Table F.28 Soil problems and improved methods of F/S area (Ban Na San)

Land Plot NO.1 (Old Rambutan, Silty coarse sand deposited approximately 25-50 cm)

1. Soil Problems
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops

Land Plot NO.2 (Young Rambutan, Coarse sand deposited approximately 25-50 cm or no deposited area)

1. Soil Problems
   - 25-50 cm thick of coarse sand are deposited on the soil surface
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil mixing with lower original soil

Land Plot NO.3 (Young Durian, No deposited area with 0-20 cm deep of natural soil)

1. Soil Problems
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.4 (Young Rambutan, Coarse sand deposited approximately 25-50 cm)

1. Soil Problems
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.5 (Young Durian, Coarse sand deposited approximately 25-100 cm)

1. Soil Problems
   - 25-100 cm thick of coarse sand are deposited on the soil surface
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.6 (Young Rambutan, Coarse sand deposited approximately 25-100 cm)

1. Soil Problems
   - 25-100 cm thick of coarse sand are deposited on the soil surface
   - Before disaster, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.7 (Old Rambutan, No deposited area)

1. Soil Problems
   - Low fertility
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil

Land Plot NO.8 (Old Durian, No deposited area)

1. Soil Problems
   - Low fertility
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil

Land Plot NO.9 (Old Rambutan, No deposited area)

1. Soil Problems
   - Low fertility
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil

Land Plot NO.10 (Old Rambutan, Coarse sand with gravel deposited approximately 100-150 cm)

1. Soil Problems

- 100-150 cm thick of coarse sand are deep deposited on the soil surface
- Low fertility
- Lack of soil moisture in the dry season

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Holes preparation for cultivation
   - Soil dressing on the soil surface

Land Plot NO.11 (Young Rambutan, Fine silty sand deposited approximately 100-150 cm)

1. Soil Problems
   - 100-150 cm thick of fine silty sand are deposited on the soil surface
   - Before disaster, this area was a paddy field
   - Low fertility
   - Poor drainage
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Make drain ditches or hollowing

Land Plot NO.12 (Young Durian, Gravelly coarse sand deposited approximately 50-100 cm)

1. Soil Problems
   - 50-100 cm thick of gravelly coarse sand are deep deposited on the soil surface
   - The former paddy field has changed to Durian cultivation, and was destroyed by the flood
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.13 (Young Rambutan, Gravelly coarse sand deposited approximately 100-150< cm)

1. Soil Problems
   - 100-150< cm thick of gravelly coarse sand are deep deposited on the soil surface
   - Formerly, this area was a paddy field
   - Cobbles of 10-20 cm, in diameter are scattered on the surface
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement

- Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
- Grow soil cover crops

3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area
   - Remove out cobbles
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.14 (Young Rambutan, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - 150< cm thick of gravelly coarse sand are deep deposited on the soil surface
   - Formerly, this area was a paddy field
   - A lot of rocks 25-30 cm, in diameter are scattered on the surface
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area
   - Remove out rocks
   - Make up the high ridge for cultivation
   - Soil dressing on the soil surface

Land Plot NO.15 (Young Rambutan, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - 150< cm thick of gravelly coarse sand are deep deposited on the soil surface
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.16 (Young Durian, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - 150< cm thick of gravelly coarse sand are deep deposited on the soil surface
   - Formerly, this area was a paddy field
   - Low fertility

- Lack of soil moisture in the dry season

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.17 (Young Rambutan, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - 150< cm thick of gravelly coarse sand are deep deposited on the soil surface
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.18 (Old Rambutan, Gravelly coarse sand deposited approximately 25-50 cm)

1. Soil Problems
   - 25-50 cm thick of gravelly coarse sand are deposited on the soil surface
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops

Land Plot NO.19 (Young Rambutan, Gravelly coarse sand deposited approximately 25>-50 cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.20 (Cashew Nut, Gravelly coarse sand deposited approximately 25-50 cm)

1. Soil Problems

- 25-50 cm thick of gravelly coarse sand are deposited on the soil surface
- Formerly, this area was a paddy field
- Low fertility
- Lack of soil moisture in the dry season

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.21 (Young Durian, Gravelly coarse sand deposited approximately 25> cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.22 (Young Rambutan, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Soil dressing on the soil surface

Land Plot NO.23 (Old Rambutan, Gravelly coarse sand deposited approximately 25> cm or 50-100 cm)

1. Soil Problems
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil

- Grow soil cover crops

Land Plot NO.24 (Young Rambutan, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.25 (Young Durian, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.26 (Young Durian, Silty coarse sand deposited approximately 25-100 cm)

1. Soil Problems
   - Approximately 25-100 cm thick of sand deposited area
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Prepare a hole for cultivation

- Soil dressing on the soil surface

Land Plot NO.27 (Young Rambutan, Silty coarse sand deposited approximately 25-100 cm)

1. Soil Problems
   - Approximately 25-100 cm thick of sand deposited area
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.28 (Young Rambutan, Silty coarse sand deposited approximately 25> or 25-100 cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.29 (Young Durian, Silty coarse sand deposited approximately 25> or 50-100 cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 10-20 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.30 (Old Rambutan, No deposited area)

1. Soil Problems

- Low fertility
- Lack of soil moisture in the dry season

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops

Land Plot NO.31 (Weed Grass, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Approximately 150< cm deep of sand deposited area
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.32 (Weed Grass, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Approximately 150< cm deep of sand deposited area
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.33 (Weed Grass, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Approximately 150< cm deep of sand deposited area
   - Cobbles are scattered on the soil surface and under
   - Low fertility
   - Lack of soil moisture in the dry season

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Remove cobbles out of this area
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.34 (Weed Grass, Coarse sand deposited approximately 50-100 cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Approximately 50-100 cm thick of sand deposited area
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 10-20 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.35 (Sand Area, Rocks, cobbles and gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Lots of rocks, cobbles and gravelly coarse sand
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - The area are not suitable for agriculture development, since they are not worth investing
   - After construction of embankment, it may be used for agriculture

Land Plot NO.36 (Sand Area, Rocks, cobbles and gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Lots of rocks, cobbles and gravelly coarse sand
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - The area are not suitable for agriculture development, since they are not worth investing

- After construction of embankment, it may be used for agriculture

Land Plot NO.37 (Sand Area, Cobbles and gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Many cobbles are scattered on the soil surface and under
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Remove cobbles out of this area
   - Plough out apploximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.38 (Sand Area, Rocks, cobbles and gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Many cobbles are scattered on the soil surface and under
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Remove cobbles out of this area
   - Plough out apploximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.39 (Sand Area, Cobbles and gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Many cobbles are scattered on the soil surface and under
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops

3. Methods of soil layer improvement
   - Remove cobbles out of this area
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.40 (Marshy Area, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Approximately 150< cm deep of sand deposited area
   - Low fertility
   - Lots of soil moisture, wet area and flood in every year
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - For make up bed, move sand to the soil surface from near site
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Land Plot NO.41 (Trial Site, Gravelly coarse sand deposited approximately 150< cm)

1. Soil Problems
   - Formerly, this area was a paddy field
   - Approximately 150< cm deep of sand deposited area
   - Low fertility
   - Lack of soil moisture in the dry season
2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops
3. Methods of soil layer improvement
   - Plough out approximately 20-30 cm of sand deposited area before cultivation
   - Prepare a hole for cultivation
   - Soil dressing on the soil surface

Table F.29 Soil problems and improved methods of F/S area (Lan Saka)

Land Plot NO.1 (Mixed Orchard, Flood affected area, Fine sand deposited various depth, 50-100, 100-150, and 150< cm)
1. Soil Problems - Low fertility - Lack of soil moisture in the dry season
2. Methods of soil improvement - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil - Grow soil cover crops - Mulch organic materials residuum
3. Methods of soil layer improvement - Soil dressing on the soil surface

Land Plot NO.2 (Mixed Orchard, Flood affected area, but not damaged, Fine sand deposited various depth, 25> and 25-50 cm)
1. Soil Problems - Low fertility
2. Methods of soil improvement - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil - Mulch organic materials residuum

Table F.29 Continued

Land Plot NO.3 (Swamp area)

1. Soil Problems
   - Can not grow anything

2. Methods of soil improvement
   - The area are not suitable for growing fruit tree, but it may be used for fish pond

Land Plot NO.4 (Mixed Orchard, Low and/or wet area, Fine sand deposited various depth, 25>, 25-50, 50-100 and 150< cm)

1. Soil Problems
   - Lots of soil moisture with gley horizon in the soil lower part
   - Low fertility

2. Methods of soil improvement
   - Add compost and barnyard manure with chemical fertilizer to provide fertility in the soil
   - Grow soil cover crops

3. Methods of soil layer improvement
   - Make up bed, to higher 25-50 cm
   - Soil dressing on the soil surface

Land Plot NO.5 (Mixed Orchard, Highland and not deposited area)

1. Soil Problems
   - Basal rock on the surface
   - The soil of sloping complex and Orthoxic Tropudults, Koi-sh(Khok Kloi shallow phase) series in Thailand

2. Methods of soil improvement
   - The area is good for rubber and fruit tree, not need to develop

Table F.30 Information for soil dressing (Ban Na San, Lan Saka)

1. Ban Na San district

1) Point of good soil for soil dressing: NS-3
2) Location: Ban Na Thia village, N 8° 48' 20", E 99° 24' 12"
3) Date: 16, December, 1994
4) Parent material: Shale
5) Price: 1 truck (250 baht / 6 cu.m)
6) Address: Captain Mr. Pirome Rukchart (Former Attorney)
Chairman of Chao Phya Arka Nac Limited
Ban Na Thia, Tambon Na San, Amphoe Ban Na San,
Surat Thani Province
Hand Telephone 01-2111299

2. Lan Saka distrit

1) Point of good soil for soil dressing: LS-3
2) Location: Ban Wang Klong village, N 8° 26' 19", E 99° 52' 02"
3) Date: 18, December, 1994
4) Parent material: Fine grain sand stone
5) Price: 1 truck (700 baht / 15 cu.m)
6) Address: Prud Ti Karn Tu Ra Kit Limited
30/15 Mu Ban Raja Pruk 2, Tambon Tha Ngiew, Amphoe Muang,
Nakhon Si Thammarat Province
Hand Telephone 01-9583403

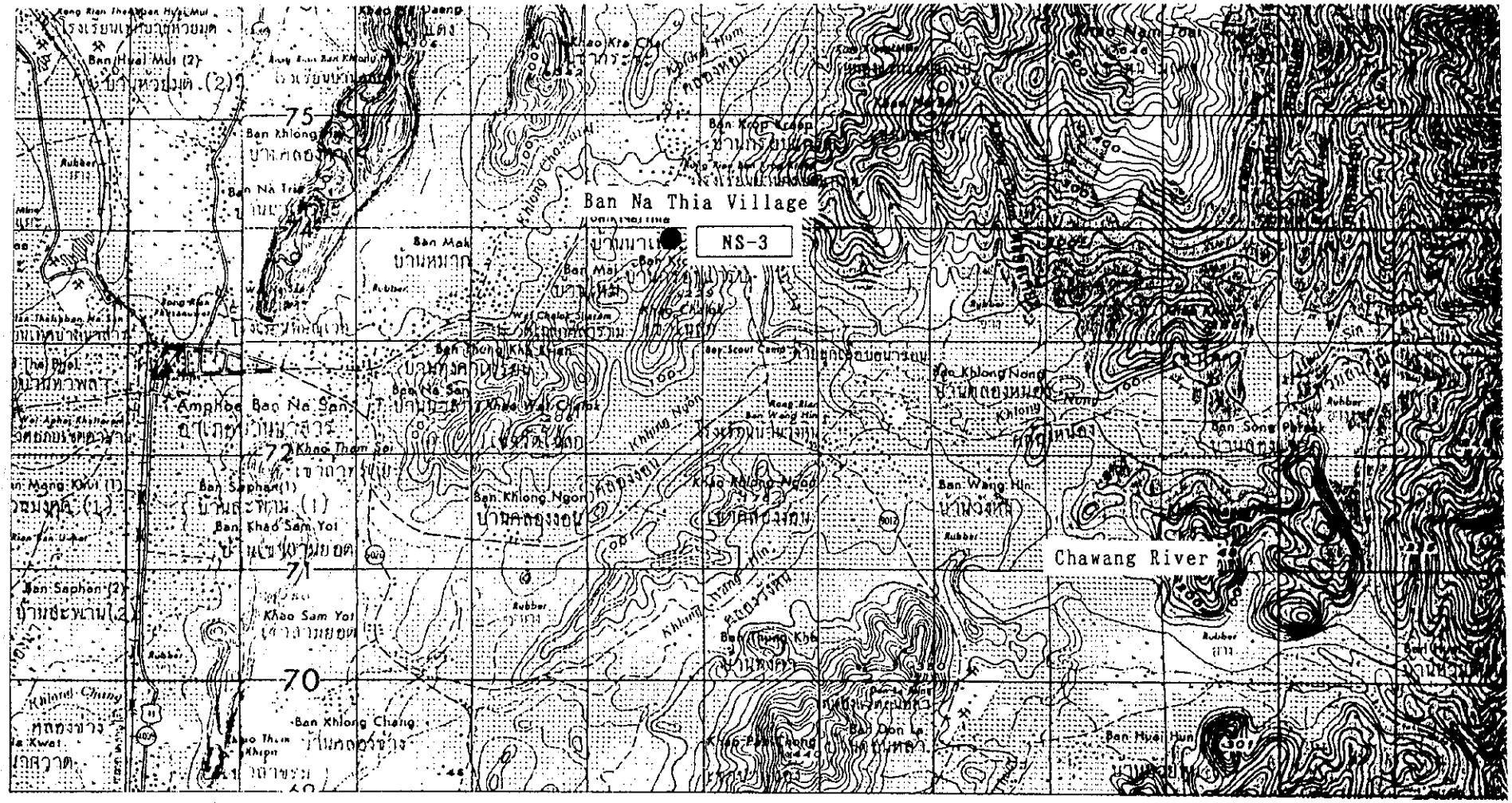
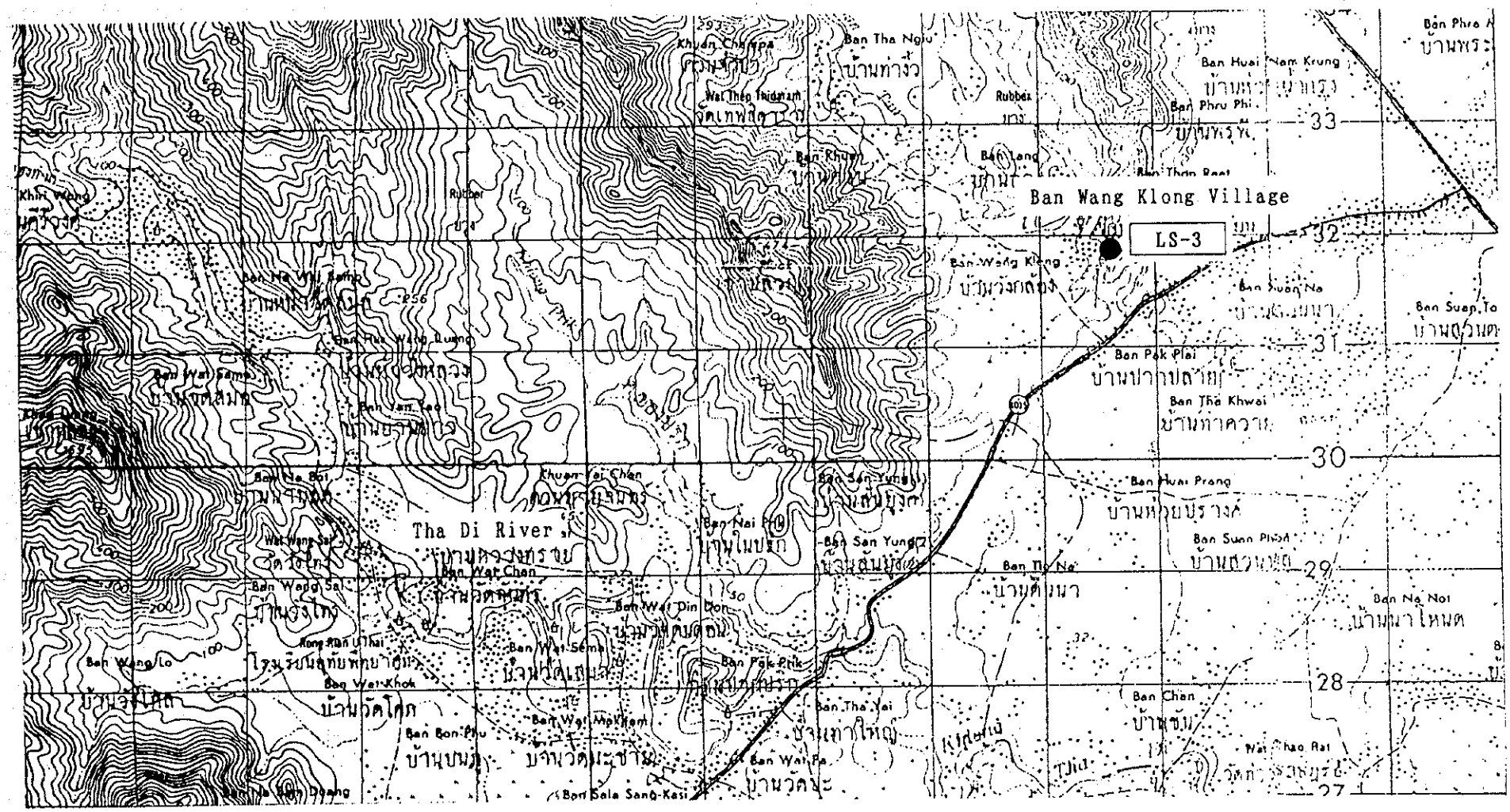


Figure F.8 Location map for soil dressing (Ban Na San)

Scale 1:5,000



Scale 1:5,000

Figure F.9 Location map for soil dressing (Lan Saka)

Table F.31 Soil physical and chemical properties of soil dressing materials

ANALYSIS RESULTS
(OVEN DRY BASIS)

Location	Depth	Particle size analysis (%)								Texture
		USDA Grading (mm)			Sand Fraction Grading (mm)					
		Sand	Silt	Clay	Very Coarse	Coarse	Medium	Fine	Very Fine	
		2-0.05	0.05-0.002	0.002>	2.0-1.0	1.0-0.5	0.5-0.25	0.25-0.1	0.1-0.05	
NS-3	At 50 cm	6.0	30.2	63.8	1.0	0.6	0.4	0.9	3.1	Clay
LS-3	At 50 cm	58.5	33.5	8.0	0.3	1.2	3.1	20.1	33.8	Sandy Loam
LS-3	At 100 cm	43.7	33.2	23.1	0.4	1.5	2.3	11.9	27.6	Loam

Location	Moisture	pH (1:1)		EC	T - C	T - N	C/N	Exchange Capacity and Cation (me/100g)					Base Saturation	P_2O_5	K_2O
	(%)	Water	KCl	ds/m	(%)	(%)		Ca	Mg	K	Na	CEC	(%)	(ppm)	(ppm)
NS-3	1.6	4.8	3.7	0.06	0.68	0.06	11	0.7	0.2	0.1	0.3	7.4	18	0.1	30.0
LS-3	0.3	4.6	3.7	0.05	0.08	0.02	4	0.3	0.1	0.1	0.1	1.4	43	0.1	12.0
LS-3	1.0	4.7	3.5	0.04	0.06	0.02	3	0.6	0.1	0.1	0.2	3.8	26	0.7	23.0

Table F.32 Unit cost of soil/soil layer improvement (Ban Na San, Lan Saka)

Unit: Bahts

Description	Unit	Quantity	Labour & materials cost				Machinery cost			Total cost		
			Unit cost		Implement cost		Depre	Implement cost				
			L.C.	F.C.	L.C.	F.C.	F.C.	L.C.	F.C.	L.C.	F.C.	Total
1. Ban Na San District												
Input of soil amendment												
Material	tree	1.0	25		25					25		25
Common labour	p/tree	0.1	130		13					13		13
Total cost			155		38					38		38
Cover crop												
Seed	rai	1.0	80		80					80		80
Common labour	rai	0.2	130		26					26		26
Total cost			210		106					106		106
Soil mixing(0.3m, average)												
Common labour	p/tree	1.5	130		195					195		195
Total cost			130		195					195		195
Removal of gravel												
Common labour(gravel)	rai	1.0	208		208					208		208
Common labour(debris)	rai	1.0	312		312					312		312
Total cost			520		520					520		520
Soil dressing												
Soil	m3	1.0	50		50					50		50
Common labour	p/tree	0.2	130		26					26		26
Total cost			180		76					76		76
2. Lan Saka District												
Input of soil amendment												
Material (Fruit tree)	tree	1.0	25		25					25		25
Common labour	p/tree	0.1	130		13					13		13
Total cost			155		38					38		38
Input of soil amendment												
Material (Upland crop)	rai	1.0	361		361					361		361
Common labour	p/rai	0.3	130		39					39		39
Total cost			491		400					400		400
Cover crop												
Seed	rai	1.0	80		80					80		80
Common labour	rai	0.2	130		26					26		26
Total cost			210		106					106		106
Soil mixing(0.3m, average)												
Common labour	p/tree	1.5	130		195					195		195
Total cost			130		195					195		195
Removal of gravel												
Common labour(gravel)	rai	1.0	208		208					208		208
Common labour(debris)	rai	1.0	312		312					312		312
Total cost			520		520					520		520
Soil dressing												
Soil	m3	1.0	50		50					50		50
Common labour	p/tree	0.2	130		26					26		26
Total cost			180		76					76		76
Circular ridge												
Set	rai	1.0			9,040		1,296	1,008	1,520	10,048	2,816	12,864
Total cost					9,040		1,296	1,008	1,520	10,048	2,816	12,864

p: person

Table F.33 Cost of soil rehabilitation in F/S area (Case 1, Ban Na San)

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht) I	II	III	IV	V	VI	Total Cost (Baht)
1	Old Rambutan	25-50	23.30	-	-	-	-	-	-	-
2	Young Rambutan	No Deposit	11.04	6,712	938	-	39,921	-	-	47,571
		25-50	11.04	6,712	938	-	39,921	-	-	47,571
3	Young Durian	No Deposit	4.83	-	-	-	-	-	-	-
4	Young Rambutan	25-50	43.10	26,205	3,664	-	155,850	-	-	185,719
5	Young Durian	25-50	3.50	2,128	298	-	12,656	-	-	15,082
		50-100	3.73	2,268	317	-	13,488	-	-	16,073
6	Young Rambutan	25-50	6.15	3,739	523	-	22,238	-	-	26,500
		50-100	6.15	3,739	523	-	22,238	-	-	26,500
7	Old Rambutan	No Deposit	16.00	-	-	-	-	-	-	-
8	Old Durian	No Deposit	1.05	-	-	-	-	-	-	-
9	Old Rambutan	No Deposit	3.82	-	-	-	-	-	-	-
10	Old Rambutan	100-150	4.23	-	-	-	-	-	-	-
11	Young Rambutan	100-150	9.53	5,794	810	-	34,460	-	-	41,064
12	Young Durian	50-100	9.45	-	-	-	-	-	-	-
13	Young Rambutan	100-150	12.24	7,442	1,040	-	44,260	-	-	52,742
		150<	12.24	7,442	1,040	-	44,260	-	-	52,742
14	Young Rambutan	150<	17.61	-	-	-	-	-	-	-
15	Young Rambutan	150<	0.55	-	-	-	-	-	-	-

Table F.33 Continued

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht) I	II	III	IV	V	VI	Total Cost (Baht)
16	Young Durian	25-50	2.45	-	-	-	-	-	-	-
		150<	2.45	-	-	-	-	-	-	-
17	Young Rambutan	25-50	1.72	-	-	-	-	-	-	-
		150<	1.73	-	-	-	-	-	-	-
18	Old Rambutan	25-50	8.35	-	-	-	-	-	-	-
19	Young Rambutan	25>	4.01	2,438	341	-	14,500	-	-	17,279
		25-50	4.02	2,444	342	-	14,536	-	-	17,322
20	Cashew Nut	25-50	8.50	-	-	-	-	-	-	-
21	Young Durian	25>	4.73	-	-	-	-	-	-	-
22	Young Rambutan	150<	20.05	12,190	1,704	-	72,501	-	-	86,395
23	Old Rambutan	25>	21.69	-	-	-	-	-	-	-
		50-100	5.54	-	-	-	-	-	-	-
24	Young Rambutan	150<	31.51	19,158	2,678	-	113,940	-	-	135,776
25	Young Durian	150<	4.50	2,736	383	-	16,272	-	-	19,391
26	Young Durian	25-50	3.84	-	-	-	-	-	-	-
		50-100	3.84	-	-	-	-	-	-	-
27	Young Rambutan	25-50	5.80	-	-	-	-	-	-	-
		50-100	1.93	-	-	-	-	-	-	-
28	Young Rambutan	25>	20.03	12,178	1,703	-	72,428	-	-	86,309
		25-50	12.02	7,308	1,022	-	43,464	-	-	51,794
		50-100	26.93	16,373	2,289	-	97,379	-	-	116,041

Table F.33 Continued

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht) I	II	III	IV	V	VI	Total Cost (Baht)
29	Young Durian	25>	5.76	-	-	-	-	-	-	-
		50-100	5.77	-	-	-	-	-	-	-
30	Old Rambutan	No Deposit	2.23	-	-	-	-	-	-	-
31	Grass	150<	21.83	13,273	1,856	2,270	-	-	78,937	96,336
32	Grass	150<	45.25	27,512	3,846	4,706	-	-	163,624	199,688
33	Grass	150<	20.25	12,312	1,721	2,106	-	-	73,224	89,363
34	Grass	50-100	6.35	3,861	540	660	-	-	22,962	28,023
35	Sand	150<	3.48	-	-	-	-	-	-	-
36	Sand	150<	1.51	-	-	-	-	-	-	-
37	Sand	150<	55.69	33,860	4,734	5,792	-	-	201,375	245,761
38	Sand	150<	16.33	9,929	1,388	1,698	-	-	59,049	72,064
39	Sand	150<	15.83	9,625	1,346	1,646	-	-	57,241	69,858
40	Marshy Area	150<	34.37	20,897	2,921	-	-	-	124,282	148,100
41	Trial Site	150<	5.60	-	-	-	-	-	-	-

Remarks: I; Input soil amendments, II; Grow soil cover crop, III; Removal of stones and cobbles, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Mix deposited soil with new good soil, and soil dressing on farm land.

Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.34 Cost of soil rehabilitation in F/S area (Case 2, Ban Na San)

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht)						Total Cost (Baht)
				I	II	III	IV	V	VI	
1	Old Rambutan	25-50	23.30	-	-	-	-	-	-	-
2	Young Rambutan	No Deposit	11.04	6,712	938	-	39,921	-	-	47,571
		25-50	11.04	6,712	938	-	39,921	-	-	47,571
3	Young Durian	No Deposit	4.83	-	-	-	-	-	-	-
4	Young Rambutan	25-50	43.10	26,205	3,664	-	155,850	-	-	185,719
5	Young Durian	25-50	3.50	2,128	298	-	12,656	-	-	15,082
		50-100	3.73	2,268	317	-	13,488	-	-	16,073
6	Young Rambutan	25-50	6.15	3,739	523	-	22,238	-	-	26,500
		50-100	6.15	3,739	523	-	22,238	-	-	26,500
7	Old Rambutan	No Deposit	16.00	-	-	-	-	-	-	-
8	Old Durian	No Deposit	1.05	-	-	-	-	-	-	-
9	Old Rambutan	No Deposit	3.82	-	-	-	-	-	-	-
10	Old Rambutan	100-150	4.23	-	-	-	-	-	-	-
11	Young Rambutan	100-150	9.53	5,794	810	-	34,460	-	-	41,064
12	Young Durian	50-100	9.45	-	-	-	-	-	-	-
13	Young Rambutan	100-150	12.24	7,442	1,040	-	44,260	-	-	52,742
		150<	12.24	7,442	1,040	-	44,260	-	-	52,742
14	Young Rambutan	150<	17.61	-	-	-	-	-	-	-
15	Young Rambutan	150<	0.55	-	-	-	-	-	-	-

Table F.34 Continued

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht) I	II	III	IV	V	VI	Total Cost (Baht)
16	Young Durian	25-50	2.45	-	-	-	-	-	-	-
		150<	2.45	-	-	-	-	-	-	-
17	Young Rambutan	25-50	1.72	-	-	-	-	-	-	-
		150<	1.73	-	-	-	-	-	-	-
18	Old Rambutan	25-50	8.35	-	-	-	-	-	-	-
19	Young Rambutan	25>	4.01	2,438	341	-	14,500	-	-	17,279
		25-50	4.02	2,444	342	-	14,536	-	-	17,322
20	Cashew Nut	25-50	8.50	-	-	-	-	-	-	-
21	Young Durian	25>	4.73	-	-	-	-	-	-	-
22	Young Rambutan	150<	20.05	12,190	1,704	-	72,501	-	-	86,395
23	Old Rambutan	25>	21.69	-	-	-	-	-	-	-
		50-100	5.54	-	-	-	-	-	-	-
24	Young Rambutan	150<	31.51	19,158	2,678	-	113,940	-	-	135,776
25	Young Durian	150<	4.50	2,736	383	-	16,272	-	-	19,391
26	Young Durian	25-50	3.84	-	-	-	-	-	-	-
		50-100	3.84	-	-	-	-	-	-	-
27	Young Rambutan	25-50	5.80	-	-	-	-	-	-	-
		50-100	1.93	-	-	-	-	-	-	-
28	Young Rambutan	25>	20.03	12,178	1,703	-	72,428	-	-	86,309
		25-50	12.02	7,308	1,022	-	43,464	-	-	51,794
		50-100	26.93	16,373	2,289	-	97,379	-	-	116,041

Table F.34 Continued

Plot NO.	Land Use	Depth (cm)	Area (rai)	Construction Cost of Soil and Soil Layer Improvement (Baht) I	II	III	IV	V	VI	Total Cost (Baht)
29	Young Durian	25>	5.76	-	-	-	-	-	-	-
		50-100	5.77	-	-	-	-	-	-	-
30	Old Rambutan	No Deposit	2.23	-	-	-	-	-	-	-
31	Grass	150<	21.83	13,273	1,856	2,270	-	-	78,937	96,336
32	Grass	150<	45.25	27,512	3,846	4,706	-	-	163,624	199,688
33	Grass	150<	20.25	12,312	1,721	2,106	-	-	73,224	89,363
34	Grass	50-100	6.35	3,861	540	660	-	-	22,962	28,023
35	Sand	150<	3.48	-	-	-	-	-	-	-
36	Sand	150<	1.51	-	-	-	-	-	-	-
37	Sand	150<	41.46	25,208	3,524	4,312	-	-	149,919	182,963
38	Sand	150<	16.33	-	-	-	-	-	-	-
39	Sand	150<	15.83	-	-	-	-	-	-	-
40	Marshy Area	150<	34.37	20,897	2,921	-	-	-	124,282	148,100
41	Trial Site	150<	5.60	-	-	-	-	-	-	-

Remarks: I; Input soil amendments, II; Grow soil cover crop, III; Removal of stones and cobbles, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Mix deposited soil with new good soil, and soil dressing on farm land.

Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.35 Cost of soil rehabilitation in F/S area (Case 1, Lan Saka)

1. Upstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	3.74	F	2,274	318	11,669	-	-	-	-	14,261
		(1.87)	(U)	748	-	-	-	-	-	-	748
	50-100	21.45	F	13,042	1,823	-	77,563	-	-	-	92,428
		(10.73)	(U)	4,292	-	-	-	-	-	-	4,292
	100-150	6.13	F	3,727	521	-	22,166	-	-	-	26,414
		(3.07)	(U)	1,228	-	-	-	-	-	-	1,228
	150<	18.04	F	10,968	1,533	-	65,233	-	-	-	77,734
		(9.02)	(U)	3,608	-	-	-	-	-	-	3,608
II. Flooded Area Not Damage	25>	21.51	F	-	-	-	-	-	-	-	-
	25-50	16.00	F	-	-	-	-	-	-	-	-
	50-100	2.65	F	-	-	-	-	-	-	-	-
	150<	6.79	F	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	No Deposit	17.46	F	10,616	1,484	-	-	-	-	-	12,100
		(8.73)	(U)	3,492	-	-	-	-	-	-	3,492
	25>	31.83	F	19,353	2,706	99,310	-	-	-	-	121,369
		(15.92)	(U)	6,368	-	-	-	-	-	-	6,368
	25-50	8.49	F	5,162	722	26,489	-	-	-	-	32,373
		(4.25)	(U)	1,700	-	-	-	-	-	-	1,700
	50-100	14.32	F	8,707	1,217	-	51,781	-	-	-	61,705
		(7.16)	(U)	2,864	-	-	-	-	-	-	2,864
	150<	5.12	F	3,113	435	-	18,514	-	-	-	22,062
		(2.56)	(U)	1,024	-	-	-	-	-	-	1,024
V. Highland	No Deposit	92.22	F	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.
Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.35 Continued

2. Downstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	6.93	F	4,213	589	21,622	-	-	-	-	26,424
		(3.47)	(U)	1,388	-	-	-	-	-	-	1,388
	50-100	35.14	F	21,365	2,987	-	127,066	-	-	-	151,418
		(17.57)	(U)	7,028	-	-	-	-	-	-	7,028
		16.60	RB	10,093	1,411	-	-	-	-	213,542	225,048
		5.43	U	2,172	-	-	-	-	-	-	2,172
	100-150	4.89	F	2,973	416	-	17,682	-	-	-	21,071
		(2.45)	(U)	980	-	-	-	-	-	-	980
		0.74	RB	450	63	-	-	-	-	9,519	10,032
	150<	97.17	F	59,079	8,259	-	351,367	-	-	-	418,705
		(48.59)	(U)	19,436	-	-	-	-	-	-	19,436
		27.77	RB	16,884	2,360	-	-	-	-	357,233	376,477
		2.72	U	1,088	-	-	-	-	-	-	1,088
	Reclaimed area	6.25	-	-	-	-	-	-	-	-	-
II. Flooded Area Not Damage	-	-	-	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	-	-	-	-	-	-	-	-	-	-	-
V. Highland	-	-	-	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.

Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.36 Cost of soil rehabilitation in F/S area (Case 2, Lan Saka)

1. Upstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	3.74	F	2,274	318	11,669	-	-	-	-	14,261
		(1.87)	(U)	748	-	-	-	-	-	-	748
	50-100	21.45	F	13,042	1,823	-	77,563	-	-	-	92,428
		(10.73)	(U)	4,292	-	-	-	-	-	-	4,292
	100-150	6.13	F	3,727	521	-	22,166	-	-	-	26,414
		(3.07)	(U)	1,228	-	-	-	-	-	-	1,228
	150<	18.04	F	10,968	1,533	-	65,233	-	-	-	77,734
		(9.02)	(U)	3,608	-	-	-	-	-	-	3,608
II. Flooded Area Not Damage	25>	21.51	F	-	-	-	-	-	-	-	-
	25-50	16.00	F	-	-	-	-	-	-	-	-
	50-100	2.65	F	-	-	-	-	-	-	-	-
	150<	6.79	F	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	No Deposit	17.46	F	10,616	1,484	-	-	-	-	-	12,100
		(8.73)	(U)	3,492	-	-	-	-	-	-	3,492
	25>	31.83	F	19,353	2,706	99,310	-	-	-	-	121,369
		(15.92)	(U)	6,368	-	-	-	-	-	-	6,368
	25-50	8.49	F	5,162	722	26,489	-	-	-	-	32,373
		(4.25)	(U)	1,700	-	-	-	-	-	-	1,700
	50-100	14.32	F	8,707	1,217	-	51,781	-	-	-	61,705
		(7.16)	(U)	2,864	-	-	-	-	-	-	2,864
	150<	5.12	F	3,113	435	-	18,514	-	-	-	22,062
		(2.56)	(U)	1,024	-	-	-	-	-	-	1,024
V. Highland	No Deposit	92.22	F	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.
Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.36 Continued

2. Downstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	6.93	F	4,213	589	21,622	-	-	-	-	26,424
		(3.47)	(U)	1,388	-	-	-	-	-	-	1,388
	50-100	13.59	RB	8,263	1,155	-	-	-	-	174,822	184,240
		43.58	U	17,432	-	-	-	-	-	-	17,432
	100-150	5.63	U	2,252	-	-	-	-	-	-	2,252
	150<	8.45	F	5,138	718	-	30,555	-	-	-	36,411
		(4.12)	(U)	1,648	-	-	-	-	-	-	1,648
		38.04	RB	23,128	3,233	-	-	-	-	489,347	515,708
		103.52	U	41,408	-	-	-	-	-	-	41,408
	Reclaimed area	6.25		-	-	-	-	-	-	-	-
II. Flooded Area Not Damage	-	-		-	-	-	-	-	-	-	-
III. Swamp	-	-		-	-	-	-	-	-	-	-
IV. Low and Wet Land	-	-		-	-	-	-	-	-	-	-
V. Highland	-	-		-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.
Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.37 Cost of soil rehabilitation in F/S area (Case 3, Lan Saka)

1. Upstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	4.54	U	1,816	-	-	-	-	-	-	1,816
	50-100	26.18	U	10,472	-	-	-	-	-	-	10,472
	100-150	8.43	U	3,372	-	-	-	-	-	-	3,372
	150<	35.21	U	14,084	-	-	-	-	-	-	14,084
II. Flooded Area Not Damage	25>	21.51	F	-	-	-	-	-	-	-	-
	25-50	16.00	F	-	-	-	-	-	-	-	-
	50-100	2.65	F	-	-	-	-	-	-	-	-
	150<	6.79	F	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	No Deposit	20.59	F	12,519	1,750	-	-	-	-	-	14,269
		(10.15)	(U)	4,060	-	-	-	-	-	-	4,060
	25>	31.83	F	19,353	2,706	99,310	-	-	-	-	121,369
		(15.92)	(U)	6,368	-	-	-	-	-	-	6,368
	25-50	8.49	F	5,162	722	26,489	-	-	-	-	32,373
		(4.25)	(U)	1,700	-	-	-	-	-	-	1,700
	50-100	14.32	F	8,707	1,217	-	51,781	-	-	-	61,705
		(7.16)	(U)	2,864	-	-	-	-	-	-	2,864
	150<	5.12	F	3,113	435	-	18,514	-	-	-	22,062
		(2.56)	(U)	1,024	-	-	-	-	-	-	1,024
V. Highland	No Deposit	92.22	F	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.
Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.37 Continued

2. Downstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	6.93	F	4,213	589	21,622	-	-	-	-	26,424
		(3.47)	(U)	1,388	-	-	-	-	-	-	1,388
	50-100	35.14	F	21,365	2,987	-	127,066	-	-	-	151,418
		(17.57)	(U)	7,028	-	-	-	-	-	-	7,028
		16.60	RB	10,093	1,411	-	-	-	-	213,542	225,048
		5.43	U	2,172	-	-	-	-	-	-	2,172
	100-150	4.89	F	2,973	416	-	17,682	-	-	-	21,071
		(2.45)	(U)	980	-	-	-	-	-	-	980
		0.74	RB	450	63	-	-	-	-	9,519	10,032
	150<	97.17	F	59,079	8,259	-	351,367	-	-	-	418,705
		(48.59)	(U)	19,436	-	-	-	-	-	-	19,436
		27.77	RB	16,884	2,360	-	-	-	-	357,233	376,477
		2.72	U	1,088	-	-	-	-	-	-	1,088
	Reclaimed area	6.25	-	-	-	-	-	-	-	-	-
II. Flooded Area Not Damage	-	-	-	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	-	-	-	-	-	-	-	-	-	-	-
V. Highland	-	-	-	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.

Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.38 Cost of soil rehabilitation in F/S area (Case 4, Lan Saka)

1. Upstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	4.54	U	1,816	-	-	-	-	-	-	1,816
	50-100	26.18	U	10,472	-	-	-	-	-	-	10,472
	100-150	8.43	U	3,372	-	-	-	-	-	-	3,372
	150<	35.21	U	14,084	-	-	-	-	-	-	14,084
II. Flooded Area Not Damage	25>	21.51	F	-	-	-	-	-	-	-	-
	25-50	16.00	F	-	-	-	-	-	-	-	-
	50-100	2.65	F	-	-	-	-	-	-	-	-
	150<	6.79	F	-	-	-	-	-	-	-	-
III. Swamp	-	-	-	-	-	-	-	-	-	-	-
IV. Low and Wet Land	No Deposit	20.59	F	12,519	1,750	-	-	-	-	-	14,269
		(10.15)	(U)	4,060	-	-	-	-	-	-	4,060
	25>	31.83	F	19,353	2,706	99,310	-	-	-	-	121,369
		(15.92)	(U)	6,368	-	-	-	-	-	-	6,368
	25-50	8.49	F	5,162	722	26,489	-	-	-	-	32,373
		(4.25)	(U)	1,700	-	-	-	-	-	-	1,700
	50-100	14.32	F	8,707	1,217	-	51,781	-	-	-	61,705
		(7.16)	(U)	2,864	-	-	-	-	-	-	2,864
	150<	5.12	F	3,113	435	-	18,514	-	-	-	22,062
		(2.56)	(U)	1,024	-	-	-	-	-	-	1,024
V. Highland	No Deposit	92.22	F	-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.
Note: Area is calculated by digital planimeter(PLANIX, Japan)

Table F.38 Continued

2. Downstream Area

Land Use	Depth (cm)	Area (rai)	Land Use* Plan	Construction Cost of Soil and Soil Layer Improvement (Baht)** I	II	III	IV	V	VI	VII	Total Cost (Baht)
I. Flood Affected Area	25-50	6.93	F	4,213	589	21,622	-	-	-	-	26,424
		(3.47)	(U)	1,388	-	-	-	-	-	-	1,388
	50-100	13.59	RB	8,263	1,155	-	-	-	-	174,822	184,240
		43.58	U	17,432	-	-	-	-	-	-	17,432
	100-150	5.63	U	2,252	-	-	-	-	-	-	2,252
	150<	8.45	F	5,138	718	-	30,555	-	-	-	36,411
		(4.12)	(U)	1,648	-	-	-	-	-	-	1,648
		38.04	RB	23,128	3,233	-	-	-	-	489,347	515,708
		103.52	U	41,408	-	-	-	-	-	-	41,408
	Reclaimed area	6.25		-	-	-	-	-	-	-	-
II. Flooded Area Not Damage	-	-		-	-	-	-	-	-	-	-
III. Swamp	-	-		-	-	-	-	-	-	-	-
IV. Low and Wet Land	-	-		-	-	-	-	-	-	-	-
V. Highland	-	-		-	-	-	-	-	-	-	-

Remarks: * F; Fruit tree, RB; Fruit tree with raising bed, U; Upland crop, (U); Intercrop in fruit tree area.
** Improvement methods are, I; Input soil amendments, II; Grow soil cover crop, III; Soil mixing, IV; Soil dressing on farm land, V; Exchange deposited soil with buried surface horizon, VI; Replace deposited soil with new good soil, VII; Circular ridge.

Note: Area is calculated by digital planimeter(PLANIX, Japan)

APPENDIX G

FLOOD DAMAGE AND GENERAL RESTORATION PROGRAM

Contents

List of Tables

G.1 Summary of damages due to flood in the south (November 1 to December 12, 1988)

The damage in the southern region, amphoe Lan Saka and Ban Na San are summarized in Table G.1.1, G.1.2 and G.1.3.

Nakhon Si Thammarat, Surat Thani and Song-Khla are the most damaged provinces in the South. Damage in agriculture (details are shown in Table G.1.4) is classified as follows.

1) Crop

Total damaged areas of crop in 13 provinces are about 1,600,000 rai. Of which, rice fields accounted for 80 %, rubber trees and fruit trees 9 % and 7 % of the total crop damaged area.

Crop damaged areas in three provinces; Nakhon Si Thammarat, Song Khla and Surat Thani, are about 1,400,000 rai or equal to 83 % of the total. Nakhon Si Thammarat is the most seriously affected with the rate of 54 % of the total. Details are shown in Table G.1.5.

2) Livestock and poultry

Total number of damaged livestock in 12 provinces is about 1,450,000. Poultry is the highest with the rate of 96 % of the total.

Nakhon Si Thammarat is the most seriously affected province with the rate of more than half of the total(refer to Table G.1.6).

3) Fishery

Total damaged value of aquaculture is about 840 million Bahts. Of which, sea shrimps amount to 83 % of the total damage.

Nakhon Si Thammarat is the most seriously affected province with the rate of 51 % of the total aquacultural damage(refer to Table G.1.7 and G.1.8).

Table G.1.1 Summary of Damages caused by Flooding in the South (during November 1 - December 12, 1988)

	Province	Affected Items						Moved out people		Damaged House	Damage on Public Infrastructure						Damaged Agricultural Area(rai)	Live Stock	Total Damaged Value (Baht)
		No. of Amphoe	No. of Family	People	Died	Loss	Injured	Family	People		Road	Bridge	Irrigation Structure	Government Building	School	Temple			
1	Chum Phon	8	11,770	50,655	7					252	491	137	23	105	35		37,754	23,700	369,657,230
2	Surat Thani	18	3,100	200,000	47			1,500	5,250	7,019	728	200	49		264	144	425,668	125,182	1,000,000,000
3	Nakhon Si Thammarat	17	30,000	160,550	346	211	1,906		5,816	8,139	1,125	326	109	15	802	240	2,473,757	481,674	2,603,000,000
4	Phatthalung	8	26,040	130,200	2		12			553	620	179	48	16	186	97	231,232	123,674	200,000,000
5	Krabi	5	477	1,270						1	25	19	21				1,050		1,640,000
6	Song Khla	15	71,098	301,144	31	50	88	4,605	23,450	37,342	1,286	260	38	80	326	182	274,479	122,633	1,000,000,000
7	Yala	6	6,395	25,587	18	1		758	3,034	401	477	66	7		88	22	58,816	127	509,720,000
8	Pattani	11	19,552	99,379	3	9				437	264	157	9	64	134		56,237	39,818	97,614,700
9	Ranong	2	50	200						2	10	4					1,000		500,000
10	Narathiwat	12	10,280	45,142	2		1	590	2,686	653	282	132	49	149	225	47	131,014	8,193	75,565,767
11	Satun	5	1,380	6,956	1			5	26	17	77	22	2		3		6,198	3,468	12,608,430
12	Phu Ket	1																	
13	Trang	6	24,279	97,116	1			2,002	8,072	221	246	33	36		27	24	73,887	19,954	53,410,930
14	Prachuap Khirikhan	2	120	600						14	70	27	2					1	3,739,742
	T o t a l	116	204,541	1,118,799	458	271	2,007	9,460	48,334	55,051	5,701	1,562	393	429	2,090	756	3,771,092	948,424	5,927,456,799

Source:Department of Local Administration, MOI

Table G.1.2 Summary of Damages due to Flood in Amphoe Ban Na San and Surat Thani Province, November 1988

Damage Item	Surat Thani		Ban Na San Compare to Whole Province %	Ban Na San Estimated Value of Damages (million baht)
	Whole Province	Amphoe Ban Na San		
Agriculture				
Agricultural land (rai)	215,343	19,089	8.86	9.5
Livestock & poultry (head)	125,182	na	–	na
Public Infrastructures				
Road (route)	728	85	11.67	14.90
Bridge	200	44	22.00	10.38
Weir	49	–	–	–
Gov't Building	–	–	–	–
School	284	31	10.91	19.00
Temple	144	7	4.86	7.00
Private House	7,019	700	9.97	na
Flood Victims				
Family suffed	3,100	na	–	
People suffed	200,000	na	–	
Death	31	25	80.64	
Lost	15	–	–	
Injured	855	na	–	
Evacuate to Safe Place				
No. of Family	1,500	317	21.13	
No. of People	5,250	na	–	
Total Damage Value (Mill.Baht)	1,000	300	30.00	

Source: Department of Local administration MOI and Amphoe Ban Na San Office

Table G.1.3 Summary of Damages due to Flood in Amphoe Lan Saka and Nakhon Si Thammarat Province, November 1988

Damage Item	Nakhon Si Thammarat		Lan Saka Compare to Whole Province %	Lan Saka Estimated Value of Damages (million baht)
	Whole Province	Amphoe Lan Saka		
Agriculture				
Agricultural land (rai)	895,921	11,358	1.27	68.71
Livestock & poultry (head)	481,874	7,591	1.58	1.26
Public Infrastructures				
Road (route)	1,125	23	2.04	12.54
Bridge	326	14	4.29	10.54
Weir	109	–	–	–
Gov't Building	15	1	–	0.10
School	802	18	2.24	7.96
Temple	240	10	4.17	9.88
Village water supply	–	6	–	4.50
Private House	8,139	920	11.29	–
Flood Victims				
Family suffed	30,000	6,832	22.77	
People suffed	160,550	38,542	24.00	
Death	346	15	4.05	
Lost	211	–	–	
Injured	1,906	–	–	
Evacuate to Safe Place				
No. of Family	na	475	–	
No. of People	5,816	2,600	44.70	
Total Damage Value (Mill.Baht)	2,803	194.35	6.93	

Source: Department of Local administration MOI and Amphoe Lan Saka Office

Table G.1.4 Farmland area affected by flood in the South from Nov.19 to Dec.30, 1988

No.	Changwat	Damaged Areas (Rai)						Total (Rai)
		Rice	Upland Crop	Vegetable	Rubber	Fruit	Others	
1	Nakhon Si Thammarat	1,028,724	14,325	19,658	343,583	117,570		1,523,860
2	Song Khla	447,826	3,840	5,600	323,633	49,552		830,451
3	Surat Thani	224,069	30,925	21,854	139,316	156,209		572,373
4	Phat Talung	256,867		1,673	19,036	1,616		279,192
5	Chum-porn	94,167	5,236	3,051	8,482	75,311		186,247
6	Pattani	127,843	4,988	682	3,318	15,915		152,746
7	Narathiwat	111,203	3,613	2,000	360	18,912		136,088
8	Trang	36,470	343	2,363	50,311	218		89,705
9	Yala	37,894	6,171	2,383	3,109	11,340		60,897
10	Satun	33,197		332		830		34,359
11	Krabi	870				8,000		8,870
12	Prajuab Kirikhan						135	135
13	Ranong	31				35		66
T o t a l		2,399,161	69,441	59,596	891,148	455,508	135	3,874,989

Source : Department of Agricultural Extension, MOAC

Table G.1.5 Crop damages caused by flood in the South from Nov.19 to Dec.30, 1988

No.	Changwat	Damaged Areas (Rai)						Total (Rai)
		Rice	Upland Crop	Vegetable	Rubber	Fruit	Others	
1	Nakhon Si Thammarat	711,867	4,207	15,785	107,174	56,915		895,948
2	Song Khla	261,732	1,680	2,458	4,697	3,912		274,479
3	Surat Thani	117,529	25,687	18,524	22,000	31,603		215,343
4	Phat Talung	88,537						88,537
5	Chum-porn	25,309	3,667	2,953	2,498	14,392		48,819
6	Pattani	52,066	1,823	843	482	1,023		56,237
7	Narathiwat	15,530	1,037	1,000	99	656		18,322
8	Trang	21,493	280	2,126	10,285	170		34,354
9	Yala	18,275	2,379	1,771	177	1,768		24,370
10	Satun	4,850		230		40		5,120
11	Krabi	813				38		851
12	Prajuab Kirikhan	-	-	-	-	-		0
13	Ranong	31	-	-	-	33		64
T o t a l		1,318,032	40,760	45,690	147,412	110,550		1,662,444

Source : Department of Agricultural Extension, MOAC

Table G.1.6 Livestock damage caused by flood in the South from Nov.19 to Jan.3, 1989

No.	Changwat	Number of death and loss (piece)						Assistance		Medicine (set)	Feed for Hogs	Remarks
		Horse	Cattle	Hog	Poultry	Goat Lamb	Total	Hay	Grass			
1	Nakhon Si Thammarat	21	5,590	27,361	795,470	191	828,633	187,800	30,000	315	4,500	
2	Pattalung		540	2,826	196,842	354	200,562	161,250	534,210	315		
3	Song-khla	6	798	5,144	159,864	606	166,418	129,310	82,520	315	150	
4	Surat Thani	9	1,518	7,752	111,164	25	120,468	300,210	254,000	245	10,000	-Animal feed of
5	Chumporn		85	904	56,475	-	57,464	41,830	15,725	106		2,330kg were
6	Yala		340	1,009	53,277	368	54,994	24,965	-	106		delivered to
7	Trang		48	417	19,659	11	20,135	16,020	74,300	106		Zone 8.
8	Pathani		135	76	17,520	994	18,725	22,245	47,500			-Animal feed of
9	Nara-thivas		438	42	11,563	322	12,365	39,600	118,770	85		2,330kg and
10	Satoon		10	1	19,062	82	19,155	6,330	3,100	106		feed for hogs
11	Ranoag			5	382		387		-			of 12,350kgs to
12	Krabi				586		586		10,000	106		Zone 9.
Total		36	9,502	45,537	1,441,864	2,953	1,499,892	929,560	1,170,125	1,805	14,650	

Source : Livestock Development Department, MOAC

Table G.1.7 Damage on aquaculture caused by flood in the South in 1988

No.	Changwat	Number of Farmers		Damaged Area		Damaged Value		A i d		
		Sea Shrimp	Other	Sea Shrimp	Other	Sea Shrimp	Other	Sea Shrimp	Other	Total
1	Chum-porn	27	889	10.59	538.76	41,030,000	9,358,100	262,500	2,229,780	2,492,280
2	Surat Thani	868	3,789	40,840.00	4,691.00	229,722,760	78,448,387	8,622,500	11,463,900	20,086,400
3	Satun	12	90	530.00	41.70	463,500	774,999	96,000	288,000	384,000
4	Nakhon Si Thammarat	1,278	107	55,546.21	27.26	423,427,240	1,272,100	10,625,000	458,200	11,083,200
5	Pattani	6	542	452.00	285.50	1,585,000	6,062,600	60,000	1,546,700	1,606,700
6	Prajuab	7	8	1.00	6.00	295,000	365,000	70,000	40,000	110,000
7	Phat-Talung	13	2,423	13.00	1,063.30	130,000	18,095,526	130,000	5,912,340	6,042,340
8	Yala	-	309	-	200.40	-	2,583,700	-	844,100	844,100
9	Narathiwat	-	251	-	91.50	-	1,505,050	-	709,050	709,050
10	Trang	-	891	-	401.59	-	5,611,222	-	2,013,650	2,013,650
11	Krabi	-	13	-	8.00	-	92,000	-	49,800	49,800
12	Song Khla	41	1,819	254.30	589.30	1,450,000	16,862,598	406,000	4,557,480	4,963,480
T o t a l		2,252	11,131	97,647.10	7,944.31	698,103,500	141,031,282	20,272,000	30,113,000	50,385,000

Source : Department of Fishery, MOAC

Notes : Total of damaged farmers 13,383 Household
Total damaged value 839,134,792.00 Bahts
Total of damaged area 105,591.41 rai

Table G.1.8 Value of damage in Fishery Projects of DOA in the South (1988)

Unit : Baht

No.	Changwat	Silver Barb	Cat fish	Tilapia	Jullien's Golden price	White sea Perch	Oyster	Shrimp	Clam	Others	Total
1	Chum-porn	469,050	853,900	329,900	286,800	115,290	-	7,200	-	167,640	2,229,780
2	Surat Thani	2,968,650	6,124,360	301,760	153,730	18,750	1,119,650	21,800	345,000	410,200	11,463,900
3	Pattani	-	855,050	-	-	616,380	-	5,000	-	70,270	1,546,700
4	Phat-Talung	1,871,260	1,864,520	590,710	279,870	292,680	-	276,020	-	737,280	5,912,340
5	Trang	1,463,590	201,010	124,480	23,730	-	-	-	-	200,840	2,013,650
6	Song-khla	832,230	1,749,120	87,680	138,690	1,422,490	-	75,610	-	251,660	4,557,480
7	Satun	-	288,000	-	-	-	-	-	-	-	288,000
8	Prajuab	-	10,000	-	20,000	10,000	-	-	-	-	40,000
9	Yala	341,530	235,130	145,380	-	-	-	16,000	-	106,060	844,100
10	Narathiwat	118,180	354,520	236,350	-	-	-	-	-	-	709,050
11	Krabi	-	49,800	-	-	-	-	-	-	-	49,800
12	Nakhon Si Thammarat	71,510	101,510	14,650	5,050	45,450	-	-	-	220,030	458,200
T o t a l		8,136,000	12,686,920	1,830,910	907,870	2,521,040	1,119,650	401,630	345,000	2,163,980	30,113,000

Source : Department of Fishery, MOAC

Table G.1.9 Agricultural Damages due to Flood, November 1988 in Amphoe Ban Na San, Surat Thani Province

Unit : rai

Crops	Planted Area	Damaged Area	Degree of Damage(%)
Rice	10,446	6,957	66
Rubber	4,178	2,667	64
Coffee	708	527	74
Cashew nut	56	48	86
Coconut	75	41	55
Cocoa	29	22	76
Pakia(Sa-Tor)	9	5	56
Pepper	18	12	67
Fruit Trees			
Rambutan	8,050	5,716	71
Durian	1,855	1,501	81
Mangosteen	857	567	68
Long Kong	274	160	66
Lang Sard	70	44	63
Mango	5	5	100
Vegetable	723	589	82
Corn	153	94	61
Groundnut	43	29	64
Water melon	15	15	100
Bean	35	28	80
Sesame	84	52	62
Banana	3	3	67
Lemon	7	7	100
Total	27,693	19,089	

Source : Report on flood damage as of November 28, 1988 by Amphoe Ban Na San Agricultural Extension Office

Table G.1.10 Agricultural Damages due to Flood, November 1988 in Amphoe Lan Saka, Nakhon Si Thammarat Province

Unit : rai

Crops	Planted Area	Damaged Area	Degree of Damage(%)
Rice	2,554	2,198	86
Rubber	1,933	1,445	75
Coffee	98	76	76
Coconut	601	418	70
Sator	103	77	75
Pepper	35	27	78
Fruit Trees			
Rambutan	1,499	1,249	83
Durian	2,140	1,606	75
Mangosteen	3,513	2,729	86
Long Kong	611	515	85
Lang Sard			
Jackfruit	7	6	78
Sapodilla	61	52	85
Vegetable	37	37	100
Corn	37	37	100
Groundnut	8	8	100
Lemon	1,042	878	84
Total	14,279	11,358	

Source : Report on flood damage as of November 28, 1988 by Amphoe Lan Saka Agricultural Extension Office

G.2 Restoration program after flood disaster in the South, November 1988

G.2.1 Assistance to flood affected people for short term programs

1) Assistance by Changwat and other agencies is as follows.

Item	Unit	Changwad	Other Agencies
Cash	Bahts	13,921	1,214,395
Rice	sacks	35,791	28,840
Canned food	cans	2,816,942	940,680
Cloth	peices	44,465	110,440
Boat	unit	170	-
Car	unit	224	-
Oil	liters	11,655	-
Blanket	peices	-	6,160
Medicine	dose	-	2,875

2) Assistance by Central government

- Southern Relief Center

Items	Donation recieved on December 12, 1988	Accumulated donation during Nov. 24-Dec. 12, 1988
Cash	-	18,480,044 Bahts
Rice	33 sacks and 13 percel	5,469 sacks and 11,681 parcels
Cloth	44 crates and 1 parcels	801 pieces, 3,802 crates and 1,050 parcels
Lungi	15,000 pieces	15,000 pieces
Blanket	5,000 pieces	3,000 pieces
Ready-cooked noodle	-	1,638 crates
Sweetned milk	-	10,170 cans
Robe for monks	-	4 crates
Medicine	-	732 crates

- Southern Civil Defence Unit

Southern Military Unit approved 58,259,000 Bahts of budget for rehabilitation on 383 projects of facilities in 8 provinces.

Unit : project

Province	road	bridge	dyke	weir	others	Total	Budget (unit)
Song-Khla	177	65	16	-	2	260	37,769,700
Surat Thani	39	2	-	-	-	41	7,426,000
Pattalung	10	-	-	-	-	10	3,300,500
Trang	23	3	-	-	-	26	2,850,100
Chum-poun	4	1	-	-	2	7	664,700
Nakhon Si Thammarat	13	-	-	-	-	13	2,711,900
Yala	17	-	-	2	-	19	1,648,900
Nara-thivas	7	-	-	-	-	7	1,886,600

Southern Unit approved following budget until December 11, 1988

Rehabilitation of public utility	64,683,000 Bahts
Consumption items	14,744,000 Bahts
Repair of houses	54,200,000 Bahts

- Navy

Donation	480 sets of rice and other consumption items
Transport	rice and other consumption items
Distribution	11 sacks of rice

- Accelerated Development Department

a) Surat Thani Province

-Remove soil from an area of 115,059m^2 in Ban Na San.

-Dig a well two(2) inches deep at Ban Muang Tuad Mu 7 Tambon Lam Poon Amphoe Ban Na San.

b) Nakhon Si Thammarat Province

-Built one temporary bridge

-Repaired 500m of surface of traffic road No.NS.11020

-Repaired the traffic surface at Wat-Ta Node and Ban-Nai-Khiew intersection

-Dug six(6) deep wells in Amphoe Prom Kiri and one in Amphoe Pi-Pune.

- Civil Work Department

Repair	15 roads
Sending/distribution	5 water-trucks(Surat Thani and Nakhon Si Thammarat provinces), 10 sets of drilling equipments for digging deep wells, 10 maintenance units for deep wells(Song Khla, Nakhon Si Thammarat and Surat Thani provinces). Maintenance of 80 damaged wells

- MOAC

a) Agriculture

Sending 602 tons of seeds(Surat Thani, Nakhon Si Thammarat Chumporn and Pattalung provinces).

b)Cattle

Sending Hay(331,000kg), Grass(1,264,000kg), Medicine(1,985 dose), Animal feel(19,500kg), and mobile unit of Veterinaries to the South.

- Local Water-Works

Distribution 87 cu.meters(Song Khla province), 195 cu.meters(Trang province), 24 cu.meters(Yala

province) and 72,000 liters(further distribution in Chum Porn province) of water, and 200km of alum(further distribution in Chum Porn province).

Donation 3,000km of alum(further distribution)

G.2.2 Organization for rehabilitation and development of southern region affected by flood in 1998 under jurisdiction of MOAC

1) Development and Rehabilitation Southern Region Committee
   Member : all D.G of department concern
   Chairman : Deputy Permanent Secretary
   Duty : to survey and collect all data to formulate a plan for development and rehabilitation of the southern region affected by flood disaster

2) Sub-committee for Surat Thani
   Chairman : Provincial agricultural extension officer

3) Sub-committee for Nakhon Si Thammarat
   Chairman : Provincial agricultural extension officer

4) Working group of the Committee
   Member : Staff of office of agricultural economics
   Duty : To collect data and coordinate each department's concern, prepare the report every 15 days for submission to MOAC.

G.2.3 Summary of agricultural infrastructure rehabilitation projects by RID

1) Flood Relief Project in Ban Na San, Surat Thani
   Reshape, Re-excavation and Bank Protection
   Chawang Canal
   Project cost 124,463,000 Bahts
   Progress of work 100%

2) Klong Kratoon Storage Dam in Nakhon Si Thammarat
   Earth Dam
   Height 24m
   Capacity 70.50 MCM
   Benefit area 12,500 rai
   Project cost 920,080,500 Bahts
   Progress of work 64%

3) Klong Dn Dang Storage Dam in Nakhon Si Thammarat
   Request Budget 580,625,000 Bahts
   Progress of work 0.68%

4) Flood Relief Project on Park Panang River in Nakhon Si Thammarat
   Re-excavation of existing canal systems
   Construction of Regulators
   Project cost 340,583,000 Bahts
   Progress of work 58%

5) Flood Relief Project in Nakhon Si Thammarat City
   Re-excavation of existing channels
   Construction of new drainage canal
   Diverse stream flow out of the city
   Project cost 129,990,000 Bahts
   Progress of work 60%

6) Land Rehabilitation and Flood Relief in Ban Krireewong, Nakhon Si Thammarat
   Re-excavation, enlarge cross section, fill up low land
   Project cost 197,747,000 Bahts
   Progress of work 96%

G.2.4 Summary of proposed long term restoration programs (1989-1995) by MOAC.

1) Proposed long term restoration programs by MOAC
Proposed long term restoration programs by MOAC are shown in Table G.2.1.

2) Flood relief project by the advice of The King
Storage dam, redredging, bank revetment, spur dike implemented in 1989 = 7 projects (5 in Nakhon Si Thammarat, and 1 each in Surat Thani and Song Khla).

3) Princess Chula Porn Village Development Project
To settle the new village for the landless people by the flood damage in the public land, the project consists of housing, infrastructure, agricultural development, agricultural industry, irrigation, drainage, flood protection, soil and water conservation and deforestation.
4 projects in Nakhon Si Thammarat
4 projects in Yala
2 projects in Nara Thi Wat
1 project in Surat Thani
1 project in Patani

Notes : These proposed projects were approved in principle by the Cabinet on March 4, 1989.

Table G.2.1 Proposed Long Term Restoration Programs by MOAC (1989-1995)

	Activity	Department	Budget requirement
Infrastructure	Rehabilitation and improvement irrigation structures, road, redredging, repair the office buildings	RID, ALRO, CPD, DOE	1989 = 551.02 M.Bahts 1990-1995 = 1,972.27 M.Bahts
Agricultural resources development	Remove sediment, silt deposit on farm land, reforestation	DOAE, RFD, DLD	1989 = 33.07 M.Bahts 1990 = 48.89 M.Bahts
Agricultural development	Seed, agricultural input, chemical and fertilizer, plant protection, agricultural research	RID, LDD, DOAE, DOA	1989 = 6.54 M.Bahts 1990/94 = 361.91 M.Bahts
Land settlement	Survey, forest land settlement, land use plan, water development	RFD, DLD, RID, CPD	1990 = 25.83 M.Bahts

Table G.2.2 The provinces received the assistance from Government and Private Sector up to December 12, 1988

	Province	Cash (Baht)	Rice (Sack)	Can Food (Can)	Clothing (set)	Blanket (piece)	First Aid (set)
1	Chun Phon		40	13,000			
2	Surat Thani	394,158	5,926	100,880	22,870	170	1,755
3	Nakhon Si Thammarat	811,980	18,323	675,200	83,770	3,220	820
4	Phatthalung		40	13,000			
5	Krabi		1,080	27,000		400	
6	Song Khla		999	38,500	1,000	2,040	300
7	Yala	8,257	100	43,100	800	200	
8	Pattani		1,900	2,000	2,000		
9	Ranong		100				
10	Narathivat						
11	Satun						
12	Phu Ket		332	28,000		130	
13	Trang						
14	Prachuap Khirikhan						
	T o t a l	1,214,395	28,840	940,680	110,440	6,160	2,875

Source : Department of Local administration, MOI

Table G.2.3 Assistance to Flood Affected People up to December 12, 1988

No.	Province	Received Assistance		Budget for AID program (Baht)	Shallow Depth Boat (unit)	Car Track (unit)	Rice (sack)	Food Can (can)	Consumer Stuff (set)	Fish soy source (bottle)	Blanket (piece)	Clothing (suit)	First Aid (set)	Fuel (liter)	Remark
		Family	People												
1	Chum Phon			649,375	36	20	227	43,592	1,400	400		920			1 Helicopter
2	Surat Thani	38,000		1,029,600	20	55	11,081	1,301,250	15,203	5,520	2,074	102,745	22,926		
3	Nakhon Si Thammarat		2,850	7,109,651	3	15	14,180	749,700	17,743	2,080	5,000	28,887	2,696		
4	Phatthalung	11,457		656,843			2,341	65,900		12,696	3,019	1,710			
5	Songkhla	139,016	156,205	803,004	72	117	4,877	540,694	1,612	39,720	3,999	8,635	5,326	11,655	7 Helicopters
6	Yala	1,329	5,835	341,470	7	1	303	8,568	3,142		1,000	2,620	138		
7	Pattani	19,562	99,794	1,013,954	4		1,540	28,660	2,258	6,336	460	80	812		
8	Narathivat	13,609	63,910	1,550,475	7	16	134	25,174	1,415	695	1,740	597	33		
9	Krabi	477		59,231			18	1,650		324					
10	Satun	1,691	4,193	18,154											
11	Trang	4,617	1,200	683,395	21		3,090	51,754	1,692	136	500	6,026	20		
	T o t a l	229,758	333,987	13,915,152	170	224	37,791	2,816,942	44,465	67,907	17,792	152,220	31,951	11,655	

Table G.2.4 Agricultural Infrastructure Rehabilitation Project by RID

Location / Name / Type	Progress in Project (as of Feb.1995)
Surat Thani	
(1) Ban Na San Flood Relief Project Redredging and enlargement of about 2,400 m of Chawang canal with flood protection dikes. A new 800 m short-cut canal was constructed with earth dikes Project cost : 125.50 million Baht	100 %
Nakhon Si Thammarat	
(1) Klong Kratoon Storage Dam Earth dam : Height 24 m, Length 1,934 m Max. storage capacity : 70.50 MCM Benefit area : 12,500 rai Project cost : 920.08 million Baht	64.42 %
(2) Klong Din Dang Storage Dam Earth dam : Height 24 m, Length 2,260 m Max. storage capacity : 60 MCM Benefit area : 20,000 rai Project cost : 580 million Baht	0.68 %
(3) Flood Relief in Park Panang River Redredging and enlargement of existing canal, construction of regulators, excavation a short-cut canal Project cost : 340.60 million Baht	57.62 %
(4) Flood Relief in Nakhon Si Thammarat City Redredging and enlargement of natural canals Excavation of new drainage canal, and construction of control structures Project cost : 130 million Baht	60.22 %
(5) Land Rehabilitation and Flood Relief in Ban Krireewong Redredging, enlargement of canal construction of flood protection dikes Project cost : 197.75 million Baht	95.88 %

Table G.2.5 Summary of Princess Chula Porn's Projects in the General Study Area (Nakhon Si Thammarat)

No	Location: Tambon	Location: Amphoe	Project Name	Activities	Progress
1	Thayang	Tung Yai	Pat ta na Tung Na Muang Chai	Dyke; 3.85 km Drainage canal; 6.95 km Pumping station irrigation facilities Budget; 45 Million Baht Benefit; 1300 rai, 100 household	1990 - 1992
2	Khao Phra	Pipoon	Ban Hui Tret	Redreging; 5.6 km Culvert Light industry Budget; 15.0 million Baht Benefit; 265 household	1990 - 1992
3	Ku Rac	Tung Yai	Ban Sa Net Juan	Storage dam; 1.68 MCM Mix farming Reforestation Budget; 14.3 million Baht Benefit; 2700 rai, 377 household	1990
4	Ku Rac	Tung Yai	Nong Ta Lac Pron	Storage dam; 1.15 MCM Farm pond; 2 $\times 5000\,m^3$ Mix farming Reforestation Budget; 29.5 million Baht Benefit; 2000 rai, 377 household	1993

APPENDIX H

AGRICULTURE

CONTENTS

Table H-1-1 Production of Paddy Rice, Thailand

Year	Second + Major				Second				Major			
	Area				Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	,000 rais	,000 rais	,000 tons	kg/rai	,000 rais	,000 rais	,000 tons	kg/rai	,000 rais	,000 rais	,000 tons	kg/rai
1. 1983/84	62,596	60,038	19,549	326	4,481	4,410	2,606	591	58,115	55,628	16,942	305
2. 1984/85	62,329	60,183	19,905	331	4,415	4,412	2,630	596	57,915	55,774	17,272	310
3. 1985/86	63,422	61,457	20,264	330	3,985	3,981	2,334	586	59,437	57,476	17,930	312
4. 1986/87	61,571	57,463	18,868	328	3,628	3,627	2,042	563	57,943	53,836	16,826	313
5. 1987/88	58,888	57,169	18,428	322	4,564	4,505	2,771	615	54,324	52,664	15,658	297
6. 1988/89	64,677	61,912	21,263	343	5,306	5,264	3,381	642	59,372	56,648	17,882	316
7. 1989/90	64,439	61,744	20,601	334	5,244	4,567	2,124	465	59,195	57,177	18,477	323
8. 1990/91	61,910	54,949	17,193	313	3,705	3,646	2,291	628	58,205	51,303	14,902	290
9. 1991/92	59,671	56,581	20,400	361	4,494	4,379	2,882	658	55,177	52,202	17,518	336
10. 1992/93	60,453	57,248	19,917	348	4,158	4,049	2,615	646	56,295	53,199	17,302	325
Total	619,956	588,744	196,388	–	43,980	42,840	25,676	–	575,978	545,907	170,709	–
Average	61,996	58,874	19,639	334	4,398	4,284	2,568	599	57,598	54,591	10,071	313

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-1-2 Production of Paddy Rice, Surat Thani

Year	Second + Major				Second				Major			
	Area				Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai
1. 1983/84												
2. 1984/85												
3. 1985/86												
4. 1986/87												
5. 1987/88												
6. 1988/89	413,528	377,232	105,921	281	36,308	36,308	18,783	517	377,220	340,924	87,138	256
7. 1989/90	399,686	331,075	86,720	262	10,104	9,087	2,960	326	389,582	321,988	83,760	260
8. 1990/91	340,002	314,786	78,966	251	17,002	17,002	8,552	503	323,000	297,784	70,414	236
9. 1991/92	355,231	349,388	106,363	304	6,370	6,370	3,100	487	348,861	343,018	103,263	301
10. 1992/93	323,968	285,693	89,836	314	11,760	11,760	4,916	418	312,208	274,023	84,920	310
Total	1,832,415	1,658,174	467,806	–	81,544	80,527	38,311	–	1,750,871	1,577,737	429,495	–
Average	366,483	331,635	93,561	282	16,309	16,105	7,662	450	350,174	315,547	85,899	273

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-1-3 Production of Paddy Rice, Nakhon Si Thammarat

Year	Second + Major				Second				Major			
	Area				Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai
1. 1983/84												
2. 1984/85												
3. 1985/86												
4. 1986/87												
5. 1987/88												
6. 1988/89	991,087	643,159	192,027	301	18,597	18,597	8,852	476	972,490	624,562	185,175	296
7. 1989/90	1,023,892	824,122	238,406	289	11,475	8,075	2,513	311	1,012,417	816,047	235,893	289
8. 1990/91	1,066,691	889,887	185,202	208	18,219	18,219	8,909	489	1,048,472	871,668	176,293	202
9. 1991/92	945,540	893,145	274,177	306	17,221	17,221	6,821	396	928,319	875,924	267,356	305
10. 1992/93	960,675	903,188	289,807	321	49,897	45,938	16,574	361	910,778	903,188	273,233	303
Total	4,987,885	4,153,501	1,179,619	–	115,409	108,050	43,669	–	4,872,476	4,091,389	1,137,950	–
Average	997,577	830,700	235,923	285	23,082	21,610	8,734	407	974,495	816,278	227,590	279

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-2 Production of Maize

Year	Thailand				Surat Thani			
	Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	,000 rais	,000 rais	,000 tons	kg/rai	rais	rais	tons	kg/rai
1. 1983/84	10,552	9,792	3,552	363				
2. 1984/85	11,355	10,866	4,226	389				
3. 1985/86	12,377	11,990	4,934	412				
4. 1986/87	12,194	11,345	4,309	380				
5. 1987/88	10,941	8,484	2,781	328				
6. 1988/89	11,471	11,163	4,675	419	17,134	15,441	3,295	213
7. 1989/90	11,165	10,687	4,393	411	18,296	18,153	3,604	199
8. 1990/91	10,910	9,657	3,722	385	13,322	12,751	2,051	161
9. 1991/92	9,219	8,741	3,793	434	5,796	5,735	1,375	240
10. 1992/93	8,446	7,725	3,672	475	4,214	2,930	293	100
Total	108,630	100,450	40,057	–	58,762	55,010	10,618	–
Average	10,863	10,045	4,006	400	11,752	11,002	2,124	183

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-3 Production of Groundnuts

Year	Thailand				Surat Thani				Nakhon Si Thammarat			
	Area				Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	,000 rais	,000 rais	,000 tons	kg/rai	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai
1. 1983/84	783	753	147	194								
2. 1984/85	820	781	172	220								
3. 1985/86	779	756	171	227								
4. 1986/87	790	781	169	217								
5. 1987/88	763	736	162	219								
6. 1988/89	771	737	164	222								
7. 1989/90	763	752	161	215	5,539	5,355	954	178	8,297	8,270	1,531	185
8. 1990/91	760	734	161	220	4,690	4,199	751	179	5,538	5,538	775	140
9. 1991/92	723	687	157	228	4,986	4,914	974	198	5,730	5,674	900	159
10. 1992/93	650	628	137	218	3,649	3,629	785	285	5,138	4,793	750	117
Total	7,602	7,345	1,601	–	18,864	18,097	3,464	–	24,703	24,275	3,956	–
Average	760	735	160	218	4,716	4,524	866	210	6,176	6,069	989	150

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-4 Production of Mungbean

Year	Thailand				Surat Thani				Nakhon Si Thammarat			
	Area				Area				Area			
	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield	Planted	Harvested	Production	Yield
	,000 rais	,000 rais	,000 tons	kg/rai	rais	rais	tons	kg/rai	rais	rais	tons	kg/rai
1. 1983/84	3,022	2,803	288	103								
2. 1984/85	3,280	3,017	352	117								
3. 1985/86	3,426	3,307	323	98								
4. 1986/87	3,172	3,081	301	98								
5. 1987/88	2,900	2,735	267	98								
6. 1988/89	2,964	2,888	333	115	1,597	1,389	128	92	4,264	3,474	371	107
7. 1989/90	3,205	3,102	356	115	435	372	43	116	19,193	17,558	1,776	101
8. 1990/91	2,808	2,674	303	113	–	–	–	–	25,764	24,264	2,518	104
9. 1991/92	2,754	2,610	304	117	247	243	24	99	22,674	17,509	2,305	132
10. 1992/93	2,404	2,189	261	119	203	141	14	99	10,201	8,793	792	90
Total	29,935	28,406	3,088	–	2,482	2,145	209	–	82,096	71,598	7,762	–
Average	2,994	2,841	309	109	621	536	42	77	16,419	14,320	1,552	107

Source ; Agricultural Statistics of Thailand, Crop Year 1983/84, 1987/88,1990/91, 1992/93

Table H-5-1 Agricultural Production in Ban Na San

Crops Name		Harvesting rai	Not Yet Bearing rai	Total rai	Production ton	Average /Yield kg/rai
Para Rubber	88/89	81,915	3,025	84,940	24,661	301
	89/90	82,415	2,625	85,040	24,443	297
	90/91	83,330	1,740	85,070	25,588	307
Rambutan	88/89	22,831	562	23,393	19,178	840
	89/90	22,831	562	23,393	17,123	750
	90/91	24,008	530	24,538	35,932	1,497
Durian	88/89	769	971	1,710	369	480
	89/90	769	971	1,710	352	458
	90/91	1,354	2,017	3,372	1,083	800
Mangosteen	88/89	370	147	517	222	600
	89/90	370	152	522	204	550
	90/91	372	539	911	205	550
Betel Nut	88/89	682	210	892	1,309	1,920
	89/90	670	180	850	1,201	1,800
	90/91	700	150	850	1,120	1,600
Oil Palm	88/89	256	65	321	320	1,250
	89/90	265	105	370	318	1,200
	90/91	663	252	915	1,658	1,500
Coffee	88/89	535	60	595	80	150
	89/90	565	40	605	79	140
	90/91	490	95	585	74	150

Source ; Agricultural Extension Office, Amphoe Ban Na San

Table H-5-2 Agricultural Production in Lan Saka

Crops Name		Harvesting rai	Not Yet Bearing rai	Total rai	Production ton	Average /Yield kg/rai
Para Rubber	(1991)	31,250	2,550	33,800	8,750	280
	(1992)	32,450	1,930	34,380	8,079	248
	(1993)	34,142	199	34,341	8,525	249
Mangosteen	(1991)	3,500	3,952	7,452	1,750	500
	(1992)	4,800	4,116	8,916	2,448	510
	(1993)	5,785	3,194	8,979	4,628	800
Durian	(1991)	1,588	230	1,818	1,558	981
	(1992)	6,698	241	6,930	6,703	1,000
	(1993)	5,250	56	5,306	6,300	1,200
Rambutan	(1991)	486	230	716	356	731
	(1992)	510	424	940	310	600
	(1993)	694	287	980	1,110	1,600
Log Kong	(1991)	20	143	163	1.6	80
	(1992)	44	127	171	3.5	80
	(1993)	74	269	343	55.5	750
Coconut	(1992)	5,262	955	6,218	2,138	406
	(1993)	6,218	-	6,218	3,497	562
Rice	(1989)	7,146	-	7,146	3,970	400
	(1990)	9,530	-	9,530	3,544	460
	(1991)	9,570	-	9,570	3,388	340
	(1992)	9,073	-	9,073	3,523	379
	(1993)	7,805	-	7,805	2,942	420

Source ; Agricultural Extension Office, Amphoe Lan Saka

Table H-6-1 Number of Livestocks in the National Level

(Unit : heads)

Year	Buffaloes	Cattle	Swine
1983	6,354,349	4,832,570	4,192,653
1984	6,300,896	4,788,989	4,263,201
1985	6,249,926	4,828,983	4,224,120
1986	6,256,854	4,878,741	4,201,074
1987	5,998,423	4,968,845	4,209,059
1988	5,708,270	5,072,024	4,684,926
1989	5,442,614	5,284,960	4,678,503
1990	5,094,270	5,458,680	4,761,622
1991	4,976,730	5,631,130	4,859,036
1992	4,861,910	5,815,470	4,655,479
Total	57,244,242	51,560,392	44,729,673
Mean	5,724,424	5,156,039	4,472,967

Source ; Agricultural Statistics of Thailand, Crop Year 1992/93

Table H-6-2 Number of Livestocks in Surat Thani

(Unit : heads)

Year	Buffaloes	Cattle	Swine	Chicken	Duck
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990	27,409	29,975	150,945	1,188,499	176,740
1991	26,776	30,922	158,732	1,322,874	206,324
1992	26,159	31,934	155,157	1,475,165	277,808
Total	80,344	92,831	464,834	3,986,538	660,872
Mean	26,781	30,943	154,945	1,328,846	220,291

Source ; Agricultural Statistics of Thailand, Crop Year 1992/93

Table H-6-3 Number of Livestocks in Nakhon Si Thammarat

(Unit : heads)

Year	Buffaloes	Cattle	Swine	Chicken	Duck
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990	31,423	217,731	173,956	2,272,597	346,297
1991	30,698	224,610	182,930	2,529,542	411,535
1992	29,990	231,962	178,810	2,820,747	411,735
Total	92,111	674,303	535,696	7,622,876	1,169,567
Mean	30,704	224,768	178,565	2,540,959	389,856

Source ; Agricultural Statistics of Thailand, Crop Year 1992/93

Table H-6-4 Number of Animals Raised in Amphoe Ban Na San (1990 ~ 1992)

(Unit : heads)

Year	Elephant	Horse	Buffalo	Cattle	Swine	Goat	Duck	Chicken	Goose
1990	1	20	267	2,578	6,175	-	3,823	38,969	20
1991	2	23	170	1,435	4,329	-	1,818	25,390	-
1992	1	18	216	3,971	8,453	12	4,791	48,664	-

Source ; Commerce in Surat Thani

Table H-6-5 Number of Animals Raised in Amphoe Lan Saka (1989 ~ 1993)

(Unit : heads)

Year	Elephant	Horse	Buffalo	Cattle	Swine	Goat	Duck	Chicken	Goose
1989	3	3	15	2,731	2,400	17	520	11,800	22
1990	3	3	35	3,350	2,400	26	872	28,512	54
1991	3	3	15	2,731	2,400	17	520	11,800	22
1992	3	3	35	3,350	2,400	26	872	28,512	54
1993	3	3	27	3,102	2,021	70	563	23,613	62

Source ; Nakorn Si Livestock Office

Table H-7-1 Cropping Guide (Vegetables)

Crops Name : Sweet Corn
(Variety)

1. Sowing Time — all year round

2. Transplanting Time — all year round

3. Planting Pattern — 75 cm x 50 cm = 4,266 plant/rai
(row width spacing)

4. Seed Rate — 4 kg/rai 500 Baht/kg
1 pit = 4~5 seeds

5. Fertilizers Input — (1) Before Sowing

Lime stone kg/rai
N15:P15:K15 50 kg/rai

(2) Flower-bud-appearing stage

Urea 50 kg/rai

6. Irrigation Interval — once/3~4 days

7. Pest Control (Agricultural Chemicals name)
Disease injury - Metalaxyl+Maucozeb (Metalaxyl MZ 72)
Insect injury - Carbofuran (Furandan 3% G)

8. Harvesting — 70 days (59~82)

9. Average Production — 4,000 - 8,000 kg/rai

10. Cropping Season

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
← all year → 3~4 times (70 days/times)

Source : Agricultural Extension

Table H-7-2 Cropping Guide (Vegetables)

Crops Name : Baby Corn
(Variety)

1. Sowing Time Feb. - Oct.

2. Transplanting Time 1st Feb. ~ 15th Sep.

3. Planting Pattern row width spacing
50cm x 50cm = 6,400 - 12,800 plant/rai

4. Seed Rate 3 - 4 kg/rai 100 Baht/kg

5. Fertilizers Input (1) Before Sowing
Lime stone kg/rai
N15:P15:K15 25-30 kg/rai

(2) Flower-bud-appearing stage
Urea 25 kg/rai

6. Irrigation Interval start cultivating - harvest

7. Pest Control (Agricultural Chemicals name)
Disease injury - Metalaxyl MZ 72
Insect injury - Carbonfuran (Furandan 3% G)

8. Harvesting Jun. ~ Oct.

9. Average Production 1,013 kg/rai

10. Cropping Season
Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
sowing time

Source ; Agricultural Extension

Table H-7-3 Cropping Guide (Food Crop)

Crops Name : Mungbean
(Variety)

1. Sowing Time May - June

2. Transplanting Time May - June

3. Planting Pattern 50 cm x 20 cm = 12,800 - 38,400
(row width spacing) plant/rai

4. Seed Rate 4-5 kg/rai 13 - 18 Baht/kg.1

5. Fertilizers Input (1) Before Sowing

Lime stone 100~200 kg/rai(ph 6.5-7.0)
N12:P24:K12 25 - 30 kg/rai

(2) Flower-bud-appearing stage

Urea - kg/rai

6. Irrigation Interval Flower-bud appearing stage - vegetable cutting

7. Pest Control (Agricultural Chemicals name)
Disease injury - Daconil
Insect injury - Carbaryl (Sevin 50))

8. Harvesting 90-100 days

9. Average Production 83 kg/rai (80-100 kg/rai)

10. Cropping Season

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
All times (90-100 days/times)

Source : Agricultural Extension

Table H-7-4 Cropping Guide (Food Crop)

Crops Name : Groundnut
(Variety)

1. Sowing Time	Apr - May July - Aug (rain season)
2. Transplanting Time	Jun - July Dec - Jan (irrigation)
3. Planting Pattern	50 cm x 25 cm = 12,800-38,400 plant/rai (row width spacing)
4. Seed Rate	15-18 kg/rai 13 - 18 Baht/kg 1 pit = 2-9 seeds
5. Fertilizers Input	(1) Before Sowing Lime stone 150-500 kg/rai (ph 5.5-6.5) N12:P24:K12 25-30 kg/rai (2) Flower-bud-appearing stage Urea - kg/rai
6. Irrigation Interval	Flower → bud appearing stage

7. Pest Control (Agricultural Chemicals name)
   Disease injury - Rust, chlorothalonil (Daconil)
   Insect injury - Caterpillar

8. Harvesting	100-110 days
9. Average Production	212 kg/rai

10. Cropping Season

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.

Source : Agricultural Extension

Table H-7-5 Cropping Guide (Food Crop)

Crops Name : Sweet Potato
(Variety)

1. Sowing Time all year round

2. Transplanting Time --- 25~30cm nursery plant

3. Planting pattern row width spacing 100cm × 30~50cm = 3,200~5,333plant/rai

4. Seed Rate 200ml/rai 550Baht/tin can

5. FertilizersInnput (1)Before Sowing
Lime stone Kg/rai
N12:P12:K21 25~50Kg/rai or N10:P10:K20 25~50Kg/rai
(2)Flower-bud-appearing stage
N12:P12:K21 25~50Kg/rai or N10:P10:K20 25~50Kg/rai

6. Irrigation Interval In the beginning - once/10~15days
After 1 monthly - once/20~30days

7. Pest Control(Agricultural Chemicals name)
Disease injury ---- leaf spot,Head rot
Insect injury ---- Thrip,warm,Aphid

8. harvesting 90~150days

9. Average Production Kg/rai

10. Cropping Season
Jan.Feb.Mar.May.Jun.jul.Aug.Sep.Oct.Nov.Dec.
all times

Source: Cultivation Method

TABLE H-7-6 CROPPING GUIDE (Vegetables)

Crops Name: Chili
(Variety)

1. Sowing Time all year round

2. Transplanting time 30~40 days

3. Planting pattern row width 50 - 75 cm × spacing 50 cm = 4,000 - 6,400 plant/rai

4. Seed Rate 0.15 ℓ/rai 100 Baht/ℓ

5. Fertilizers Input (1) Before Sowing

Lime stone		kg/rai
N13 : P13 : K21	20 - 25	kg/rai

(2) Flower-bud-appearing stage

Urea	10	kg/rai

6. Irrigation Interval Flower → bud-appearing stage

7. Pest Control (Agricultural Chemicals name)

Disease injury - Rust,Chlorothalonil (Daconil)
Insect injury - Caterpillar

8. Harvesting 80 ~ 100 days

9. Average Production 200 ~ 400 kg/rai (dry weight)

10. Cropping Season

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
← all year →

Source : Agricultural Extension

Table H-7-7 Cropping Guide (Food Crop & Vegetables)

Crops Name : Eggplant
(Variety)

1.	Sowing Time	30 days
2.	Transplanting Time	all year round
3.	Planting Pattern	50 cm x 80 cm = 4,000-4,266 plant/rai 75 50 (row width spacing)
4.	Seed Rate	0.15 l/rai 100 Baht/kg
5.	Fertilizers Input	(1) Before Sowing Lime stone kg/rai N13:P13:K21 25-100 kg/rai (2) Flower-bud-appearing stage N13:P13:K21 25-100 kg/rai
6.	Irrigation Interval	all year round

7. Pest Control (Agricultural Chemicals name)
   Disease injury - Karathane LC
   Insect injury - Carbofuran (Furandan 3% G)

8.	Harvesting	60-85 days (as long as 6-8 months)
9.	Average Production	4,000 - 4,000 kg/rai

10. Cropping Season

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.

Source : Cultivation Method

Table H-7-8 Cropping Guide (Vegetables)

Crops Name : Watermelon
(Variety)

1. Sowing Time all year round

2. Transplanting Time

3. Planting pattern row width spacing 2~3m× 90m =593 ~ 889 Plant/rai 1pit=5 seeds

4. Seed Rate

5. FertilizersInnput (1)Before Sowing
Lime stone Kg/rai (pH5.0~7.5=averagepH6.3)
N13:P13:K21 100~150Kg/rai

(2)Flower-bud-appearing stage
Urea 20Kg/rai

6. Irrigation Interval

7. Pest Control(Agricultural Chemicals name)
Disease injury ---- Mildew,rot vine
Insect injury ----Thrip,Bug

8. harvesting Sugar Baby - 65days
charleston Gray - 85days

9. Average Production 2,400Kg/rai (estimate)

10. Cropping Season
Jan.Feb.Mar.May.Jun.jul.Aug.Sep.Oct.Nov.Dec.
all times

Source : Cultivation Method

Table H-7-9 Cropping Guide (Vegetables)

Crops Name : Pumpkin
(Variety)

1. Sowing Time all year round

2. Transplanting Time all year round

3. Planting pattern row width 1.0~1.5m × spacing 1.0~1.5=711 ~ 1600plant/rai

4. Seed Rate 2Kg/rai 120Baht/Kg 1pit=5Seeds

5. FertilizersInnput (1)Before Sowing
Lime stone Kg/rai (pH5.5~6.8)
N13:P13:K21 50~ 75Kg/rai

(2)after one month stage
N13:P13:K21 50~ 75Kg/rai

6. Irrigation Interval

7. Pest Control(Agricultural Chemicals name)
Disease injury
Insect injury

8. harvesting young-45~60days to be harvest according fo the hardness of
old-120~180days the skin and color

9. Average Production 8,000Kg/rai

10. Cropping Season
Jan.Feb.Mar.May.Jun.jul.Aug.Sep.Oct.Nov.Dec.
all times

Source : Cultivation Method

TABLE H-7-10 CROPPING GUIDE (Vegetables)

Crops Name: Cucumber
(Variety)

1. Sowing Time able to cultivate all year round

2. Transplanting time

3. Planting pattern row width 30 cm × spacing 60 cm = 8,000 plant/rai

4. Seed Rate 2 ~ 3 kg/rai 50 Baht/ℓ

5. Fertilizers Input (1) Before Sowing

   Lime stone - kg/rai
   N15 : P15 : K15 50 kg/rai

   (2) Flower-bud-appearing stage

   Urea kg/rai

6. Irrigation Interval

7. Pest Control (Agricultural Chemicals name)

   Disease injury - --
   Insect injury - ( ) fly destory product --- used

8. Harvesting 30 ~ 60 days start harvest when it reach 28 days

9. Average Production 4,379 kg/rai

10. Cropping Season

    Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.
    ← all year →

Source : Agricultural Extension

Table H-7-11 Cropping Guide (Vegetables)

Crops Name : Yard long been
(Variety)

1. Sowing Time all year round

2. Transplanting Time

3. Planting pattern row width 60~80cm × spacing 40~60cm = 4,444~5,000plant/rai

4. Seed Rate 2~3Kg/rai 120Baht/Kg 1pit=5Seeds

5. FertilizersInnput (1)Before Sowing
Lime stone Kg/rai (pH5.5~6.0)
N13:P13:K21 50~ 75Kg/rai

(2)after one month stage
N13:P13:K21 50~ 75Kg/rai

6. Irrigation Interval

7. Pest Control(Agricultural Chemicals name)
Disease injury - Metalaxyl MZ72
Insect injury - Carbonfuran(Furandan3%G)

8. harvesting 50~75 days or 60~90 days

9. Average Production 3,000Kg/rai

10. Cropping Season
Jan.Feb.Mar.May.Jun.jul.Aug.Sep.Oct.Nov.Dec.
all times

Source : Cultivation Method

Table H-8-1 Cropping Guide (Fruit Tree)

Crops Name : Rambutan

(Variety)

1. Planting Pattern 10m × 10m = 16 plant/rai

nursery stock 30 Baht/plant

2. Fertilizers Inputs

N15:P15:K15

1 year	0.5 kg/plant	6 year	3 kg/plant	11 year	5.5 kg/plant
2 year	1 kg/plant	7 year	3.5 kg/plant	12 year	6 kg/plant
3 year	1.5 kg/plant	8 year	4 kg/plant	13 year	6.5 kg/plant
4 year	2 kg/plant	9 year	4.5 kg/plant	14 year	7 kg/plant
5 year	2.5 kg/plant	10 year	5 kg/plant	15 year	7.5 kg/plant

3. Pest Control (Agricultural Chemicals name)

Disease injury - Rafang disease destory young crops ··· prevent by using Caratan

Insect injury - Thrips absorbed water to feed flower ·· prevent by spraying Dimentoen or Phos.

4. First Harvesting seeding 4 year

budding or grafting 3 year

5. Flowering - Harvesting 100 ~ 110 days

6. Average production

1 year (4 year)	115 kg/rai	5 year (8 year)	1,213 kg/rai
2 year (5 year)	580 kg/rai	6 year (9 year)	1,225 kg/rai
3 year (6 year)	746 kg/rai	7 year (10 year)	1,252 kg/rai
4 year (7 year)	1,067 kg/rai		

Source ; Agricultural Group

Table H-8-2 Cropping Guide (Fruit Tree)

Crops Name : Durian
(Variety)

1. Planting Pattern 10 m x 10m = 16 plant/rai
nursery stock 25 Baht/plant
Budding

2. Fertilizers Inputs

(pH 5.5~6.5)
N:P:K 15:15:15 or 16:16:16

1 year	500	g/plant	6 year	2-3	kg/plant	11 year	kg/plant
2 year	500	g/plant	7 year		kg/plant	12 year	kg/plant
3 year	500	g/plant	8 year		kg/plant		
4 year	1	kg/plant	9 year		kg/plant		
5 year	1.5	kg/plant	10 year		kg/plant		

3. Pest Control (Agricultural Chemicals name)

Disease injury - Root-rot - spray with Phosethy aluminum
Insect injury - leaf sucking plant louse - spray with sevin 85%

4. First Harvesting seeding - year
budding or grafting 5 year

5. Flowering - Harvesting 110 - 120 days Chanee
140 - 150 days Mon-thong

6. Average production

1 year (5 year)	250 kg/rai	4 year (8 year)	2,300 kg/rai
2 year (6 year)	1000 kg/rai	5 year (9 year)	2,500 kg/rai
3 year (7 year)	1,500 kg/rai	6 year (10 year)	2,500 kg/rai

Source : Agricultural Extension

Table H-8-3 Cropping Guide (Fruit Tree)

Crops Name : Mangosteen
(Variety)

1. Planting Pattern
9 m x 9 m = 20 plant/rai
10m x 10m = 16 plant/rai
nursery stock 50-150 Baht/plant
seeding

2. Fertilizers Inputs

(pH 5.0~6.0)
N:P:K 14:14:14 or 15:15:15 or 16:16:16

1 year	500	g/plant	6 year	2-3	kg/plant
2 year	1.0	kg/plant	7 year	4-7	kg/plant
3 year	1.5	kg/plant	8 year	4-7	kg/plant
4 year	2.0	kg/plant	9 year	4-7	kg/plant
5 year	2.0	kg/plant	10 year	4-7	kg/plant

3. Pest Control (Agricultural Chemicals name)

Disease injury - Leaf spot - spray with macozeb 48g/20l water
Insect injury - Leaf minor - spray with Sevin 85%
Thrips - spray with Azodrin 30-40 c.c/20l water
Redmite - spray with Omite or Kelthane

4. First Harvesting seeding 7 year
budding or grafting 7 - 8 years

5. Flowering - Harvesting 40 days

6. Average production

1 year (7 year)	160 kg/rai
2 year (8 year)	480 kg/rai
3 year (9 year)	960 kg/rai
4 year (10 year)	1,120 kg/rai

Source : Agricultural Extension

TABLE H-8-4 CROPPING GUIDE (Fruit Tree)

Crops Name: Banana
(Variety)

1. Planting Pattern 4 - 5 m × 4 - 5 m = 64 - 100 plant/rai
   nursery stock 50 Baht/plant

2. Fertilizers N15 :P15 :K15

1 year	1/2	kg/plant	6 year	1	kg/plant	11 year	kg/plant
2 〃	1	〃	7 〃	1			
3 〃	1	〃	8 〃	1			
4 〃	1	〃	9 〃	1			
5 〃	1	〃	10 〃	1			

3. Pest Control (Agricultural Chemicals name)

   Disease injury -
   Insect injury -

4. First Harvesting seeding 1 year
   budding or grafting - year

5. Flowering - Harvesting 110 days

6. Average production

1st	1	bunch/plant
2 year	1	bunch/plant
3 year	1	bunch/plant
4 year	1	bunch/plant
5 year	1	bunch/plant

1 bunch (10 kg～13 kg)

Source : Agricultural Extension

TABLE H–8–5 CROPPING GUIDE (Fruit Tree)

Crops Name: Cashew Nut
(Variety)

1. Planting Pattern — 6 m × 6 m = 45 plant/rai
   nursery stock 5 Baht/plant

2. Fertilizers Inputs

   N15 : P15 : K15

1 year	100	gm/plant	6 year	1	kg/plant
2 〃	100	〃	7 〃	1	
3 〃	100	〃	8 〃	2	
4 〃	500	〃	9 〃	2	
5 〃	500	〃	10 〃	2	

3. Pest Control (Agricultural Chemicals name)

   Disease injury - ---
   Insect injury - hole bored by the grub in the tree trunk - - - used Sevin or Malathion inject into the hole

4. First Harvesting — seeding 3 year
   budding or grafting 2 months

5. Flowering - Harvesting ~100 days

6. Average production

1 year	(3 year)	1 kg/plant
2 〃	(4 〃)	1 kg/plant
3 〃	(5 〃)	2 kg/plant
4 〃	(6 〃)	2 kg/plant
5 〃	(7 〃)	2 kg/plant
6 - 10	(8 ~ 12 year)	4 - 5 kg/plant
11 - 15	(13 ~ 17 year)	8 - 10 kg/plant

Source : Agricultural Extension

Table H-9-1 Recommended Fertilizer for Rambutan

Time of Application	Recommended (N-P_2O_5-K_2O) gm/tree x Age**	Recommended formula	Rate of Application gm/tree/Age**	Method of Application
Preparation of hole	0-15-0	0-3-0	gm/hole	mix with soil in hole
Before bearing fruit (0-4 years old) 4 applications-March, May, August, October	200-35-100	12-6-17 15-5-20 together with* 21-0-0 46-0-0 or 16-3-9	700-800 600-700 500-600 250-300 1,000-1,200	split into two applications spread around tree 30 cm away from the trunk and hoe in the soil split into 4 times
Bearing stage after 2 harvested and 1 fruit formation	200-25-130 apply stable at 12 years old	18-6-6 25-7-7 together with 14-0-20 or 16-3-9	500-600 400-500 500-600 1,200-1,400	split into 2 times for first and second application Third application split into 3 times

* select either one

** Age means the number of years after planting eg 4 years used fertilizer 700 x 4 = 2,800 gram/tree/year

Application of manure

Chicken manure at 30-50 kg/tree-apply after harvesting.

Planting of leguminous crops

While fruit trees are still young, leguminous crops can be planted in between rows of trees and then ploughed in when flowering begins.

Dolomite

Apply 400 grams/tree x age and apply at stable rate at 10 years old.

Table H-9-2 Recommended Fertilizer for Durian

Time of Application	Recommended (N-P_2O_5-K_2O) gm/tree x Age**	Recommended formula	Rate of Application gm/tree/Age**	Method of Application
Preparation of hole	0-15-0	0-3-0	500	mix with soil in hole
Before bearing fruit (0-6 years old) Apply 4 times, March, May, August, October	150-30-100	12-6-17 15-5-20 together with* 21-0-0 46-0-0 or 14-4-9	500-600 600-700 400-500 200-250 1,000-1,100	split into 2 times spread evenly around trees, 30 cm away from the trunk then cover with organic matter split into 4 times
Bearing stage apply 2 times, when flower bud form and after harvesting	130-15-180 stable rate at 15 years old	14-5-20 15-5-20 together with* 14-0-20 or 15-5-20	300-350 300-350 600-700 800-900	Apply after harvesting Apply when flower bud is form Split into 2 times

* select either one

** Means the number of years after planting eg 4 years use fertilizer 500 x 4 = 2,000 grams/

Application of manure

Chicken manure at 5 kg x age of tree-apply after harvesting.

Planting of leguminous crops

While fruit trees are still young, leguminous crops can be planted in between rows of trees and then ploughed in when flowering begins.

Table H-9-3 Recommended Fertilizer for Mangosteen

Time of Application	Recommended (N-P_2O_5-K_2O) gm/tree x Age**	Recommended formula	Rate of Application gm/tree/Age**	Method of Application
Preparation of hole	0-15-0	0-3-0	500	mix with soil in hole
Before bearing fruit (0-9 years old) Apply 4 times, March, May, August, October	70-6-50	12-6-17 15-5-20 together with* 21-0-0 46-0-0 or 16-3-9	200-300 200-300 200-300 100-150 400-500	split into 2 times spread around trees, 30 cm away from the trunk and hoe in the soil split into 4 times
Bearing stage apply, 2 times after harvesting	70-6-50 stable rate at 15 years old	15-3-12 16-3-9 together with* 14-0-20 or 15-3-12	250-300 250-300 250-250 450-250	First application Second application Split into 2 times

* select either one

** Means the number of years after planting eg 4 years used fertilizer 200 x 4 = 800 grams/tree/year

Application of manure

Chicken manure at 30-50 kg/tree-apply after havesting.

Planting of leguminous crops

While fruit trees are still young, leguminous crops can be planted in between rows of trees and then ploughed in when flowering begins.

Dolomite Application

Apply 200 grams/tree x age-spread even around the spread of tree and turn in the soil is days before first application of fertilizer.

Table H-9-4 Recommended Fertilizer for Coconut

Time of Application	Recommended (N-P_2O_5-K_2O) gm/tree x Age**	Recommended formula	Rate of Application gm/tree/Age**	Method of Application
Preparation of hole	0-15-0	0-3-0	500	Lining in the bottom of hole
Before bearing fruit (1-5 years old)	125-125-375	13-13-21 or 15-15-15	1,000	Spread around tree at a radius of 0.5-2.0m depending on age and size of tree then turn into soil
		16-16-16	1,000	
		together with 0-0-60	500	
Bearing stage (6 years up)	750-750-2,250	13-13-21 or 15-15-15 16-16-16	600	Split 2 times, in the beginning of rainy season and late rainy season
		together with 0-0-60	3,000	

** Means the number of year after planting eg 4 years use fertilizer 1,000 x 4 = 4,000 grams/tree/year

In case of magnesium deficiency occuring especially in sandy soil

It is recommended to apply magnesium at 300-500 grams/tree or apply dolomite at 2-3kg/tree together with inorganic fertilizer.

For effective application of fertilizer, leaf analysis may be used to compare the critical level. If any nutrient has a value lower than critical level, it should then be considered.

Critical level in 14 frond N = 1.80-2.0% P = 0.12% K = 0.800-1.00% Ca = 0.500% Mg = 0.300% Fe = 50ppm and Mn = 60ppm

Coconuts that are grown in sandy soil should apply manure at 10-30kg/tree at least once a year or plant leguminous crop in between rows of coconut trees then tplough in.

APPENDIX I

AGRO-ECONOMY / PROJECT EVALUATION

Contents

Part 1

1. Present Conditions of the Surat Thani Province

Table 3·2.1·1 Area, Administrative Division, Population and Density of Surat Thani Province , year1990

Province & Amphoe	Total area (km2)	Administrative boundary				Population		Density (persons/ sq.km)
		Amphoe	King Amphoe	Tamboe	Village	Male	Total	
Surat Thani P.	12,891	17	2	129	953	n.a.	770,197	60
Ban Na San Amphoe	839	-	-	9	63	n.a.	68,009	81

Source: Surat Thani Administration

Table 3·2·1·2 Population Trend of the both Provinces during the Last Two Decades

Year / Area	Population (1,000 persons)			Average annual growth rate (%)		
	1970	1980	1990	1970 to 80	1980 to 90	1970 to 90
Surat Thani P.	437	588	747	3.00	2.42	2.72
Nakhon Si Thammarat P.	929	1,214	1,401	2.71	1.44	2.08
Southern Region	4,510	5,974	6,964	2.85	1.55	2.20
Thailand	36,379	46,718	54,532	2.53	1.56	2.04

Source:1970,1980,1990 Population and Housing Census

Table 3·2·1·3 Population Transition of the both Provinces between 1986 to 1991

Unit:person

	Surat Thani P.			Nakhon Si Thammarat P.		
	Male	Female	Total	Male	Female	Total
1986	345,700	364,700	710,400	708,900	707,500	1,416,400
1987	353,500	377,200	730,700	721,300	720,800	1,442,100
1988	361,300	390,100	751,400	733,800	733,500	1,467,300
1989	369,100	403,300	772,400	748,300	745,900	1,494,200
1990	377,200	416,300	793,500	758,900	758,900	1,517,800
1991	385,700	430,700	816,400	771,500	771,300	1,542,800
Sex rate	47.2%	52.8%	100.0%	49.1%	50.1%	100.0%
Sex ratio (M/F*100)	90(1991)			100(1991)		
1991/1986 rate	111.6%	118.1%	114.9%	108.8%	109.0%	108.9%
Average annual growth rate between 1986-1991	2.21%	3.38%	2.82%	1.70%	1.75%	1.72%

Table 3.2.1.4 Agriculture Households and Population, and Major Occupation Group

Items	Surat Thani Province	Nakhon Si Thammarat Province
(a) Agriculture Households		
Number	100,819	194,460
Percentage	60.1	65.5
(b) Population in Agriculture Households		
Number Number	467,543	946,915
PercentagePercentage	62.5	67.6
(c) Percentage of Major Occupation Group		
1) Total		
(1) Agricultural,Animal Husbandry and Forest workers,Fishermen and Hunders	73.6	77.0
(2) Sales Workers	8.4	6.6
(3) Crafismen,Production Workes and Laborers	7.0	6.8
(4) Professional,Technical and Related Workers	3.5	3.4
(5) Administrative,Executive,Manegerial Workers and Governments Officials,n.e.c	a	a
(6) service workers	a	a
2) Male		
(1) Agricultural,Animal Husbandry and Forest workers,Fishermen and Hunders	73.2	75.5
(2) Sales Workers	5.8	4.1
(3) Crafismen,Production Workes and Laborers	8.2	8.0
(4) Professional,Technical and Related Workers	3.1	a
(5) Administrative,Executive,Manegerial Workers and Governments Officials,n.e.c	a	3.3
(6) service workers		
3) Female		
(1) Agricultural,Animal Husbandry and Forest workers,Fishermen and Hunders	74.1	78.6
(2) Sales Workers	11.2	9.3
(3) Crafismen,Production Workes and Laborers	5.8	5.4
(4) Professional,Technical and Related Workers	3.9	3.8
(5) service workers	a	a

Source: 1990 Population and Housing Census
Note: Symbol "a" means the lower percentage or lower ranking order than those shown the column.

Table 3.2.1.5 Major Characteristics of 1990 Population and Housing Census

(1) Demographic Characteristics

	Surat Thani Province	Nakhon Si Thammarat Province
1. Age and Sex Stracture		
Total Population (persons)	747,049	1,400,598
Sex Ratio (%)	99.0	99.6
Percentage of Population Aged under 15 Years	30.6	34.0
Percentage of Population Aged 15-59 Years	61.5	57.7
Percentage of Population Aged 60 Years and over	7.9	8.3
Dependency Ratio (%)	62.5	73.4
2. Fertility		
Average Number of Children ever borend per Ever-married Women Aged 15 Years and over (persons)	3.0	3.4
Percentage of Currently Marr-ed Women Aged 15-49 Years Practicing Contraception	59.1	56.0
3. Population Distribution and and Migration		
Percent Distribution of Popul-ation in Municipal and Non-municipal Areas	11.9/88.6	8.0/92.0
Persons Migrated to this Prov-ince during 1985-1990		
(a) Number	31,217	27,064
(b) Percentage	4.2	1.9

Source:1990 Population and Housing Census
(National Statistical Office,Office of the Prime Minister Thailand)

(2) Social Characteristics and Sex

Items	Surat Thani Province	Nakhon Si Thammarat Province
Percentage of Literate Persons Aged 6 Years and over		
Total	95.5	93.3
Male	96.7	95.0
Female	94.3	91.7
Percentage of School Attendance of the persons Aged 6-29 Years		
Total	39.3	43.8
Male	39.8	43.9
Female	38.8	43.7
Percentage of Persons Aged 6 Years and over Who Attained more than Primary School		
Total	20.6	19.4
Male	23.3	22.2
Female	18.0	16.8
Percentage of Persons Aged 6 Years and over Who Completed Primary School Level		
Total	70.7	71.2
Male	69.9	70.7
Female	71.4	71.7
Percentage of Persons Aged 6 Years and over Who Completed Secondary School Level		
Total	16.2	14.3
Male	18.9	17.0
Female	13.6	11.7

(3) Selected Housing Characteristics and Aoliances Owned

	Surat Thani Province	Nakhon Si Thammart Province
\	%	%
(1) Housing Characteristics		
Permanent Construction Materials*1	87.9	87.6
Tenure of Living Quarters	86.9	91.1
Tenure of Land Where Quarters Situated*2	97.5	98.0
Tap Water	20.3	14.3
Electric Lighting	79.2	83.2
Charcoal for Cooking	27.8	17.4
Gas for Cooking	53.3	41.6
Sanitary Types of Toilet*3	79.1	74.9
Radio	81.5	75.9
Colour Television	56.0	47.6
Electric Rice Cooker	73.4	73.5
Electric Fan	66.4	63.5
Refringgerator	40.2	30.3
Teleohone	4.9	3.4
Motor Car	12.3	8.5
Motor Cycle	58.7	42.1
Bicycle	35.4	31.1

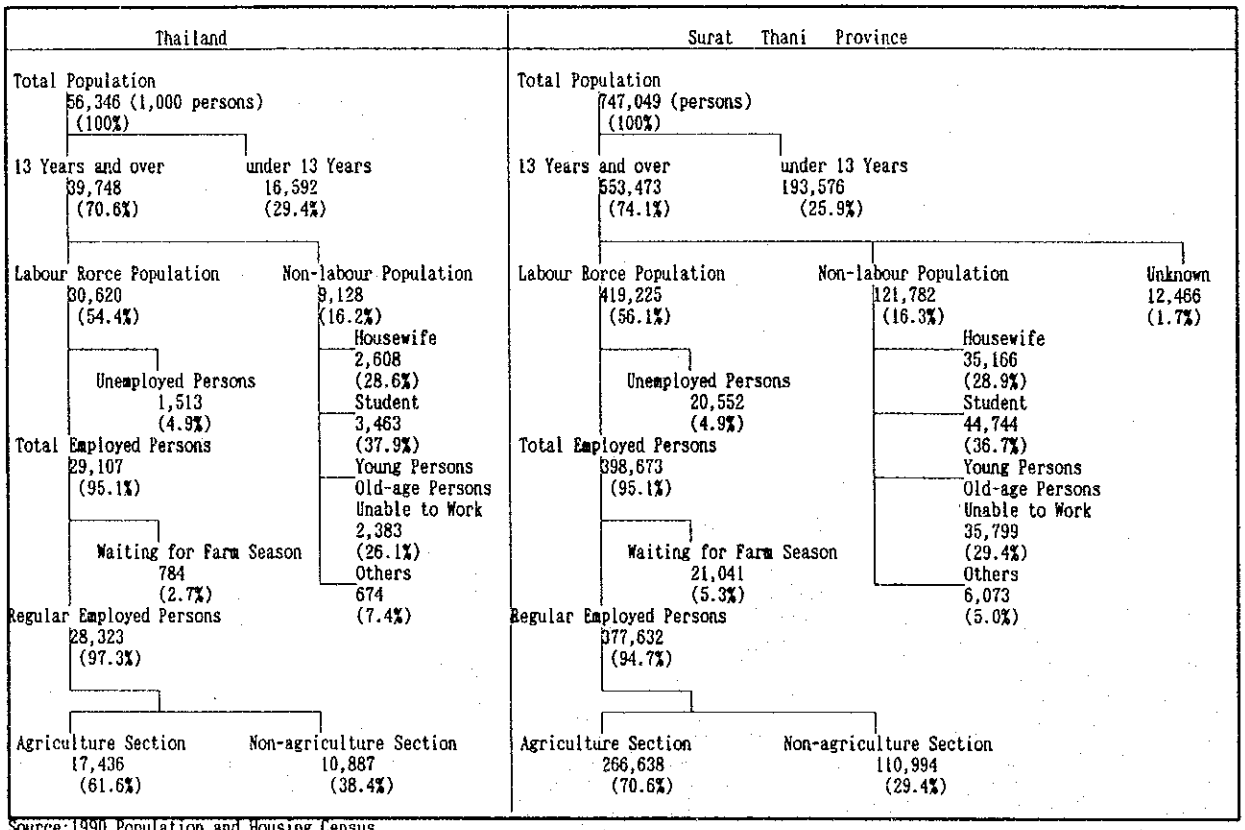
Note: *1···Permanent materials are wood and cement.
*2···Tenure means owner and hire-purchaser.
-Owner means the person having the legal right of possession.
-Hire-purchaser means a person who purchases annd pays in installments at intervals.
*3···Sanitary types of toilet means flush latrine and moulded bucket latrine.

Table 3.2.1.6 Regular Employed Persons bt Major Occupation group

	Surat Thani P.		Nakhon Si Thammarat P.	
	persons	%	persons	%
Professional,Technical and Related Workers	15,070	4.0	26,737	4.6
Administrative,Executive Managerial Workers and Government Officials,Na.e.c	7,295	1.9	13,646	2.3
Clerical and Related Workers	8,185	2.2	9,157	1.6
Sales Workers	36,628	9.7	52,608	9.0
Agricultural,Animal Husbandry and Forest Workers,Fishermen and Hunters	266,638	70.6	398,075	68.1
Miners,Quarrymen,Well Drillers and Related Workers	294	0.1	734	0.1
Transport Eqipment Operators and Related Workers	5,633	1.5	11,965	2.0
Crafitmen,Production Workers and Labourers	28,397	7.5	59,689	10.2
Service Workers	9,219	2.4	12,199	2.1
Workera not Classiable by Occupation or Unknown	228	0.1	55	-
Total	377,587	100.0	584,865	100.0

Source:1990 Population and Housing Census

Table 3.2.1.7 Labour Force Composition as to Surat Thani Province 1990



Source:1990 Population and Housing Census
Note:Non-labour population of Thailand include unknown population.

Table 3.2.1.8 Economic Position in National Gross Domestic Product

	1986			1991		
	Product	%	%	Product	%	%
	Bhats			Bhats		
Thailand (GDP)	1,072,931,000	100.0		2,509,427,000	100.0	
Southern Region (GRP)	106,584,774	9.9	100.0	207,328,091	8.3	100.0
Surat Thani Province (GPP)	11,795,898	1.1	11.1	25,027,451	1.0	12.1
Nakhon Si Thammarat Province (GPP)	15,722,969	1.5	14.8	32,037,871	1.3	15.5

Source: National Income of Thailand,1981-1991. Office of the National Economic and Social Development Board,Office of Prime Minister

Table 3·2·1·9 Gross Provincial Product of the Surat Thani Province (at current market prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986		1987		1988		1989		1991		1990	
	GPP	%	GPP	%	GPP	%	GPP	%	GPP	%	GPP	%
Agriculture	4,257,181	36.1	5,211,190	38.5	7,952,982	44.2	7,517,847	36.8	7,875,752	34.6	8,645,628	34.5
Crops	2,323,398	19.7	3,202,707	23.6	4,997,471	27.8	5,613,840	27.4	5,798,313	25.4	6,168,256	24.6
Livestock	235,281	2.0	353,543	2.6	409,734	2.3	305,720	1.5	244,049	1.1	465,303	1.9
Fishery	811,124	6.9	856,305	6.3	1,444,221	8.0	673,199	3.3	888,293	3.9	989,694	4.0
Forestry	426,253	3.6	265,214	2.0	405,121	2.3	62,728	0.3	55,528	0.2	6,232	0.0
Agro-services	46,367	0.4	47,604	0.4	55,340	0.3	64,078	0.3	56,330	0.2	61,375	0.2
Agro-processing product	414,758	3.5	485,817	3.6	641,095	3.6	798,282	3.9	833,239	3.7	954,768	3.8
Mining and quarring	250,028	2.1	269,001	2.0	463,633	2.6	2,159,913	10.6	2,161,224	9.5	2,121,242	8.5
Manufacturing	1,085,469	9.2	1,469,389	10.8	1,810,527	10.1	2,085,427	10.2	2,306,158	10.1	2,411,276	9.6
Construction	697,723	5.9	716,871	5.3	894,908	5.0	772,529	3.8	1,156,485	5.1	1,315,758	5.3
Electricity and water supply	231,522	2.0	268,428	2.0	331,391	1.8	381,022	1.9	386,639	1.7	432,714	1.7
Transportation and communication	720,052	6.1	591,583	4.4	611,326	3.4	810,841	4.0	938,180	4.1	1,029,621	4.1
Wholesale and retail trade	1,791,218	15.2	1,989,117	14.7	2,473,014	13.7	2,575,352	12.6	2,842,016	12.5	3,208,981	12.8
Banking	270,757	2.3	416,454	3.1	472,530	2.6	616,717	3.0	852,013	3.7	897,421	3.6
Ownership of dwellings	527,301	4.5	573,606	4.2	612,184	3.4	699,394	3.4	820,605	3.6	945,571	3.8
Public administration	615,484	5.2	642,841	4.7	701,518	3.9	810,089	4.0	990,158	4.3	1,158,371	4.6
Service	1,349,163	11.4	1,401,640	10.3	1,672,825	9.3	2,026,951	9.9	2,463,026	10.8	2,860,868	11.4
Total of GPP	11,795,898	100.0	13,550,120	100.0	17,996,838	100.0	20,456,082	100.0	22,792,256	100.0	25,027,451	100.0
GPP per capita (Unit:baht)	16,498		18,587		24,060		26,881		29,334		31,442	
Population (1,000)	715		729		748		761		777		796	

Source : Agriculture Economic Resarch Division
Agriculture Economic Office

Table3.2.1.10Number of Hospital and Medical Establishment with Beds,Beds,Patients,Physicians and Nurses 1988

	No. of Hospital and Medical Establishment*1	No. of Bed for Patients	Population /Bed Ratio	Number of Patients *2			Number of Physicians	Population / Physician Ratio	Number of Nuraes	Population /Nurse Ratio
				Total	in Patients	out Patients				
	No.	No.	persons	persons	persons	persons	persons	persons	persons	persons
Surat Thani Province	17	981	727.35	379,946	53,798	326,148	83	8,396.71	298	2,394.39
Nakhon Si Thammarat Province	22	1,465	953.04	665,213	102,413	562,800	124	11,259.75	397	3,516.90
Southern Region	144	9,882	694.30	3,232,076	449,342	2,782,734	1,200	5,717.58	3,809	1,801.28

NOte:*1··Included Government Hospital,State Enterprise Hospital,Municipality Hospital and Private Hospital,except Specialized Hospital.
*2·· Data covers only medical establishment under jurisdiction of Ministry of Public Health.
Source:Statistical Reports of Region-Southern Region 1990 (National Statistical Office,Office of The Prime Minister; Heath Statistics Division,Office of the Permanent Secretary,Ministry of Public Health)

Table 3·2·1·11 Average Annual Growth Rate of GDP(GRP,GPP)

	Surat Thani Province	Nakhon Si Thammarat Province	Southern Region	Country
1. 1981-1991(10 years)	%	%	%	%
a. GDP(GRP,GPP)	10.18	7.17	6.95	
b.Agriculture	9.80	5.29	6.14	
c.crop	12.33	4.13	7.80	
2. 1986-1991(5 years)				
a. GDP(GRP,GPP)	11.05	9.41	8.31	
b.Agriculture	10.92	7.35	7.53	
c.crop	17.17	6.23	8.87	
3.1988-1991(3 years)				
a. GDP(GRP,GPP)	9.28	11.62	8.46	10.56
b.Agriculture	6.58	10.98	7.50	3.29
c.crop	12.71	5.86	8.06	2.97

Source: National Income of Thailand,1981-1991. Office of the National Economic and Social Development Board,Office of Prime Minister

Note: The average annual growth rate targets of GDP and, Agriculture and Crop sections during the Seventh Plan (1992-1996) are 8.2%, 3.29% and 2.97% respectively.

Table 3·2·1·12 Gross Provincial Product of the Surat Thani Province (at constant 1988 prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986		1987		1988		1989		1990		1991	
	GPP	%	GPP	%	GPP	%	GPP	%	GPP	%	GPP	%
Agriculture	5,735,261	48.6	6,285,848	46.4	7,952,982	44.2	8,918,466	43.1	9,346,437	41.0	9,627,527	38.5
Crops	3,240,984	27.5	3,918,981	28.9	4,997,471	27.8	6,840,114	33.1	7,027,081	30.8	7,156,383	28.6
Livestock	257,803	2.2	334,994	2.5	409,734	2.3	329,140	1.6	319,899	1.4	371,389	1.5
Fishery	1,246,742	10.6	1,147,234	8.5	1,444,221	8.0	790,025	3.8	1,028,825	4.5	1,052,223	4.2
Forestry	442,132	3.7	284,742	2.1	405,121	2.3	57,418	0.3	49,578	0.2	5,783	0.0
Agro-services	47,691	0.4	45,383	0.3	55,340	0.3	57,543	0.3	48,227	0.2	50,957	0.2
Agro-processing product	499,909	4.2	554,514	4.1	641,095	3.6	844,226	4.1	872,827	3.8	990,792	4.0
Mining and quarring	289,072	2.5	300,775	2.2	463,633	2.6	1,716,230	8.3	2,022,924	8.9	2,089,826	8.4
Manufacturing	1,207,128	10.2	1,560,553	11.5	1,810,527	10.1	1,916,876	9.3	2,084,133	9.1	2,115,976	8.5
Construction	752,747	6.4	756,287	5.6	894,908	5.0	723,131	3.5	996,461	4.4	1,049,795	4.2
Electricity and water supply	269,859	2.3	279,954	2.1	331,391	1.8	364,530	1.8	377,302	1.7	399,994	1.6
Transportation and communication	775,467	6.6	593,926	4.4	611,326	3.4	794,954	3.8	931,526	4.1	992,802	4.0
Wholesale and retail trade	1,962,592	16.6	2,053,912	15.2	2,473,014	13.7	2,488,155	12.0	2,579,252	11.3	2,726,199	10.9
Banking	287,553	2.4	431,901	3.2	472,530	2.6	585,820	2.8	764,091	3.4	761,238	3.0
Ownership of dwellings	551,354	4.7	575,670	4.2	612,184	3.4	656,647	3.2	683,108	3.0	701,965	2.8
Public administration	635,497	5.4	654,924	4.8	701,518	3.9	718,024	3.5	793,653	3.5	869,646	3.5
Service	1,436,430	12.2	1,460,059	10.8	1,672,825	9.3	1,787,644	8.6	1,953,147	8.6	2,149,896	8.6
Total of GPP	13,902,960	100.0	14,953,809	100.0	17,996,838	100.0	20,670,477	100.0	22,532,034	100.0	23,484,864	100.0
GPP per capita (Unit:baht)	19,445		20,512		25,036		27,302		28,999		29,504	
Population (1,000)	715		729		748		761		777		796	

Source : Agriculture Economic Resarch Division
Agriculture Economic Office

Table 3.2.1.13 Gross Regional Product of the Southern Region (at current market prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986		1987		1988		1989		1990		1991	
	GRP	%	GRP	%	GRP	%	GRP	%	GRP	%	GRP	%
Agriculture	37,307,769	35.0	45,600,692	37.3	57,350,170	39.4	58,033,330	35.3	62,066,384	33.4	67,706,034	32.7
Crops	18,666,959	17.5	23,661,740	19.4	31,013,558	21.3	30,602,542	18.6	33,059,027	17.8	34,391,486	16.6
Livestock	2,215,193	2.1	2,571,589	2.1	2,844,263	2.0	2,794,335	1.7	2,153,659	1.2	4,049,270	2.0
Fishery	6,451,735	6.1	7,948,106	6.5	11,087,831	7.6	11,945,756	7.3	14,056,292	7.6	15,699,520	7.6
Forestry	5,411,055	5.1	6,231,832	5.1	6,206,053	4.3	5,200,416	3.2	4,609,884	2.5	3,933,955	1.9
Agro-services	445,702	0.4	468,016	0.4	488,341	0.3	541,749	0.3	517,033	0.3	545,223	0.3
Agro-processing product	4,117,125	3.9	4,719,409	3.9	5,710,124	3.9	6,948,532	4.2	7,670,489	4.1	9,086,580	4.4
Mining and quarring	1,552,181	1.5	1,559,352	1.3	1,838,907	1.3	5,212,418	3.2	4,667,481	2.5	4,854,452	2.3
Manufacturing	5,824,589	5.5	6,568,576	5.4	7,886,798	5.4	9,267,284	5.6	10,733,917	5.8	11,243,045	5.4
Construction	6,455,775	6.1	6,693,888	5.5	8,089,096	5.6	8,948,695	5.4	12,633,270	6.8	15,210,097	7.3
Electricity and water supply	1,898,386	1.8	2,282,058	1.9	2,554,335	1.8	3,001,214	1.8	3,574,259	1.9	3,736,591	1.8
Transportation and communication	7,922,732	7.4	8,545,958	7.0	8,740,477	6.0	10,776,912	6.5	11,163,744	6.0	12,183,988	5.9
Wholesale and retail trade	17,058,144	16.0	19,639,705	16.1	23,678,368	16.3	26,943,278	16.4	29,607,750	15.9	33,250,267	16.0
Banking	2,674,329	2.5	3,153,912	2.6	4,070,159	2.8	5,377,637	3.3	6,697,886	3.6	7,526,658	3.6
Ownership of dwellings	4,896,014	4.6	5,228,860	4.3	5,540,125	3.8	6,216,837	3.8	7,281,324	3.9	8,375,294	4.0
Public administration	5,913,293	5.5	6,129,465	5.0	6,717,334	4.6	7,708,764	4.7	9,198,899	5.0	10,789,856	5.2
Service	15,081,562	14.1	16,789,868	13.7	19,180,900	13.2	23,086,789	14.0	28,101,232	15.1	32,451,809	15.7
Total of GRP	106,584,774	100.0	122,192,334	100.0	145,646,669	100.0	164,573,178	100.0	185,726,146	100.0	207,328,091	100.0
GRP per capita	15,589		17,441		20,311		22,437		24,803		27,084	
Population (1,000)	6,837		7,006		7,171		7,335		7,488		7,655	

Source: National Income of Thailand ,1986-1991. Office of the National Economic and Social Development Board, Office of Prime Minister.

Table 3·2·1·14 Gross Regional Product of the Southern Region (at constant 1988 prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986		1987		1988		1989		1990		1991	
	GRP	%	GRP	%	GRP	%	GRP	%	GRP	%	GRP	%
Agriculture	49,565,064	39.7	53,850,801	40.2	57,350,170	39.4	65,607,157	40.1	69,669,300	39.3	71,248,762	38.3
Crops	25,585,360	20.5	28,382,353	21.2	31,013,558	21.3	36,430,598	22.3	38,727,019	21.8	39,138,660	21.1
Livestock	2,262,992	1.8	2,421,659	1.8	2,844,263	2.0	2,770,444	1.7	2,750,897	1.6	3,097,063	1.7
Fishery	9,997,271	8.0	10,766,018	8.0	11,087,831	7.6	14,071,592	8.6	16,381,071	9.2	16,707,410	9.0
Forestry	6,366,180	5.1	6,478,224	4.8	6,206,053	4.3	4,815,777	2.9	3,919,838	2.2	3,290,779	1.8
Agro-services	470,839	0.4	470,157	0.4	488,341	0.3	508,227	0.3	458,990	0.3	461,473	0.2
Agro-processing product	4,882,432	3.9	5,332,390	4.0	5,710,124	3.9	7,010,519	4.3	7,431,485	4.2	8,553,377	4.6
Mining and quarring	1,860,323	1.5	1,731,538	1.3	1,838,907	1.3	3,970,237	2.4	4,651,780	2.6	5,162,203	2.8
Manufacturing	6,790,192	5.4	7,280,991	5.4	7,886,798	5.4	8,467,240	5.2	9,483,456	5.4	9,829,573	5.3
Construction	6,967,831	5.6	7,060,540	5.3	8,089,096	5.6	8,379,313	5.1	10,878,367	6.1	12,124,022	6.5
Electricity and water supply	2,077,369	1.7	2,288,666	1.7	2,554,335	1.8	2,960,491	1.8	3,517,925	2.0	3,508,890	1.9
Transportation and communication	8,486,046	6.8	9,022,400	6.7	8,740,477	6.0	10,165,146	6.2	10,630,142	6.0	11,026,987	5.9
Wholesale and retail trade	18,690,177	15.0	20,279,466	15.1	23,678,368	16.3	26,031,030	15.9	26,870,311	15.2	28,247,860	15.2
Banking	2,840,238	2.3	3,270,905	2.4	4,070,159	2.8	5,108,218	3.1	6,006,718	3.4	6,384,452	3.4
Ownership of dwellings	5,119,354	4.1	5,247,675	3.9	5,540,125	3.8	5,836,858	3.6	6,061,295	3.4	6,217,579	3.3
Public administration	6,105,575	4.9	6,244,668	4.7	6,717,334	4.6	6,832,683	4.2	7,373,296	4.2	8,100,469	4.4
Service	16,220,940	13.0	17,726,018	13.2	19,180,900	13.2	20,344,121	12.4	22,105,384	12.5	24,017,840	12.9
Total of GRP	124,723,109	100.0	134,003,668	100.0	145,646,669	100.0	163,702,494	100.0	177,247,974	100.0	185,868,637	100.0
GRP per capita (Unit:Bahts)	18,242		19,127		20,311		22,318		23,671		24,281	
Population (1,000)	6,837		7,006		7,171		7,335		7,488		7,655	

Source: 1986-1991. Office of the National Economic and Social Development Board, Office of Prime Minister.

Table 3·2·2·1 Farm Size in Each Adoministrative Level Unit:upper column;rai under column;ha

	Total land	Forest land	Farm holding			Unclassified field land
			Farm holding land	Farm size	Number of Farm	
Surat Thani Province	8,057,168 1,289,147 (100.0%)	2,051,812 328,290 (25.5%)	2,251,640 360,262 (27.9%)	31.02 4.96	72,584 72,584	3,753,716 600,595 (46.6%)
Nakhon Si Thammarat P. Province	6,214,064 994,250 (100.0%)	880,625 140,900 (14.2%)	3,064,478 490,316 (49.3%)	22.95 3.67	133,518 133,518	2,268,961 363,034 (36.5%)
Southern Region	44,196,992 7,071,519 (100.0%)	8,405,590 1,344,894 (19.0%)	17,333,915 2,773,427 (39.2%)	22.69 3.62	766,833 766,833	2,953,198 (41.8%)
Thailand	320,696,888 51,311,502 (100.0%)	85,436,254 13,669,805 (26.6%)	133,076,188 21,292,190 (41.5%)	25.94 4.15	5,130,531 5,130,531	102,184,416 16,349,507 (31.9%)

Source:Agricultural Statistics of Thiland , Crop Year 1991/92
The Surat Thani Agro-economic 1993,and Amphoe Lan Saka Agricultural Extension Office.

Table 3.2.2.2 Utilization of Farm Land in the Provinces

Province	Number of Farm	Item	total Farm land and Farm size	by Utilization of Farm Holding Land							
				Housing land	Paddy land	Under field crops	Under fruit tress & *1	Under vegetable & *2	Live-stock farm land	Idle land *3	Other land
Surat Thani Province	H.H 72,584	Land	2,251,640 360,262	69,355 11,097	373,454 59,753	35,957 5,753	1,644,110 263,058	8,213 1,314	11,427 1,818	76,898 12,304	32,226 5,156
		Farm size	31.02 4.96	0.96 0.15	5.15 0.82	0.50 0.08	22.65 3.62	0.11 0.02	0.16 0.03	1.06 0.17	0.44 0.07
			100.0%	3.1	16.6	1.6	73.0	0.4	0.5	3.4	1.4
Nakhon Si Thamarrat Province	H.H 133,518	Land	3,064,478 490,316	99,204 15,872	1,206,734 193,077	20,270 3,243	1,522,518 243,602	8,553 1,368	8,065 1,290	135,764 21,722	63,370 10,142
		Farm size	22.95 3.67	0.74 0.12	9.04 1.45	0.15 0.02	11.40 1.82	0.06 0.01	0.06 0.01	1.02 0.16	0.47 0.08
			100.0%	3.2	39.4	0.7	49.7	0.3	0.3	4.4	2.1

Source: Agricultural Statistics of Thailand Crop Year 1992/93
(Center for Agricultural Statistics Office of Agricultural Ecomics , Minister of Agricultural & Co-Operatives)

Table 3·2·2·3 Type of Farm Holding Land of the both Province , 1991

Unit:ha

	Farm holding land	Owned land				Other				
		Owner	Morigate out		Total	Rented	Morigate in		Free of charge	Total
			Period unspecified	Period specified			Period unspecified	Period specified		
Surat Thani P.	360,263 (100.0%)	298,492 (82.9%)	34,690 (9.6%)	115 (-%)	333,297 (92.5%)	1,802 (0.5%)	74 (-%)	- (-%)	25,090 (7.0%)	26,966 (7.5%)
Nakhon S Thammarat P.	100,417 (100.0%)	389,899 (79.5%)	42,704 (8.7%)	556 (0.1%)	43,260 (88.3%)	32,233 (6.6%)	4,204 (0.9%)	125 (-%)	20,595 (4.2%)	57,157 (11.7%)
Southern Region	2,773,426 (100.0%)	2,367,250 (85.4%)	170,788 (6.2%)	1,890 (0.1%)	2,539,928 (91.6%)	88,129 (3.2%)	11,616 (0.4%)	125 (-%)	133,628 (4.8%)	233,498 (8.4%)
Thailand	21,292,190 (100.0%)	15,206,466 (71.4%)	2,043,178 (9.6%)	39,561 (0.2%)	17,289,205 (81.2%)	2,561,410 (12.0%)	128,797 (0.6%)	10,453 (-%)	1,302,325 (6.1%)	4,002,985 (18.8%)

Source:Agricultural Statistics of Thiland , Crop Year 1991/92

Table 3·2·2·4 Utilization of Farm Holding Land of Surat Thani Province

Unit:ha

Year	Total land	Forest land	Sub-total	Farm holding land								Unclassified field land	Remark
				Hosing land	Paddy land	Under field crops	Under fruit trees*1	Under vegetables*2	Livestock farm land	Idle land *3	Other land *4		
1991	1,289,147 [100.0%]	328,290 [25.5%]	360,262 [27.9%] [100.0%]	11,097 [3.1%]	59,753 [16.6%]	5,753 [1.6%]	263,058 [73.0%]	1,314 [0.4%]	1,818 [0.5%]	12,304 [3.4%]	5,156 [1.4%]	600,595 [46.6%]	
1986	1,289,147 [100.0%]	367,675 [28.5%]	324,125 [25.1%] [100.0%]	7,314 [2.3%]	71,354 [22.0%]	6,581 [2.0%]	212,481 [65.6%]	2,113 [0.7%]	2,026 [0.6%]	12,079 [3.7%]	10,178 [3.1%]	597,347 [46.3%]	Before 88' disaster

Source:*1···Under fruit trees & tree crops
*2···Under vegetables & flowers
*3···idle land is areas which is a mass of grasses and can not grow any crops in the while.
All this include paddy land and under field crops bought to make profit.
*4···Other land is the rosd , the sidewalk of the diches.

Table 3.2.2.5 Agricultural Household Income - Expenditure as to Province Surat Thani and Nakhon Si Thammarat

(Unit:Baht)

Item	Surat Thani Province	Nakhon Si Thammarat P.	Remark
1. Farm Income	62,277	49,215	
1.1 Crpo	47,843	21,286	
1.1.1 Fruit Tree	46,043	17,109	
1.1.1.1 Rambutan	2,970	176	
1.1.1.2 Durian	25	118	
1.1.1.3 Mangosteen	84	180	
1.1.1.4 Rubber	36,186	13,088	
1.1.1.5 Others	6,778	3,550	
1.1.2 Others	1,800	4,177	
1.2 Livestock	9,794	22,101	
1.3 Others	4,640	828	
2. Farm Expenses	24,580	20,267	
2.1 Crop	15,243	6,411	
2.2 Livestock	5,605	11,784	
2.3 Others	4,332	2,072	
3. Farm Net Income	37,697	23,948	
4. Non-farm Net Income	40,468	28,740	
5. Farm Household Net Income	78,165	52,688	
6. Farm HOusehold Expenditure	73,238	48,462	
6. Farm Economic Surplus	4,927	4,226	

Source: Agricultural Household Income - Expenditure 1991/92
(OAE of MOAC)

Table 3.2.2.6 Income and Expendition of Farm Household
in Surat Thani ,Crop Year 1991/92

Unit : bahts/far

Item	Surat Thani	Southern Region	Central Region	Average Whole Kingdom
1. Cash farm income	62,277.42	36,736.22	79,215.49	35,042.91
1.1 Crop	47,842.78	27,258.42	56,318.39	25,207.61
1.2 Livestok andpoultry	9,793.81	5,768.75	15,145.97	6,252.02
1.3 Others	4,640.83	3,708.05	7,751.13	3,583.28
2. Cash farm expenses	24,580.18	18,156.82	59,915.65	23,812.16
2.1 Crop	15,242.87	9,053.52	30,059.23	11,961.42
2.2 Livestok andpoultry	5,004.64	5,891.75	17,091.07	5,065.47
2.3 Others	4,332.67	3,211.53	12,765.35	6,785.27
3. Net cash farm income	37,697.24	18,579.40	19,299.84	11,230.78
per capita	8,195.05	3,870.71	3,859.97	2,495.73
4. Non-farm cash income	40,468.06	31,057.92	35,736.36	22,930.69
per capita	8,797.40	6,470.40	7,147.27	5,095.71
5. Farm household net cash income	78,165.30	49,637.32	55,036.21	34,161.45
per capita	16,992.46	10,341.11	11,007.24	7,591.43
6. Farm household cash expenses	73,237.98	50,694.84	66,370.40	35,432.99
per capita	15,921.30	10,561.43	13,274.08	7,874.00
7. Cash saving	4,927.32	-1,057.52	-11,334.19	-1,271.54
per capita	1,071.14	-220.32	-2,266.84	-282.56

Source : Agriculture Economic Research Division
Agiculture Economic Office

2. Present Conditions of the Nakhon Si Thammarat Province

Table 3-3-1-1 Gross Provincial Product of the Nakhon Si Thammarat Province (at current market prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986 GPP	%	1987 GPP	%	1988 GPP	%	1989 GPP	%	1990 GPP	%	1991 GPP	%
Agriculture	4,377,268	27.8	5,265,161	29.9	5,927,725	29.3	5,358,936	23.0	6,619,691	24.2	7,532,284	23.5
Crops	2,670,163	17.0	3,527,523	20.1	4,017,932	19.9	3,335,619	14.3	3,939,066	14.4	4,014,298	12.5
Livestock	483,539	3.1	478,682	2.7	535,199	2.6	535,108	2.3	456,690	1.7	954,070	3.0
Fishery	560,687	3.6	524,395	3.0	596,442	3.0	619,260	2.7	1,224,702	4.5	1,367,434	4.3
Forestry	48,774	0.3	1,728	0.0	2,822	0.0	12,340	0.1	5,054	0.0	81,876	0.3
Agro-services	128,291	0.8	135,166	0.8	117,456	0.6	130,850	0.6	154,897	0.6	148,347	0.5
Agro-processing product	485,814	3.1	597,667	3.4	657,874	3.3	725,759	3.1	839,282	3.1	966,259	3.0
Mining and quarring	253,461	1.6	271,878	1.5	350,793	1.7	1,685,092	7.2	1,594,846	5.8	1,867,111	5.8
Manufacturing	993,280	6.3	922,890	5.2	1,144,934	5.7	1,479,325	6.4	1,950,762	7.1	2,348,398	7.3
Construction	1,008,306	6.4	1,070,658	6.1	1,213,510	6.0	1,507,592	6.5	2,278,498	8.3	2,920,112	9.1
Electricity and water supply	236,731	1.5	299,170	1.7	338,595	1.7	412,029	1.8	463,449	1.7	535,446	1.7
Transportation and communication	707,568	4.5	816,020	4.6	893,728	4.4	996,147	4.3	956,648	3.5	1,132,933	3.5
Wholesale and retail trade	3,057,228	19.4	3,498,057	19.9	4,205,197	20.8	4,703,240	20.2	5,190,359	19.0	5,893,718	18.4
Banking	320,006	2.0	381,140	2.2	496,289	2.5	661,256	2.8	674,791	2.5	1,018,819	3.2
Ownership of dwellings	982,140	6.2	1,035,837	5.9	1,089,188	5.4	1,217,258	5.2	1,417,675	5.2	1,618,944	5.1
Public administration	1,156,201	7.4	1,194,212	6.8	1,291,492	6.4	1,472,923	6.3	1,742,122	6.4	2,074,607	6.5
Service	2,630,780	16.7	2,831,605	16.1	3,248,076	16.1	3,785,152	16.3	4,412,012	16.2	5,095,499	15.9
Total of GPP	15,722,969	100.0	17,586,628	100.0	20,199,527	100.0	23,278,950	100.0	27,300,853	100.0	32,037,871	100.0
GPP per capita (Unit:baht)	11,034		12,196		13,807		15,676		18,128		20,926	
Population (1,000)	1,425		1,442		1,463		1,485		1,506		1,531	

Source:Agriculture Economic Research Division
Agriculture Economic Office

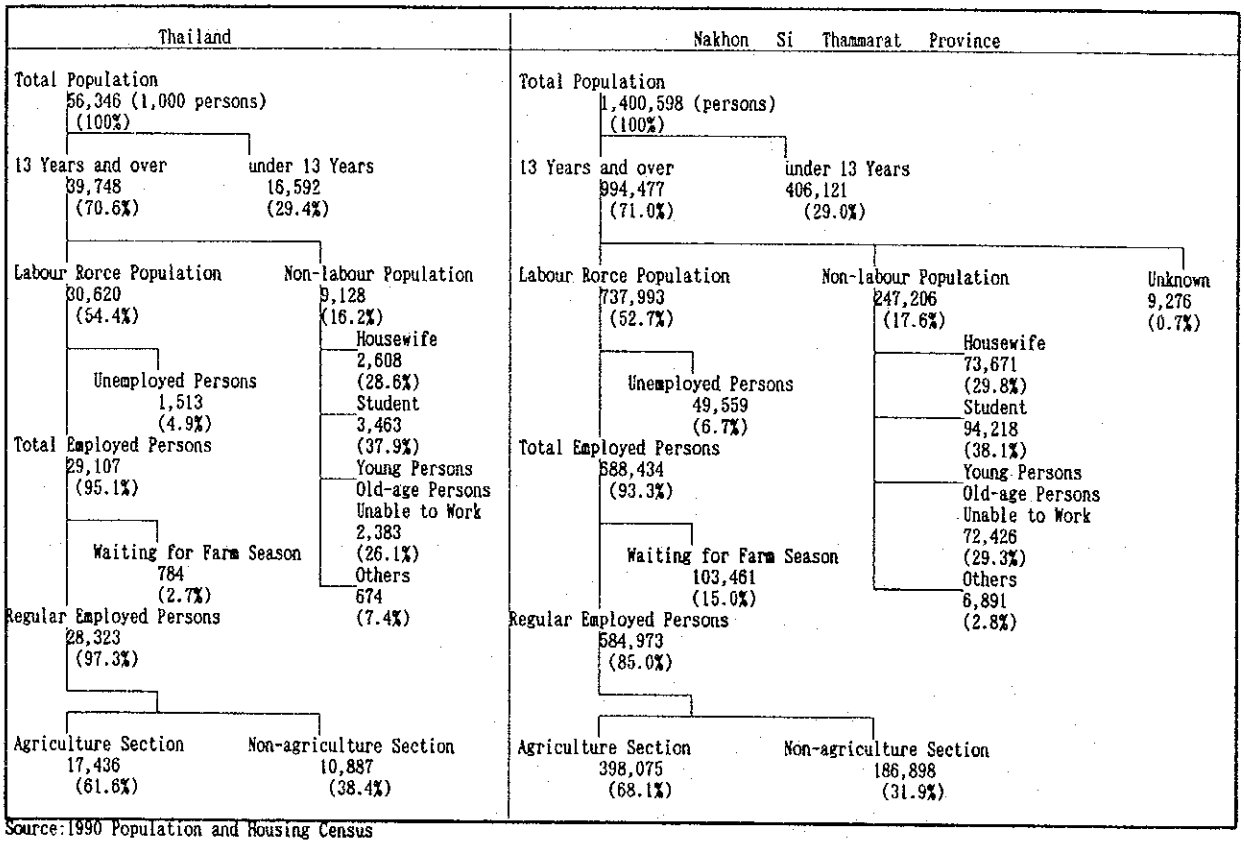
Table 3-3-1-2 Gross Provincial Prduction of Nakhon Si Thammarat Province
(at constant 1988 prices by industrial origin)

Unit: 1,000 Bahts

Sector	1986 GPP	%	1987 GPP	%	1988 GPP	%	1989 GPP	%	1990 GPP	%	1991 GPP	%
Agriculture	5,682,448	31.7	6,140,548	32.3	5,927,725	29.3	6,043,188	26.9	7,785,298	30.3	8,102,395	28.8
Crops	3,523,100	19.7	4,166,056	21.9	4,017,932	19.9	3,901,428	17.4	4,774,033	18.6	4,766,318	17.0
Livestock	506,569	2.8	451,713	2.4	535,199	2.6	542,999	2.4	591,901	2.3	738,177	2.6
Fishery	864,129	4.8	708,887	3.7	596,442	3.0	728,362	3.2	1,426,107	5.5	1,455,040	5.2
Forestry	58,464	0.3	1,830	0.0	2,822	0.0	11,141	0.0	4,919	0.0	68,652	0.2
Agro-services	136,545	0.8	136,242	0.7	117,456	0.6	124,980	0.6	145,800	0.6	140,729	0.5
Agro-processing product	593,641	3.3	675,820	3.6	657,874	3.3	734,278	3.3	842,538	3.3	933,479	3.3
Mining and quarring	330,703	1.8	302,427	1.6	350,793	1.7	1,289,263	5.7	1,568,316	6.1	1,960,760	7.0
Manufacturing	1,124,882	6.3	1,067,820	5.6	1,144,934	5.7	1,352,439	6.0	1,599,720	6.2	1,724,329	6.1
Construction	1,087,924	6.1	1,129,545	5.9	1,213,510	6.0	1,411,122	6.3	1,957,611	7.6	2,317,443	8.3
Electricity and water supply	259,770	1.5	304,438	1.6	338,595	1.7	402,705	1.8	454,012	1.8	488,429	1.7
Transportation and communication	707,473	3.9	824,958	4.3	893,728	4.4	960,036	4.3	948,003	3.7	1,068,754	3.8
Wholesale and retail trade	3,349,728	18.7	3,612,006	19.0	4,205,197	20.8	4,543,998	20.2	4,710,475	18.3	5,007,025	17.8
Banking	339,856	1.9	395,278	2.1	496,289	2.5	628,130	2.8	605,156	2.4	864,220	3.1
Ownership of dwellings	1,026,943	5.7	1,039,565	5.5	1,089,188	5.4	1,142,857	5.1	1,180,134	4.6	1,201,858	4.3
Public administration	1,193,798	6.7	1,216,657	6.4	1,291,492	6.4	1,305,529	5.8	1,396,383	5.4	1,557,508	5.5
Service	2,809,770	15.7	2,963,651	15.6	3,248,076	16.1	3,373,045	15.0	3,527,735	13.7	3,796,384	13.5
Total of GPP	17,913,295	100.0	18,996,893	100.0	20,199,527	100.0	22,452,312	100.0	25,732,843	100.0	28,089,105	100.0
GPP per capita (Unit:baht)	12,571		13,797		14,467		15,901		17,087		18,347	
Population (1,000)	1,425		1,442		1,463		1,485		1,506		1,531	

Source:Agriculture Economic Research Division
Agriculture Economic Office

Table 3.3.1.3 Labour Force Composition as to Nakhon Si Thammarat Province 1990



Source: 1990 Population and Housing Census

3. Socio-Economy of the Ban Na San Area

Table 4.2.1.1 Administrative Division in Amphoe Ban Na San 1994

Tambon / Item	Sanitary (10 Tambon)											Municipality	Amphoe
	Lampoon	Permpoon-sab	Thung Tao	Thung Tao Mai	Khoan Sub-am	Tha Chee	Nam Phu	Phu Pee	Khoan Sri	Klong Prab	sub-total	Na sam	(Total)
Area (rai)	218,130		76,890		25,827	35,500	19,147	49,705	29,222	18,165	177,566	48,239	521,825
No. of Village	7	6	5	7	6	6	6	7	8	5	63	13	76
Population (persons)	4,872	2,966	4,062	3,806	3,802	3,393	3,953	6,313	4,724	2,975	40,866	18,576	59,442
Density (persons/sq.km)	22		64		93	100	128	79	101	103	54	235	71

Source: Area; Report of Cooperatives Promotion Department of MOAC in Amphoe level(1994) (Agricultural Extension Office in Amphoe Ban Na San)
Population: Amphoe Ban Na San Office (1994)

Table 4.2.1.2 Arrangement in the Need Level for Development of Villages

No. of Village / Tambon Level	1	2	3	4	5	6	7	8
Lampoon	2	1	1	2	2	2	2	
Permpoonsab	2	1	2	2	2	2		
Thung Tao	2	2	2	2				
Thung Tao Mai	1	1	1	2	1	2	1	
Khoan Suban	2	3	2	3	3	2		
Tha Chee	2	2	1	1				
Nam Phu	2	2	2	2	2			
Phu Pee	2	2	1	2	2	1	1	
Kloan Sri	1	1	1	1	1	2	1	1
Klong Prab	2	2	2	2	3			

Source: Ban Na San Amphoe Office

Remark: Level 1···Most Urgent Development Level, 20 Villages
Level 2···Secondary Urgent Development Level,37 Villages
Level 3···Thirdly Urgent Development Level,4 Villages

Table 4.2.2.1 Population Characteristics 1992

Item / Tambon	Population: Family Size (Household) (persons)	Population: Sex Ratio (%)	Population: Dependency Ratio (%)	Percentage by Occupation of Family Head: Agriculture (%)	Percentage by Occupation of Family Head: Merchant (%)	Percentage by Occupation of Family Head: Industry (%)	Percentage by Occupation of Family Head: Employment (%)	Percentage of Graduates of Compulsory over in above 12 Years (%)	Persons of Illiteracy (persons)	Annual Income of Farmer(Family Head): Farm only (Baht)	Annual Income of Farmer(Family Head): Farm and Others (Baht)
Lampoon	5.7	94.9	57.4	89.0	0.6	-	10.4	83.5	46	50,000	60,000
Permpoonsab	4.7	95.8	62.4	88.2	0.8	-	11.6	81.2	0	54,000	66,000
Thung Tao	5.5	90.5	49.8	99.3	0.7	-	-	79.2	0	73,000	62,000
Thung Tao Mai	4.9	99.8	51.6	99.0	-	-	1.0	88.2	0	57,000	64,000
Khoan Suban	5.0	100.0	53.0	99.9	0.1	-	-	79.6	3	36,000	36,000
Tha Chee	5.4	97.7	63.5	99.0	-	-	1.0	92.6	0	23,000	26,000
Nam Phu	4.5	96.9	57.0	100.0	-	-	-	74.2	16	43,000	46,000
Phu Pee	5.6	92.0	40.1	99.7	0.2	-	0.1	91.8	5	19,000	25,000
Khoan Sri	5.0	95.1	64.7	96.7	-	-	3.3	86.7	5	29,000	33,000
Klong Prab	5.2	94.2	63.0	90.5	1.3	-	8.2	81.5	13	42,000	46,000
Sanitary Area:10 Tambon)	5.2	96.4	54.7	96.4	0.3	-	3.3	84.4	88	42,000	46,000

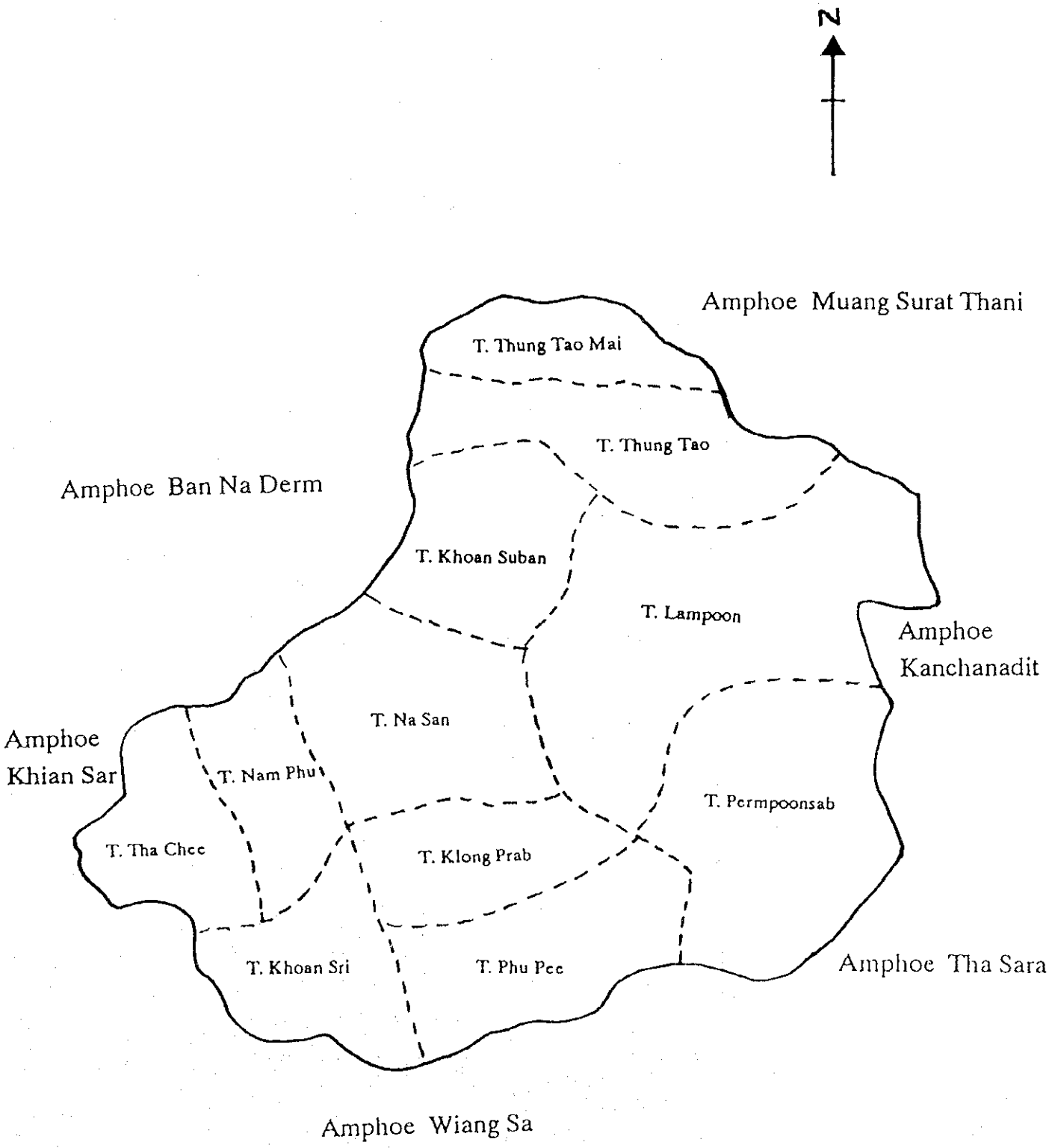
Source: Community Development Department of Ministry of Interior
Remark: Dependency Ratio = (under 14 years + above 60 years)/(between 14 years and 60 years)

Table 4.2.2.2 Occuoation of Household and Farm Land Holding

Item / Tambon	Household: Total Household	Household: Occupation of Household: Farm Household: Total	Household: Occupation of Household: Farm Household: Farm Only	Household: Occupation of Household: Farm Household: Farm and Other	Household: Occupation of Household: Others	Land: Total Land	Land: Farm Land Holding: Total	Land: Farm Land Holding: Owned Land	Land: Farm Land Holding: Non-owned Land	Land: Farm Size /Farm
	H·H	H·H	H·H	H·H	H·H	Rai	Rai	Rai	Rai	Rai
Thung Tao	1,426	1,343	1,243	100	83	76,890	52,893	18,123	28,888	39.4
	(100.0%)	(94.2%)				(100.0%)	(66.2%)			
Lampoon	1,488	1,481	1,425	56	7	218,130	48,609	30,476	18,133	32.8
	(100.0%)	(99.5%)				(100.0%)	(22.3%)			
Khoan Sub-an	849	823	823	-	26	25,827	24,728	24,728	-	30.0
	(100.0%)	(96.9%)				(100.0%)	(95.7%)			
Klong Prab	599	386	310	76	213	18,165	8,659	7,170	1,489	22.4
	(100.0%)	(64.4%)				(100.0%)	(47.6%)			
Phu Pee	1,064	1,044	968	76	20	49,705	20,978	13,779	4,601	20.1
	(100.0%)	(98.1%)				(100.0%)	(42.2%)			
Khoan Sri	858	766	733	33	92	29,222	22,775	13,870	430	29.7
	(100.0%)	(89.3%)				(100.0%)	(77.9%)			
Tha Chee	875	875	744	131	-	35,500	11,775	9,942	8,128	13.5
	(100.0%)	(100.0%)				(100.0%)	(33.2%)			
Nam Phu	828	653	553	100	175	19,147	15,838	9,603	4,026	24.3
	(100.0%)	(78.9%)				(100.0%)	(82.7%)			
(Sanitary Area)		<100.0%>	<92.2%>	<7.8%>			<100.0%>	<61.9%>	<31.9%>	
	7,987	7,371	6,799	572	616	472,586	206,255	127,691	65,696	30.3
Sub-total	(100.0%)	(91.8%)				(100.0%)	(43.6%)			
(Municipality Area) Na Sam	1,509	1,230	1,230	-	279	49,239	28,379	22,370	2,348	18.8
	(100.0%)	(81.5%)				(100.0%)	(57.6%)			
		<100.0%>	<93.3%>	<6.7%>			<100.0%>	<64.0%>	<29.0%>	
Amphoe Total	9,496	8,601	8,029	572	895	521,825	234,634	150,061	68,044	27.3
	(100.0%)	(90.6%)				(100.0%)	(45.0%)			

Source:CPD of MOAC (Way of Agricultual Development Amphoe Level)

Figure 3.2.1.1 Administrative Map of Amphoe Ban Na San



4. Farm Household Economy of the Ban Na San Area

Table 4.3.4.1 Agricultural Household Income - Expenditure as Amphoe Ban Na San and Lan Saka

(Unit:Baht)

Item	BAn Na San Amphoe	Lan saka Amphoe	Remark
1. Farm Income	58,937	23,066	
1.1 Crpo	55,324	19,786	
1.1.1 Fruit Tree	54,891	19,129	
1.1.1.1 Rambutan	2,030	1,383	
1.1.1.2 Durian	66	242	
1.1.1.3 Mangosteen	630	1,280	
1.1.1.4 Rubber	51,957	9,798	
1.1.1.5 Others	208	6,426	
1.1.2 Others	433	657	
1.2 Livestock	2,105	3,280	
1.3 Others	1,508	-	
2. Farm Expenses	19,471	10,056	
2.1 Crop	14,218	4,780	
2.2 Livestock	1,220	706	
2.3 Others	4,033	4,570	
3. Farm Net Income	39,466	13,010	
4. Non-farm Net Income	53,290	29,650	
5. Farm Household Net Income	92,756	42,660	
6. Farm HOusehold Expenditure	99,327	44,096	
6. Farm Economic Surplus	-6,571	-1,436	

Source: Agricultural Household Income - Expenditure 1991/92
(OAE of MOAC)

5. Socio-Economy of the Lan Saka Area

Table 5.2.1.1 Administrative Division in Amphoe Lan Saka 1992

Item	Sanitary (5 Tambons)					Amphoe (Total)
	Lan Saka	Kun Ta Le	Tha Dee	Kam Loan	Khao Kaew	
No. of Village	6	9	7	7	6	35
Population (persons)	5,441	9,308	7,854	8,054	6,311	36,968

Source: Amphoe Lan Saka Office

Table 5.2.1.2 Development Level of Villages

No. of Village / Tambon Level	1	2	3	4	5	6	7	8	9
Lan Saka	2	1	2	2	2	1			
Kun Ta Le	2	2	2	2	1	1	1	2	1
Tha Dee	2	2	2	2	2	3	1		
Kam Loan	2	3	2	2	2	2	2		
Khao Khew	2	2	2	2	1	1			

Source: Lan Saka Amphoe Office
Remark: Level 1…Development Level is lower tnan Average level, 9 Villages
Level 2…Average Level, 24 Villages
Level 3…Higher Level, 2 Villages

Table 5.2.2.1 Population Characteristics by Tambon

Item / Tambon	Density (sq/km)	Population: Family Size (Household persons)	Population: Sex Ratio (%)	Population: Dependency Ratio (%)	Percentage by Occupation of Family Head: Agriculture (%)	Merchant (%)	Employment (%)	Industry and Others (%)	Percentage of Graduates of Compulsory over in above 12 Years (%)	Persons of Illiteracy (persons)
Lan Saka	209	5.3	90.4	47.8	77.0	-	22.9	-	65.6	-
Kun Ta Le	234	5.4	94.4	65.4	90.7	0.6	8.7	1.6	76.6	72
Tha Dee	163	4.7	91.8	37.0	93.7	0.9	5.1	0.3	72.3	-
Kam Loan	230	4.9	99.1	112.0	94.3	-	5.7	-	61.8	-
Khao Khew	95	5.1	98.1	38.3	85.0	1.3	11.8	1.9	73.5	34
Amphoe (Total)	172	5.1	94.9	58.5	89.0	0.6	9.4	0.8	70.3	106

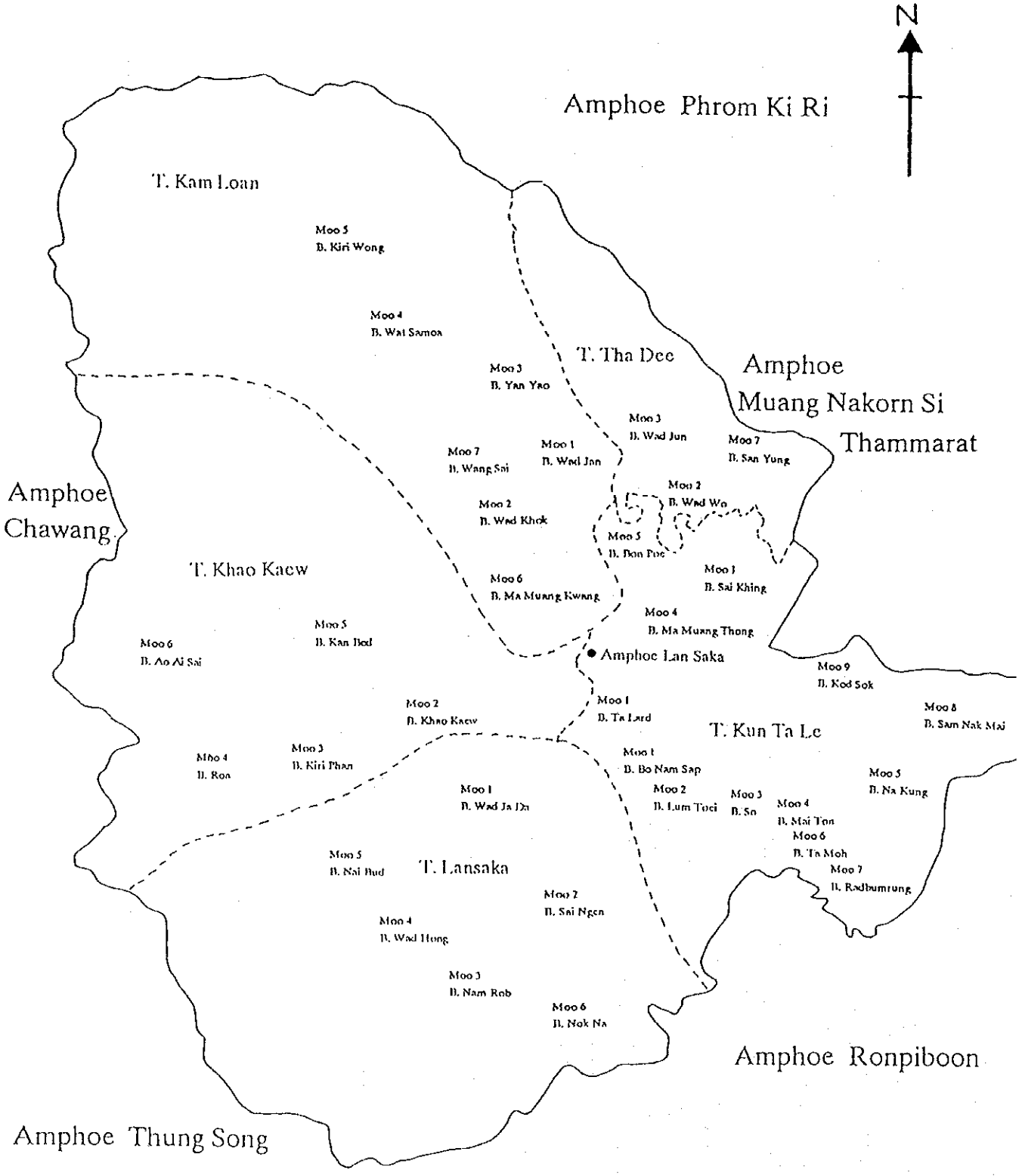
Source: Fundamental Data Survey for Village Level of Ministry of Interior

Table 5.2.2.2 Characteristics of Farm Household

Item / Tambon	Number of Farm Household (H.H)	Occupation of Farmer (Family Head): Farm only (H.H)	Occupation of Farmer (Family Head): Farm and Others (H.H)	Farm Size (Rai/H.H)	Annual Income of Farmer (Family Head): Farm only (Baht)	Annual Income of Farmer (Family Head): Farm and Others (Baht)
Lan Saka	683 (100.0%)	76 (11.1%)	607 (88.9%)	15.0	18,000	26,000
Kun Ta Le	1,424 (100.0%)	35 (2.5%)	1,389 (97.5%)	12.1	40,000	53,000
Tha Dee	1,480 (100.0%)	71 (4.8%)	1,409 (95.2%)	19.0	18,000	28,000
Kam Loan	1,658 (100.0%)	4 (0.2%)	1,654 (99.8%)	11.8	18,000	18,000
Khao Khew	976 (100.0%)	533 (54.6%)	443 (45.4%)	33.2	16,000	40,000
Amphoe (Total)	6,221 (100.0%)	719 (11.6%)	5,502 (88.4%)	17.3	22,000	33,000

Source: Fundamental Data Survey for Village Level of Ministry of Interior

Figure 4.2.1.1 Administrative Map of Amphoe Lan Saka



Part 2

1. Socio-Economic Conditions of the Ban Na San F/S Study Area

Table 1.2.1.1 Administrative Division in Tambon Permpoonsab

Item / Village	Area (rai)	Population (persons)	Density (persons/sq.km)	Development Level
Muban 1	4,420 14.3	283 9.3	40	2
Muban 2	2,280 7.4	233 7.7	64	1
Muban 3	7,280 23.6	578 19.0	50	2
Muban 4 (including F/S Area)	7,460 24.1	899 29.5	75	2
Muban 5	3,125 10.1	354 11.6	71	2
Muban 6	6,258 20.3	619 20.3	62	2
Total (Tambon Permpoonsab)	30,902 100.0	3,043 100.0	62	

Source: Community Development Department of Minjstry of Interior 1994

Table 1.2.2.1 General Situation of the F/S Study Area-1-
-Population and Occupation Characteristics of Household

Item / Village	Population: Family Size (persons)	Population: Sex Ratio (Fe/M) (%)	Population: Dependency Ratio (%)	Occupation of Family Head and Percentage by Occuation: Agriculture (persons) (%)	Merchant (persons) (%)	Industry (persons) (%)	Employment (persons) (%)	Percentage of Graduates of Compulsory in 12 and over Years(%)	Persons of Illiteracy (persons)	Annual Income of Family Head: Single: Farm only (baht)	Single: Others only (baht)	Farm and Others (baht)
Muban 4 (f/S Area)	4.2	92.5	56.1	203 95.8	- -	- -	9 4.2	83.9	-	58,000	40,000	65,000
Tambon Permpoon-sab	4.7	95.8	74.4	560 89.3	1 0.2	- -	66 10.5	82.7	-	58,000	41000	61,000

source: Community Development Department Of Ministry of Interior,1994
Remark: Merchant only…48,000 Baht, Employment only…38,000 Baht

Table 1.2.2.2 General Situation of the F/S Study Area-2-

- Farm Land, Farm Household, Farm Size and Land Ownership

Item / Village	Total Land (rai)	Farm Land (rai)	Farm household: Total (H.H)	Farm only (H.H)	Farm and Others (H.H)	Farm Size (rai/H.H)	Farm Land Ownership: Owned (H.H)	Owned and Rented (H.H)	All Rented (H.H)
Muban 4 (F/S Area)	7,460 24.2 100.0	5,830 24.0 78.2	203 100.0	189 93.1	14 6.9	(43.3) *	196 96.6	7 3.4	-
Tambon Permpoon-sab	30,823 100.0 100.0	24,250 100.0 78.7	560 100.0	501 89.5	59 10.5	43.3	553 98.8	7 1.2	-

source: Community Development Department of Ministry of Interior,1994
remark: *…Generally,many farmers have their owned land not only the inside but the outside of the living muban. So that, as the average farm size per household in the feasibility study area, it is rather nearer to the actual situation to adopt that of the tambon. Accoringly, it is 43.3 rai(6.9 ha)

Table 1.2.2.3 General Situation of the F/S Study Area-3-

- Farm Household, Area and Income/Year/F.H.H by Main Crops

Item / Village	Total Farm Household (H.H)	Fruit: NO. of Farm Household (H.H)	Fruit: Average Planted Area/F.H.H (rai)	Fruit: Average Income/Year/F.H.H (baht)	Vegetable: NO. of Farm Household (H.H)	Vegetable: Average Planted Area/F.H.H (rai)	Vegetable: Income/Year/F.H.H (baht)	Tree Crops: NO. of Farm Household (H.H)	Tree Crops: Average Planted Area/F.H.H (rai)	Tree Crops: Income/Year/F.H.H (baht)	Rubber: No. of Household by Planting Size: Total (H.H)	Under 16 rai (H.H)	16~50 rai (H.H)	50 and over rai (H.H)
Muban 4 (F/S Area)	203 100.0	122 60.1	10.0	58,000	- -	-	-	- -	-	-	97 100.0 47.8	58 59.8	33 34.0	6 6.2
Tambon Permpoon-sab	560 100.0	211 37.7	10.6	58,000	3 0.5	2.0	8,000	-	-	-	341 100.0 60.9	184 54.0	124 36.4	33 9.7

source: Community Development Department of Ministry of Interior,1994

Table 1.2.3.1 Farm Household Economy

Large Size Farmer : Muban 4 in Tambon Pernpoonsab

Item	Content							
Family Status (persons)	of Family Head			Number of Family	Male	female	Total	
	Age : 53	Education : P.4			3	3	6	
Labour status	On owned farm (menber)			Off farm	Non-agriculture			
	Full time	Part time	None		Occupation and menber			
(persons)	4	-	2	-	-			
Land holding	Homestead	Farm land	Total					
(rai)	0.25	58.00	58.25					

Farm land utilization by crops (58.0rai)	Kind of crop/item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)
	Rambutan	8.0	Sin. H.Y.V	16～20	Plains	Inside	490(fami.244,hir.246)
	Rambutan	15.0	Sin. H.Y.V	0～3	High land	Outside	198(fami.99,hir.99)
	Durian	5.0	Promotion	0～3	Plains	Outside	58(fami.52,hir.6)
	Rubber	20.0	Promotion	11～15	High land	Outside	279(fami.263,hir.16)
	Rubber	10.0	Sin. H.Y.V	4～5	High land	Outside	20(fami.2,hir.18)

Farm Household Economy	Kind of Crops	Farm Net Income: Gross income	Management cost	Net income	Off Farm Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Rambutan	140,000	64,798	75,202				
	Rambutan	-	53,722	-53,722				
	Durian	-	19,937	-19,937				
	Rubber	132,600	20,517	112,083				
	Rubber	-	12,168	-12,168				
		*(273,100)	*(149,432)	*(123,668)	*(-)	*(123,668)	*(102,500)	*(21,168)
	Total	272,600	171,142	101,458	-	101,458	102,550	-1,092

Analysis Index	Agricultural Dependency ratio	Satisfactry ratio of Farm Net Income to H.H Expenditures	per Capita (Family) Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%	%	baht	baht	baht	baht
	100	99	17,001	17,001	17,092	-91

Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Requirement per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 88,624 baht	
%	%	%	man/day	per capita / year	per man / day
37	34	140	25(fami.4)	22,156 baht	134 baht

source: Farm Economic Survey
remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.
remark: *; cash base

Table 1.2.3.2 Farm Household Economy

Medium Size Farmer : Muban 4 in Tambon Pernpoonsab

Item	Content							
Family Status (persons)	of Family Head			Number of Family	Male	female	Total	
	Age : 40	Education : P.4			4	2	6	
Labour status	On owned farm (menber)			Off farm	Non-agriculture			
	Full time	Part time	None		Occupation and menber			
(persons)	2	1	2	-	Merchant: 1			
Land holding	Homestead	Farm land	Total					
(rai)	0.25	40.00	40.25					

Farm land utilization by crops (40.0rai)	Kind of crop/item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)
	Rambutan	7.5	Mix.H.Y.V	6～10	Plains	Inside	160(fami.155,hir.5)
	Rambutan	15.0	Single H.Y.V	0～3	Plains	Inside	37(fami.37)
	Durian	7.5	Mix.H.Y.V	6～10	Plains	Inside	66(fami.64,hir.2)
	Rabber	10.0	Single H.Y.V	11～15	High land	Outside	132(fami.131,hir.1)

Farm Household Economy	Kind of Crops	Farm Net Income: Gross income	Management cost	Net income	Off Farm Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Rambutan	40,000	17,114	22,886				
	Rambutan	-	16,391	-16,391				
	Durian	35,000	14,057	20,943				
	Rabber	55,250	17,463	37,787				
	Sub-total	130,250	65,025	65,225	50,000	115,225	83,200	
	Livestock	700	-	700		700	700	
	Total	130,950	65,025	65,925	50,000	115,925	83,900	32,025

Analysis Index	Agricultural Dependency ratio	Satisfactry ratio of Farm Net Income to H.H Expenditures	per Capita (Family) Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%	%	baht	baht	baht	baht
	36 *1	34 *2	4,706	13,040	13,867	-827

Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 55,790 baht	
%	%	%	man/day	per capita / year	per man / day
50 *3	26	73	10(fami.10)	18,597 baht	144 baht

source: Farm Economic Survey
remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.
remark: *; cash base
remark: *1; (Farm net income / Farm hosehold income) * 100
remark: *2; (Farm net income / Farm hosehold expenditures) * 100
remark: *3; (Farm net income / Farm gross income) * 100
remark: *4; (Food expenditures / Household expenditures) * 100

Table 1.2.3.3 Farm Household Economy

Small Size Farmer : Muban 4 in Tambon Pernpoonsab

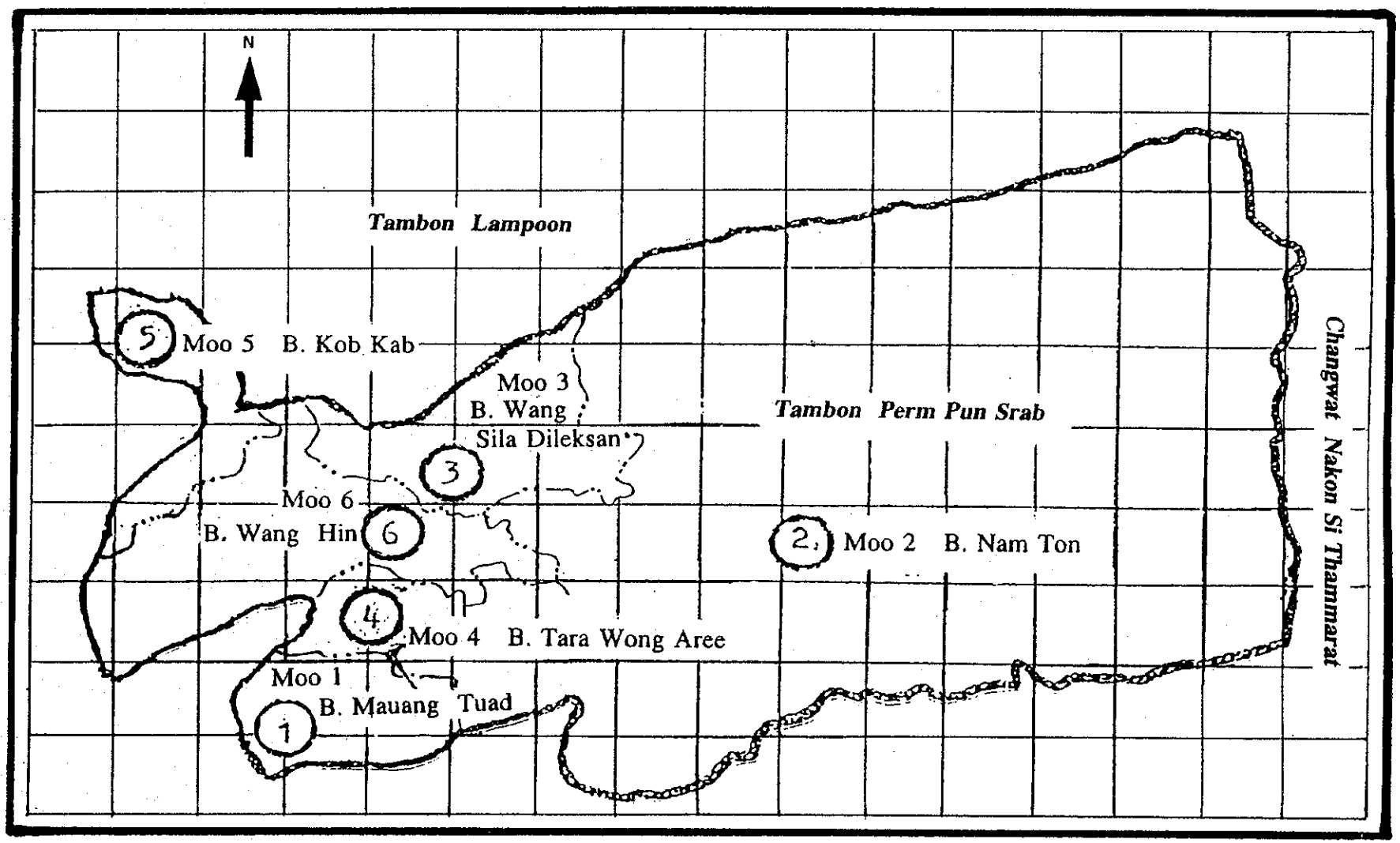
Item		Content						
Family Status (persons)		of Family Head Age : 35 Education : P.4			Number of Family	Male 1	female 1	Total 2
Labour status (persons)		On owned farm (menber) Full time 2	Part time -	None -	Off farm -	Non-agriculture Occupation and menber -		
Land holding (rai)		Homestead 0.25	Farm land 22.00	Total 22.25				
Farm land utilizat- by crops (22.0rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Descript-ion	Location	Labour requirement (man/day)	
	Rambutan	8.0	Single H.Y.V	16~20	High land	Inside	233(fami.17, hir.216)	
	Rambutan	4.0	Mix.H.Y.V	6~10	Plains	Outside	121(fami.40,hir.81)	
	Durian	5.5	Single H.Y.V	0~3	High land	Outside	56(fami.12,hir.44)	
	Durian	4.5		6~10	High land	Outside	138(fami.24,hir.114)	
Farm Household Economy	Kind of Crops	Farm Net Income Gross income	Management cost	Net income	Off Farm Net Income	Farm Household Net Income	Household Expen-ditures	Farm Household Economic Surplus
	Rambutan	114,800	74,116	40,684			H.H. Expe-nditures 43,800	
	Rambutan	84,000	42,810	41,190				
	Durian	-	64,441	-64,441				
	Durian	68,000	39,868	28,132			Direct Tax 20,000	
	Total	*(266,800) 266,800	*(198,337) 221,235	*(68,463) 45,565	*(-) -	*(68,463) 45,565	*(63,800) 63,800	*(4,663) -18,235
Analysis Index	Agricultural Depend-ency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita (Family) Net Farm Income	Net H.H Income	H.H Expen-ditures	H.H Econo-my Surplus
	% 100		% 71		baht 22,783	baht 22,783	baht 21,900	baht -9,117
	Farm Net Income ratio	Engel's coefficie-nt	Ave. Cons-umption D-isposition	Labour Re-quirement per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 32,526 baht			
	% 17	% 34	% 140	man/day 25(fami.4)	per capita / year 16,263 baht		per man / day 350 baht	

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Figure 1.2.1 **TAMBON PERM PUN SRAB**



2. Socio-Economic Conditions of the Lan Saka F/S Study Area

Table 2.2.1.1 Administrative Division in Tambon Kam Loan

Item / Village	Area (rai)	Population (persons)	Density (persons/sq.km)	Development Level
Muban 1 (including F/S Area)	2,340 10.5	487 5.9	130	2
Muban 2	4,500 20.1	1,297 15.6	180	3
Muban 3 (including F/S Area)	1,435 6.4	968 11.6	422	2
Muban 4	4,450 19.9	1,107 13.3	155	2
Muban 5	4,569 20.4	2,769 33.3	379	2
Muban 6	2,503 11.2	982 11.8	245	2
Muban 7	2,550 11.4	618 7.4	151	2
Total (Tambon Kam Loan)	22,347 100.0	8,319	233	
(remark) F/S Study Area	3,775 16.9	1,455 17.5	241	2

Source: Community Development Department of Minjstry of Interior 1992

Table 2.2.2.1 General Situation of the F/S Study Area-1- -Population and Occupation Characteristics of Household

Item / Village	Population			Occupation of Family Head and Percentage by Occuation				Percentage of Graduates of Compulsory in 12 and over Years(%)	Persons of Illiteracy (persons)	annual Income of Family Head		
	Family Size (persons)	Sex Ratio (%)	Dependency Ratio (%)	Agriculture (persons) (%)	Merchant (persons) (%)	Industry (persons) (%)	Employment (persons) (%)			Single: Farm only (baht)	Single: Others only (baht)	Farm and Others (baht)
Muban 1 (F/S Area)	4.3	98.0	138.7	109 97.3	- -	- -	3 2.7	46.6	-	19,000	18,000	15,000
Muban 3 (F/S Area)	5.5	96.7	133.3	159 90.3	- -	- -	17 9.7	69.9	-	15,000	17,000	15,000
Tambon Kam Loan	4.7	99.1	111.7	1,658 94.3	- -	- -	100 5.7	61.8	-	19,000	16,000	18,000
(remark) F/S Study Area	5.1	97.2	135.1	268 93.1	- -	- -	20 6.9	62.6	-	19,000	17,000	15,000

source: Community Development Department Of Ministry of Interior,1992

Table 2.2.2.2 General Situation of the F/S Study Area-2-

- Farm Land, Farm Household, Farm Size and Land Ownership

Item	Total Land	Farm Land	Farm household			Farm Size	Farm Land Ownership		
			Total	Farm only	Farm and Others		Owned	Owned and Rented	All Rented
	(rai)	(rai)	(H.H)	(H.H)	(H.H)	(rai/H.H)	(H.H)	(H.H)	(H.H)
	2,340	2,228							
Muban 1	10.5	11.4	109	4	105	(11.8)	105	-	4
(F/S Area)	100.0	95.2	100.0	3.7	96.3	*	96.3	-	3.7
	4,500	4,000							
Muban 3	20.1	20.4	159	-	159	(11.8)	159	-	-
(F/S Area)	100.0	88.9	100.0	-	100.0	*	100.0	-	
	22,350	19,610							
Tambon	100.0	100.0	1,658	4	1,654	11.8	1,607	47	4
Kam Loan	100.0	87.7	100.0	0.2	99.8		96.9	2.8	0.2
(remark)	6,840	6,228							
F/S Study	30.6	31.8	268	4	264	(11.8)	264	-	4
Area	100.0	91.1	100.0	1.5	98.5	*	98.5	-	1.5

source: Community Development Department of Ministry of Interior,1992
remark: *…see remark of the above table

Table 2.2.2.3 General Situation of the F/S Study Area-3-

- Growing Farm Household, Area and Income/Year/F.H.H by Main Crops

Item	Total Farm House-hold	Fruit			Vegetable			Tree Crops			Rubber			
		NO. of Farm House-hold	Average Planted Area/ F.H.H	Income/ Year/ F.H.H	NO. of Farm House-hold	Average Planted Area/ F.H.H	Income/ Year/ F.H.H	NO. of Farm House-hold	Average Planted Area/ F.H.H	Income/ Year/ F.H.H	No. of Household by Planting Size			
	(H.H)	(H.H)	(rai)	(baht)	(H.H)	(rai)	(baht)	(H.H)	(rai)	(baht)	Total (H.H)	Under 16 rai (H.H)	16~50 rai (H.H)	50 and over rai (H.H)
											62	48	14	-
Muban 1	109	75	3.0	25,000	36	1.2	4,000	32	1.0	5,000	100.0	77.4	22.6	-
(F/S Area)	100.0	68.8			33.0			29.4			56.9			
											113	113	-	-
Muban 3	159	26	3.2	25,000	13	1.0	5,000	31	1.0	3,500	100.0	100.0	-	-
(F/S Area)	100.0	16.4			8.2			19.5			71.1			
											914	637	277	-
Tambon	1,658	1,136	2.7	29,000	142	6.4	4,300	295	1.0	4,200	100.0	69.7	30.3	-
Kam Loan	100.0	68.5			8.6			17.8			55.1			
(remark)											175	161	14	-
F/S Study	268	101	3.1	25,000	49	1.1	4,300	63	1.0	4,300	100.0	92.0	8.0	-
Area	100.0	37.7			18.3			23.5			65.3			

source: Community Development Department of Ministry of Interior,1992

Table 2.2.3.1 Farm Household Economy

Large Size Farmer: Muban 3 in Tambon Kam Loan

Item	Content							
Family Status (persons)	of Family Head				Number of Family	Male	female	Total
	Age: 48	Education: P.4				4	1	5
Labour status (persons)	On owned farm (menber)				Off farm	Non-agriculture Occupation and menber		
	Full time	Part time	None			-		
	3	-	2		-			
Land holding (rai)	Homestead	Farm land	Total					
	2.00	16.00	18.00					

Farm land utilization by crops (16.0 rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)
	Mangosteen	2.0	Promotion	0~3	Low land	Inside	11(fami.11)
	Rambutan	1.0	Promotion	0~3	Low land	Inside	4.5(fami.4.5)
	Mangosteen	5.0	Promotion	11~15	High land	Outside	37(fami.37)
	Durian	5.0	Local	11~15	High land	Outside	15(fami.15)
	Rubber	3.0	Sing.H.Y.V	6~10	High land	Outside	140(fami.140)

Farm Household Economy (baht)	Kind of Crops	Farm Net Income: Gross income	Management cost	Net income	Off Farm and Non agriculture Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Mangosteen	-	655	-655	Off Farm		31,520	
	Rambutan	-	325	-325	Net Income		Direct Tax	
	Mangosteen	31,000	3,520	27,480	-		30	
	Durian	11,000	2,175	8,825				
	Rubber	22,500	1,292	21,208				
		*(62,500)	*(1,668)	*(60,802)	*(-)	*(60,802)	*(29,550)	*(31,252)
	Total	64,500	7,967	56,533	-	56,533	31,550	24,983

Analysis Index	Agricultural Dependency ratio	Satisfactry ratio of Farm Net Income to H.H Expenditures	per Capita (Family) Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%	%	baht	baht	baht	baht
	100	179	11,307	11,307	6,304	4,997

Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 54,180 baht	
%	%	%	man/day	per capita / year	per man / day
88	49	57	13(fami.13)	18,060 baht	261 baht

source: Farm Economic Survey
remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.
remark: *; cash base

Table 2.2.3.1 Farm Household Economy

Large Size ; No. 2 Farmer: Muban 1 in Tambon Kam Loan

Item	Content							
Family Status (persons)	of Family Head				Number of Family	Male	female	Total
	Age: 67	Education: P.4				3	1	4
Labour status (persons)	On owned farm (menber)				Off farm	Non-agriculture Occupation and menber		
	Full time	Part time	None			-		
	2	-	2		-			
Land holding (rai)	Homestead	Farm land	Total					
	2.00	16.50	18.50					

Farm land utilization by crops (16.5rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)
	Mangosteen	0.75	Promotion	4~5	Low land	Inside	12(fami.12)
	Jack fruit	0.75	Promotion	4~5	Low land	Inside	12(fami.12)
	Rubber	6.5	Sing.H.Y.V	0~3	High land	Outside	64.5(fami.64.5)
	Rubber	8.5	Sing.H.Y.V	6~10	High land	Outside	243(fami.85.5,hire 157.5)

Farm Household Economy (baht)	Kind of Crops	Farm Net Income: Gross income	Management cost	Net income	Off Farm and Non agriculture Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Mangosteen	-	356	-356	Off Farm			
	Jack fruit	-	356	-356	Net Income			
	Rubber	-	232	-232				
	Rubber	58,500	21,102	37,398	5,000			
		*(58,500)	*(20,946)	*(37,554)	*(5,000)	*(42,554)	*(13,100)	*(29,454)
	Total	58,500	22,046	36,454	5,000	41,454	13,100	28,354

Analysis Index	Agricultural Dependency ratio	Satisfactry ratio of Farm Net Income to H.H Expenditures	per Capita (Family) Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%	%	baht	baht	baht	baht
	88	278	9,114	10,364	3,275	7,089

Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 35,413 baht	
%	%	%	man/day	per capita / year	per man / day
62	49	32	20(fami.11)	17,707 baht	204 baht

source: Farm Economic Survey
remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.
remark: *; cash base

Table 2.2.3.1 Farm Household Economy

Large Size ; No. 3 Farmer: Muban 1 in Tambon Kam Loan

Item		Content						
Family Status (persons)		of Family Head Age : 69	Education : P.4		Number of Family	Male 2	female 3	Total 5
Labour status (persons)		On owned farm (menber) Full time 1	Part time 1	None 3	Off farm -	Non-agriculture Occupation and menber Merchant: 1 , Official: 1		
Land holding (rai)		Homestead 2.00	Farm land 22.50	Total 24.50				
Farm land utilization by crops (22.5rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)	
	Rambutan	2.5	Sing.H.Y.V	0～3	Plains	Inside	7(fami.7)	
	Durian	2.0	Local	20～	High land	Outside	7(fami.7)	
	Jack Fruit	2.0	Local	6～10	High land	Outside	12(fami.12)	
	Rubber	10.0	Local	20～	High land	Outside	93.5(fami.93.5)	
	Sataw	2.0	Local	20～	High land	Outside	4(fami.4)	
	Sweet Corn	4.0	Third Crop	D.3 x3time	Plains	Inside	108(fami.93,hir.15)	
Farm Household Economy	Kind of Crops	Farm Net Income Gross income	Management cost	Net income	Off Farm and Non agriculture Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Rambutan	-	3,073	-3,073				
	Durian	-	2,538	-2,538				
	Jack Fruit	27,000	3,054	23,946				
	Rubber	18,750	11,150	7,600				
	Sataw	3,500	2,208	1,292				
	Sweet Corn	17,600	22,406	-4,806				
		*(63,250)	*(42,585)	*(20,665)	*(162,000)	*(182,665)	*(11,280)	*(171,385)
	Total	66,850	44,429	22,421	162,000	184,421	14,880	169,541
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita (Family) Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%		%		baht	baht	baht	baht
	12		151		4,484	36,884	2,976	33,908
	Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 21,250 baht			
	%	%	%	man/day	per capita / year		per man / day	
	34	49	88	10(fami.10)	10,635	baht	98	baht

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Table 2.2.3.1 Farm Household Economy

Large Size ; No. 4 Farmer: Muban 1 in Tambon Kam Loan

Item		Content						
Family Status (persons)		of Family Head Age : 32	Education : L.S		Number of Family	Male 3	female 1	Total 4
Labour status (persons)		On owned farm (menber) Full time -	Part time 2	None 2	Off farm -	Non-agriculture Occupation and menber Merchant: 1 , Merchant: 1		
Land holding (rai)		Homestead 0.25	Farm land 14.00	Total 14.25				
Farm land utilization by crops (14.0rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Description	Location	Labour requirement (man/day)	
	Rambutan	1.0	Promotion	0～3	Low land	Inside	2.5(fami.2.5)	
	Mangosteen	2.0	Local	20～	High land	Outside	27(fami.27)	
	Durian	2.0	Local	6～10	High land	Outside	27(fami.27)	
	Jack Fruit	7.0	Local	20～	High land	Outside	76(fami.36,hir.40)	
	Coconuts	1.0	Local	0～3	Low land	Inside	3.5(fami.3.5)	
	Bamboo	1.0	Local	0～3	Low land	Inside	5(fami.5)	
Farm Household Economy	Kind of Crops	Farm Net Income Gross income	Management cost	Net income	Off Farm and Non agriculture Net Income	Farm Household Net Income	Household Expenditures	Farm Household Economic Surplus
	Rambutan	-	490	-490			30,160 payment of loan(not farming)	
	Mangosteen	30,000	948	29,052				
	Durian	20,000	1,038	18,962				
	Jack Fruit	40,500	6,370	34,130				
	Coconuts	-	200	-200			22,400	
	Bamboo	10,000	305	9,695				
		*(97,100)	*(2,311)	*(94,789)	*(75,000)	*(169,789)	*(49,160)	*(120,629)
	Total	100,500	9,351	91,149	75,000	166,149	52,560	113,588
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita Net Farm Income	Net H.H Income	H.H Expenditures	H.H Economy Surplus
	%		%		baht	baht	baht	baht
	55		173		22,787	41,537	13,140	28,397
	Farm Net Income ratio	Engel's coefficient	Ave. Consumption Disposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 90,508 baht			
	%	%	%	man/day	per capita / year		per man / day	
	91	57	32	10(fami.7)	45,254	baht	896	baht

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Table 2.2.3.1 Farm Household Economy

Large Size ; No. 5 Farmer: Muban 3 in Tambon Kam Loan

Item		Content						
Family Status (persons)		of Family Head Age : 53	Education : L.S		Number of Family	Male 3	female 4	Total 7
Labour status (persons)		On owned farm (menber) Full time 3	Part time -	None 4	Off farm 2	Non-agriculture Occupation and menber -		
Land holding (rai)		Homestead 0.50	Farm land 27.75	Total 28.25	(out of farm land, 7.75 rai are not ayailable)			
Farm land utilizat-ion by crops (20.0rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Descript-ion	Location	Labour requirement (man/day)	
	Rambutan	0.75	Promotion	0～3	Low land	Inside	4(fami.4)	
	Mangosteen	1.5	Promotion	0～3	Low land	Inside	4(fami.4)	
	Jack Fruit	1.75	Promotion	0～3	Low land	Inside	5(fami.5)	
	Bamboo	1.0	Promotion	0～3	Low land	Inside	6(fami.6)	
	rubber	15.0	Sing.H.Y.V	11～15	High land	Outside	300(fami.30,hire 270)	
Farm Household Economy	Kind of Crops	Farm Net Income Gross income	Management cost	Net income	Off Farm and Non a-griculture Net Income	Farm Household Net Income	Household ditures	Farm Household Economic Surplus
	Rambutan	-	71	-71			22,170	
	Mangosteen	-	272	-272			Direct Tax 200	
	Jack Fruit	-	318	-318				
	Bamboo	-	442	-442				
	rubber	72,000	36,863	35,137				
	(farm land	purchase)	22,531	-22,531				
		*(72,000)	*(60,087)	*(11,913)	*(15,300)	*(27,213)	*(22,370)	*(4,843)
	Total	72,000	60,497	11,503	15,300	26,803	22,370	4,433
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita Net Farm Income	Net H.H Income	H.H Expen-ditures	H.H Econo-my Surplus
	%	43	%	51	baht	1,643	3,829	3,196	633
	Farm Net Income ratio	Engel's coefficie-nt	Ave. Cons-umption D-isposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = 10,273 baht			
	%	%	%	man/day	per capita / year		per man / day	
	47	54	83	16(fami.2)	3,424	baht	210	baht

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Table 2.2.3.1 Farm Household Economy

Large Size ; No. 6 Farmer: Muban 3 in Tambon Kam Loan

Item		Content						
Family Status (persons)		of Family Head Age : 55	Education : P.4		Number of Family	Male 2	female 2	Total 4
Labour status (persons)		On owned farm (menber) Full time 2	Part time 1	None 1	Off farm -	Non-agriculture Occupation and menber Services/Trading 2		
Land holding (rai)		Homestead 1.00	Farm land 20.00	Total 21.00				
Farm land utilizat-ion by crops (20.0rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Descript-ion	Location	Labour requirement (man/day)	
	Rambutan	3.5	Sing.H.Y.V.	0～3	Low land	Inside	23.5(fami.23.5)	
	Mangosteen	1.0	Sing.H.Y.V.	0～3	Low land	Inside	5.75(fami.5.75)	
	rubber	6.0	Sing.H.Y.V	4～5	High land	Outside	86(fami.6,hire 80)	
	rubber	9.5	Sing.H.Y.V	4～5	High land	Outside	212.5(fami.212.5)	
Farm Household Economy	Kind of Crops	Farm Net Income Gross income	Management cost	Net income	Off Farm and Non a-griculture Net Income	Farm Household Net Income	Household ditures	Farm Household Economic Surplus
	Rambutan	-	8,378	-8,378			33,400	
	Mangosteen	-	2,434	-2,434			Direct Tax 150	
	rubber	-	24,274	-24,274				
	rubber	45,000	21,486	23,514				
				0				
		*(45,000)	*(29,472)	*(15,528)	*(75,000)	*(90,528)	*(33,550)	*(56,978)
	Total	45,000	56,572	-11,572	75,000	63,428	33,550	29,878
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita Net Farm Income	Net H.H Income	H.H Expen-ditures	H.H Econo-my Surplus
	%	-18	%	-34	baht	-2,893	15,857	8,388	7,469
	Farm Net Income ratio	Engel's coefficie-nt	Ave. Cons-umption D-isposition	Labour Intensive per rai	Family farm labour reward {farm gross income-(production cost-family labour cost)} = -19,197 baht			
	%	%	%	man/day	per capita / year		per man / day	
	-26	13	53	16(fami.12)	-6,399	baht	-77	baht

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Table 2.2.3.2 Farm Household Economy

Medium Size Farmer : Muban 1 in Tambon Kam Loan

Item	Content							
Family Status (persons)	of Family Head				Number of Family	Male 2	female 3	Total 5
	Age : 42	Education : P.7						
Labour status (persons)	On owned farm (menber)				Off farm	Non-agriculture Occupation and menber		
	Full time 2	Part time 1	None 2		1			
Land holding (rai)	Homestead 0.25	Farm land 8.25	Total 8.50					
Farm land utilizat- by crops (8.25rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Descript-ion	Location	Labour requirement (man/day)	
	Mangosteen	0.75	Promotion	20～	Low land	Inside	21.75(fami.21.75)	
	Mangosteen	4.00	Sin. H.Y.V	0～3	Plains	Outside	21(fami.21)	
	Coconut	0.50	Local	20～	Low land	Inside	15(fami.15)	
	Rubber	3.00	Sin. H.Y.V	20～	Low land	Inside	66.25(fami.65.25)	
Farm Household Economy	Kind of Crops	Farm Net Income			Off Farm Net Income	Farm Household Net Income	Household Expen-ditures	Farm Household Economic Surplus
		Gross income	Management cost	Net income				
	Mangosteen	17,250	220	17,030			Expenditu-res 30,300	
	Mangosteen	-	2,202	-2,202				
	Coconut	3,800	147	3,653				
	Rubber	13,800	1,002	12,798			Direct Tax 2,000	
					18,000			
	Total	*(32,400) 34,850	*(1,903) 3,571	*(30,497) 31,279	*(18,000) 18,000	*(48,497) 49,279	*(29,850) 32,300	*(18,647) 16,979
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita (Family) Net Farm Income	Net H.H Income	H.H Expen-ditures	H.H Econo-my Surplus
	% 63		% 97		baht 6,256	baht 9,856	baht 6,060	baht 3,396
	Farm Net Income ratio	Engel's coefficie-nt	Ave. Cons-umption D-isposition	Labour Re-quirement per rai	Family farm labour reward (farm gross income-(production cost-family labour cost)) = 30,481 baht			
	% 90	% 35	% 64	man/day 40(fami.40	per capita / year 10,160 baht		per man / day 246 baht	

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Table 2.2.3.3 Farm Household Economy

Small Size Farmer : Muban 1 in Tambon Kam Loan

Item	Content							
Family Status (persons)	of Family Head				Number of Family	Male 3	female 3	Total 6
	Age : 47	Education : L.S						
Labour status (persons)	On owned farm (menber)				Off farm	Non-agriculture Occupation and menber		
	Full time 2	Part time 1	None 3		-	Construction worker 1		
Land holding (rai)	Homestead 0.25	Farm land 2.75	Total 3.00					
Farm land utilizat- by crops (2.75rai)	Kind of crop/Item	Area (rai)	Pattern	Years	Descript-ion	Location	Labour requirement (man/day)	
	Rambutan	1.25	Single H.Y.V	0～3	Low land	Inside	12(fami.12)	
	Mangosteen	0.75	Promotion	4～5	Low land	Inside	7(fami.7)	
	Coconut	0.75	Local	20～	Low land	Inside	21(fami.21)	
	Sweet corn	(0.75) (3 times)			Low land	Inside	70.5(fami.70.5)	
Farm Household Economy	Kind of Crops	Farm Net Income			Off Farm Net Income	Farm Household Net Income	Household Expen-ditures	Farm Household Economic Surplus
		Gross income	Management cost	Net income				
	Rambutan	-	243	-243				
	Mangosteen	-	396	-396				
	Coconut	7,500	146	7,354				
	Sweet corn	6,650	821	5,829				
					27,000		19,100	
	Total	*(13,450) 14,150	*(1,254) 1,606	*(12,196) 12,544	*(27,000) 27,000	*(39,196) 39,544	*(18,400) 19,100	*(20,796) 20,444
Analysis Index	Agricultural Dependency ratio		Satisfactry ratio of Farm Net Income to H.H Expenditures		per Capita (Family) Net Farm Income	Net H.H Income	H.H Expen-ditures	H.H Econo-my Surplus
	% 32		% 66		baht 2,091	baht 6,590	baht 3,183	baht 3,407
	Farm Net Income ratio	Engel's coefficie-nt	Ave. Cons-umption D-isposition	Labour Re-quirement per rai	Family farm labour reward (farm gross income-(production cost-family labour cost)) = 12,181 baht			
	% 89	% 50	% 48	man/day 40(fami.40)	per capita / year 4,060 baht		per man / day 110 baht	

source: Farm Economic Survey

remark: Management cost is that of which be expended by money within production cost. But the depreciation cost is included.

remark: *; cash base

Figure 2.2.1 **TAMBON KAM LOAN**