

JAPAN INTERNATIONAL COOPERATION AGENCY(JICA)  
AGRICULTURAL LAND REFORM OFFICE(ALRO), MOAC  
THE KINGDOM OF THAILAND

**THE FEASIBILITY STUDY  
ON  
THE INTEGRATED AGRICULTURE DEVELOPMENT  
IN  
THE AGRICULTURAL LAND REFORM AREAS  
IN  
THE UPPER NORTHEASTERN REGION  
THE KINGDOM OF THAILAND**

**FINAL REPORT**

**APPENDIX (II)**

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THE KINGDOM OF THAILAND**

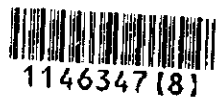
**THE FEASIBILITY STUDY  
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## **APPENDIX (II)**

### **APPENDIX(I)**

- A. GENERAL**
- B. METEOROLOGY, HYDROLOGY AND WATER RESOURCES**
- C. SOCIAL CONDITIONS**
- D. EXISTING INFRASTRUCTURE**

### **APPENDIX(II)**

- E. SOIL AND LAND USE**
- F. AGRICULTURE**
- G. ECONOMY AND RURAL FINANCE**
- H. ENVIRONMENT**
- I. INVENTORIES**

## **E. SOIL AND LAND USE**

## **APPENDIX E. SOIL AND LAND USE**

### **1. Figures**

1. Figure E-1	Soil Map in Study Area: Mukdahan.....	E-1
2. Figure E-2	Soil Map in Study Area: Maha Sarakham.....	E-2
3. Figure E-3	Soil Map in Study Area: Sakon Nakhon .....	E-3
4. Figure E-4	Soil Map in Study Area: Khon Kaen.....	E-4
5. Figure E-5	Land Use Map : Mukdahan .....	E-5
6. Figure E-6	Land Use Map : Maha Sarakham .....	E-6
7. Figure E-7	Land Use Map : Sakon Nakhon.....	E-7
8. Figure E-8	Land Use Map : Khon Kaen.....	E-8
9. Figure E-9	Soil Map in Mukdahan Priority Area .....	E-9
10. Figure E-10	Soil Map in Maha Sarakham PriorityArea .....	E-10
11. Figure E-11	Soil Map in Sakon Nakhon Priority Area.....	E-11
12. Figure E-12	Soil Map in Khon Kaen Priority Area.....	E-12

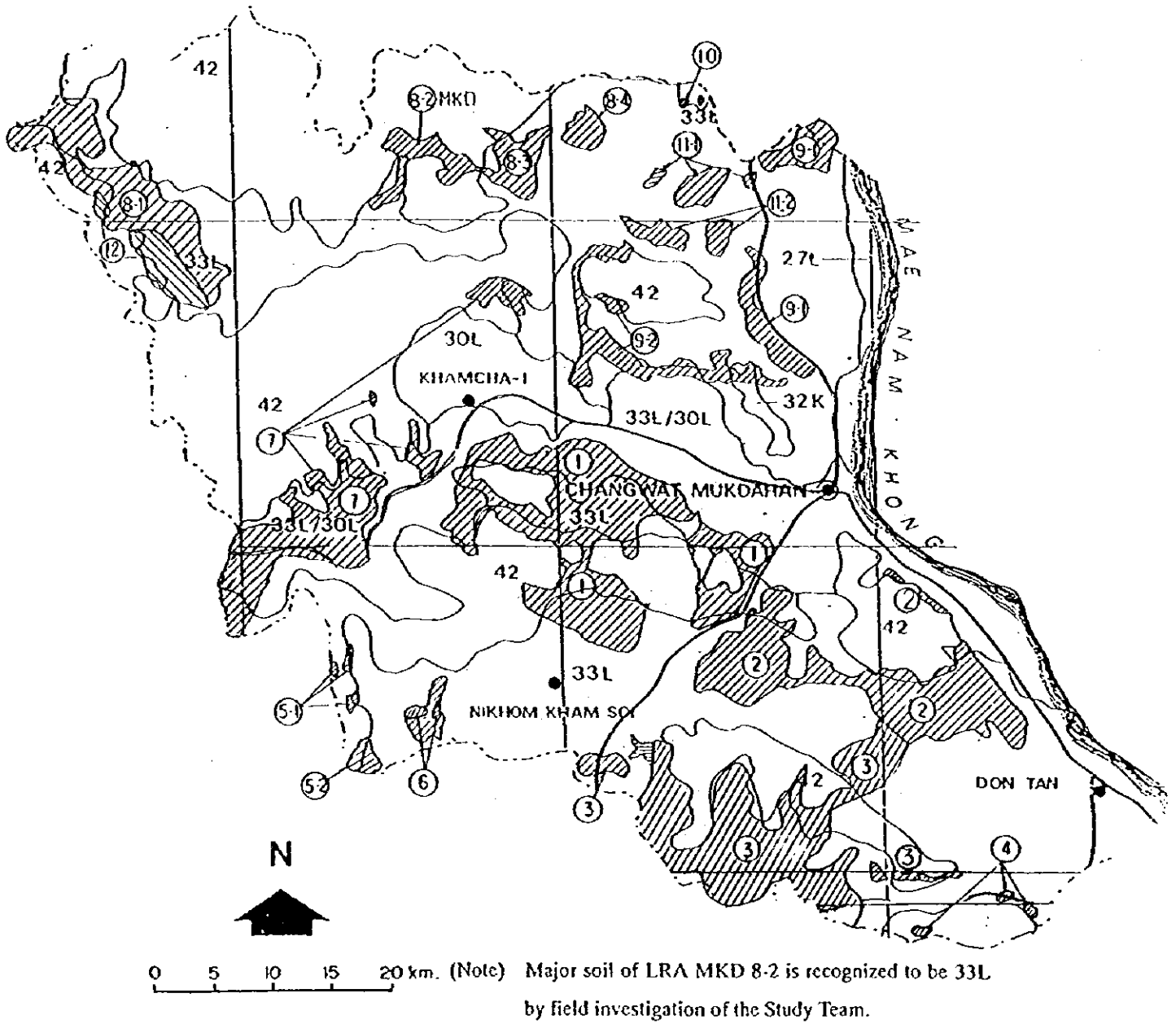
### **2. Tables**

1. Table E-1	Soil in the Mukdahan Study Area .....	E-13
2. Table E-2	Soil in the Maha Sarakham Study Area .....	E-13
3. Table E-3	Soil in the Sakon Nakhon Study Area.....	E-14
4. Table E-4	Soil in the Khon Kaen Study Area .....	E-14
5. Table E-5	Soil Characteristics in the Study Area.....	E-15
6. Table E-6	Major Soil Characteristics in the Priority Areas.....	E-16
7. Table E-7	Land Classification System .....	E-17
8. Table E-8	Soil Group and Crop Suitability .....	E-19





# GENERAL SOIL MAP



**Figure E-1 Soil Map in Study Area Mukdahan**

# GENERAL SOIL MAP

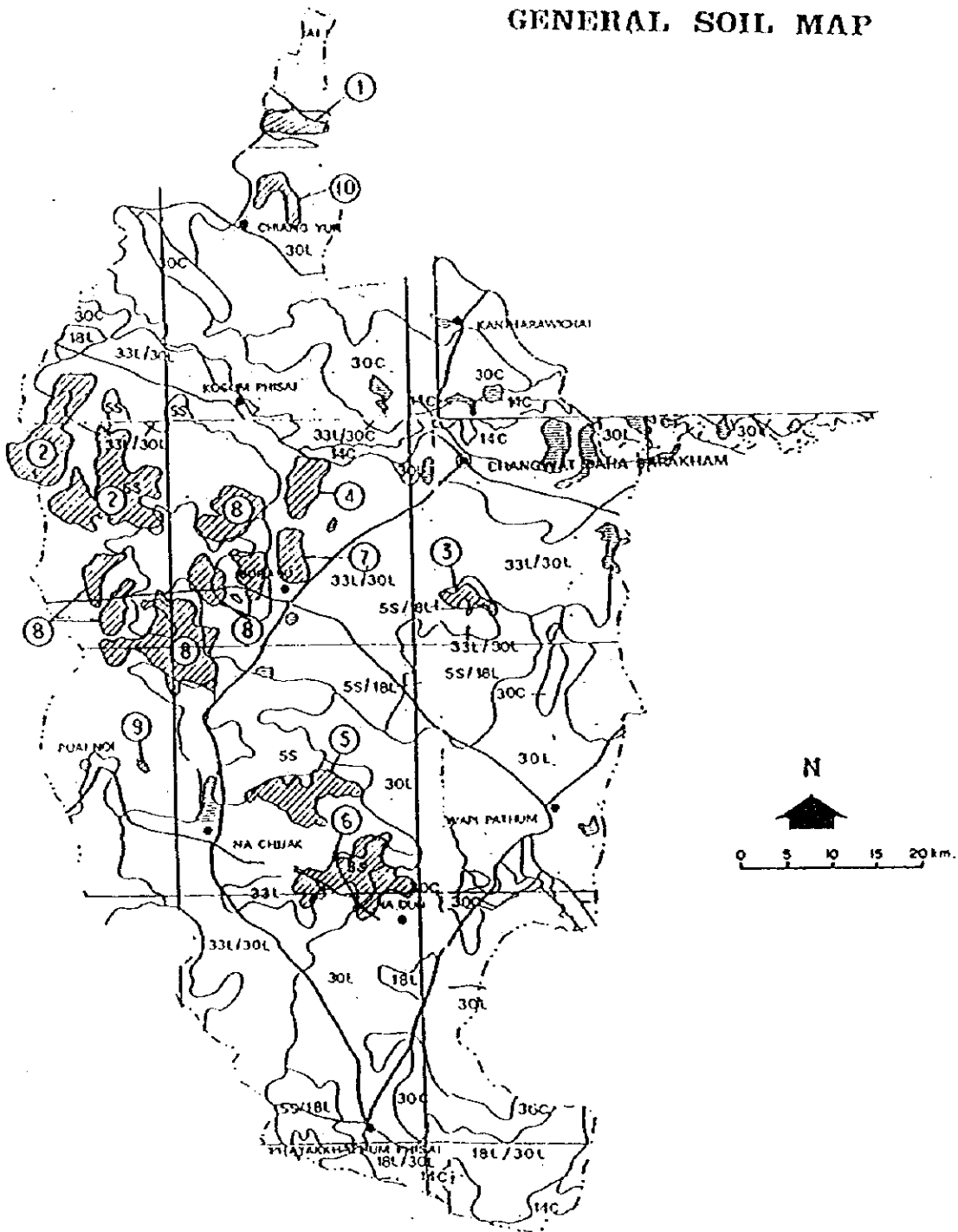


Figure E-2 Soil Map in Study Area Makusarakham

# GENERAL SOIL MAP

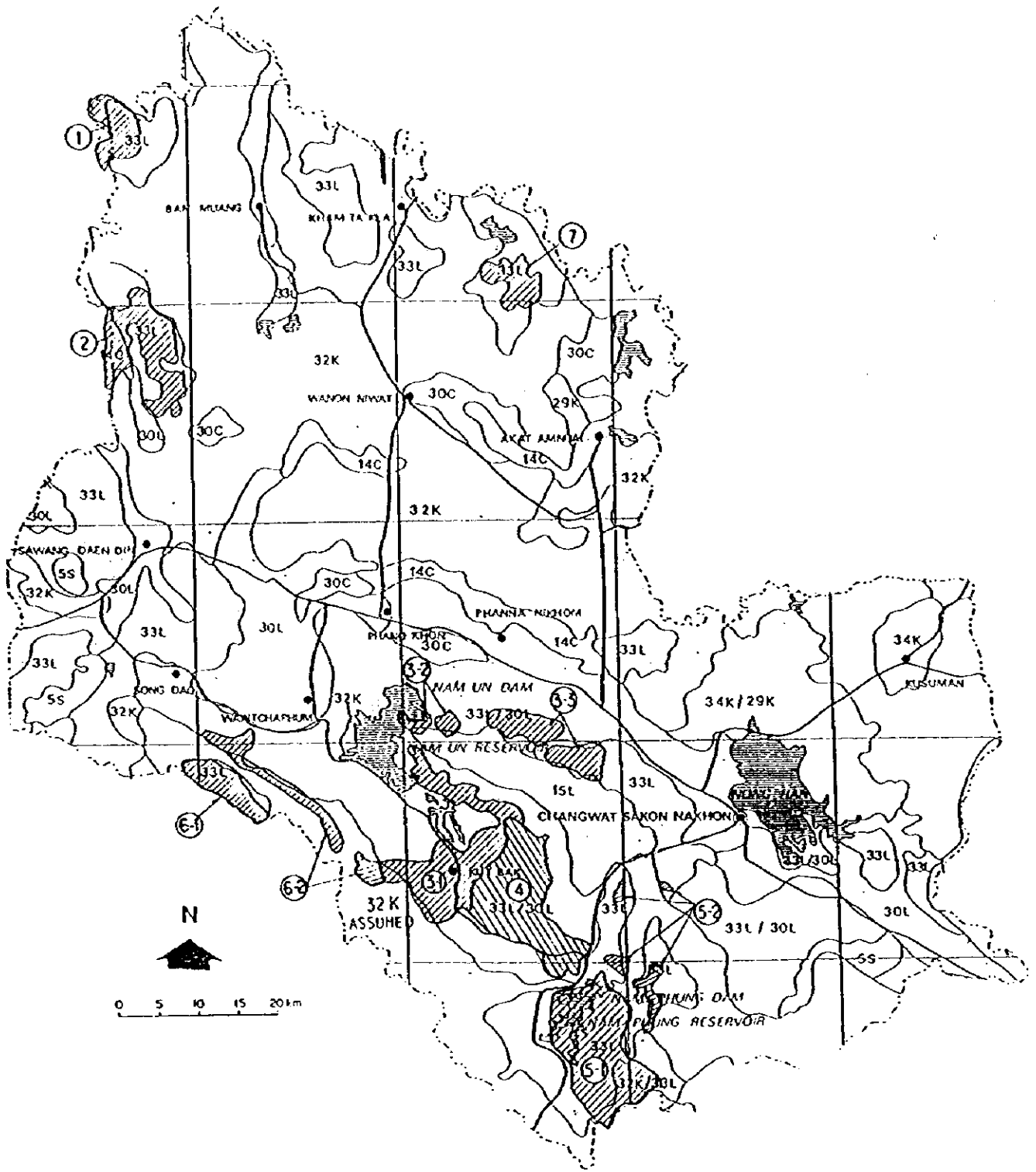


Figure E-3 Soil Map in Study Area Sakon Nakhon

GENERAL SOIL MAP

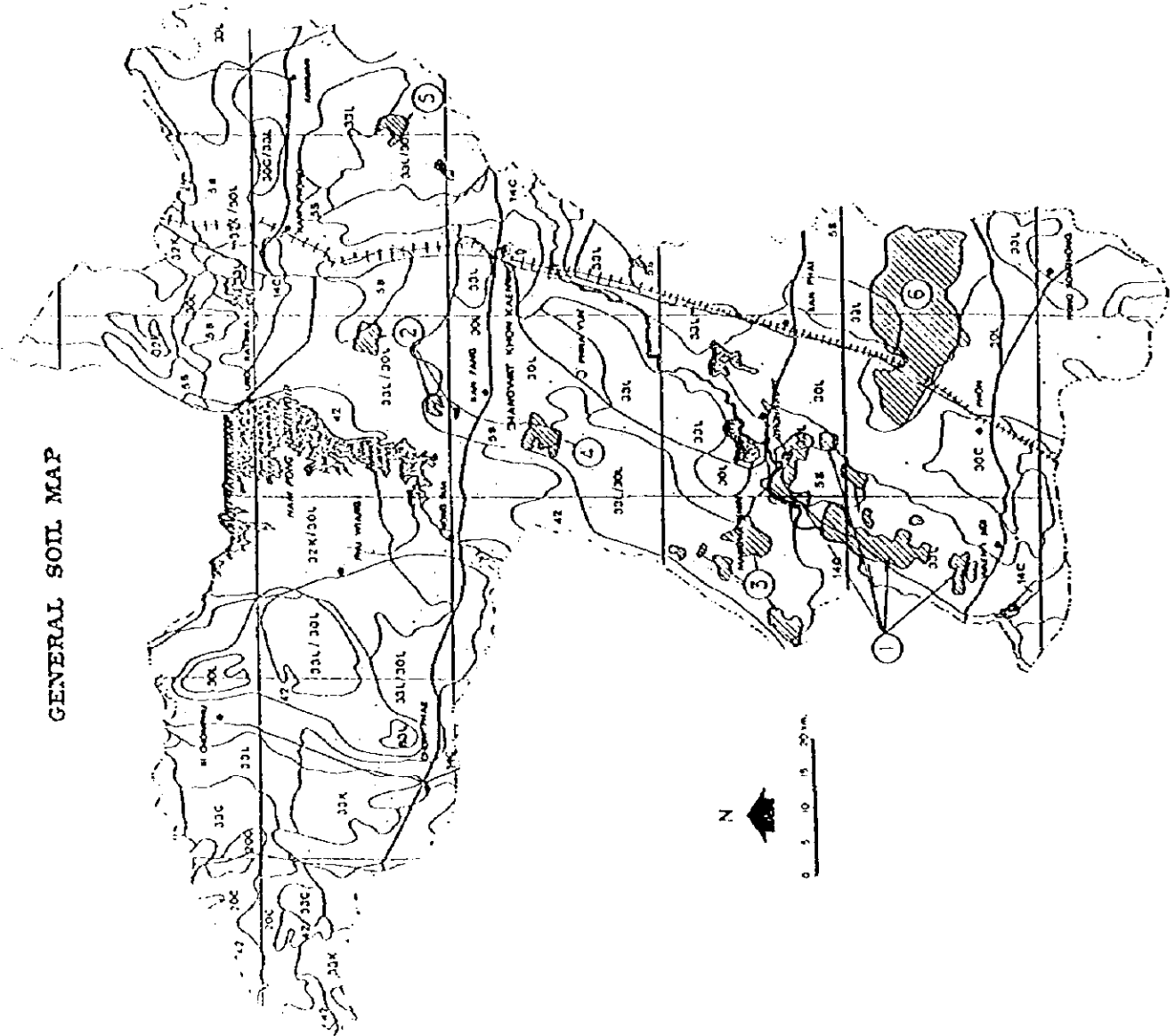
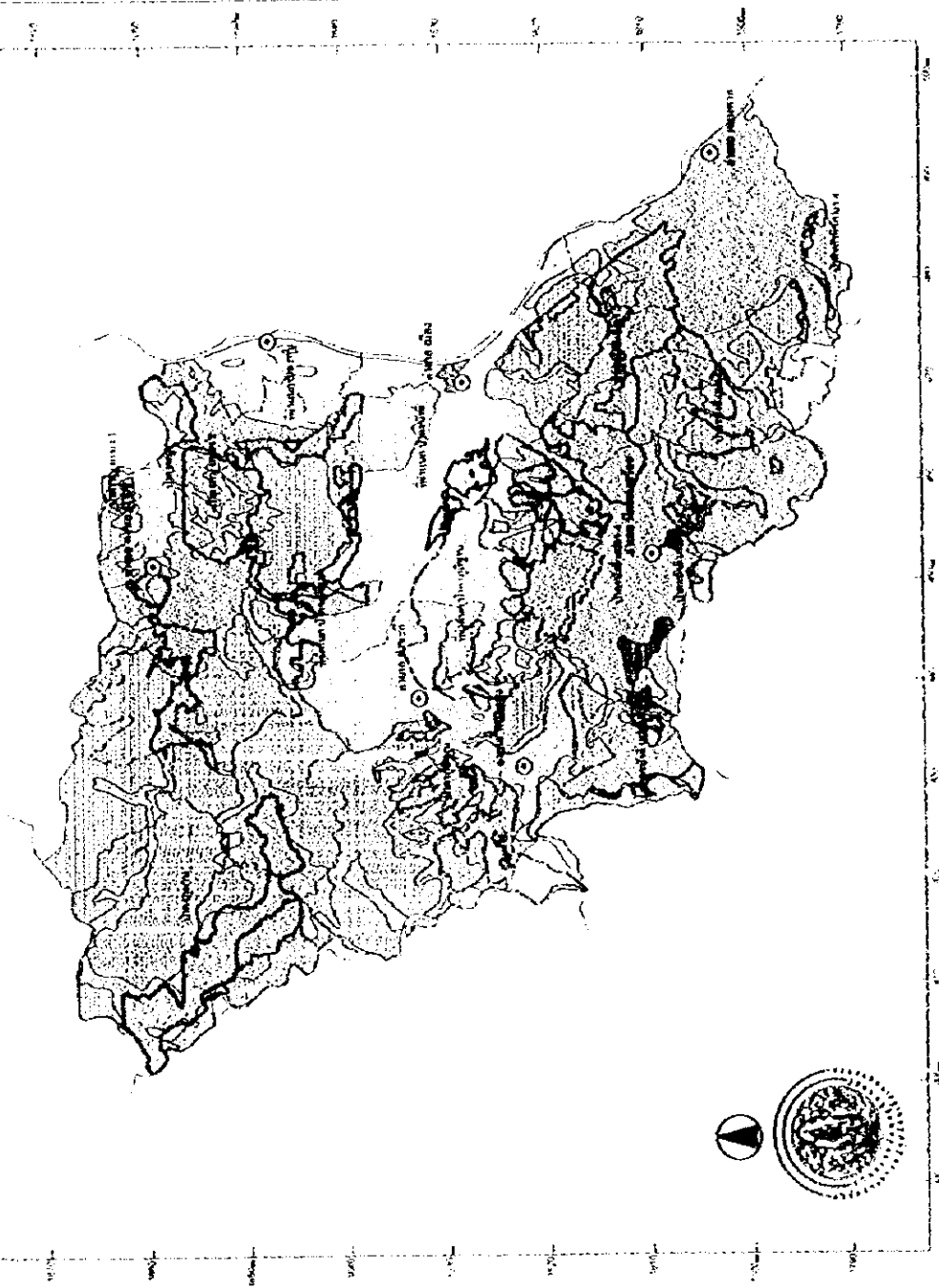


Figure E-4 Soil Map in Study Area Khon Kaen

LAND USE MAP 1994  
MUKDAHAN PROVINCE

5. Figure E-5 Land Use Map : Mukdahan

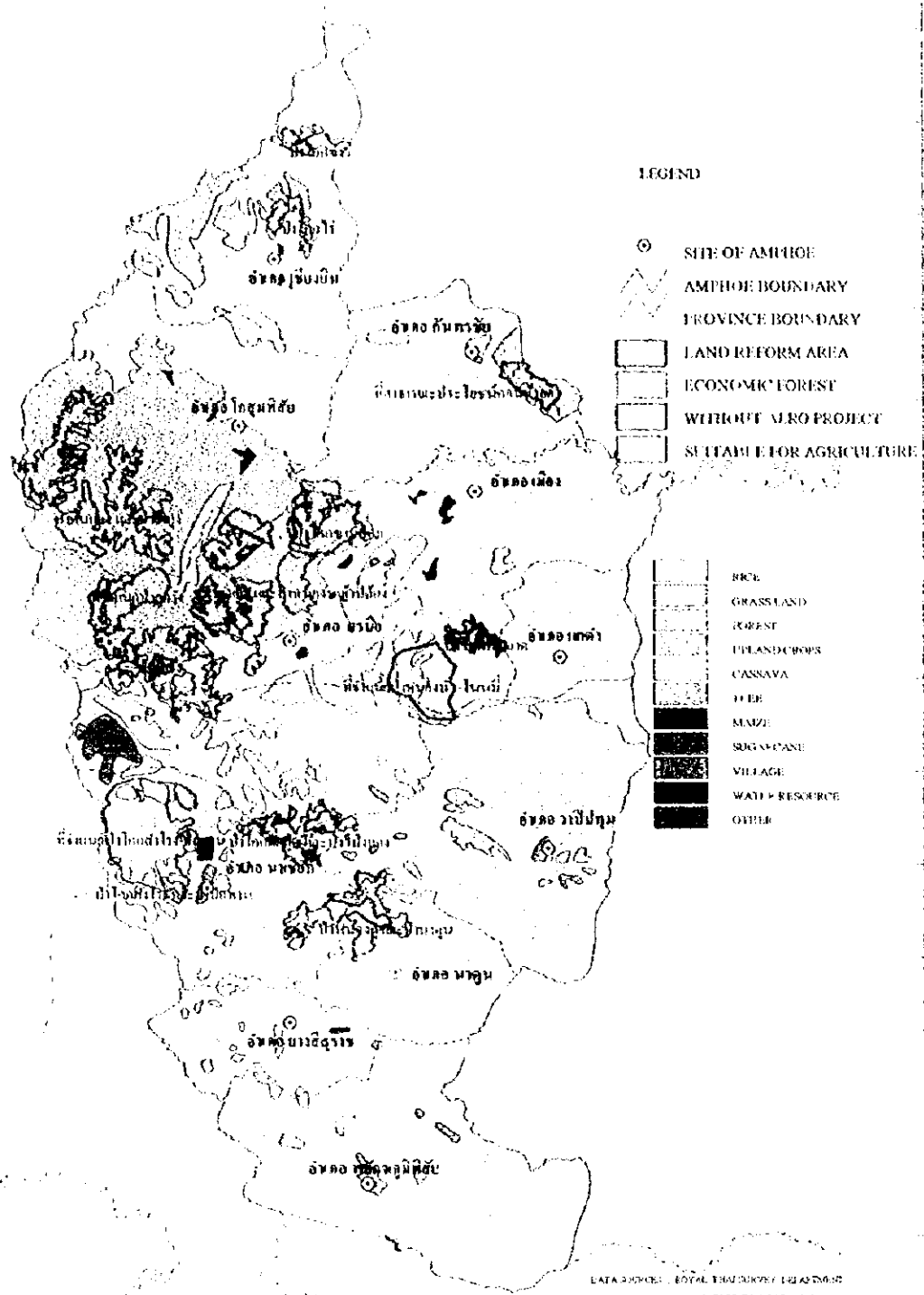


- LEGEND
- SITE OF AMPHOE
  - △ AMPHOE BOUNDARY
  - ▭ PROVINCE BOUNDARY
  - ▭ WITHOUT ALRO PROJECT
  - ▭ LAND REFORM AREA
  - ▭ RESERVATION FOREST
  - ▭ RICE
  - ▭ GRASSLAND
  - ▭ FOREST
  - ▭ UPLAND CROPS
  - ▭ CASSAVA
  - ▭ TUBE
  - ▭ MAIZE
  - ▭ SUGARCANE
  - ▭ VILLAGE
  - ▭ WATER RESOURCE
  - ▭ OTHER

DATA SOURCES : ROYAL TIL SURVEY DEPARTMENT  
ROYAL FORESTRY DEPARTMENT  
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AGRICULTURAL INFORMATION CENTER  
RESEARCH AND PLANNING DIVISION  
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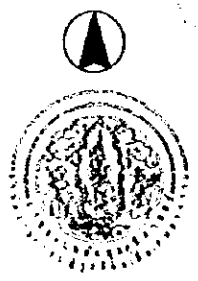
6. Figure E-6 Land Use Map : Maha Sarakham

LAND USE MAP 1994  
MAHA SARAKHAM PROVINCE



- LEGEND
- ⊙ SITE OF AMPHOE
  - AMPHOE BOUNDARY
  - - - PROVINCE BOUNDARY
  - ▭ LAND REFORM AREA
  - ▭ ECONOMIC FOREST
  - ▭ WITHOUT A/R/O PROJECT
  - ▭ SUITABLE FOR AGRICULTURE

- ▭ RICE
- ▭ GRASSLAND
- ▭ FOREST
- ▭ UPLAND CROPS
- ▭ CASSAVA
- ▭ RICE
- ▭ MAIZE
- ▭ SUGARCANE
- ▭ VILLAGE
- ▭ WATER RESOURCE
- ▭ OTHER

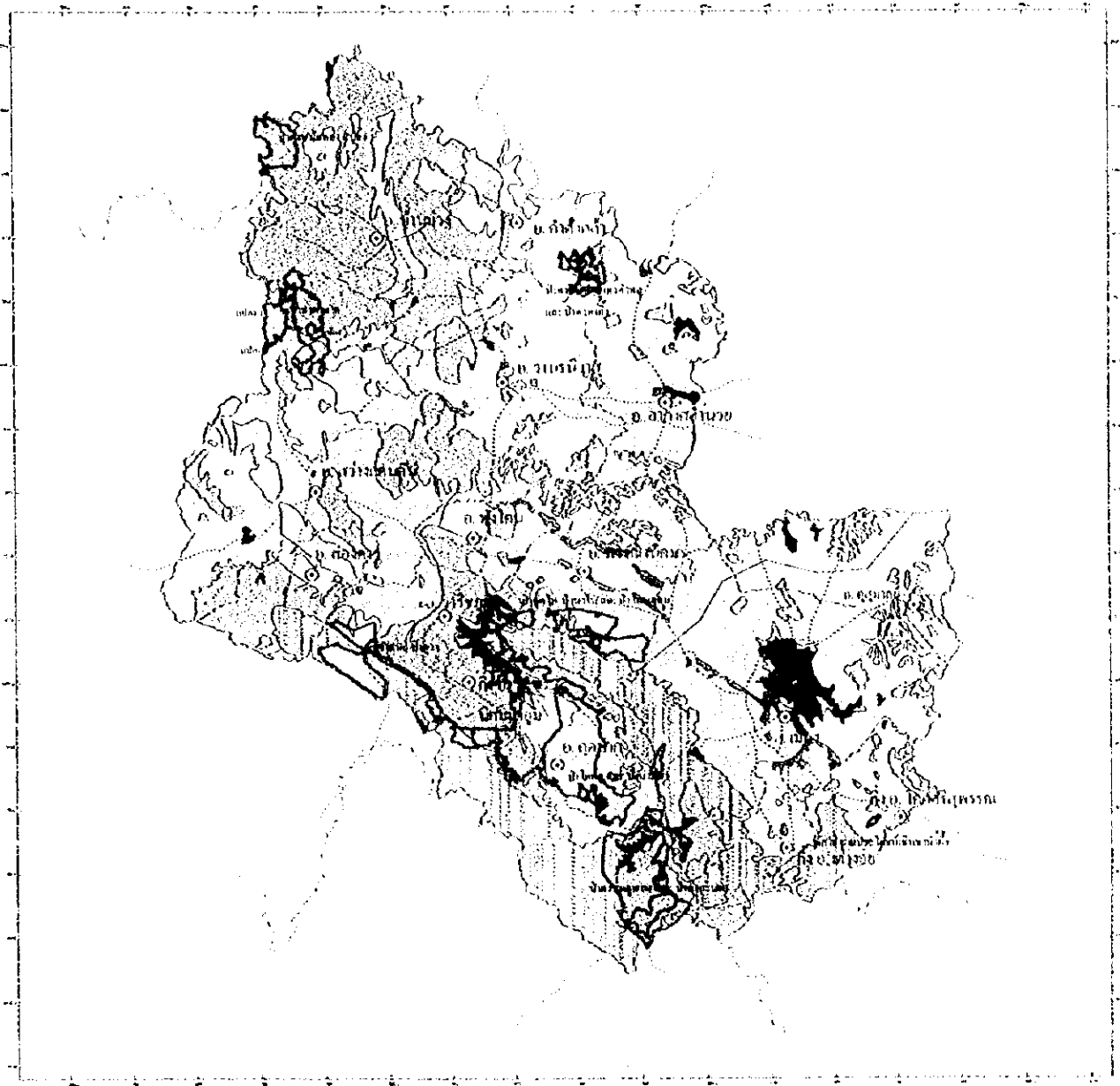


DATA SOURCE: ROYAL ENGINEERING DEPARTMENT  
ROYAL FORESTRY DEPARTMENT  
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ENGINEERED BY: ORGANIZATION OF MATHEMATICS AND  
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# 7. Figure E-7 Land Use Map : Sakon Nakhon

LAND USE MAP 1994

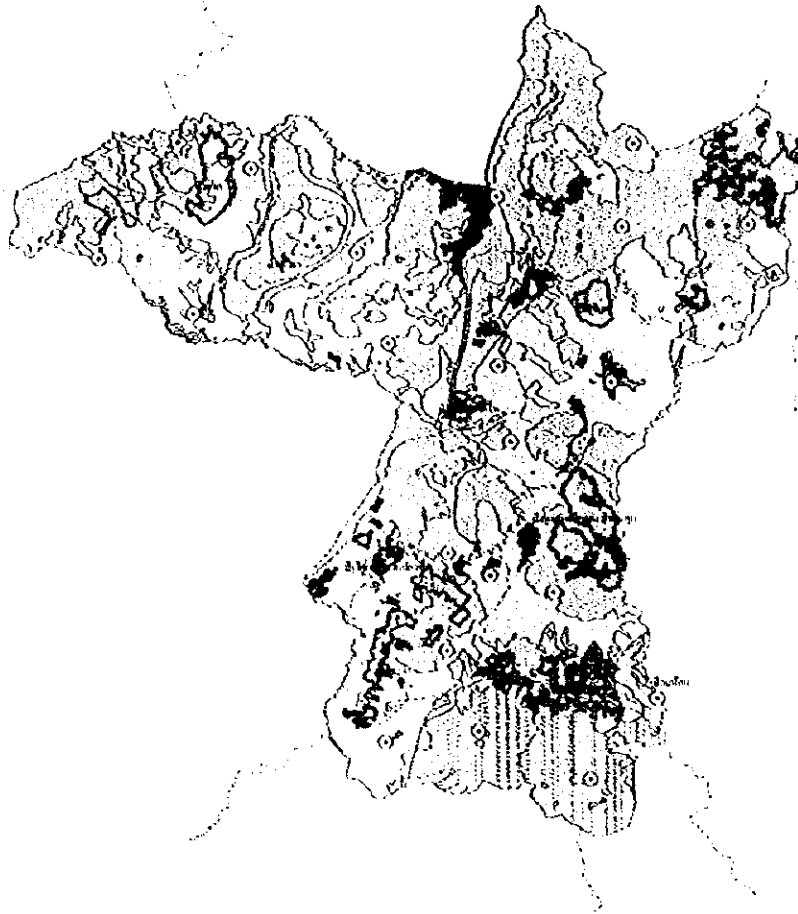
SAKON NAKHON PROVINCE



<p><b>LEGEND</b></p> <ul style="list-style-type: none"> <li>⊙ SITE OF AMSHIDE</li> <li>--- AMSHIDE BOUNDARY</li> <li>--- PROVINCE BOUNDARY</li> <li>--- WITHOUT ALRO PROJECT</li> <li>--- LAND REFORM AREA</li> </ul>	<ul style="list-style-type: none"> <li>--- RICE</li> <li>--- GRASSLAND</li> <li>--- PLANT</li> <li>--- UPLAND CROPS</li> <li>--- CASSAVA</li> <li>--- TREE</li> <li>--- MAIZE</li> <li>--- SUGARCANE</li> <li>--- VILLAGE</li> <li>--- WATER RESOURCE</li> <li>--- OTHER</li> </ul>		<p>DATA SOURCE: ROYAL LAND SURVEY DEPARTMENT ROYAL FORESTRY DEPARTMENT OFFICE OF AGRICULTURAL RESEARCH AGRICULTURAL LAND REFORM CENTER GEOSPATIAL INFORMATION CENTER PROVINCIAL AND RESEARCH SERVICE AGRICULTURAL LAND REFORM CENTER</p>
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8. Figure E-8 Land Use Map : Khon Kaen

LAND USE MAP 1994  
KHON KAEN PROVINCE



LEGEND

- ⊙ SITE OF AMPHOE
- △ AMPHOE BOUNDARY
- ▭ PROVINCE BOUNDARY
- ▭ (with diagonal lines) WILHOIT ALRO PROJECT
- ▭ (with horizontal lines) LAND REFORM AREA

- ▭ RICE
- ▭ GRASSLAND
- ▭ FOREST
- ▭ UPLAND CROPS
- ▭ CASSAVA
- ▭ TREE
- ▭ MAIZE
- ▭ SUGARCANE
- ▭ VILLAGE
- ▭ WATER RESOURCE
- ▭ OTHER

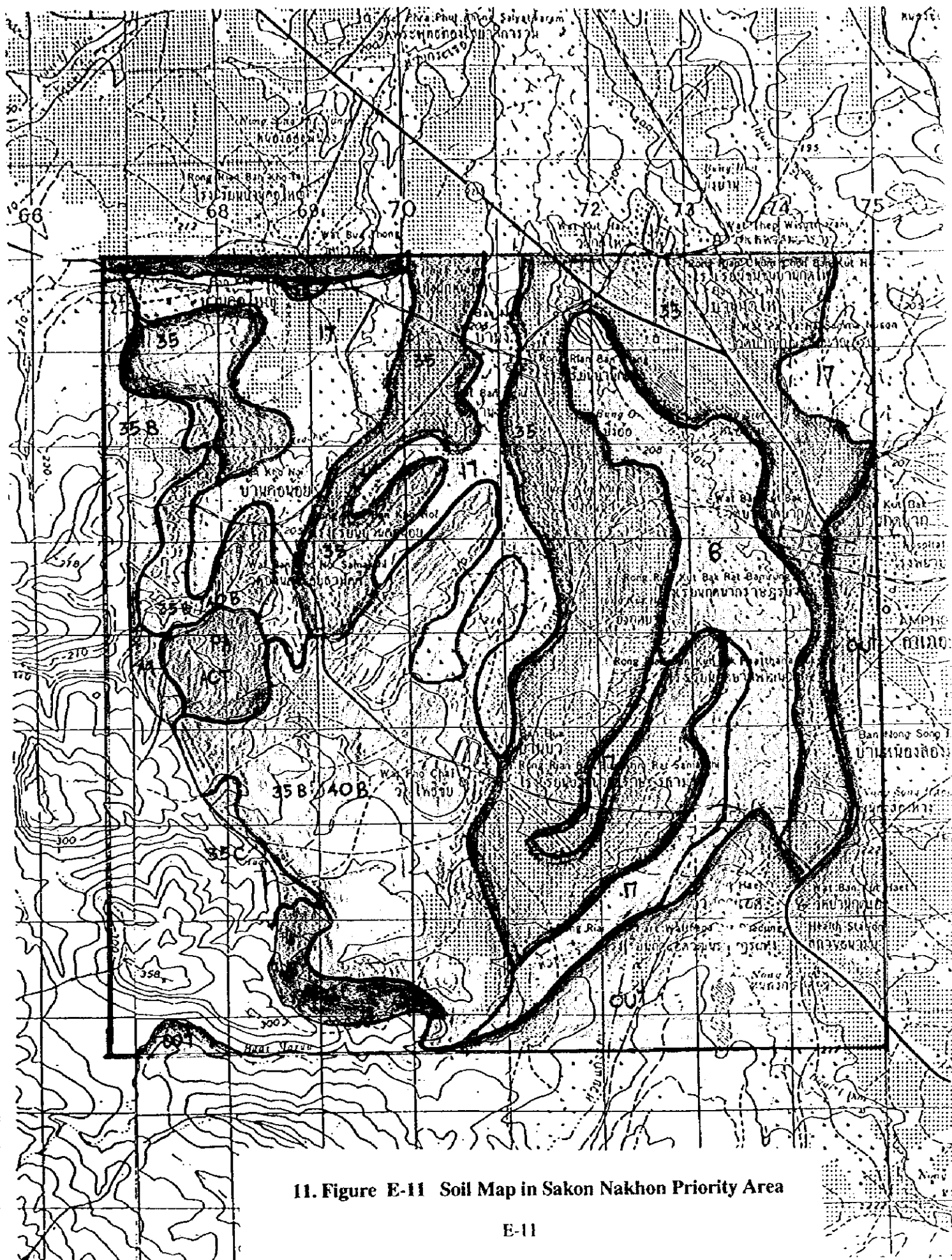


DATA SOURCES : ROYAL THAI SURVEY DEPARTMENT  
ROYAL FORESTRY DEPARTMENT  
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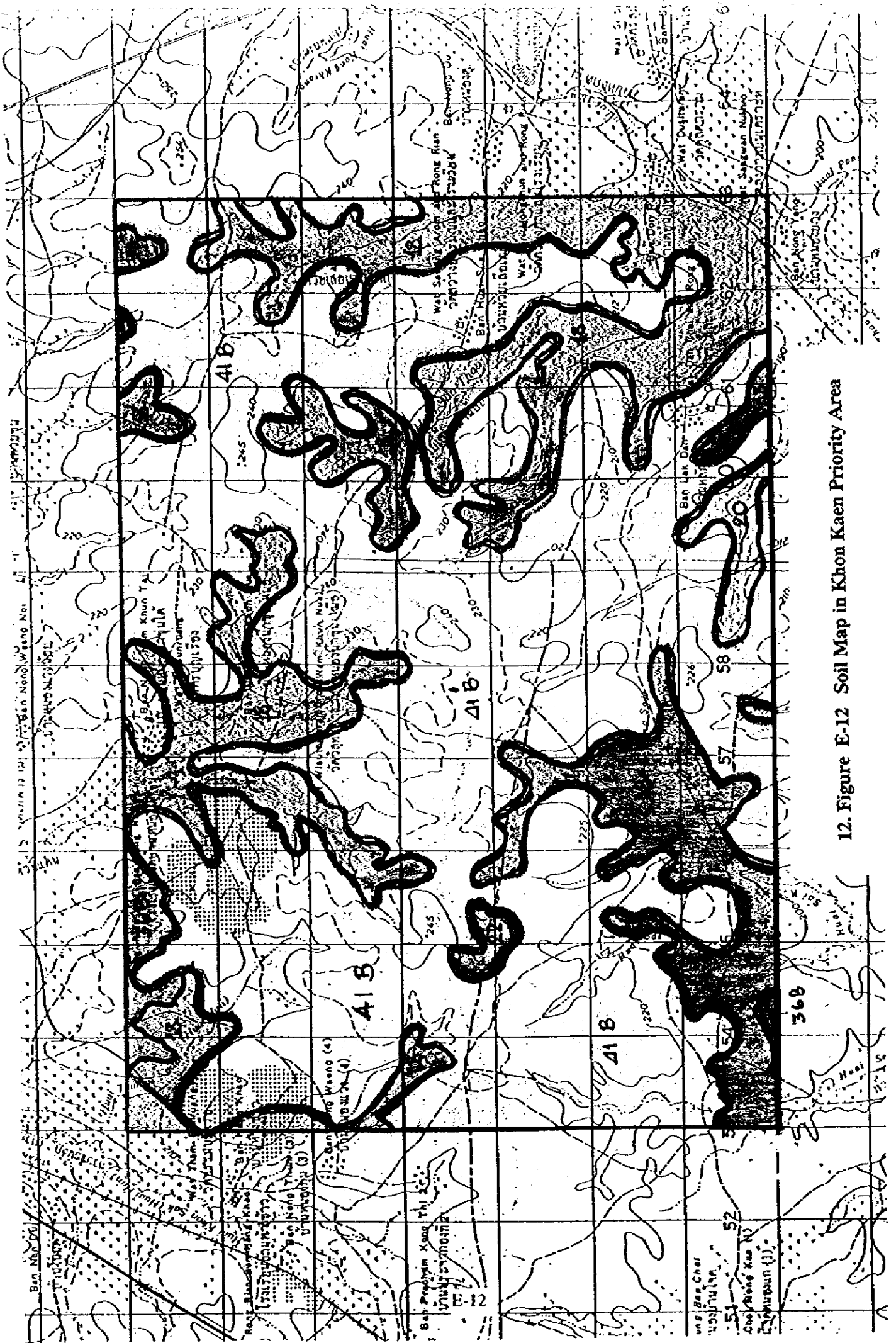








11. Figure E-11 Soil Map in Sakon Nakhon Priority Area



12. Figure E-12 Soil Map in Khon Kaen Priority Area

**Table E-1 Soil in the Mukdahan Study Area**

Site No.	Mapping Unit	Phase of Great Group
1	33L/30L	Loamy Paleustults/Loamy Paleaquults
2	33L	Loamy Paleustults
3	33L	Loamy Paleustults
4	33L	Loamy Paleustults
5	33L/30L	Loamy Paleustults/Loamy Paleaquults
6	33L/30L	"
7	33L/30L	"
8	33L	Loamy Paleustults
9	33L	"
10	33L	"
11	33L	"
12	33L	"

**Table E-2 Soil in the Mahasarakham Study Area**

Site No.	Mapping Unit	Phase of Great Group
1	30L	Loamy Paleustults
2	33L/33L	Loamy Paleustults/ Loamy Paleaquults
3	5s	Sandy Quartzipsamments
4	33L	Loamy Paleustults/Loamy Paleaquults
5	33L/30L	"
6	33L/30L	"
7	33L/30L	"
8	33L/30L	"
9	33L/30L	"
10	30L	Loamy Paleustults

**Table E-3 Soil in the Sakhon Nakhon Study Area**

Site No.	Mapping Unit	Phase of Great Group
1	32K	Skeletal Plinthustults
2	33L	Loamy Paleustults
3	33L/30L	Loamy Paleustults/Loamy Paleaquults
4	33L/30L	"
5	33L/30L	"
6	33L/30L	"
7	33L	Loamy Paleustults

**Table E-4 Soil in the Khon Kaen Study Area**

Site No.	Mapping Unit	Phase of Great Group
1	32K	Loamy Paleaquults
2	33L/30L	Loamy Paleustults /Loamy Paleaquults
3	33L/30L	"
4	5s	Sandy Quartzipsamments
5	33L	Loamy Paleustults
6	5s	Sandy Quartzipsamments

**Table E-5 Soil Characteristics in the Study Area**

Mapping Unit	Soil Characteristics
5s	Deep, gently sloping, excessively drained, Sandy soils, low fertility.
30L	Deep, level to nearly level, poorly drained, medium texture or loamy soils with low to moderate fertility.
32K	Shallow to very shallow, moderately sloping, well to moderately well drained, gravely soils including area with laterite or bed rock near the surface.
33L	Deep, gently sloping to strongly sloping, well to moderately well drained, medium to coarse texture soils with low fertility.

Table E-6 Major Soil Characteristics in the Priority Areas

Soil Group	Soil Code	Soil Classification	% Slope	Location	A Drainage B Permeability	Soil Depth	Flooding (month)	Texture		Fertility	pH	
								A Upper Soil B Lower Soil			Upper Soil	Lower Soil
6	Cr, No, Re-c	Clayey Paleaquults	0-2	Lowland	A Poorly B Slowly	Deep	-	A Loamy sand, sandy loam B Sandy clay loam mixed with layer of sand or clay	Low	4.5-5.5		
17	Rn, Re, Re-da	Loamy Paleaquults	2-8	Lowland	A Poorly B Moderately well	Deep	-	A Sandy loam, loamy sand B Sandy loam, sandy clay loam	Low	5.5-6.5	4.5-5.5	
18	Kyo, Re-tu	Loamy Paleaquults	0-2	Lowland	A Poorly B Slowly	Deep	3-4	A Sandy loam B Clay	Low	5.0-6.5	5.0-6.0	
20	Ud	Loamy Paleaquults	2-8	Lowland	A Poorly B Slowly	Shallow	-	A Sandy loam, loamy sand B Sandy clay loam, sandy loam, sandy clay, clay	Low	7.5-8.0	>8.0	
21	Ca, Tu, Sa	Loamy Ustifluvents	0-2	Low Ridge	A Poorly B Fast, moderately	Deep	2-4	A Sandy loam, sandy clay loam B Sandy clay loam to clay	Moderately	4.5-5.5	5.0-6.5	
22	Kyo, Su	Loamy Tropaquults	2-16	Lowland	A Rather poor B Moderately	Moderate	-	A Sandy clay loam, loamy sand B Sandy loam more than 80 cm. deep	Low	6.5-8.0	6.5-8.0	
24	Ub, Ng	Sandy Quartzipsamment	0-2	Lowland, Upland	A Well B Moderately fast	Deep	-	A Sandy loam, loam, sandy clay B Clay	Vary Low	5.0-7.0	5.0-5.5	
35	Kl, Suk, Wn, Yt	Loamy Paleustults	4-16	Upland	A Rather well B Fast	Deep	-	A Loamy sand, sandy B Sandy, Loamy sand to sandy loam	Low	5.0-6.5	6.0-7.5	
36	Si	Loamy Paleustults		Upland	A Well B	Deep	-	A Sandy loam B Clay loam or sandy clay loam	Moderately	5.5-6.0		
40	Yt	Loamy Dystropepts		Upland	A Well B	Deep	-	A Sandy loam B Some areas found colour mottle in lower soil	Low	4.5-5.5		
41	Kg	Loamy Paleustults		Upland	A Well B Fast	Deep	-	A Loamy sand to sandy loam B Sandy loam to sandy clay loam	Moderately	4.5-5.5		
49	Pp	Skeletal Plinthustults	2-8	Upland	A Well B Fast	Shallow	-	A sandy loam, sandy clay loam B Sandy clay loam mixed with gravel, sandy clay with gravel	Low	5.0-6.5		
61				Footslope complex	A Well-moderately B		-	A Rock found on surface scatter all over B	Uncertain			

Source : Land use Plan of the North Eastern Region, Department of Land Development, 1993.  
: Physical Characteristics of Soil  
Office of Land Development Regional 5, Department of Land Development, 1991



Table E-7 Land Classification System

Land Class Group	Land Unit	Definition	Suggested Management
L1	1, 2, 3, 4, 5, 6, 7	Suitable for paddy rice, in area where water resource exists, annual crops or vegetables can be grown in the dry season.	Fertilizer should be applied for improving and maintain soil fertility.
L2	16, 17, 17/22, 17/25, 18, 21, 22, 22/24, 22/25, 24, 25, 29	Suitable for paddy rice with a risk of water shortage when rainfall is erratic as soil in top layer is mostly sandy.	Providing water reservoir for use if shortage.
L3	20, 20 sa	Moderately suitable to paddy rice as salinity is the problem.	Necessary to have sufficient water, preventive measures and soil improvement program before and after growing should be practiced.
L4	2/38, 17/35b, 17/40, 17/40b, 18/40, 22/40, 22/40b	Suitable for paddy rice, upland crops and pasture.	Crops should be selected according to soil suitability.
L5	33, 35, 56, 56B, 38	Suitable for upland crops and vegetables.	Apply fertilizer to improve and maintain soil fertility, in some areas measurement for soil and water conservation should be applied.
L6	40, 40B	Suitable for upland crops and vegetables, soils are rather sandy and by nature low in fertility.	Organic matter and cover crops should be used, fertilizer must be applied at suitable rate and time of application to each crop as to reduce loss.
L7	40/41, 40B/41B, 41, 41b, 41B, 41C, 41/41b, 44, 44C	Moderately suitable for upland crops or pasture as soils are very sandy and very low in organic matters.	Organic matter is needed for soil improvement, crops should be selected to suit the land use.
L8	35b, 40b, 40/40b, 40b/41b, 40b, 56b, 47b/47/47b, 56b, 56b/60b, 35/35b	Suitable for upland crops, at present the land is renovated by making dike for growing rice.	Land use should be changed according to soil suitability and fertilizer should be applied for soil improvement.
L9	44D, 44E	Moderately suitable for pasture or some certain trees due to the texture of soil is very sandy and steep slope.	Necessary to use suitable measurement and good management to conserve soil and
L10	40C, 40D, 56C	Suitable for fruit crops and trees.	Fertilizer should be used to improve soil fertility together with the suitable measurement to conserve soil and water.

Table E-7 Land Classification System (Cont)

Land Class Group	Land Unit	Definition	Suggested Management
L11	40E, 48E	Moderately suitable for fruits and trees due to steep slope.	Soil and water conservation measures are necessary and should be exercised simultaneously with fertilizer application.
L12	47, 49, 49E, 49/56, 47B, 48D, 35/49, 48	Suitable or moderately suitable for fruits and trees due to soil contains gravel or having layer of rock in subsoil.	Planting holes should be well prepared, organic matter and fertilizer should be applied to improve soil fertility together with measurement for soil and water
L13	40C/RL, 40D/RL, 40E/RL, 40C/40D/RL, 44B/RL, 44C/RL, 44D/RL, 44E/RL, 47/RL, 47B/RL, 48D/RL, 48E/RL, 56C/RL, 62, RL	High mountainous areas, rolling topography with rock outcrops or soil mixed with irregular hilly areas having rock outcrops, unsuitable for economic crops.	Land should be preserved as forest or watershed areas, in natural forest areas having encroachments, they should be reforested.
L14	Borrow pit, Swamp, Urban	Other areas such as lateritic soil area, water resources, housing or industrial plant area.	Measures should be exercised to prevent their impact on environment and other natural resources.

Source : Department of Land Development

Table E-8 Soil Group and Crop Suitability

Soil Group	Non Nam Baeng Khon Kaen	Khok Phuak Kut and Pong Daeng, Mahasarakham	Dong Phu Phan Muekdahan	Kut Hai Na Nai, Non Udom Sakon Nakhon	First Suitability	Second Suitability
6				✗	Rice Kenaf Sugarcane Coconut	Pasture
17			✗	✗	Rice Kenaf Sugarcane Coconut	Pasture
18	✗				Rice Kenaf Sugarcane Coconut	Pasture
20	✗					Rice
20 + 18		✗			Rice Kenaf Sugarcane Coconut	Rice Pasture
22	✗				Rice Kenaf Sugarcane Coconut	Pasture
22 + 24		✗			Rice Kenaf Sugarcane Coconut	Pasture Rice Kenaf
35				✗	Every Crops except Rice	
35B			✗	✗	Every Crops except Rice	Jute Asparagus
35B/40B				✗	Every Crops except Rice	Vegetables
35B/41B		✗			Every Crops except Rice	Vegetables
35C			✗	✗	Every Crops except Rice	Jute Asparagus
35E			✗			Fruit trees Rubber Pasture Bamboo
36/18		✗			Every Crops except Rice	Pasture
36B	✗				Every Crops except Rice	
36B/41B		✗			Every Crops except Rice	Rice Lime Vegetables
40/41		✗			Every Crops except Rice	
41/35		✗			Every Crops except Rice	Cassava Sorghum Kenaf Sugarcane Sesame Rice
41B	✗				Kenaf Sugarcane Coconut Cassava Bamboo Eucalyptus	Rice Lime Vegetables
41B/21B		✗			Cashew nut Coconut Bamboo Sesame Eucalyptus Pasture	Cassava Sorghum Kenaf Sugarcane (Industry) Sesame Maize Leguminous Lime Papaya Asparagus Castor Cotton Jute Vegetables

Table E-8 Soil Group and Crop Suitability (cont.)

Soil Group	Non Nam Baeng Khon Kaen	Khok Phuk Kut and Pong Daeng, Mahasara Kham	Dong Phu Phan Mukdahan	Kut Hai Na Nai, Non Udom Sakon Nakhon	First Suitability	Second Suitability
49				✗	Bamboo Pasture	Upland Rice Maize Leguminous crops Cassava Sorghum Kenaf Jute Sugarcane Castor Cotton Sesame Sericulture Kapok Jack fruit Mango Cashew nut Coconut Rubber Eucalyptus Lime Papaya Asparagus Vegetables
49C				✗	Sugarcane Sorghum Kenaf Jute Cassava Bamboo Pasture	Rice Maize Ground nut Soybean Sesame Castor Sericulture Tamarind Mango Cashew nut Rubber
61/35					Bamboo Pasture	Every Crops except Rice
61D/35D					Bamboo Pasture	Every Crops except Rice

Note:

- B Sloping 2-5%
- C Sloping 5-12%
- D Sloping 12-20%
- E Sloping 20-35%

/ eg. 35B/41B The area has two groups of soil 35B and 41B mix together.

## **F. AGRICULTURE**

## **APPENDIX F. AGRICULTURE**

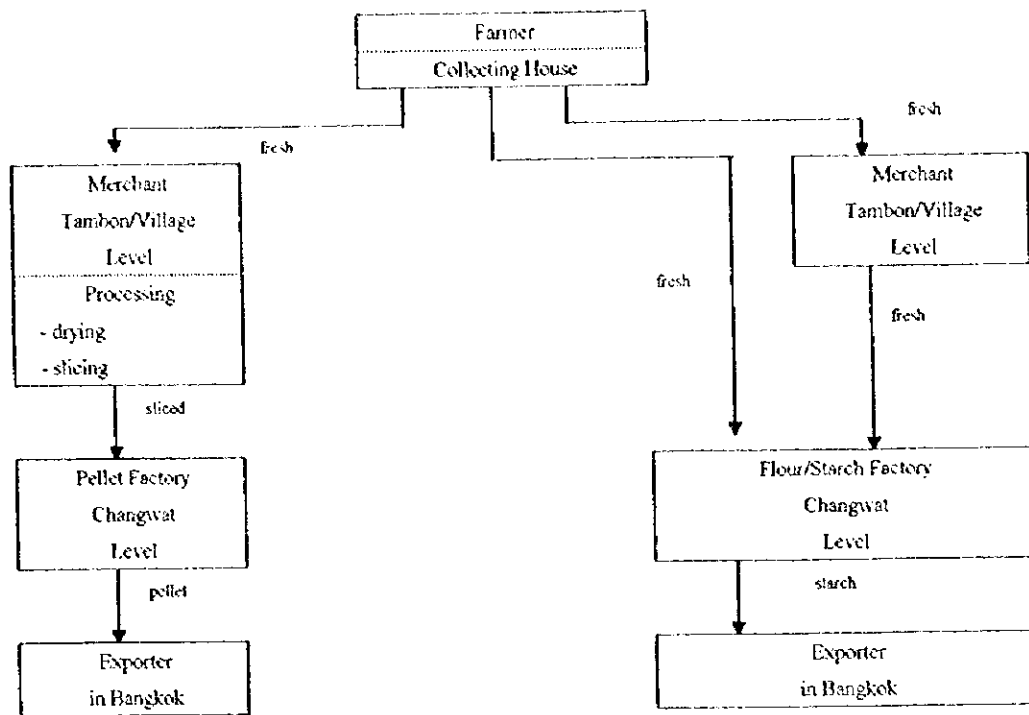
### **1. Figures**

1. Figure F-1 Marketing Channel of Agriculture Products,  
Cassava & Sugarcane ..... F-1
2. Figure F-2 Marketing Channel of Agricultural Products,  
Jute and Peanut..... F-2

### **2. Tables**

1. Table F-1 Planted Area and Yield per Rai of Major Rice by  
Province, 1994..... F-3
2. Table F-2 Second Rice: Area, Production and Yield by Province, 1995... F-3
3. Table F-3 Planted Area and Yield per Rai of Major Crops by  
Province, 1995..... F-4
4. Table F-4 Irrigated Area and Non-Irrigated Area Under Dry Season Crops  
by Province, Crops Year 1991/1992 - 1992/1993..... F-5
5. Table F-5 Number of Farm Pond by Province in 1994..... F-5
6. Table F-6 List of Agencies involved in Agricultural Research and  
Experimentation ..... F-6
7. Table F-7 Cultivated Area, Damaged Area, Yield and Production in  
1995/1996: Sakhon Nakhon..... F-7
8. Table F-8 Number of Rice Mill by 4 Province ..... F-7
9. Table F-9 Planted Area of Glutinous Rice, Harvested Area and Yield per  
Rai by Amphoe in Sakon Nakhon: 1995/96..... F-8
10. Table F-10 Inventory of Post-Harvest/Marketing Facilities ..... F-9
11. Table F-11 Estimated Paddy Production and Surplus with Project..... F-10
12. Table F-12 Estimated Fruits Production and Surplus with Project..... F-11
13. Table F-13 Estimated Vegetable Production and Surplus with Project..... F-12
14. Table F-14 Monthly Price Fluctuation of Agriculture Product..... F-13
15. Table 7.2.5-1 Estimated Paddy Production and Surplus..... F-15
16. Table 7.2.5-2 Inventory of Post-Harvest/Marketing Facilities  
in Priority Areas ..... F-16
17. Table 11.4.4-1 Estimated Vegetable Production and Demend by Areas..... F-17
18. Table 11.4.4-2 Estimated Fruits Production and Demend by Areas..... F-18
19. Table 11.4.4-3 Food Consumption in Thailand and Japan..... F-19
20. Table 11.4.4-4 Yield and Price with or without Project..... F-20

Cassava



Sugar Cane

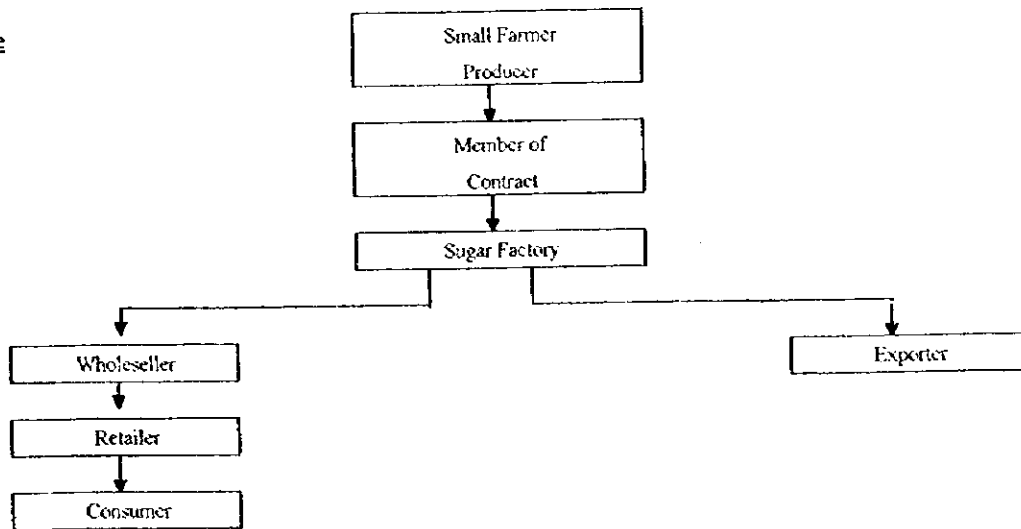
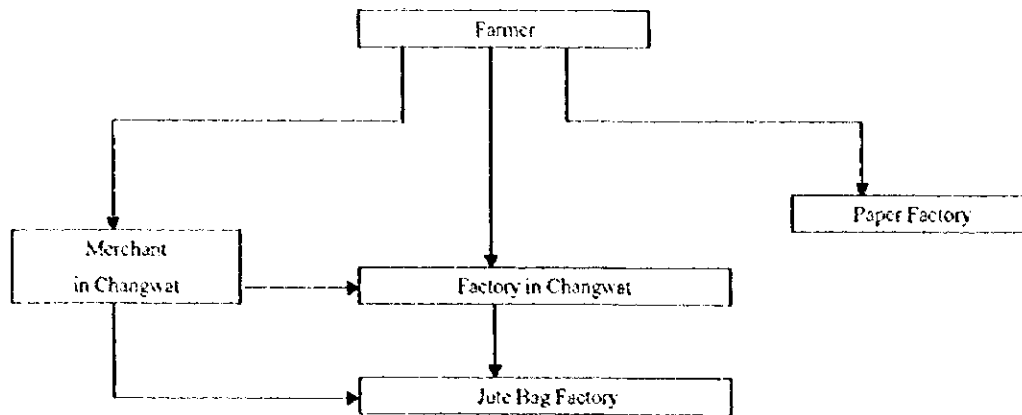


Figure F-1 Marketing Channel of Agricultural Products, Cassava & Sugar Cane

Jute



Peanut

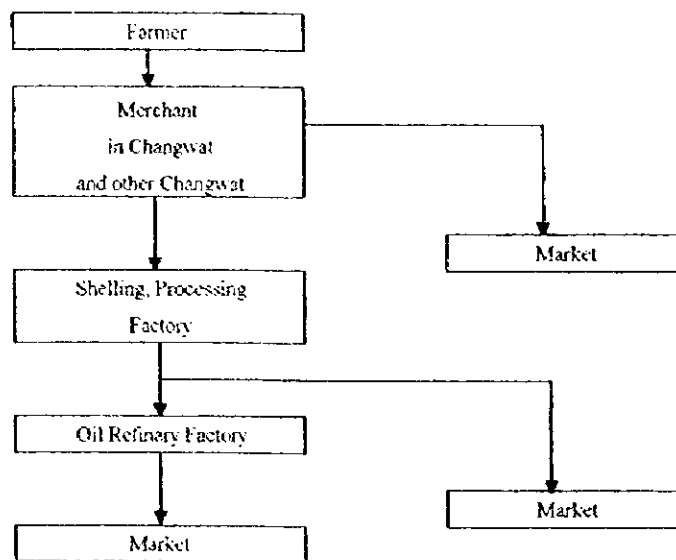


Figure F- 2 Marketing Channel of Agricultural Products, Jute and Peanut



**Table F-1 Planted Area and Yield per Rai of Major Rice by Province 1994/95**

Province	Planted Area (rai)		Average Yield (kg/rai)	
	Non-glutinous Rice	Glutinous Rice	Non-glutinous Rice	Glutinous Rice
Khon Kaen	276,821	1,444,763	283	263
Maharakham	389,477	1,090,300	278	274
Sakon Nakhon	329,966	1,292,459	283	265
Mukdahan	59,390	312,218	309	290
Total	1,055,654	4,139,740	288	273

Source : Center for Agricultural Statistics Office of Agricultural Economics, 1995

**Table F-2 Second Rice : Area, Production and Yield by Province, 1995**

Province	Planted Area (rai)	Yield per rai (kgs.)
Khon Kaen	5,563	464
Mahasaakham	3,448	478
Sakon Nakhon	2,364	326
Mukdahan	75	293
Total	11,450	390

Source : Thailand, Office of Agricultural Economics Others, FAO Production Yearbook 1993

Table F-3 Planted Area and Yield per Rai of Major Crops by Province 1995

Province	Cassava		Maize		Sugarcane (industry)		Kenaf	
	Planted Area (rai)	Average Yield (kg/rai)	Planted Area (rai)	Average Yield (kg/rai)	Planted Area (rai)	Average Yield (kg/rai)	Planted Area (rai)	Average Yield (kg/rai)
Khon Kaen	342,942	2,068	27,489	452	263,058	9,689	26,078	236
Maharakham	170,069	1,890	-	-	7,035	9,914	4,991	225
Sakon Nakhon	141,582	1,914	-	-	16,346	8,726	17,195	243
Mukdahan	100,317	2,050	-	-	76,093	7,952	8,845	217
Total	754,910	1,980	27,489	452	362,532	9,070	57,109	230

(Continue)

Province	Soybean				Ground Nut			
	Planted Area (rai)		Average Yield (kg/rai)		Planted Area (rai)		Average Yield (kg/rai)	
	Rainy Season	Dry Season	Rainy Season	Dry Season	Rainy Season	Dry Season	Rainy Season	Dry Season
Khon Kaen	17,367	75,672	225	224	16,528	3,082	211	190
Maharakham	-	1,699	-	208	6,992	2,637	238	237
Sakon Nakhon	650	4,292	180	206	5,962	7,821	207	237
Mukdahan	-	207	-	198	3,474	3,424	197	235
Total	18,017	81,870	203	209	32,956	16,964	213	225

Source : Center for Agricultural Statistics Office of Agricultural Economics, 1996

**Table F-4 Irrigated Area and Non-Irrigated Area Under Dry Season Cops by Province, Crop Year 1991/92 - 1992/93**

Province	1991/92		1992/93	
	Irrigated Area	Non-Irrigated Area	Irrigated Area	Non-Irrigated Area
Khon Kaen	102,482	108,985	15,091	79,790
Maharakham	57,426	73,597	1,500	30,700
Sakon Nakhon	23,868	19,932	17,507	14,182
Mukdahan	3,029	10,019	2,783	8,964
	186,805	212,531	36,881	133,636

Source: Planning and Promotion of Dry-Season Cropping Sub-Committee  
Department of Agricultural Extension

**Table F-5 Number of Farm Pond by Province in 1994**

Province	Number of Pond	Capacity (m <sup>3</sup> )	Beneficial Area (rai)
Khon Kaen	594	664,295	2,970
Maharakham	391	494,435	1,955
Sakon Nakhon	297	379,638	1,358
Mukdahan	77	98,720	355
Total	1,359	1,637,088	6,638

Source: Royal Irrigation Department

Table F-6 List of Agencies Involved in Agricultural Research and Experimentation

Agencies	Provinces			
	Khon Kaen	Maharashtra	Sakon Nakhon	Mukdahan
OPS-MOAC	X			
DOA				
1. Northeast agricultural Development Research Center	X			
1. Office of Agricultural Research and Development Region 3	X			
2. Field Crop Research Center	X	X		X
3. Field Crop Experiment Stations		X	X	
4. Rice Research Center	XX			
5. Rice Experiment Stations				
6. Sericulture Research Center	X		X	X
7. Sericulture Experiment Stations				
DOF				
1. Freshwater Fisheries' Development Center	X			
2. Aquaculture Genetic Research Center	X			
3. Freshwater Fisheries Stations	X	X		X
DOL				
1. Animal Husbandry Research Center	X			
2. Animal Nutrition Research Center	X			
3. Artificial Insemination Research Center	X			
4. Northeastern Veterinary Research Diagnostic Center	X			
5. Livestock Breeding Stations		X	XX	
6. Livestock Breeding Units		X	X	
7. Kud Rang Forage Crop Station		X		
8. Chieng Yuen Forage Crop Station		X		
9. Forage Crop Stations			X	X
DLD				
1. Land Development Region 5	X			
2. Land Development Stations	X	X	X	X
RFD				
1. Forest Nursery Station	X			
2. REX				
3. Forest NU		X		

Table E-7 Cultivated Area, Damaged Area, Harvested Area, Yield and Production in 1995/96, Sakon Nakhon

Amphoe/ Province	Main Rice			Second Rice			Cassava				
	Cultivated Area (rai)	Damaged Area (rai)	Harvested Area (rai)	Cultivated Area (rai)	Damaged Area (rai)	Harvested Area (rai)	Cultivated Area (rai)	Damaged Area (rai)	Harvested Area (rai)	Yield (kg/rai)	Production (t)
1. Muang	157,896	13,521	149,295	49,801	3,930	47,011	5,104	-	5,104	2,500	13,270
2. Akat Amnuai	121,559	32,147	89,412	21,500	15,400	6,100	350	-	350	2,800	980
3. Phenna Nikhom	142,600	3,600	139,000	20,500	300	20,200	254	-	254	2,000	508
4. Sawang Daen Din	211,042	24,400	186,642	99,960	400	99,560	3,322	-	3,322	2,370	7,876
5. Waiwachaphum	70,437	-	70,437	24,240	-	24,240	3,564	-	3,564	2,086	7,438
6. Kusuman	80,164	12,846	67,318	34,355	5,500	28,849	-	-	-	-	-
7. Wanon Niwat	89,074	7,000	82,074	35,900	9,839	26,061	180	-	180	1,200	216
8. Kut Bak	42,000	-	42,000	1,505	-	1,505	52,080	-	52,080	1,495	77,876
9. Phang Khon	50,105	4,269	46,986	29,395	3,146	26,899	840	-	840	2,000	1,680
10. Ban Muang	127,905	18,308	109,597	32,000	12,000	20,000	200	-	200	2,500	500
11. Song Dao	32,100	-	32,100	4,700	-	4,700	16,800	-	16,800	2,016	33,880
12. Nikhom Nam Un	9,460	-	9,460	3,890	-	3,890	340	-	340	1,322	466
13. Kham Ta Kila	85,107	10,741	74,366	21,941	10,284	11,657	315	-	315	3,671	1,124
14. Tao Ngoi	33,250	-	33,250	3,515	-	3,515	320	-	320	3,671	1,124
15. Khok Si Suphan	48,247	5,867	42,380	26,423	3,092	23,331	367	-	367	8,579	3,070
16. Charoen Silp	76,980	4,230	72,750	13,530	1,530	12,000	3,720	-	3,720	3,720	3,680
17. A Phon Ne Kaew	49,850	17,463	32,387	24,970	12,702	12,268	-	-	-	300	169
18. A Phu Phan	15,612	-	15,612	470	-	470	31,758	-	31,758	2,500	79,395
Total:	1,443,388	154,392	1,295,060	448,595	78,183	372,256	140,582	0	140,582	1,934	271,893

Source: Marketing Information, 1994 Sakon Nakhon Commercial Office

Table E-8 Number of Rice Mill by 4 Province

Province	1990	1991	1992	1993	1994
Khon Kaen	1433	1,430	1,419	1,401	1,395
Maha Sarakham	1580	1,574	1,559	1,559	1,558
Sakon Nakhon	1509	1,485	1,472	1,452	1,440
Mukdahan	37	35	35	35	33

Source: Agricultural Statistics of Thailand, Crop Year 1994/95  
Center of Agricultural Statistics

F-9 Planted Area of Glutinous Rice, Harvested Area and Yield per rai by Amphoe in Sakon Nakhon : 1995/96

	Amphoe/King Amphoe	Planted Area (rai)	Damaged Area (rai)	Harvested Area (rai)	Yield Per rai (kgs)	Total Yield (tons)
1	Muang Sakon Nakhon	157,896	13,521	149,295	350	52,253
2	Akat Amnuai	121,559	32,147	89,412	280	25,035
3	Phanna Nikhom	142,600	3,600	139,000	447	62,133
4	Sawang Daen Din	211,042	24,400	186,642	300	55,992
5	Waritchaphum	70,437	-	70,437	379	26,744
6	Kusuman	80,164	12,846	67,318	320	21,541
7	Wanon Niwat	84,074	7,000	82,074	230	18,877
8	Kut Bak	42,000	-	42,000	295	12,390
9	Phang Khon	50,105	4,269	46,986	400	18,794
10	Ban Muang	127,905	18,308	109,597	380	41,646
11	Song Dao	32,100	-	32,100	369	11,870
12	Nikhom Nam Oon	9,460	-	9,460	326	3,087
13	Kham Ta Kla	85,107	10,741	74,366	310	23,053
14	Tao Ngoi	33,250	-	33,250	296	9,863
15	Khok Sri Suphan	48,247	5,867	42,380	338	14,331
16	Charoen Silp	76,980	4,230	72,750	300	21,825
17	King A. Phon Na Kaew	49,850	17,463	32,387	300	9,716
18	King A. Phu Phan	15,612	-	15,612	350	5,464
	Total	1,438,388	154,392	1,295,066	332	434,614

Table F-10 Inventory of Post-Harvest/Marketing Facilities

	Population	House-holds of village	Number of village	Public service in village			Service Tambon		Store in village			Stock Yard				
				3.2	3.3	3.3	4.5	9.4	7.4	No. of rice mills	Indiv- dual	mate- rial or mach- inery	7.6	for central market	for dom. market	for coop. store
KK-1	8,561	2,511	36	9	12	10	45	354	16	2	4	37	6	19	66	
KK-2	4,277	1,042	11	1	14	2	20	19	1	0	8	4	1	6	19	
KK-3	31	1,610	25	0	14	0	5	130	0	1	9	15	1	7	32	
KK-4	0	261	8	0	2	0	6	5	34	0	12	3	0	6	21	
KK-5	5,655	1,163	9	5	1	7	29	61	14	2	0	0	0	0	0	
KK-6	7,323	5,907	37	20	6	8	45	619	1	5	10	58	10	17	95	
sub-total:	25,847	12,497	126	35	49	27	150	1,188	66	10	43	117	18	55	233	
MHS-1	1,084	234	3	1	0	0	8	6	0	0	0	0	0	0	0	
MHS-2	5,771	1,318	19	2	1	1	33	49	1	0	0	0	0	0	0	
MHS-3	0	0	9	1	1	0	0	0	0	0	0	0	0	0	0	
MHS-4	9,085	1,760	9	3	1	5	34	54	3	1	0	0	2	0	2	
MHS-5	7,359	1,361	13	8	2	10	45	46	5	0	0	0	3	1	4	
MHS-6	8,911	1,617	20	6	4	10	49	65	3	1	0	0	2	0	2	
MHS-7	10,000	1,810	11	2	1	3	37	45	7	0	0	0	1	0	1	
MHS-8	19,730	3,844	67	8	3	18	75	107	7	0	0	0	7	3	10	
MHS-9	2,166	411	5	2	2	3	9	15	2	0	0	0	1	0	1	
MHS-10	1,896	424	14	1	1	0	8	13	1	0	0	0	0	0	0	
sub-total:	66,002	12,779	170	34	16	50	298	400	29	2	0	0	16	4	20	
MKD-1	12,182	2,095	19	12	0	13	105	77	10	1	0	0	5	2	7	
MKD-2	4,947	873	11	5	1	7	27	29	1	1	1	0	1	1	3	
MKD-3	5,804	1,295	11	8	1	7	39	35	12	1	1	1	1	1	4	
MKD-4	1,591	324	3	3	0	3	12	13	4	0	0	0	0	0	0	
MKD-5	4,770	1,053	10	5	1	7	48	37	3	0	0	0	4	0	4	
MKD-6	2,850	583	6	4	1	5	24	19	0	0	0	0	3	0	3	
MKD-7	4,845	1,000	8	2	0	8	31	42	14	0	0	0	2	0	2	
MKD-8	11,089	2,093	19	7	3	0	30	53	7	0	0	1	0	0	1	
MKD-9	4,937	856	11	7	0	0	35	18	1	0	0	0	0	0	0	
MKD-10	1,164	198	2	0	0	0	8	8	4	0	0	0	0	0	0	
MKD-11	11,663	2,012	14	8	2	2	65	85	13	0	0	0	0	0	0	
MKD-12	4,132	740	3	1	2	0	5	15	0	0	0	0	0	0	0	
sub-total	70,024	13,122	117	62	11	52	429	431	69	3	2	2	16	4	24	
SKN-1	2,586	495	2	1	0	1	5	14	2	0	0	0	0	0	0	
SKN-2	0	0	12	0	0	0	0	0	0	0	0	0	0	0	0	
SKN-3	22,947	5,186	29	15	6	22	76	128	13	1	0	0	7	0	7	
SKN-4	11,072	2,355	24	10	1	10	40	81	17	0	0	0	0	0	0	
SKN-5	673	326	24	1	0	2	3	20	3	0	0	0	0	0	0	
SKN-6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	
SKN-7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	
sub-total:	37,278	8,362	99	27	7	35	124	243	35	1	0	0	7	0	7	
Total:	199,151	46,760	512	158	83	164	1,001	2,262	199	16	45	119	57	63	284	

Source:

Kor. Chor. Chor. 1994

Table F-11 Estimated Paddy Production and Surplus with Project

Estimated population	Area (rais)	Av. holding area (rai/HH)	Estimated home consumption (kg x p/year) (t)	Estimated Paddy Area			* Estimated Production			Estimated surplus	
				Irrigated (ha)	Non-irrigated (ha)	Total Paddy Field (ha)	Irrigated (kg)	Non-irrigated (kg)	Total Production (kg)		
KK-1	16,910	67,640	20.00	3,956,940	1,302	483	1,785	4,068,750	845,250	4,914,000	957,060
KK-2	4,375	14,130	16.15	1,023,750	118	152	270	368,750	266,000	634,750	-389,000
KK-3	3,999	18,370	22.97	935,766	182	538	720	568,750	941,500	1,510,250	574,484
KK-4	3,621	11,740	16.21	847,314	110	10	120	343,750	17,500	361,250	-486,064
KK-5	1,674	6,250	18.67	391,716	0	150	150	0	262,500	262,500	-129,216
KK-6	30,834	149,790	24.29	7,215,156	770	2,730	3,500	2,406,250	4,777,500	7,183,750	-31,406
sub-total:	61,413	267,920		14,370,642	2,482	4,063	6,545	7,756,250	7,110,250	14,866,500	495,858
MHS-1	2,182	2,640	6.05	510,588	0	0	0	0	0	0	-510,588
MHS-2	14,383	59,690	20.75	3,365,622	0	0	0	0	0	0	-3,365,622
MHS-3	1,814	3,080	8.49	424,476	0	0	0	0	0	0	-424,476
MHS-4	2,797	9,510	17.00	654,498	0	0	0	0	0	0	-654,498
MHS-5	5,875	13,030	11.09	1,374,750	54	446	500	168,750	780,500	949,250	-425,500
MHS-6	5,791	29,790	25.72	1,355,094	104	1,196	1,300	325,000	2,093,000	2,418,000	1,062,906
MHS-7	3,860	10,940	14.17	903,240	0	1,250	1,250	0	2,187,500	2,187,500	1,284,260
MHS-8	20,035	79,620	19.87	4,688,190	131	1,479	1,610	409,375	2,588,250	2,997,625	-1,690,565
MHS-9	82	310	18.90	19,188	0	0	0	0	0	0	-19,188
MHS-10	2,677	4,830	9.02	626,418	0	100	100	0	175,000	175,000	-451,418
sub-total:	59,496	213,440		13,922,064	289	4,471	4,760	903,125	7,824,250	8,727,375	-5,194,689
MKD-1	30,681	103,580 (16.88)		7,179,354	653	3,147	3,800	2,040,625	5,507,250	7,547,875	368,521
MKD-2	22,464	75,840 (16.88)		5,256,576	843	457	1,300	2,634,375	799,750	3,434,125	-1,822,451
MKD-3	32,037	106,490 16.62		7,496,658	840	4,340	5,180	2,625,000	7,595,000	10,220,000	2,723,342
MKD-4	551	1,860 (16.88)		128,934	42	0	42	131,250	0	131,250	2,316
MKD-5	1,786	6,030 (16.88)		417,924	102	98	200	318,750	171,500	490,250	72,326
MKD-6	207	700 (16.88)		48,438	0	10	10	0	17,500	17,500	-30,938
MKD-7	13,928	47,020 (16.88)		3,259,152	1,094	2,151	3,245	3,418,750	3,764,250	7,183,000	3,923,848
MKD-8 -1	9,599	33,040 17.21		2,246,166	320	0	320	1,000,000	0	1,000,000	-1,246,166
MKD-8 -2	3,117	10,730 17.21		729,378	300	0	300	937,500	0	937,500	208,122
MKD-8 -3	2,888	9,940 17.21		675,792	0	0	0	0	0	0	-675,792
MKD-8 -4	1,659	5,710 17.21		388,206	200	300	500	625,000	525,000	1,150,000	761,794
MKD-9 -1	8,451	28,530 (16.88)		1,977,534	173	627	800	540,625	1,097,250	1,637,875	-339,659
MKD-9 -2	7,023	23,710 (16.88)		1,643,382	272	248	520	850,000	434,000	1,284,000	-359,382
MKD-10	349	1,180 (16.88)		81,666	82	18	100	256,250	31,500	287,750	206,084
MKD-11-1	2,038	6,880 (16.88)		476,892	131	69	200	409,375	120,750	530,125	53,233
MKD-11-2	1,940	6,550 (16.88)		453,960	100	0	100	312,500	0	312,500	-141,460
MKD-12	3,400	11,480 (16.88)		795,600	0	0	0	0	0	0	-795,600
sub-total:	142,118	479,270		33,255,612	5,152	11,465	16,617	16,100,000	20,063,750	36,163,750	2,908,138
SKN-1	5,273	22,810	21.62	1,234,350	187	613	800	584,375	1,072,750	1,657,125	422,775
SKN-2	8,446	43,580	25.80	1,976,364	408	2,532	2,940	1,275,000	4,431,000	5,706,000	3,729,636
SKN-3 -1	36,516	80,920	11.08	8,544,744	1,261	2,049	3,310	3,940,625	3,585,750	7,526,375	-1,018,369
SKN-3 -2	3,001	6,650	11.08	702,234	0	20	20	0	35,000	35,000	-667,234
SKN-3 -3	14,684	32,540	11.08	3,436,056	1,100	0	1,100	3,437,500	0	3,437,500	-1,444
SKN-4	21,771	86,520	19.87	5,094,414	66	3,434	3,500	206,250	6,009,500	6,215,750	1,121,336
SKN-5 -1	5,248	16,740	15.95	1,228,032	110	0	110	343,750	0	343,750	-884,282
SKN-5 -2	22,727	72,500	15.95	5,318,118	400	0	400	1,250,000	0	1,250,000	-4,068,118
SKN-6 -1	5,235	23,400	22.35	1,224,990	0	3,180	3,180	0	5,565,000	5,565,000	4,340,010
SKN-6 -2	4,897	21,890	22.35	1,145,898	53	357	410	165,625	624,750	790,375	-355,523
SKN-7	2,116	13,200	31.19	495,144	160	340	500	500,000	595,000	1,095,000	599,856
sub-total:	129,916	420,750		30,400,344	3,745	12,525	16,270	11,703,125	21,918,750	33,621,875	3,221,531
Total:	392,943	1,381,380	0.00	91,948,662	11,668	32,524	44,192	36,462,500	56,917,000	93,379,500	1,430,838

- Remarks: (1) Estimated home consumption = 150kg white rice /0.64 milling recovery = 234 kg/person/year of dried paddy  
(2) Estimated production = 280kg/rai for non-irrigated fields and 500kg/rai for irrigated fields.  
(3) Paddy area = according to the farming type A, B, C & I as well as ratio of paddy field, such as A x 1/2/20 rai, B x 1/2/20 rai, C x 7/20 rai and I x 5/20 rai respectively



Table F-12 Estimated Fruits Production and Surplus with Project

	Estimated population	Area (rais)	Estimated home consumption (kgexp/period)	Estimated Fruits Planting Area										Total Area (ha)	Estimated Production (kg)	Estimated surplus (t)	
				A	B	C	D	E	F	G	H	I	K				L
				(2:20)	(2:20)	(2:20)	(2:20)	(2:20)	(2:20)	(2:20)	(2:20)	(10:20)	(2:20)				(2:20)
				(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)				(ha)
KK-1	16,910	67,640	304,380	61	24	284	284	285	19	0	0	0	0	956	8,600,400	8,296	
KK-2	4,375	14,130	78,750	19	8	0	0	98	98	0	0	0	0	223	2,003,400	1,925	
KK-3	3,999	18,370	71,982	67	27	0	0	107	107	0	0	0	0	309	2,778,750	2,707	
KK-4	3,621	11,740	65,178	1	1	0	0	0	84	3	84	0	0	174	1,562,850	1,498	
KK-5	1,674	6,250	30,132	19	8	0	28	28	28	0	0	0	0	110	992,250	962	
KK-6	30,834	149,790	555,012	278	91	91	0	672	672	0	0	0	0	1,754	15,788,100	15,230	
sub-total:	61,413	267,920	1,105,434	394	158	375	312	1,190	1,009	3	84	0	0	3,525	31,722,750	30,617	
MHS-1	2,182	2,640	39,276	0	0	0	21	21	0	0	0	0	0	42	378,000	339	
MHS-2	14,383	59,690	258,894	0	0	0	443	443	21	21	21	0	0	951	8,557,200	8,298	
MHS-3	1,814	3,080	32,652	0	0	0	25	25	0	0	0	0	0	49	442,800	410	
MHS-4	2,797	9,510	50,346	0	0	0	30	30	30	30	30	0	0	152	1,368,000	1,318	
MHS-5	5,875	13,030	105,750	37	15	15	79	79	0	0	0	0	0	226	2,030,850	1,925	
MHS-6	5,791	29,790	104,238	150	60	0	165	165	5	5	5	0	0	554	4,986,900	4,883	
MHS-7	3,860	10,940	69,480	156	63	0	25	25	0	0	0	0	0	269	2,420,550	2,351	
MHS-8	20,035	79,620	360,630	185	74	0	500	500	38	38	38	0	0	1,372	12,347,100	11,986	
MHS-9	82	310	1,476	0	0	0	3	3	0	0	0	0	0	5	45,000	44	
MHS-10	2,677	4,830	48,186	13	5	0	34	34	0	0	0	0	0	85	764,100	716	
sub-total:	59,496	213,440	1,070,928	541	216	15	1,325	1,325	94	94	94	0	0	3,705	33,340,500	32,270	
MKD-1	30,681	103,380	552,258	394	157	218	218	218	253	253	35	175	35	1,955	17,598,600	17,046	
MKD-2	22,464	75,840	404,352	57	23	205	205	205	214	214	9	46	9	1,185	10,665,450	10,261	
MKD-3	32,037	106,490	576,666	543	217	0	0	547	558	11	11	55	11	1,952	17,566,200	16,990	
MKD-4	551	1,860	9,918	0	0	0	0	2	4	4	4	11	2	27	246,600	237	
MKD-5	1,786	6,030	32,148	12	5	0	0	12	18	18	18	28	6	116	1,043,550	1,011	
MKD-6	207	700	3,726	1	1	0	0	2	4	4	2	0	2	14	124,650	121	
MKD-7	13,928	47,020	250,704	269	108	0	88	88	114	26	26	130	26	875	7,871,400	7,621	
MKD-8 -1	9,599	33,040	172,782	0	0	0	64	64	73	73	73	47	9	403	3,624,300	3,452	
MKD-8 -2	3,117	10,730	56,106	0	0	0	11	11	18	18	18	35	7	119	1,071,900	1,016	
MKD-8 -3	2,898	9,940	51,984	0	0	0	26	26	26	26	26	0	0	129	1,161,000	1,109	
MKD-8 -4	1,659	5,710	29,862	38	15	0	7	7	8	8	8	2	0	93	833,400	804	
MKD-9 -1	8,451	28,530	152,118	79	31	0	66	66	75	75	75	46	9	521	4,687,200	4,535	
MKD-9 -2	7,023	23,710	126,414	31	12	0	59	59	65	65	65	34	7	396	3,565,800	3,439	
MKD-10	349	1,180	6,282	2	1	0	2	2	2	2	2	0	0	12	109,350	103	
MKD-11-1	2,038	6,880	36,684	9	4	0	18	18	18	18	18	0	0	102	920,250	884	
MKD-11-2	1,940	6,550	34,920	0	0	0	11	11	18	18	18	0	0	75	670,500	636	
MKD-12	3,400	11,480	61,200	0	0	0	18	18	25	25	25	0	0	112	1,005,300	944	
sub-total:	142,118	479,270	2,558,124	1,434	574	423	792	1,355	1,492	856	432	606	123	8,085	72,765,450	70,207	
SKN-1	5,275	22,810	94,950	77	31	0	141	141	0	0	0	0	0	388	3,496,050	3,401	
SKN-2	8,446	43,580	152,028	317	127	0	199	199	0	0	0	0	0	841	7,571,700	7,420	
SKN-3 -1	36,516	80,920	657,288	256	103	0	301	301	310	10	10	49	10	1,348	12,133,350	11,476	
SKN-3 -2	3,001	6,650	54,018	3	1	0	31	31	31	0	3	14	3	116	1,046,700	993	
SKN-3 -3	14,684	32,540	264,312	0	0	0	116	116	116	0	10	49	10	416	3,740,400	3,476	
SKN-4	21,771	86,520	391,878	429	172	0	340	340	340	0	0	0	0	1,619	14,575,050	14,183	
SKN-5 -1	5,248	16,740	94,464	0	0	0	57	57	57	0	13	66	13	263	2,367,900	2,273	
SKN-5 -2	22,727	72,500	409,086	0	0	0	184	184	184	0	92	458	92	1,192	10,729,800	10,321	
SKN-6 -1	5,235	23,400	94,230	398	159	0	0	18	18	0	0	0	0	592	5,325,300	5,231	
SKN-6 -2	4,897	21,890	88,146	45	18	0	0	94	118	24	24	120	24	465	4,188,150	4,100	
SKN-7	2,116	13,260	38,088	43	17	0	0	81	81	0	0	0	0	221	1,986,300	1,948	
sub-total:	129,916	420,750	2,338,488	1,566	626	0	1,368	1,260	1,254	34	151		151	7,462	67,160,700	64,822	
Total:	392,943	1,381,380	7,072,974	3,935	1,574	812	3,797	5,430	3,848	987	761	606	274	22,777	204,989,400	197,916	

Remarks: (1) Estimated home consumption = 0.2kg/day x 90 days (estimated harvesting period) = 18 kg/person (estimated harvesting period)  
(2) Estimated area = according to the estimated integrated area and ratio of pattern  
(3) Estimated production ratio = 9 ton/ha (example: mango)

Table F-13 Estimated Vegetables Production and Surplus with Project

	Estimated population	Area (rais)	Estimated home consumption (kg/period)	Estimated Fruits Planting Area										Total Area (ha)	Estimated Production (kg)	Estimated surplus (t)
				A	B	C	D	E	F	G	H	I				
				ratio(1/20)	(1-20)	(1-20)	(1-20)	(1-20)	(1-20)	(1-20)	(1-20)	(1-20)	(1-20)			
KK-1	16,910	67,640	608,760	12	12	142	142	142	9	0	0	0	460	3,677,200	3,068	
KK-2	4,375	14,130	157,500	4	4	0	0	49	49	0	0	0	106	844,800	687	
KK-3	3,999	18,370	143,964	13	13	0	0	54	54	0	0	0	134	1,073,600	930	
KK-4	3,621	11,740	130,356	0	0	0	0	0	42	2	42	0	86	691,600	561	
KK-5	1,674	6,250	60,264	4	4	0	14	14	14	0	0	0	50	398,000	336	
KK-6	30,834	149,790	1,110,024	46	46	46	0	336	336	0	0	0	809	6,469,600	5,360	
sub-total:	61,413	267,920	2,210,868	79	79	187	156	595	504	2	42	0	1,641	13,152,800	10,942	
MHS-1	2,182	2,610	78,552	0	0	0	11	11	0	0	0	0	21	168,000	89	
MHS-2	14,383	59,600	517,788	0	0	0	222	222	11	11	11	0	475	3,803,200	3,285	
MHS-3	1,814	3,080	65,304	0	0	0	12	12	0	0	0	0	25	196,800	131	
MHS-4	2,797	9,510	100,692	0	0	0	15	15	15	15	15	0	76	608,000	507	
MHS-5	5,875	13,030	211,500	7	7	7	40	40	0	0	0	0	102	813,200	602	
MHS-6	5,791	29,790	208,476	30	30	0	83	83	2	2	2	0	232	1,857,600	1,649	
MHS-7	3,860	10,940	138,960	11	11	0	13	13	0	0	0	0	88	700,800	562	
MHS-8	20,035	79,620	721,260	37	37	0	250	250	19	19	19	0	630	5,043,600	4,322	
MHS-9	82	310	2,952	0	0	0	1	1	0	0	0	0	3	20,000	17	
MHS-10	2,677	4,830	96,372	3	3	0	17	17	0	0	0	0	39	309,600	213	
sub-total:	59,496	213,440	2,141,856	108	108	7	663	663	47	47	47	0	1,690	13,520,800	11,379	
MKD-1	30,681	103,580	1,104,516	79	79	109	109	109	126	126	18	18	772	6,177,200	5,073	
MKD-2	22,464	75,840	808,704	11	11	102	102	102	107	107	5	5	553	4,420,300	3,612	
MKD-3	32,037	106,490	1,153,332	109	109	0	0	274	279	5	5	5	786	6,287,200	5,134	
MKD-4	551	1,860	19,836	0	0	0	0	1	2	2	2	1	8	65,600	46	
MKD-5	1,786	6,030	64,296	2	2	0	0	6	9	9	9	3	40	322,400	258	
MKD-6	207	700	7,452	0	0	0	0	1	2	2	1	1	7	52,400	45	
MKD-7	13,928	47,020	501,408	54	54	0	44	44	57	13	13	13	292	2,332,800	1,831	
MKD-8 -1	9,599	33,040	345,564	0	0	0	32	32	37	37	37	5	178	1,424,800	1,079	
MKD-8 -2	3,117	10,730	112,212	0	0	0	6	6	9	9	9	3	42	338,400	226	
MKD-8 -3	2,888	9,940	103,968	0	0	0	13	13	13	13	13	0	65	516,000	412	
MKD-8 -4	1,659	5,710	59,724	8	8	0	4	4	4	4	4	0	34	272,400	213	
MKD-9 -1	8,431	28,530	304,236	16	16	0	33	33	37	37	37	5	214	1,712,800	1,409	
MKD-9 -2	7,023	23,710	252,828	6	6	0	29	29	33	33	33	3	172	1,376,400	1,124	
MKD-10	349	1,180	12,564	0	0	0	1	1	1	1	1	0	5	43,200	31	
MKD-11-1	2,038	6,880	73,368	2	2	0	9	9	9	9	9	0	49	388,000	315	
MKD-11-2	1,940	6,550	69,840	0	0	0	5	5	5	5	5	0	37	298,000	228	
MKD-12	3,490	11,460	122,400	0	0	0	9	9	13	13	13	0	56	446,800	324	
sub-total:	142,118	479,270	5,116,248	287	287	211	396	677	746	428	216	61	3,309	26,475,200	21,359	
SKN-1	5,275	22,810	189,900	15	15	0	70	70	0	0	0	0	171	1,369,600	1,180	
SKN-2	8,446	43,580	304,056	63	63	0	100	100	0	0	0	0	326	2,605,600	2,302	
SKN-3 -1	36,516	80,920	1,314,576	51	51	0	150	150	155	5	5	5	573	4,583,600	3,269	
SKN-3 -2	3,601	6,650	108,036	1	1	0	16	16	16	0	1	1	51	405,200	297	
SKN-3 -3	14,684	32,540	578,624	0	0	0	58	58	58	0	5	5	184	1,468,400	940	
SKN-4	21,771	86,520	783,756	86	86	0	170	170	170	0	0	0	681	5,447,600	4,664	
SKN-5 -1	5,248	16,740	188,928	0	0	0	28	28	28	0	7	7	99	788,400	599	
SKN-5 -2	22,727	72,500	818,172	0	0	0	92	92	92	0	46	46	367	2,938,800	2,121	
SKN-6 -1	5,235	23,400	188,460	80	80	0	0	9	9	0	0	0	177	1,412,800	1,224	
SKN-6 -2	4,897	21,890	176,292	9	9	0	0	47	59	12	12	12	160	1,276,000	1,100	
SKN-7	2,116	13,200	76,176	9	9	0	0	40	40	0	0	0	98	780,800	705	
sub-total:	129,916	420,750	4,676,976	313	313	0	684	780	627	17	75	75	2,885	23,076,800	18,400	
Total:	392,943	1,381,380	14,145,948	787	787	406	1,898	2,715	1,924	494	381	137	9,528	76,225,600	62,080	

Remarks: (1) Estimated home consumption = 0.4kg/day x 90 days (estimated harvesting period) = 36 kg/person (estimated harvesting period)  
 (2) Estimated area = according to the estimated integrated area and ratio of pattern  
 (3) Estimated production ratio = 8 ton/ha (example: cucumber)

Table F-14 Monthly Price Fluctuation of Agricultural Product

Khon Kaen

	Sticky Rice(short grain) B/ton			Sticky Rice(long grain) B/ton			Paddy (grade 1) B/ton			Paddy (grade 2) B/ton		
	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
January	3,625.00	3,406.25	4,356.25	3,856.25	3,612.50	4,543.75	4,850.00	3,900.00	4,800.00	3,575.00	3,556.25	4,525.00
February	3,725.00	3,525.00	4,487.50	3,925.00	3,737.50	4,656.25	5,225.00	4,262.50	5,025.00	3,800.00	3,750.00	4,775.00
March	3,537.50	3,537.50	4,493.75	3,762.50	3,687.50	4,712.50	5,200.00	4,187.50	5,137.50	3,950.00	3,650.00	4,875.00
April	3,550.00	3,800.00	4,662.50	3,775.00	3,956.25	4,762.50	4,950.00	4,162.50	5,162.50	3,850.00	3,756.25	4,912.50
May	3,625.00	3,981.25	4,825.00	3,750.00	4,175.00	4,912.50	5,050.00	4,187.50	5,400.00	3,925.00	3,762.50	4,925.00
June	3,600.00	4,031.25	4,750.00	3,700.00	4,135.00	4,837.50	5,025.00	4,212.50	5,762.50	3,875.00	3,825.00	4,925.00
July	3,375.00	4,537.50	4,725.00	3,575.00	4,731.25	4,850.00	4,800.00	4,775.00	5,856.25	3,750.00	4,475.00	5,025.00
August	3,575.00	4,700.00	-	3,750.00	4,887.50	-	4,950.00	5,175.00	-	3,900.00	4,875.00	-
September	3,550.00	4,550.00	5,650.00	3,825.00	4,675.00	5,825.00	4,950.00	5,000.00	6,375.00	4,000.00	4,750.00	5,437.50
October	3,450.00	4,612.50	-	3,743.75	4,775.00	-	4,950.00	5,100.00	-	4,100.00	4,775.00	-
November	3,225.00	3,837.50	-	3,475.00	4,362.50	-	4,850.00	5,062.50	-	4,050.00	4,850.00	-
December	-	4,012.50	-	-	4,275.00	-	-	4,500.00	-	-	4,225.00	-
average	3,530.68	4,044.27	4,743.75	3,739.77	4,250.83	4,887.50	4,981.82	4,543.75	5,439.84	3,888.64	4,187.50	4,925.00
increase		14.55	17.30		13.67	14.98			19.72		7.69	17.61

	Fresh Cassava B/ton			Soybean B/ton			Peanut with shell B/ton			Orange No.1 B/kg		
	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
January	71.00	119.00	132.50	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	10,750.00	14.00	22.00	22.00
February	71.00	126.00	124.25	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	10,750.00	19.00	22.00	26.00
March	67.00	139.00	122.50	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	10,750.00	18.00	22.00	23.50
April	60.00	147.00	109.00	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	10,750.00	22.75	24.00	25.75
May	60.00	147.00	88.50	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	11,000.00	21.00	23.50	26.00
June	67.00	131.00	90.75	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	11,000.00	20.00	22.50	24.00
July	70.00	140.00	85.50	13,000.00	13,000.00	13,000.00	8,000.00	10,000.00	11,000.00	20.00	16.50	24.00
August	70.00	166.00	-	13,000.00	13,000.00	-	9,500.00	10,000.00	-	22.50	16.00	-
September	70.00	121.00	85.00	13,000.00	13,000.00	13,000.00	10,000.00	10,000.00	11,000.00	23.00	21.75	25.00
October	70.00	116.00	-	13,000.00	13,000.00	-	10,000.00	10,000.00	-	23.00	22.00	-
November	70.00	120.00	-	13,000.00	13,000.00	-	10,000.00	10,000.00	-	20.25	20.00	-
December	-	127.00	-	-	13,000.00	-	-	10,500.00	-	-	20.00	-
average	68.00	133.00	104.75	13,000.00	13,000.00	13,000.00	8,681.80	10,041.70	10,875.00	20.32	21.02	24.53
increase		96.48	21.24		0.00	0.00		15.66	8.30		3.46	16.70

	Cabbage (mixed) B/kg			Pak Kana (mixed) B/kg			Chinese Cabbage (mixed) B/kg			Pak Bungchin B/kg		
	1994	1995	1996	1994	1995	1996	1994	1995	1996	1994	1995	1996
January	6.50	9.75	5.00	10.00	17.75	5.00	7.25	9.50	5.00	10.75	14.00	9.00
February	5.00	10.25	3.00	6.25	18.00	10.00	5.75	10.00	3.00	5.00	14.25	5.75
March	5.25	11.25	2.75	11.00	8.50	10.50	8.25	11.00	4.75	6.50	6.00	2.88
April	7.50	9.00	6.00	12.00	10.50	14.25	9.50	7.25	4.75	5.75	5.75	4.00
May	8.00	10.00	12.25	9.50	16.75	12.25	9.50	11.75	13.00	7.25	8.25	9.50
June	9.50	6.50	23.50	18.50	18.50	23.50	9.50	16.25	20.00	6.50	5.75	12.00
July	8.00	8.50	10.00	18.00	19.00	18.25	8.00	15.00	9.75	5.00	9.50	7.75
August	8.00	15.00	-	9.00	15.25	-	8.00	11.00	-	3.50	5.25	-
September	8.00	8.00	11.50	11.00	20.00	15.00	8.50	8.00	15.75	8.50	9.00	7.50
October	8.00	10.00	-	15.00	20.50	-	8.00	10.00	-	8.00	11.00	-
November	8.00	8.25	-	12.25	12.50	-	9.50	14.50	-	6.00	10.75	-
December	-	5.75	-	-	6.25	-	-	4.75	-	-	5.00	-
average	7.43	9.35	9.25	12.05	15.29	13.59	8.34	10.75	9.50	6.61	8.71	7.30
increase		25.87			26.95			28.88			31.67	-16.20

Source: Commercial Office, Khon Kaen

Table F-14 Monthly Price Fluctuation of Agricultural Product

Maha Sarakam										
	Sticky Paddy(long gra B/ton			Hom Mari Paddy B/ton			Fresh Cassave B/kg			Bleached Jute (mixed B/kg
	1992	1993	1994	1992	1993	1994	1992	1993	1994	1994
January	3,000.00	3,550.00	3,950.00	3,400.00	4,250.00	5,250.00	1.05	0.70	0.66	-
February	3,100.00	3,716.00	4,050.00	3,500.00	4,350.00	5,250.00	0.91	0.71	0.66	-
March	3,100.00	3,550.00	3,750.00	3,360.00	4,275.00	4,850.00	0.92	0.75	0.65	-
April	3,100.00	3,650.00	3,700.00	3,700.00	4,450.00	4,850.00	0.85	0.69	0.65	-
May	3,100.00	3,633.00	3,750.00	3,750.00	4,416.00	5,000.00	0.81	0.62	0.62	-
June	3,150.00	3,450.00	3,650.00	3,750.00	4,450.00	5,000.00	0.81	0.60	0.62	-
July	3,150.00	3,500.00	3,550.00	3,800.00	4,750.00	4,700.00	0.84	0.55	0.62	-
August	3,200.00	-	3,600.00	3,900.00	-	4,950.00	0.86	-	0.86	-
September	3,300.00	3,550.00	3,700.00	3,950.00	4,800.00	4,950.00	0.80	0.60	1.15	-
October	3,400.00	-	3,650.00	4,200.00	-	4,950.00	0.77	-	1.04	5.80
November	3,400.00	3,616.00	3,450.00	4,300.00	4,750.00	4,600.00	0.77	0.66	1.30	6.37
December	3,450.00	-	3,475.00	4,400.00	-	4,075.00	0.85	-	1.62	6.92
average	3,204.00	3,579.00	3,689.00	3,834.00	4,499.00	4,868.00	0.85	0.65	0.87	6.36
increase		11.70	3.07		17.34	8.20			33.85	

Source: Marketing Information 1994 Maha Sarakam

Mukdahan										
	Sticky Paddy B/ton		Paddy B/ton		Fresh Cassava B/kg		Bleached Jute B/kg		Peanut B/kg	
	1993	1994	1993	1994	1993	1994	1993	1994	1993	1994
January	3,481.00	3,830.00	4,447.00	5,410.00	0.66	0.56	6.25	4.15	-	-
February	3,952.00	3,890.00	4,490.00	5,530.00	0.60	0.52	5.50	4.50	-	-
March	3,920.00	3,690.00	4,428.00	5,270.00	0.66	0.49	5.50	-	-	-
April	3,700.00	3,625.00	4,483.00	5,100.00	0.60	0.57	5.50	-	9.50	9.50
May	3,500.00	3,670.00	4,475.00	5,145.00	0.60	0.55	-	-	8.50	8.50
June	3,312.00	3,550.00	4,862.00	5,060.00	0.60	-	-	-	8.25	8.25
July	3,525.00	3,545.00	5,075.00	5,080.00	-	-	-	-	-	-
August	3,220.00	3,550.00	4,970.00	5,125.00	-	-	-	-	-	-
September	3,100.00	3,535.00	4,912.00	5,085.00	-	-	-	-	7.00	7.00
October	3,350.00	3,410.00	5,025.00	4,970.00	0.48	0.89	5.31	5.40	7.25	7.25
November	3,925.00	3,175.00	4,850.00	4,910.00	0.59	1.00	5.51	5.60	7.50	7.50
December	3,425.00	3,200.00	4,676.00	4,850.00	0.55	-	4.48	5.88	-	-
average	3,534.00	3,555.00	4,724.00	5,127.00	0.60	0.65	5.49	5.11	8.00	8.00
increase		0.06		8.53			8.33		0.00	

Source: Marketing Information 1994 Mukdahan

Sakon Nakorn												
	Sticky Paddy(long)B/ton		Sticky Paddy(short)B/ton		Hom Mari Paddy B/ton		Cassava(fresh) B/kg		Cassava(sliced) B/kg		Kenaf B/kg	Jute B/kg
	1994	1995	1994	1995	1994	1995	1994	1995	1994	1995	1995	1995
January	-	4,500.00	-	4,300.00	-	4,380.00	-	1.20	-	2.48	-	-
February	-	4,400.00	-	4,200.00	-	4,725.00	-	1.20	-	2.20	-	-
March	-	4,460.00	-	4,260.00	-	4,700.00	-	1.20	-	2.33	-	-
April	-	4,470.00	-	4,270.00	-	4,900.00	-	1.20	-	2.33	-	-
May	-	4,700.00	-	4,500.00	-	5,200.00	-	-	-	-	-	-
June	-	4,720.00	-	4,520.00	-	5,470.00	-	-	-	-	-	-
July	-	-	-	-	-	-	-	-	-	-	-	-
August	-	-	-	-	-	-	-	-	-	-	-	-
September	-	-	-	-	-	-	-	-	-	-	-	-
October	-	-	-	-	-	-	-	-	-	-	11.00	10.00
November	3,950.00	-	3,750.00	-	4,700.00	-	1.10	-	-	-	11.00	10.00
December	4,150.00	-	3,950.00	-	4,316.00	-	1.10	-	-	-	11.00	10.00
average	4,050.00	4,541.67	3,850.00	4,341.67	4,508.00	4,895.83	1.10	1.20	-	2.34	11.00	10.00
increase		12.14		12.77		8.60		9.09				

Source: Marketing Information 1995, Sakon Nakorn

Table 7.2.5-1 Estimated Paddy Production and Surplus

	Estimated Actual population consumption (kg x p./year) (1)	Priority Area Recommended consumption (kg x p./year) (2)	Estimated Paddy Area (priority area)				Total (rai)	Consumption of seed (kg) (rai)	Priority whole study area (rai)	Priority/whole study area (%)	* Estimated Production (kg)		Estimated surplus/shortage (1)	Estimated surplus/shortage (2)
			Irrigated (rai)	Non-irrigated Lowland (rai)	Mixedland (rai)	Upland (rai)					Irrigated (kg)	Non-irrigated (kg)		
<b>Khon Kaen KK-6</b>														
Nong Nam Khun Nua	1,080	172,800	252,720											
Nong Nam Khun Tai	470	75,200	109,980											
Nong Wang	1,112	177,920	260,208	(include Nong Wang Noi and Kud Li-hong villages)										
Don Tuen	540	86,400	126,360											
Itan Sun Han	1,130	180,800	264,420											
Wang Yin	1,526	244,160	357,084	(include Wang Thong and Nong Sala villages)										
Lak Dan	561	89,760	131,274											
sub-total(present):	6,419	1,027,040	1,502,046	0	0	0	7,760	155,200	43,400	149,790	29	1,823,600	641,360	
sub-total(future):	6,419	1,027,040	1,502,046	0	0	0	7,371	147,420	43,400	149,790	29	2,063,880	889,420	
<b>Maharakham</b>														
Sala	864	138,240	202,176											
Nom Thong	662	105,920	154,908											
Nom Sa-oi	313	50,080	73,242											
Nong Khan	414	66,240	96,876											
To-oi Nua	717	114,720	167,778											
Nong Po	465	74,400	108,810											
Itan Kao Tsak	259	41,440	60,606											
sub-total(present):	3,694	591,040	864,396	0	0	0	6,090	113,800	18,200	18,200	100	1,672,500	947,660	
sub-total(future):	3,694	591,040	864,396	0	0	0	5,421	108,420	18,200	18,200	100	1,817,880	818,420	
<b>Mukdahan</b>														
Phiang Doeng	970	155,200	226,980											
Tui	731	116,960	171,084											
Na Lak	389	62,240	91,026											
Nong Mu	570	91,200	133,380											
Itan Lao														
(included in Nong Klong)														
Nong Klong	1,175	188,000	274,950	(include Pan Swang and Itan Lao villages)										
sub-total(present):	3,835	613,600	897,390	0	0	0	3,200	64,000	10,730	10,730	100	640,000	37,600	
sub-total(future):	3,835	464,160	678,834	0	0	0	3,040	60,800	10,730	10,730	100	851,200	326,240	
<b>Sakon Nakhon</b>														
Kut Dak	3,907	625,120	914,238											
Nong Song Hlang	827	132,320	193,518											
Kut Had	2,071	331,360	484,614											
Ban Bua	1,450	232,000	339,300											
Sai Kaew	1,208	193,280	282,672											
Itan Ngui	458	73,280	107,172											
Itan Kho Yai	3,839	614,240	898,326	(include Kut Hai village)										
Ban Kho Noi	1,666	266,560	389,844											
sub-total(present):	15,426	2,468,160	3,609,684	0	0	0	12,850	257,000	33,900	80,920	42	5,011,500	2,286,340	
sub-total(future):	15,426	2,468,160	3,609,684	0	0	0	12,103	242,060	10,730	10,730	100	4,720,170	2,009,950	

(1) Actual home consumption = 280.9g/0.64(milling recovery) x 365days = 438.9g x 36.5days = 160 kg(dried paddy)/person/year

(2) Recommended consumption = 150kg white rice/0.64 milling recovery = 234 kg/person/year

(3) Estimated consumption of seed = 20kg/rai

(4) Estimated present production = 235kg/rai, 250kg/rai, 200kg/rai and 390kg/rai in KK, MH, MK and SN areas respectively.

(5) Estimated production = 280kg/rai for non-irrigated fields except in SN (390kg/rai) area

Remarks:

## ANNEX

Table 7.2.5-2 Inventory of Post-Harvest/Marketing Facilities in Priority Areas

	Population	House-holds	Number of villages	Public services in village		Service Tambon		Warehouses in village			Stock Yard					
				3.2	3.3	4.5	9.4	7.4	7.4	7.6	7.6	7.6	7.6	7.6	7.6	
				Rice bank	Storage for agri product	Market center	No. of rice mills	No. of stores	Indiv- dual	mate- rial or mach- inery	for central market	for dom. market	for coop. store	for group store	total stock yard	
<b>Khon Kaen</b>																
Nong Nam Khun Nua	940	156	1	0	0	0	4	6	0	0	0	0	0	0	0	0
Nong Nam Khun Tai	474	88	1	0	0	0	2	3	0	0	0	0	0	0	0	0
Nong Waeng	364	77	1	0	0	0	0	2	0	0	0	0	0	0	0	0
Don Puai	520	2	1	5	0	1	0	0	0	0	0	0	0	0	0	0
Huai Sua Hao	211	750	1	5	0	0	0	0	0	0	0	0	0	0	0	0
Wang Hin	165	33	1	0	0	0	2	50	0	0	0	0	0	0	1	0
Lak Dan	55	11	1	0	0	0	0	50	0	0	0	0	0	0	1	0
sub-total:	2,729	1,117	7	10	0	1	8	111	0	0	0	0	0	0	2	0
<b>Maharakham</b>																
Sala	755	150	1	1	0	0	6	0	0	0	0	0	0	0	0	0
Non thong	685	114	1	0	0	0	1	2	0	0	0	0	1	0	0	0
Non Sa-at	279	58	1	0	0	0	3	0	0	0	0	0	0	0	0	0
Nong Khan	524	105	1	0	0	1	6	3	0	0	0	0	0	0	0	0
Ta-lat Nua	640	140	1	1	0	1	4	3	0	0	0	0	1	0	0	0
Nong Po	481	85	1	1	0	1	2	3	0	0	0	0	0	0	0	0
Hua Kae Tack	316	71	1	1	0	1	4	4	2	0	0	0	0	1	0	0
sub-total:	3,680	723	7	4	0	4	26	15	2	0	0	0	2	1	0	0
<b>Mukdahan</b>																
Phung Daeng	851	158	1	1	0	0	7	4	2	0	0	0	0	0	0	0
Tui	646	106	1	1	0	0	2	2	0	0	0	0	0	0	0	0
Na Lak	389	60	1	0	0	0	2	3	0	0	0	0	0	0	0	0
Nong Mu	507	96	1	1	0	0	2	2	0	0	0	0	0	0	0	0
Hoai Leo	(included in Nong Klong)															
Nong Klong	508	106	1	0	0	0	3	1	0	0	0	0	0	0	0	0
sub-total:	2,901	526	5	3	0	0	16	12	2	0	0	0	0	0	0	0
<b>Sakon Nakhon</b>																
Kut Bak	-	-	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Nong Song Hang	-	-	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Kut Haet	2,392	441	1	1	0	1	5	21	2	0	0	0	1	0	0	0
Ban Bua	1,496	265	1	0	0	1	4	9	0	0	0	0	0	0	0	0
Sai Kaev	1,201	261	1	1	0	1	3	12	0	0	0	0	0	0	0	0
Ban Ngui	411	81	1	1	0	1	2	2	0	0	0	0	1	0	0	0
Ban Kho Yai	1,608	315	1	1	1	1	5	7	1	0	0	0	0	0	0	0
Ban Kho Noi	1,270	284	1	1	0	1	6	8	0	0	0	0	0	0	0	0
sub-total:	8,378	1,647	8	5	1	6	25	59	3	0	0	0	2	0	0	0
Total:	17,688	4,013	27	22	1	11	75	197	7	0	0	0	4	3	0	0

Source:

Kon. Chor. Chor. 1994

ANNEX Table 11.4.4-1 Estimated Vegetable Production and Demand by Areas

Khon Kaen

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Ban Phai & Nong Song Hong		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
KK-6	43,400	149,790	29.0	1,399.80	165,546	1,683,603	5,959,656
						487,805	1,726,745 (priority area portion)

Planting Area and Production by Priority Area:			(rai)	(production.kg)
(a) 40%	740 ponds		740	851,000
(b) 20%	370 ponds		370	425,500
(vegetable field: average 1 rai/pond)				

Maharakham

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Borabu & Na Chuak		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
MHS-5	18,200	18,200	100.0	1,210.41	166,714	1,695,481	6,001,704
						1,695,481	6,001,704 (priority area portion)

Planting Area and Production by Priority Area:			(rai)	(production.kg)
(a) 40%	490 ponds		490	563,500
(b) 20%	245 ponds		245	281,750
(vegetable field: average 1 rai/pond)				

Mukdahan

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Dong Luang		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
MKD-8	10,730	59,420	18.1	10,070	32,250	327,983	1,161,000
						59,227	209,652 (priority area portion)

Planting Area and Production by Priority Area:			(rai)	(production.kg)
(a) 40%	270 ponds		270	310,500
(b) 20%	135 ponds		135	155,250
(vegetable field: average 1 rai/pond)				

Sakon Nakhon

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Kut Bak		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
SKN-3	33,900	120,110	28.2	456.0	30,759	312,819	1,107,324
						88,290	312,533 (priority area portion)

Planting Area and Production by Priority Area:			(rai)	(production.kg)
(a) 40%	1,000 ponds		1,000	1,150,000
(b) 20%	500 ponds		500	575,000
(vegetable field: average 1 rai/pond)				

- Remarks: (1) Actual home consumption = 0.113kg/day x 90 days(estimated harvesting period) = 10.17 kg/p  
 (source: Department of Health, Nutrition Division, 1995)  
 (2) Recommended consumption= 0.40kg/day x 90 days(estimated harvesting period) = 36.00kg/p  
 (3) Estimated production yield = 1,150kg/rai (average proposed vegetable production)

**ANNEX Table 11.4.4-2 Estimated Fruit Production and Demand by Areas**

**Khon Kaen**

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Ban Phai & Nong Song Hong		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
KK-6	43,400	149,790	29.0	1,399.80	165,546	1,095,915	2,979,828
						317,529	863,372 (priority area portion)

Planting Area and Production in Priority Area:			(rai)	(production:kg)
(a) 40%	740 ponds		2,220	2,468,640
(b) 20%	370 ponds		1,110	1,234,320
(fruit field: average 3 rai/pond)				

**Maharakham**

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Borabu & Na Chuak		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
MHS-5	18,200	18,200	100.0	1,210.41	166,714	1,103,647	3,000,852
						1,103,647	3,000,852 (priority area portion)

Planting Area and Production in Priority Area:			(rai)	(production:kg)
(a) 40%	490 ponds		1,470	1,634,640
(b) 20%	245 ponds		735	817,320
(fruit field: average 3 rai/pond)				

**Mukdahan**

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Dong Luang		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
MKD-8	10,730	59,420	18.1	10.070	32,250	213,495	580,500
						38,553	104,826 (priority area portion)

Planting Area and Production in Priority Area:			(rai)	(production:kg)
(a) 40%	270 ponds		810	900,720
(b) 20%	135 ponds		405	450,360
(fruit field: average 3 rai/pond)				

**Sakon Nakhon**

No.	Priority (rai)	Area		Area (km <sup>2</sup> )	Amphoe Kut Bak		
		Whole (rai)	Priority/Study (%)		Population	Demand(1) (kg)	Demand(2) (kg)
SKN-3	33,900	120,110	28.2	456.0	30,759	203,625	553,662
						57,471	156,266 (priority area portion)

Planting Area and Production in Priority Area:			(rai)	(production:kg)
(a) 40%	1,000 ponds		3,000	3,336,000
(b) 20%	500 ponds		1,500	1,668,000
(fruit field: average 3 rai/pond)				

- Remarks: (1) Actual home consumption = 0.0736kg/day x 90days(estimated harvesting period) = 6.62kg/p  
 (source: Department of Health, Nutrition Division, 1995)  
 (2) Recommended consumption = 0.20kg/day x 90days(estimated harvesting period) = 18.00kg/p  
 (3) Estimated production yield = 1.112kg/rai (average proposed fruit production)



ANNEX Table 11.4.4-3 Food Consumption in Thailand and Japan

Item	Japan		Thailand		
	(1) Recommended consumption (g/person/day)	(2) Actual consumption (g/person/day)	(3) Actual consumption (g/person/day)		
1st Category					
1. Milk and its products	280	246.6	-		
2. Egg and its products	50	55.7	-		
sub-total:	330	302.3	-		
2nd Category					
1. Fish	65	194.4	-		
2. Meat	45	116.9	64.6		
3. Beans	140	26.1	-		
sub-total:	250	337.4	-		
3rd Category					
1. Vegetables	310	348.8	113.2		
2. Root crops	100	63.2	-		
3. Fruit	200	167.0	73.6		
sub-total:	610	579.0	-		
4th Category					
1. Cereals	390	366.4	280.9	*	438.9
2. Saccharoid, Seasonings	21	91.9	18.7		
3. Oil	18	50.5	-		
sub-total:	429	508.8	-		
Total:	1619	1,727.5	-		

Source: (1) Shokuhin Seibunhyo, Joshi Eiyo Daigaku, Japan, case 1(for light work, age 20-29)  
(2) Food Supply Data, as of October 1, 1994, MOAFF, Japan  
(3) Department of Health, Ministry of Public Health, Nutrition Division, 1995

Remarks: \* = corresponding to dry paddy,  $280.9/0.64(\text{milling recovery}) = 438.9 \text{ g/person/day}$   
(study team estimation)

I. MAIN CROPS	On-farm	Present		Unit Price (Baht/kg)	with Project		
	testing Yield (kg/rai)	Yield (kg/rai) (not irrig.)	Yield (kg/rai) (irrigated)		Yield (kg/rai) (not irrig.)	Yield (kg/rai) (pond irrig.)	Yield (kg/rai) (irrigated)
* 1 Paddy							
(1) Glutinous Paddy(short,dry)		230-300		4.74 (2)	280		500
(2) Non-glutinous(grade 2, dry)	540	230-350		4.93 (2)	280		500
* 2 Sugarcane	10,555	7200-8000			7,200		
* 3 Cassava (fresh)	2,235	1800-2200		1.05 (2)	1,800		
average:				3.57	2,390		500
<b>II. VEGETABLES</b>							
* 1 Groundnuts (with shell, dry)	250	230	225-250	10.88 (2)		230	
* 2 Soybean	430	216	200-231	13.00 (2)		216	
3 Sweet Corn			1000-1250			1,200	
4 Baby Corn	2,381		600	75.00 (3)		600	
5 Watennelon	6,000		3200-5000	5.00 (2)		3,200	
6 Tomato		800	950(-2300)	30.00 (3)		950	
7 Cucumber			1,500	10.00 (3)		1,500	
* 8 Chilli		350	800-1300	5.00 (3)		1,300	
9 Chinese Kalo			1000-2300	15.29 (1)		1,750	
* 10 String Bean			700-1200			700	
11 Chinese Morning Glory		600	702	8.71 (1)		700	
12 Cabbage			1000-2300	9.35 (1)		1,750	
13 Mungbean (without shell)		200		20.00 (2)		200	
14 Chinese Cabbage	3,450		1200-2500	10.75 (1)		1,800	
average:		399	934	17.75		1,150	
<b>III. FRUITS</b>							
			(4)				
* 1 Mango			1050-1500			1,500	
* 2 Papaya			3000-4000			4,000	
3 Banana			1000-1400	10.00 (3)		1,000	
4 Tamalindo			617	60.00 (3)		500	
5 Jack fruit			2,070			1,400	
6 Caster apple			878			700	
7 Longan			825	50.00 (3)		700	
8 Litchi			375			300	
9 Sapodilla			1,063			900	
10 Manao	545		452			330	
11 Jujube			1,013			900	
12 Coconut							
average:			912	40.00		1,112	
<b>IV. LIVESTOCK</b>							
1 Chicken				60.00 (1)			
2 Duck							
3 Cattle			9000-10,000	(3)		1	
4 Pig							
average:				60.00			
<b>V. FISHERY</b>							
* 1 Tilapia (1 pond - 1 rai)			178-250	40.00 (3)		178	
2 Catfish				70 - 80 (3)			
3 Carp				50.00 (3)			
average:						178	
<b>VI. TREES</b>							
1 Eucalyptus		15,000		0.56-0.7 (3)		15,000	
2 Acacia							
average:		15,000				15,000	

Source: (1) = Commercial Office in KK, 1995  
(2) = Commercial Office in KK, 1996  
(3) = study team survey in KK  
(4) = average yield of fruits in Northeastern Region  
\* = used to project evaluation