

資料 II - 11 村落共有林單價表

(1) ANR Treatments

1st year				per ha	
Items	Unit	No.	Rate (P)	Cost per ha (P)	
1. Labor					
Ringweeding of pioneers 500 pioneers per ha/100 per man day	m.d.	5	102	510	
Lodging cogon, talahib, etc. 10,000 sq.meters/1,000 sq.m. per manday	"	10	102	1,020	
Cultivate covercrop planting spots 400 planting spots per ha/80 spots per manday	"	5	102	510	
Plant covercrop 400 planting spots per ha/200 planting spots per manday	"	2	102	204	
Sub-total				2,244	
2. Material					
Covercrop seeds	kg	2	80	160	
Total				2,404	

Cost share : Gov't P 160  
Comm. P 2,244

2nd year				per ha	
Items	Unit	No.	Rate (P)	Cost per ha (P)	
Labor					
Ringweeding of pioneers 500 pioneers per ha/100 per manday	m.d.	5	102	510	
Lodging cogon, talahib, etc. 10,000 sq.meters/1,000 sq.m. per manday	"	10	102	1,020	
Cultivate covercrop planting spots 400 planting spots x3 cycles/200 per manday	"	6	102	612	
Total				2,142	

Cost share : Gov't P 0  
Comm. P 2,142

(2) Firebreak

				per km	
Items	Unit	No.	Rate (P)	Cost per ha (P)	
1. Firebreak Establishment					
10 ha planting block with 1,400 meter perimeter x 10 meter width = 14,000sq.m. 1,000m/1,400m x 14,000 sq.m.=10,000sq.m. per km/100 sq.m. accomplishment per manday	m.d.	100	102	10,200	
2. Firebreak Maintenance					
10,000 sq.m./250 sq.m. accomplishment per manday	"	40	102	4,080	
Total				14,280	

Cost share : Gov't P 0  
Comm. P 14,280

## (3) Seedling Production

Species	Seedlings per ha	Proposed Area (ha)	Total No. of seedlings	Unit cost (P)	Total cost (P)
Bamboo spp.	50	348	17,400	15	261,000
Timber spp.	120	348	41,760	2	83,520
Fuel spp.	250	348	87,000	1	87,000
Total	420		146,160		431,520

Average unit cost : P 2.95/sdling (431,520/146,160)

## (4) Afforestation / Reforestation

## A. Afforestation (New Plantation)

Items	Unit	No.	Rate (P)	Cost per ha (P)
<b>1. Labor (Planting including application of fertilizer):</b>				
Staking : 340 planting spots per ha/100 spots per manday	m.d.	3.4		
Holing : 40 large size holes (for bamboo)/20 holes per manday	"	2.0		
100 medium size holes (for timber species)/50 holes per manday	"	2.0		
200 small size holes (for fuelwood & misc. species)/80 holes per manday	"	2.5		
Haul seedlings : 340 seedlings per ha/20 sdlings. per trip/8trips per manday (i.e. one trip per hour, equivalent to 160 sdlings. per manday)	"	2.1		
Plant 340 seedlings per ha/80 seedlings per manday	"	4.2		
Labor (replanting-approx. 20% of original 340, i.e. 80)	"			
Haul seedlings : 80 seedlings per ha/20 sdlings. per trip/8 trips per manday	"	0.5		
Plant 80 seedlings per ha/80 seedlings per manday	"	1.0		
Sub-total		17.7	102	1,805
<b>2. Materials :</b>				
Stakes : 340 planting spots x 1 stake per planting spot	stake	340	1	340
Fertilizer : 100 timber species + 40 bamboo sdlings. x 0.25 kilograms per sdling	kg	80	6	480
100 timber species + 40 bamboo sdlings. x 0.25 kilograms per sdling = 60 kg				
200 fuelwood & miscellaneous sdlings x 0.1 kilograms per sdling = 20kg				
Sub-total				820
Total				2,625

Cost share : Gov't P 0

Comm. P 2,625

## B. Reforestation

Items	Unit	No.	Rate (P)	Cost per ha (P)
<b>1. Labor</b>				
Staking : 150 planting spots per ha/200 spots per manday	m.d.	0.8		
Holing : 150 holes/80 holes per manday	"	1.9		
Haul seedlings : 150 seedlings per ha/20 sdlings. per trip/8trips per manday	"	0.9		
Plant 150 seedlings per ha/80 seedlings per manday	"	1.9		
Sub-total	"	5.5	102	561
<b>2. Materials :</b>				
Seedlings : 150	"	150.0	2	300
Stakes : 150	"	150.0	1	150
Fertilizer : 150 sdlings x 0.25kg = 38kg	"	38.0	6	228
Sub-total	"			678
Total		349.0	102	1,239

Cost share : Gov't P 0

Comm. P 1,239

(5) Weeding

A. Afforestation (New Plantation)

Items	Unit	No.	Rate (P)	Cost per ha (P)
Ringweeding (1st-3rd year)				
340 planted seedlings x 2 cycles / 100 per manday	m.d.	6.8	102	693
500 pioneers x 2 cycles / 100 per manday	"	10.0	102	1,020
Total	"	16.8		1,713

Cost share : Gov't P 0  
Comm. P 1,713

B. Reforestation

Items	Unit	No.	Rate (P)	Cost per ha (P)
Ringweeding (1st-3rd year)				
150 planted seedlings x 2 cycles / 80 per manday	m.d.	3.8	102	388

Cost share : Gov't P 0  
Comm. P 388

(6) Refining and Liberation

Items	Unit	No.	Rate (P)	Cost per ha (P)
5th year				
500 pioneers + 100 timber spp. + 200 misc. spp./200 per manday	m.d.	4.0	102	408
8th year				
200 pioneers + 100 timber spp./100 per manday	"	3.0	102	306
Total		7.0		714

Cost share : Gov't P 0  
Comm. P 714

## (7) Logging and Hauling

## 1. Fuelwood

Computation	No. of m.d.	Rate (P)	Amount	Unit
(Based on Estimated Harvest Volume for Year 5)				
Felling : Pollard cutting of 100 trees x 50 trees per manday (m.d.)	2	102	204	
Bucking, Splitting and bundling : 100 trees x 2 bundles per tree/40 bundles per m.d.	5	102	510	
Hauling to roadside : 200 bundles/25 bundles per trip/8 trips per man-carabao day	1	160	160	
Tying materials : P 0.25 per bundle x 200 bundles			50	
Sub-total	8		924	
Production cost per cubic meter : P 924/3.25 cu.m.			284.30	cu.m.
Rounded off			284.00	"

## 2. Bamboo

Computation	No. of m.d.	Rate (P)	Amount	Unit
(Based on Estimated Harvest Volume for Year 10-20)				
Felling and trimming : 40 clumps x 3 poles per clump (i.e. 120 poles)/20 poles per manday	6	102	612	
Skidding to roadside : 120 poles/10 poles per trip/4 trips per man-animal day	3	160	480	
Sub-total	9		1,092	
Production cost per bamboo pole : P 1,092/120 poles			9.10	pole
Rounded-off			9.00	"

## 3. Poles

Computation	No. of m.d.	Rate (P)	Amount	Unit
(Based on Estimated Harvest Volume for Year 14)				
Tree marking : 10 trees/40 trees per manday	0.25	102	25.50	
Felling : 10 trees/5 trees per manday	2.00	102	204.00	
Topping and de-limbing : 10 trees/20 trees per manday	0.50	102	51.00	
Skidding to roadside : 10 trees x 1 tree per trip/5 trips per man-animal day	2.00	160	320.00	
Sub-total	4.75		600.50	
Production cost per pole : 10 trees x 0.15 cubic meters per tree = 1.5 cubic meters P 600.50/1.5 cubic meters			400.33	cu.m.
Rounded-off			400.00	"

## 4. Sawlogs (Year 23)

Computation	No. of m.d.	Rate (P)	Amount	Unit
Tree marking : 30 trees/30 trees per manday	1	102	102	
Felling : 30 trees/3 trees per manday	10	102	1,020	
Topping and de-limbing : 30 trees/10 trees per manday	3	102	306	
Handsawing into boards and flitches : 30 trees x 0.5 cubic meters per tree x 250 bd.ft. recovery per cu.m./50 bd.ft. per m.d. (conversion rate of 250 bd.ft. per cubic meter)	75	102	7,650	
Skidding to roadside : 30 trees x 0.5 cubic meters per tree x 250 bd.ft. recovery per cu.m.=3,750 bd.ft. 3,750 bd.ft./100 bd.ft. per trip/4 trips per man-animal day	9.375	160	1,500	
Sub-total	98		10,578	
Production cost per cubic meter : P 10,578/15 cubic meters			705.2	cu.m.
Rounded off			705.0	"

資料Ⅲ-1 用材販売価格

Assumptions:	
Species	<i>Gmelina arborea</i>
Harvesting method	After felling and bucking, the logs will be converted into boards and/or flitches by local residents using two-man handsaws (i.e. pit-saws). The boards and flitches will be cut into English dimensions (i.e. board feet) because this is the normal practice in the Philippines.
Conversion ratio	One cubic meter of round logs contains 424 board feet on the Brereton scale. After cutting into boards or flitches each cubic meter will yield approximately 250 board feet, (i.e. conversion ratio of 59%) 250 bd.ft.divided by 424 bd.ft. = 59%
Market price	The market price for <i>Gmelina arborea</i> lumber will be equivalent to the average price for high grade lumber (i.e. Philippine mahogany) and low grade lumber (i.e. coconut lumber).
Computation	
Current price of Philippine mahogany lumber (e.g. lauan)	P 20 per bd.ft.
Current price of coconut lumber	P 8 per bd.ft.
	P 28 per bd.ft.
Average price : P28.00 divided by 2	P 14 per bd.ft.
250 board feet per cubic meter × P14 per board foot	P 3,500 per cu.m.
Minus : Cost of conversion to boards and flitches	
250 b.d.ft.per cubic meter × 4.00	P 1,000 per cu.m.
Net farmgate value	P 2,500 per cu.m.



(2) Jackfruit (Langkat)

(In Thousand Pesos) (P'000)

Year Planted	Years Harvested											
	8	9	10	11	12	13	14	15	16	17	18	19-20
2	No. of ha 150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 375	750	1,125	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
3	No. of ha 200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 500	1,000	1,500	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
4	No. of ha 300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 750	1,500	2,250	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
5	No. of ha 350	350	350	350	350	350	350	350	350	350	350	350
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 875	1,750	2,625	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500	3,500
6	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 1,000	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
7	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 1,000	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
8	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 1,000	2,000	3,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000	4,000
9	No. of ha 472	472	472	472	472	472	472	472	472	472	472	472
	Income per ha 2,500	5,000	7,500	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
	Income ('000) 1,180	2,360	3,540	4,720	4,720	4,720	4,720	4,720	4,720	4,720	4,720	4,720
Yearly Total	375	1,350	2,875	5,375	8,500	12,125	16,000	20,180	23,960	25,540	26,720	26,720

each year, the same as year 18

(3) Tamarind

(In Thousand Pesos) (P'000)

Year Planted	Years Harvested																
	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24-40
2	No. of ha 150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha 2,400	3,200	4,000	4,800	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 360	480	600	720	720	840	960	1,080	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
3	No. of ha 200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 320	480	640	800	800	960	1,120	1,280	1,440	1,600	1,600	1,600	1,600	1,600	1,600	1,600	1,600
4	No. of ha 300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 480	720	960	1,200	1,200	1,440	1,680	1,920	2,160	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
5	No. of ha 350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 560	840	1,120	1,400	1,400	1,680	1,960	2,240	2,520	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
6	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 640	960	1,280	1,600	1,600	1,920	2,240	2,560	2,880	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
7	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 640	960	1,280	1,600	1,600	1,920	2,240	2,560	2,880	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
8	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 640	960	1,280	1,600	1,600	1,920	2,240	2,560	2,880	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200
9	No. of ha 472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472	472
	Income per ha 1,600	2,400	3,200	4,000	4,000	4,800	5,600	6,400	7,200	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Income ('000) 755	1,133	1,511	1,889	1,889	2,267	2,645	2,963	3,281	3,659	3,659	3,659	3,659	3,659	3,659	3,659	3,659
Yearly Total	240	680	1,440	2,520	3,960	5,720	7,900	10,315	12,453	14,470	16,328	17,946	19,283	20,301	20,999	21,376	21,376

each year, the same as year 23

(4) Citrus  
(In Thousand Pesos) [P000]

Year Planted	Years Harvested										19	20-40					
	4	5	6	7	8	9	10	11	12	13			14	15	16	17	18
2	No. of ha	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha	1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)	225	338	450	563	675	788	900	1,013	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
3	No. of ha		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		300	450	600	750	900	1,050	1,200	1,350	1,500	1,500	1,500	1,500	1,500	1,500	1,500
4	No. of ha		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		450	675	900	1,125	1,350	1,575	1,800	2,025	2,250	2,250	2,250	2,250	2,250	2,250	2,250
5	No. of ha		350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		525	788	1,050	1,313	1,575	1,838	2,100	2,363	2,625	2,625	2,625	2,625	2,625	2,625	2,625
6	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,000	3,000	3,000	3,000	3,000	3,000
7	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,000	3,000	3,000	3,000	3,000	3,000
8	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		600	900	1,200	1,500	1,800	2,100	2,400	2,700	3,000	3,000	3,000	3,000	3,000	3,000	3,000
9	No. of ha		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha		1,500	2,250	3,000	3,750	4,500	5,250	6,000	6,750	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		450	675	900	1,125	1,350	1,575	1,800	2,025	2,250	2,250	2,250	2,250	2,250	2,250	2,250
	Yearly Total	225	638	1,350	2,363	3,713	5,363	7,313	9,671	11,875	13,566	15,308	16,824	18,078	19,032	19,886	20,040

each year,  
the same as year 19

(5) Flukewood  
(In Thousand Pesos) [P000]

Year Planted	Years Harvested										19	20-40					
	4	5	6	7	8	9	10	11	12	13			14	15	16	17	18
2	No. of ha	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000	8,500
	Income ('000)	150	225	300	375	450	525	600	675	750	825	900	975	1,050	1,125	1,200	1,275
3	No. of ha		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		200	300	400	500	600	700	800	900	1,000	1,100	1,200	1,300	1,400	1,500	1,600
4	No. of ha		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		300	450	600	750	900	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,100	2,250	2,400
5	No. of ha		350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		350	525	700	875	1,050	1,225	1,400	1,575	1,750	1,925	2,100	2,275	2,450	2,625	2,800
6	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
7	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
8	No. of ha		400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		400	600	800	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
9	No. of ha		300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha		1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000	7,500	8,000
	Income ('000)		300	450	600	750	900	1,050	1,200	1,350	1,500	1,650	1,800	1,950	2,100	2,250	2,400
	Yearly Total	150	350	725	1,175	1,800	2,475	3,225	4,075	4,472	4,908	5,308	5,684	6,032	6,352	6,646	6,906

each year, the same as year 13



(6) Bamboo  
(In Thousand Pases) [P'000]

Year Planted	Years Harvested															
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	No. of ha 150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 90	180	270	270	270	270	270	270	270	270	270	270	270	270	270	270
3	No. of ha 200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 120	240	360	360	360	360	360	360	360	360	360	360	360	360	360	360
4	No. of ha 300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 180	360	540	540	540	540	540	540	540	540	540	540	540	540	540	540
5	No. of ha 350	350	350	350	350	350	350	350	350	350	350	350	350	350	350	350
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 210	420	630	630	630	630	630	630	630	630	630	630	630	630	630	630
6	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 240	480	720	720	720	720	720	720	720	720	720	720	720	720	720	720
7	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 240	480	720	720	720	720	720	720	720	720	720	720	720	720	720	720
8	No. of ha 600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 360	720	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
9	No. of ha 600	600	600	600	600	600	600	600	600	600	600	600	600	600	600	600
	Income per ha 600	1,200	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
	Income ('000) 360	720	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
Yearly Total	90	300	690	1,200	1,830	2,520	3,240	4,005	4,526	4,810	4,810	4,810	4,810	4,810	4,810	4,810

each year, the same as year 14

(7) Rotacrops  
(In Thousand Pases) [P'000]

Year Planted	Years Harvested																		
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	No. of ha 150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 450	675	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900	900
3	No. of ha 200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 600	900	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
4	No. of ha 300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 900	1,350	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
5	No. of ha 300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300	300
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 900	1,350	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800	1,800
6	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 1,200	1,800	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
7	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 1,200	1,800	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
8	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 1,200	1,800	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
9	No. of ha 400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400
	Income per ha 3,000	4,500	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000
	Income ('000) 1,200	1,800	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400	2,400
Yearly Total	450	1,050	2,175	3,355	5,400	7,425	9,675	12,216	13,416	14,724	15,824	16,932	18,040	19,148	20,256	21,364	22,472	23,580	24,688

each year, the same as year 13

(8) Vegetables  
(In Thousand Paces) [P'000]

Year Planted	Years Harvested													
	2	3	4	5	6	7	8	9	10	11	12	13	14	14-40
2	No. of ha	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha	2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)	375	563	750	938	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125
3	No. of ha		200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha		2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)		500	750	1,000	1,250	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
4	No. of ha			300	300	300	300	300	300	300	300	300	300	300
	Income per ha			2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)			750	1,125	1,500	1,875	2,250	2,250	2,250	2,250	2,250	2,250	2,250
5	No. of ha				350	350	350	350	350	350	350	350	350	350
	Income per ha				2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500	7,500	7,500
	Income ('000)				875	1,313	1,750	2,188	2,625	2,625	2,625	2,625	2,625	2,625
6	No. of ha					400	400	400	400	400	400	400	400	400
	Income per ha					2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500	7,500
	Income ('000)					1,000	1,500	2,000	2,500	3,000	3,000	3,000	3,000	3,000
7	No. of ha						400	400	400	400	400	400	400	400
	Income per ha						2,500	3,750	5,000	6,250	7,500	7,500	7,500	7,500
	Income ('000)						1,000	1,500	2,000	2,500	3,000	3,000	3,000	3,000
8	No. of ha							400	400	400	400	400	400	400
	Income per ha							2,500	3,750	5,000	6,250	7,500	7,500	7,500
	Income ('000)							1,000	1,500	2,000	2,500	3,000	3,000	3,000
9	No. of ha								472	472	472	472	472	472
	Income per ha								2,800	3,750	5,000	6,250	7,500	7,500
	Income ('000)								1,328	1,770	2,360	2,950	3,540	3,540
	Yearly Total	375	1,063	2,250	3,938	6,183	8,750	11,563	14,680	16,770	18,360	19,450	20,040	20,040

each year, the same as year 13

(9) Grain Crops  
(In Thousand Paces) [P'000]

Year Planted	Years Harvested													
	2	3	4	5	6	7	8	9	10	11	12	13	14	15-40
2	No. of ha	150	150	150	150	150	150	150	150	150	150	150	150	150
	Income per ha	563	750	938	1,125	1,313	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
	Income ('000)	84	113	141	169	197	225	225	225	225	225	225	225	225
3	No. of ha		200	200	200	200	200	200	200	200	200	200	200	200
	Income per ha		563	750	938	1,125	1,313	1,500	1,500	1,500	1,500	1,500	1,500	1,500
	Income ('000)		113	150	188	225	263	300	300	300	300	300	300	300
4	No. of ha			300	300	300	300	300	300	300	300	300	300	300
	Income per ha			563	750	938	1,125	1,313	1,500	1,500	1,500	1,500	1,500	1,500
	Income ('000)			169	225	281	338	394	450	450	450	450	450	450
5	No. of ha				350	350	350	350	350	350	350	350	350	350
	Income per ha				563	750	938	1,125	1,313	1,500	1,500	1,500	1,500	1,500
	Income ('000)				197	263	328	394	460	525	525	525	525	525
6	No. of ha					400	400	400	400	400	400	400	400	400
	Income per ha					563	750	938	1,125	1,313	1,500	1,500	1,500	1,500
	Income ('000)					225	300	375	450	525	600	600	600	600
7	No. of ha						400	400	400	400	400	400	400	400
	Income per ha						563	750	938	1,125	1,313	1,500	1,500	1,500
	Income ('000)						225	300	375	450	525	600	600	600
8	No. of ha							400	400	400	400	400	400	400
	Income per ha							563	750	938	1,125	1,313	1,500	1,500
	Income ('000)							225	300	375	450	525	600	600
9	No. of ha								472	472	472	472	472	472
	Income per ha								563	750	938	1,125	1,313	1,500
	Income ('000)								266	354	443	531	620	708
	Yearly Total	84	225	460	778	1,191	1,679	2,213	2,825	3,204	3,518	3,756	3,920	4,008

each year, the same as year 14

資料Ⅲ-2-2 アグロフォレストリーha当たり年次別生産量及び販売額

(1) Mango  
(One Hectare)  
(Prices at Farmgate)

Year	No. of trees	No. of bearing trees (a)	No. of fruits per tree	Total (fruits)	No. of fruits per kg.	Total (kgs.)	Price per kg. (P)	Total (P)
8	10	10	50	500	5	100	10	1,000
9	10	5	100	500	5	100	10	1,000
10	10	10	200	2,000	5	400	10	4,000
11	10	5	300	1,500	5	300	10	3,000
12	10	10	400	4,000	5	800	10	8,000
13	10	5	500	2,500	5	500	10	5,000
14	10	10	600	6,000	5	1,200	10	12,000
15	10	5	700	3,500	5	700	10	7,000
16	10	10	800	8,000	5	1,600	10	16,000
17	10	5	900	4,500	5	900	10	9,000
18	10	10	1,000	10,000	5	2,000	10	20,000
19	10	5	1,000	5,000	5	1,000	10	10,000
20	10	10	1,000	10,000	5	2,000	10	20,000
21	10	5	1,000	5,000	5	1,000	10	10,000
22	10	10	1,000	10,000	5	2,000	10	20,000
23	10	5	1,000	5,000	5	1,000	10	10,000
24	10	10	1,000	10,000	5	2,000	10	20,000
25	10	5	1,000	5,000	5	1,000	10	10,000
26	10	10	1,000	10,000	5	2,000	10	20,000
27	10	5	1,000	5,000	5	1,000	10	10,000
28	10	10	1,000	10,000	5	2,000	10	20,000
29	10	5	1,000	5,000	5	1,000	10	10,000
30	10	10	1,000	10,000	5	2,000	10	20,000
31	10	5	1,000	5,000	5	1,000	10	10,000
32	10	10	1,000	10,000	5	2,000	10	20,000
33	10	5	1,000	5,000	5	1,000	10	10,000
34	10	10	1,000	10,000	5	2,000	10	20,000
35	10	5	1,000	5,000	5	1,000	10	10,000
36	10	10	1,000	10,000	5	2,000	10	20,000
37	10	5	1,000	5,000	5	1,000	10	10,000
38	10	10	1,000	10,000	5	2,000	10	20,000
39	10	5	1,000	5,000	5	1,000	10	10,000
40	10	10	1,000	10,000	5	2,000	10	20,000

(a) Assume one year of normal harvest followed by one year of poor harvest

(2) Jackfruit (Langka)  
 (One Hectare)  
 (Prices at Farmgate)

Year	No. of trees	No. of fruits per tree	Total (fruits)	No. of kgs. per fruit	Total (kgs.)	Price per kg. (P)	Total (P)
8	20	5	100	5	500	5	2,500
9	20	10	200	5	1,000	5	5,000
10	20	15	300	5	1,500	5	7,500
11	20	20	400	5	2,000	5	10,000
12 : : 40	each year, the same as year 11						

(3) Tamarind (Sampaloc)  
 (One Hectare)  
 (Prices at Farmgate)

Year	No. of trees	No. of 20 liter cans per tree	Total 20 liter cans	No. of kgs. per can	Total (kgs.)	Price per kg. (P)	Total (P)
8	20	2	40	10	400	4	1,600
9	20	3	60	10	600	4	2,400
10	20	4	80	10	800	4	3,200
11	20	5	100	10	1,000	4	4,000
12	20	6	120	10	1,200	4	4,800
13	20	7	140	10	1,400	4	5,600
14	20	8	160	10	1,600	4	6,400
15	20	9	180	10	1,800	4	7,200
16	20	10	200	10	2,000	4	8,000
17 : : 40	each year, the same as year 16						

(4) Citrus  
(One Hectare)  
(Prices at Farmgate)

Year	No. of trees	No. of kg. per tree	Total kg.	Price per kg. (P)	Total (P)
4	50	2	100	15	1,500
5	50	3	150	15	2,250
6	50	4	200	15	3,000
7	50	5	250	15	3,750
8	50	6	300	15	4,500
9	50	7	350	15	5,250
10	50	8	400	15	6,000
11	50	9	450	15	6,750
12	50	10	500	15	7,500
13 : : 40	each year, the same as year 12				

(5) Fuelwood  
(One Hectare)  
(Prices at Farmgate)

Year	No. of trees planted	No. of trees harvested	No. of bundles per tree	Total bundles	No. of bundles per cu.m.	Total cu.m.	Price per cu.m. (P)	Total bundles (P)
4	200	100	2	200	60	3.3	300	1,000
5	200	100	2	200	60	3.3	300	1,000
6	200	100	3	300	60	5.0	300	1,500
7	200	100	3	300	60	5.0	300	1,500
8	200	100	4	400	60	6.7	300	2,000
9 : : 40	each year, the same as year 8							

(6) Bamboo  
(One Hectare)  
(Prices at Farmgate)

Year	No. of clumps planted	No. of poles per clump	Total poles	Price per pole (P)	Total (P)
5	20	1	20	30	600
6	20	2	40	30	1,200
7	20	3	60	30	1,800
8 : : 40	each year, the same as year 7				

(7) Rootcrops  
(One Hectare)  
(Prices at Farmgate)

Year	No. of sq. meters planted	No. of kgs. harvested per sq.m.	Total kgs.	Average price per kg. (P)	Total (P)
2	1,000	1	1,000	3	3,000
3	1,000	1	1,000	3	3,000
4	1,000	2	1,500	3	4,500
5	1,000	2	1,500	3	4,500
6	1,000	2	2,000	3	6,000
7	each year, the same as year 6				
:					
:					
40					

(8) Vegetables  
(One Hectare)  
(Prices at Farmgate)

Year	No. of sq. meters planted	No. of kgs. harvested per sq.m. (a)	Total kgs.	Average price per kg. (P)	Total (P)
2	250	2	500	5	2,500
3	250	3	750	5	3,750
4	250	4	1,000	5	5,000
5	250	5	1,250	5	6,250
6	250	6	1,500	5	7,500
7	each year, the same as year 6				
8					
9					
10					

(a) 3 harvests per year

(9) Grain Crops  
(One Hectare)  
(Prices at Farmgate)

Year	No. of sq. meters planted	No. of kgs. harvested per sq.m.	Total kgs.	Average price kg. (P)	Total (P)
2	1,250	0.15	188	3	563
3	1,250	0.2	250	3	750
4	1,250	0.25	313	3	938
5	1,250	0.3	375	3	1,125
6	1,250	0.35	438	3	1,313
7	1,250	0.4	500	3	1,500
8	each year, the same as year 7				
9					
10					
11					

資料Ⅲ-3 村落共有林伐採基準及び年次別収穫計画

(1) Standard of Harvesting

I New Plantation

Harvesting volume per ha is as followings.

1. FURLWOOD

Tree age	Computation	Volume by Year
5	100 trees per ha 2 bundles per tree=200 bundles/60 bundles per cu.meter	3.3 m <sup>3</sup>
9	100 trees per ha 3 bundles per tree=300 bundles/60 bundles per cu.meter	5.0 m <sup>3</sup>
13	50 trees per ha 4 bundles per tree=200 bundles/60 bundles per cu.meter	3.3 m <sup>3</sup>
17	50 trees per ha 5 bundles per tree=250 bundles/60 bundles per cu.meter	4.2 m <sup>3</sup>
2. BAMBOO		
8	40 clumps X1 bamboo pole per clump	40 poles
9	40 clumps X2 bamboo poles per clump	80 poles
10	40 clumps X3 bamboo poles per clump	120 poles
3. POLES		
15	10 trees X 0.15 cu.meters per tree	1.5 m <sup>3</sup>
20	10 trees X 0.20 cu.meters per tree	2.0 m <sup>3</sup>
25	10 trees X 0.25 cu.meters per tree	2.5 m <sup>3</sup>
4. SAWLOGS		
25	10 trees X 0.45 cu.meters per tree	4.5 m <sup>3</sup>
32	10 trees X 0.50 cu.meters per tree	5.0 m <sup>3</sup>
40	10 trees X 0.55 cu.meters per tree	5.5 m <sup>3</sup>

II Old Plantation

Harves volum per ha is as followings. The computation is based on 500 of tree number per ha.

1. FURLWOOD

Tree age	Computation	Volume by Year
5	25 trees per ha 2 bundles per tree=50 bundles /60 bundles per cu.meter ( 5 yrs plantation )	0.8 d
9	50 trees per ha 3 bundles per tree=150 bundles /60 bundles per cu.meter ( 5 yrs plantation )	2.5 d
13	50 trees per ha 4 bundles per tree=200 bundles /60 bundles per cu.meter ( 5 yrs plantation )	3.3 d
	100 trees per ha 4 bundles per tree=400 bundles /60 bundles per cu.meter ( 10 yrs plantation )	6.7 d
15	100 trees per ha 5 bundles per tree=500 bundles /60 bundles per cu.meter ( 15 yrs plantation )	8.3 d
17	50 trees per ha 5 bundles per tree=250 bundles /60 bundles per cu.meter ( 5 yrs plantation )	4.2 d
	75 trees per ha 5 bundles per tree=375 bundles /60 bundles per cu.meter( 10 yrs plantation )	6.2 d
20	75 trees per ha 5 bundles per tre= 375 bundles /60 bundles per cu.meter ( 15 yrs plantation )	6.2 d
2. Poles		
15	75 trees 0.15 cu.meter per ha (Harvesting ratio: 15 %)	11.2 d
20	75 trees 0.20 cu.meter per ha ( ' ' : 15 %)	15.0 d
25	50 trees 0.25 cu.meter per ha ( ' ' : 10 %)	12.5 d
3. SAWLOGS		
25	25 trees 0.45 cu.meter per ha ( ' ' : 5 %)	11.2
32	50 trees 0.50 cu.meter per ha ( ' ' : 10 %)	25.0
40	50 trees 0.55 cu.meter per ha ( ' ' : 10 %)	27.5

III Reforested Plantation

Inter/underplanting will be conducted immediately after harvesting. Accordingly, the stand structure will be multi-storied gradually. Selective cutting system should be applied in the future. Therefore, harvesting from the reforested plantation is not counted. Only harvesting in the first cycle is computed in the study.

## (2) Harvest Volume by Year (Community Forest)

Year	Fuelwood (m <sup>3</sup> )	Bamboo (pieces)	Pole (m <sup>3</sup> )	Sawlog (m <sup>3</sup> )	Selective Cutting Area
1					
2	1,681		2,240		229
3	1,627		2,195		196
4	1,340				200
5	1,445				235
6	1,240		5,240		400
7	1,545		5,247		502
8	1,636				320
9	1,785				363
10		4,000			
11	500	12,800	5,031	2,240	529
12	600	26,720	4,757	2,195	522
13	749	36,640			157
14		41,760			
15	330	41,760			100
16	396	41,760	2,630	2,240	349
17	422	41,760	2,457	2,307	434
18		41,760	180	5,000	320
19	420	41,760	192	4,900	424
20	504	41,760			120
21	538	41,760	325	291	157
22		41,760	200		100
23		41,760	240	5,000	320
24		41,760	256	5,150	334
25		41,760			
26		41,760		5,500	200
27		41,760	250	5,580	296
28		41,760	300	1,190	149
29		41,760	320	576	128
30		41,760			
31		41,760		5,500	200
32		41,760		5,665	206
33		41,760			
34		41,760		500	100
35		41,760		600	120
36		41,760		1,355	157
37		41,760			
38		41,760			
39		41,760			
40		41,760			
				Total	7,928

Note: The cutting area will be covered by under-tree planting after cutting. Under-tree planting will be carried out in a period of 36 years after cutting at a rate of 220 ha per year (7,928/36).



(3) Annual Harvest Volume (Fuelwood)

Year	New Plantation						Old Plantation						TOTAL Volume	
	Planted in Yr. 3		Planted in Yr. 4		Planted in Yr. 5		5 Years		10 years		15 years			
	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha		
1													0	
2								26	0.8	21		200	8.3	1,660
3												196	8.3	1,627
4											200	6.7	1,340	
5								26	2.5	65	206	6.7	1,380	
6												200	6.2	1,240
7	100	3.3	330									196	6.2	1,215
8				120	3.3	396								
9							128	3.3	422	26	3.3	86	6.2	1,277
10														0
11	100	5.0	500											500
12				120	5.0	600								600
13							128	5.0	640	26	4.2	109		749
14														0
15	100	3.3	330											330
16				120	3.3	396								396
17							128	3.3	422					422
18														0
19	100	4.2	420											420
20				120	4.2	504								504
21							128	4.2	538					538
22														
23														
24														
25														
26														
27														
28														
29														
30														
31														
32														
33														
34														
35														
36														
37														
38														
39														
40														

(4) Annual Harvest Volume (Bamboo)

Year	New Plantation										TOTAL Volume	
	Planted in Yr. 3		Planted in Yr. 4		Planted in Yr. 5		Planted in Yr. 6		Planted in Yr. 7			
	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha
1												
2												
3												
4												
5												
6												
7												
8												
9												
10	100	40	4,000									4,000
11	100	80	8,000	120	40	4,800						12,800
12	100	120	12,000	120	80	9,600	128	40	5,120			26,720
13	100	120	12,000	120	120	14,400	128	80	10,240			36,640
14	100	120	12,000	120	120	14,400	128	120	15,360			41,760
15	100	120	12,000	120	120	14,400	128	120	15,360			41,760
16	100	120	12,000	120	120	14,400	128	120	15,360			41,760
17	100	120	12,000	120	120	14,400	128	120	15,360			41,760
18	100	120	12,000	120	120	14,400	128	120	15,360			41,760
19	100	120	12,000	120	120	14,400	128	120	15,360			41,760
20	100	120	12,000	120	120	14,400	128	120	15,360			41,760
21	100	120	12,000	120	120	14,400	128	120	15,360			41,760
22	100	120	12,000	120	120	14,400	128	120	15,360			41,760
23	100	120	12,000	120	120	14,400	128	120	15,360			41,760
24	100	120	12,000	120	120	14,400	128	120	15,360			41,760
25	100	120	12,000	120	120	14,400	128	120	15,360			41,760
26	100	120	12,000	120	120	14,400	128	120	15,360			41,760
27	100	120	12,000	120	120	14,400	128	120	15,360			41,760
28	100	120	12,000	120	120	14,400	128	120	15,360			41,760
29	100	120	12,000	120	120	14,400	128	120	15,360			41,760
30	100	120	12,000	120	120	14,400	128	120	15,360			41,760
31	100	120	12,000	120	120	14,400	128	120	15,360			41,760
32	100	120	12,000	120	120	14,400	128	120	15,360			41,760
33	100	120	12,000	120	120	14,400	128	120	15,360			41,760
34	100	120	12,000	120	120	14,400	128	120	15,360			41,760
35	100	120	12,000	120	120	14,400	128	120	15,360			41,760
36	100	120	12,000	120	120	14,400	128	120	15,360			41,760
37	100	120	12,000	120	120	14,400	128	120	15,360			41,760
38	100	120	12,000	120	120	14,400	128	120	15,360			41,760
39	100	120	12,000	120	120	14,400	128	120	15,360			41,760
40	100	120	12,000	120	120	14,400	128	120	15,360			41,760

(5) Annual Harvest Volume (Pole)

Year	New Plantation						Old Plantation						TOTAL Volume					
	Planted in Yr. 3		Planted in Yr. 4		Planted in Yr. 5		5 years		10 years		15 years							
	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha						
1														0				
2													200	11.2	2,240	2,240		
3													196	11.2	2,195	2,195		
4																0		
5																0		
6										200	11.2	2,240	200	15.0	3,000	5,240		
7										206	11.2	2,307	196	15.0	2,940	5,247		
8																0		
9																0		
10																0		
11									26	11.2	291	200	11.2	2,240	2,500	5,031		
12												206	11.2	2,307	196	12.5	2,457	4,757
13																	0	
14																	0	
15																	0	
16																	0	
17	100	1.5	150						26	15.0	390	200	11.2	2,240			2,630	
18				120	1.5	180						206	11.2	2,307			2,457	180
19							126	1.5	192								192	
20																		0
21												26	12.5	325			325	
22	100	2.0	200														200	
23				120	2.0	240											240	
24							126	2.0	256								256	
25																		0
26																		0
27	100	2.5	250															250
28				120	2.5	300												300
29							126	2.5	320									320
30																		
31																		
32																		
33																		
34																		
35																		
36																		
37																		
38																		
39																		
40																		

(6) Annual Harvest Volume (Sawlog)

Year	New Plantation						Old Plantation						TOTAL Volume			
	Planted in Yr. 3		Planted in Yr. 4		Planted in Yr. 5		5 years		10 years		15 years					
	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha	ha	cu.m/ha				
1													0			
2													0			
3													0			
4													0			
5													0			
6													0			
7													0			
8													0			
9													0			
10													0			
11											200	11.2	2,240	2,240		
12											196	11.2	2,195	2,195		
13													0			
14													0			
15													0			
16										200	11.2	2,240	2,240			
17										206	11.2	2,307	2,307			
18													0			
19											200	25.0	5,000	5,000		
20											196	25.0	4,900	4,900		
21									26	11.2	291		291	291		
22													0			
23										200	25.0	5,000	5,000	5,000		
24										206	25.0	5,150	5,150	5,150		
25													0			
26													0			
27	100	4.5	450										200	27.5	5,500	5,500
28				120	4.5	540			26	25.0	650		196	27.5	5,390	5,840
29							128	4.5	576						576	576
30															0	
31													200	27.5	5,500	5,500
32													206	27.5	5,665	5,665
33															0	
34	100	5.0	500												500	500
35				120	5.0	600									600	600
36							128	5.0	640	26	27.5	715			1,355	1,355
37															0	
38															0	
39															0	
40															0	

資料IV-1-1 森林管理計畫內部收益率算出表

(Unit: P 1,000)

Year	Benefit		Present Value		Present Value		Benefit	
	Cost	D.R. (3%)	Cost	D.R. (4%)	Cost	D.R. (4%)	Benefit	Benefit
1	7,405	0	7,405	0	7,405	1	7,405	0
2	8,642	0	8,390	0	8,310	0.9615	8,310	0
3	9,555	0	9,007	0	8,834	0.9246	8,834	0
4	7,625	0	6,978	0	6,779	0.8890	6,779	0
5	13,619	11,464	12,100	10,186	11,642	0.8548	11,642	9,799
6	7,533	0	6,584	0	6,274	0.8219	6,274	0
7	7,637	0	6,396	0	6,036	0.7903	6,036	0
8	7,640	0	6,212	0	5,806	0.7599	5,806	0
9	7,544	0	6,034	0	5,585	0.7307	5,585	0
10	17,650	20,294	13,527	15,554	12,401	0.7026	12,401	14,258
11	7,441	0	5,537	0	5,027	0.6756	5,027	0
12	7,371	0	5,325	0	4,788	0.6496	4,788	0
13	7,251	0	5,086	0	4,529	0.6246	4,529	0
14	7,184	0	4,892	0	4,315	0.6006	4,315	0
15	24,323	35,093	16,080	23,201	14,046	0.5775	14,046	20,265
16	6,662	0	4,276	0	3,699	0.5553	3,699	0
17	6,273	0	3,909	0	3,349	0.5339	3,349	0
18	5,953	0	3,602	0	3,056	0.5134	3,056	0
19	5,560	0	3,266	0	2,745	0.4936	2,745	0
20	19,530	30,587	11,138	17,443	9,270	0.4746	9,270	14,518
21	17,206	24,603	9,527	13,622	7,853	0.4564	7,853	11,228
22	15,629	22,095	8,401	11,877	6,859	0.4388	6,859	9,696
23	15,951	22,811	8,325	11,905	6,731	0.4220	6,731	9,625
24	17,269	25,745	8,750	13,045	7,006	0.4057	7,006	10,445
25	16,818	22,733	8,273	11,183	6,561	0.3901	6,561	8,869
26	17,653	33,197	8,431	15,855	6,822	0.3751	6,822	12,453
27	21,262	31,052	9,859	14,399	7,669	0.3607	7,669	11,200
28	21,318	31,052	9,597	13,979	7,393	0.3468	7,393	10,769
29	21,472	42,427	9,385	18,544	7,160	0.3335	7,160	14,148
30	21,647	31,409	9,186	13,328	6,941	0.3207	6,941	10,071
31	19,744	28,423	8,134	11,710	6,087	0.3083	6,087	8,763
32	19,390	28,066	7,756	11,226	5,748	0.2965	5,748	8,320
33	19,279	28,066	7,487	10,899	5,496	0.2851	5,496	8,000
34	19,359	28,185	7,297	10,626	5,305	0.2741	5,305	7,725
35	18,434	26,632	6,748	9,749	4,858	0.2636	4,858	7,019
36	17,922	25,915	6,369	9,210	4,542	0.2534	4,542	6,567
37	17,391	25,199	6,000	8,694	4,238	0.2437	4,238	6,140
38	17,366	24,050	5,985	8,726	4,186	0.2343	4,186	6,103
39	19,433	28,306	6,320	9,206	4,378	0.2253	4,378	6,377
40	32,948	58,839	10,403	18,579	7,137	0.2166	7,137	12,746
Total	580,583	688,243	307,977	312,745	256,663		256,663	245,109
			4,768					-11,554

Note : D.R. - Discount Rate IRR=3%+(4%-3%)x4,768/(4,768+11,554)=3.3%

資料IV-1-2 社会林業計画内部収益率算出表

(Unit: P.1,000)

Year	Cost	Benefit	D.R. (40%)		Present Value		D.R. (41%)		Present Value	
					Cost	Benefit			Cost	Benefit
1	2,308	0	1	0	2,308	0	1	2,308	0	
2	8,188	4,773	0.7143	3,409	5,849	3,409	0.7092	5,807	3,385	
3	11,537	6,119	0.5102	5,886	5,886	3,122	0.5030	5,803	3,078	
4	14,202	5,661	0.3644	5,176	5,176	2,063	0.3567	5,066	2,019	
5	17,428	9,753	0.2603	4,537	4,537	2,539	0.2530	4,409	2,467	
6	20,847	23,386	0.1859	3,876	3,876	4,348	0.1794	3,741	4,195	
7	23,527	30,415	0.1328	3,125	3,125	4,039	0.1273	2,994	3,871	
8	24,607	31,420	0.0949	2,334	2,334	2,981	0.0903	2,221	2,836	
9	27,989	41,983	0.0678	1,897	1,897	2,845	0.0640	1,792	2,688	
10	29,231	51,767	0.0484	1,124	1,124	2,506	0.0454	1,055	2,350	
11	26,457	76,817	0.0346	915	915	2,656	0.0322	852	2,473	
12	26,377	87,491	0.0247	651	651	2,161	0.0228	602	1,998	
13	23,023	87,303	0.0176	406	406	1,540	0.0162	373	1,414	
14	22,793	98,541	0.0126	287	287	1,242	0.0115	262	1,132	
15	22,858	109,663	0.0090	206	206	987	0.0081	185	893	
16	25,507	130,040	0.0064	164	164	836	0.0058	147	751	
17	25,493	138,663	0.0046	117	117	637	0.0041	104	568	
18	25,985	149,913	0.0033	85	85	492	0.0029	76	436	
19	26,415	155,479	0.0023	62	62	364	0.0021	54	320	
20	27,907	147,327	0.0017	38	38	247	0.0015	33	215	
21	23,252	153,385	0.0012	28	28	183	0.0010	24	159	
22	22,344	154,845	0.0009	20	20	132	0.0007	17	114	
23	26,385	170,631	0.0006	16	16	104	0.0005	14	89	
24	26,497	171,126	0.0004	12	12	75	0.0004	10	63	
25	22,764	160,059	0.0003	7	7	50	0.0003	6	42	
26	26,642	172,089	0.0002	6	6	38	0.0002	5	32	
27	26,981	175,034	0.0002	4	4	28	0.0001	4	23	
28	23,723	161,764	0.0001	3	3	18	0.0001	2	15	
29	23,298	161,979	0.0001	2	2	13	0.0001	2	11	
30	22,764	158,339	0.0001	1	1	9	0.0000	1	7	
31	26,642	173,809	0.0000	1	1	7	0.0000	1	5	
32	26,758	172,501	0.0000	1	1	5	0.0000	1	4	
33	22,764	160,059	0.0000	0	0	3	0.0000	0	3	
34	23,117	159,589	0.0000	0	0	2	0.0000	0	2	
35	23,187	161,559	0.0000	0	0	2	0.0000	0	1	
36	23,719	161,726	0.0000	0	0	1	0.0000	0	1	
37	22,764	160,059	0.0000	0	0	1	0.0000	0	1	
38	22,764	158,339	0.0000	0	0	1	0.0000	0	0	
39	22,406	160,059	0.0000	0	0	0	0.0000	0	0	
40	22,321	158,339	0.0000	0	0	0	0.0000	0	0	
Total	903,271	4,651,805		39,144	59,685			37,972	37,665	
					541				-307	

IRR=40%+(41%-40%)x541/(541+307)=40.6%

Note : D.R. - Discount Rate

資料IV-2 用材の計算価格

(Unit : Pesos)

Items	Unit p.	Remarks
CIF Value/d	3,397	Amount of Imported Sawlogs : 487,856d Amount of CIF Value : \$49,678,885 (From "Forestry Stastics"1,992) Unit Price of CIF Value : \$101.83/d Price hike rate (DEC '93DEC/'92DEC=235/195=1.20 FOB SARAWAK MERANTI) $\$101.83 \times 1.20 = \$122.2/d$ Exchange Rate(as of DEC.1993): 27.8P/\$
Transportation & Marketing costs	355	Assumption : Average size importation 2,000d Transportation: P200 Trucking from Manila South Harbor to sawmill in the Metro Manila area. Stevedoring Charges : 42.82 $77.75P/M \text{ Bd.f.} \div 2.36d/M \text{ Bd.f}$ 30%equipment standby&labor VAT(10%) 4.28 Arrastre Services : 37.00 $41.9P/t \times 0.883t/d$ VAT(10%) 3.70 $(2,000d=1,766t)$ Equipment Standby Charges : 3.83 $7,667.10P/day/2,000d \text{ size}$ Wharfage Fee : 20.75 $0.883t/d \times 23.5P/t$ Sales Commission 43.08 $2,872P/d \times 1.5\%$ 355.46
Total	3,752	

資料IV-3-1 果実等農産物の輸出量及び輸出額(FOB価)

Agricultural Crops	Quantity	FOB Value(\$)	FOB/Unit	Destination Country
Mango	79,843	108,357	1.36	Canada
	64,403	146,079	2.27	UK&North Ireland
	450	510	1.13	Netherlands
	13,680	28,636	2.09	Saudi Arabia
	1,035,880	965,430	0.93	Singapore
	164,204	111,139	0.68	China
	13,494,057	9,934,982	0.74	Hongkong
	7,339,138	12,645,864	1.72	Japan
	224,830	420,168	1.87	Australia
	9,280	16,000	1.72	New Zealand&Western Samoa
Total	22,425,765	24,377,165	1.09	
Jackfruit	50	245	4.90	Arabia Peninsula State
	200	1,080	5.40	Taiwan
Tamarind	5,564	9,393	1.69	Canada
	27,324	47,409	1.74	U.S.
	85	140	1.65	Iceland
	1,967	3,351	1.70	U.K.&North Ireland
	681	1,266	1.86	Netherland
	591	975	1.65	France
	190	352	1.85	Germany
	170	308	1.81	Austria
	75	149	1.99	Switzerland
	2,188	2,925	1.34	Saudi Arabia
	475	569	1.20	Oman
	1,158	2,391	2.06	Arabia Peninsula State
	148	245	1.66	Qatar
	37	61	1.65	Brunei
	118	198	1.68	Hongkong
	4	27	6.75	Japan
	1,002	1,759	1.76	Australia
64	165	2.58	Guam	
344	567	1.65	Trust Territory, Pac Island	
6,674	12,712	1.90	Hawaii	
Total	48,859	84,962	1.74	
Calamansi	1,000	4,273	4.27	Hongkong
Bamboo	184	1,362	7.40	Canada
	882	1,946	2.21	U.S.
	184	676	3.67	U.K.&North Ireland
	231	1,525	6.60	Germany
	260	1,860	7.15	Switzerland
	2,664	13,488	5.06	Portugal
	135	1,092	8.09	Italy
	12,350	19,700	1.60	Saudi Arabia
	1,463	4,238	2.90	Japan
	2,346	1,525	0.65	Australia
	1,688	1,134	0.67	Hawaii
182	532	2.92	Canary Islands(Spain)	
Total	22,569	49,078	2.17	
Camote	24,330	16,243	0.67	Japan
Cassava	1,792	2,725	1.52	U.S.
	57,828	63,254	1.09	Japan(Okinawa)
	180	290	1.61	Australia
Asparagus	16,183	28,679	1.77	Hongkong
	917,074	1,555,167	1.70	Japan
Rice	10,090,183	2,342,143	0.23	General
	10,000,000	2,340,000	0.23	Indonesia, marshall Islands
Corn	21,440	828,368	38.64	Thailand
	1,806,527	252,150	0.14	Malaya
	5,585	113,191	20.27	Indonesia
	2,500	9,306	3.72	Japan
	2,000	120,000	60.00	Egypt
	60	3,600	60.00	Ivory Coast
	600	36,000	60.00	Rhodesia
19,465,919	3,407,705	0.18	General	

Source : Foreign Trade Statistics 1991-1992



資料IV-3-2 マンゴ等果実の搬出及び輸出費用

Items	Pesos /Container		Remarks
Transportation Charges (Farm gate to Port)	San Mateo 29km	4,400 P	Container size 40-Footer Carrying Capacity of 40-footer Container :26.6t
	Rodorigues 29km	5,140	
	Antipolo 29km	5,140	
	Baras 52km	7,965	
	Tanay 55km	8,330	
	(VAT included)		
Arrastre Services	(VAT included) 2,227.5		
Wharfage Fee	(VAT included) 300.8		
Documentary Stamps	53.0		

資料IV-4 聞き取り調査による相場賃金

(Unit : Pesos)

ITEMS	FARMHOUSE 1	FARMHOUSE 2	FARMHOUSE 3	FARMHOUSE 4	FARMHOUSE 5	FARMHOUSE 6	FARMHOUSE 7	FARMHOUSE 8
Labor			80/m. day, w/lunch	90/m. day, w/o lunch		75/day, w/ lunch 100/day, w/o lunch		
Preparation for rice planting		150/day, w/ carabao					60/hour	
Weeding	100/day, w/o lunch	100/day, w/o lunch						
Spraying insecticides		110/day, w/o lunch						
Kaingin/brushing	100/day, w/o lunch							110/m. day, w/o lunch 75/m. day, w/lunch
Planting	100/day, w/o lunch	100/day, w/o lunch					75/day, w/ lunch	110/m. day, w/o lunch 75/m. day, w/ lunch
Using handtractor								600/day (8 hrs.)
Construction works					150/m. day, w/o lunch			
Skilled worker					300/m. day, w/o lunch			

Note : The average local wage (without lunch) for agriculture and forestry is approximately 100 pesos.

資料IV-5 計算価格による内部収益率算出表

(Unit: P.1,000)

Year	Cost	Benefit	Present Value		D.R. (36%)	Benefit	Cost	Present Value		D.R. (37%)	Benefit	Cost
			D.R. (36%)	Benefit				D.R. (37%)	Benefit			
1	7,413	0	0	7,413	0	0	0	7,413	0	0	7,413	0
2	12,457	4,296	0.7353	9,159	3.159	3,159	9,092	0.7299	3,136	9,092	3,136	9,092
3	14,979	5,507	0.5407	8,098	2,977	2,977	7,981	0.5328	2,934	7,981	2,934	7,981
4	14,764	5,095	0.3975	5,869	2,025	2,025	5,742	0.3889	1,981	5,742	1,981	5,742
5	21,325	29,187	0.2923	6,234	8,532	8,532	6,054	0.2839	8,285	6,054	8,285	6,054
6	18,964	21,047	0.2149	4,076	4,524	4,524	3,929	0.2072	4,261	3,929	4,261	3,929
7	20,516	27,374	0.1580	3,242	4,326	4,326	3,103	0.1512	4,140	3,103	4,140	3,103
8	20,704	28,278	0.1162	2,406	3,286	3,286	2,286	0.1104	3,122	2,286	3,122	2,286
9	22,730	37,790	0.0854	1,942	3,229	3,229	1,832	0.0806	3,045	1,832	3,045	1,832
10	27,111	81,894	0.0628	1,703	5,145	5,145	1,595	0.0588	4,817	1,595	4,817	1,595
11	21,728	72,500	0.0462	1,004	3,349	3,349	933	0.0429	3,113	933	3,113	933
12	21,623	82,039	0.0340	734	2,787	2,787	678	0.0313	2,571	678	2,571	678
13	19,075	78,573	0.0250	476	1,962	1,962	436	0.0229	1,797	436	1,797	436
14	18,872	88,687	0.0184	347	1,629	1,629	315	0.0167	1,481	315	1,481	315
15	32,142	159,920	0.0135	434	2,160	2,160	392	0.0122	1,949	392	1,949	392
16	20,417	120,400	0.0099	203	1,195	1,195	182	0.0089	1,071	182	1,071	182
17	20,116	128,262	0.0073	147	936	936	131	0.0065	833	131	833	131
18	20,284	142,432	0.0054	109	763	763	96	0.0047	675	96	675	96
19	20,023	147,291	0.0039	79	581	581	69	0.0035	510	69	510	69
20	28,495	182,623	0.0029	83	530	530	72	0.0025	461	72	461	72
21	27,063	182,285	0.0021	58	389	389	50	0.0018	336	50	336	50
22	25,595	178,696	0.0016	40	280	280	34	0.0013	240	34	240	34
23	28,149	201,690	0.0012	32	233	233	28	0.0010	198	28	198	28
24	29,208	206,763	0.0008	25	175	175	21	0.0007	148	21	148	21
25	26,472	185,515	0.0006	17	116	116	14	0.0005	97	14	97	14
26	29,587	206,728	0.0005	14	95	95	11	0.0004	79	11	79	11
27	32,609	221,595	0.0003	11	75	75	9	0.0003	62	9	62	9
28	30,545	202,658	0.0002	8	50	50	6	0.0002	41	6	41	6
29	30,389	202,353	0.0002	6	37	37	5	0.0001	30	5	30	5
30	30,123	198,423	0.0001	4	27	27	3	0.0001	22	3	22	3
31	31,207	215,293	0.0001	3	21	21	2	0.0001	17	2	17	2
32	30,994	213,727	0.0001	2	15	15	2	0.0001	12	2	12	2
33	28,340	194,020	0.0001	2	10	10	1	0.0000	8	1	8	1
34	28,622	194,560	0.0000	1	8	8	1	0.0000	6	1	6	1
35	27,953	193,718	0.0000	1	6	6	1	0.0000	4	1	4	1
36	27,899	193,728	0.0000	1	4	4	0	0.0000	3	0	3	0
37	26,885	188,916	0.0000	0	3	3	0	0.0000	2	0	2	0
38	27,249	188,903	0.0000	0	2	2	0	0.0000	2	0	2	0
39	28,133	194,445	0.0000	0	2	2	0	0.0000	1	0	1	0
40	38,291	239,356	0.0000	0	1	1	0	0.0000	0	0	0	0
				53,983		54,667		52,518			51,593	
						665					-925	

Note: D.R. - Discount Rate

$EIRR = 36\% + (37\% - 36\%) \times 665 / (665 + 925) = 36.4\%$

資料IV-6 マニラにおける水料金

Items	Price
<b>Residential</b>	
Household w/no-added establishment	
First 10 m <sup>3</sup>	28.00 P
Next	3.40P/m <sup>3</sup>
Household w/added establishment	
First 10 m <sup>3</sup>	33.50 P
Next	4.10P/m <sup>3</sup>
<b>Commercial</b>	
Malls, Office, Hardwear etc	
First 25 m <sup>3</sup>	226.25 P
Next	9.05P/m <sup>3</sup>
<b>Industry</b>	
First 25 m <sup>3</sup>	246.25 P
Next	9.85P/m <sup>3</sup>
Calculation of Unit Cost	$(9.05 + 9.85) / 2 = 9.45P/m^3$

資料IV-7 植栽樹種の差異による土壌侵食量

Treatment (Species)	Erosion rate		Remarks
	m <sup>3</sup> /ha	ton/ha	
Ipil-Ipil	49.0	60.9	All plots have more or less the same % of understory grass vegetation cover.
Bagras	203.0	250.19	
Narra	208.0	256.35	
Teak	46.0	56.7	
Control	271.0	333.99	

Source: "Evaluation of *Leucaena leucocephala*, *Tectona grandis*, *Pterocarpus indicus* and *Eucalyptus deglupta* for stream-bank stabilization in the Agusan River Basin" by SANTIAGO R. BACONGUS

資料IV-8 水源涵養効果及び土砂流出防止効果を含む内部収益率算出表

(Unit: P1,000)

Year	Cost	Benefit	D.R. (8.4%)		Present Value		D.R. (8.5%)		Present Value	
			Cost	Benefit	Cost	Benefit	Cost	Benefit		
1	7,413	0	1	0	7,413	0	1	7,413	0	
2	12,457	4,296	0.5435	2,335	6,770	2,335	0.5405	6,733	2,322	
3	14,979	5,507	0.2954	1,627	4,424	1,627	0.2922	4,377	1,609	
4	14,764	24,615	0.1605	3,951	2,370	3,951	0.1579	2,332	3,883	
5	21,325	68,227	0.0872	5,952	1,860	5,952	0.0854	1,821	5,825	
6	18,964	79,607	0.0474	3,775	899	3,775	0.0461	875	3,674	
7	20,516	105,454	0.0258	2,717	529	2,717	0.0249	512	2,650	
8	20,704	120,022	0.0140	1,681	290	1,681	0.0135	279	1,618	
9	22,730	149,054	0.0076	1,134	173	1,134	0.0073	166	1,086	
10	27,111	212,678	0.0041	880	112	880	0.0039	107	838	
11	21,728	222,804	0.0022	501	49	501	0.0021	46	474	
12	21,623	251,863	0.0012	308	26	308	0.0012	25	290	
13	19,075	258,950	0.0007	172	13	172	0.0006	12	161	
14	18,872	287,974	0.0004	104	7	104	0.0003	6	97	
15	32,142	378,117	0.0002	74	6	74	0.0002	6	69	
16	20,417	356,897	0.0001	38	2	38	0.0001	2	35	
17	20,116	383,059	0.0001	22	1	22	0.0001	1	20	
18	20,284	397,290	0.0000	13	1	13	0.0000	1	11	
19	20,023	420,449	0.0000	7	0	7	0.0000	0	7	
20	28,495	471,641	0.0000	4	0	4	0.0000	0	4	
21	27,063	485,943	0.0000	2	0	2	0.0000	0	2	
22	25,595	495,774	0.0000	1	0	1	0.0000	0	1	
23	28,149	519,805	0.0000	1	0	1	0.0000	0	1	
24	29,208	525,122	0.0000	0	0	0	0.0000	0	0	
25	26,472	504,972	0.0000	0	0	0	0.0000	0	0	
26	29,587	527,222	0.0000	0	0	0	0.0000	0	0	
27	32,609	542,079	0.0000	0	0	0	0.0000	0	0	
28	30,545	523,152	0.0000	0	0	0	0.0000	0	0	
29	30,389	522,847	0.0000	0	0	0	0.0000	0	0	
30	30,123	518,917	0.0000	0	0	0	0.0000	0	0	
31	31,207	535,787	0.0000	0	0	0	0.0000	0	0	
32	30,994	534,221	0.0000	0	0	0	0.0000	0	0	
33	28,340	514,514	0.0000	0	0	0	0.0000	0	0	
34	28,622	515,054	0.0000	0	0	0	0.0000	0	0	
35	27,953	514,212	0.0000	0	0	0	0.0000	0	0	
36	27,899	514,222	0.0000	0	0	0	0.0000	0	0	
37	26,885	509,410	0.0000	0	0	0	0.0000	0	0	
38	27,249	509,397	0.0000	0	0	0	0.0000	0	0	
39	28,133	514,939	0.0000	0	0	0	0.0000	0	0	
40	38,291	559,850	0.0000	0	0	0	0.0000	0	0	
				25,301	24,946			24,713	24,663	
				354					-50	

EIRR=8.4%+(8.5%-8.4%)×354/(354+50)=8.4.9%

Note : D.R. - Discount Rate

## RECORD OF MEETING

On May 17 to May 18, 1994, the DENR, the JICA Advisory Team and the members of the Study Team held a meeting to discuss the Draft Final Report of the Study on the Marikina Watershed Development Project. The following paragraphs summarize the major points that were discussed.

1. DENR - Is the social forestry (SF) component of the proposed MWDP plan consistent with SF plans contained in the Region IV Master Plan?

ST - The MWDP plan was prepared with the active collaboration of Region IV personnel who provided key inputs to the plan. Consequently, it seems safe to assume that it is consistent. However, the proper parties to assess consistency would be Region IV management, rather than the ST.

2. DENR - How current and accurate are the demographic statistics contained in the plan?

ST - Demographic and socio-economic data were derived from a census and survey conducted in mid-1993 by Regional, PENRO and CENRO staff in collaboration with the ST. Thus, the current estimate of about 9,500 permanent residents is considered to be quite accurate. However, some allowance should be made for a "floating" population of part-time and transient residents whom it was not practical to include in the census.

3. DENR - One of the urgent mandates of DENR is establishment of water impoundment structures in the Marikina Watershed. Is this matter addressed in the plan and if so, to what extent?

ST - The plan identifies fourteen(14) key locations for construction of water impoundments. These proposed locations are based on the need to reduce the risk of floods and siltation and to help recharge underground aquifers. Proposed water impoundment structures are strategically placed to mitigate flooding and related damage. Furthermore, soil and water conservation activities proposed in the social forestry component of the plan include extensive application of water impoundment principles such as (i) the construction of interceptor canals (referred to as "drains" in the plan), (ii) establishment of hedgerows and (iii) contour farming.

4. DENR - Implementation of the project would probably attract new in-migrants anxious to share in project benefits. This could lead to loss of forest cover and conflicts with the present occupants. Were these potential problems considered during formulation of the plan?

ST - These issues were given serious consideration and are addressed by two (2) measures included in the plan. First, no new roads would be constructed since this could induce in-migration and complicate forest protection problems. Proposed investments to improve access are limited to upgrading of existing roads and construction of foot trails. This limitation would help reduce the risk of large-scale in-migration.

Second, following the recommendation of DENR counterparts, the plan calls for expeditious issuance of tenure documents via Community Certificates of Stewardship Contract (CCFS) rather than the time-consuming award of individual Certificates of Stewardship Contract (CSC). The plan assumes that tenure security would provide incentives to resist entry of outsiders. It furthermore assumes that community protection of the site is the most effective deterrent against intrusion.

Admittedly, the two (2) aforementioned measures could be categorized as technical approaches to what is essentially a social issue. Resolution of this issue will rely primarily on institutional measures. The ST did not consider it appropriate to focus on institutional issues since this would have exceeded the bounds of the study. But the ST agrees with the DENR position that the threat of potential in-migration has to be faced and appropriately addressed.

5. DENR - Presidential Proclamation (PP) No. 585 sets aside 1,430 hectares (ha) for Integrated Social Forestry (ISF). However, the plan envisions over 5,000 ha for social forestry. How can these figures be reconciled? Moreover, the map does not indicate the location of areas covered by PP 585.

ST - It would be technically feasible to indicate the boundaries of PP 585 on the existing maps, if DENR will provide an accurate technical description of the area and the location of the appropriate reference points. In respect of the total proposed social forestry area, these are lands considered appropriate for social forestry interventions based on (i) their technical features, (ii) the reality that these additional areas are already occupied, and (iii) recommendations by DENR field staff that said additional areas should be included in ISF coverage.

While recognizing that certain policy issues are involved, and that such issues are beyond the bounds of the study, the ST fully concurs with the aforementioned recommendations of DENR field staff. Individual and communal implementation of agroforestry, treefarm development and soil/water conservation on these proposed additional areas are essential requirements for enhancing the hydrologic functions of the watershed in the context of existing social realities.

DENR - Approximately 4,000 ha in the eastern portion of the watershed have been targetted by the MWSS as a resettlement site. Given its technical features, the proposed site is not appropriate for resettlement.

The Pantabangan experience demonstrates that ill-advised resettlement can create more problems than those it intends to solve. Recently, it has been reported that current residents of the proposed resettlement site will actively resist MWSS intentions. Does the plan address this issue?

ST - Since this is an institutional issue, it is not directly addressed in the plan. However, the study clearly points out that there are already numerous settlers in the proposed MWSS resettlement site. Introduction of additional settlers could be very problematic and the probability of conflict should not be ignored. Furthermore, the site is characterized by low fertility and harsh terrain which is far from ideal for resettlement. Moreover, the site is designated as an important watershed for conservation of the natural environment and the headwaters of rivers. To achieve the purposes of conservation, it is preferable that management of the Marikina Watershed should be entrusted to only one agency.

DENR - Part of the proposed resettlement site is titled in the name of MWSS but the plan recommends social forestry interventions. Normally, titled land is not included in social forestry programs. Why was this titled land recommended for social forestry?

ST - The legal status of the proposed MWSS resettlement site may need to be clarified. The titled area is reportedly 1,507 ha. Subsequently, Presidential Decree No. 2480 issued in 1986 provided that the titled land would be used for resettlement. The same decree also designated an additional 2,917 ha for resettlement, thus increasing the total area for resettlement to 4,424 ha (i.e. 1,507 ha + 2,917 ha).

Can a Presidential Decree dictate how land titled to a government agency such as MWSS will be utilized? If so, this implies that such land is to be administered similar to public domain (i.e. for public benefit). Social forestry is a land use that pertains to public benefit.



On the other hand, a title implies that the owner should be the proper party to decide how land will be used. Which document has legal precedence: the title or the PD?

From a technical perspective, social forestry development would help create a buffer zone to protect nearby virgin forest areas. This would be consistent with the watershed management objectives of the project and the concept that public land should be used for public benefit.

7. DENR - Inclusion of Marikina Watershed in the National Integrated Protected Areas System (NIPAS) could be an impediment to expeditious rehabilitation of the area. NIPAS procedures are time-consuming, while the need for rehabilitation is urgent. Has this constraint been considered in plan formulation?

ST - One assumption of the study was that Marikina Watershed was already part of NIPAS. If this assumption is not valid, the language in the Report can be revised accordingly. This would not affect the technical recommendations however, since these are based on bio-physical and environmental parameters.

One positive feature of NIPAS is the implicit recognition that previous laws, decrees (etc.) imposing strict prohibitions against utilization can be a constraint to community collaboration in sustainable management.

The multiple-use zone concept contained in the NIPAS provides a socially-equitable mechanism for addressing this constraint. But there may be other mechanisms available. When formulating alternatives to NIPAS coverage, inclusion of the multiple-use zone concept would be consistent with the intention to reconcile social and environmental objectives in watershed management.

8. DENR - PD 324 sets aside 1,728 ha for exploitation. This corresponds to the areas identified with Milestone Farms, Baras Development Corporation and Mountain Resort. Is this reflected in the plan?

ST - The area covered by PD 324 is excluded from the plan and considered part of the private lands inside the watershed. This is indicated on the map.

9. DENR - Did the Environmental Impact Analysis (EIA) examine the negative impacts of waste water discharge from Foremost Farms?

ST - The study clearly points out that waste water from Foremost Farms is contaminating the Boso-boso River. This may not be a serious problem at present since Boso-boso River is not being utilized as a source of drinking water. But if there is any intention to draw on the river for household use, contamination would be a problem and mitigating measures would be required. Undoubtedly, technical approaches to mitigation will be important, but they are not included in the Report which only deals with public land.

Meanwhile, some watershed residents have complained about pollution from the Foremost Farms. Therefore, it may be timely to consider administrative measures such as those prescribed for issuance of Environmental Clearance Certificates (ECC).

10. DENR - The EIA in the plan identifies certain activities that might have an adverse environmental impact. But appropriate mitigating measures are not clearly described.

ST - The EIA mentions several mitigating measures, but the Study Team recognizes that these should be presented in a more orderly manner. This will be attended to in the revised Final Report, perhaps through a table showing the direct relationship between activities with possible adverse effects and the proposed mitigating measures.

11. DENR - The plan includes a small-scale, shifting harvest system in plantation forests. This may be in conflict with existing policies prohibiting utilization of forest products on proclaimed watersheds. Furthermore, clear-cutting as envisioned in the system might have negative environmental impacts.

ST - Pursuant to the minutes of a meeting held on 6 September 1993 (page 237, item "e" of the Report), small and medium-scale commercial timber production by local residents was identified as a component of plantation management. The Study Team responded to this issue by formulating the proposed small-scale, shifting harvest system.

Undoubtedly, other harvesting options could be considered as alternatives to the proposed system such as:

- selective cutting by parcel or block;
- thinning and pruning, also on a selective basis;
- and
- shelterbelt cutting.

The Study Team feels that the shifting harvest system would be the most feasible option to follow in terms of management, monitoring and evaluation. In this system, the area subject to harvest would be small and clearly defined. This would simplify supervision, monitoring and evaluation.

By contrast, monitoring of a selective harvest system would be more labor intensive and subject to personal discretion of the evaluator who would be required to consider diameter limits and other variables.

Environmental impacts of the small-scale, shifting harvest system would not be significant from the perspective of watershed management. At any single point in time, more than 90% of the crown cover would remain intact and not disturbed. Furthermore, the disturbed areas (<10%) would not be contiguous. They would be widely dispersed.

12. DENR - The rotation schedules proposed in the small-scale shifting harvest system establish a twenty (20) year harvest cycle for fast-growing species. However, many fast-growing species mature earlier than 20 years. Furthermore, if interplanted with medium and slow-growing trees, many fast-growing species would be shaded out prior to the 20th year.

ST - Harvesting age of short rotation schedule usually viewed from the point of economic benefits. However, the study area is a critical watershed. So, from a conservation perspective, longer rotation are considered preferable to shorter rotation schedule. Although the proposed twenty (20) year harvest cycle is used for the purpose of facilitating financial and economic analysis, it contributes significantly to its conservation. Clearly, this cycle would not be applicable in all cases and for all species. During actual operations, it is assumed that the cycles would be modified and adjusted to respond to conditions prevailing in the future. DENR's comments on this matter are well-taken and will be reflected in the Final Report.

13. DENR - It would be useful to revise the first chapter of the Report, and state therein the basic assumptions of the study as well as the historical background of the site. Among others, the past and present status of the Wawa Dax should be discussed so that readers will appreciate its potential importance in relation to the proposed plan. It would also be useful to include the Terms of Reference as an annex to the report.

ST - The Study Team will revise the first paragraph of Chapter I (General Plan) to further explain the background of the study. This should help clarify the premise for technical recommendations included in the plan and the basic assumptions that were used.

Regarding the Wawa Dam, the Study Team commented that prior to World War II, this dam provided water to Metro Manila. However, the aqueducts were damaged at the end of the War and never repaired. In the 1960's, the Government announced a plan to build a much larger dam at the site, but this plan was abandoned for technical reasons. Since that time, nothing has been done to rehabilitate the dam. This is unfortunate because even if it is not as large as the dam envisioned in the 1960's, the Wawa Dam still has the potential to provide a significant amount of water. This is indicated on tables contained in the report and was verified by ocular inspection during the study. Rehabilitation of the Marikina Watershed would increase this potential.

14. DENR - Some limits should be placed on social forestry which is often being used as an excuse to occupy lands that should be reserved for environmental reasons. Law enforcement is an essential requirement for effective watershed management.

ST - This is a policy issue and is therefore not addressed in the proposed plan which focuses on technical issues.

15. DENR - Only one species (*Leucaena luecocephala*) is mentioned for inclusion in firebreaks. It would be advisable to include other species such as *Leucaena diversifolia*, *L. esculenta*, bananas and other agricultural crops.

ST - This suggestion is well-taken and will be reflected in the revised Final Report.

16. DENR - The Report does not discuss proposed organizational and institutional arrangements for project implementation. The DENR requested the Study Team to draw up recommendations on institutional arrangements.

ST - As mentioned earlier, the Study Team focused on technical matters. However, some suggestions are included for consideration when setting up appropriate organizational and institutional arrangements. These suggestions underscore the need for integration of activities which cut across the sectoral mandates of various central and local government agencies, and the sectoral concerns of other stakeholders such as present occupants, private land owners and others.

In addition to the discussions summarized in paragraphs 1 to 16 above, the DENR also brought up the matter of future collaboration on implementation of the plan. The DENR mentioned that it intends to favorably endorse the plan to the National Economic Development Authority (NEDA) for inclusion in the programs to be taken up in bilateral consultations with the Government of Japan.

DENR will also communicate with the Government of Japan through appropriate channels and request assistance in implementation of the project.

Finally, it was agreed that (i) any additional comments from the DENR will be submitted to JICA within one (1) month after the meeting and (ii) the Final Report will be submitted to the DENR within two (2) months after receiving the comments.

The meeting adjourned at 3:15 PM on May 18, 1994.



