n(N)	n(P2O5)	n(K)	n(Ca)	n(Mg)
AC	45.0	0.050	0.0037	0.094	0.505	0.151
ACC I	29.0	0.050	0.0116	0.236	0.842	0.584
ACC II	30.0	0.035	0.0040	0.118	0.575	0.282
CM I	68.5	0.055	0.0034	0.165	0.449	0.413
CM II	11.0	0.040	0.0039	0.094	1.740	0.343
CM III	20.0	0.020	0.0013	0.141	1.431	0.443
CM IV	45.0	0.030	0.0020	0.047	0.281	0.081
ANC	78.0	1.355	0.0044	0.094	1.024	0.353
AN I	88.0	0.060	0.0046	0.047	1.010	0.101
AN II	34.0	0.060	0.0016	0.094	0.730	0.584
LPR	7.0	0.020	0.0001	0.047	0.337	0.363
WS	2.0	0.070	0.0077	0.188	0.309	0.343
Average	38.1	0.154	0.0040	0.114	0.769	0.337

Note 1) Quantity of whole carbon used. * 1,000 kg x C (%) / 100
2) Non-organic nitrogen / whole nitrogen = 0.01, the value of whole nitrogen used.
* 1,000 kg x N (%) / 100 x 0.01
3) Quantity of effective phosphoric acid utilized. * 1,000 kg x P (ppm) / 1,000,000
4) Quantity including exchangeable potassium mg / 100 g = mg of actual volume x 47.1 used.
* K x 47.1 / 100
5) Quantity including exchangeable calcium mg / 100 g = mg actual volume x 28.04 used.
* 1,000,000 / 100 g x (mg of actual volume) x 28.04 / 1,000,000
6) Quantity including exchangeable magnesium mg / 100 g = mg of actual volume x 20.15 used.
* 1,000,000 g / 100 g x (mg of actual volume) x 20.15 / 1,000,000

2) Calculation base for costs required to return soil which flowed into rivers to its original state.

From the estimate cost of returning soil that has accumulated in rivers to its original forest land and farmland, the maintenance and improvement effect in terms of physical properties (of soil productivity resulting from implementation of the Social Forestry Project) is trial estimated as the cost of actual soil replacement. From the amount of river-accumulated sediment that is transported to each basin center and scattered (sediment removed from the rivers after estimating the amount of sedimentation), the soil restoration cost was calculated. Since the scatter distances differ in terms of central points, they were assumed to be points closest to the unloading sites at an altitude midway between the unloading sites and the points of highest altitude in each basin.

I. Data Relating to Environmental Consideration

I-1 Notification (Copy) of Screening Results from the Ministry of Forestry, Environmental Impact Assessment (AMDAL) Committee

DEPARTEMEN KEHUTANAN
KOMISI PUSAT ANALISIS MENGENAI DAMPAK LINGKUNGAN
Jl. Ir. H. Juanda No. 100 Telp. (0251) 321014 BOGOR

Nomor : 174 /KPA-VI/AMDAL/96
Lampiran :
Perihal : Penyusunan studi kelayakan pengembangan perhutanan sosial di Sub DAS Musi Hulu, Bengkulu.

JAKARTA, 30 Agustus 1996

Kepada Yth.

Sdr. Direktur Bina Program
Direktorat Jenderal Reboisasi dan Rehabilitasi Lahan
di -
JAKARTA

Sehubungan dengan surat Saudara nomor 1378/V/Bp-3/1996 tanggal 22 Juli 1996 perihal seperti tersebut di atas, bersama ini kami sampaikan hal-hal sebagai berikut :

1. Karena kegiatan yang akan dilaksanakan tersebut masih berupa penyusunan studi kelayakan dan belum melaksanakan kegiatan fisik di lapangan, maka kegiatan tersebut tidak perlu dilengkapi dengan penyusunan dokumen Upaya Pengelolaan Lingkungan (UKL) dan Upaya Pemantauan Lingkungan (UPL).

2. Tetapi apabila kegiatan tersebut akan dilaksanakan di lapangan yang akan merubah bentang alam, maka harus dilengkapi UKL dan UPL

3. Apabila kegiatan Pengembangan Perhutanan Sosial yang meliputi areal seluas ± 200.000 Ha tersebut akan dilaksanakan di lapangan, maka kegiatan tersebut wajib dilengkapi dengan Analisis Mengenai Dampak Lingkungan (AMDAL).

Demikian untuk menjadi maklum.

Direktur Jenderal Perlindungan Hutan
dan Pelestarian Alam/
Ketua Komisi Pusat AMDAL
Departemen Kehutanan,

Ir. SOEMARSONO
NIP. 080019732

Tembusan : Kepada Yth.
1. Sdr. Sekretaris Jenderal Departemen Kehutanan
2. Sdr. Direktur Jenderal RRL.

I-2 Results of Outline Scoping

Table I-1 Main Development Activities of the Project
(Social Forestry Development Project Draft Plan)

Development Category	Activities	Planned Scale (ha or m, etc.)	Main Structures (Machinery)
Social Forestry (National Forest)	- planting of timber-producing and multi-purpose species - natural regeneration	Approx. 1,600 ha	workshops
Social Forestry (Private Land)	- distribution of seedlings of multi-purpose species - Planting of multi-purpose species among coffee trees, etc. - terracing - Terrace formation (dry crops field) - Wood-fenced conservation work (steep slope coffee fields)	Approx. 27,000 ha	
Nursing (Private Land)	- production of seedlings	Approx. 1 ha	nurseries (mainly temporary)
Erosion Control (Private Land)	- stream works - planting of bank protection forests (Cultivation of bamboo)	16 sites (height 8 m, length 50 m, width 10 m, approx. 130 km)	check dams
Settlements/Roads (Private Land)	- cutting, banking, side ditches, asphalt paving and bridges	Total width approx. 6 m Approx. 27 km	roads
Extension Facilities (Private Land)	- construction of facilities	94 site	Center facilities
Water Supply Facilities (Private Land)	- development of water supply sources	1 site	Storage pond Pump facilities Conveyance pump Storage tank

Table I-2 Main Factors Affecting Environment
(Inferred from Basic Concept of Social Forestry Development Project)

Development Category	Work (Construction)	Facilities (Sites)	Activities (Services)
Social Forestry	- planting - wood-fenced work - terracing	- social forestry sites	- ground preparation - planting, tending harvesting - marketing
Nursing	- establish nursery	- nursery (mainly temporary)	- nursing
Erosion Control	- erosion control works - improvement of existing facilities	- erosion control facilities - bank protection forests	- deposition - water storage - gathering of products
Roads	- new roads - improvement of existing roads	- roads	- vehicle passage
Extension and Testing Facilities	- new facilities	- centre	- testing - extension activities
Water Supply Facilities	- new facilities - removal of waste	- water source facilities - conduit facilities	- water intake - maintenance work

Table I-3 Impact Matrix by Development Category and Environmental Factor
(based on Tables I-1, I-2 and I-3)

< I. Social Environment >

Environmental Item	Degree of Environmental Impact of Development Activity (1)						Judgement Criterion (2)
	Social Forestry	Nursing	Erosion Control	Roads	Extension Facility	Water Supply Facilities	
1. Social Life							
(1) Daily Life							
① Systematic Resettlement							
② Non-Voluntary Resettlement	2						Handling of people living on national forest land
③ Change of Lifestyle							
④ Conflict Among People	2						Project participants and non-participants
(2) Demographic Problems							
① Population Increase							
② Rapid Change of Demographic Structure							
(3) Economic Activities of Local Inhabitants							
① Transfer of Economic Activity Base	+						Positive effect of non-timber production in national forests
② Conversion of Economic Activity - Unemployment		+	+	+	+		Positive effect of increased employment opportunities
③ Widening Income Gap							
(4) Systems/Customs							
① Readjustment of Common Rights to Forest Use	2						Restricted use in the forests
② Change of Social Structure through Grouping, etc.	++					+	Positive effect of increased group activities
③ Reform of Existing Systems and Customs	2						Related to restricted entry to forests
2. Health and Hygiene							
① Increased Use of Agrochemicals	1	1					Use of agrochemicals for nurseries and social forestry on private land
② Outbreak of Local Diseases							
③ Accumulation of Residual Toxicity (Agrochemicals)	1						Negative impact resulting from increased coffee cultivation on private shrub land, and positive impact resulting from improvement of agricultural chemicals used
④ Increased Household and Body Waste							Positive effect of waste treatment

Environmental Item	Degree of Environmental Impact of Development Activity (1)						Judgement Criterion (2)
	Social Forestry	Nursing	Erosion Control	Roads	Extension Facility	Water Supply Facilities	
3. Historical Remains, Cultural Heritage and Beautiful Landscape, etc.							
① Damage/Destruction of Historical Remains, etc.							
② Loss of Rare Landscape							
③ Impact on Underground Resources							

< II. Natural Environment >

Environmental Item	Degree of Environmental Impact of Development Activity (1)						Judgement Criterion (2)
	Social Forestry	Nursing	Erosion Control	Roads	Extension Facility	Water Source Facility	
4. Rare Wildlife Habitat							
① Vegetational Change	+	1	1	1	1		- Decrease of ground cover vegetation due to construction of forest roads and the centre - Increase of ground cover vegetation and conservation of rare species due to creation of forests and tree belts by social forestry (positive effects)
② Impact on Rare Species and Indigenous Wildlife	+		1	1			
③ Decline of Biological Diversity	+						
④ Invasion by and Propagation of Harmful Species							
5. Soil and Land							
(1) Soil							
① Soil Erosion	++		++				- Positive effects of erosion control and forest creation - Positive effects of soil fertilising function of forests
② Increased Base Content of Soil							
③ Decline of Soil Fertility	+		+				
④ Soil Contamination							
(2) Land							
① Land Devastation	+		+				- Positive effects of forestation - Positive effects of forest roads functioning as fire belts
② Emergence of Devastated Land	+		+				
③ Decline of Wind Breaking and Fire Prevention Functions				+			

Environmental Item	Degree of Environmental Impact of Development Activity (1)						Judgement Criterion (2)
	Social Forestry	Nursing	Erosion Control	Roads	Extension Facility	Water Source Facility	
6. Hydrology and Water Quality, etc.							
(1) Hydrology							
① Change of Flow Regime of Surface Water	+	1	+	1	1	1	- Possible impacts of construction of forest roads and centre on surface and groundwater flow - Positive effects of forestation
② Change of Flow Regime and Table of Groundwater	+		+		1	1	
③ Occurrence of Drought or Flood	++		++				
④ Sedimentation	++		++				
(2) Water Quality/Water Temperatur							
① Water Pollution/Decline of Water Quality	++		+	1	1		- Turbid water due to opening of forest roads, etc. - Positive effects of increased vegetation by social forestry and erosion control and also of water sources conservation facilities
② Eutrophication							
③ Change of Water Temperature							
(3) Atmosphere							
① Atmospheric Pollution							- Positive effects of forestation
② Microclimatic Change	+						
7. Sustainability of Forest Resources and Functions							
① Discontinued Sustainability of Environmental Conservation Functions	+		+				- Positive effects of forestation

Notes (1) Degree of Environmental Impact

3	:	major negative impact
2	:	intermediate negative impact
1	:	minor negative impact
+	:	minor positive impact
++	:	intermediate positive impact
no score	:	irrelevant

(2) Anticipated Impact

I-3 Related Laws, Ordinances and Regulations for Preparation of UKL-UPL

(1) Undang-Undang

① Undang-Undang No. 5 Tahun 1960 tentang Pokok-pokok Agraria

② Undang-Undang No. 5 Tahun 1967 tentang Ketentuan-ketentuan Pokok Kehutanan

③ Undang-Undang No. 5 Tahun 1990 tentang Konservasi Sumberdaya Alam Hayati dan Ekosistemnya

④ Undang-Undang No. 23 Tahun 1997 tentang Ketentuan-ketentuan Pokok Pengelolaan Lingkungan Hidup

⑤ Undang-Undang No. 5 Tahun 1994 tentang Pengesahan Konvensi Keanekaragaman Hayati

⑥ Undang-Undang No. 5 Tahun 1992 tentang Benda-banda Cagar Budaya

⑦ Undang-Undang No. 24 Tahun 1992 tentang Penataan Ruang

(2) Peraturan Pemerintah

① Peraturan Pemerintah No. 33 Tahun 1970 tentang Perencanaan Hutan

② Peraturan Pemerintah No. 28 Tahun 1985 tentang Perlindungan Hutan

(3) Keputusan Presiden

① Keputusan Presiden No. 23 Tahun 1990 tentang Badan Pengendalian Dampak Lingkungan (BAPEDAL)

② Keputusan Presiden No. 32 Tahun 1990 tentang Pengelolaan Kawasan Lindung

(4) Keputusan dan Instruksi Menteri/Bapedal

① Keputusan Menteri Kehutanan No. 680/Kpts/UM/8/1981 tentang Pedoman Penatagunaan Hutan Kesepakatan

② Keputusan Menteri Negara Lingkungan Hidup No. 14/MENKHL/3/1994 tentang Pedoman Umum Penyusunan Analisis Dampak Lingkungan

③ Keputusan Kepala Bapedal No. Kep-056 Tahun 1994 tentang Pedoman mengenai Ukuran Dampak Penting

I-4 List of Researchers Cooperative in Preparing Environmental Impacts Assessment Paper / UKL-UPL

Name of the chief researcher	Career / Background
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I-5 Shannon's Index of Diversity in Each Surveyed Plot

(July 1997)

HL-RJ	HL-BD	HS-BD	CA-DP	HL-TP	HL-TA	HL-BG
Seedling						
3.0424	3.5093	3.6464	3.3175	3.0615	3.4269	2.9888
Sapling						
3.0633	3.6755	3.5785	3.3410	3.333	2.8604	2.3854
Tree						
3.9782	3.5611	4.005	3.3616	3.6186	3.5777	2.9023

Note) HL-RJ : Protection forest, Rejang Lebong
HL-BD : Protection forest, Bukit Dendan
HS-BD : Secondary forest, Bukit Dendan
CA-DP : Nature reserve, Das Petah
HL-TP : Protection forest, Tebat Pulau
HL-TA : Protection forest, Tanjung Alam
HL-BG : Protection forest, Benuanggaling

I-6 Measurement Examples of Total Number of Coliform Bacillus (Escherichia Coli)

(Unit: Colicount/100ml water)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
10*	3	2	5*	5*	10*	1	2	5*	3	23*	20*	15*	15*

Note 1) Sources: Secondary data from the prefectual Hospital (Rumah Sakit Umum Kab. DT II. Rejang Lebong) (July, 1997)

2) *1 = Air Selimang
2 = Ujan Mas Bawah
3 = Surobali
*4 = Tebat Monok
*5 = Cirebon Baru
*6 = Air pikat
7 = Taba Padang
8 = Tebat Laut
*9 = Tebat Pulau
10 = Sukarami
*11 = Air Lanang
*12 = Tabarenah
*13 = Tanjung Dalam
*14 = Kampung Melayu

3) * : above the threshold value in Category A, 3 colicout/100ml stipulated by "Peraturan Pemerintah Republic Indonesia Nomor 20 Tahun 1990 tentang Pengendalian Pencemaran Air"

I-7 Analysis Statements of Quality of the River Water Sampled in July – August 1997 (1/3)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax : (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS KUALITAS AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VIII/KA/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

PARAMETER	STASIUN	1.A	1.C	1.D	2.A	2.B	2.C	3.A	3.B
FISIKA :									
1. Suhu *)	°C	22	21,8	21	22,6	22	20	24	22,8
2. Warna	Pt Co	4,30	5,10	5,10	4,80	4,35	4,40	4,39	4,20
3. Padatan tersuspensi (TSS)	mg/l	18	14	26	32	22	4	14	6
4. Kekeruhan	NTU	2,3	1,1	3,5	1,5	2,0	0,35	0,71	1,5
5. Daya Hantar Listrik (DHL) *)	umhos/cm	225	305	390	290	350	258	248	245
KIMIA :									
1. pH *)	-	6	6	6	6	5,5	6	6	5,5
2. Kesadahan Total	mg/l$CaCO_3$	49	46	25	53	31	36	40	40
3. Karbondioksida bebas (CO_2) *)	mg/l	19,92	19,98	21,97	7,99	5,99	7,99	3,99	27,97
4. Oksigen terlarut (DO) *)	mg/l	6,44	8,14	6,96	7,64	7,20	7,20	7,72	6,62
5. BOD_5 *)	mg/l	2,03	1,69	0,34	1,02	0,68	0,34	0,51	0,85
6. COD	mg/l	42,48	46,63	46,63	46,63	61,17	48,71	44,56	61,17
7. NH_3-N	mg/l	0,632	0,138	0,214	0,656	0,433	0,375	0,450	0,536
8. NO_2-N	mg/l	0,017	0,013	0,011	0,008	0,012	0,015	0,015	0,010
9. NO_3-N	mg/l	0,117	0,138	0,174	0,656	0,702	1,373	0,357	0,220
10. Ortho phosphat	mg/l	0,097	0,099	0,023	0,084	0,096	0,069	0,049	0,036
11. Sulfida (H_2S)	mg/l	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01
12. Mangan (Mn)	mg/l	0,054	0,110	0,105	0,162	0,110	0,066	0,073	0,118
13. Besi (Fe)	mg/l	0,942	0,397	0,670	0,408	0,624	0,043	0,096	0,324
14. Magnesium (Mg)	mg/l	0,294	0,284	0,118	0,294	1,010	0,216	0,784	0,814
15. Pestisida :									
Lindan	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt	tt	tt
Aldrin	mg/lx10^{-3}	tt	0,212	tt	tt	tt	tt	tt	tt
OPDDE	mg/lx10^{-3}	0,850	tt	0,100	0,025	4,437	0,050	0,237	tt
OPDDD	mg/lx10^{-3}	0,862	0,035	0,387	0,437	0,80	1,287	0,425	0,275
Dieldrin	mg/lx10^{-3}	0,650	tt	tt	tt	tt	0,040	tt	tt
PPTDE	mg/lx10^{-3}	0,037	0,062	0,025	tt	0,037	tt	0,087	tt
Endrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt	tt	tt

Keterangan : tt = tidak terdeteksi (<0,001)

1.A = S. Lanang (*Sarobuli*)
1.C = S. Lanang (Air Lanang)
1.D = Hulu S. Lanang (Air Lanang)
2.A = S. Pikat (Tanjung Dalam)
2.B = S. Pikat (Tebat Pulau)
2.C = S. Pikat (Air Pikat)
3.A = S. Ketapang (Cirebon Baru)
3.B = S. Ketapang (Tebat Monok)

Bogor, 9 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP. 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima. pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah tanggal dikeluarkan Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-7 Analysis Statements of Quality of the River Water Sampled in July – August 1997 (2/3)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS KUALITAS AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VIII/KA/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

PARAMETER	STASIUN	4.A	4.B	4.C	4.D	5.A	5.B	5.C	5.D	5.E
FISIKA :										
1. Suhu *)	°C	22.6	26.3	25	26.5	24.8	19 *	30	25	26
2. Warna	Pt.Co	5.15	4.85	4.65	4.95	4.45	4.60	4.45	4.80	4.65
3. Padatan tersuspensi (TSS)	mg/l	8	8	10	20	14	22	12	16	2
4. Kekeruhan	NTU	1.2	1.4	0.54	1.5	1.30	5.5	12	1.8	21
5. Daya Hantar Listrik (DHL) *)	umhos/cm	220	230	220	440	215	185	200	201	186
KIMIA :										
1. pH *)	-	6	6	6	6	6	5.5	5.5	5.6	6
2. Kesadahan Total	mg/l$CaCO_3$	37	68	43	180	25	30	30	22	34
3. Karbondioksida bebas (CO2) *)	mg/l	19.98	2.00	29.96	21.97	15.98	15.98	2.00	2.00	3.99
4. Oksigen terlarut (DO) *)	mg/l	6.96	7.88	5.31	6.36	6.96	7.38	7.38	6.10	6.11
5. BOD_5 *)	mg/l	1.44	0.93	2.88	0.34	0.59	0.25	0.85	5.41	0.25
6. COD	mg/l	37.02	50.79	40.40	52.87	48.71	46.63	59.10	54.91	52.87
7. NH_3-N	mg/l	0.283	0.240	0.439	0.669	0.347	0.486	0.236	0.351	0.329
8. NO_2-N	mg/l	0.012	0.009	0.007	0.006	0.013	0.007	0.019	0.009	0.013
9. NO_3-N	mg/l	0.283	0.210	0.073	0.669	0.341	0.486	0.138	0.321	0.242
10. Ortho phosphat	mg/l	0.069	0.094	0.070	0.152	0.066	0.068	0.032	0.035	0.044
11. Sulfida (H_2S)	mg/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.01
12. Mangan (Mn)	mg/l	0.081	0.044	0.088	0.083	0.088	0.130	0.096	0.015	0.184
13. Besi (Fe)	mg/l	0.187	0.275	0.098	0.212	0.315	0.597	1.179	0.418	0.679
14. Magnesium (Mg)	mg/l	0.657	0.637	0.632	2.176	0.206	0.520	0.059	0.323	0.137
15. Pestisida :										
Lindan	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt	tt	tt
Aldrin	$mg/lx10^{-3}$	tt	tt	tt	0.050	tt	0.300	tt	tt	tt
OPDDE	$mg/lx10^{-3}$	32.225	70.362	tt	0.037	tt	tt	tt	tt	0.062
OPDDD	$mg/lx10^{-3}$	24.173	18.587	1.750	0.333	9.350	tt	2.662	0.153	0.275
Dieldrin	$mg/lx10^{-3}$	18.537	45.100	tt	0.333	tt	tt	tt	0.037	tt
PPTDE	$mg/lx10^{-3}$	0.200	58.925	0.025	0.037	tt	0.050	0.025	0.062	0.012
Endrin	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt	tt	tt

Keterangan : tt = tidak terdeteksi (<0,001)

4.A = S. Teretik (Tendak)
4.B = S. Teretik (Taba Padang)
4.C = S. Teretik (Tebat Laut)
4.D = S. Hulu S Teretik (Air Selimang)
5.A = S. Mundu (Tabarenah)
5.B = Anak s Mundu (Sukarami)
5.C = Hulu S Mundu (Talang Tebat Jauh)
5.D = Anak S Mundu (Kampung sajad)
5.E = S. Mundu (Kampung melayu)

Bogor, 9 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP. 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima. pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah tanggal dikeluarkan Laboratorium tidak bertanggungjawab atas kelahan yang disampaikan diluar batas waktu tersebut

I-7 Analysis Statements of Quality of the River Water Sampled in July – August 1997 (3/3)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Telp/Fax : (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS KUALITAS AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/KA/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

PARAMETER	STASIUN	6.A	7.A	7.B	7.B'	7.C	7.D
FISIKA :							
1. Suhu *)	°C	24	25,5	27	26	25	22,5
2. Warna	Pt Co	4,80	4,75	4,75	4,20	4,60	4,55
3. Padatan tersuspensi (TSS)	mg/l	14	8	18	8	4	6
4. Kekeruhan	NTU	0,80	1,5	2,1	2,5	2,5	1,0
5. Daya Hantar Listrik (DHL) *)	umhos/cm	227	310	348	340	320	111
KIMIA :							
1. pH *)	-	6	6	6	5,5	6,5	5,5
2. Kesadahan Total	mg/l$CaCO_3$	26	69	53	53	34	25
3. Karbondioksida bebas (CO_2) *)	mg/l	13,98	3,99	2,00	9,99	2,00	15,98
4. Oksigen terlarut (DO) *)	mg/l	7,80	7,38	7,12	7,96	7,88	7,38
5. BOD_5 *)	mg/l	0,76	1,94	0,17	0,42	0,34	1,69
6. COD	mg/l	46,63	48,71	57,02	50,79	54,94	46,63
7. NH_3-N	mg/l	0,546	0,204	0,493	0,321	0,268	0,139
8. NO_2-N	mg/l	0,008	0,019	0,011	0,015	0,140	0,015
9. NO_3-N	mg/l	0,090	0,629	0,530	0,629	0,490	0,087
10. Ortho phosphat	mg/l	0,067	0,144	0,040	0,091	0,079	0,197
11. Sulfida (H_2S)	mg/l	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01
12. Mangan (Mn)	mg/l	0,125	0,044	0,044	0,103	0,044	0,140
13. Besi (Fe)	mg/l	0,099	0,225	0,387	0,486	0,396	0,148
14. Magnesium (Mg)	mg/l	0,088	0,931	1,206	1,029	1,059	0,216
15. Pestisida :							
Lindan	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt
Aldrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt
OPDDE	mg/lx10^{-3}	tt	tt	tt	tt	tt	1,025
OPDDD	mg/lx10^{-3}	1,075	0,200	0,825	1,275	1,512	0,325
Dieldrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt
PPTDE	mg/lx10^{-3}	0,037	tt	0,050	0,037	tt	0,075
Endrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt

Keterangan : tt = tidak terdeteksi (<0,001)

6.A = S. Dendan (Tabarenah)
7.A = Outlet Musi (Kunduran Baru)
7.B = S. Musi (Lubuk Penyamun)
7.B' = S. Musi (PLTA) (Ujan Mas Atas
7.C = S. Musi (Embu Ijuk)
7.D = Inlet S. Musi (Seguring)

Bogor, 9 Agustus 1997
Penanggung Jawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP. 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima, pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah tanggal dikeluarkan. Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-8 Analysis Statements of Quality of the Existing Well Water Sampled in July – August 1997 (1/2)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS KUALITAS AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/KA/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sumur

PARAMETER	STASIUN	STASIUN						
		1	2	3	4	5	6	7
FISIKA :								
1. Suhu	°C	25	24	24	24,5	26,5	23	24
2. Warna	Pt.Co	4,35	4,40	4,35	4,55	4,20*	4,50	14,45
3. Padatan tersuspensi (TSS)	mg/l	16	12	2	10	8	4	110
4. Kekeruhan	NTU	1,20	0,61	0,71	0,75	0,92	0,45	58
5. Daya Hantar Listrik (DHL) *)	umhos/cm	300	350	240	310	260	224	376
KIMIA :								
1. pH *)	-	6	6	6	6	5,5	5	6
2. Kesadahan Total	mg/l$CaCO_3$	39	70	33	37	25	21	37
3. Karbondioksida bebas (CO_2) *)	mg/l	23,97	17,98	23,97	19,98	33,96	25,97	15,98
4. Oksigen terlarut (DO) *)	mg/l	5,08	7,20	6,86	6,86	4,24	4,66	6,62
5. BOD_5 *)	mg/l	4,63	0,42	3,47	0,51	2,45	0,59	5,33
6. COD	mg/l	54,91	69,48	57,02	61,17	44,56	46,63	69,48
7. NH_3-N	mg/l	0,504	0,289	0,311	0,214	0,354	0,461	0,579
8. NO_2-N	mg/l	0,015	0,026	0,014	0,020	0,020	0,014	0,049
9. NO_3-N	mg/l	1,813	3,542	1,861	2,356	1,986	1,000	2,049
10. Ortho phosphat	mg/l	0,030	0,060	0,084	0,041	0,035	0,026	0,031
11. Sulfida (H_2S)	mg/l	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01	<0,01
12. Mangan (Mn)	mg/l	0,213	0,147	0,022	0,125	0,176	0,037	0,353
13. Besi (Fe)	mg/l	0,056	0,046	0,076	0,043	0,058	0,048	6,601
14. Magnesium (Mg)	mg/l	0,588	14,321	0,088	0,225	0,490	0,029	0,990
15. Pestisida :								
Lindan	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt
Aldrin	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt
OP'DDE	$mg/lx10^{-3}$	tt	tt	tt	tt	2,80	0,062	0,100
OP'DDD	$mg/lx10^{-3}$	tt	1,400	0,937	4,587	1,500	tt	0,150
Dieldrin	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt
PP'TDE	$mg/lx10^{-3}$	tt	0,062	0,037	0,100	0,150	0,037	0,025
Endrin	$mg/lx10^{-3}$	tt	tt	tt	tt	tt	tt	tt

Keterangan : tt = tidak terdeteksi (<0,001)
1 = Air Selimang
2 = Ujan Mas bawah
3 = Surobali
4 = Tebat Monok
5 = Circbon Baru
6 = Air Pikat
7 = Taba Padang

Bogor, 8 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M. Sc.
NIP. 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima, pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah tanggal dikeluarkan. Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-8 Analysis Statements of Quality of the Existing Well Water Sampled in July – August 1997 (2/2)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS KUALITAS AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/KA/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sumur

PARAMETER	STASIUN	STASIUN						
		8	9	10	11	12	13	14
FISIKA :								
1. Suhu	°C	22	22.5	23.5	23	24	23	23.5
2. Warna	Pt.Co	4.30	4.30	4.60	4.60	4.70	4.60	4.85
3. Padatan tersuspensi (TSS)	mg/l	10	20	16	12	16	6	4
4. Kekeruhan	NTU	2.2	0.70	1.3	2.6	1.5	0.7	0.6
5. Daya Hantar Listrik (DHL) *)	umhos/cm	-	265	180	70	145	250	183
KIMIA :								
1. pH *)	-	6	6	5.5	6	6	6	6
2. Kesadahan Total	mg/l$CaCO_3$	34	34	28	21	33	74	41
3. Karbondioksida bebas (CO_2) *)	mg/l	2.60	23.97	31.96	63.92	65.92	29.96	27.97
4. Oksigen terlarut (DO) *)	mg/l	0.76	4.66	4.92	2.54	3.06	3.74	5.08
5. BOD_5 *)	mg/l	0.59	0.17	3.72	3.98	0.42	3.98	3.30
6. COD	mg/l	73.63	46.63	42.48	52.87	38.32	52.87	27.94
7. NH_3-N	mg/l	1.039	1.974	0.750	0.536	0.096	0.086	0.632
8. NO_2-N	mg/l	0.009	0.010	0.007	0.007	0.012	0.012	0.014
9. NO_3-N	mg/l	1.039	1.974	2.665	0.735	1.960	2.572	2.476
10. Ortho phosphat	mg/l	0.048	0.069	0.312	0.125	0.102	0.088	0.176
11. Sulfida (H_2S)	mg/l	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
12. Mangan (Mn)	mg/l	3.765	0.015	0.125	0.147	0.272	0.140	0.103
13. Besi (Fe)	mg/l	1.267	0.598	0.101	0.471	0.147	0.035	0.116
14. Magnesium (Mg)	mg/l	1.520	1.294	1.059	0.098	598	1.667	1.225
15. Pestisida :								
Lindan	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt	tt
Aldrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt	tt
OPDDE	mg/lx10^{-3}	0.400	0.512	tt	tt	tt	41.075	tt
OPDDD	mg/lx10^{-3}	0.650	0.600	21.075	2.962	tt	1.387	36.062
Dieldrin	mg/lx10^{-3}	0.050	tt	5.500	tt	tt	12.587	28.262
PPTDE	mg/lx10^{-3}	tt	tt	3.587	0.050	23.112	42.037	6.325
Endrin	mg/lx10^{-3}	tt	tt	tt	tt	tt	tt	tt

Keterangan : tt = tidak terdeteksi (<0.001)
8 = Tebat Laut
9 = Tebat Pulau
10 = Sukarami
11 = Air Lanang
12 = Tabarenah
13 = Tanjung Dalam
14 = Kampung Melayu

Bogor, 8 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M. Sc.
NIP 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima. pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah tanggal dikeluarkan Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-9 Analysis Statements of Aquatic Biota of the River Sampled in July – August 1997 (1/4)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS BIOTA AIR

Nama Konsultan : PT. CAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/PL/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

Kepadatan Phytoplankton (Ind/l)

ORGANISME	STASIUN														
	1.A	1.B	1.C	2.A	2.C	3.A	3.B	4.A	5.A	5.B	5.C	6.A	7.A	7.B'	7.D
BACILLARIOPHYCEAE :															
Achnanthes sp	0	3	15	0	0	0	0	0	18	6	0	21	9	0	6
Navicula sp	2	156	6	4	4	0	12	0	3	4	0	0	9	6	0
Fragilaria sp	92	30	141	232	212	18	40	28	348	54	0	462	369	72	345
Nitzschia sp	0	102	18	6	16	4	12	0	0	0	0	0	3	6	0
Surirella sp	26	15	54	10	22	24	12	4	30	38	10	3	21	60	12
Pinnularia sp	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0
Cymbella sp	0	0	0	2	0	0	0	2	3	0	0	0	6	0	0
Diatoma sp	0	0	0	0	0	0	0	0	0	0	0	6	0	3	3
Cocconeis sp	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
CHLOROPHYCEAE :															
Closterium sp	2	9	0	0	0	2	2	0	0	0	0	6	6	3	3
Cosmarium sp	0	3	0	2	0	16	12	0	0	2	0	3	0	0	3
Spirogyra sp	36	0	36	0	30	372	1362	14	0	0	4	66	0	297	33
Euastrum sp	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cladophora sp	20	0	0	0	0	0	92	0	0	0	0	0	0	450	0
Hyalotheca sp	0	0	0	0	0	28	0	0	0	0	0	0	0	0	0
Mougeotia sp	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0
Dictyosphaerium sp	0	0	0	0	0	0	0	0	0	0	0	42	0	0	0
Desmidium sp	0	0	0	0	0	0	0	0	0	0	0	0	0	222	30
Pediastrum sp	0	0	0	0	0	0	0	0	0	0	0	0	0	93	0
Rhizoclonium sp	0	0	0	0	0	0	0	0	0	0	0	0	0	300	150
Cloniophora sp	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0
CYANOPHYCEAE :															
Oscillatoria sp	0	0	60	0	0	0	0	0	0	0	0	0	0	75	0
Spirulina sp	0	15	0	0	0	0	0	0	0	0	0	0	0	0	0
Chroococcus sp	0	0	0	0	0	34	0	0	0	0	0	0	0	0	0
EUGLENOPHYCEAE :															
Euglena sp	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0
Phacus sp	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0
Jumlah Taxa	8	10	7	6	5	8	9	4	5	5	2	8	8	14	9
Jumlah Individu/l	182	348	330	256	284	498	1548	48	302	104	14	609	428	1650	585
Indeks Keanekaragaman	1.38	1.54	1.58	0.44	0.87	1.00	0.55	1.01	0.53	1.07	0.60	0.89	0.63	2.00	1.18
Indeks Kesergaman	0.66	0.67	0.81	0.25	0.54	0.48	0.25	0.73	0.33	0.67	0.87	0.43	0.300	0.75	0.54
Indeks Dominansi	0.33	0.30	0.26	0.82	0.58	0.57	0.78	0.43	0.76	0.41	0.59	0.59	0.75	0.17	0.42

Bogor, 8 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP. 131 471 376

I-9 Analysis Statements of Aquatic Biota of the River Sampled in July - August 1997 (2/4)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
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Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS BIOTA AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/B/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

Kepadatan Makro Benthos (Ind/m^2)

ORGANISME	STASIUN														
	1.A	1.B	1.C	2.A	2.C	3.A	3.B	4.A	5.A	5.B	5.C	6.A	7.A	7.B'	7.D
DIPTERA :															
Antocha sp	0	0	22	0	11	0	0	0	0	0	0	0	0	0	0
Pentaneura sp	0	0	0	11	121	308	44	0	22	0	11	0	0	0	0
Chironomus sp	11	0	539	121	484	792	660	330	77	44	121	11	110	660	176
Mikrochironomus sp	0	0	0	231	22	0	0	0	0	0	0	11	0	275	0
Pseudochironomus sp	0	0	33	0	0	33	0	0	0	0	0	0	0	0	0
Polpamyia sp	0	0	22	0	0	11	0	0	0	22	0	0	0	0	0
Tabanus sp	0	0	0	33	33	0	0	0	0	0	0	0	0	0	0
Dictya sp	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0
Corynoneura sp	22	0	0	0	0	0	0	0	0	0	11	0	0	0	0
Pedicia sp	11	0	0	11	0	0	0	0	0	0	0	0	0	0	0
COLEOPTERA :															
Laccophilus sp	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0
Berosus sp	0	0	0	0	0	0	22	0	0	0	0	0	0	0	0
Psephenus sp	0	0	11	0	0	0	11	0	0	0	0	0	0	0	0
Stenelmis sp	11	11	330	77	99	0	22	55	22	0	0	0	0	165	132
Hydrocanthus sp	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
Stenolophus sp	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0
Thermonectus sp	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0
EPHEMEROPTERA :															
Ametropus sp	0	0	22	77	88	0	0	0	0	0	0	0	0	0	0
Ephemerella sp	0	0	55	66	11	836	0	0	0	0	11	0	0	33	0
Rhithrogena sp	0	0	231	264	198	143	165	88	132	0	0	55	0	440	253
Cinygmula sp	0	0	0	0	0	0	0	22	0	0	0	0	0	0	0
Cinygma sp	0	0	110	22	0	0	0	0	0	22	0	44	0	0	0
Iron sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	154
PLECOPTERA :															
Atoperla sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11
ODONATA :															
Gomphus sp	0	0	44	0	22	0	0	0	0	0	0	0	0	0	77
TRICHOPTERA :															
Rhyacophila sp	0	0	0	0	0	99	0	0	0	0	0	0	0	0	0
Hydropsyche sp	0	0	0	11	0	88	0	0	0	0	0	0	0	22	0
OLIGOCHAETA :															
Tubifex sp	0	0	0	0	0	396	0	0	0	0	0	0	22	0	0
BRACHIURA :															
Paratelphusa sp	0	0	11	0	0	11	0	0	0	0	0	0	0	0	0

I-9 Analysis Statements of Aquatic Biota of the River Sampled in July – August 1997 (3/4)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

Lanjutan :

Kepadatan Makro Benthos (Ind/m^2)

ORGANISME	STASIUN														
	1.A	1.B	1.C	2.A	2.C	3.A	3.B	4.A	5.A	5.B	5.C	6.A	7.A	7.B[1]	7.D
PELECYPODA :															
Corbicula sp	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
GASTROPODA :															
Melanoides sp	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0
Thiara sp	0	0	0	0	0	0	0	0	0	0	0	0	33	0	0
Jumlah Taxa	4	1	14	12	11	11	6	4	4	3	4	4	5	6	6
Jumlah Individu/l	55	11	1452	935	110	2728	924	495	253	88	154	121	187	1595	805
Indeks Keanekaragaman	1.33	0	1.40	1.56	1.73	1.75	0.92	0.96	1.12	1.04	0.75	1.16	1.20	1.40	1.59
Indeks Keseragaman	0.96	0	0.53	0.80	0.72	0.73	0.51	0.69	0.81	0.94	0.55	0.84	0.75	0.78	0.89
Indeks Dominansi	0.28	1.00	0.22	0.18	0.25	0.22	0.54	0.49	0.38	0.37	0.63	0.35	0.40	0.29	0.22

Keterangan :

1.A = Outlet S. Lanang
1.B = Inlet S. Lanang
1.C = S. Lanang
2.A = Outlet S. Pikat Kering
2.C = Inlet S. Pikat Kering
3.A = Outlet S. Ketapang
3.B = Inlet S. Ketapang
4.A = Outlet S. Teretik
5.A = Outlet S. Mundu
5.B = S. Mundu
5.C = Inlet S. Mundu
6.A = Outlet S. Dendam
7.A = Outlet S. Musi
7.B1 = PLTA S. Musi
7.D = Inlet S. Musi

Bogor, 8 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima.
Pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah dikeluarkan.
Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-9 Analysis Statements of Aquatic Biota of the River Sampled in July - August 1997 (4/4)

LABORATORIUM FISIKA-KIMIA-BIOLOGI PERAIRAN
JURUSAN MANAJEMEN SUMBERDAYA PERAIRAN
FAKULTAS PERIKANAN - INSTITUT PERTANIAN BOGOR
Kampus IPB Darmaga, Bogor 16680, Tel/Fax.: (0251) 621495 (direct), 622909-11 Pes. 434.

HASIL ANALISIS BIOTA AIR

Nama Konsultan : PT. BAKTI MULTI PERSADA
Tanggal Terima : 24 Juli 1997
Tanggal Analisa : 25 Juli - 6 Agustus 1997
Nomor Analisa : 007/VII/PL/97
Lokasi : Kab. Rejang Lebong - Bengkulu
Jenis sampel : Air Sungai

Kepadatan Zooplankton (Ind/l)

ORGANISME	STASIUN														
	1.A	1.B	1.C	2.A	2.C	3.A	3.B	4.A	5.A	5.B	5.C	6.A	7.A	7.B	7.D
RHIZOPODA :															
Arcella sp	8	18	30	2	6	0	0	0	0	4	0	0	2	6	0
Centropyxis sp	4	20	30	20	30	0	8	2	20	30	8	6	10	14	10
Difflugia sp	0	8	10	10	4	0	0	0	16	16	0	0	2	10	0
Nebella sp	2	4	8	0	2	0	0	0	0	2	0	0	0	0	0
Euglypha sp	0	6	2	0	2	0	0	0	0	0	0	2	0	0	0
Cyphoderia sp	0	8	4	2	2	0	0	0	0	0	0	0	0	0	0
ROTIFERA :															
Monostyla sp	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0
Lepadella sp	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0
Lecane sp	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Cephalodella sp	0	0	0	0	2	2	0	0	0	0	2	0	0	0	0
Brachionus sp	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Jumlah Taxa	3	7	7	6	7	1	1	1	2	4	2	2	3	3	2
Jumlah Individu/l	14	66	86	38	48	2	8	2	36	52	10	8	14	30	12
Indeks Keanekaragaman	0.95	1.72	1.52	1.31	1.29	0	0	0	0.68	1.00	0.50	0.56	0.79	1.04	0.38
Indeks Keseragaman	0.87	0.89	0.78	0.73	0.66	0	0	0	0.99	0.72	0.72	0.81	0.72	0.95	0.55
Indeks Dominansi	0.43	0.21	0.27	0.36	0.42	1.00	1.00	1.00	0.50	0.43	0.68	0.62	0.55	0.37	0.72

Keterangan :

1.A = Outlet S. Lanang
1.B = Inlet S. Lanang
1.C = S. Lanang
2.A = Outlet S. Pikat Kering
2.C = Inlet S. Pikat Kering
3.A = Outlet S. Ketapang
3.B = Inlet S. Ketapang
4.A = Outlet S. Teretik
5.A = Outlet S. Mundu
5.B = S. Mundu
5.C = Inlet S. Mundu
6.A = Outlet S. Dendan
7.A = Outlet S. Musi
7.B1 = PLTA S. Musi
7.D = Inlet S. Musi

Bogor, 8 Agustus 1997
Penanggungjawab Analisa

Ir. Sigid Hariyadi, M.Sc.
NIP. 131 471 376

Catatan :

Hasil analisa diatas hanya berdasarkan sampel yang diterima. pertanyaan dan/atau keluhan tentang hasil analisa supaya dilakukan dalam waktu 21 hari setelah dikeluarkan. Laboratorium tidak bertanggungjawab atas keluhan yang disampaikan diluar batas waktu tersebut.

I-10 Notes of Wildlife Survey (1/6)

Thally Sheet Pengamatan Satwa Liar
Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Bukit Dendan (Hutan Primer)
Tanggal : 15 Juli 1997
No. Transek : II

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
09.49	Siamang		✓			2 group	Primata	Suara
14.38	*Dicrurus macroceicus* (Black Drongo)	✓				1 ekor	Burung	
15.22	Babi Hutan		✓			3 ekor	Cervidae	Jejak, sarang
15.29	*Pycnonotus squamatus* (Black-crested Bulbul) = Burung Kutilang Emas		✓			2 ekor	Burung	suara
15.39	*Phaenicapheus tristis* (Green-billed Makloha)		✓			1 ekor	Burung	Suara
15.42	Sri gunting		✓			2 ekor	Burung	Suara

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain

I-10 Notes of Wildlife Survey (2/6)

Thally Sheet Pengamatan Satwa Liar
Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Bukit Dendan (Hutan sekunder)
Tanggal : 16 Juli 1997
No. Transek : III

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
13.43	Crocot		✓			2 ekor	Burung	Suara
15.22	*Arborophila orientalis rolli* (Grey-breasted Partridge)	✓				3 ekor	Burung	

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain

I-10 Notes of Wildlife Survey (3/6)

Thally Sheet Pengamatan Satwa Liar
Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Cagar Alam Das Petah
Tanggal : 17 Juli 1997
No. Transek : IV

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
09.25	*Rhipidura albicollis* (White-throated Fantail)	✓				2 ekor	Burung	Suara
10.05	*Aethopyga siparaja* (Crimson Sunbird)	✓				2 ekor	Burung	Suara, mengisap nektar bunga
12.20	Beruk		✓			2 group	Primata	Suara
12.24	Beruang Madu (*Heliarctos malayanus*)		✓			1 ekor	Mamalia	Bekas cakaran

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain

I-10 Notes of Wildlife Survey (4/6)

Thally Sheet Pengamatan Satwa Liar

Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Ds Tebat Pulau
Tanggal : 19 Juli 1997
No. Transek : V

(1)

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				∑ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
	Aethopyga temminckii (Temmick's Sunbird)			✓		+	Burung	
	Alcedo meninting (Blue-eared Kingfisher)			✓		+++	Burung	
	Lacedo pulchella (Banded Kingfisher)			✓		++	Burung	
	Ceyx rufidorsa (Rufous-backed Kingfisher)			✓		+	Burung	
	Asio flammeus (Short-eared Owl)			✓		++	Burung	
	Otus umbra (Simeulue Scops-Owl)			✓		++	Burung	
	Harpactes duvaucelli (Scarlet-rumped Trogon)			✓		+++	Burung	
	Nyctyornis amictus (Red-bearded Bee-Eater)			✓		+++	Burung	
	Upupa epops (Eurasian Hoopoe)			✓		++	Burung	
	Anorrhinus Galeritus (Bushy-crested Hornbill)			✓		+	Burung	
	Buceros rhinoceros (Rhinoceros hornbill)			✓		+	Burung	
	Buceros vigil (Helmeted			✓		+	Burung	

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
	Hornbill)							
	Megalaima chrysopogon (Gold-whiskered Barbet)			✓		+++	Burung	
	Megalaima rafflesii (Red-crowned Barbet)			✓		+++	Burung	
	Chloropsis sonnerati (Lesser Green Leafbird)			✓		++	Burung	

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain
+++ : Banyak
++ : Sedang
+ : Sedikit

I-10 Notes of Wildlife Survey (5/6)

Thally Sheet Pengamatan Satwa Liar
Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Ds. Tanjung Alam
Tanggal : 20 Juli 1997
No. Transek : VI

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
09.47	*Ictinaetus malayensis* (Black Eagle)	✓				2 ekor	Burung	
10.01	Siamang		✓			1 group (4-6 ekor)	Primata	Suara
11.54	*Arachnothera flavigaster* (Spectacled Spiderhunter)		✓			2 ekor	Burung	Suara
13.33	Musang Coklat	✓				1 ekor	Musang	

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain

I-10 Notes of Wildlife Survey (6/6)

Thally Sheet Pengamatan Satwa Liar
Dalam Studi UKL/UPL Propinsi Bengkulu

Lokasi : Ds. Benuanggaling
Tanggal : 21 Juli 1997
No. Transek : VII

Waktu (Pengamatan)	Jenis	Hasil Pengamatan				Σ Individu (Dugaan)	Kelompok	Keterangan
		MI	TL	IM	LL			
09.13	*Dicaeum agile* (Thick-billed Flowespecker)		✓			2 ekor	Burung	Suara
10.02	Burung Prenjak		✓			4 ekor	Burung	Suara
10.36	*Dicaeum agile* (Thick-billed Flowespecker)		✓			4 ekor	Burung	Suara
12.53	*Centopus sinensis* (Greater coucal) = Burung bubut	✓				1 ekor	Burung	
13.04	Bajing Tanah	✓				1 ekor	Tupaidae	
14.51	*Centopus sinensis* (Greater coucal) = Burung bubut		✓			1 ekor	Burung	Suara
14.55	*Phaenicophaeus sumatranus* (Chestnut-bellid Molkoha) = Burung bubut	✓				1 ekor	Burung	
15.49	Monyet ekor panjang	✓				1 ekor	Primata	

Keterangan :

MI : Penemuan Langsung
TL : Penemuan tidak Langsung (Jejak, kotoran, dan suara serta tanda lain)
IM : Informasi Masyarakat
LL : Lain-lain

I-11 Kinds of Nekton Observed in Surveyed Points

(July, 1997)

No.	Kinds of Nekton		Observed point																						
	Scientific name	Local name	1A	1C	1D	2A	2B	2C	3A	3B	4A	4B	4C	4D	5A	5B	5C	5D	5E	6A	7A	7B	7B'	7C	7D
1	CYPRINIDAE: Cyclocheilichthys enelops	Bajang													X				X						
2	Cyprinus carpio	Ikan Mas				X	X			X															
3	Hampala macrolepidota	Ikan Putih / Barau																			X		X		
4	Mystacoleucus padangensis	Bilih						X															X		
5	Mystacoleucus sp																			X			X		
6	Osteochilus hasselti	Palau	X	X																					
7	Puntius binotatus	Ikan Sepada / Ikan Tanah	X	X	X	X	X		X											X	X		X		X
8	P. aprotaenia		X																						X
9	Rasbora spilotaenia		X				X	X																	X
10	Rasbora sp		X		X		X		X											X					
11	Tor douronensis	Semah																			X	X	X	X	
12	BAGRIDAE Mystus nemurus	Baung																			X	X	X	X	
13	CLARIIDAE Clarias batrachus	Lele		X					X	X	X	X			X	X	X	X	X		X		X		X
14	Clarias teysmanni	Kalang													X	X			X						
15	ANABANTIDAE Anabas testudineus	Puyu / Betok					X		X	X								X							
16	Trichogaster trichopterus	Sepat / Rawa					X			X	X				X	X	X								
17	CHANNIDAE Channa striata	Gabus					X			X					X	X									
18	POECILIDAE Lebistes reticulatus	Ikan Seribu	X	X	X		X	X				X		X		X	X	X							X
19	CYPRINODONTIDAE Panchax panchax	Kepala timah	X	X			X			X	X						X	X							X
20	HEMIRHAMPHIDAE Dermogenys pusillus		X	X			X							X				X					X		

Notes: 1A = S. Lanang (Sorobali)
1C = S. Lanang (Air Lanang)
1D = Hulu S. Lanang (Air Lanang)
2A = S. Pikat (Tanjung Dalam)
2B = S. Pikat (Tebat Pulau)
2C = S. Pikat (Air Pikat)
3A = S. Ketapang (Cirebon Baru)
3B = S. Ketapang (Tebat Monok)
4A = S. Teretik (Temdak)
4B = S. Teretuk (Taba Padang)
4C = S. Teretik (Tebat Laut)
4D = Hulu S. Teretuk (Air Selimang)
5A = S. Mundu (Tabarenah)
5B = Anak S. Mundu (Sukarami)
5C = Hulu S. Mundu (Talang Tebat Jauh)
5D = Anak S. Mundu (Kamp. Sajad)
5E = S. Mundu (Kamp. Melayu)
6A = S. Dandan (Tabarenah)
7A = Outlet Musi (Kunduran Baru)
7B = S. Musi (Lubuk Penyamun)
7B' = S. Musi (PLTA) (Ujan Mas)
7C = S. Musi (Embu Ijuk)
7D = Inlet S. Musi (Seguring)

1-12 Land Tenure Data from Respondents in July -- August 1997

No.	Zone Sampling	No. Responder	Land Tenure (ha)		
			Out of the Protection Forest		In the Protection Forests
			Dry Crop Field	Paddy Field	Dry Crop Field
1.	Lubuk Saung	1	1		
		2	1		
		3	2		
		4	1		
2.	Air Selimang	1			2
		2			1
		3			3
3.	Taba Padang	1	1	0.6	
		2			1
		3	2		
4.	Tebat Laut	1	3		
		2	5		
5.	Tebat Tebelet	1	1	1.5	
		2	1	0.25	
6.	Cirebon Baru	1	1	0.75	
		2	1.5		1
		3	3.5	0.5	
7.	Kandang	1	0.5		2
		2	1		
		3	1		
8.	Tebat Monok	1	2		
		2	2		
9.	Benuang Galing	1	1.5		
		2	1.5		
		3	1.5	0.25	
		4	2		2
10.	Talang Babatm	1	0.67		
		2	1		
		3	—		—
		4	1.5		
		5	1		
		6	3		
11.	Kelobak	1	1		
		2	3	0.75	
12.	Pelangkian	1	1.5		
		2	2		
		3	1		
13.	Ujan Mas Bawah	1	3		
		2	0.5		2
		3			1
		4	0.25		
14.	Dusun Sawah	1	0.5		
		2	0.25		
		3	1.5		
		4	1		
		5	1		
15.	Ujan Mas Atas	1	1		2
		2	1.5		
16.	Air Lanang	1			2
		2	1		1
		3	0.5		1
17.	Tanjung Alam	1	1		
		2	0.5		
		3	2		
		4	0.5		3
18.	Ops Perah	1	4		
		2	1.5		
		3	1		
19.	Sumber Rejo	1	4		
		2	3		
		3	1.5		
20.	Kampung Sajad	1	2		
		2	2		
21.	Kampung Melayu	1	0.75	0.5	
		2	2.5	0.75	
		3	3		
22.	Kelilik	1			0.75
		2	2		
		3	1		
		4	1	0.75	
23.	Air Mundu	1	0.2		
		2	3		
		3	1.5		
24.	Suro Baji	1	2		
		2	2		
		3	4		
25.	Punggik Lalang	1	2		2
		2	2		
		3	2		
26.	Pelangkian	1	2		
		2	2.5		
		3	2		
		4	1.5		
27.	Tebat Pulau	1			2
		2		1	3
		3	—	—	—
28.	Air Pikat	1	1.5	0.5	
		2	0.67		
		3	1		
29.	Baru Manis	1	1		
		2	1		
		3	3		
30.	Paget Gunung	1	1		
		2	1		
	Total	93	137.79	8.1	31.75
	Mean		1.66	0.68	1.76

J. Aerial Photography and Preparation of Topographical Map

J-1 Aerial Photography

(1) Outline of Aerial Photography

Aerial photographs (scale: approximately 1/20,000) of the Study Area of approximately 220,000 ha were taken to interprete the current conditions of land use in the Study Area and to prepare the topographical map (scale: 1/25,000) of the Project Area.

(2) Execution of Aerial Photography

1) Subcontracting

The aerial photography, processing and development work were subcontracted to and conducted by P.T. Aerokarto Indonesia, a private company specialising in aerial photography.

2) Photography Work

① Specifications

The following specifications were adopted for the aerial photography.

Photography Course	:	east-west
Number of Models	:	approximately 600
Camera	:	Zeiss RMK-A (2 cameras)
Lens	:	PLEOGON A2 (focal length: 153 mm)
Photography Altitude	:	4,400 m
Overlapping	:	overlap: 60 ± 5%, sidelap: 30 ± 5%

② Execution of the Work

Padang Kumilin Airport in Bengkulu, located some 70 km west of the Study Area, was used as the base for the aerial photography. The aircraft was a Beachcraft twin-engine turboprop Super King Air. The Germin GPS navigation system was used to ensure accurate flights over the planned photography courses. The photography courses and the locations and code numbers of the orientation points are shown in Fig. J-1.

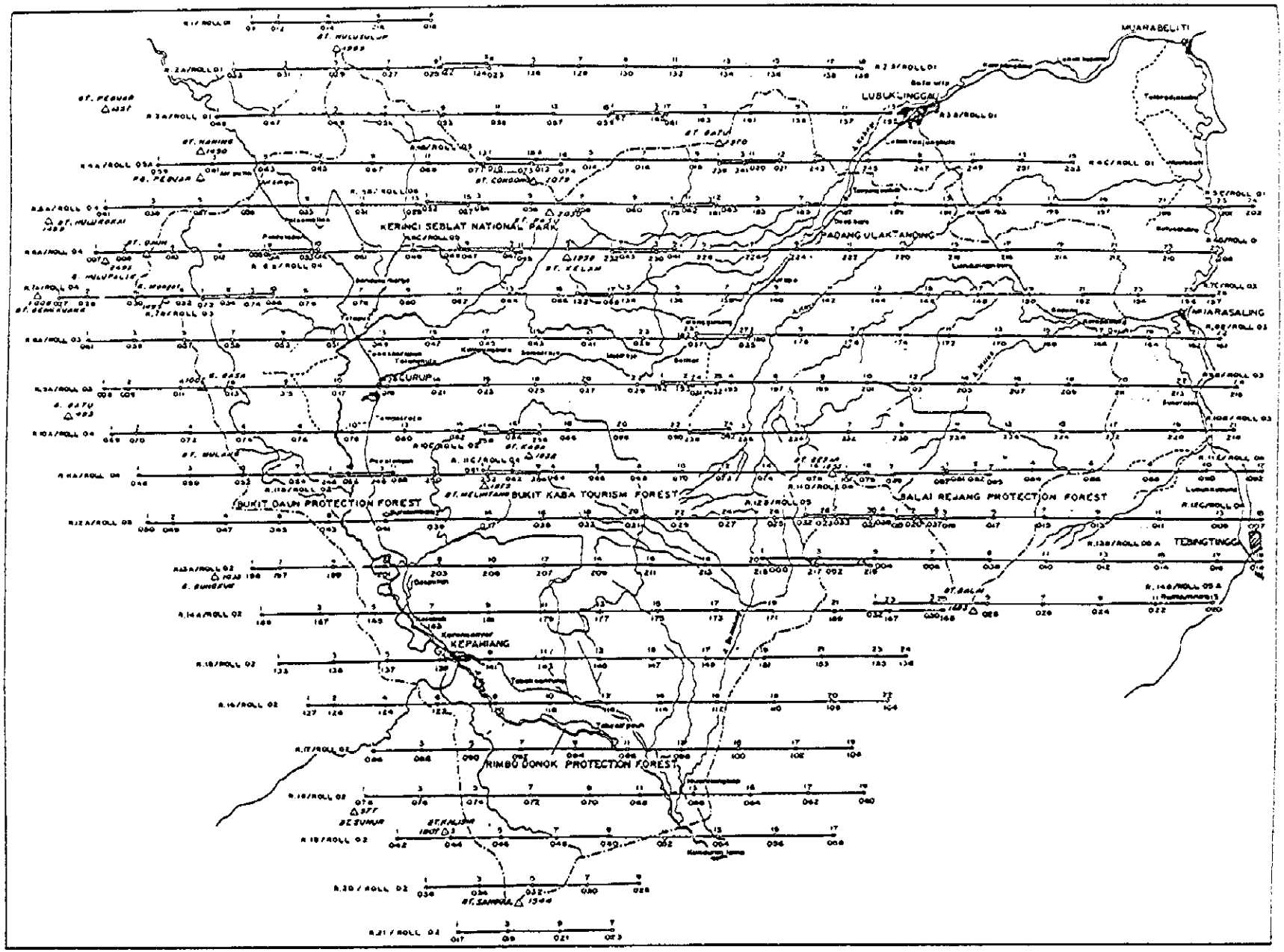

Fig. J-1 Orientation Map for Aerial Photography Work

③ Processing of Photographs

The negatives taken were immediately developed at a temporary processing facility established in Bengkulu to check the quality of the photographs as soon as possible. Following inspection of the developed negatives, notes were written on them before production of the contact prints.

Table J-1 shows the number of photographs taken for each course.

Table J-1 List of Photographs Taken

Course	Photo No.	Quantity	Course	Photo No.	Quantity	Course	Photo No.	Quantity
1	No. 1 - 8	8	7A	No. 1 - 10	10	12A	No. 1 - 30	30
2A	No. 1 - 11	11	7B	No. 1 - 17	17	12B	No. 1 - 6	6
2B	No. 1 - 18	18	7C	No. 1 - 26	26	12C	No. 1 - 15	15
3A	No. 1 - 17	17	8A	No. 1 - 27	27	13A	No. 1 - 24	24
3B	No. 1 - 13	13	8B	No. 1 - 22	22	13B	No. 1 - 19	19
4A	No. 1 - 16	16	9A	No. 1 - 25	25	13C	No. 1 - 8	8
4B	No. 1 - 12	12	9B	No. 1 - 24	24	14A	No. 1 - 25	25
4C	No. 1 - 15	15	10A	No. 1 - 24	24	14B	No. 1 - 13	13
5A	No. 1 - 15	15	10B	No. 2 - 21	21	15	No. 1 - 24	24
5B	No. 1 - 12	12	10C	No. 1 - 3	3	16	No. 1 - 22	22
5C	No. 1 - 24	24	11A	No. 1 - 11	11	17	No. 1 - 19	19
6A	No. 1 - 10	10	11B	No. 1 - 9	9	18	No. 1 - 19	19
6B	No. 1 - 11	11	11C	No. 1 - 18	18	19	No. 1 - 17	17
6C	No. 1 - 9	9	11D	No. 1 - 7	7	20	No. 1 - 9	9
6D	No. 1 - 25	25	11E	No. 1 - 12	12	21	No. 1 - 7	7
Sub-Total		216	Sub-Total		256	Sub-Total		249
						Total		721

3) Results

The results of the aerial photography work are as follows.

Negative Films : one set
Contact Prints : one set
Photography Orientation Map : one set

J-2 Preparation of Topographical Map

(1) Outline of Topographical Mapping

The topographical map (scale: 1/25,000) to be used as the base map for the Study was prepared for the Upper Musi watershed area of some 50,000 ha, centering on Kec. Curup and Kec. Kepahiang in Kab. Rejang Lebong, Propensi Bengkulu. The geographical scope of the topographical map is shown in Fig. J-2.

The technical specifications of the topographical mapping were governed by JICA's Survey and Mapping Standards for Overseas National Base Mapping (for Feasibility Study) and the Indonesian National Base Mapping Standards of the Indonesian National Institute of Geography (BAKOSURTANAL).

(2) Ground Control Survey

1) Preparatory Work

① Contract

The actual topographical mapping work was subcontracted to P.T. Aerokarto, Indonesian, the Indonesian surveying company which conducted the aerial photography at the first field survey stage.

② Existing Data and Information

Second class TTG BMs (bench marks) set up by the BAKOSURTANAL exist along the Bengkulu-Lubuk Linggau Road, the major trunk road in the Study Area, at approximate intervals of 5 km. In order to use these TTG BMs as reference elevation points for the Study, elevation data and descriptions were obtained from the BAKOSURTANAL. The GPS station recently established in the city of Curup by the BPN was used as the reference point for horizontal ground control.

2) Marking and Pricking

① Site Selection

Thirty-one vertical and horizontal ground control points were located on the topographical map (scale: 1/50,000) and aerial photographs (scale: 1/20,000) on the grounds that the positioning of each of them was adequate for aerial triangulation, GPS observation and levelling purposes with an open sky view above the cut-off angle of 15° as required for GPS observation. The locations and code numbers of these points are shown in Fig. J-2.

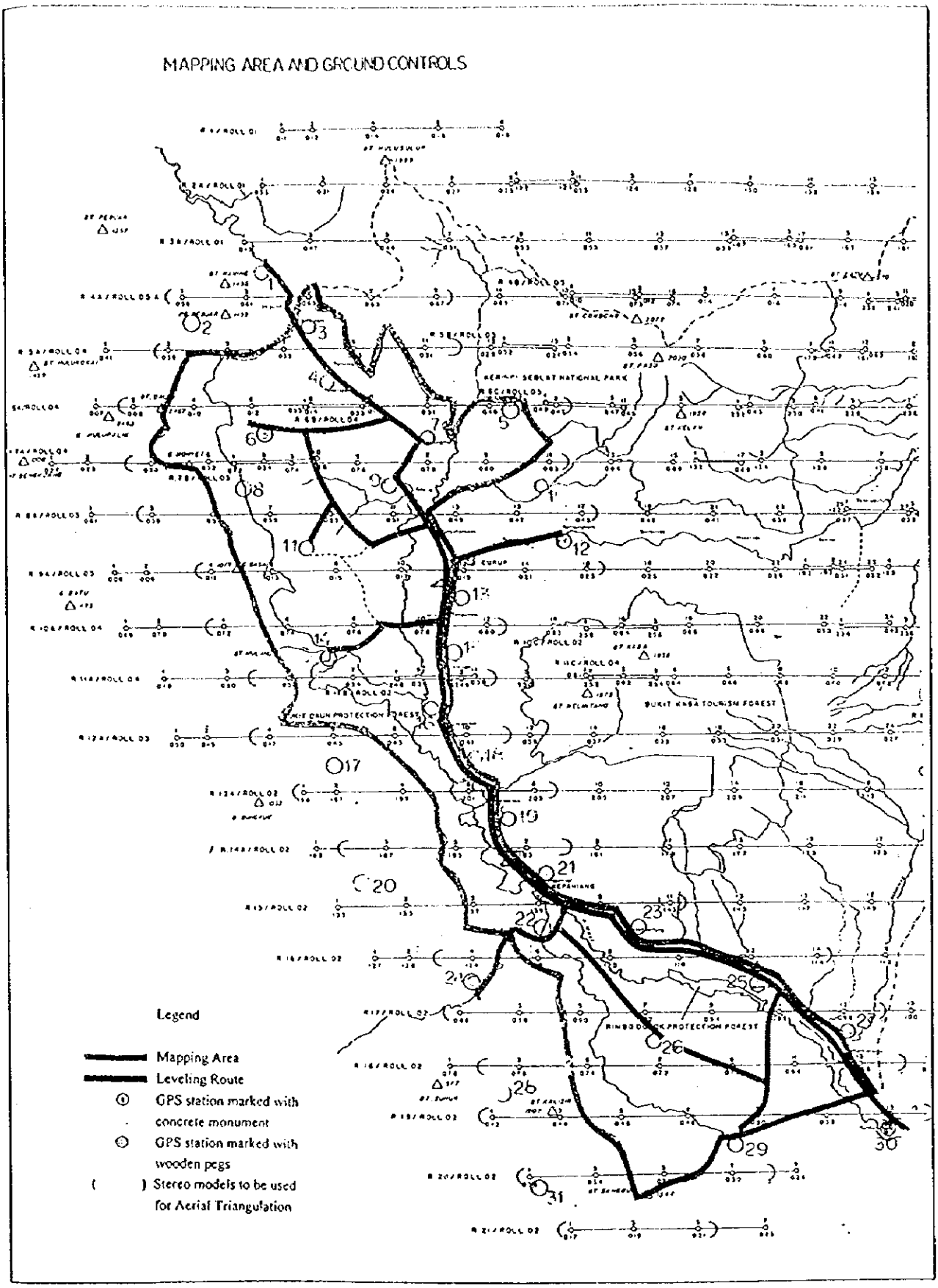

Fig. J-2 Geographical Scope of Topographical Mapping and Locations of Ground Control Points

② Marking

Marking stones were placed at the locations of the selected bench marks. These positions are indicated in Figure J-2.

③ Pricking

Two or three eccentric points for each ground control point were selected for pricking on the aerial photographs.

3) Levelling

① Leveling Routes and Reference Bench Marks

Leveling was conducted to establish reference elevation for the aerial triangulation. The leveling routes were planned along main roads to link the existing TTG bench marks with the newly established ground control points.

② Results

The leveling established 18 vertical ground control points and 150 leveling points were pricked on the aerial photographs.

4) GPS Survey

① Observation

GPS satellite observation was conducted for the one reference point and 31 newly established ground control points using the concrete markings previously set up at each control point. Simultaneous observation involving three observation points was conducted to receive satellite signals using the GPS signal receiver unit at each of the three points.

② Results

The GPS survey observed the 31 newly established ground control points and determined their ID-74 geodetic coordinates and UTM Zone 48 coordinates.

5) Field Identification Survey

① Field Survey

Data which could not be obtained by aerial photograph interpretation, such as place names, public facilities, government buildings and administrative boundaries, etc., were obtained by the field identification survey and the disclosed data were marked on the aerial photographs.

The field identification survey was conducted for the entire mapping area and the obtained data and information were marked on the topographical map (scale: 1/25,000) at the map editing stage.

② Field Completion

Areas covered by the field completion were slightly wider than that of topographic mapping and was a total of 67,000ha. The field work was carried out as follows:

(3) Topographic Mapping

1) Aerial Triangulation

The aerial triangulation was carried out to establish photogrammetric controls on 172 stereo models in 19 flight lines of aerial photographs covering the 50,000ha mapping area.

2) Photogrammetric plotting

The photograph orientation points (pass and tie points, etc.), ground standard points, photograph principal points, and photo Nos., course Nos., altitude values and 2.5 km grid lines were plotted on a polyester base at a reduced scale of 1:25,000 by using an automatic coordinate plotter.

The intervals of the contour lines were 50m as index, 10m as ordinary and 5m as supplementary.

3) Editing

Plotted map manuscripts were edited by adding information and data collected by the field identification.

4) Drawing

All artificial terrain features together with vegetation, standard points, altitudes, contour lines, photograph principal points, photo Nos., photography course Nos. and coordinate values, etc. were carefully traced and draft topographic maps were prepared.

5) Results

8 sheets of Original 1:25,000 topographic maps, their second originals and the blue prints were prepared.

K. Preparation of Land Use and Vegetation Maps

K-1 Land Use and Vegetation Map for Study Area

(1) Interpretation Criteria

Based on the results of the field survey and preliminary interpretation of the aerial photographs (taken in 1996 with a scale of 1/20,000), the land use and vegetation categories and the colour tone and shape of each category on the photographs were established to formulate the land use and vegetation interpretation criteria. (see Table K-1)

(2) Mapping

The work to prepare the land use and vegetation map for the Study Area, using the existing topographical map (scale: 1/50,000) as the base map, was subcontracted to an Indonesian consultancy company although the actual work was supervised by the Study Team.

The category boundaries were placed on the aerial photographs (contact prints) based on comparison of the land use and vegetation conditions identified by the field survey and photographic images and in accordance with the interpretation criteria. The results of this work were inspected and modifications were made where deemed necessary.

The modified boundary lines were then transplanted onto the topographical map (scale: 1/50,000) to produce a base map which was subsequently inspected and confirmed by the Study Team. Tracing work was then conducted to produce a polyester-based original map (scale: 1/50,000).

K-2 Land Use and Vegetation Map for Project Area

(1) Interpretation Criteria

Based on the interpretation criteria for land use and vegetation in the Study Area, a fact-finding survey was carried out with the aim of preparing interpretation criteria for aerial photographs of land use and vegetation in the Project Area.

The land use and vegetation classification items found in the Project Area were further detailed according to purpose of use, and the color tone and shape of each category on the photographs were newly established to formulate the detailed land use and vegetation interpretation criteria. The produce interpretation criteria are shown in Table K-2. When preparing the interpretation criteria, consultations and coordination were carried out with the Indonesian counterparts in the same way as during the Phase I survey.

Table K-1 Interpretation Criteria of Land Use and Vegetation in the Study Area

Category		Symbol	Interpretation Criteria
Forest	Natural Forest (Crown Density Class) - upto 30% - 31 - 70% - 71% or more	Ha Ha 1 Ha 2 Ha 3	- tropical broad-leaf forest - mixture of many species - bell-shaped, bulging crown - irregular crown size - unclear crown edge - pale black
	Secondary Forest	Hs	- orderly, bulging crown but unclear crown edge - grey
	Man-Made Forest - *Acacia mangium* - *Pinus merkusii* - *Swietenia macrophylla* (mahoni)	Ht Hta Htp Hts	- small, uniform bell-shaped crown - grey - uniform, orderly, circular crown with sharp, clear head - black - evenly distanced, umbrella-shaped crown - grey or white
	Shrub Land	Sb	- widespread growth of 2 - 5 m low shrubs - grey or pale black but darker than dry farmland - including secondary forests on private land
	Bamboo Forest	Bb	- dense crown - grey or white
Non-Forest	Paddy Field - Irrigated Paddy Field - Paddy Field Served by Natural Rain	S Sp Sh	- white or greyish white with each compartment showing a plane figure - very clear boundary lines - irrigation channels observed and fairly regular compartmentation - irrigation channels not observed and irregular compartmentation
	Dry Farmland - Without Terrace - With Terrace	L Ldg Ldt	- white or greyish white with relatively large coverage - in many cases, shows a slanting figure - terraces not observed on aerial photographs - terraces observed on aerial photographs
	Coffee Plantation - Without Upper-Storey Trees - With Upper-Storey Trees	Lk Lkt Lkb	- areas with shelter trees show a large, flat spread of the crown - planted coffee sites show a small uniform crown - coverage by upper-storey trees upto 10% - coverage by upper-storey trees 11% or more < Tree Height Classes for Upper-Storey Trees > upto 5.0 m : 1 5.1 m or more : 2 < Crown Density Classes for Upper-Storey Trees > 11 - 30% : 1 31 - 70% : 2 71% or more : 3
	Orchard	Kb	- local cultivation of bananas and oranges confirmed by the field survey
	Mixed Garden	Kc	- located near houses with upper layer consisting of fruit and banana trees and lower layer consisting of dry farmland crops - mixed shapes and colour tones
	Cinnamon Plantation	Lm	- uniform distribution of 4 - 8 m tall trees - small bell-shaped crown with grey appearance
	Estate (Coffee)	Pk	- similar to coffee plantation - extensive coverage
	Grassland	Pr	- whiter than shrub land and darker than dry farmland with less coverage
	Bare Land	Lt	- no standing trees with exposed ground (including man-made bare land and landslide sites) - hard white
	Settlement	Pm	- concentration of buildings and roads, etc.
	Swamp	Rw	- located on flat land in an area of concave topography - pale black
	Water Body	W	- ponds and dam reservoirs, etc. - pale black
	Industrial Facility	Bi	- factories, etc. confirmed by the field survey
	River	Si	- those wide enough to be included on the topographical map

Table K-2 Interpretation Criteria of Land Use and Vegetation in the Project Area

	Category	Symbol	Interpretation Criteria
Forest	Natural Forest		- tropical broad-leaf forest - mixture of many species
	Crown density classes	Ha	- bell-shaped, bulging crown - irregular crown size - unclear crown edge - pale black
	30% or less	Ha 1	
	31 - 70%	Ha 2	
	71% or more	Ha 3	
	Secondary Forest	Hs	- orderly, bulging crown but unclear crown edge - grey
	Man-Made Forest	Ht	
	Acacia mangium	Hta	- small, uniform bell-shaped crown - grey
	Pinus merkusii	Htp	- uniform, orderly, circular crown with sharp, clear head - black
	Swietenia macrophylla (Mahoni)	Hts	- evenly distanced, umbrella-shaped crown - grey or white
	Shrub Land	Sb	- widespread growth of 2 - 5 m low shrubs - grey or pale black but darker than dry farmland - including secondary forests on private land
	Bamboo Forest	Bb	- dense crown - grey or white
Non-Forest	Paddy Field	S	- white or greyish white with each compartment showing a plane figure - very clear boundary lines
	Irrigated field	S	• Water channels have been confirmed and block layout is fairly neat.
	Rain-fed paddy	Sh	• Water channels have not been confirmed and block layout is uneven.
	Dry Farmland	Ldg	- white or greyish white with relatively large coverage - in many cases, shows a slanting figure
	No terraces		• Terraces cannot be recognized from reading of aerial photographs.
	Terraces	Ldt	Terraces can be recognized from reading of aerial photographs.
	Coffee Plantation	Lk	
	No upper trees	Lkt	• Upper tree coverage is 10% or less.
	Upper trees	Ldt	• Upper tree coverage is 11% or more.
	Upper tree height classes 5.0 m or less ..... 1 5.1 m or more..... 2		Upper tree crown density classes 11 - 30% ..... 1 31 - 70% ..... 2 71% or more 3
	Orchard		• Cultivation of oranges and bananas confirmed on site.
	Mixed Garden	Kc	- located near houses with upper layer consisting of fruit and banana trees and lower layer consisting of dry farmland crops - mixed shapes and colour tones
	Cinnamon Plantation	Lm	- uniform distribution of 4 - 8 m tall trees - small bell-shaped crown with grey appearance
	Estate (Coffee)	Pk	- similar to coffee plantation - extensive coverage
	Grassland	Pr	- whiter than shrub land and darker than dry farmland with less coverage
	Bare Land	Lt	- no standing trees with exposed ground (including man-made bare land and landslide sites) - hard white
	Settlement	Pm	- concentration of buildings and roads, etc.
	Swamp	Rw	- located on flat land in an area of concave topography - pale black
	Water Body	W	- ponds and dam reservoirs, etc. - pale black
	Industrial Facility	Bi	- factories, etc. confirmed by the field survey
	River	Si	- those wide enough to be included on the topographical map
	Road	Ji	• Vehicular roads, sinuous and white in color.

(2) Attention Points in the Preparation and Interpretation of Land Use and Vegetation Maps

1. Local natural forests are tropical, broad-leafed tree forests and consist of many species. They are mainly located along mountain ridges in the western part of the Project Area. The color tone is pale black. While the crowns are supposed to have a slightly bulging bell shape, the size of crowns varies widely and is not consistent.

The crown edge forms an almost exact circle even though it is unclear. In the survey, crown density in the natural forests was classified into 3 classes.

① Local natural forests are tropical broad-leaf forests and consist of many species. They are mainly located along mountain ridges in the western part of the Project Area. The colour tone is pale black. While the crown is supposed to have a slightly bulging bell shape, the size greatly varies from small to large. The crown edge forms an almost exact circle even though it is unclear. Three crown density categories are introduced for natural forests in this Study.

② Some areas of man-made forests on national forest land are found to have coffee trees planted as lower-storey trees. These areas are classified in the category of man-made forest.

③ Shrub land includes residual forests (secondary forests) located on steep slopes or along river banks on private land.

④ Scattered bamboo forests are found around settlements and along river channels. Many of these, however, are smaller than the minimum interpretation unit. Consequently, there are many small bamboo sites in reality even though they are not shown on the land use and vegetation map.

⑤ Paddy fields are classified as irrigated paddy fields which have fairly distinctive unit fields served by identifiable irrigation channels and which are mainly found along rivers and on flat land and paddy fields served by natural rain which have no identifiable irrigation channels and which have various shapes.

⑥ Dry farmland is also established as an interpretation category because of its importance for soil conservation and the realistic prospect of interpreting terraces with good conditions.

⑦ Scattered trees of a low density found on dry farmland, etc. are ignored as they are hardly expected to play a positive role in soil conservation. When the upper-storey trees have a certain density, the respective area is classified in the category of mixed garden.

⑧ As coffee plantations, which is the largest land use category of all, appear difficult areas to deal with for the future study, the existence of upper-storey trees in coffee plantations are surveyed. In areas where shelter trees are retained or planted, two tree height categories and three crown density categories are introduced for the classification of upper-storey trees.

⑨ Young coffee plantations which are also used as dry farmland are classified in the category of coffee plantations.

⑩ Areas where trees, including fruit trees, are planted as upper-storey trees with some type of farming activity near a settlement are classified in the category of mixed garden.

⑪ Areas with cinnamon as upper-storey trees and coffee as lower-storey trees are classified in the category of cinnamon plantation.

⑫ A (coffee) estate boundary map (scale: 1/10,000) was obtained and its scale was reduced to 1/25,000. The boundaries were then inserted on the topographical map (scale: 1/25,000) using the results of the field survey and aerial photograph interpretation. The boundary map used is described below.

Peta Areal
PT. Sahid Sembada Nabrocom
Perkebunan Kopi Arabica
Desa : Bukit Daun
Sekala : 1/10,000
Tahun : 1996/1997

⑬ The boundaries of a settlement are determined as including not only housing areas but also small tree areas around houses so that a settlement appears as a coherent entity on the land use and vegetation map.

⑭ The boundaries of national forests were inserted on the topographical map (scale: 1/25,000) using the national forest boundary base map (scale: 1/25,000) following verification of the results of the field survey and aerial photograph interpretation. The national forest boundary base map used is described below.

PETA
TATA BATAS DEFINITIF KAWASAN
HL. RIMBO PENGADAN REG. 73
KABUPATEN REJANG LEBONG
PROPINSI BENGKULU
Sekala: 1/25,000

The topographical map (scale: 1/25,000) prepared during the Phase 2 Study was used as the base map for the land use and vegetation map. As in the case of the Phase 1 Study, the actual work was subcontracted to an Indonesian consultancy company. The land use and vegetation map (scale: 1/25,000) for the Project Area was prepared under the supervision of the Study Team.