ANNEX 4

SUITABLE LAND USE

4.1 Suitable Land Use

Land use must be conducted in a suitable manner, taking such conditions as the land productivity (soil type), workability (gradient), environmental conservation (water yield and soil loss prevention) and legal control (conservation of dam reservoir shores, etc.) into consideration. In the case of the development of hitherto undeveloped land, the satisfaction of these conditions can lead to suitable land use. However, it is much more common for land to be cultivated by local people. Because of established land use methods and expectations regarding specific types of land use on the part of local people, enforced land use without prior consultation with local people may fail to achieve the intended land use. Conversely, the ideas of local people regarding how land should be used do not necessarily reflect the actual site conditions and the rethinking and improvement of such ideas may be required from the viewpoint of environmental conservation, etc.

As the Model Area spreads from hilly areas to mountainous areas, forest development is essential for watershed conservation. The predominance of agriculture in the area suggests that agriculture continues to be a key industry. Accordingly, agriculture and forestry are identified as key land use categories. The concrete work process to determine the land use suitability is described next.

(1) Site Classification

The slope gradient is closely related to the workability and soil erosion volume. The gentler a slope is, the more suitable it is for both agriculture and forestry. A steeper gradient makes it less suitable for these activities. Consequently, site suitability is judged on the basis of a combination of slope gradient and productivity potential of each soil type.

Firstly, the slope gradient suitability is evaluated in terms of five grades as shown table below. As forestry has wider tolerance regarding slope gradient than agriculture, site suitability is separately classified for agriculture and forestry. A higher point (5 is the highest and 1 is the lowest) means better suitability.

Suitability Classification Based on Slope Gradient

Slope (°)	Suitability	
	Agriculture	Forestry
- 10	5	5
10 - 15	4	5
16 - 20	3	5
21 - 25	2	4
26 - 30	1	3
31 - 40	1	2
41 -	1	1

The productivity potential of 13 soil types found in the Model Area is classified in terms of five grades. Here, the productivity potential grade is taken as the grade of suitability as shown in the table below. As in the case of slope gradient, a higher point suggests a higher level of suitability.

Suitability Classification Based on Soil Type

Soil Type	Suitability
Eutric Cambisols (CMe) Dystric Cambisols (CMd)	5
Dystric Fluvisols (FLd) Rendzic Leptosols (LPk) Haplic Ferralsols (FRh)	4
Eutric Leptosols (LPe) Rhodic Ferralsols (FRr) Haplic Acrisols (ACh)	3
Dystric Gleysols (GLd) Haplic Alisols (ALh) Chromic Luvisols (LVx)	2
Dystric Regosols (RGd) Dystric Leptosols (LPd)	1

By combining the suitability based on slope gradient and the suitability based on soil type, the suitability of land in the Model Area for agriculture or forestry is judged in terms of five grades as shown in the table below. The resulting site classification for the Model Area is shown in Fig. 4-1.

Land Suitability for Agriculture/Forestry Based on Combination of Slope Gradient and

Soil Type

Slope (°)	Soil Type				
	Cme,CMd	FLd,LPk,FRh	Lpe,FRr,Ach	GLd,Alh,LVx	RGd,LPd
～10	A V/F V				
10～15	A IV/F V	A IV/F IV	A III/F III	A II/F II	
16～20	A III/F V	A III/F IV			
21～25	A II/F IV		A II/F III		
26～30	A I/F III				
31～40	A I/F II				
41～	A I/F I				

A:Agriculture F:Forestry	Suitability	V : High IV : Rather high III : Moderate II : Rather low I : Low

Category AV/FV : High suitability for both agriculture and forestry
Category AIV/FV : Rather high suitability for agriculture and high suitability for forestry
Category AIV/FIV: Rather high suitability for both agriculture and forestry
Category AIII/FV : Moderate suitability for agriculture and high suitability for forestry
Category AIII/FIV : Moderate suitability for agriculture and rather high suitability for forestry
Category AIII/FIII : Moderate suitability for both agriculture and forestry
Category AII/FIV : Rather low suitability for agriculture and rather high suitability for forestry
Category AII/FIII : Rather low suitability for agriculture and moderate suitability for forestry
Category AI/FIII : Low suitability for agriculture and moderate suitability for forestry
Other categories are unsuitable for either agriculture or forestry.

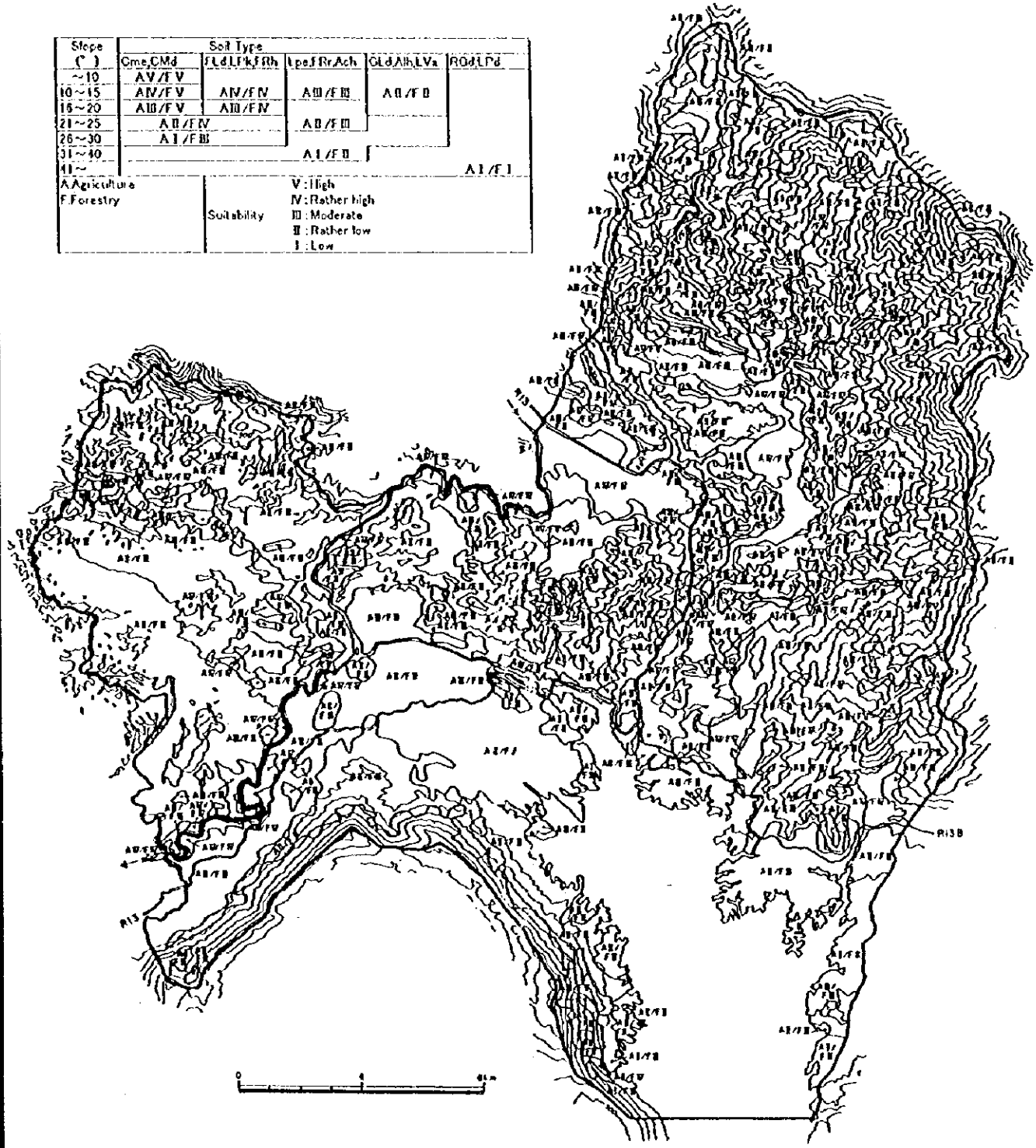


Fig. 1-4-1

Flow Rate Check Points

The Study on Watershed Management Plan for Forest Conservation in Vangvieng District

Fig.4-1(1) Landuse Plan (All Model Area)

( ) means protection area included.

Present Landuse					Landuse Plan												
Land Use Type			Code	Area (ha)	Forest (ha)							Agricultural Land (ha)				Others (ha)	
					Mfc	Nn	Nc	Ny	R	B	B'	Sa	Ag	Fl	W Permanent Farmland	W Settlement	Waterbody
Forest Zone	Forest	Man-made Forest	Mf	0.00													
		Natural Forest Primary	Npd1	435.15		435.15 (87.22)											
			Npd2	1,238.80		1,238.80 (500.29)											
			Npd3	4,497.66		4,497.66 (1,617.54)											
			Npd4	1,180.70		1,180.70 (47.23)											
		Secondary	Nsd1	10.65		10.65											
			Nsd2	304.26		304.26 (115.12)											
			Nsd3	1,901.14		1,901.14 (483.86)											
			Nsd4	608.77		608.77 (2.42)											
		Bamboo Forest (1)	B1	1,698.87		1,698.87 (439.82)											
		Shrub land	S	100.99			100.99 (60.82)										
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	349.61					349.61 (0.29)								
		Bush	Bh	655.71			655.71 (110.40)										
		Bamboo (2)	B2	3,352.19					3,352.19 (751.16)								
		Grass land	G	2,357.88					2,357.88 (537.08)								
	Permanent Farmland	Low land Paddy	Lp	0.00													
		Dry Farm land	Df	0.00													
		Orchard	Og	0.00													
	Settlement		Co	0.00													
	Bare land		Br	1.50					1.50								
	Water body		W	0.00													
	Total			18,693.98		11,876.10 (3,293.41)	756.70 (171.32)		6,061.18 (1,288.53)								
Symbiosis Zone	Forest	Man-made Forest	Mf	19.69	19.69												
		Natural Forest Primary	Npd1	20.13		20.13 (20.13)											
			Npd2	251.58		10.34 (10.34)		241.24									
			Npd3	507.10		280.74 (280.74)		226.36									
			Npd4	281.57		32.00 (32.00)		249.57									
		Secondary	Nsd1	25.86		13.86 (13.86)							12.00				
			Nsd2	532.54		193.66 (144.33)						7.00	331.88				
			Nsd3	2,686.17		545.49 (545.49)		2,140.68									
			Nsd4	5,423.09		1,383.40 (1,383.40)		4,039.69									
		Bamboo Forest (1)	B1	148.90		12.09 (12.09)				136.81			4.63				
		Shrub land	S	4.63													
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	1,829.32					242.29 (100.29)			122.00	1,465.03				
		Bush	Bh	8,404.83			1,203.91 (642.91)					707.00	4,493.92				
		Bamboo (2)	B2	8,249.37					1,122.25 (1,122.25)		5,127.12						
		Grass land	G	5,826.88					1,560.39 (780.39)			272.00	3,994.29				
	Permanent Farmland	Low land Paddy	Lp	131.59											131.59		
		Dry Farm land	Df	4.43											4.43		
		Orchard	Og	10.49											10.49		
	Settlement		Co	123.38												123.38	
	Bare land		Br	198.85					51.38 (48.38)			31.70	115.79				6,180.38
	Water body		W	6,180.38													6,180.38
	Total			36,860.56	19.69	2,491.71 (2,442.38)	1,203.91 (642.91)	6,897.54	2,976.29 (2,051.29)	136.81	5,127.12	1,139.70	10,417.54		146.51	123.38	6,180.38
Agriculture Zone	Forest	Man-made Forest	Mf	7.79	7.79												
		Natural Forest Primary	Npd1	0.00													
			Npd2	0.00													
			Npd3	0.04				0.04									
			Npd4	0.79				0.79									
		Secondary	Nsd1	6.29										6.29			
			Nsd2	5.43										5.43			
			Nsd3	178.86				178.86									
			Nsd4	200.98		2.76 (2.76)		198.22									
		Bamboo Forest (1)	B1	4.13						4.13							
		Shrub land	S	30.84			8.76 (8.76)							22.08			
				114.66										114.66			
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	114.66										963.89			
		Bush	Bh	951.89			8.00 (8.00)										
		Bamboo (2)	B2	398.30					17.03 (17.03)		379.27						
		Grass land	G	92.04										92.04			
	Permanent Farmland	Low land Paddy	Lp	995.90											995.90		
		Dry Farm land	Df	28.19											28.19		
		Orchard	Og	17.51											17.51		
	Settlement		Co	384.63												384.63	
	Bare land		Br	167.06										167.06			237.17
	Water body		W	237.17													237.17
	Total			3,820.50	7.79	2.76 (2.76)	16.76 (16.76)	377.91	17.03 (17.03)	4.13	379.27			1,351.45	1,041.60	384.63	237.17

Fig.4-1(2) Landuse Plan(Namon Area)　　Area: 15,781 ha　　( ) means protection area included

Present Landuse					Landuse Plan (ha)												
					Forest (ha)							Agricultural Land (ha)				Others (ha)	
Land Use Type			Code	Area(ha)	Mfc	Mn	Mr	Mu	R	B	BI	Sa	Ag	Fl	Permanent Farmland	Settlement	Waterbody
Forest Zone	Forest	Man-made Forest	Mf	0.00													
		Natural Forest Primary Mpd1	Mpd1	7.59		7.59 (7.59)											
		Mpd2	Mpd2	77.79		77.79 (58.18)											
		Mpd3	Mpd3	639.89		639.89 (362.62)											
		Mpd4	Mpd4	88.26		88.26 (36.19)											
		Secondary Msd1	Msd1	0.00													
		Msd2	Msd2	173.61		173.61 (83.44)											
		Msd3	Msd3	763.62		763.62 (383.98)											
		Msd4	Msd4	288.18		288.18											
		Bamboo Forest(1)	BI	433.45		433.45 (242.77)											
		Shrub land	S	24.42			24.42 (24.42)										
	S/B Site & Former S/B Site	Slash and Burn Site	My	196.51					196.51								
		Bush	Bh	355.15			355.15 (17.78)										
		Bamboo(2)	B2	1,034.03					1,034.03 (321.22)								
		Grass land	G	1,254.78					1,254.78 (302.00)								
	Permanent Farmland	Low land Paddy	Lp	0.00													
		Dry Farm land	Df	0.00													
		Orchard	Od	0.00													
	Settlement		Co	0.00													
	Bare land		Br	0.00													
	Water body		W	0.00													
	Total			5,337.28		2,472.39 (1,174.75)	379.57 (42.18)		2,485.32 (623.22)								
Symbiosis Zone	Forest	Man-made Forest	Mf	0.00													
		Natural Forest Primary Mpd1	Mpd1	20.13		20.13 (20.13)											
		Mpd2	Mpd2	20.49		4.00 (4.00)		16.49									
		Mpd3	Mpd3	107.00		100.06 (100.06)		6.94									
		Mpd4	Mpd4	112.32		32.00 (32.00)		80.32									
		Secondary Msd1	Msd1	0.01									0.01				
		Msd2	Msd2	148.65		53.05 (24.33)							95.60				
		Msd3	Msd3	1,173.98		150.01 (150.01)		1,023.97									
		Msd4	Msd4	2,302.47		492.00 (492.00)		1,810.47									
		Bamboo Forest(1)	BI	12.23		12.09 (12.09)				0.14							
		Shrub land	S	0.00													
	S/B Site & Former S/B Site	Slash and Burn Site	My	430.26					83.14 (18.14)			45.00	292.12				
		Bush	Bh	1,573.99			270.91 (97.91)					146.00	1,157.08				
		Bamboo(2)	B2	1,823.30					405.29 (405.29)		1,418.01						
		Grass land	G	713.47					189.49 (43.49)				523.98				
	Permanent Farmland	Low land Paddy	Lp	72.17											72.17		
		Dry Farm land	Df	0.00													
		Orchard	Od	0.14											0.14		
	Settlement		Co	6.06												6.06	
	Bare land		Br	51.98								8.00	43.98				27.19
	Water body		W	27.19													
	Total			8,595.76		863.34 (434.62)	270.91 (97.91)	2,938.20	687.92 (464.92)	0.14	1,418.01	199.00	2,112.77		72.31	6.06	27.19
Agriculture Zone	Forest	Man-made Forest	Mf	0.00													
		Natural Forest Primary Mpd1	Mpd1	0.00													
		Mpd2	Mpd2	0.00													
		Mpd3	Mpd3	0.00													
		Mpd4	Mpd4	0.79				0.79									
		Secondary Msd1	Msd1	5.40										5.40			
		Msd2	Msd2	2.36										2.36			
		Msd3	Msd3	121.85				121.85									
		Msd4	Msd4	44.95		2.76 (2.76)		42.19									
		Bamboo Forest(1)	BI	4.13						4.13							
		Shrub land	S	30.84			8.76 (8.76)							22.08			
	S/B Site & Former S/B Site	Slash and Burn Site	My	8.67										8.67			
		Bush	Bh	421.30			8.00 (8.00)							413.30			
		Bamboo(2)	B2	14.39							14.39						
		Grass land	G	0.01										0.01			
	Permanent Farmland	Low land Paddy	Lp	827.25											827.25		
		Dry Farm land	Df	11.99											11.99		
		Orchard	Od	5.52											5.52		
	Settlement		Co	214.74												214.74	
	Bare land		Br	28.19										28.19			
	Water body		W	105.41													105.41
	Total			1,847.79		2.76 (2.76)	16.76 (16.76)	164.83		4.13	14.39			480.01	844.76	214.74	105.41

Fig.4-1(3) Landuse Plan(Somboun Area)　　Area: 21,542 ha　　( ) means protection area included

Present Landuse					Landuse Plan												
Land Use Type			Code	Area(ha)	Forest (ha)							Agricultural Land (ha)				Others (ha)	
					Mfc	Mn	Mr	Mu	R	B	BT	Sa	Ag	Fl	Permanent Farmland	Settlement	Waterbody
Forest Zone	Forest	Man-made Forest	Mf	0.00													
		Natural Forest Primary	Npd1	96.63		96.63 (79.63)											
			Npd2	410.98		410.98 (410.98)											
			Npd3	1,280.77		1,280.77 (1,167.25)											
			Npd4	11.04		11.04 (11.04)											
		Secondary	Nsd1	9.07		9.07											
			Nsd2	32.24		32.24 (31.68)											
			Nsd3	229.26		229.26 (89.88)											
			Nsd4	2.77		2.77 (2.42)											
		Bamboo Forest(1)	B1	179.16		179.16 (179.05)											
		Shrub land	S	11.71			11.71 (11.71)										
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	0.29					0.29 (0.29)								
		Bush	Bh	129.14			129.14 (92.64)										
		Bamboo(2)	B2	528.60					528.60 (429.96)								
		Grass land	G	351.91					351.91 (218.14)								
	Permanent Farmland	Low land Paddy	Lp	0.00													
		Dry Farm land	Df	0.00													
		Orchard	Od	0.00													
	Settlement		Co	0.00													
	Bare land		Br	1.23					1.23 0.00								
	Water body		W	0.00													0.00
	Total			3,274.80	0.00	2,251.92 (1,971.93)	140.85 (104.35)	0.00	882.03 (648.37)	0.00	0.00	0.00	0.00	0.00	0.00		
Symbiosis Zone	Forest	Man-made Forest	Mf	7.74	7.74												
		Natural Forest Primary	Npd1	0.00													
			Npd2	0.44				0.44									
			Npd3	277.08		174.68 (174.68)		102.40									
			Npd4	98.11				98.11									
		Secondary	Nsd1	13.86		13.86 (13.86)							7.00	117.34			
			Nsd2	244.95		120.61 (120.00)											
			Nsd3	814.59		367.48 (367.48)		447.11									
			Nsd4	2,190.17		635.80 (635.80)		1,554.37									
		Bamboo Forest(1)	B1	126.40						126.40							
		Shrub land	S	0.00									55.00	728.40			
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	892.55					109.15 (76.15)				312.64	1,719.47			
		Bush	Bh	2,669.11			637.00 (456.00)				2,148.68						
		Bamboo(2)	B2	2,782.37					633.69 (633.69)				189.00	1,676.11			
		Grass land	G	2,782.01					916.90 (660.90)						25.87		
	Permanent Farmland	Low land Paddy	Lp	25.87											3.61		
		Dry Farm land	Df	3.61											6.29		
		Orchard	Od	6.29												112.08	
	Settlement		Co	112.04					26.67 (26.67)				14.00	41.28			
	Bare land		Br	81.95													4,008.20
	Water body		W	4,008.20													4,008.20
	Total			17,137.34	7.74	1,312.43 (1,311.82)	637.00 (456.00)	2,202.43	1,686.41 (1,397.41)	126.40	2,148.68	577.64	6,282.60	0.00	35.77	112.08	4,008.20
Agriculture Zone	Forest	Man-made Forest	Mf	6.54	6.54												
		Natural Forest Primary	Npd1	0.00													
			Npd2	0.00													
			Npd3	0.04				0.04									
			Npd4	0.00													
		Secondary	Nsd1	0.00										0.06			
			Nsd2	0.06													
			Nsd3	14.21				14.21									
			Nsd4	96.79				96.79									
		Bamboo Forest(1)	B1	0.00													
		Shrub land	S	0.00										66.14			
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	66.14										282.16			
		Bush	Bh	282.16							245.47						
		Bamboo(2)	B2	245.47										64.52			
		Grass land	G	64.52											82.28		
	Permanent Farmland	Low land Paddy	Lp	82.28											1.36		
		Dry Farm land	Df	1.36											2.94		
		Orchard	Od	2.94												75.66	
	Settlement		Co	75.66										100.25			
	Bare land		Br	100.25													91.10
	Water body		W	91.10													91.10
	Total			1,129.52	6.54			111.04		0.00	245.47	0.00	0.00	513.13	86.58	75.66	91.10

Fig.4-1(4) Landuse Plan(Sharing Area and Out of Village Area)　　Area: 22,053 ha　　( ) means protection area included

Present Landuse					Landuse Plan													
Land Use Type			Code	Area(ha)	Forest (ha)							Agricultural Land (ha)				Others (ha)		
					Mfc	Mn	Mr	Mu	R	B	Br	Cp	Ag	Fl	Permanent Farmland	Settlement	Waterbody
Forest Zone	Forest	Man-made Forest	Mf	0.00														
		Natural Forest Primary	Npd1	330.93		330.93												
			Npd2	750.03		750.03 (31.06)												
			Npd3	2,577.00		2,577.00 (87.67)												
			Npd4	1,081.40		1,081.40												
		Secondary	Nsd1	1.58		1.58												
			Nsd2	98.51		98.51												
			Nsd3	908.26		908.26 (10.00)												
			Nsd4	317.82		317.82												
		Bamboo Forest(1)	B1	1,086.26		1,086.26 (18.00)												
		Shrub land	S	64.86			64.86 (24.79)											
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	152.81					152.81									
		Bush	Bh	171.42			171.42											
		Bamboo(2)	B2	1,789.56					1,789.56									
		Grass land	G	751.19					751.19 (16.94)									
	Permanent Farmland	Low land Paddy	Lp	0.00														
		Dry Farm land	Df	0.00														
		Orchard	Od	0.00														
	Settlement		Cp	0.00														
	Bare land		Br	0.27					0.27									
	Water body		W	0.00														0.00
	Total			10,081.90	0.00	7,151.79 (146.73)	236.28 (24.79)	0.00	2,693.83 (16.94)	0.00	0.00	0.00	0.00	0.00	0.00			
Symbiosis Zone	Forest	Man-made Forest	Mf	11.95	11.95													
		Natural Forest Primary	Npd1	0.00														
			Npd2	230.65		6.34 (6.34)		224.31										
			Npd3	123.02		6.00 (6.00)		117.02										
			Npd4	71.13				71.13										
		Secondary	Nsd1	11.99										11.99				
			Nsd2	138.94		20.00								118.94				
			Nsd3	897.60		28.00 (28.00)		669.60										
			Nsd4	930.45		255.60 (255.60)		674.85										
		Bamboo Forest(1)	B1	10.27						10.27								
		Shrub land	S	4.63										4.63				
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	506.51					40.00 (8.00)			22.00	444.51					
		Bush	Bh	2,161.73			296.00 (89.00)					248.36	1,617.37					
		Bamboo(2)	B2	1,643.70					83.27 (83.27)		1,560.43							
		Grass land	G	2,331.20					454.00 (76.00)			93.00	1,784.20					
	Permanent Farmland	Low land Paddy	Lp	33.55											33.55			
		Dry Farm land	Df	0.82											0.82			
		Orchard	Od	4.06											4.06			
	Settlement		Cp	5.26												5.26		
	Bare land		Br	64.92					24.69 (21.69)			9.70	30.53					2,145.08
	Water body		W	2,145.08														2,145.08
	Total			11,127.46	11.95	315.94 (295.94)	296.00 (89.00)	1,756.91	601.96 (188.96)	10.27	1,560.43	363.06	4,022.17	0.00	38.43	5.26	2,145.08	
Agriculture Zone	Forest	Man-made Forest	Mf	1.25	1.25													
		Natural Forest Primary	Npd1	0.00														
			Npd2	0.00														
			Npd3	0.00														
			Npd4	0.00														
		Secondary	Nsd1	0.89										0.89				
			Nsd2	3.01										3.01				
			Nsd3	42.80				42.80										
			Nsd4	59.24				59.24										
		Bamboo Forest(1)	B1	0.00														
		Shrub land	S	0.00										39.85				
	S/B Site & Former S/B Site	Slash and Burn Site	Hy	39.85										248.43				
		Bush	Bh	248.43					17.03 (17.03)		119.41			27.51				
		Bamboo(2)	B2	136.44											86.37			
		Grass land	G	27.51											14.84			
	Permanent Farmland	Low land Paddy	Lp	86.37											9.05			
		Dry Farm land	Df	14.84												94.23		
		Orchard	Od	9.05														
	Settlement		Cp	94.23										38.62				40.66
	Bare land		Br	38.62														
	Water body		W	40.66														
	Total			843.19	1.25			102.04	17.03 (17.03)	0.00	119.41	0.00	0.00	258.31	110.26	94.23	40.66	

ANNEX 5

PROJECT PROFILES

Project No.AF

1. TITLE OF PROGRAM — Slope Land Agriculture and Agroforestry

2. TARGET VILLAGES — Twenty-nine villages of which the priority order is shown in the table below.

Village (No.)	(Name)	Multipled points	Area of Agroforestry (Point)	% of Upland Paddy Household at Present (Point)	Note
5-05	Houaypamom	25	5	5	
5-06	Somsanouk	25	5	5	
3-07	Nalao	20	5	4	
5-08	Vangkhi	20	5	4	
5-13	Namphao	20	5	4	
5-07	Nampat	20	4	5	Lao Theung
5-12	Houayxi	20	4	5	
5-10	Taothan	15	3	5	Lao Theung
5-11	Nampath-Tai	15	3	5	Lao Theung
5-14	Phakoub	15	3	5	
3-05	Phonkeo	12	4	3	Lao Sung
3-13	Houaysan	12	3	4	Lao Theung
3-10	Nangeun-Nua	10	2	5	Lao Sung
3-14	Nampath-Nua	10	2	5	Lao Theung
3-03	Namon-Nua	9	3	3	Lao Sung
5-01	Houaymo-Nua	9	3	3	Lao Theung
3-01	Vangmiang	8	4	2	
3-09	Phongnang	6	3	2	
5-02	Houaymo-Tai	6	2	3	
5-09	Phonthong	6	2	3	
5-15	Sivilai	4	1	4	Lao Sung
3-11	Nangeun-Tai	3	1	3	Lao Sung
3-06	Ngiou	2	2	1	
3-12	Vanghua	2	2	1	
5-03	Thahua-Nua	2	1	2	
5-04	Thahua-Tai	2	1	2	
3-02	Namon-Tai	1	1	1	
3-04	Phonsavang	1	1	1	
3-08	Nakhom	1	1	1	
Data Sourse			Land Use Map	SE Base Line Survey	

% of upland paddy HH (%):
Point 1 (<20%), Point 2 (21-40%), Point 3 (41-60%)
Point 4 (61-80%), Point 5 (81-100%)
Area of Agroforestry
Point 1 (<50ha), Point 2 (51-200ha), Point 3 (201-400ha)
Point 4 (401-700ha), Point 5 (701ha<)
Agroforestry area : Secondary Natural Forest(Nsd1,Nsd2), Shrub Land, Hay, Bush, Grass Land, Bare Land
3: Namon Area, 5- : Sonboun Area

3. AGENCIES TO BE INVOLVED — This program will be implemented by the Project in close coordination with the respective village authorities, PAFSO (Vientiane) and DAFOs (Vangvieng and Hinheup).

4. OBJECTIVES — Introduction of farming methods to replace slash and burn cultivation

5. EXPECTED EFFECTS

(1) Reduction of slash and burn cultivation by the introduction of farming on permanent sites

(2) Reduction of excessive labour by means of cultivating land near dwelling places

6. PROJECT COST

The total cost of agroforestry, including nursery development, grazing grass and fencing costs, will be approximately US$ 50,400 for the 29 villages. The total cost of slope land agriculture will be approximately US$ 20,500 for the 29 villages.

Agroforestry

Item	Amount	Cost(kip)	Assumption
Area of Silviagriculture per Village	6 ha		
1. Nursery Management	1 no.	1,333,000	
2. Requried number of pasture grass	84 kg	168,000	Unit price is 2,000kip/kg
3. Requried amount of barbed wire	4000m	760,000	Unit price is 19,000kip/100m
4.Miscellaneous(20%)		452,200	
Total		2,713,200	kip
		1,739	us$
	29villages	78,682,800	kip
		50,438	us$=50,400

Slope Land Agriculture

Item	Amount	Cost(kip)	Assumption
Area of Silviagriculture per Village	6 ha		
1. Requried number of pasture grass	80 kg	160,000	Unit price is 2,000kip/kg
2. Requried amount of barbed wire	4000m	760,000	Unit price is 19,000kip/100m
3. Miscellaneous(20%)		184,000	
Total		1,104,000	kip
		708	us$
	29villages	32,016,000	kip
		20,523	us$=20,500

7. IMPLEMENTATION SCHEDULE In six years (2003-2008)

8. PROJECT DESCRIPTION

The planting of trees under this programme should be understood as an attempt to promote agriculture while utilising the positive effects of trees instead of an attempt to return the subject land to forests in the future. The planned agroforestry consists of two patterns, i.e. silvi-agriculture (combination of trees, including fruit trees and crops) and silvo-pastoral (combination of trees and livestock).

The subject agroforestry sites are shrubland, slash and burn cultivation sites, bush land, grassland, bare land and other sparse secondary natural forests with a slope gradient of between 10° and 25°. Slope land agriculture will be introduced at land in any of the above categories but with a slope gradient of less than 10°.

Demonstration farms for silvi-agriculture, silvo-pastoral and slope land agriculture will be established in each village provided that there is a local demand for such farms as bases for extension activities. The respective sizes of these farms will be 1.2 ha, 2 h and 1.2 ha per participating household. If five households participate, the actual sizes of the farms will be 6 ha, 10 ha and 6 ha respectively.

(1) Silvi-Agriculture

This is a combination of trees and crops. While dry field rice may be an obvious candidate for a suitable crop, the cultivation of pulses, red peppers, tomatoes, cabbages, melons, cassava and/or sweet potatoes is feasible. The cultivation of multiple crops will also be possible by growing vegetables, etc. around rice fields or in the shade of trees. Suitable fruit trees include banana, pineapple, papaia, mango and breadfruit.

As a soil loss prevention measure is required, pasture grass seeds will be sown along the contour lines for a width of 20 cm at 3 m intervals on the slope. The trees for planting will be those of the Leguminosae family which are short and compact and which have a small shaded area to minimise the adverse effects of shading and which also have the added advantage of assisting soil improvement. Once mature, these trees can be used as firewood and their branches and leaves can be used as fodder. Three lines of trees will be planted in a zigzag manner for every five lines of grass. When the subject site is sparse secondary natural forest, useful trees will be kept. Assuming square dry farmland of 100 m × 100 m, the number of trees and quantity of grass seeds required per ha are calculated below.

< Quantity of Required Pasture Grass Seeds >

Number of lines	:	approximately 35 lines
Sowing area	:	100 m × 0.2 m × 35 = 700 m^2
Quantity of seeds	:	14 kg based on 2 kg/100 m^2 approximately 84 kg for 6 ha

< Number of Required Trees >

Number of tree belts	:	seven belts based on one belt per five lines of grass
Planting distance	:	three lines of 2 m apart/belt
Planting tree members	:	(100 m/2 m) × 3 lines × 7 belt = 1,050 (≒ 1,100/ha) • 6,600 trees for 6 ha

The maintenance of farmland as permanent cultivation sites will require the supply of nutrients to the soil. The planting of leguminous trees is one measure to meet this requirement. Although the primary requirement is to make compost, the transportation of compost on a slope constitutes hard work. Gramineae grass growing around farmland will instead be cut and buried on the farmland to act as simple compost. This will not only reduce the adverse impacts of rain but will also supply the soil with the necessary nutrients.

(2) Silvo-Pastoral

Stock raising (particularly cattle) in the Model Area has so far relied on free grazing and households engaged in this practice have high expectations of a high income without the cost of animal feed. In contrast, other households have suffered serious damage as the animals feed on dry field paddy and other crops as well as grass. It will, therefore, be necessary in the future to encourage the ranch system with enclosure fencing.

1) Enclosure Fencing

Naturally grown bamboo and/or trees on mountain land can be used as fencing materials together with barbed wire. However, the need for initial investment and constant repair due to poor durability are disadvantages of this type of fencing. The creation of hedges is proposed here as permanent fencing using such leguminous species as *Gliricidia sepium*. Apart from acting as enclosure fencing, such hedges have the advantage of producing branches and leaves which can be used as fodder. To create hedges, such bamboo as Mai Shoth will firstly be used to make simple fencing, followed by the planting of suitable leguminous species at 70 - 80 cm intervals. Five hundred seedlings will be required per ha.

2) Creation of Shaded Area for Livestock

Small stands will be created on pasture land to allow livestock to avoid scorching sunshine. If small forests already exist in an enclosed area, they will be used for this purpose. One small stand of some 30 trees randomly planted at intervals of approximately 3 m will be created for each 2 - 3 ha. At the early stage of tree growth, it will be necessary to fence off the planted trees to protect them from the cattle.

3) Grassland Improvement

The cultivation of grass on pasture land is important to increase the productivity of livestock raising and, therefore, the introduction of high quality grass is desirable. While the full-scale cultivation of grass requires the use of a bulldozer to till the land, a simpler method which can be employed by local farmers will be used to improve the grass under the Plan in view of the principle of participation by local people.

As the mixed existence of Graminease grass and leguminous grass is desirable for pasture, the seeds of leguminous grass will be sown at grassland dominated by Gramineae grass to improve the grassland quality. Firstly, the Gramineae grass will be moved and holes will be made at 1 m intervals at the planned improvement site using a 15 cm diameter wood pile shaped like a sharpened pencil. Leguminous grass

seeds will then be sown in these holes. Such holes will have a depth of approximately 10 cm and a diameter of approximately 5 cm. The seeds of such leguminous grasses as Alysicarpus will be collected from wild fields for sowing the following year and the amount of seeds collected in this manner should be gradually increased.

(3) Slope Land Agriculture

Gently sloping land with a gradient of less than 10° will be used as permanent farmland. The basic use principles will be the same as those for agroforestry. Pasture grass will be grown to prevent soil loss along the center line, although the line planting of trees on farmland will not be conducted. Because of the gentler gradient, the number of grass planting lines will be slightly lower than in the case of silvi-agriculture. Assuming square farmland of 100 m × 100 m, the quantity of required grass seeds per ha is calculated as follows.

< Quantity of Required Grass Seeds >

Number of lines	:	approximately 33 lines
Sowing area	:	100 m × 0.2 m × 33 = 660 m^2
Quantity of seeds	:	13 kg based on 2 kg/100 m^2 approximately 80 kg for 6 ha

Project No. NF-1

1.	PROJECT TITLE	Charcoal Production
2.	TARGET VILLAGES	This programme will mainly cover villages in the Model Area which are heavily dependent on slash and burn cultivation and which have extensive firewood forests, such as secondary natural forests and bamboo forests, i.e. Nalao, Somsanouk, Houayxi, Taothan, Vangkhi, Namphao.
3.	AGENCIES TO BE INVOLVED	The Project Office will coordinate with the PAFSO, DAFOs and NGOs in field extension work.
4.	OBJECTIVES	Improvement of charcoal making practices and their extension
5.	EXPECTED EFFECTS	(1) Effective use of forest resources (2) Supply of fuel-efficient materials (3) Increase income for farmers (4) Improved cooking environment
6.	PROJECT COSTS	–
7.	IMPLEMENTATION SCHEDULE	In four years (2005-2008)

8. PROGRAMME DESCRIPTION

In Lao PDR, oil and gas are imported while firewood and charcoal are said to generally account for 85% of the total domestic energy consumption. Firewood collected from neighbouring mountain forests and slash and burn cultivation sites in the Model Area is virtually the only fuel for most villages. Although the use of charcoal is not particularly popular in the Model Area, its use by restaurants in such commercial areas as Thahua-Nua and Thahua Thai is an exception. The charcoal used in these areas is produced in the neighbouring Hine Heup District as charcoal making is virtually non-existent in the Model Area. However, secondary forests from which local people obtain firewood are limited and the depletion of forests will be inevitable if the present situation continues.

In order to use forest resources more efficiently, the use of charcoal is recommended as charcoal has a better fuel efficiency than firewood, promising a reduction of the use of resources. In addition, charcoal is suitable for indoor use as it produces less smoke than

firewood, contributing to the health of women who are responsible for cooking. As the marketing of charcoal will be possible not only in the Vangvieng area but also in Vientiane, charcoal can provide a source of cash income for local people. The price of charcoal sold in Hine Heup is 4,000 - 5,000 kip/bag (approximately 40 kg) but the price in Vientiane is as high as 7,000 - 9,000 kip/bag.

There are various charcoal making methods, such as the kiln method, pit method and drum method, etc. The pit method has the advantage of producing inexpensive charcoal due to its easy and simple construction which does not involve much equipment or materials even though the quality of the produced charcoal is inferior to that produced by other methods. The charcoal produced in the neighbouring Hine Heup District is mainly produced by the pit method. Using the pit method to produce a small quantity of charcoal as the initial stage of local charcoal production, it will be possible to stimulate local charcoal consumption. At this stage, charcoal will be produced mainly for home consumption although any surplus can be marketed. When the development of charcoal wood forests has much progressed in the future with the establishment of a system to supply a sufficient quantity of charcoal wood, it may be feasible to plan the fostering of charcoal manufacturers to produce charcoal using the more advanced kiln method. However, the immediate task should be the wide use of the pit method.

The supply of charcoal wood will be made using surplus wood at the time of creating farmland at agroforestry sites and deciduous trees mixed in Bamboo Forests (2) which are emerging at former slash and burn cultivation sites. In view of the fact that Mai Shoth, which is the main species of Bamboo Forests (2), is not particularly useful, the planting of more useful, large diameter bamboo species, such as Mai Phaibaan, should be actively conducted to create superior quality bamboo forests to produce raw materials for bamboo charcoal. As bamboo is fast growing, harvesting will be possible in the fourth year after planting. Accordingly, it should be possible to use existing trees to produce charcoal wood while improving the quality of bamboo forests which will start to provide raw materials for charcoal in the fourth year. Refer to 7.4 - Symbiosis Zone Conservation Plan for the bamboo forest improvement method.

Project No. NF-2

1.	PROJECT TITLE	Bamboo Plantation Programme
2.	TARGET VILLAGES	As the prospect of easily transporting bamboo materials is an important criterion in the selection of the subject sites for bamboo production, the selection priority is given to such villages as Namon-Nua, Nampath-Nua, Houaymo-Nua, Samsanouk, Nampat, Vangkhi, Houayxi and Namphao in view of the extensive distribution of Bamboo Forests (2) near national roads or vehicle roads. In the case of Phonkeo, Nalao, Nangeum-Nua and Nangeum-Tai which are located along their respective village roads planned under the Social Infrastructure Development Plan, the improvement of bamboo forests will be conducted in line with the progress of road construction.
3.	AGENCIES TO BE INVOLVED	The Project Office will coordinate with the PAFSO, DAFOs and NGOs in field extension work.
4.	OBJECTIVES	Improvement of low quality bamboo forests to high quality bamboo forests.
5.	EXPECTED EFFECTS	(1) Production and supply of high quality bamboo (2) Increased income for farmers
6.	PROJECT COSTS	–
7.	IMPLEMENTATION SCHEDULE	In six years (2003-2008)

8. PROJECT DESCRIPTION

Bamboo is a very promising local resource because of its (i) suitability vis-a-vis the natural environment of the Model Area, (ii) ease of cultivation which does not require advanced technologies and (iii) ease of transportation to and marketability in Vientiane which is not far from the Model Area. At present, one bamboo craft factory in Vientiane is closed during the rainy season because of the difficulty of obtaining raw bamboo, in turn caused by poor road access to areas of production. As it will be possible for the Model Area to use National Route 13, the supply of bamboo from roadside bamboo forests will be possible even during the rainy season, assuring supply throughout the year.

The producer price of bamboo is 180 - 300 kip/bamboo in Vientiane while the retail price in the city is 300 - 600 kip/bamboo (1998). As bamboo is easy to plant and tend, it is attractive for farmers. Accordingly, the production of bamboo is planned as part of the plan to produce non wood forest products.

The present bamboo forests along the national road, however, are dominated by such species as Mai Shoth with a low use value (classified as Bamboo Forests (2) in this Study) and it is firstly necessary to improve Bamboo Forests (2) to more useful bamboo forests. In the selection of the subject sites for bamboo forest development, priority will be given to those villages where Bamboo Forests (2) are widely distributed along the national road or vehicle roads to ensure the easy transportation of bamboo materials even during the rainy season. In the case of those villages subject to village road construction under the Social Infrastructure Development Plan (see 7-6), the improvement of bamboo forests will be conducted in line with the progress of road construction. Under this programme, a bamboo forest development group will be established in each of the target villages and these groups will receive seedlings and technical guidance on silviculture.

Feasible species for planting include Mai Phaibaan, Mai Hea and Mai Sanphai and the bamboo forest improvement method is discussed in 7.4.2 (2). An important point in this context is the decision on the bamboo species to be planted, taking the trend of products produced by bamboo craft factories, etc. in Vientiane into consideration.

Efforts will also be made to increase income by means of creating added value in the form of bamboo crafts plus to selling bamboo as only a raw material. There is currently no local producer of bamboo crafts in the Vangvieng area, including the Model Area. The availability of locally produced bamboo materials in the future will make bamboo craftwork a promising side job. The transfer of bamboo craft techniques to volunteers in the subject villages for bamboo forest improvement will be attempted with the assistance of JOCV members with the relevant experience.

Project No. NF-3

1.	PROJECT TITLE	Cardamon Production
2.	TARGET VILLAGES	As cardamon is one of the few sources of cash income for minority ethnic groups, special care is required in that the priority under this project should be given to those villages inhabited by such groups. The priority villages to be selected will be those which have so far been highly dependent on slash and burn cultivation in Lao Sung and Lao Theung. Such priority villages are Nangeun-Nua, Namon-Nua, Phonekeo and Nampath-Nua, in the Namon Area and Taothan, Nampath-Tai, Nampat and Houaymo-Nua, in the Somboun Area. In order to intensify the effects of the project, villages with knowledge of handling cardamon will be given priority.
3.	AGENCIES TO BE INVOLVED	The Project Office will coordinate with the PAFSO and DAFOs.
4.	OBJECTIVES	Increased production of cardamon
5.	EXPECTED EFFECTS	Increased income for farmers (particularly those belonging to minority ethnic groups)
6.	PROJECT COSTS	–
7.	IMPLEMENTATION SCHEDULE	In six years (2003-2008)

8. PROJECT DESCRIPTION

Cardamon is currently traded in Vangvieng albeit in a small quantity, suggesting that the local conditions are suitable for cardamon production. Although the price of commodity crops is significantly affected by market trends, earnings of 765,000 - 1,800,000 kip/ha can be anticipated based on an average unit price of 4,500 kip/kg in 1996, making cardamon an attractive crop for farmers.

The ideal environment to grow cardamon is shady areas under trees on wind-free slope land and the cultivation of cardamon in forests or as part of agroforestry will be promoted. The planting distance wil be 2 - 2.5 m between the lines with a distance of 50 - 60 cm

between the cardamon trees. Three or four rhizomes or seedlings will be planted and, therefore, as many as some 20,000 - 40,000 rhizomes or seedlings will be required per hectare. Large-scale planting will be avoided at the start because of the necessary time and labour to properly cultivate cardamon and also because of the fact that the price is significantly affected by the market situation. Under the programme, cardamon seeds will be distributed using the Village Revolving Fund System Establishment Programme to expand the cultivation of cardamon.

Project No. AP-1

1. TITLE OF PROGRAM — Paddy Seeds Multiplication and Supply System Establishment

2. TARGET VILLAGES — This program will basically cover all the lowland paddy area available in 25 villages in the Model Area. The village selection will be made in accordance with the priority order as decided in Table AP-1-1.

Table AP-1-1 Village Selection Priority for Lowland Paddy Related Programs

Village (No.)	(Name)	Village Selection Priority (Order)	Total Points (Point)	% of L.Paddy HH at Present (Point)	Per Capita Lowland Paddy at Present (Point)	Ave. Yield of L.Paddy (Point)	Cash Income per HH at Present (Point)
Weight of Criteria				4	3	1	2
3-08	Nakhome	1	43	5	5	2	3
3-03	Namon Neua	2	36	5	2	2	4
3-01	Vangmiang	2	36	5	3	1	3
3-06	Ngiou	4	33	5	2	1	3
3-07	Nalao	5	32	4	2	2	4
3-05	Phonekeo	6	29	4	1	2	4
3-11	Nangeun Tay	6	29	4	1	2	4
3-13	Houaysanth	8	28	3	2	2	4
3-12	Vangheua	8	28	5	1	1	2
5-09	Phonethong	10	27	3	1	4	4
3-09	Phone Ngam	10	27	4	1	2	3
5-01	Houay Mo Neua	10	27	4	1	2	3
3-02	Namon Tay	10	27	4	2	1	2
3-10	Nangeun Neua	14	25	2	1	4	5
5-13	Namphao	15	24	3	1	3	3
5-10	Taothan	16	23	2	1	4	4
5-08	Vangkhy	16	23	3	1	2	3
3-04	Phonesavang	16	23	4	1	2	1
3-14	Nampad Neua	19	21	1	1	4	5
5-02	Houay Mo Tay	20	16	2	1	3	1
5-03	Thaheua Neua	21	13	2	0	3	1
5-04	Thaheua Tay	22	11	1	0	5	1
5-11	Nampath Tay	22	11	0	1	0	4
5-06	Somsanouk		10	0	0	0	5
5-12	Houay Xi	24	9	0	1	0	3
5-07	Nampat		8	0	0	0	4
5-15	Sivilay		8	0	0	0	4
5-05	Houay Pamom	25	6	0	0	0	3
5-14	Pha Koub		6	0	0	0	3
Data Sourse				SEBS	PRA	SEBS	SEBS

% of lowland paddy HH (%):
Point 1 (<18%), Point 2 (19-37%), Point 3 (38-55%)
Point 4 (56-74%), Point 5 (75-100%)

Per capita lowland paddy (ha);
Point 1 (<0.15ha), Point 2 (0.16-0.30ha), Point 3 (0.31-0.45ha),
Point 4 (0.46-0.60ha), Point 5 (>0.61ha)

Ave. yield of lowland paddy (ton/ha);
Point 1 (>2.1ton), Point 2 (1.6-2.0ton), Point 3 (1.1-1.5ton),
Point 4 (0.6-1.0ton), Point 5 (<0.5ton)

Cash income per HH (Mil.Kip/HH)
Point 1 (>1.21MKip), Point 2 (0.91-1.20MKip), Point 3 (0.61-0.90MKip),
Point 4 (0.31-0.60MKip), Point 5 (<0.3MKip)

Adopted criteria of the village selection priority have been decided based on the data from socio-economic baseline survey and PRA. They include i) percentage of lowland paddy households among total sample household, ii) per capita lowland paddy area, iii) average yield of lowland paddy, and iv) cash income per household as also shown in Table AP-1-1.

3. AGENCIES TO BE INVOLVED

The Project will coordinate with PAFSO and DAFOs (Vangvieng and Hinheup) in the field extension works, and also coordinate with the Naphok Research and Seed Multiplication Center in technical matters mainly in the selection of paddy varieties and seeds multiplication technics. In addition, close coordination will be prerequisite with Agriculture and Rural Development Project in Vientiane Province (ARDP) in order to learn their experience in similar activities.

4. OBJECTIVES

(1) To establish lowland paddy seeds multiplication and supply system at village level, and
(2) To improve farming practices in use of improved seeds.

5. EXPECTED EFFECTS

Increased and stabilized lowland paddy production and improved self-sufficiency rate of paddy in the Model Area

6. PROJECT COSTS

Direct cost required per village is estimated to be about Kip 77,400 (US$ 50) for one season operation of 0.15 ha seed multiplication farm as shown in Table AP-1-2. Since this program is proposed to be implemented in 25 villages for two seasons, the total

cost is estimated to be Kip 3.87 million (US$ 2,500).

Table AP-1-2 Direct Cost of Seed Multiplication Farm per Village

Item	Amount	Cost (Kip)	Assumption
Area of Seed Farm per Village a/	0.15 ha		500kg/3,500kg unit yield (3.5ton/ha)
1. Requied amount of improved seeds	7.5 kg	3,750	50 kg/ha with Kip 500/kg
2. Required amount of fertilizer	82.5 kg	41,250	550 kg/ha with Kip 500/kg
3. Required amount agro-chemical	0.3 kg	19,500	2kg/ha with Kip 65,000/kg
4. Miscellaneous (20%)		12,900	
Total		77,400	kip
Total in US$		(50	

a/: It is assumed that an average size of seeds farm is to be 0.15 ha for 500kg seeds pr

7. IMPLEMENTATION SCHEDULE Five years(2001-2005) for 25 villages.

8. PROJECT DESCRIPTION

According to the information from ARDP, there is a high potential to increase lowland paddy yield using improved seeds (about 10% increase in the first trail). At present, however, the majority of farmers continuously use paddy seeds from their previous harvest which productivity is low at about 2.0 - 2.5 tons/ha. It is thus needed to disseminate improved lowland paddy seeds to the farmers so as to increase the unit yield in the limited lowland paddy area. Improved lowland paddy seeds are available in the Naphok Research and Seed Multiplication Center in Vientiane Municipality and its branches near the Model Area (e.g. Pakcheng and Salakham Centers).

However, the present extension services undertaken by PAFSO and DAFOs are generally weak not only for seeds dissemination but for other technical services to the farmers due mainly to their financial and human resource limitations. This program is thus formulated aiming at dissemination of improved lowland paddy seeds and seeds multiplication technique to the farmers in the most cost effective manner.

Under this program, farmers interested in paddy seeds multiplication will be insisted to organize themselves into a seed multiplication group in each target village. The Project will make survey on their proposed lowland in terms of water availability, frequency of flood damages, soil conditions, locations, etc. After the selection of appropriate plots, the

Project will gratuitously provide, as an incentive, a part of initial cost to the group as shown in Table AP-1-2. The Project will also provide technical training on seeds multiplication to the group. The group members will be responsible for other inputs including farming tools and labor works for seeds multiplication. After the seeds multiplication, the group members will be responsible for the seeds distribution to other lowland farmers. Using the improve seeds, the group members and other lowland paddy farmers are expected to increase their paddy production. The group members will earn additional income by selling their improved seeds. Their income will be spent for the next seeds multiplication. The Project will provide the above mentioned inputs and technical services concentrically for two seasons to the group through periodical farm guidance on farming practices, e.g. land preparation, seed treatment, seeding rate, fertilizer application, weed and pest control, water management, harvesting, threshing and storing. In the third season, the group members are expected to manage their seeds multiplication at self-reliant level.

The expected net income from 0.15 ha seed farm is estimated to be about Kip 125,900 (US$ 81) if labor cost is excluded, as shown in Table AP-1-3 estimated on per hectare basis.

Table AP-1-3 Estimated Net Income (Kip/ha) from Seed Multiplication Farm

Item	Unit	Q'ty	Unit Price (Kip)	Amount (Kip)	Amount (US$)
1. Gross Income per Ha					
Yield	(kg/ha)	3,500	400	1,400,000	897
2. Production Cost per Ha					
1) Seeds	(kg)	50	400	20,000	
2) Land preparation	(Animal-day)	5	12,000	60,000	
3) Fertilizer	(kg)	550	500	275,000	
4) Agro-chemical	(kg)	2.0	65,000	130,000	
5) Labor	(Man-day)	135	2,000	270,000	
6) Miscellaneous (10%)			7,990	75,500	
Total cost				830,500	532
3. Net Income per Ha					
1) With labor cost				569,500	365
2) Without labor cost				839,500	538

Project No. AP-2

1. TITLE OF PROGRAM	Second Cropping Promotion in Lowland Paddy
2. TARGET VILLAGES	This program will basically cover all the lowland paddy area available in 25 villages in the Model Area. The village selection will be made in accordance with the priority order presented in Table AP-1-1.
3. AGENCIES TO BE INVOLVED	The Project will coordinate with PAFSO and DAFOs (Vangvieng and Hinheup) in the field extension works, and also coordinate with the Naphok Research and Seed Multiplication Center (NRSMC) in Vientiane Municipality in technical matters mainly in the selection of crops, crop varieties, and proposed farming practices. In addition, close coordination will be prerequisite with ARDP in order to learn their experience in similar activities.
4. OBJECTIVES	(1) To increase crop intensities of second crops in lowland paddy lands to increase overall land productivity, and (2) To improve farming practices of lowland paddy farmers for better land management.
5. EXPECTED EFFECTS	(1) Increased and stabilized agricultural production and farmer incomes in lowland paddy lands, and (2) Increased supply of second crops both for internal and external markets.
6. PROJECT COSTS	Direct cost required per village is estimated to be Kip 60,000 (US$ 38) for one season operation of 0.5 ha demonstration farm as shown in Table Ap-2-1.

Since this program is proposed to be implemented in 25 villages for two seasons in both Phases, the total cost is estimated to be Kip 3.0 million (US$ 1,923) for Phase 1 and Phase 2, respectively.

Table AP-2-1 Direct Cost of Second Crops Demonstration Farm per Village

Item	Amount	Cost (Kip)	Assumption
Area of Second Crop Demonstration per Village	0.50 ha		5 farmers x 0.1 ha
1. Required amount of seeds	10.0 No.	50,000	Price of soybean seeds
2. Required amount of fertilizer	0.0 kg	0	Application of compost is proposed.
3. Required amount agro-chemical	0.0 kg	0	Appli. of natural insecticide is proposed.
4. Miscellaneous (20%)		10,000	
Total		60,000	kip
Total in US$		(38	

7. IMPLEMENTATION SCHEDULE Promotion of second crops for the local market (2001-2004).
Promotion of second crops for large scale market such as Vientiane(2005-2008).

8. PROJECT DESCRIPTION

At present, the dry season cropping in the lowland paddy is limitedly practiced, although there is a potential to cultivate second crops after paddy using small amount of irrigation water and remaining soil moisture. Under this program, dry season cropping of potential cash crops such as onions, groundnuts, soybeans and leafy vegetables will be promoted through providing of extension services to villagers.

The extension services will basically be provided in a demonstration farm which will be established as a core of second crops development in each target village. For the establishment of demonstration farm and its management, the Project will need to coordinate with NRSMC and ARDP in technical matters, e.g. selection of appropriate farm plots, farmers training on crop selection and cultivation technique. The Project will provide proposed seeds for demonstration purpose for two-year operation of the farm.

The roughly estimated direct cost per season is as shown in Table AP-2-1.

As the first step, farmers interested in second crop cultivation will be organized into a group which will be responsible for operation and management of the demonstration farms. Appropriate plots will be selected in terms of water availability, soil conditions, locations, etc. based on the field survey. Secondly, technical training will be provided to the group members in terms of crop selection, marketing potential and several important techniques for crop cultivation. The above two steps of activities have to be completed before the harvest of wet season paddy. In the third step, the demonstration farm will be established by the group members. Bamboo fences may be needed for all demonstration farms to protect demonstration crops from livestock. In the forth step, farm guidance will be provided periodically to the group members following growing stages of the crops. Through the operation of demonstration farm, the group members are expected to lean about cultivation and marketing technique of second crops, and they are also expected to be key farmers to disseminate their learnt techniques to other village farmers.

Since crop marketing survey was limitedly made in the present study, crop selection for the demonstration farm is proposed to be carried out in due consideration of marketing potential to local markets (including village markets) in the Phase 1 operation. For the Phase 2 operation, the Project is proposed to carry out marketing survey during the Phase 1 period so as to find potential dry season crops for the Vientiane market. In the Phase 2, this program will be repeated in the same 25 villages for new crops demonstration aiming at more large markets, e.g. Vientiane.

Project No. AP-3

1. TITLE OF PROGRAM	Fish Culture Expansion in Lowland Paddy
2. TARGET VILLAGES	This program will basically cover all the lowland paddy area existing in 25 villages in the Model Area. The village selection will be made in accordance with the priority order as shown in Table AP-1-1.
3. AGENCIES TO BE INVOLVED	The Project will coordinate with PAFSO and DAFOs (Vangvieng and Hinheup) in the field extension works, and will also coordinate with the Nam Souang Seed Center (NSSC) in technical matters mainly in the selection of fish and improved farming practices. In addition, close coordination will be prerequisite with ARDP in order to learn their experience in similar activities.
4. OBJECTIVES	To increase fish production in lowland paddy areas to increase overall land productivity.
5. EXPECTED EFFECTS	(1) Increased and stabilized agricultural farmer income in lowland paddy area, and (2) Improved nutrition in rural population.
6. PROJECT COSTS	Direct cost required per village is estimated to be about Kip 108,000 (US$ 69) for one season operation of 0.5 ha demonstration farm as shown in Table AP-3-1. Since this program is proposed to be implemented in 25 villages for two seasons in Phase 1, the total cost is estimated to be Kip 5.4 million (US$ 3,460).

Table AP-3-1 Direct Cost of Fish Culture Demonstration Farm per Village

Item	Amount	Cost (Kip)	Assumption
Area of Second Crop Demonstration per Village	0.50 ha		5 farmers x 0.1 ha
1. Required amount of seeds	500 No.	40,000	Kip 80/ fry both for male and female
2. Materials	L.S.	50,000	Materials required for ridge preparation.
3. Miscellaneous (20%)		18,000	
Total		108,000	kip
Total in US$		(69	

7. IMPLEMENTATION SCHEDULE Five years (2001-2005)

8. PROJECT DESCRIPTION

Although it is practiced in very limited areas at present, the potential for fish culture development is considered to be high in the lowland paddy areas in the Model Area from the following viewpoints:

1) Nearly all lowland paddy lands are irrigated, and controlled water is available at least for wet season cropping of paddy and fishes.
2) Fish catches in Nam Ngum reservoir is of decreasing trend, and accordingly fish marketing prices are increasing in and around the Model Area,
3) In some villages (e.g. Namon-Nua), farmers have already established their technique for fish culture to be applicable to other villages.

It is thus proposed to expand fish culture in the lowland paddy areas by applying readily available technique in the Area. Under this program, the Project will provide some inputs for demonstration farm establishment including fry and training services to farmers.

The steps of the procedure for this program will be similar with those for the another program of Second Cropping Promotion. As the first step, farmers interested in fish culture development will be organized into a group which will be responsible for operation and management of the demonstration farms. Appropriate plots will be selected in terms of water availability, flood damages, locations, etc. based on the field survey. Secondly, technical training will be provided to the group members in terms of fish selection,

marketing potential and several important techniques for fish culture. In the third step, the demonstration farm will be established by the group members. In the forth step, farm guidance will be provided periodically to the group members mainly on water management. Through the operation of demonstration farm, the group members are expected to lean about fish culture, and they are also expected to be key farmers to disseminate their learnt techniques to other village farmers.

Project No. ID-1

1. TITLE OF PROGRAM — Improvement and New Construction of Local Roads

2. TARGET VILLAGES — This program aims mainly to improve the accessibility to the villages in the Namon area. Table ID-1-1 shows the target villages and the activities of the program.

Table ID-1-1 Target Villages and Proposed Local Road Improvement Project

Starting Point	End Point	Local road improvement			Related structure
		Graveling	Upgrading	Construction	
1 R-13 (Namon-Tai)	Namon-Nua	o	-	-	-
2 R-13 (Phonsavang)	Phonkeo	-	-	-	o
3 Phonkeo	Ngiou	-	-	-	o
4 Ngiou	Nalao	-	-	o	o
5 Ngiou - Nalao	Phongnang	-	-	o	o
6 Phongnang	Nanguen-Nua	-	o	-	o
7 Phonkeo	Nakhom	o	-	-	o
8 R-13 (Vanghua)	Nanguen-Tai	-	-	o	o
9 R-13	Houaysan	-	o		o
10 Houaysan	Nanguen-Tai	-	-	o	o
11 Nanguen-Tai	Nanguen-Nua	-	-	o	o

Remark: The works given the mark of "o" will be applied on the point.

3. AGENCIES TO BE INVOLVED — The program will be implemented by the Vientiane Provincial Communication Section of CTPC service under coordination by the Project Office.

4. OBJECTIVES

Project Objective

To improve accessibility to the villages, especially for remote villages from Route 13, in the Namon area.

Overall Objective

To improve the living condition in the area through increase of income generating opportunity.

5. EXPECTED EFFECTS — It is expected to expand the potential of economic activities such as agricultural marketing and cottage industry through improvement of local road condition in the area, and eventually to lift the living condition of the local people up.

6. PROJECT COSTS — Total construction cost for the program is estimated

to be about Kip 1,308.7 million (US$ 838,900), which includes direct construction cost, engineering cost, administration cost, etc. Table ID-1-2 shows its breakdown.

7. IMPLEMENTATION SCHEDULE The program will be implemented for five (5) years I (2001-2005).

8. PROJECT DESCRIPTION

Existing local roads play an very important role for local communication, daily life, farm activities and economic activities, However, the accessibility to the villages in the Namon area is significantly poor. Out of 14 villages in the Namon area, only four (4) villages are located on R-13. Some of them (8 villages) are connected to R-13 through local and either footpath or cart road, and the others (2 villages) have no fixed road connecting to any of the existing local roads / R-13 nor neighboring villages. In addition, shortage or/and deterioration of crossing structures on the local roads worsen the accessibility to these villages. The poor accessibility significantly affects the soci-economic situation in the villages.

It is essential for improvement of living condition of the local people to smooth the present accessibility in the area. The proposed development plan and the future layout of local road network in the Namon area are presented in Table ID-1-3 and Figure 1D-1-1, respectively.

Table ID-1-3 Local Road Plan in the Namon Area

Starting Point	End Point	Graveling	Upgrading	New Road	Bridge	Culvert	Level Crossing
		(km)	(km)	(km)	(nos.)	(nos.)	(nos.)
1 R-13 (Namon-Tai)	Namon-Nua	3.66			0	0	
2 R-13 (Phonsavang)	Phonkeo	-	-	-	0	2	2
3 Phonkeo	Ngiou	-	-	-	0	0	1
4 Ngiou	Nalao			2.00	2	3	0
5 Ngiou - Nalao	Phongnang			3.00	0	7	1
6 Phongnang	Nanguen-Nua		0.30		0	0	1
7 Phonkeo	Nakhom	1.30			0	0	2
8 R-13 (Vanghua)	Nanguen-Tai	-	-	2.80	1	4	3
9 R-13	Houaysan		1.30		0	0	3
10 Houaysan	Nanguen-Tai			2.40	2	5	0
11 Nanguen-Tai	Nanguen-Nua			3.20	4	10	0
		4.96	1.60	13.40	9	31	13

Table ID-1-2 Project Costs for Local Road Improvement

(Unit: Kip 1,000)

	Starting Point	End Point	Gravelling			Upgrading			New Road			Bridge	Bridge	Bridge	Bridge	Culvert			Level Crossing			Total Cost
			Unit Cost	Q'ty (km)	Amount	Unit Cost	Q'ty (km)	Amount	Unit Cost	Q'ty (km)	Amount					Unit Cost	Q'ty (nos.)	Amount	Unit Cost	Q'ty (nos.)	Amount	
1. Direct Construction Cost																						
(1)	R-13 (Namon-Tai)	Namon-Nua	21,500	3.66	78,690																	78,690
(2)	R-13 (Phonsavang)	Phonkeo		-			-			-						1,800	2	3,600	560	2	1,120	4,720
(3)	Phonkeo	Ngiou		-			-			-									560	1	560	560
(4)	Ngiou	Nalao							41,000	2.00	82,000	43,083	20,040			2,450	3	7,350				152,473
(5)	Ngiou - Nalao	Phongnang							41,000	3.00	123,000					2,450	7	17,150	560	1	560	140,710
(6)	Phongnang	Nanguen-Nua				25,000	0.30	7,500											560	1	560	8,060
(7)	Phonkeo	Nakhom	21,500	1.30	27,950														560	2	1,120	29,070
(8)	R-13 (Vanghua)	Nanguen-Tai		-			-		41,000	2.80	114,800	14,740				2,450	4	9,800	560	3	1,680	141,020
(9)	R-13	Houaysan				25,000	1.30	32,500											560	3	1,680	34,180
(10)	Houaysan	Nanguen-Tai							41,000	2.40	98,400	14,740	14,740			2,450	5	12,250				140,130
(11)	Nanguen-Tai	Nanguen-Nua							41,000	3.20	131,200	43,083	20,040	20,040	14,740	2,450	10	24,500				253,603
Sub-total					106,640			40,000			549,400	115,646	54,820	20,040	14,740			74,650			7,280	983,216
2. Engineering Cost (10 % of Direct Cost)					10,664			4,000			54,940	11,565	5,482	2,004	1,474			7,465			728	98,322
3. Administration Cost (10% of (1+2))					11,730			4,400			60,434	12,721	6,030	2,204	1,621			8,212			801	108,154
4. Physical Contingency (10% of (1+2+3))					12,903			4,840			66,477	13,993	6,633	2,425	1,784			9,033			881	118,969
Ground Total					141,938			53,240			731,251	153,925	72,965	26,673	19,619			99,359			9,690	1,308,660

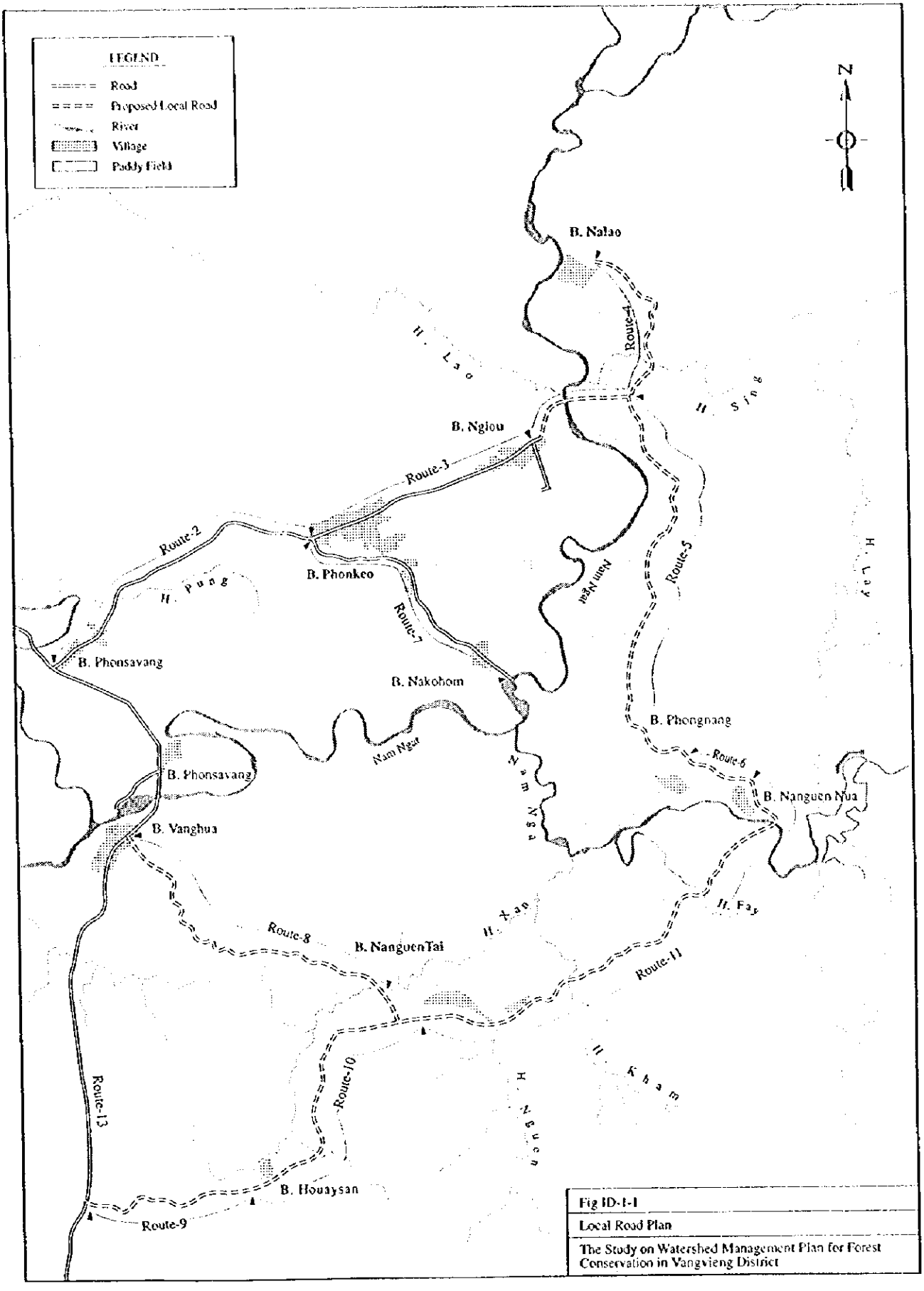


Fig ID-1-1
Local Road Plan
The Study on Watershed Management Plan for Forest Conservation in Vangvieng District

Project No. ID-2

1. TITLE OF PROGRAM

Construction of Rural Domestic Water Supply Facilities

2. TARGET VILLAGES

This program covers 21 villages in the model area, consisting of 8 villages in the Namon area and 13 villages in the Somboun area. The information of the target villages in the model area are shown in Table ID-2-1.

Table ID-2-1 Target Villages in the Model Area

Namon Area			Somboun Area		
Target Village	Households (97)	Population (96)	Target Village	Households (97)	Population (96)
Namon-Tai	140	835	Houaymo-Tai	84	550
Namon-Nua	113	757	Thahua-Nua	165	1,058
Ngiou	44	302	Thahua-Tai	142	829
Nalao	78	475	Houaypamom	195	1,156
Nanguen-Nua	29	193	Somsanuk	177	946
Nanguen-Tai	62	453	Nampat	49	314
Vanghua	151	853	Vangkhi	158	891
Houaysan	31	198	Phonthong	28	156
			Taothan	71	445
			Nampath-Tai	36	230
			Houayxi	65	343
			Namphao	202	1,423
			Phakoup	76	500

3. AGENCIES TO BE INVOLVED

The program will be implemented by the Vientiane Provincial Housing & Urban Cadastral Planning Section of CTPC service under coordination by the Project Office.

4. OBJECTIVES

(1) Project Objective

To ensure supplying domestic water to villagers in the model area by either gravity fed pipe system or dug wells / tube wells.

(2) Overall Objective

To improve the living condition especially of sanitary environment.

5. EXPECTED EFFECTS

Expected effects through implementation of the program are :

- to relieve women and children from daily work of handing domestic water, and
- to improve sanitary environment through selecting suitable water sauce.

6. PROJECT COSTS

Total construction cost for the program is estimated to be about Kip 145.7 million (US$ 93,400), composed of Kip 36.6 million (US$ 23,500) for the Namon area and Kip 109 million (US$ 69,900) for the Somboun area. The detail project cost are presented in Table ID-2-2.

7. IMPLEMENTATION SCHEDULE

The program will be implemented for five (5) years (2000-2004).

8. PROJECT DESCRIPTION

According to the result of PRA, a domestic water supply was ranked at high preference in villagers' needs on social infrastructures. In fact, as shown in Table ID-2-3, most of villages in the model area, especially in Somboun area, are required to improve the water supply system and/or to expand its capacity. As mentioned before, target of the rural water supply program in the Model area is to ensure supplying domestic water to villagers in the area by means of either gravity fed pipe water supply system (the pipe system) or dug wells/shallow tube well.

Where possible, the pipe system is firstly examined in accordance with guidelines of Water Supply and Environmental Sanitation Program, then construction of the wells is considered for the villages where the pipe system is not feasible or not applicable. The pipe system would consist of an intake structure, pipelines, tapstands, soak-pits, valve boxes and tanks such as sedimentation tank, break pressure tank and reservoir tank where necessary. A plan view and key plan of an example system is illustrated in Figure ID-2-1.

Table ID-2-2 Project Costs for Construction of Rural Water Supply Facilities

(Unit: Kip 1,000)

Village Name	Gravity Fed Pipe Water Supply System												Dug wells			Direct Cost	Engin. Cost	Adm. Cost	Physical Conti.	Total Cost
	Main Pipe			Distribution Pipe			Other Material			Installation & Others			Material and Construction							
	Unit cost	Q'ty	Amount	Unit cost	Q'ty	Amount	Unit cost	Q'ty	Amount	Unit cost	Q'ty	Amount	Unit cost	Q'ty	Amount					
Namon Area																				
1 Vangmiang																-				
2 Namon-Tai													940	4 nos	3,760	3,760				
3 Namon-Nua	1,180	0.8 km	944	320	0.4 km	128	181	4 nos	724	ls		359				2,155				
4 Phonsavang																-				
5 Phonkeo																-				
6 Ngiou													940	1 nos	940	940				
7 Nalao													940	5 nos	4,700	4,700				
8 Nakhom																-				
9 Phongnang																-				
10 Nanguen-Nua													940	3 nos	2,820	2,820				
11 Nanguen-Tai													940	6 nos	5,640	5,640				
12 Vanghua													940	5 nos	4,700	4,700				
13 Houaysan													940	3 nos	2,820	2,820				
14 Nampath-Nua																-				
Subtotal			944			128			724			359			25,380	27,535	2,754	3,029	3,332	36,649
Somboun Area																				
1 Houaymo-Nua																-				
2 Houaymo-Tai	1,180	0.9 km	1,062	320	0.5 km	160	181	5 nos	905	ls		425				2,552				
3 Thahua-Nua	1,180	0.7 km	826	320	0.5 km	160	181	17 nos	3,077	ls		813				4,876				
4 Thahua-Tai	1,180	0.8 km	944	320	0.5 km	160	181	14 nos	2,534	ls		728				4,366				
5 Houaypamom	1,180	4.0 km	4,720	320	1.0 km	320	181	20 nos	3,620	ls		1,732				10,392				
6 Somsanuk													940	18 nos	16,920	16,920				
7 Nampat													940	5 nos	4,700	4,700				
8 Vangkhi	1,180	2.6 km	3,068	320	0.5 km	160	181	16 nos	2,896	ls		1,225				7,349				
9 Phonthong													940	3 nos	2,820	2,820				
10 Taothan													940	7 nos	6,580	6,580				
11 Nampath-Tai													940	3 nos	2,820	2,820				
12 Houayxi	1,180	1.6 km	1,888	320	0.5 km	160	181	6 nos	1,086	ls		627				3,761				
13 Namphao	1,180	3.8 km	4,484	320	0.6 km	192	181	12 nos	2,172	ls		1,370				8,218				
14 Phakoup													940	7 nos	6,580	6,580				
15 Sivilai																-				
Subtotal			16,992			1,312			16,290			6,919			40,420	81,933	8,193	9,013	9,914	109,053
Total			17,936			1,440			17,014			7,278			65,800	109,468	10,947	12,041	13,246	145,702

Table ID-2-3 Current Status of Rural Water Supply in the Model Area (1/2)

Village Name	House-hold in '97**	Population in 96**	Current Status of Domestic Water Use							Current Status of Pipe System								Issues
			Pipe System	Well	River	Spring	Others	Well	HH/Well	Water Source		Pipe		Tap		Constructed		
										Name	Dry Season	Material	Condition	Type	No.	(year)	(by)	
	(HH)	(person)	(%)*	(%)*	(%)*	(%)*	(%)*	(nos.)**	(nos.)									
Namon Area 1 Vangmiang	100	598	0	100	0	0	0	9	11	-		-	-	-	-	-	-	During dry season Nam Ngat is used for bathing/washing.
2 Namon-Tai	140	835	0	71	3	0	26	10	14	-		-	-	-	-	-	-	
3 Namon-Nua	113	757	50	46	4	0	5	11	10	Spring	ok	HDP	Good	Stand	1	1997	WSEHP	This pipe system was constructed to improve sanitary condition of the primary school in particular for toilet of the school.
										Stream	ok	Bamboo	Temporary	Drum can	3		Village	
4 Phonsavang	110	640	0	95	0	0	5	28	4	-		-	-	-	-	-	-	
5 Phonkeo	130	996	39	57	4	0	0	6	22	Stream	ok	PVC	Good	Stand	1	1997	Village	3 wells are not available during dry season.
										Stream	ok	PVC	Good	W.Tank	1	1994	Village	
6 Ngiou	44	302	0	100	0	0	0	3	15	-		-	-	-	-	-	-	
7 Nalao	78	475	0	100	0	0	0	2	39	-		-	-	-	-	-	-	Nam Ngat plays an important role for bathing/washing. Survey for pipe system was made by the Health Service in 1995.
																		Nam Ngat plays an important role for bathing/washing.
8 Nakhom	22	107	0	100	0	0	0	2	11	-		-	-	-	-	-	-	
9 Phongnang	26	186	0	100	0	0	0	2	13	-		-	-	-	-	-	-	Nam Nga plays an important role for bathing/washing. Applied for pipe system to Vangvieng office, but not replied yet. Applied one seems to be short of hydraulic head.
10 Nanguen-Nua	29	193	0	0	10	90	0	0	-	Stream	no water	Bamboo	Temporary	Bamboo	1	-	Village	
11 Nanguen-Tai	62	453	0	0	0	12	86	0	-	-		-	-	-	-	-	-	H.Nguen is domestic water source.
																		During dry season, water level of the wells drops about 10 m. Survey for pipe system was made by the Health Service in 1993.
12 Vanghua	151	853	0	91	9	0	0	10	15	-		-	-	-	-	-	-	
13 Houaysan	31	198	0	0	50	50	0	0	-	-		-	-	-	-	-	-	H. Xan Noi is domestic water source.
14 Nampath-Nua	33	186	100	0	0	0	0	0	-	Stream	ok	HDP	Good	Stand	4	1997	CAA	

@ Included in a new district of Hinheup

HDP: High Density Polyethylene Pipe

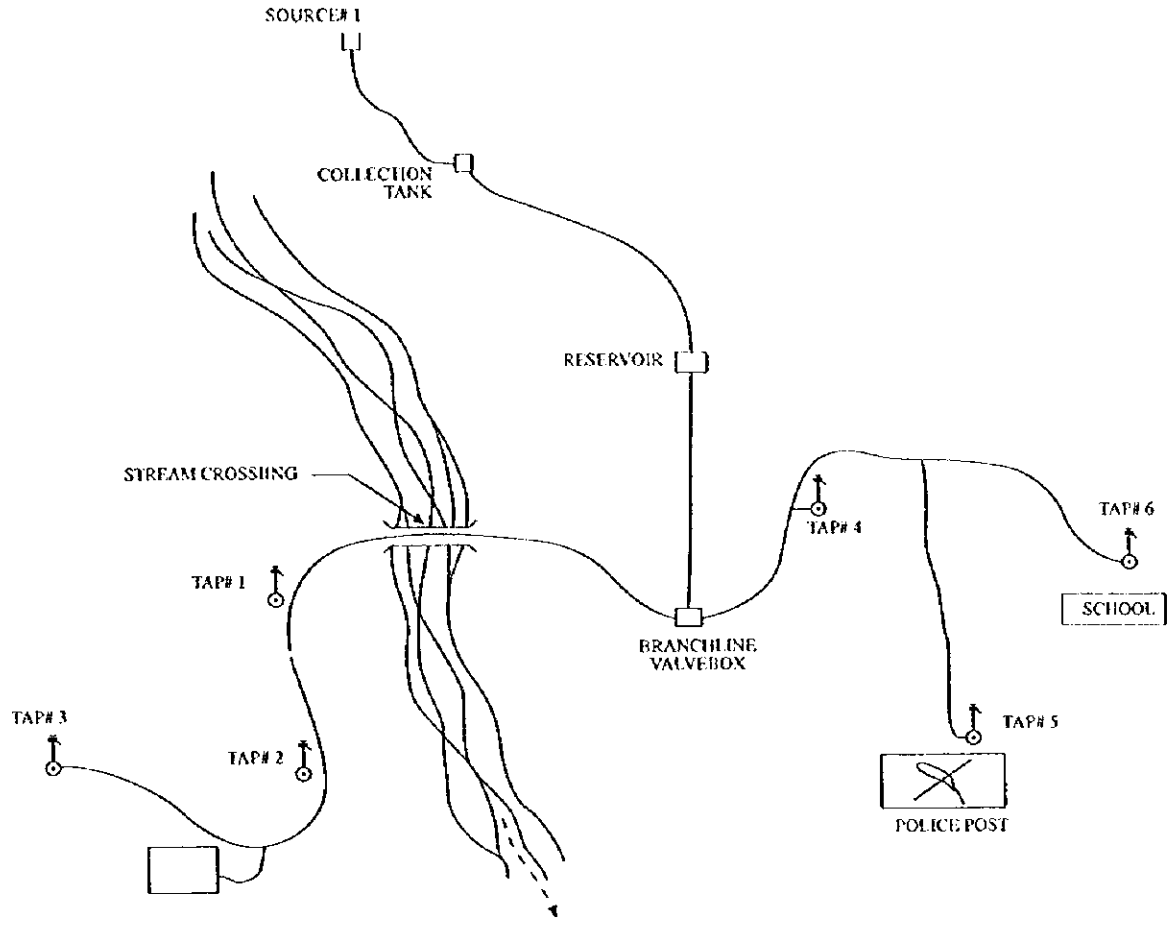
*: Table 5-4-11 of the WATMAP Progress Report

**: Village Profiles, WATMAP Progress Report

Table ID-2-3 Current Status of Rural Water Supply in the Model Area (2/2)

Village Name	House-hold in 97**	Population in 96**	Current Status of Domestic Water Use							Current Status of Pipe System								Issues
			Pipe System	Well	River	Spring	Others	Well	HH/Well	Water Source		Pipe		Tap		Constructed		
	(HH)	(person)	(%)*	(%)*	(%)*	(%)*	(%)*	(nos.)**	(nos.)	Name	Dry Season	Material	Condition	Type	No.	(year)	(by)	
Somboun Area																		
1 Houaymo-Nua	60	319	64	9	0	0	27	0	-	H.Phothao	ok	HDP		Stand	5	1997	WSEHP	
2 Houaymo-Tai	84	550	82	0	6	0	12	0	-	H. Na	ok	HDP		Stand	4	1984	WSEHP	
3 Thahua-Nua	165	1,058	100	0	0	0	0	0	-	H. Na	ok	HDP	short-capacity	Stand	2(3)	1984	WSEHP	In need of increasing capacity. Same pipe system with Houaymo-Tai.
4 Thahua-Tai	142	829	93	0	0	0	7	0	-	H. Na	ok	HDP	short-capacity	Stand	1(4)	1984	WSEHP	In need of increasing capacity. Same pipe system with Houaymo-Tai.
										H. Na	ok			Stand	1		Private	Selling tapped water at Houaymo-Tai.
5 Houaypamom	195	1,156	0	0	78	0	22	0	-	-		-	-	-	-	-	-	Domestic water source is H.Na, H.Thamhoon, H.Thawat and H.Thoksiat. Survey for pipe system was done by the Health Service in 1995.
6 Somsanuk @	177	946	0	0	96	0	4	0	-	-		-	-	-	-	-	-	H. Phamon is domestic water source.
7 Nampat @	49	314	0	9	64	0	27	0	-	-		-	-	-	-	-	-	Nam Pat is domestic water source. Pipe system was proposed to the Health Service in 1995.
8 Vangkhi @	158	891	0	3	68	0	29	1	158	-		-	-	-	-	-	-	H. Phamon is domestic water source. 3 wells with hand pump was constructed under Nam Xon Dam Project.
9 Phonthong @	28	156	0	14	86	0	0	0	-	-		-	-	-	-	-	-	Domestic water source is H.Thaoban & H.Phuumut. Pipe system was proposed to the Health Service in 1996.
10 Taothan @	71	445	0	6	94	0	0	0	-	-		-	-	-	-	-	-	Domestic water source is H. Khum. Survey was made by the Health Service in 1989.
11 Nampath-Tai @	36	230	0	0	50	0	50	0	-	-		-	-	-	-	-	-	
12 Houayxi	65	343	0	0	64	0	36	0	-	-		-	-	-	-	-	-	Proposed pipe system to the Health Service in 1996.
13 Namphao	202	1,423	100	0	0	0	0	0	-	Nam Phao Noy	ok	HDP		Stand/ Pipe	8	1992	WSEHP	
14 Phakoup	76	500	0	0	0	0	100	2	38									
15 Sivilai @	22	158	100	0	0	0	0	0	-	H.Namko uadin	ok	G. Iron	good	Stand	5	1997	UNHCR	

@ Included in a new district of Hinheup



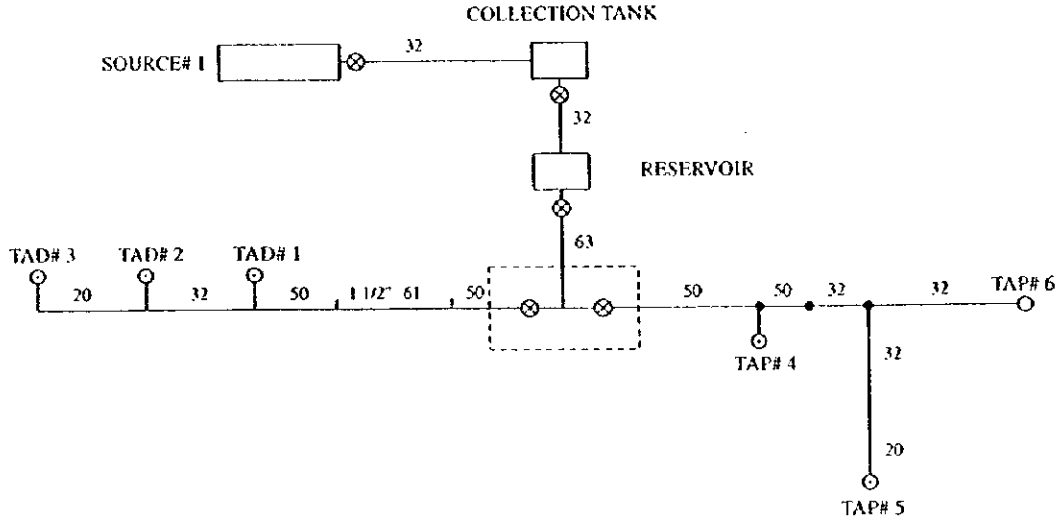


Fig ID-2-1

Plan View & Key Plan of Example System of Gravity Fed Pipe Water Supply

The Study on Watershed Management Plan for Forest Conservation in Vangvieng District

The development plan of the water supply system is formulated in accordance with the design criteria in Table ID-2-4. Preliminary development plan is presented in Table ID-2-5.

Table ID-2-4 Design Criteria of Rural Water Supply Planning

Items of Criteria	Description
(1) Designed river/stream discharge *1	- 6.7 liter/sec/km2
(2) Target population	- 1.25 times of the current population
(3) Water demand per capita	- 45 liter/day
(4) Density of wells/tapstands	- one (1) for each 10 to 15 households.
(5) Others	- For the village with population less than 300, pipe system was not considered due to cost effectiveness.

Remark : *1 It is corresponding to the lowest monthly average water inflow of the second lowest annual inflow to the Nam Ngum reservoir from 1972 through 1989.

Table ID-2-5 Preliminary Development Plan of Water Supply System

Namon Area	Way of Supply	No. of Taps/ Wells	Length of Main Pipe.	Water Source	Somboun Area	Way of Supply	No. of Taps/Wells	Length of Main Pipe.	Water Source
1. Vangmiang	-	-	-	-	1. Houaymo-Nua	-	-	-	-
2. Namon-Tai	Wells *1	4	-	GW	2. Houaymo-Tai	Pipe l. *2	5	0.9	H.Na
3. Namon-Nua	Pipeline	4	0.8	Stream	3. Thahua-Nua	Pipe l. *2	17	0.7	H.Na
4. Phonsavang	-	-	-	-	4. Thahua-Tai	Pipe l. *2	14	0.8	H.Na
5. Phonkeo	-	-	-	-	5. Houaypamom	Pipeline	20	4.0	H. Thawat
6. Ngiou	Wells *1	1	-	GW	6. Somsanuk	Wells	18	-	GW
7. Nalao	Wells *1	5	-	GW	7. Nampat	Wells	5	-	GW
8. Nakhom	-	-	-	-	8. Vangkhi	Pipeline	16	2.6	Stream
9. Phongnang	-	-	-	-	9. Phonthong	Wells	3	-	GW
10. Nanguen-Nua	Wells	3	-	GW	10. Taothan	Wells	7	-	GW
11. Nanguen-Tai	Wells	6	-	GW	11. Nampath-Tai	Wells	3	-	GW
12. Vanghua	Wells *1	5	-	GW	12. Houayxi	Pipeline	6	1.6	Stream
13. Houaysan	Wells	3	-	GW	13. Namphao	Pipe l. *1	12	3.8	Nam Phao Noy
14. Nampath-Nua	-	-	-	-	14. Phakoup	Wells	7	-	GW
					15. Sivilai	-	-	-	-

Remark : *1 Additional installation
*2 Need renovation

To build up the villager's capability for future O&M works and to make the villagers recognize ownership of the facilities, it is recommended that the beneficial villagers will be involved in construction works as a casual labor. This is also expected to increase the villager's income by wages.

Project No. ID-3

1. TITLE OF PROGRAM — Existing Primary School Upgrading

2. TARGET VILLAGES — Out of 29 villages, 24 villages will be under the program, which include 13 villages in the Namon area and 11 villages in the Somboun area. The target villages are shown in Table ID-3-1

Table ID-3-1 Target Villages in the Model Area

Namon Area				Somboun Area			
Target Village	Households (97)	Population (96)		Target Village	Households (97)	Population (96)	
		Total	6-15 yrs			Total	6-15 yrs
1. Vangmiang	100	598	173	2. Houaymo-Tai	84	550	170
2. Namon-Tai	140	835	388	3. Thahua-Nua	165	1,058	301
3. Namon-Nua	113	757	174	4. Thahua-Tai	142	829	282
4. Phonsavang	110	640	167	5. Houaypamom	195	1,156	342
5. Phonkeo	130	996	259	7. Nampat	49	314	111
6. Ngiou	44	302	113	9. Phonthong	28	156	42
7. Nalao	78	475	133	10. Taothan	71	445	143
8. Nakhom	22	107	65	11. Nampath-Tai	36	230	81
9. Phongnang	26	186	46	12. Houayxi	65	343	96
11. Nanguen-Tai	62	453	142	13. Namphao	202	1,423	387
12. Vanghua	151	853	235	14. Phakoup	76	500	106
13. Houaysan	31	198	40				
14. Nampath-Nua	33	186	30				

3. AGENCIES TO BE INVOLVED — The program will be implemented by the provincial office of the Ministry of Education in Vientiane Province, under coordination by the Project Office.

4. OBJECTIVES

(1) Project Objective

To improve educational environment of physical aspect to ensure complete education for children in the model area.

(2) Overall Objective

To encourage the villager's empowerment through improvement of educational level in villagers. Improving the existing primary school building to its national standard level is fundamental need to be fulfilled

5. EXPECTED EFFECTS

The program will give better conditions to both teachers and school children. Those schools would encourage the children to go and continue to go to school more often and continuously, resulting in increasing literacy rate of children.

6. PROJECT COSTS

Total construction cost for the program is estimated to be about Kip 744 million (US$ 477,000), composed of Kip 349 million (US$ 223,500) for the Namon area and Kip 395 million (US$ 253,500) for the Somboun area. The detail project cost are presented in Table ID-3-2.

7. IMPLEMENTATION SCHEDULE

The program will be implemented for five (5) years (2004-2008).

8. PROJECT DESCRIPTION

In the Model area, 27 villages out of the 29 have either a complete 5-year primary school or an incomplete 4-, 3-, 2-year primary school. In the Namon area, 6 villages have the 5-year primary school and in the Somboun area 8 villages have the same. School children of the village which has the incomplete primary school, continue to go to the 5-year school at the neighboring village. Buildings of those primary schools could be classified 9 types by materials used for the buildings, breakdown of which is given in Table ID-3-3 and summarized below:

Table ID-3-3 Classification of Primary School Building

Floor	Walls	Roof	Nos. of Villages
Concrete/bricks	Concrete/bricks	Zinc	4
Concrete/bricks	Wooden board	Zinc	1
Concrete/bricks	not yet	Zinc	2
Concrete/bricks	Bamboo weave	Zinc	7
Earth	Concrete/bricks	Zinc	1
Earth	Wooden board	Zinc	4
Earth	Bamboo weave	Zinc	4
Earth	Bamboo weave	Cleft bamboo	4
No school			2

Table III-3-2 Project Cost for Improvement of the Primary Schools in the Model Area

(Unit of Cost : Kip 1,000)

Village Name	Class room (nos.)	Teacher Room (nos.)	Cost for Improvement: Floor	Walls	Ceiling	Roof	Teacher room	Toilet building	Total Direct Cost	Engineer. Cost	Adm. Cost	Physical Conti.	Total Cost
Namon Area													
1 Vangniang	6		-	-	5,050	-	10,667	1,713	17,430				
2 Namon-Tai	4		-	-	3,367	-	-	3,426	6,793				
	2		-	2,193	1,683	-			3,876				
	2		-	-	1,683	-			1,683				
	3		-	2,936	2,525	-			5,461				
		1	-	-	-	-	842		842				
3 Namon-Nua	4	1	-	3,679	3,367	-	-	-	7,046				
	2		3,207	2,193	1,683	5,050			12,133				
4 Phonsavang	3		-	2,936	2,525	-			5,461				
5 Phonkeo	3		-	2,936	2,525	-	-	-	5,461				
	3		4,809	2,936	2,525	7,575			17,845				
		1	-	-	-	-	10,667		10,667				
6 Ngiou	4		-	3,679	3,367	-	-	1,713	8,759				
	3		-	2,936	2,525	-			5,461				
		1	-	-	-	-	1,939		1,939				
7 Nalao	3		-	2,936	2,525	-	10,667	1,713	17,841				
8 Nakhom	2		3,207	2,193	1,683	-	3,542	1,713	12,338				
9 Phongnang	2		3,207	2,193	1,683	5,050	10,667	1,713	24,513				
10 Nanguen-Nua	-	-	-	-	-	-	-	-	-				
11 Nanguen-Tai	2		3,207	2,193	1,683	5,050	10,667	1,713	24,513				
12 Vanghua	3		-	2,936	2,525	-	-	1,713	7,174				
	4		-	3,679	3,367	-			7,046				
	6		9,619	5,165	5,050	-			19,834				
		1	-	-	-	-	3,542		3,542				
13 Houaysan	1		1,603	1,097	842	2,525	10,667	1,713	18,447				
14 Nampath-Nua	1		1,603	1,097	842	-	10,667	1,713	15,922				
Total Cost of Namon Area									262,027	26,203	28,823	31,705	348,758
Somboun Area													
1 Houaymo-Nua	-	-	-	-	-	-	-	-	-				
2 Houaymo-Tai	6		-	5,165	5,050	15,151	10,667	1,713	37,746				
3 Thahua-Nua	8		-	7,075	-	-	-	1,713	8,788				
4 Thahua-Tai	4		-	-	(Under construction)		-	-	-				
			-	-	(Under construction)		10,667	1,713	12,380				
5 Houaypamom	5		5-class Type Standard new primary school building (Renovation)						52,792				
	3	1											
6 Somsanuk *	1		(New building is under construction)										
	1												
	1												
	1												
	2												
7 Nampai *	2		3-class Type Standard new primary school building (Renovation)						32,962				
8 Vangkhi *	4		-	-	-	-	-	-	-				
	3		-	-	-	-	-	-	-				
	4	2	-	-	-	-	-	-	-				
9 Phontheng *	1		1,603	-	842	-	10,667	1,713	14,825				
10 Taothan *	4		6,413	3,679	3,367	-	10,667	1,713	25,839				
11 Nampath-Tai	1		1,603	1,097	842	-	10,667	1,713	15,922				
12 Houayxi	3		4,809	-	2,525	-	10,667	1,713	19,714				
13 Namphao	6		9,619	-	5,050	-	21,334	5,139	41,142				
	4		6,413	-	3,367	-			9,780				
	3		4,809	2,936	2,525	7,575			17,845				
14 Phakoup	?		4,809	-	2,525	-	-	-	7,334				
15 Sivilai *	3	1	-	-	-	-	-	-	-				
Total Cost of Somboun Area									297,069	29,707	32,678	35,945	395,399
Ground Total									559,096	55,910	61,501	67,651	744,157

Remarks : * **: Village profiles, WTMAP Progress Report

Educational conditions in the Model area would be improved through upgrading the existing primary schools to the national standard level, for which reference will be made to the drawings for standard primary school applied by the Ministry of Education. The standard primary school is of class rooms, a store, a teacher room, a meeting room and a toilet building with a septic tank. Water supply facility would be provided as much as possible for sanitary purpose.

Preliminary development plan of the primary school is presented in Table ID-3-4. In the development plan, 25 school buildings will be upgraded, 2 in Houaypamon and Nampat villages will be renovated completely, because those school buildings are very temporary and have been totally aged.

Table III-3-4 Improvement Plan of the Primary Schools in the Model Area

Village Name	6 - 15 yrs (person)	School children (person)	Existing Primary School: Grade (year)	Class room (nos.)	Teacher Room (nos.)	Proposed Improvement Plan of Primary School Building: Floor	Walls	Ceiling	Roof	Teacher room	Toilet building	Water Supply
Namon Area												
1 Vanginiang	173	179	5	6		-	-	Plywood	-	1	1	1 Well
2 Namon-Tai	358	248	5	4		-	-	Plywood	-	-	2	1 Well
				2		-	Brick	Plywood	-			
				2		-	-	Plywood	-			
				3		-	Brick	Plywood	-			
					1	-	-	Plywood	-			
3 Namon-Nua	174	190	5	4	1	-	Brick	Plywood	-	-	-	-
				2		Concrete	Brick	Plywood	Asbest Cem.			
4 Phonsavang	167	130	3	3		-	Brick	Plywood	-			
5 Phonkeo	259	213	5	3		-	Brick	Plywood	-	-	-	1 Well
				3		Concrete	Brick	Plywood	Asbest Cem.			
					1	Concrete	Brick	Plywood	Asbest Cem.			
6 Ngiou	113	146	5	4		-	Brick	Plywood	-	-	1	1 Well
				3		-	Brick	Plywood	-			
					1	-	Brick	Plywood	-			
7 Nalao	133	79	3	3		-	Brick	Plywood	-	1	1	1 Well
8 Nakhom	65	16	2	2		Concrete	Brick	Plywood	-	1	1	1 Well
9 Phongnang	46	49	3	2		Concrete	Brick	Plywood	Asbest Cem.	1	1	1 Well
10 Nanguen-Nua	32	40	-	-	-	-	-	-	-	-	-	-
11 Nanguen-Tai	142	35	2	2		Concrete	Brick	Plywood	Asbest Cem.	1	1	1 Well
12 Vanghua	235	323	5	3		-	Brick	Plywood	-	-	2	1 Well
				4		-	Brick	Plywood	-			
				6		Concrete	Brick	Plywood	-			
					1	Concrete	Brick	Plywood	-			
13 Houaysan	40	24	2	1		Concrete	Brick	Plywood	Asbest Cem.	1	1	1 Well
14 Nampath-Nua	30	34	2	1		Concrete	Brick	Plywood	-	1	1	1 Tapstand
Somboun Area												
1 Houaymo-Nua	92	72	-	-	-	-	-	-	-	-	-	-
2 Houaymo-Tai	170	158	5	6		-	Brick	Plywood	Asbest Ce.	1	1	Tapstand
3 Thahua-Nua	301	260	5	8		-	Brick	-	-	-	1	-
4 Thahua-Tai	282	218	5	4		-	-	(Under construction)	-	-	-	-
						-	-	(Under construction)		1	1	
5 Houaypamom	342	202	5	5		5-class Type Standard new primary school building (Renovation)						Tapstand
				3	1							
6 Somsanuk *	259	210	5	1		(New building is under construction)						
				1								
				1								
				1								
				2								
7 Nampat *	111	100	2	2		3-class Type Standard new primary school building (Renovation)						
8 Vangkhi *	215	267	5	4		-	-	-	-	-	-	-
				3		-	-	-	-	-	-	-
				4	2	-	-	-	-	-	-	-
9 Phonthong *	42	18	2	1		Concrete	-	Plywood	-	1	1	-
10 Taothan *	143	147	4	4		Concrete	Brick	Plywood	-	1	1	-
11 Nampath-Tai	81	36	2	1		Concrete	Brick	Plywood	-	1	1	-
12 Houayxi	96	84	4	3		Concrete	-	Plywood	-	1	1	-
13 Namphao	387	393	5	6		Concrete	-	Plywood	-	2	3	2 Tapstands
				4		Concrete	-	Plywood	-			
				3		Concrete	Brick	Plywood	Asbest Cem.			
14 Phakoup	106	107	5	?		Concrete	-	Plywood	-	-	-	-
15 Sivilai *	51	68	3	3	1	-	-	-	-	-	-	-

Remarks : * **: Village profiles, WTMAP Progress Report

Project No.LS-1

1. TITLE OF PROGRAM	Land-Forest Allocation Program
2. TARGET VILLAGES	All 29 villages in the Model Area, giving priority to the ones covered by the proposed agro-forestry development program.
3. AGENCIES TO BE INVOLVED	This program will basically be implemented by PAFSO (Vientiane) and DAFOs (Vangvieng and Hinheup) in close coordination with the District Chief's Offices in Vangvieng and Hinheup. The Project will financially and technically assist the program.
4. OBJECTIVES	To establish clear village boundaries and allocate tenure rights of forest and forest land to village communities and individuals who have no permanent land.
5. EXPECTED EFFECTS	(1) Reduced slash and burn cultivation area through conversion of production system into a permanent land, and (2) Preserved forest lands and conserved watershed environment.
6. PROJECT COSTS	Kip 18.1 million (US$ 11,600) for 29 villages. (see para. 8 below)
7. IMPLEMENTATION SCHEDULE	All the steps of the program are proposed to be completed in 29 villages in early stage(2000-2004) .(see Para. 8 below).

8. PROJECT DESCRIPTION

The results of PRA showed that the ambiguity of village boundaries and land tenure is one of the most important causes of the watershed degradation. Thus, clear village boundaries and land tenure should be established by carrying out the Land-Forest Allocation Program which is under implementation by the Lao PDR government, but still not implemented in the Model Area. Under the program, the government survey teams composed of PAFO and DAFO staff will be dispatched to the villages. Each team will decide the village boundary and objective forest land for its allocation to households who are non-owner cultivators of permanent farm land. This program will be carried out in participatory manner in each village.

The general steps of the program in each village will be as follows:

1) Step 1 (preparation); data collection, survey team establishment, detailed planning, materials and equipment arrangement including maps and aerial photos, etc.,
2) Step 2 (consultation with village); explanation of the program, scheduling with villagers, etc.,
3) Step 3 (data collection); working team establishment together with villagers, review of the PRA and SEBS results with village authorities and villagers including village boundaries and land use, etc.,
4) Step 4 (village meeting); determination of village boundaries and land -forest allocation within the village,
5) Step 5 (actual field measurement); field measurement with villagers,
6) Step 6 (conclusion); development of draft rule for each type of land, providing temporary land management permit certificate to each family, writing up contract for land-forest allocation committee of the district and village authority and families depending on the land type, setting up production groups and conservation groups within the village,
7) Step 7 (extension); providing extension services from DAFOs and other relevant agencies to ensure the production in allocated lands,
8) Step 8 (monitoring and evaluation); monitoring and evaluation of land utilization of each family for 3 years, issuing land registration and permanent ownership title in

accordance with the law.

The cost of the program is about US$ 200 (Kip 312,000) per village for the steps from one to six according to the information from DOF. The cost for the total program from step one to eight is estimated to be US$ 400 (Kip 624,000) which is double of the required amount for the step one to six. For the execution, the results of PRA and scio-economic baseline survey (SEBS) will be of great use in reduction of cost and time required for the program, because village boundaries and land use plan clarified with the villagers are all available for 29 villages in the Model Area.

Project No.LS-2

1. PROJECT TITLE	Village Revolving Fund System Establishment
2. TARGET VILLAGES	All 29 villages in the Model Area, giving priority to the ones covered by the proposed agro-forestry development program.
3. AGENCIES TO BE INVOLVED	This program will basically be implemented by the Project in close coordination with the Agriculture Promotion Bank (APB) in Vangvieng and PAFSO (Vientiane) and DAFOs (Vangvieng and Hinheup). In addition, coordination will be needed with ARDP in order to learn their experience in similar activities.
4. OBJECTIVES	To establish a sustainable supply system of loans at village level to fulfil the villagers needs in investment and production loans for the proposed income generation programs particularly for agro-forestry development.
5. EXPECTED EFFECTS	(1) Improved production system in agriculture including livestock, fishery and forestry with proper supply of investment and production loans to the farmers, and (2) Increased and stabilized agricultural production.
6. PROJECT COSTS	Cost of the program is roughly estimated to be about Kip 22.62million(US$14,500).
7. IMPLEMENTATION SCHEDULE	In accordance with the proposed implementation schedule of agro-forestry development programs.

8. PROJECT DESCRIPTION

This program has basically been formulated to support the proposed agro-forestry development programs by providing financial assistance to villagers through establishment of a new revolving fund system at the village level. This is because of insufficiency of villagers' funds for investment and production. Moreover, their capacity usually doesn't meet the requirement of institutional credit facilities provided by APB (which generally requires collateral, most often in the form of land or housing). This program will not support villagers whose capacity will meet the APB's requirement. For such persons, the Project will suggest to make an application to APB for loan.

Under the program, a village organization responsible for the management of revolving fund system will firstly be established in each village. A village chief or an other capable person will be a head of the organization. Other management staff, such as a deputy head, accountant and deputy accountant will be appointed among villagers. In addition, two auditors will be appointed to audit the fund/loan management of the organization. They will consist of a selected capable person among villagers and a selected DAFO staff. After the selection of management staff, the Project will train them in revolving loan system management in detail.

The initial fund of the organization will be provided by the Project, may be in kind based on the requirement of villagers for the development of agro-forestry. Since the loan repayment performance is better in group loans than individual loans according to the information from APB, Vangvieng, the group loan system is proposed to be introduced to this revolving fund system. The village revolving fund organization will make contract with the production groups based on loan conditions which will be decided in consultation with the Project. During the operation stage of the proposed agro-forestry development programs, the Project will continuously provide technical assistance both to the village revolving fund organization and production groups in financial and production management. The production group should repay the initial fund from their benefit to be derived from their new project. The repaid fund will be provided again to another group(s) who need the investment and/or production for their programs.

Project No.LS-3

1. TITLE OF PROGRAM — Weaving Entrepreneurship Development

2. TARGET VILLAGES — This program will cover all 29 villages in accordance with the village selection priority as shown in Table LS-3-1.

Table LS-3-1 Village Selection Priority for Weaving Entrepreneurship Development

Village (No.)	(Name)	Village Selection Priority (Order)	Total Points (Point)	% of Upland Paddy HH at Present (Point)	Operated S&B Land per HH at Present (Point)	Importance of Income from Handicraft (Point)	Unit Yield of S&B Paddy at Present (Point)	Cash Income per HH at Present (Point)
Weight of Criteria				5	3	4	2	1
5-05	Houay Pamom	1	61	5	3	5	2	3
5-06	Somsanouk	2	57	5	5	2	2	5
5-10	Taothan	3	51	5	4	1	3	4
3-13	Houaysanth	4	48	4	2	2	5	4
5-14	Pha Koub	5	47	5	3	1	3	3
5-15	Sivilay	6	44	4	4	0	4	4
5-07	Nampat	6	44	5	3	1	1	4
5-12	Houay Xi	6	44	5	2	1	3	3
5-11	Nampath Tay	9	43	5	2	1	2	4
5-09	Phonethong	10	42	3	5	0	4	4
3-12	Vangheua	11	40	1	1	5	5	2
5-13	Namphao	12	39	4	2	1	3	3
3-10	Nangeun Neua	13	38	5	2	0	1	5
3-14	Nampad Neua	14	37	5	1	0	2	5
5-08	Vangkhy	14	37	4	2	1	2	3
3-07	Nalao	16	35	4	1	1	2	4
3-06	Ngiou	16	35	1	1	4	4	3
5-01	Houay Mo Neua	18	34	3	2	1	3	3
5-04	Thaheua Tay	19	32	2	3	2	2	1
3-11	Nangeun Tay	20	31	3	2	0	3	4
5-02	Houay Mo Tay	21	29	3	1	1	3	1
3-03	Namon Neua	22	28	3	1	0	3	4
3-05	Phonekeo	22	28	3	1	0	3	4
3-01	Vangmiang	22	28	2	1	1	4	3
5-03	Thaheua Neua	25	27	2	2	1	3	1
3-08	Nakhome	26	25	1	1	1	5	3
3-09	Phone Ngam	27	24	2	1	0	4	3
3-02	Namon Tay	27	24	1	1	1	5	2
3-04	Phonesavang	29	23	1	1	1	5	1
Data Sourse				SEBS	SEBS	SEBS	SEBS	SEBS

% of upland paddy HH (%):
Point 1 (<20%), Point 2 (21-40%), Point 3 (41-60%)
Point 4 (61-80%), Point 5 (81-100%)
Operated S&B per HH at present (ha/HH):
Point 1 (<0.77ha), Point 2 (0.78-1.05ha), Point 3 (1.06-1.33 ha),
Point 4 (1.34-1.61 ha), Point 5 (>1.62 ha)
Importance of income from Handicraft (score)
Point 1 (<14), Point 2 (15-29), Point 3 (30-44),
Point 4 (45-59), Point 5 (>60)
Unit yield of slash and burn paddy (t/ha):
Point 1 (>1049 kg), Point 2 (787-1048kg), Point 3 (525-786kg),
Point 4 (263-524kg), Point 5 (<262kg)
Cash income per HH at present (000Kip/HH):
Point 1 (>1201Kip), Point 2 (901-1200Kip), Point 3 (601-900Kip),
Point 4 (301-600Kip), Point 5 (<300Kip)

The village selection priority has been decided based on the following criteria:

i) Villages with larger proportion of slash and burn cultivators,

ii) Villages in which larger number of villagers consider that handicraft is the important income source, and

iii) Villages having wider per capita slash and burn cultivation area,

iv) Villages with lower yield of slash and burn paddy,

v) Villages having smaller average cash income.

3. AGENCIES TO BE INVOLVED

The Project will coordinate with the district offices of Industry-Handicrafts and Women's Unions (both in Vangvieng and Hinheup) in operation of this program.

4. OBJECTIVES

(1) To develop weaving entrepreneurship at village level to produce high quality weave products having a marketing competitiveness,

(2) To improve weavers' ability to manage their weaving industry in various activities, e.g. quality control, accounting, and marketing.

5. EXPECTED EFFECTS

(1) Increased cash income of women from weaving, and

(2) Improved vocational skills of women in wider activities relevant to weaving.

6. PROJECT COSTS

The cost of training of trainers mentioned below will be Kip 22.6 million (US$ 14,500) for 29 leader

weavers from 29 villages.

7. IMPLEMENTATION SCHEDULE In five years(2000-2004)

8. PROJECT DESCRIPTION

Weaving is of women's work and brings considerable amount of cash income to many households in the villages. In general, however, quality of weave products is low and farm-gate prices are also low. In the present village weaving system, contractors/traders play an important role. They usually supply necessary materials and information on designs and pattern details to their weavers, and responsible for the marketing. Accordingly, all weavers generally produce similar products which quality is usually low, and the prices are not competitive among villagers/ weavers.

Under the program, training of trainers will be provided. In the first step, selected leader weavers will be trained at the Nikon Handi Craft (in Vientiane) or at the Reforestation Center. In case of the Reforestation Center, a certain arrangement will be necessary for proper management of the training courses asking assistance to the Nikon Handi Craft. One potential weaver will basically be selected from one village following the above mentioned priority order. Training courses will cover several fields including the quality control, marketing and accounting ability improvement, and village training technique. In the second step, each leader weaver will train other weavers in her village after the training.

The Nikon Handi Craft has a capacity to provide one month training for 6 persons per month with a cost of US$ 500/person/month (in which food and lodging are also included). The cost of the program is estimated based on this amount of unit cost.

Project No.LS-4

1. TITLE OF PROGRAM	Skill-Based Non-Formal Education
2. TARGET VILLAGES	All 29 villages in the Model Area giving priority to the ones covered by the proposed agro-forestry development program.
3. AGENCIES TO BE INVOLVED	This program will be implemented by the Project in close coordination with the respective village authorities and the District Education Offices in Vangvieng and Hinheup.
4. OBJECTIVES	(1) To provide non-formal education particularly for women whose illiteracy rate is considerably high, (2) To improve women's management skills in village development activities.
5. EXPECTED EFFECTS	(1) Increased adult literacy rate particularly of women, and (2) Improved technical skills of women in management of village level small project.
6. PROJECT COSTS	Kip 2.7 million (US$ 1,740) for 29 villages.
7. IMPLEMENTATION SCHEDULE	In five years(2000-2004)

8. PROJECT DESCRIPTION

In the Model Area, there are many drop-out children from the primary schools and people who never went to school. The results of SEBS show that about 65% of economically active female population and 38% of economically active male population are non-educated

and/or drop-outers from primary schools, suggesting a higher illiteracy rate of women comparing to men.

Under this program, villagers interested in attending literacy class will be organized into a group. Majority of group members are expected to be women, because of their higher illiterate rate. Teaching on writing and reading will be made by selected villagers or school teachers on voluntary basis using materials to be provided by the Project. As an incentive, the Project will provide several training courses to the group members beside the literacy class. As one of the most important training courses, improved cookstove making is proposed to be undertaken by the program as described in the profile of No. LS-5. As an alternative, training on home garden management is also proposed to be taken into account in order to improve nutrition level of villagers through cultivation of beans, vegetables, fruits trees and medicinal herbal plants more intensively.

Project No.LS-5

1. TITLE OF PROGRAM	Improved Cookstove Dissemination
2. TARGET VILLAGES	All 29 villages in the Model Area giving priority to the ones covered by the proposed agro-forestry development program.
3. AGENCIES TO BE INVOLVED	This program will be implemented by the Project in close coordination with the respective village authorities, PAFSO (Vientiane) and DAFOs (Vangvieng and Hinheup). Since this program will be implemented together with the Skill-Based Non-Formal Education (No. LS-4), coordination with the District Education Offices in two districts will also be needed.
4. OBJECTIVES	To introduce improved cookstove to the villages and expand its utilization among villagers.
5. EXPECTED EFFECTS	(1) Reduced consumption of fuelwood and increased potential for forest conservation, (2) Lightened villagers' work load in fuelwood collection, and (3) Decreased respiratory diseases due to smog.
6. PROJECT COSTS	Kip 2.7 million (US$ 1,740) for 29 villages.
7. IMPLEMENTATION SCHEDULE	In course of the implementation of Skill-Based Non-Formal Education (LS-5)

8. PROJECT DESCRIPTION

This program has been formulated as the one to support the Skill-Based Non-Formal Education (LS-5). However, this program alone can be promoted in villages having higher potential for the development (may be in availability of materials) and expectation of villagers' participation.

Under the program, training on how to make an improved cookstove using locally available materials will be provided giving priority to the members of literacy class group. It is said that the improved stove save fuelwood consumption about 30% comparing to that in traditional one. The group will make the stoves and sell them to other villagers. A profit to be obtained from the sale of stoves will be spent for purchasing of materials required for the operation of literacy class, e.g. textbook, notebook and pencil. In Phase 2, the literacy class is expected to be operational on sustainable basis covering all the costs including remuneration of teachers.

Project No. LS-6

1. TITLE OF PROGRAM — School Forest Establishment

2. TARGET VILLAGES — The program will cover 12 villages each of which has a complete primary school, giving priority to the ones covered by the proposed agro-forestry development program. These villages are listed as shown in Table LS-6-1.

Table LS-6-1 List of Village with Complete Primary School

(No.)	Village No.	Village Name	(No.)	Village No.	Village Name
	Namon Area			Somboun Area	
1	3-1	Vangmiang	6	5-2	Houaymo-Tai
2	3-2	Namon-Tai	7	5-4	Thahua-Tai
3	3-3	Namon-Nua	8	5-5	Houaypamom
4	3-6	Ngiou	9	5-6	Somsanouk
5	3-12	Vanghua	10	5-8	Vangkhi
			11	5-13	Namphao
			12	5-14	Phakoup

3. AGENCIES TO BE INVOLVED — This program will be implemented by the Project in close coordination with PAFSO, DAFOs, the District Education Offices in Vangvieng and Hinheup, and the Hinheup Research Station which is responsible for researches on fruit trees.

4. OBJECTIVES — To enlighten school children on the importance of forests, and educate them in proper forest management.

5. EXPECTED EFFECTS
(1) Improved consciousness of forest conservation among children and their parents, and
(2) Activated village level forest management.

6. PROJECT COSTS

About Kip 12.3 million (US$ 7,880) for 12 villages; The cost required for each village is estimated to be Kip 1,024,800 (US$ 657) for an assumed size of 1.0 ha school forest as shown in Table LS-6-2.

Table LS-6-2 Direct Cost of School Forest Establishment

Item	Amount	Cost (Kip)	Assumption
Area of School Forest per Village	1.00 ha		
1. Required number of seedlings a/	2,500 No.	-	Including forest and fruit trees
2. Required amount of barbed wire	1,600 m	304,000	Unit price is 19,000 kip/100m
3. Farming tools	L.S.	550,000	Shovel, hoe, sickle, etc.
4. Miscellaneous (20%)		170,800	
Total		1,024,800	kip
Total in US$		(657	

a/: Seedlings will be provided from nursery established by the Project.

7. IMPLEMENTATION SCHEDULE In five years(2003-2007)

8. PROJECT DESCRIPTION

This program is proposed to be carried out as one of environmental education programs mainly for primary school pupils. Under the program, the school forest will be established for each complete primary school which has classes from first to fifth year students. The Project will provide materials required for the forest establishment including seedlings, barbed wires and farming tools. School pupils and their parents will be responsible for labor works for the establishment, and for the management after the establishment. The technical assistance will also be provided by the Project not only for tree planting technique but for the forest management through periodical visit to the schools/ school forests. The school pupils and their parents are expected to learn the importance of trees and forest through management of the forest. In addition, it is expected that they learn some techniques for recovery of degraded forests existing in and around the villages. Timber to be produced in the forests (after about 20 years later) will possibly be utilized for school renovation, and fruits will possibly be consumed among the pupils or sold out for cash income also for the school renovation.

Project No.LS-7

1.	TITLE OF PROGRAM	Bamboo Crafts Promotion
2.	TARGET VILLAGES	This programme will commence with villages where the Bamboo Plantation Programme is implemented, i.e. Namon-Nua, Nampath-Nua, Houaymo-Nua, Somsanouk, Nampat, Vangkhi, Houayxi, Namphao, Phonkeo, Nalao, Nangeun-Nua and Nangeun-Tai.
3.	AGENCIES TO BE INVOLVED	This programme will be implemented by the Project Office in close coordination with the respective village authorities, the PAFSO (Vientiane) and DAFOs.
4.	OBJECTIVES	Promotion of the use of bamboo and extension of bamboo craft skills
5.	EXPECTED EFFECTS	(1) Improvement of bamboo craft skills (2) programmramme will be implemented by the Project Office in close coordination with the respective village authorities, the PAFSO (Vientiane) and DAFOs.
6.	PROJECT COSTS	US$ 800
7.	IMPLEMENTATION SCHEDULE	Timed to the commencement of production from improved bamboo forest (2004-2008)

8. PROJECT DESCRIPTION

The Model Area is considered a promising production area of bamboo and the conversion of small diameter bamboo which widely grows at former slash and burn sites to high quality, large diameter bamboo is planned. The production of bamboo assumes its sale to bamboo factories in Vientiane. However, with the sufficient local production of bamboo in the future, bamboo crafts will be promoted as a side business for local farming households. The local processing of bamboo to give it added value before sale will contribute to increasing the income of local people more than the simple sale of raw bamboo. At present, many Vietnamese bamboo products are on sale in Vientiane together with locally produced products. With the improvement of skills, the export of bamboo crafts is feasible. The assistance of JOCV members will be sought for the extension of

bamboo craft techniques/skills. The total cost will be approximately US$ 800 (10,000 kip/person, 10 persons/village and 12 villages) provided that the Project Office supplies the necessary locally manufactured knives and other tools.

ANNEX 6

ROUGH COST ESTIMATION

Agroforestry

Item	Amount	Cost(kip)	Assumption
Area of Silviagriculture per Village	6 ha		
1. Nursery Management	1 no.	1,333,000	
2. Requried number of pasture grass	84 kg	168,000	Unit price is 2,000kip/kg
3. Requried amount of barbed wire	4000 m	760,000	Unit price is 19,000kip/100m
4.Miscellaneous(20%)		452,200	
Total		2,713,200	kip
		1,739	us$
	29villages	78,682,800	kip
		50,438	us$=50,400

Slope Land Agriculture

Item	Amount	Cost(kip)	Assumption
Area of Silviagriculture per Village	6 ha		
1. Requried number of pasture grass	80 kg	160,000	Unit price is 2,000kip/kg
2. Requried amount of barbed wire	4000 m	760,000	Unit price is 19,000kip/100m
3. Miscellaneous(20%)		184,000	
Total		1,104,000	kip
		708	us$
	29villages	32,016,000	kip
		20,523	us$=20,500

Man made Forest Plantation

Item	Amount	Cost(kip)	Assumption
Area of Plantation	1375(910) ha		
1. Requried number of seedlings	1,000,000	100,000,000	Unit price is 100kip/本
Total		100,000,000	kip
		64,103	us$=64,100

Seed Multipicatio Farm

Item	Amount	Cost(kip)	Assumption
Area of seed Farm per Village	0.15 ha		500kg/3.500kg unit yield(3.5ton/ha)
1. Requried amount of improved seeds	7.5 kg	3,750	50kg/ha with kip 500/kg
2.Required amount of fertilizer	82.5 kg	41,250	550kg/ha with kip500/kg
3.Required amount agro-chemical	0.3 kg	19,500	2kg/ha with kip 65,000/kg
4. Miscellaneous(20%)		12,900	
Total		77,400	kip
Total in us $		50	us$
	25Villages	3,870,000	kip
	2 seasons	2,500	us$=2,500

Second Crops Demonstratio Farm

Item	Amount	Cost(kip)	Assumption
Area of seed Farm per Village	0.5 ha		5 farmers ×0.1ha
1.Requried amount of seeds	10 kg	50,000	price of soybeans seeds
2.Required amount of fertilizer	0 kg	0	Application of compost is proposed.
3.Required amount agro-chemical	0 kg	0	Application of natural insecticide is proposed.
4. Miscellaneous(20%)		10,000	
Total		60,000	kip
Total in us $		38	us$
	25Villages	6,000,000	kip
	2 seasons×2Phases	3,800	us$=3,800

Fish Culture Demonstration Farm

Item	Amount	Cost(kip)	Assumption
Area of Second Crop Demonstration Farm per Village	0.5 ha		5 farmers ×0.1ha
1.Requried amount of seeds	500 no.	40,000	kip 80/fry both for male and female
2.Materials		50,000	Materials reqired for ridge preparation.
3. Miscellaneous(20%)		18,000	
Total		108,000	kip
Total in us $		69	us$
	25Villages	5,400,000	kip
	2 seasons	3,450	us$=3,500

Infrastracture Development

Item	Amount	Cost(kip)	Assumption
Local Road Improvement		1,308,700,000	838,900us$
Construction of Rural Domestic Water Supply Facility		145,700,000	93,400us$
Existing Primary School Upgrading		744,000,000	477,000us$
Total		2,198,400,000	kip
Total in us $		1,409,300	us$=1,409,000

Rural Suppoting Program

Item	Amount	Cost(kip)	Assumption
Land-Forest Allocation Program	29 vill.	18,100,000	624,000kip/village(=400us$/village) us$11,600
Revolving Fund System Establishment	29 vill.	22,620,000	780,000kip/village(=500us$/village) us$14,500
Weaving Entrepreneurship Development	29 vill.	22,620,000	780,000kip/village(=500us$/village) us$14,500
Skill-Based Non-Formal Education	29 vill.	2,700,000	93600kip/village(=60us$/village) us$1,700
Improved Cookstove Dissemination	29 vill.	2,700,000	93600kip/village(=60us$/village) us$1,700
School Forest Establishment	12 vill.	15,300,000	1,274,800kip/village(=817us$/village) us$9,800
Bamboo Craft Promotion	12 vill.	1,200,000	10person×10,000kip×12 vill.(=64us$) us$800
Total		85,240,000	kip
Total in us $		54,641	us$=54,600

Office Cost

Item	Amount	Cost(su$)	Assumption
Vihicles		216,500	
Pik up Tracks	5 no.	158,500	31,700us$/Trac
Motor bike	20 no.	58,000	2,900us$/Bike
Other equipment		64,890	30% of Vihicles(Building is Excloded) us$64,900
Personnel		205,200	
Project Director	1 P.	12,000	100us$/month×120months
Section Chief	8 P.	67,200	70us$/month×120months
Staff	21 P.	126,000	50us$/month×120months
Staff Trainning		85,000	17,000us$/year×5years
Running Cost		205,200	100% of peronnel cost
Total		1,198,490	us$=776,800

ANNEX 7

MEMBERS FOR THE STUDY

7.1 Work Supervisory Committee

JICA has established the Work Supervisory Committee in order to ensure the smooth implementation of the Study by the Study Team members . The task of the committee is to provide the members with technical advice both in Japan and in Lao. The committee consists of two experts listed in Table 7-1

Table 7-1 Work Supervisory Committee

Name	Specialist Area	Background
Noriyoshi Kitamura (Sep. 1996 ~ March, 1998)	Leader/Watershed Management	Forestry Agency
Yoshimitsu Nishitani (April, 1998~)	Rural Socioeconomy	Forestry and Forest Products Research Institute
Masahiro Amano	Rural Socioeconomy	Forestry and Forest Products Research Institute

7.2 Members of the Study Team

The members of the Japanese Study Team and their respective work assignments are given in Table 7-2

Table 7-2 Study Team Members

Name	Work Assignment	Organization
Etsuzo Uchimura	Team Leader/Watershed Management	JAFTA
Makoto Ishizuka	Social Analysis/Social Environment	Nippon Koei
Akinori Nishio	Forest Management/Natural Environment	JAFTA
Seiji Koyanagi	Infrastructure Development	Nippon Koei
Jiro Yoshioka	Soil	JAFTA
Junzo Watanabe	Land Use/Vegetation	JAFTA
Kazuo Furukata	Aerial Photography Supervision/Surveying	Kokusai Kogyo
Shozo Shimoda	Surveying	Kokusai Kogyo
Kazunori Masuda	GIS	Kokusai Kogyo
Hidetaka Tsuchi	Coordination	Kokusai Kogyo

7.3 Counterparts

The Government of Lao has selected the counterparts for the Study from its Department of Forestry, and the Agriculture and Forestry Department of the Vientiane Provincial Government. Their names and areas of assignments are listed in Table 7-3

Table 7-3 Counterparts

Name	Area of Assignment
Banethom Thepsombat	Leader/Watershed Management
Khonevanh Bachanh	Social Analysis/Social Environment
Bounmanh Keomorakot	Forest Management/Natural Environment
Keobouaphanh Bouthpanida	Infrastructure Development
Boukeo Phonexaysavath	Soil
Keobouaphanh Bouthpanida	Land Use/Vegetation
Sombat Panyasuk	Aerial Photography Supervision/Surveying
Souliya Thamakot	Surveying
Khonevanh Bachanh	GIS

ANNEX 8

S/W

① S/W

SCOPE OF WORK

FOR

THE STUDY ON WATERSHED MANAGEMENT PLAN FOR FOREST CONSERVATION IN VANGVIENG DISTRICT IN LAO PEOPLE'S DEMOCRATIC REPUBLIC

AGREED UPON BETWEEN

THE MINISTRY OF AGRICULTURE AND FORESTRY,
THE GOVERNMENT OF
LAO PEOPLE'S DEMOCRATIC REPUBLIC

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY

Vientiane, April 10, 1996

Dr. Akhom TOUNALOM
Head,
Committee for Cooperation and Investment,
Ministry of Agriculture and Forestry,
Lao People's Democratic Republic

Mr. Takamasa HAYASE
Team Leader,
The Preparatory Study Team,
Japan International Cooperation Agency,
Japan

I. INTRODUCTION

In response to the request of the Government of Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") the Government of Japan decided to conduct the Study on Watershed Management Plan for Forest Conservation in Vangvieng District (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.
Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programs of the Government of Japan, will undertake the Study in close cooperation with the authorities concerned of Lao PDR.

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

II. OBJECTIVES OF THE STUDY

The objectives of the study are ;

1. to formulate an Integrated Watershed Management Plan in Vangvieng District in order to contribute to the improvement of resource management and livelihood of the local people, and,
2. to transfer technology in the course of the Study to the Lao PDR counterpart personnel,

thus preventing forest degradation and soil erosion, and maintaining environmental sustainability.

III. SCOPE OF THE STUDY

1. Aerial Photography Area
   The Aerial Photography Area covers the existing former Nam Ngum Dam Catchment Area in Vientiane Province and Saysomboon Special Zone, and the Nam Xong Watershed in Vangvieng District. It covers approximately 700 ,000 ha (see Appendix 1).

2. Study Area
   The Study Area covers approximately 170,000 ha in the Nam Xong Watershed Area and relevant area in Vangvieng District (see Appendix 1).

3. Model Area
   The Model Area covers approximately 50,000 ha in Som Boon and Na Mon

Areas in Vangvieng District (see Appendix 1).

4. Outline of the study

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

Work in Phase I

(1) Aerial photographs in the Aerial Photography Area (scale 1/20,000)

(2) Topographic survey in the Model Area

(3) Preparation of topographic maps for the Model Area (scale 1/20,000)

(4) Collection of general information in the Study Area

a) Natural conditions
b) Socio-economic conditions

(5) Socio-economic Baseline Survey in the Model Area

(6) Collection and analysis of the data and information on the following items which are important factors for the formulation of the Watershed Management Plan in the Model Area

a) Land-use and vegetation
b) Soil
c) Climate / Hydrology
d) Soil erosion / Landslide

(7) Field Survey in the Model Area

a) Land-use and vegetation
b) Soil

(8) Preparation of the following thematic maps for the Model Area (scale 1/20,000)

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

Work in Phase II

(1) Formulation of the Watershed Management Plan in the Model Area which shows appropriate watershed management practices / measures

(2) Preparation of maps for the Watershed Management Plan for the Model Area (Scale 1/20,000)

(3) Initial Environmental Examination

(4) Formulation of Guidelines for Watershed Management Planning for the Study Area

IV. WORK SCHEDULE

The Study shall be carried out in accordance with the attached tentative work schedule (see Appendix 2).

V. REPORTS

JICA shall prepare and submit the following reports in English to Lao PDR.

1. Inception Report
   Twenty (20) copies at the commencement of the Study

2. Progress Report
   Twenty (20) copies at the end of Phase I of the Study

3. Interim Report
   Twenty (20) copies at the middle of Phase II of the Study

4. Draft Final Report
   Twenty (20) copies at the end of Phase II of the Study. Lao PDR will provide JICA with its comments on the Draft Final Report within one (1) month after the receipt of the Draft Final Report.

5. Final Report
   Fifty (50) copies within two (2) months after the receipt of the comments of Lao PDR on the Draft Final Report.

In addition to the above reports, the followings are to be submitted to Lao PDR with relevant reports.

a) Aerial photographs in the Aerial Photography Area (scale 1/20,000) :
- Negative films
- Contact prints
- Index maps

b) Maps and others for the Model Area (scale 1/20,000) :
- Topographic maps
- Land-use and vegetation maps
- Soil maps
- Maps of the Watershed Management Plan

VI. UNDERTAKING OF LAO PDR

1. To facilitate the smooth conduct of the Study, Lao PDR shall take the necessary measures :

(1) to secure the safety of the Japanese study team,

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

(3) to exempt the members of the Japanese study team from taxes, duties and other charges on equipment, machinery and other materials brought into Lao PDR for the conduct of the Study,

(4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study,

(5) to provide the necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into Lao PDR from Japan in connection with the implementation of the Study,

(6) to secure permission for entry into private properties or restricted areas for the conduct of the Study,

(7) to secure permission for the Japanese study team to take all data and documents (including maps and photographs) related to the Study out of Lao PDR to Japan,

(8) to provide medical services as needed. These expenses will be chargeable to members of the Japanese study team.

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

3. Department of Forestry, Ministry of Agriculture and Forestry of Lao PDR (hereinafter referred to as "DOF") are to be responsible for the overall management and the implementation of the Study, and shall act as a counterpart agency to the Japanese study team and also as a coordinating body in relation to other relevant Lao PDR authorities for the smooth implementation of the Study.

4. DOF shall, at its own expense, provide the Japanese study team with the following, in cooperation with the other organizations concerned :

(1) available data and information related to the Study,
(2) counterpart personnel,
(3) suitable office space with necessary equipment in Vangvieng District or the relevant area, and,
(4) credentials or identification cards.

VII. UNDERTAKING OF JICA

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

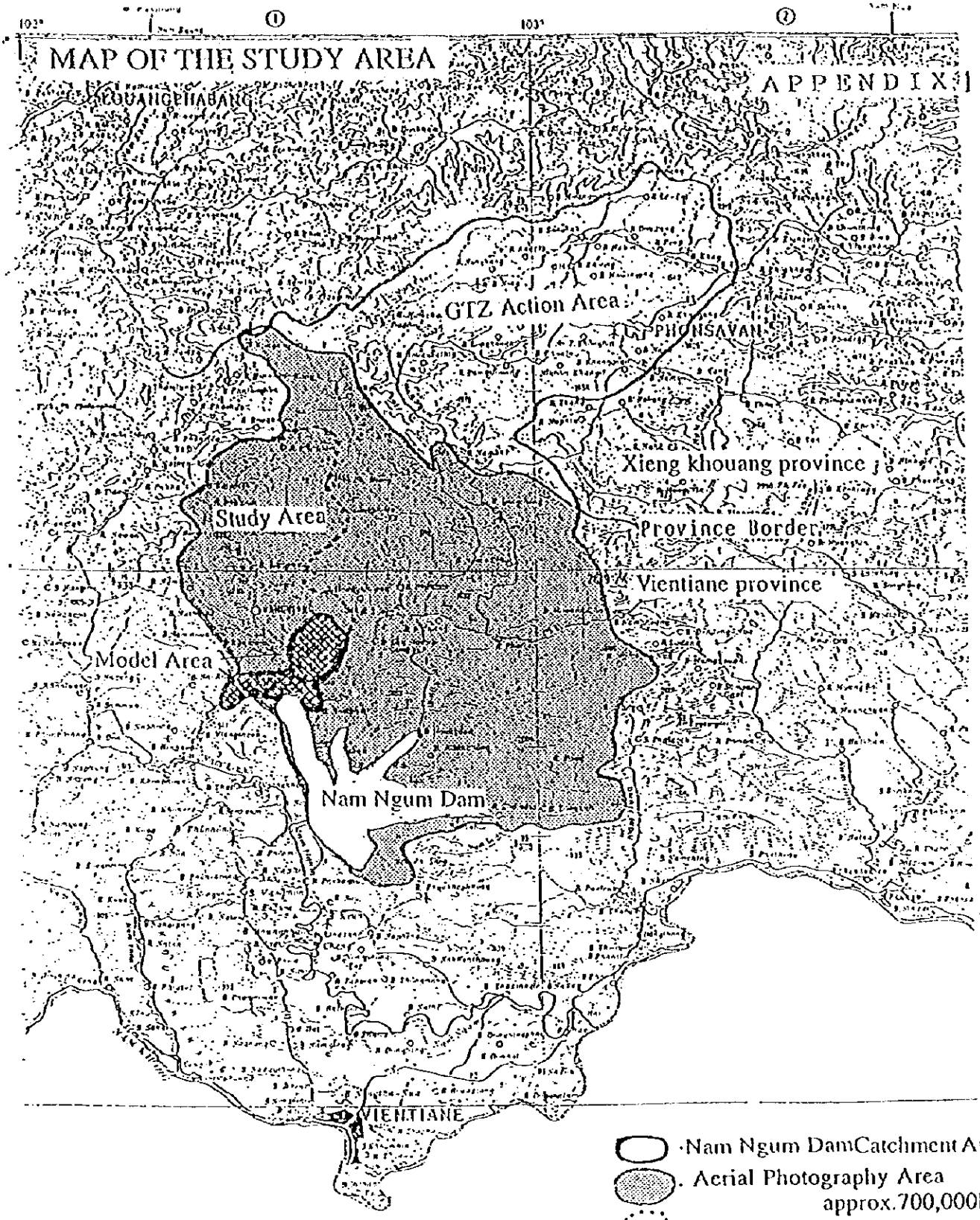
(1) to dispatch, at its own expense, the study teams to Lao PDR, and,
(2) to pursue technology transfer to the Lao PDR counterpart personnel in the course of the Study.

VIII. OTHERS

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

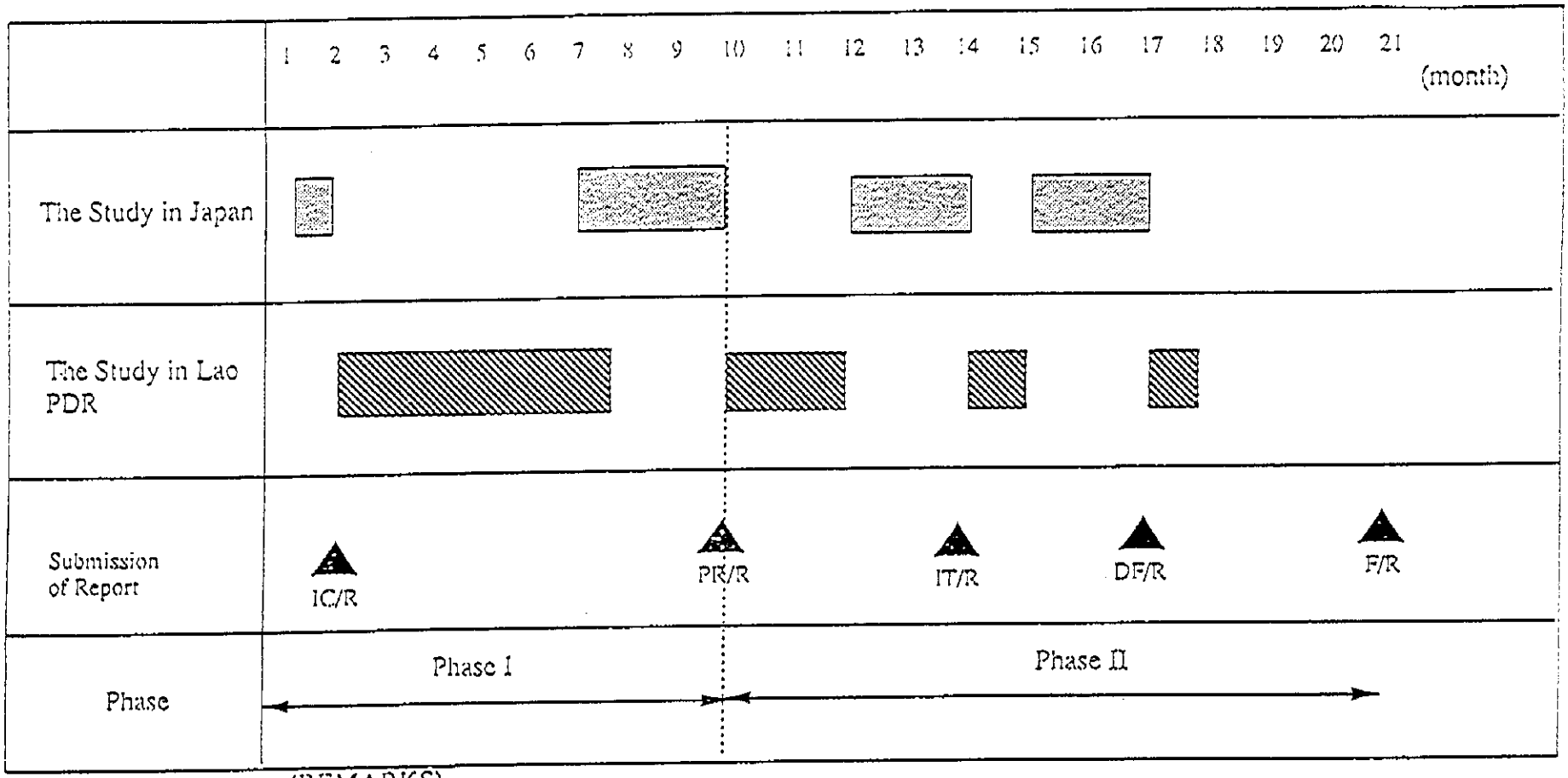
MAP OF THE STUDY AREA

APPENDIX 1



- Nam Ngum DamCatchment Area
- Aerial Photography Area approx.700,000ha
- Study Area approx.170,000ha
- Model Area approx 50,000ha

Tentative Work Schedule of the Study



(REMARKS)

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

② M／M

MINUTES OF MEETING
ON
SCOPE OF WORK
FOR
THE STUDY ON WATERSHED MANAGEMENT PLAN FOR FOREST CONSERVATION IN VANGVIENG DISTRICT
IN
LAO PEOPLE'S DEMOCRATIC REPUBLIC

The preparatory study team (hereinafter referred to as " the Team ") organized by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), and headed by Mr. Takamasa HAYASE, visited the Lao People's Democratic Republic (hereinafter referred to as "Lao PDR") from April 1 to April 11, 1996 for the purpose of discussing and confirming the Scope of Work for the Study on Watershed Management Plan for Forest Conservation in Vangvieng District (hereinafter referred to as "the Study").

The Team had a series of discussions with the officials concerned of the Committee for Cooperation and Investment, Ministry of Agriculture and Forestry (hereinafter referred to as "MAF") headed by Dr. Akhom TOUNALOM on the Scope of Work for the Study.

As a result of the discussions, MAF and the Team agreed upon the Scope of Work for the Study.

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

Vientiane, April 10, 1996

Dr. Akhom TOUNALOM
Head,
Committee for Cooperation and Investment,
Ministry of Agriculture and Forestry,
Lao People's Democratic Republic

Mr. Takamasa HAYASE
Team Leader,
The Preparatory Study Team,
Japan International Cooperation Agency,
Japan

ANNEX

1. Both sides agreed that the Study would be mostly contributed to implementation of "The Forest Conservation and Afforestation Project"(hereinafter referred to as "the Project").
2. The Team requested that MAF take necessary permissions from the authorities concerned for taking aerial photographs of the Aerial Photography Area, and MAF accepted this request.
3. Both sides agreed that, when MAF would efficiently formulate Watershed Management Plans in the Study Area excluding the Model Area in the future through the guidelines.
4. MAF strongly requested following items.
   1) JICA should prepare Color Aerial Photographs covered full Aerial Photography Area. These photographs work as basic data for formulating Integrated Watershed Management in this Area by Lao PDR in the near future. Especially, when the villagers who will not understand their land conditions by maps, consider a land-use plan by themselves, the Color Aerial Photographs are suitable materials and tools without any map.
   2) Contact Prints of Color Aerial Photographs (Scale 1/20,000) in Som Boon Area should be prepared 3 sets in the Model Area.
   3) Digital Data of Maps and Socio-economic Survey for GIS data should be adjusted with GTZ format.
5. The Team promised to convey above requests to the Government of Japan.
6. MAF requested that JICA transfer technology to counterpart personnel of Lao PDR through OJT (on the job training) or workshops which would be held for a participatory watershed management plan in the course of the Study as well as training in Japan. The Team expressed that JICA would ask consultants, which would actually conduct the Study, to prepare the technology transfer plan as well as to implement the programs under the plan.
7. Both sides agreed that the Watershed Management Plan consisted on following items.
   1) Land-use
   2) Forest Management
   3) Infrastructure
   4) Operation and Management
   5) Rough Cost Estimate
   6) Initial Environment Examination
   7) Monitoring Method
   8) Participation of the local population

8. MAF will provide the following counterpart personnel during the implementation of the Study:
   1) Watershed Management
   2) Socio-economic
   3) Aerial Photograph and Topography Map
   4) Land-use and Vegetation
   5) Soil
   6) Erosion
9. Both sides agreed that JICA should transfer survey technology to counterpart personnel in Vangvieng District Agriculture and Forestry Office to conduct smoothly field surveys.
10. Both sides agreed to hold a seminar on the presentation of the Draft Final Report of the Study.
11. Both sides agreed that a "Liaison Meeting" between the Team and the Project would be established in order to carry out the Study activities smoothly and effectively, through exchanging information with each other. "The Liaison Meeting" will be held at least once a month and whenever a necessity arises. The "Liaison Meeting" should be comprised of the following members:

    [Lao PDR Side]
    (1) Representative of the Committee for Cooperation and Investment, MAF
    (2) Counterpart personnel concerned with the Team of DOF, MAF
    (3) Counterpart personnel concerned with the Project of DOF, MAF
    (4) Representative of the Vientiane Province Agriculture and Forestry Office
    (5) Representative of the Vangvieng District Agriculture and Forestry Office

    [Japanese Side]
    (1) Concerned personnel dispatched by the Team
    (2) Experts of the Project
    (3) Representative of the JICA Office in the Lao PDR

    Note : Other concerned member(s) can participate in this meeting when both sides recognize the necessity.

LIST OF PARTICIPANTS OF DISCUSSION

Subject : Discussion of Scope of Work
Date : April 8 - 9 ,1996
Place : Office of Committee for Cooperation and Investment, Ministry of Agriculture and Forestry, Lao PDR

	Name	Position
1. Lao PDR SIDE		
(1)	Dr. Akhom.TOUNALOM	Head of Committee for Cooperation and Investment (CCI),Ministry of Agriculture and Forestry (MAF)
(2)	Mr. Khamphiou VISSAPRA	Deputy Head of CCI, MAF
(3)	Mr. Oudone SISONGKHAM	Deputy Chief of the International Cooperation Division, Cabinet Office, MAF
(4)	Mr. Khambay KHAMSANA	Desk Officer,Planning,Finance and Cooperation Division ,Department of Forestry (DOF), MAF
(5)	Mr. Banethom THEPSOMBAT	Team Leader of G.I.S and Mapping Unit of The Center for Protected Areas and Watershed Management, DOF, MAF
2. JAPANESE SIDE		
(1)	Mr. Takamasa HAYASE	Leader of Preparatory Study Team, JICA
(2)	Mr. Shigeo KISHINO	Coordinator of Preparatory Study Team, JICA
(3)	Mr. Yasuyuki INOUE	Watershed Management of Preparatory Study Team, JICA
(4)	Dr. Masahiro AMANO	Social Analysis of Preparatory Study Team, JICA
(5)	Mr. Hiroyuki TSUBURAYA	JICA Expert, DOF, MAF, Lao PDR