CHAPTER 5. DEVELOPMENT PLAN AND COST OF THE INFRASTRUCTURES

5.1 Development plan and Cost of the Agricultural Infrastructures

5.1.1 Water resources Development Plan and Cost

1) Development Plan of Water Resources

Table 5.1-1 shows the result of investigation. Other than 110 new development sites, 39 existing reservoirs are selected for rehabilitation to dredge sedimentation and to install outlet. As the result of investigation, potential irrigation area is estimated at 98,380 rai or 15,740 ha including the area of pump irrigation. Present irrigation ratio is estimated at 2.7%, which is rather lower than the average ratio of 9% in the Northeastern Region. Although the area is full developed, irrigation ratio remains at 7.2%, which is still lower than the present average of the region.

Table 5.1-1 Potential Development of Surface Water Resources

Development Stage	Reservoirs			Rehabilitation	Pump Irrigation	Total	Irrigation Area	Irrigation Ratio
	MSIPs	SSIPs	Total					
Present Irrigation Projects	5	39	44	-	2	46	36,730 rai 5,876 ha	2.7 %
Potential Development	15	95	110	39	14	163	61,650 rai 9,864 ha	4.5 %
- Conservation Forest	(7) *	(18) *	(25) *					
- Economic Forest	(4)	(38)	(42)					
- LRAs	(4)	(39)	(43)					
Total	20	134	154	39	16	209	98,380 rai 15,740 ha	7.2 %

(Note) *: Some of surface of other reservoirs extends into the area of conservation forests.

Based on the Table 5.1-1, the water resources development in the study areas is planned as shown Table 5.1-2.

Table 5.1-2 Water Resources Development Plan in the Study Area

Sub-LRAs	Proposed Irrigation Projects												
	Proposed		Rehabilitation			Total	Irrigation Area (rai)				Total	
	Number of MSIPs	Number of SSIPs	Number of Existing Reservoirs for Dredging	Number of Existing Reservoirs for Intake installation	Pump Irrigation	Number of Projects	MSIP+SSIP	Rehabilitation	Pump Irrigation	Total	Storage Capacity (MCM)	Catchment (km2)
KK1	2	12		3		17	4,400	260		4,660	4.52	41.7
KK2		5				5	740			740	0.513	5.6
KK3		5				5	1,140			1,140	0.924	7.4
KK4		5				5	490			490	0.324	1.3
KK5						0				0		
KK6	2	9		6		17	2,460	1,280		3,740	3.426	16.9
MHS1						0				0		
MHS2		3				3	270			270	0.167	0.7
MHS3						0				0		
MHS4						0				0		
MHS5		4		1		5	270	70		340	0.186	0.7
MHS6				2		2		120		120	0.061	6.8
MHS7						0				0		
MHS8		7				7	820			820	0.537	2.9
MHS9						0				0		
MHS10						0				0		
MKD1	2	3			2	7	2,280		1,000	3,280	2.35	53.4
MKD2	2	1			4	7	2,770		2,000	4,770	3.521	31
MKD3			16	16	1	17		2,850	500	3,350	2.28	0
MKD4	1	1				2	610			610	0.548	2.2
MKD5		2				2	540			540	0.475	2.5
MKD6						0				0		
MKD7	0	14				14	6,760			6,760	9.159	44.2
MKD8-1		2 *				2	3,800			3,800	1.35	0.6
MKD8-2	3	0			1	4	4,140		500	4,640	6.021	99
MKD8-3						0				0		
MKD8-4	1	2				3	1,250			1,250	1.328	7.6
MKD9-1		2			1	3	580		500	1,080	0.523	2.3
MKD9-2		4		1		5	1,460	240		1,700	1.62	9.9
MKD10		2				2	510			510	0.424	2.1
MKD11-1	1	1				2	820			820	0.816	3.5
MKD11-2		2			2	4	700		1,000	1,700	0.688	8.5
MKD12						0				0		
SKN1		1				1	370			370	0.35	3
SKN2		3		4		7	1,470	580		2,050	2.082	15.7
SKN3-1	1	2 *		1		4	7,000	880		7,880	12.37	52.5
SKN3-2						0				0		
SKN3-3		1		1		2	220	760		980	1.074	2.7
SKN4				2		2		410		410	0.33	1.6
SKN5-1					3	3			1,500	1,500	0	0
SKN5-2						0				0		
SKN6-1		1 *				1	?			0	0	0.4
SKN6-2		1				1	330			330	0.3	10
SKN7				2		2		1,000		1,000	1.032	2
Total	15	95	16	39	14	163	46,200	8,450	7,000	61,650	59.3	438.7

(Note) (1) *: under-construction or plan by RID, (2) Number of dredging of the existing reservoirs is included in the number of intake installation.

2) Estimation Procedure of Water Resources Development Cost

i) Estimation Procedure of Reservoir Development Cost

Reservoir development cost has been estimated in accordance with the following procedure:

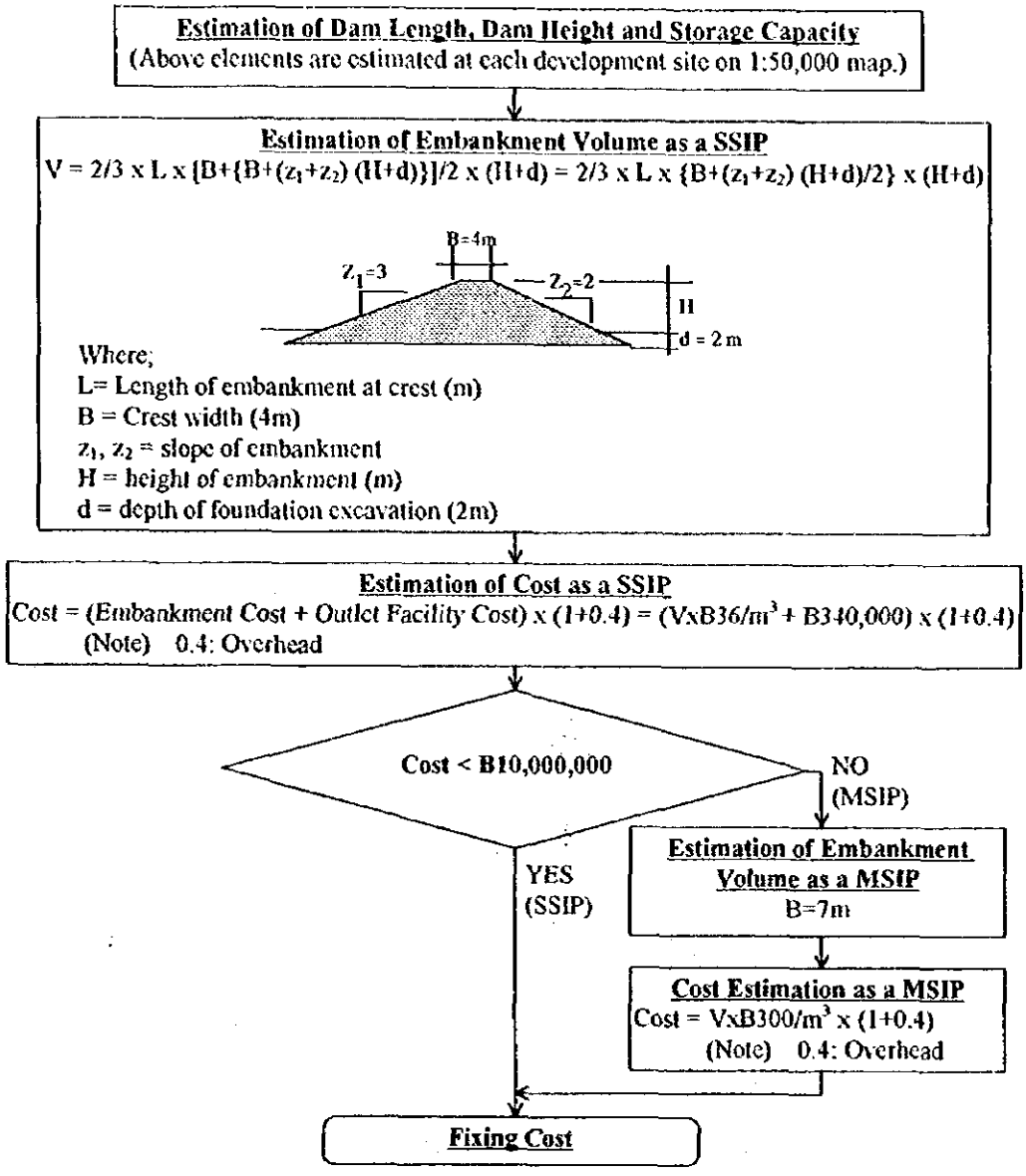

Figure 5.1- 1 Procedure of Cost Estimation for Reservoir Development

ii) Cost Estimation of Reservoir Rehabilitation

Among existing small scale reservoirs, there are some reservoirs which are equipped with a spillway but not with an outlet. There are also some reservoirs deposited with sediment and lessened in capacity. Such reservoirs can be rehabilitated by means of provision of outlet facilities or dredging.

Following facilities have been assumed for estimating rehabilitation cost of the reservoirs which are to be equipped with an outlet or to be dredged.

<Assumed Facilities for Outlet>

- Intake (2.00m x 2.00m Box)
- Outlet Conduit (ϕ 600m approximately)
- Cutoff Wall (Reinforced concrete)
- Cutoff Wall (Steel sheet pile)
- Energy Dissipater (Impact Box)

<Dredging>

- Dredging is assumed at 1m depth for the reservoir area.

iii) Cost Estimation of Pump Irrigation Project

Cost of pump irrigation project has been estimated based on B5,000/rai, "a standard cost of DEDP", which is a cost of fixed type pump equipped with a diversion weir.

3) Unit Costs used for Cost Estimation

Following unit costs have been used for estimating the cost for water resources development for the LRAs. These unit costs are not including such indirect costs as tax, profits and overheads.

Table 5.1-3 Unit Costs used for Cost Estimation of Water Resources Development

Items	Unit Cost	Remarks
Reservoirs		depending on the volume of embankment.
MSIP	300 Baht/m^3 1)	(including canal system.)
SSIP	36 Baht/m^3 2)	(not including canal system.)
Intakes and Canals for SSIP	340,000 Baht/place 3)	
Rehabilitation of Reservoir		
Dredging	18 Baht/m^3 4)	
Installation of Intakes and Outlets	390,000 Baht/place 3)	
Pump Projects		
Pump Projects	5,000 Baht/rai 5)	(including a diversion weir.)

(Notes)

1) Unit cost has been estimated in following manner based on two MSIP reservoirs implemented recently by RID in Northeastern region. The cost includes such whole necessary facilities as embankment, spillway, intake and canals.
   i) Huai Khon Sak Reservoir (under construction in flat lowland beside MHS-2 LRA)
   V=352,000m^3, Direct Construction Cost = B82million (1997 basis), Unit Cost = B223/m^3
   ii) Huai Krachoe Reservoir (under construction in upstream mountainous area of SKN-3.1,
   V=657,000m^3, Direct Construction Cost = B184.57million (1990 basis), Unit Cost = B280/m^3
   iii) Adjustment of the Unit Cost of Huai Krachoe Reservoir into 1997 basis
   1997 Basis Embankment Cost = B401/m^3 = B280/m^3 x 1.434
   Where; 1.434 = Ratio of Embankment Cost in 1997 and 1990
   Embankment Cost (1997 basis) = B36.0/m^3 (95% compaction (*))
   Embankment Cost (1990 basis) = B25.1/m^3
   iv) Unit Cost of MSIP Reservoir
   B300/m^3 = (B233/m^3+B401/m^3)/2
2) B31/m^3 (85% compaction (*)) x (1+Appurtenant Structure 5% + Contingency 10%) = B36/m^3
3) Cost of intake, outlet conduit, cutoff wall, and energy dissipater = B340,000
   Above cost + Temporary Closure (earth bank) + Cut and fill = B390,000
4) Common excavation of dredging = B17.35 /m^3 (*)
5) DEDP Standard Cost (Fixed type pump with a diversion weir)
6) (*): see Appendix-D, Table 7.3-4

4) Development Cost for Water resources

The development cost for water resources has been estimated at 1,319 Million Baht in total as shown in Table 5.1-4. This cost includes the indirect costs which are composed of tax, profits and overheads. The indirect cost is assumed to be 40% of the direct cost.

Table 5.1-4 Development Cost of Water Resources

Province	LRA	Sub-LRA	New Reservoir SSIP ('000 Baht)		New Reservoir MSIP ('000 Baht)		Intake Installation ('000 Baht)		Intake Installation and Dredging ('000 Baht)		Pump Irrigation ('000 Baht)		Total Cost ('000 Baht)
			Number	Cost	Number	Cost	Number	Cost	Number	Cost	Number	Cost	
KK	1	0	12	20,731	2	109,091	3	1,638	0	0	0	0	131,459
KK	2	0	5	8,865	0	0	0	0	0	0	0	0	8,865
KK	3	0	5	10,913	0	0	0	0	0	0	0	0	10,913
KK	4	0	5	10,572	0	0	0	0	0	0	0	0	10,572
KK	6	0	9	16,572	2	125,874	6	4,368	0	0	0	0	146,814
KK-Total			36	67,653	4	234,965	9	6,006	0	0	0	0	308,624
MHS	2	0	3	5,865	0	0	0	0	0	0	0	0	5,865
MHS	5	0	4	6,000	0	0	1	546	0	0	0	0	6,546
MHS	6	0	0	0	0	0	2	1,092	0	0	0	0	1,092
MHS	8	0	7	11,183	0	0	0	0	0	0	0	0	11,183
MHK-Total			14	23,048	0	0	3	1,638	0	0	0	0	24,686
MKD	1	0	3	5,524	2	109,091	0	0	0	0	2	7,000	121,615
MKD	2	0	1	3,765	2	117,482	0	0	0	0	4	14,000	135,247
MKD	3	0	0	0	0	0	0	0	16	32,256	1	3,500	35,756
MKD	4	0	1	2,449	1	60,480	0	0	0	0	0	0	62,929
MKD	5	0	2	4,365	0	0	0	0	0	0	0	0	4,365
MKD	7	0	13	103,835	1	33,127	0	0	0	0	0	0	136,962
MKD	8	2	0	0	3	300,326	0	0	0	0	1	3,500	303,826
MKD	8	4	2	4,365	1	46,622	0	0	0	0	0	0	50,987
MKD	9	1	2	5,130	0	0	0	0	0	0	1	3,500	8,630
MKD	9	2	4	8,389	0	0	1	1,092	0	0	0	0	9,481
MKD	10	0	2	4,707	0	0	0	0	0	0	0	0	4,707
MKD	11	1	1	2,524	1	60,480	0	0	0	0	0	0	63,004
MKD	11	2	2	4,707	0	0	0	0	0	0	2	7,000	11,707
MKD-Total			33	149,761	11	727,607	1	1,092	16	32,256	11	38,500	949,216
SKN	1	0	1	3,207	0	0	0	0	0	0	0	0	3,207
SKN	2	0	3	8,255	0	0	4	3,276	0	0	0	0	11,531
SKN	3	1	0	0	0	0	1	1,092	0	0	0	0	1,092
SKN	3	3	1	1,791	0	0	1	1,092	0	0	0	0	2,883
SKN	4	0	0	0	0	0	2	2,184	0	0	0	0	2,184
SKN	5	1	0	0	0	0	0	0	0	0	3	10,500	10,500
SKN	6	2	1	3,252	0	0	0	0	0	0	0	0	3,252
SKN	7	0	0	0	0	0	2	2,184	0	0	0	0	2,184
SKN-Total			6	16,505	0	0	10	9,828	0	0	3	10,500	36,833
Grand Total			89	256,967	15	962,572	23	18,564	16	32,256	14	49,000	1,319,359

(Note) (1)Above cost includes the indirect costs such as tax, profits and overheads.

(2)Cost of the dams which are proposed or under construction by RID is not included in this estimation. Those dams are as follows:

SSIP: 5 SSIPs (2 SSIPs in MKD 8-1, 2 SSIPs in SKN 3-1, 1 SSIP in SKN 6-1)

MSIP: 1 MSIP (Huai Kra Choe in SKN 3-1) Project Cost: 185,000,000 Baht (by RID)

5.1.2 On-Farm Development Plan and Cost

1) Unit Costs of Farm Pond and Farm Road

i) Cost of Farm Pond and Irrigation Facilities

Two different sizes of farm pond have been proposed for on-farm development. One is an ordinary size farm pond, and the other is a large size farm pond. Ordinary size farm pond has a capacity of 1,200 m^3, while a large size 6,000 m^3. A large size farm pond, however, is not counted in the project cost because it is constructed with a charge depending on the request of farmers. Other than farm pond, wells are also proposed in the area where groundwater can be expected like as in Sakon Nakhon SKN-3.1 Priority Area. Unit costs for construction and operation of them are as shown in Table 5.1-5.

Table 5.1-5 Unit Construction and Operation Cost of Farm Pond and Well (per Place)

Farm Ponds Size (m^3)	Dimensions of Farm Pond (Appendix-D, Table 4.2-2)			Construction Cost (Baht)	Irrigation Method	Irrigation Facility Cost (Baht)	Total Construction Cost (Baht)	O/M Cost (Baht/year)
	B (m)	L (m)	Area (rai)					
1,200	40	43	1.1	37,500	Bucket	0	37,500	375
6,000	60	63	2.4	160,250	Sprinkler (4 rai)	68,000	228,250	8,790
					Hose (4 rai)	10,500	170,750	5,460
Well	Well Depth = 9 m (average)			17,500	Hand Pump (1 rai)	1,500	19,000	190
					Sprinkler (4 rai)	62,900	80,400	7,920

(Note) 1) Detail estimation of cost is described Tables from 7.3.34 to 7.3.42 in Appendix-D.
2) O/M cost is composed of maintenance cost of farm pond and irrigation facilities and operation cost of irrigation.

ii) Unit Cost of Farm Road

Table 5.1-6 Unit Construction and Maintenance Cost of Farm Road

Farm Road	Width (m)	Pavement	Construction Cost	Maintenance Cost (7%/yr)	Culvert (RC Pipe ϕ 500mm)	Bridge
Main & Rateral Farm Road	4	Laterite	B352/m	B25.0/m/yr	B38,930/place	depending on length.
On-Farm Road	2	Lateraite	B149/m	B10.5/m/yr	B11,220/place	- ditto -

(Note) 1) Detail estimation of cost is described in Tables from 7.3.36 to 7.3.37 in Appendix-D.
2) O/M cost is composed of maintenance cost of farm road.

2) On-Farm Development and Project Cost

Total on-farm development will be 27,948 farm ponds, 3,505 wells and 7,689 km farm road, and total project cost amounts to 5,212 million Baht as shown in Table 5.1-7. Details of cost are described in Table 5.1-9.

Table 5.1-7 Summary of On-Farm Development and Cost in the Study LRAs

Study Area	Study Area	On-Farm Development			Project Cost (*1)			Unit Project Cost		
		Farm Pond (1,200m^3)	Wells	Farm Road	Farm Pond (1,200m^3)	Farm Road	Total	Farm Pond (1,200m^3)	Farm Road	Total
	(rai)	(nos.)	(nos.)	(km)	(B 1,000)	(B 1,000)	(B 1,000)	(B/rai)	(B/rai)	(B/rai)
KK	267,920	4,914	0	1,337	252,477	563,248	815,725	942	2,102	3,045
MHS	218610	4,779	0	1,192	245,545	523,306	768,851	1,123	2,394	3,517
MKD	479270	11,368	0	2,795	584,058	1,328,722	1,912,780	1,219	2,772	3,991
SKN	420750	6,887	3,505	2,365	445,077	1,269,634	1,714,711	1,058	3,018	4,075
Total	1,386,550	27,948	3,505	7,689	1,527,157	3,684,910	5,212,067	1,101	2,658	3,759

(Note) 1) Project Cost = 1.37 × Construction Cost (see Table 5.1-9),
2) Farm pond cost includes well cost.

3) *Detail Cost Estimation of On-Farm Development*

For cost estimation of on-farm development in the whole LRAs, study results in the priority areas have been applied. On-farm development is composed of farm road and farm pond development. Development cost of farm pond has been estimated on the assumption that 40% of farmers will have a 1,200m^3 farm pond. In Sakon Nakhon, groundwater developed will be developed by wells in SKN-3.1 and SKN-4 where alluvial plane extents at certain area and groundwater basin is formed. In those two LRAs, it is assumed to develop 1/4 by farm ponds and 3/4 by wells.

On the other hand, farm road development cost generally increases with a density of farm roads. It is clarified by the study in the priority areas that the farm road density should be increased in case smaller land holdings as shown in Figure 5.1-2 based on data in Table 5.1-8. It is, therefore, necessary to estimate farm road length and cost based on the land holding size in each LRA. Consequently, Figure 5.1-2 and 5.1-3 have been applied to estimate farm road length and cost respectively.

Table 5.1-8 Study Results of Farm Road Development in the Priority Areas

Elements of On-Farm Conditions	Study of Priority Areas			
	KK-6	MHS-5	MKD-8.2	SKN-3.1
Farm Land (rai)	36,700	14,600	8,600	25,100
Total Households (Nos.)	1,840	1,220	660	2,510
Average Land Holding (rai)	20	12	13	10
(Inventory Table 2.15-1 in Main Report)	24.29	11.09	17.21	11.08
Farm Road Density (m/rai) (see Main Report Chapter 7 to 10)				
Existing Condition	3.16	4.73	1.38	0.95
New Construction	2.21	2.19	5.25	5.87
Future Condition	5.37	6.92	6.63	6.82
Construction Cost of Farm Road Development (Referring Tables from 7.3.1 to 7.3.15, Appendix-D)				
Farm Road (B1,000)	47,620	26,315	18,760	63,149
Unit Construction Cost of Farm Road Development				
Farm Road (B/rai)	1,300	1,800	2,180	2,520

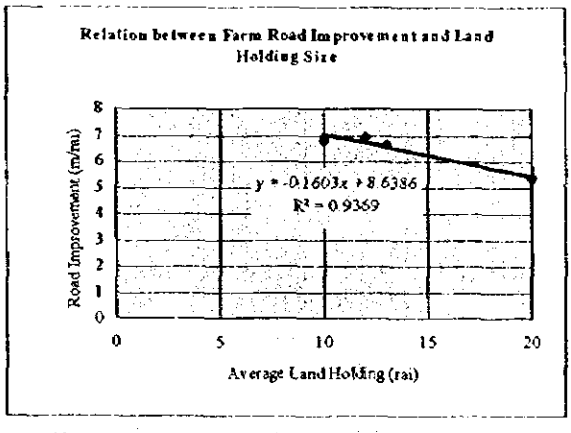

Figure 5.1-2 Relation between Farm Road Length and Land Holding Size

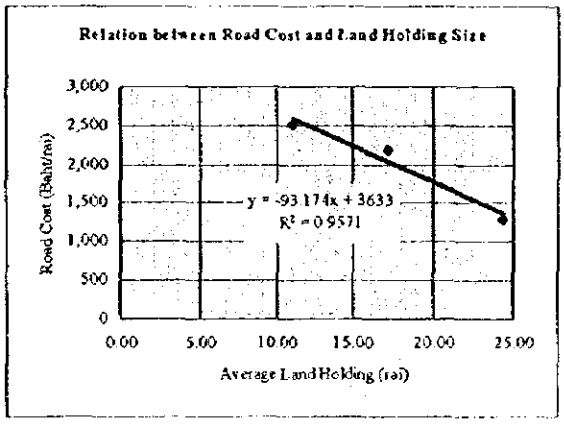

Figure 5.1-3 Relation between Farm Road Cost and Land Holding Size

Table 5.1-9 shows the results of total quantity and cost of on-farm development in each LRA.

Table 5.1-9 Details of On-Farm Development and Construction Cost in Each LRA

Study LRAs	Farm Land (rai)	House holds (*1)	Land Holding (*2)	On-Farm Development						
				Development			Construction Cost (B1,000)			
				Farm Road	Farm Pond	Wells	Farm Road	Farm Pond	Wells	Total
		(Nos)	(rai farmer)	(km)	(Nos.)	(Nos.)				
KK1	65,560	3,382	20.00	357	1,353		116,010	50,740		166,750
KK2	13,940	875	16.15	84	350		29,670	13,130		42,800
KK3	17,910	800	22.97	89	320		26,740	12,000		38,740
KK4	11,490	724	16.21	69	290		24,390	10,880		35,270
KK5	6,180	335	18.67	35	134		11,700	5,030		16,730
KK6	147,920	6,167	24.29	703	2,467		202,620	92,510		295,130
MHS1	2,640	436	6.05	20	174		8,100	6,530		14,630
MHS2	59,680	2,877	20.75	317	1,151		101,430	43,160		144,590
MHS3	3,080	363	8.49	22	145		8,750	5,440		14,190
MHS4	9,510	559	17.00	56	224		19,490	8,400		27,890
MHS5	14,600	1,220	12.00	101	490		26,315	18,380		44,695
MHS6	29,660	1,158	25.72	134	463		36,680	17,360		54,040
MHS7	10,940	772	14.17	70	309		25,300	11,590		36,890
MHS8	79,610	4,007	19.87	435	1,603		141,840	60,110		201,950
MHS9	310	16	18.90	2	6		580	230		810
MHS10	4,830	535	9.02	35	214		13,490	8,030		21,520
MKD1	102,760	6,136	16.88	610	2,454		211,710	92,030		303,740
MKD2	74,900	4,493	16.88	445	1,797		154,310	67,390		221,700
MKD3	104,180	6,407	16.62	623	2,563		217,160	96,110		313,270
MKD4	1,760	110	16.88	10	44		3,630	1,650		5,280
MKD5	6,020	357	16.88	36	143		12,400	5,360		17,760
MKD6	710	41	16.88	4	16		1,460	600		2,060
MKD7	44,890	2,786	16.88	267	1,114		92,480	41,780		134,260
MKD8	57,040	3,453	17.21	336	1,381		115,760	51,790		167,550
MKD9	52,040	3,095	16.88	309	1,238		107,210	46,430		153,640
MKD10	1,180	70	16.88	7	28		2,430	1,050		3,480
MKD11	13,430	796	16.88	80	318		27,670	11,930		39,600
MKD12	11,480	680	16.88	68	272		23,650	10,200		33,850
SKN1	22,560	1,055	21.62	117	422		36,520	15,830		52,350
SKN2	43,260	1,689	25.80	195	676		53,170	25,350		78,520
SKN3	118,470	10,840	11.08	814	2,137	2,199	430,400	80,140	41,780	552,320
SKN3-1	80,100	7,330			733	2,199	291,000	27,490	41,780	360,270
SKN3-2	6,650	608			243		24,160	9,110		33,270
SKN3-3	31,720	2,902			1,161		115,240	43,540		158,780
SKN4	85,530	4,354	19.87	467	435	1,306	152,380	16,310	24,814	193,504
SKN5	81,800	5,595	15.95	498	2,238		175,610	83,930		259,540
SKN6	44,540	2,026	22.35	226	810		69,060	30,380		99,440
SKN7	13,200	423	31.19	48	169		9,600	6,340		15,940
KK	263,000	12,283	21.41	1,337	4,914	0	411,130	184,290	0	595,420
MHS	214,860	11,943	17.99	1,192	4,779	0	381,975	179,230	0	561,205
MKD	470,390	28,424	16.55	2,795	11,368	0	969,870	426,320	0	1,396,190
SKN	409,360	25,982	15.76	2,365	6,887	3,505	926,740	258,280	66,594	1,251,614
Total	1,357,610	78,632	17.27	7,689	27,948	3,505	2,689,715	1,048,120	66,594	3,804,429

(Note) 1) Farm pond development is based 1,200m^3 size and assumed to 40% of farmers.

2) Groundwater development is considered in SKN-3-1 and SKN4 LRAs.

3) Farm road length is estimated by following equation:

Farm Length (m) = (8.64 - 0.160 x Land Holding Size) x Farm Land Area (see Figure 5.1-2)

4) Farm road cost is estimated by following equation:

Farm Road Cost (Baht) = (3,633 - 93.17 x Land Holding Size) x Farm Land Area (see Figure 5.1-3)

5) Estimated cost in Priority Area has been applied to MHS-5, because priority area covers whole MHS-5.

5.2 Development plan and Cost of the Rural Infrastructures

5.2.1 Rural Road Development Plan and Cost

As mentioned in Section 4.4.2 in the Main Report, rural road development is planned to improve and pave with asphalt for a length of 972km with a cost of 2,177 million Baht on the assumption that 2 km of road pavement for each village in the study areas. Table 5.2-1 shows the requirement of rural road improvement and it's cost in the LRAs.

Table 5.2-1 Rural Road Improvement and Cost in the Study LRAs

Province	Study Area Number	Sub-Area Number	Total Number of Villages	Necessary Improve Road (km)	Improve Cost '000 Baht
KK	1	0	37	74	165,760
KK	2	0	11	22	49,280
KK	3	0	21	42	94,080
KK	4	0	8	16	35,840
KK	5	0	9	18	40,320
KK	6	0	37	74	165,760
KK-Total			123	246	551,040
MHS	1	0	3	6	13,440
MHS	2	0	19	38	85,120
MHS	3	0	9	18	40,320
MHS	4	0	9	18	40,320
MHS	5	0	13	26	58,240
MHS	6	0	18	36	80,640
MHS	7	0	8	16	35,840
MHS	8	0	64	128	286,720
MHS	9	0	3	6	13,440
MHS	10	0	17	34	76,160
MHS-Total			163	326	730,240
MKD	1	0	19	38	85,120
MKD	2	0	11	22	49,280
MKD	3	0	9	18	40,320
MKD	4	0	2	4	8,960
MKD	5	0	10	20	44,800
MKD	6	0	0	0	0
MKD	7	0	8	16	35,840
MKD	8	1	6	12	26,880
MKD	8	2	5	10	22,400
MKD	8	3	3	6	13,440
MKD	8	4	5	10	22,400
MKD	9	1	2	4	8,960
MKD	9	2	9	18	40,320
MKD	10	0	2	4	8,960
MKD	11	1	8	16	35,840
MKD	11	2	6	12	26,880
MKD	12	0	3	6	13,440
MKD-Total			108	216	483,840
SKN	1	0	2	4	8,960
SKN	2	0	12	24	53,760
SKN	3	1	22	44	98,560
SKN	3	2	6	12	26,880
SKN	3	3	1	2	4,480
SKN	4	0	17	34	76,160
SKN	5	1	2	4	8,960
SKN	5	2	22	44	98,560
SKN	6	1	1	2	4,480
SKN	6	2	5	10	22,400
SKN	7	0	2	4	8,960
SKN-Total			92	184	412,160
Grand Total			486	972	2,177,280

(Note) Cost is estimated based on the main road (6m width) in 50% and the secondary road (4m width) in 50%. Unit cost is then applied as an average cost of the main and secondary roads.

Unit cost = (B3,400,000/km + B1,065,000/km)/2 = B2,240,000/km (see Table 7.2.43 in Appendix-D)

5.2.2 Rural Water Supply Development Plan and Cost

Rural water supply development is planned to the all villages where rural water supply is not provided yet. Project scale is assumed by the number of total households in the village. Table 5.2-2 shows the number of the rural water supply projects, scale of the project and its cost in each study area.

Table 5.2-2 Rural Water Supply Development and Cost in the Study LRAs

Study Area No.	Number of Necessary Scale						Total Houshold 3)	Total Cost '000Baht 4)
	Small Scale	Medium Scale 1)	2)	Total	Large Scale	Total		
KK-1	1	1	2	3	0	4	157	1,591
KK-6	1	0	0	0	0	1	20	298
KK-Total	2	1	2	3	0	5	177	1,889
MHS-2	1	1	0	1	1	3	367	2,139
MHS-3	3	0	0	0	0	3	179	894
MHS-5	1	2	0	2	1	4	542	2,570
MHS-6	3	2	0	2	0	5	490	1,756
MHS-7	0	2	0	2	1	3	469	2,272
MHS-8	7	21	3	24	7	38	4,521	22,300
MHS-9	0	1	0	1	0	1	98	431
MHS-10	0	1	0	1	0	1	119	431
MHS-Total	15	30	3	33	10	58	6,785	32,793
MKD-5	0	1	0	1	0	1	85	431
MKD-7	0	1	0	1	0	1	80	431
MKD-8-3	0	0	1	1	0	1		431
MKD-11	2	1	0	1	0	3	178	1,027
MKD-Total	2	3	1	4	0	6	343	2,320
SKN-2	0	0	1	1	4	5	1,458	6,071
SKN-3-1	0	1	1	2	5	7	1,694	7,912
SKN-3-3	1	0	0	0	0	1	47	298
SKN-4	1	4	0	4	3	8	1,811	6,252
SKN-5-1	0	1	0	1	0	1	153	431
SKN-5-2	2	6	0	6	0	8	685	3,182
SKN-6-2	0	0	0	0	1	1	302	1,410
SKN-7	0	0	0	0	2	2	604	2,820
SKN-Total	4	12	2	14	15	33	6,754	28,376
Grand-Total	23	46	8	54	25	102	14,059	65,378

Note; 1)The number of villages where the total household is identified.
2) The number of villages where the total household is not identified.
3) Not include the number of household which is not identified.
4) Not identify household villages are estimated as medium scale.

Applied unit costs for cost estimation are as follows;

Table 5.2-3 Unit Costs of Rural Water Supply Project (Baht/Place)

	Small Scale	Medium Scale	Large Scale
Deep Well & Pump	105,000	140,000	260,000
Filter Tank	50,000	260,000	350,000
Tower Tank	113,000	181,000	600,000
Pipe System	30,000	50,000	200,000
Total	298,000	431,000	1,410,000

CHAPTER 6. INVENTORY OF INFRASTRUCTURE

6.1 Irrigation Development Projects

6.1.1 Existing Irrigation Projects

There are 91 existing irrigation projects in the study LRAs. Out of 91 projects, 46 projects are well operated. Those projects are listed in Table 6.1-1.

6.1.2 Proposed Irrigation Projects

163 irrigation projects are proposed as listed in Table 6.1-2. Out of 163 projects, 110 projects are proposed newly as reservoir type development, 39 projects are as rehabilitation type and 14 are as pump irrigation type.

Table 6.1-1 List of Existing Irrigation Projects in the LRAs

Province	LRA	Sub-LRA	Topo-LRA	Cathment Area (km2)	Amphoe	Tambon	Muban	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No.	Storage Capacity (MCM)	Irrigation Area (rai)	Construction Year	Agency
KK	1	0	4	4.38	Chon-nab	Wang sang	Nong Yai Klieng	Nong Wai Res.	SSIP	Reservoir	Common	278-674	5440-I	0.072	55	1988	RID
KK	1	0	4	0.5	Chon-nab	Wang sang	Huai Phai	Nong Phai Res.	SSIP	Reservoir	Common	265-714	5441-II	0.057	30	1988	RID
KK	1	0	4	0.5	Chon-nab	Wang sang	Khok Phra	Nong Gud Gwang Res.	SSIP	Reservoir	Common	265-712	5441-II	0.06	150	1989	RID
KK	1	0	4	0.5	Chon-nab	Wang sang	Khok Phra	Nong Tao Re-excavation	SSIP	Dredge	Common	347-789	5541-III	0.04	Consumption	1991	RID
KK	1	0	2	0.5	Chon-nab	Non Phayo	Nong Tao	Nong Soke Mod Ngam Re-ex.	SSIP	Dredge	Common	258-702	5440-I	0	Consumption	1993	RID
KK	1	0	6	0.5	Chon-nab	Wang sang	Nong Yai Klieng	Nong Ban Non Phayom Re-ex.	SSIP	Dredge	Common	385-775	5541-III	0	Consumption	1993	RID
KK	1	0	2	6.13	Chon-nab	Non Phay	Non Phayom	Nong Kang Huai Bong Re-ex.	SSIP	Dredge	Common	384-778	5541-III	0.07	Consumption	1994	RID
KK	1	0	2	6.13	Chon-nab	Non Phay	Non Phayom	Nong Bung Beng Re-ex.	SSIP	Dredge	Common	347-789	5541-III	0.05	Consumption	1996	RID
KK	1	0	2	0.5	Chon-nab	Non Phay	Nong Tab Tao	Nong Sa-Bang Res.	SSIP	Reservoir	Common	191-519	5440-I	0.054	45	1988	RID
KK	1	0	10	0.5	Wang No	Lahan Na	Nong Sa-Bang	Ban Nam Sub Res.	SSIP	Reservoir	Common	223-542	5440-I	0.075	200	1990	RID
KK	1	0	9	0.5	Wang No	Ta Nangm	Nam Sub	Soke Khum Poon Res.	SSIP	Reservoir	Common	408-117	5541-IV	0.5	200	1985	RID
KK	4	0	0	0.1	Ban Fang	Pa Manao	Hua Kham Chang	Huai Nong Khun Re-ex.	SSIP	Dredge	Common	572-623	5540-IV	0.049	0	1987	RID
KK	6	0	2	0.1	Ban Phai	Ban Han	Nong Nam Khun Tai	Nong Learng Puaci Re-ex.	SSIP	Dredge	Common	643-536	5540-I	0.074	0	1988	RID
KK	6	0	3	0.1	Ban Phai	Pa Por	Don Puaci	Nong Pa Por Re-ex.	SSIP	Dredge	Common	654-612	5540-I	0.087	70	1988	RID
KK	6	0	2	0.1	Ban Phai	Pa Por	Pa Por	Nong Pa Lam Res.	SSIP	Reservoir	Common	643-585	5540-I	0.273	300	1989	RID
KK	6	0	3	5	Ban Phai	Pa Por	Don Du	Nong pa Lam Re-ex.	SSIP	Dredge	Common	643-586	5540-I	0.807	Consumption	1995	RID
KK	6	0	3	0.1	Ban Phai	Pa Por	Nong Doo	Ban Nong Nam Khun's Pond Re-ex.	SSIP	Dredge	Common	575-627	5540-IV	0.04	Consumption	1996	RID
KK	6	0	2	0.1	Ban Phai	Ban Han	Nong Nam Khun Nua	Jod Nong Kae Re-ex.	SSIP	Dredge	Common	505-568	5540-IV	0.072	0	1987	RID
KK	6	0	2	0.1	Phon	Jod Nong	Jod Nong kae	Wang Krua Jan Res.	SSIP	Reservoir	Common	682-582	5540-I	0.16	Consumption	1978	RID
KK	6	0	3	1	Puai Noi	Wang Mu	Non Sawang	Huai Rae Res.	SSIP	Reservoir	Common	683-543	5540-I	0.08	200	1979	RID
KK	6	0	3	1.8	Puai Noi	Wang Mu	Huai Rae	Ban Sok Nak Res.	SSIP	Reservoir	Common	643-568	5540-I	0.07	500	1982	RID
KK	6	0	3	4.5	Puai Noi	Wang Mu	Sok Nard	Ban Som Kob Res.	SSIP	Reservoir	Common	48 QTC 012-266	5642-III	0.00742	20	1993	RID
MH	1	0	0	0.2	Chieng Yi	Lao Dorki	Som Kob	Ban Som Kob Res.	SSIP	Reservoir	Common	48 QTD 012-266	5642-III	0	Consumption	1996	RID
MH	1	0	0	0.2	Chieng Yi	Lao Dorki	Som Kob	Nong Ban Re-ex.	SSIP	Dredge	Common	48 PUC 043-555	5640-IV	0.039	Consumption	1994	RID
MH	5	0	0	0	Borabu	Kham Lee	Sa Baeng	Nong Huai Here Re-ex.	SSIP	Dredge	Common	48 PUC 085-437	5640-IV	0	Consumption	1994	RID
MH	6	0	0	1.8	Na Khun	Nong Khu	Lao Jan	Huai Na Khun Res.	SSIP	Reservoir	Common	48 PUC 090-440	5640-IV	0.25	200	1985	RID
MH	6	0	0	5	Na Khun	Nong Khu	Lao Jan	Huai Na Khun Res. Re-ex.	SSIP	Dredge	Common	48 PUC 090-441	5640-IV	0.03	0	1992	RID
MH	6	0	0	5	Na Khun	Nong Khu	Lao Jan	Nong Khaow Hea Re-ex.	SSIP	Dredge	Common	48 PUC 085-437	5640-IV	0.031	0	1994	RID
MH	6	0	0	1.8	Na Khun	Nong Khu	Lao Jan	Khok Mon Reservoir	SSIP	Reservoir	Common	48 PTC 987-428	5640-IV	0.254	330	1987	RID
MH	6	0	0	0.6	Na Chuk	Nong Pho	Hua Nong	Nong Fai Hin Rong Re-ex.	SSIP	Dredge	Common	48 PUC 032-444	5640-IV	0	Consumption	1997	RID
MH	6	0	0	0.3	Na Chuk	Nong Rua	Khok Lam	Nong Hom Tuai Re-ex.	SSIP	Dredge	Common	48 QTC 794-727	5541-II	0	Consumption	1994	RID
MH	8	0	3	0.5	K.A. Kut	Nong War	Nong Wang	Nong Hom Tuai Re-ex.	SSIP	Dredge	Common	48 QTC 794-727	5541-II	0	Consumption	1994	RID
MH	8	0	3	0.5	K.A. Kut	Nong War	Nong Wang										

Table 6.1-1 List of Existing Irrigation Projects in the LRAs

Province	I.RA	Sub-I.RA	Topo-I.RA	Cathment Area (km2)	Amphoe	Tambon	Muban	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No.	Storage Capacity (MCM)	Irrigation Area (rai)	Construction Year	Agency
MK	8	3	4	34	Dong Lua	Nong Can	Phon Hai	Huai Rai res.	MSIP	Reservoir	Royal	430-575	5842I	2.8	1,500	1981	RID
MK	8	1	2	10	Dong Lua	Kok Toon	Kaeng Nang	Huai Tha res.	SSIP	Reservoir	Common	182-477	5842III	2.235	1,500	1989	RID
MK	1	0	3	5.6	Muang	Na Sok	Na sok	Huai Ka Long res.	SSIP	Reservoir	Common	48QVD506-264	5942III	0.455	400	1978	RID
MK	1	0	4	2.5	Muang	Na Sok	Na Do	Huai Hin Sew Noi Res.	SSIP	Reservoir	Common	48QVD529-197	5941IV	0.222	400	1986	RID
MK	2	0	1	6	Muang			Huai Si Seat Res.	SSIP	Reservoir	Common	48QVD655-160	5941IV		0		RID
MK	3	0	3	63	Ni Khom	Na Udom	Sai Lai Lang	Huai Yai Res.	SSIP	Reservoir	Common	48QVD.616-049	5941IV	0.1085	500	1983	RID
MK	3	0	3	1	Ni Khom	Na Udom	Na Udom	Huai Yang res.	SSIP	Reservoir	Common	48QVD.633-974	5941IV	0.1176	200	1978	RID
MK	3	0	3	1	Ni Khom	Na Udom	Khon Kaen	Nong Lai res.	SSIP	Reservoir	Common	48QVD.620-987	5941IV	0.1354	200	1978	RID
MK	2	0	3	4	Don Tan	Lao Mi	Pa Pha Yom	Huai Chang Chon res.	SSIP	Reservoir	Common	48QVD.758-119	5941I	0.22925	500	1978	RID
MK	3	0	5	0.6	Don Tan	Parai	Ban Na Mon	Huai Nang Wan res.	SSIP	Reservoir	Common	48QVD.745-953	5941II	0.088	750	1978	RID
MK	3	0	5	1.5	Don Tan	Parai	Ban Nong Meg	Huai Hin Kho res.	SSIP	Reservoir	Common	48QVD.767-943	5941II	0.558663	250	1978	RID
MK	5	0	3	18	Nong Soo	Nong Soo	Ban Loop Ping	Nong Khor res.	SSIP	Reservoir	Common	48QVD.313-060	5841I	0.2	100	1978	RID
MK	7	0	1	0.1	Nong Soo	Non Yang	Ngiu	Nong Ma	SSIP	Reservoir	Common	48QVD.222-236	5841I	0.038	30	1978	RID
MK	7	0	1	0.1	Nong Soo	Non Yang	Ngui	Nong Bua res.	SSIP	Reservoir	Common	48QVD.231-233	5841IV	0.044495	50	1978	RID
MK	8	1	2	3	Dong Lua	Kok Toon	Park Chong	Pak Chong res.	SSIP	Reservoir	Common	48QVD.140-517	5842III	0.1	100	1978	RID
MK	8	1	2	0.4	Dong Lua	Kok Toon	Na Hin Kong	Huai Kham Men res.	SSIP	Reservoir	Common	48QVD.169-504	5842III	0.08	100	1978	RID
MK	8	1	2	3	Dong Lua	Kok Toon	Kham Pak Kood	Huai Ta Thai res.*	SSIP	Reservoir	Common	48QVD.127-568	5842IV	0.752	650	1978	RID
MK	8	1	2	5.5	Dong Lua	Kok Toon	Sam Wae	Huai Dan res.*	SSIP	Reservoir	Common	48QVD.107-529	5842IV	0.544	500	1978	RID
MK	12	0	2	11	Dong Lua	Kok Toon	Na Hin Kong	Huai Phu res.*	SSIP	Reservoir	Common	48QVD.139-503	5842III	4.5	2,000	1978	RID
MK	8	1	2	4.5	Dong Lua	Kok Toon	Park Chong	Huai Hoi res.*	SSIP	Reservoir	Common	48QVD.107-514	5842III	2	2,000	1978	RID
MK	12	0	2	14	Dong Lua	Kok Toon	Kaeng Nang	Huai Phai res.*	SSIP	Reservoir	Common	48QVD.146-445	5842III	10.5	2,500	1978	RID
MK	9	2	5	3	Muang	Ban Khok	Ban Khok	Ban Khok res.	SSIP	Reservoir	Common	48QVD.503-414	5942III	0.2	0	1984	RID
MK	11	2	2	0.7	Muang	Kham Pa I	Kham Pa Lai	Huai Kok Dua res.	SSIP	Reservoir	Common	48QVD.620-514	5942III	0.28895	200	1985	RID
MK	8	1	2	1.6	Dong Lua	Kok Toon	San Wae	San Wae res.	SSIP	Reservoir	Common	48QVD.102-549	5842IV	0.0561	100	1978	RID
SK	1	0	0	1.5	Ban Muai	Dong Mo	Dong Mo Thong	Huai Hin Khan Na Res.	SSIP	Reservoir	Common	48 QUE 335-830	5644-I	0.59	800	1983	RID
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Nong Kor Yai (Dredge)	SSIP	Dredge	Common				0	1989	RID
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Lam Huai Sai (Dredge)	SSIP	Dredge	Common				0	1991	RID
SK	3	1	1		Panna Nik	Na Nai	Oon Dong	Nong Pla (Dredge)	SSIP	Dredge	Common				0	1987	RID
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Nong Kor Yai	SSIP	Dredge	Common				0	1989	RID
SK	3	1	4		Kut Bak	Kut Hai	Kut Hai	Bung Arka	SSIP	Dredge	Common				0	1993	RID
SK	3	1	4		Kut Bak	Khu Hai	Kho Yai	Nong Pa Jac	SSIP	Dredge	Common				0	1997	RID
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Nong Song Pee Nong	SSIP	Dredge	Common				0	1997	RID

Table 6.1-1 List of Existing Irrigation Projects in the LRAs

Province	LRA	Sub-LRA	Topo-LRA	Cathment Area (km2)	Amphoe	Tambon	Muban	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No.	Storage Capacity (MCM)	Irrigation Area (rai)	Construction Year	Agency
SK	4	0	2	1	Panna Nil	Na Nai	Pak Kham Phu	Huai Khok res.	SSIP	Reservoir	Common	48QVE839-906	5743II	0.21	0	1980	RID
SK	3	1	4		Kut Bak	Kut Bak	Kut Bak	Kut Kor Ou (Dredge)	SSIP	Dredge	Common				0	1989	RID
SK	3	1	4		Kut Bak	Kut Bak	Nong Song Hang	Nong Song Hang (Dredge)	SSIP	Dredge	Common				0	1998	RID
SK	3	1	4		Kut Bak	Kut Bak	Kut Bak	Nong Kut Saw O	SSIP	Dredge	Common				0	1989	RID
SK	3	1	4		Kut Bak	Kut Bak	Kut Kaet	Upper Huai Ma Rua	SSIP	Dredge	Common				0	1996	RID
SK	5	1	1	3.5	Huai Yan	Huai Yang	Muang	Phu Mai Ruak res. (Huai Muang)	SSIP	Reservoir	Royal	48QVD977-890	5843III	0.72	600	1984	RID
SK	5	2	8	0.7	K.A. Phu	Sang Kho	Jat Rabiab	Kok Tae res.	SSIP	Reservoir	Royal	48QUD917-734	5742I	0.327	600	1980	RID
SK	5	2	9	18	K.A. Phu	Sang Kho	Sang Kho	Huai Kee Hin res.	MSIP	Reservoir	Royal	48QUD867-625	5742I	4	3,900	1985	RID
SK	5	2	9	11.7	K.A. Phu	Sang Kaev	Sang Kaew	Huai Kae res.	MSIP	Reservoir	Royal	48QUD885-600	5742I	3.8	3,600	1980	RID
SK	5	2	8	0.9	K.A. Phu	Sang Kaev	Sang Kaew	Ban Sang Kaew res.	SSIP	Reservoir	Royal	48QUD899-60186	5742I	0.4	300	1978	RID
SK	7	0	0	1	Kham Tal	Patt	Ban Fang	Huai Kloi res.	SSIP	Reservoir	Common	48QUE780-675	5744I	0.518	0	1987	RID
SK	7	0	0	1	Kham Tal	Patt	Ban Fang	Huai Kloi res.	SSIP	Reservoir	Common	48QUE780-657	5744I	0.514	0	1977	RID
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Ban Lat Kachar weir	SSIP	Weir	Royal	48QUD695-919	5743II	0	0	1981	RID
SK	3	3	6	2	Panna Nil	Na Hau B	Na Sao Nan	Huai Wang Rua res.	SSIP	Reservoir	Royal	48QUE871-045	5743II	0.9	0	1982	RID
SK	3	1	1	8	Panna Nil	Na Nai	Pak Kham Phu	Huai Suan Pan res.	SSIP	Reservoir	Royal	48QUE810-007	5743II	1.1	0	1980	RID
SK	4	0	2	0.6	Kut Bak	Na Mong	Phon Ngam	Pone Ngam Weir	SSIP	Weir	Royal	48QUD821-900	5743II	0.12	0	1979	RID
SK	2	0	1	0.1	Sawang D	Khok See	Nong Phai	Nam Sub2 res.	SSIP	Reservoir	Royal	48QUE393-528	5644II	0.07	0	1984	RID
SK	2	0	1	0.1	Sawang D	Khok See	Nong Phai	Nam Sub3 res.	SSIP	Reservoir	Royal	48QUE397-518	5644II	0.037	0	1984	RID
SK	2	0	1	0.1	Sawang D	Khok See	Pa Ruk Nam	Ban Pa Ruk Nam weir	SSIP	Weir	Royal	48QUE397-527	5644II	-	0	1984	RID
SK	2	0	1	0.5	Sawang D	Khok See	Nong Phai	Nong Phai2 res.	SSIP	Reservoir	Royal	48QUE390-515	5644II	0.15	0	1985	RID
SK	2	0	1	1.5	Sawang D	Khok See	Nong Phai	Nong Phai res.	SSIP	Reservoir	Common	48QUE379-494	5644II	0.3188	500	1980	RID
SK	2	0	1	0.5	Sawang D	Khok See	Nong Phai	Nam sub4 res.	SSIP	Reservoir	Royal	48QUE396-509	5644II	0.15	0	1987	RID
SK	3	1	4		Kut Bak	Kut Hai	Kut Hai	Khlong Huai Mek Re-excavatin	SSIP	Dredge	Royal				0	1995	ALRO
SK	3	3	7	7.3	Panna Nil	Rai	Non Udom	Huai Wang Tham res.	MSIP	Reservoir	Royal	48 QUE 793-082	5743I	5	6,000	1981	RID
SK	3	3	6	6	Panna Nil	Na Hua B	Phu Phek	Phu Phek Res.	MSIP	Reservoir	Common	48 QUE 885-037	5743II	2.7	600		RID
KK	1	0	4		Chon-nab	Wang San	Nong Yai Kliang	Pump Irrigation (No.79)	SSIP	Pump	Common	242-695	5440-I		1,500	1995	DEDP
KK	1	0	1		Man Cha Kiri		Lub Ka	Pump Irrigation (No.77)	SSIP	Pump	Common	381-798	5541-III		1,500	1995	DEDP
Total Irrigation Projects																	
91				309.1									Total=	51.2	36,730		
Well Operated Projects (projects having irrigation area) =															46		

Table 6.1-2 List of Proposed Irrigation Projects in the Study LRAs

Location									Project Category			Coordination						Rehabilitation			Dam Dimensions				Occupation by Reservoir (ha)			
Province	LRA	Sub-LRA	Type-LRA	Catchment Area (km2)	Amphoe	Tambon	Muban	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No.	Capacity (MCM)	Irrigation Area (rai)	Construction Year	Exist / Const / Plan / Proposed	Dredging-1m depth (MCM)	Installation of intakes	Agency	Water Level (m)	Height (m)	Length (m)	Surface Area (ha)	Conservation Forest	Economic Forest	Economic Zone in LRA	Agricultural Zone in LRA
KK	1	0	2	1				1	SSIP	Reservoir		351-748	5541-III	0.08	120		Proposed			ALRO	190	5	200	3	0	3	0	0
KK	1	0	2	5.5				2	MSIP	Reservoir		379-750	5541-III	1.37	1,040		Proposed			ALRO	180	10	300	80	0	80	0	0
KK	1	0	2	0.6				3	SSIP	Reservoir		396-744	5541-III	0.15	190		Proposed			ALRO	180	5	200	6	0	5	0	1
KK	1	0	6	3.5				4	MSIP	Reservoir		280-662	5440-I	0.63	580		Proposed			ALRO	195	10	350	12.5	0	10	0	3
KK	1	0	6	1.7				5	SSIP	Reservoir		297-664	5440-I	0.10	140		Proposed			ALRO	200	5	150	4	0	3	0	1
KK	1	0	4	0.4				6	SSIP	Reservoir		263-617	5440-I	0.10	140		Proposed			ALRO	200	5	150	10.5	0	11	0	0
KK	1	0	4	7.8				7	SSIP	Reservoir		266-612	5440-I	0.38	390		Proposed			ALRO	200	5	200	15	0	15	0	0
KK	1	0	4	1.2				8	SSIP	Reservoir		241-600	5440-I	0.15	200		Proposed			ALRO	200	5	200	6	0	3	0	3
KK	1	0	4	6.3				9	SSIP	Reservoir		239-584	5440-I	0.38	390		Proposed			ALRO	200	5	200	15	0	3	0	12
KK	1	0	8	2.2				10	SSIP	Reservoir		235-563	5440-I	0.50	490		Proposed			ALRO	200	5	200	20	0	14	0	6
KK	1	0	8	1				11	SSIP	Reservoir		234-561	5440-I	0.18	220		Proposed			ALRO	200	5	100	7	0	7	0	0
KK	1	0	9	0.6				12	SSIP	Reservoir		226-545	5440-I	0.13	180		Proposed			ALRO	220	5	150	5.25	0	5	0	0
KK	1	0	9	1.6				13	SSIP	Reservoir		222-536	5440-I	0.10	140		Proposed			ALRO	200	5	200	4	0	0	0	4
KK	1	0	9	1.2				14	SSIP	Reservoir		220-533	5440-I	0.14	190		Proposed			ALRO	200	5	250	5.4	0	0	0	5
KK	1	0	2	0.5	Chom-nabo	Non Phayo	Nong Tao	Nong Tao Re-excavation		SSIP	Dredge	Common	347-789	5541-III	0.04	70	1991	Proposed		1	ALRO								
KK	1	0	2	0.13	Chom-nabo	Non Phayo	Non Phayo	Nong Kang Huai Bong Re-ex.		SSIP	Dredge	Common	384-778	5541-III	0.07	110	1994	Proposed		1	ALRO								
KK	1	0	2	0.5	Chom-nabo	Non Phayo	Nong Tab	Nong Bung Beng Re-ex.		SSIP	Dredge	Common	347-789	5541-III	0.05	80	1996	Proposed		1	ALRO								
KK	2	0	1	1.2				1	SSIP	Reservoir		568-393	5542-III	0.09	140		Proposed			ALRO	210	5	200	3.75	0	0	0	0
KK	2	0	1	1.5				2	SSIP	Reservoir		581-381	5542-III	0.15	200		Proposed			ALRO	200	5	200	6	0	0	0	1
KK	2	0	3	0.3				3	SSIP	Reservoir		518-347	5542-III	0.07	120		Proposed			ALRO	220	5	200	3.5	0	0	0	4
KK	2	0	3	0.8				4	SSIP	Reservoir		531-346	5542-III	0.11	150		Proposed			ALRO	200	5	150	4.2	0	3	0	1
KK	2	0	3	1.8				5	SSIP	Reservoir		466-274	5542-III	0.09	130		Proposed			ALRO	200	5	200	3.6	0	0	0	4
KK	3	0	4	0.6				1	SSIP	Reservoir		253-873	5541-II	0.15	190		Proposed			ALRO	220	5	200	6.75	0	2	0	0
KK	3	0	4	0.9				2	SSIP	Reservoir		257-859	5541-II	0.20	240		Proposed			ALRO	200	5	200	8	0	8	0	0
KK	3	0	4	3				3	SSIP	Reservoir		244-853	5541-II	0.18	220		Proposed			ALRO	200	5	200	7	0	7	0	0
KK	3	0	6	1.4				4	SSIP	Reservoir		142-815	5541-II	0.15	200		Proposed			ALRO	220	5	250	6	0	6	0	0
KK	3	0	6	1.5				5	SSIP	Reservoir		137-812	5541-II	0.25	290		Proposed			ALRO	220	5	400	10	0	10	0	0
KK	4	0	0	0.1				1	SSIP	Reservoir		398-158	5541-IV	0.02	50		Proposed			ALRO	210	5	200	2	0	2	0	0
KK	4	0	0	0.1				2	SSIP	Reservoir		403-158	5541-IV	0.02	50		Proposed			ALRO	210	5	200	2	0	2	0	0
KK	4	0	0	0.3				3	SSIP	Reservoir		410-141	5541-IV	0.07	120		Proposed			ALRO	210	5	200	4	0	2	0	2
KK	4	0	0	0.1				4	SSIP	Reservoir		434-136	5541-IV	0.02	50		Proposed			ALRO	200	5	200	1	0	0	0	1
KK	4	0	0	0.2				5	SSIP	Reservoir		414-119	5541-IV	0.17	220		Proposed			ALRO	200	5	400	10	0	0	0	10
KK	6	0	1	0.8				1	SSIP	Reservoir		492-638	5540-IV	0.13	170		Proposed			ALRO	220	5	300	5	0	5	0	0
KK	6	0	1	0.5				2	SSIP	Reservoir		442-608	5540-IV	0.04	60		Proposed			ALRO	220	5	100	1.4	0	1	0	0
KK	6	0	1	0.3				3	SSIP	Reservoir		469-592	5540-IV	0.03	50		Proposed			ALRO	220	5	100	1	0	1	0	0
KK	6	0	2	0.9				4	MSIP	Reservoir		539-598	5540-IV	0.22	260		Proposed			ALRO	230	10	300	14	0	14	0	0
KK	6	0	2	2.5				5	MSIP	Reservoir		534-574	5540-IV	0.62	570		Proposed			ALRO	220	10	450	49.5	0	50	0	0
KK	6	0	2	0.9				6	SSIP	Reservoir		547-580	5540-IV	0.18	220		Proposed			ALRO	220	5	150	7.2	0	7	0	0
KK	6	0	2	1				7	SSIP	Reservoir		558-579	5540-IV	0.19	230		Proposed			ALRO	220	5	300	7.5	0	8	0	0
KK	6	0	2	0.6				8	SSIP	Reservoir		640-610	5540-I	0.15	190		Proposed			ALRO	230	5	200	6	0	6	0	0
KK	6	0	3	2.3				9	SSIP	Reservoir		657-562	5540-I	0.57	540		Proposed			ALRO	210	5	250	40	0	0	0	40
KK	6	0	3	5				10	SSIP	Reservoir		631-554	5540-I	0.06	90		Proposed			ALRO	190	5	200	2.25	0	2	0	0
KK	6	0	3	0.6				11	SSIP	Reservoir		670-540	5540-I	0.05	80		Proposed			ALRO	210	5	200	1.875	0	0	0	2
KK	6	0	2	0.1	Ban Phai	Ban Han	Nong Nam	Huai Nong Khun Re-ex.		SSIP	Dredge	Common	572-623	5540-IV	0.05	80	1987	Proposed		1	ALRO								
KK	6	0	3	0.1	Ban Phai	Pa Por	Don Puset	Nong Leuang Puset Re-ex.		SSIP	Dredge	Common	643-536	5540-I	0.07	110	1988	Proposed		1	ALRO								
KK	6	0	3	0.1	Ban Phai	Pa Por	Nong Doo	Nong pa Lam Re-ex.		SSIP	Dredge	Common	643-586	5540-I	0.81	700	1995	Proposed		2	ALRO								
KK	6	0	2	0.1	Ban Phai	Ban Han	Nong Nam	Ban Nong Nam Khun's Pond Re-ex.		SSIP	Dredge	Common	575-627	5540-IV	0.04	70	1996	Proposed		1	ALRO								
KK	6	0	2	0.1	Phon	Jod Nong K	Jod Nong L	Jod Nong Kao Re-ex.		SSIP	Dredge	Common	505-568	5540-IV	0.07	110	1987	Proposed		1	ALRO								
KK	6	0	3	1	Puay Noi	Wang Muang	Nan Sawan	Wang Krua Jan Res.		SSIP	Reservoir	Common	682-582	5540-I	0.16	210	1978	Proposed		2	ALRO								
MH	2	0	2	0.35				1	SSIP	Reservoir		746-856	5541-II	0.09	130		Proposed			ALRO	200	5	250	3.6	0	0	4	0

Table 6.1-2 List of Proposed Irrigation Projects in the Study LRAs

Location								Project Category			Coordination					Rehabilitation		Dam Dimensions				Occupation by Reservoir (ha)				
Province	LRA	Sub-LRA	Topo-LRA	Catchment Area (km2)	Amphoe	Tambon	Mubon	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No.	Capacity (MCM)	Irrigation Area (rai)	Construction Year	Exist / Const / Plan / Proposed	Dredging/ Inc depth (MCM)	Installation of intakes	Agency	Water Level (m)	Height (m)	Length (m)	Surface Area (ha)	Conservation Forest	Economic Forest	Economic Zone in LRA	Agricultural Zone in LRA
MH	3	0	3	0.12				2	SSIP	Reservoir		807-897	5541-II	0.03	60		Proposed			ALRO	200	5	250	1.8	0	0	2	0
MH	3	0	3	0.2				3	SSIP	Reservoir		824-848	5541-II	0.05	80		Proposed			ALRO	180	5	150	2	0	0	2	0
MH	5	0	0	0.16				1	SSIP	Reservoir		974-533	5640-IV	0.02	40		Proposed			ALRO	190	5	100	0.7	0	1	0	0
MH	5	0	0	0.1				2	SSIP	Reservoir		982-534	5640-IV	0.02	40		Proposed			ALRO	190	5	100	0.7	0	1	0	0
MH	5	0	0	0.3				3	SSIP	Reservoir		985-528	5640-IV	0.07	120		Proposed			ALRO	190	5	200	6	0	6	0	0
MH	5	0	0	0.15				4	SSIP	Reservoir		990-514	5640-IV	0.04	70		Proposed			ALRO	190	5	200	2.25	0	2	0	0
MH	5	0	0	0	Horaba	Khum Lee	Na Baeng	Nong Ban Re-ex.	SSIP	Dredge	Common	48 PUC 043-555	5640-IV	0.04	70	1994	Proposed		1	ALRO								
MH	6	0	0	5	Na Khun	Nong Khu	Lao Jan	Huai Na Khun Res. Re-ex.	SSIP	Dredge	Common	48 PUC 090-441	5640-IV	0.03	60	1992	Proposed		1	ALRO								
MH	6	0	0	1.8	Na Khun	Nong Khu	Lao Jan	Nong Khaow Hea Re-ex.	SSIP	Dredge	Common	48 PUC 085-437	5640-IV	0.03	60	1994	Proposed		1	ALRO								
MH	8	0	1	0.4				1	SSIP	Reservoir		937-872	5641-III	0.08	120		Proposed			ALRO	170	5	150	3	0	0	3	0
MH	8	0	1	0.6				2	SSIP	Reservoir		926-833	5641-III	0.11	160		Proposed			ALRO	170	5	200	4.5	0	0	5	0
MH	8	0	2	0.4				3	SSIP	Reservoir		956-795	5641-III	0.08	120		Proposed			ALRO	190	5	150	3	0	0	3	0
MH	8	0	3	0.2				4	SSIP	Reservoir		781-782	5541-II	0.04	70		Proposed			ALRO	190	5	150	1.5	0	0	2	0
MH	8	0	3	0.5				5	SSIP	Reservoir		802-740	5541-II	0.12	170		Proposed			ALRO	200	5	200	6.75	0	0	7	0
MH	8	0	4	0.5				6	SSIP	Reservoir		816-714	5541-II	0.05	80		Proposed			ALRO	210	5	100	2	0	0	2	0
MH	8	0	4	0.5				7	SSIP	Reservoir		890-682	5640-IV	0.06	100		Proposed			ALRO	190	5	200	3	0	0	3	0
MH	8	0	4	0.25				1	SSIP	Reservoir		466-774	5841-I	0.64	590		Proposed			ALRO	180	5	100	25.5	0	0	0	26
MK	1	0	4	27				2	SSIP	Reservoir		482-720	5941-IV	0.12	160		Proposed			ALRO	180	5	150	4.75	0	0	0	5
MK	1	0	4	20				3	MSIP	Reservoir		510-212	5941-IV	0.57	540		Proposed			ALRO	200	10	300	24.75	10	0	0	15
MK	1	0	4	2.3				4	MSIP	Reservoir		588-209	5941-IV	0.57	540		Proposed			ALRO	205	10	350	30	30	0	0	0
MK	1	0	5	2.3				5	SSIP	Reservoir		600-201	5941-IV	0.45	450		Proposed			ALRO	205	5	350	9.625	10	0	0	0
MK	1	0	5	1.8																					0	0	0	0
MK	1	0	4					Pump Irrigation MKD1(1)	SSIP	Pump		487-174	5941-IV		500		Proposed			ALRO					0	0	0	0
MK	1	0	4					Pump Irrigation MKD1(2)	SSIP	Pump		502-164	5941-IV		500		Proposed			ALRO					0	0	0	0
MK	2	0	1	6				1	MSIP	Reservoir		655-162	5941-IV	1.49	1,120		Proposed			ALRO	180	10	400	66	40	0	0	26
MK	2	0	2	22				2	SSIP	Reservoir		702-124	5941-IV	1.28	990		Proposed			ALRO	160	8	250	32	32	0	0	0
MK	2	0	3	3				3	MSIP	Reservoir		737-130	5941-I	0.75	660		Proposed			ALRO	180	10	300	18	18	0	0	0
MK	2	0	3					Pump Irrigation MKD2(1)	SSIP	Pump		737-081	5941-I		500		Proposed			ALRO					0	0	0	0
MK	2	0	3					Pump Irrigation MKD2(2)	SSIP	Pump		767-075	5941-I		500		Proposed			ALRO					0	0	0	0
MK	2	0	3					Pump Irrigation MKD2(3)	SSIP	Pump		802-079	5941-I		500		Proposed			ALRO					0	0	0	0
MK	2	0	3					Pump Irrigation MKD2(4)	SSIP	Pump		835-068	5941-I		500		Proposed			ALRO					0	0	0	0
MK	3	0	2					1	SSIP	Reservoir		547-016	5941-IV	0.12	160		Proposed	0.04	2	ALRO	180	3	0	4	0	0	0	4
MK	3	0	2					2	SSIP	Reservoir		548-017	5941-IV	0.21	250		Proposed	0.07	2	ALRO	180	3	0	7	0	0	0	7
MK	3	0	2					3	SSIP	Reservoir		555-017	5941-IV	0.12	160		Proposed	0.04	2	ALRO	180	3	0	4	0	0	0	4
MK	3	0	2					4	SSIP	Reservoir		610-928	5941-III	0.39	400		Proposed	0.13	2	ALRO	190	3	0	13	0	0	0	13
MK	3	0	3					5	SSIP	Reservoir		599-975	5941-IV	0.18	220		Proposed	0.06	2	ALRO	175	3	0	6	0	0	0	6
MK	3	0	3					6	SSIP	Reservoir		599-981	5941-IV	0.08	120		Proposed	0.025	2	ALRO	175	3	0	2.5	0	0	0	3
MK	3	0	3					7	SSIP	Reservoir		607-998	5941-IV	0.18	220		Proposed	0.06	2	ALRO	175	3	0	6	0	0	0	6
MK	3	0	3					8	SSIP	Reservoir		596-017	5941-IV	0.06	100		Proposed	0.02	2	ALRO	175	3	0	2	0	0	0	2
MK	3	0	3					9	SSIP	Reservoir		612-040	5941-IV	0.45	450		Proposed	0.15	2	ALRO	165	3	0	15	0	0	0	15
MK	3	0	3					10	SSIP	Reservoir		639-964	5941-IV	0.12	160		Proposed	0.04	2	ALRO	190	3	0	4	0	0	0	4
MK	3	0	3					11	SSIP	Reservoir		666-971	5941-IV	0.09	130		Proposed	0.03	2	ALRO	185	3	0	3	0	0	0	3
MK	3	0	4					12	SSIP	Reservoir		647-009	5941-IV	0.08	120		Proposed	0.025	2	ALRO	190	3	0	2.5	0	0	0	3
MK	3	0	4					13	SSIP	Reservoir		654-017	5941-IV	0.03	60		Proposed	0.01	2	ALRO	180	3	0	1	0	0	0	1
MK	3	0	4					14	SSIP	Reservoir		654-023	5941-IV	0.06	100		Proposed	0.02	2	ALRO	180	3	0	2	0	0	0	2
MK	3	0	4					15	SSIP	Reservoir		722-043	5941-IV	0.06	100		Proposed	0.02	2	ALRO	160	3	0	2	0	0	0	2
MK	3	0	4					16	SSIP	Reservoir		721-941	5941-IV	0.06	100		Proposed	0.02	2	ALRO	180	3	0	2	0	0	0	2
MK	3	0	4																						0	0	0	0
MK	3	0	4					Pump Irrigation MKD3(1)	SSIP	Pump		738-078	5941-I		500		Proposed			ALRO					0	0	0	0
MK	4	0	2	0.7				1	MSIP	Reservoir		827-933	5941-II	0.17	220		Proposed			ALRO	200	8	500	18	18	0	0	0
MK	4	0	3	1.5				2	SSIP	Reservoir		842-922	5941-II	0.37	390		Proposed			ALRO	200	8	150	10.5	0	0	0	11
MK	5	0	2	0.8				1	SSIP	Reservoir		289-109	5941-I	0.13	170		Proposed			ALRO	220	5	200	3	0	0	0	3

Table 6.1-2 List of Proposed Irrigation Projects in the Study LRAs

Province	LRA	Sub-LRA	Type-LRA	Catchment Area (km2)	Location: Amphoe	Location: Tambon	Location: Mubon	Location: Project's names	Project Category: Project Scale	Project Category: Project Type	Project Category: Project Category	Coordination: Coordinate	Coordination: Map No.	Capacity (MCM)	Irrigation Area (ra)	Construction Year	Exist / Const / Plan / Proposed	Rehabilitation: Dredging - Ins depth (MCM)	Rehabilitation: Installation of Intakes	Dam Dimensions: Agency	Dam Dimensions: Water Level (m)	Dam Dimensions: Height (m)	Dam Dimensions: Length (m)	Dam Dimensions: Surface Area (ha)	Occupation by Reservoir (ha): Conservation Forest	Occupation by Reservoir (ha): Economic Forest	Occupation by Reservoir (ha): Economic Zone in LRA	Occupation by Reservoir (ha): Agricultural Zone in LRA
MK	3	0	3	1.7				2	SSIP	Reservoir		304-054	5841-I	0.35	370		Proposed			ALRO	210	5	300	14	0	0	0	14
MK	7	0	1	19				1	SSIP	Reservoir		217-307	5842-II	4.73	2,670		Proposed			ALRO	232.5	7.5	300	113	113	0	0	0
MK	7	0	1	9				2	SSIP	Reservoir		253-318	5842-II	2.24	1,520		Proposed			ALRO	230	5	250	92	92	0	0	0
MK	7	0	1	1.3				3	SSIP	Reservoir		212-257	5842-II	0.19	230		Proposed			ALRO	230	5	100	7.5	2	0	0	5
MK	7	0	1	0.5				4	SSIP	Reservoir		221-261	5842-II	0.06	90		Proposed			ALRO	230	5	150	2.25	1	0	0	1
MK	7	0	1	0.7				5	SSIP	Reservoir		225-264	5842-II	0.15	200		Proposed			ALRO	230	5	350	6	6	0	0	0
MK	7	0	1	3				6	SSIP	Reservoir		274-339	5842-II	0.16	200		Proposed			ALRO	260	5	250	6.25	3	0	0	3
MK	7	0	1	0.3				7	SSIP	Reservoir		285-335	5842-II	0.07	120		Proposed			ALRO	260	5	200	3.6	3	0	0	1
MK	7	0	1	0.7				8	SSIP	Reservoir		296-327	5842-II	0.10	140		Proposed			ALRO	260	5	100	4	4	0	0	0
MK	7	0	1	1.5				9	SSIP	Reservoir		299-292	5842-II	0.13	170		Proposed			ALRO	260	5	150	5	0	0	0	5
MK	7	0	1	1.2				10	SSIP	Reservoir		272-285	5842-II	0.10	140		Proposed			ALRO	240	5	250	4	4	0	0	0
MK	7	0	1	0.7				11	SSIP	Reservoir		276-266	5842-II	0.15	200		Proposed			ALRO	240	5	200	6	4	0	0	2
MK	7	0	3	1				12	SSIP	Reservoir		345-344	5842-II	0.23	270		Proposed			ALRO	220	5	200	9	0	0	0	9
MK	7	0	3	0.3				13	SSIP	Reservoir		352-328	5842-II	0.07	120		Proposed			ALRO	220	5	200	4	4	0	0	0
MK	7	0	4	3				14	SSIP	Reservoir		417-462	5842-II	0.79	690		Proposed			ALRO	220	5	350	31.5	0	0	0	32
MK	8	1	2	0.3	Dong Luan	Kok Toom	Park Chon	WSS. of Huai Phai res. (No. 2)		SSIP	Reservoir	Common	105-537	5842-IV	0.08	2,500	1997	Plan			RID								3
MK	8	1	2	0.3	Dong Luan	Kok Toom	Na Hua Kh	WSS. of Huai Hoi res. (No. 1)		SSIP	Reservoir	Common	165-497	5842-IV	1.28	1,300	1997	Plan			RID	300	10	200	25.5				26
MK	8	2	3	65					3	MSIP	Reservoir		322-517	5842-II	1.56	1,150		Proposed			ALRO	200	25	250	12.5	13	0	0	0
MK	8	2	3	22					4	MSIP	Reservoir		342-524	5842-I	1.47	1,100		Proposed			ALRO	180	15	200	19.6	20	0	0	0
MK	8	2	3	12					5	MSIP	Reservoir		373-548	5842-I	2.99	1,890		Proposed			ALRO	189.5	9.5	300	39.9	60	0	0	0
MK	8	2	3					Pump Irrigation MKD8(1)		SSIP	Pump		350-573	5842-I		500		Proposed			ALRO					0	0	0	0
MK	8	4	5	1.3					6	SSIP	Reservoir		477-603	5942-IV	0.31	340		Proposed			ALRO	200	5	300	12.5	13	0	0	0
MK	8	4	5	3.7					7	MSIP	Reservoir		486-615	5942-IV	0.92	770		Proposed			ALRO	194.5	9.5	300	20	20	0	0	0
MK	8	4	5	2.6					8	SSIP	Reservoir		498-617	5942-IV	0.09	140		Proposed			ALRO	190	5	200	3.75	4	0	0	0
MK	9	1	1	1.6					1	SSIP	Reservoir		681-570	5942-IV	0.40	410		Proposed			ALRO	160	10	200	15	0	0	0	15
MK	9	1	1	0.7					2	SSIP	Reservoir		690-565	5942-IV	0.13	170		Proposed			ALRO	160	5	100	5	0	0	0	5
MK	9	1	3					Pump Irrigation MKD9(1)		SSIP	Pump		627-443	5942-III		500		Proposed			ALRO					0	0	0	0
MK	9	2	4	2					3	SSIP	Reservoir		607-399	5942-III	0.50	490		Proposed			ALRO	160	5	250	24	0	0	0	24
MK	9	2	5	2.1					4	SSIP	Reservoir		533-395	5942-III	0.23	270		Proposed			ALRO	160	5	300	9	0	0	0	9
MK	9	2	5	0.4					5	SSIP	Reservoir		496-453	5942-III	0.10	140		Proposed			ALRO	220	5	200	5	5	0	0	0
MK	9	2	6	2.4					6	SSIP	Reservoir		520-457	5942-III	0.60	560		Proposed			ALRO	240	5	200	48	48	0	0	0
MK	9	2	5	3	Muang	Ban Khok	Pan Khok	Ban Khok res.		SSIP	Reservoir	Common	48QVD.503-414	5942III	0.20	240	1984	Proposed		2	ALRO								
MK	10	0	0	1.1					1	SSIP	Reservoir		576-629	5942-IV	0.27	310		Proposed			ALRO	180	5	250	14	14	0	0	0
MK	10	0	0	1					2	SSIP	Reservoir		590-625	5942-IV	0.15	200		Proposed			ALRO	180	5	300	6	6	0	0	0
MK	11	1	1	1.1					1	SSIP	Reservoir		568-538	5942-IV	0.22	260		Proposed			ALRO	180	5	300	8.75	9	0	0	0
MK	11	1	1	2.4					2	MSIP	Reservoir		585-535	5942-IV	0.60	560		Proposed			ALRO	180	8	500	42.5	21	0	0	21
MK	11	2	2	5					3	SSIP	Reservoir		568-511	5942-III	0.56	530		Proposed			ALRO	180	5	400	22.5	23	0	0	0
MK	11	2	2	3.5					4	SSIP	Reservoir		540-510	5942-III	0.13	170		Proposed			ALRO	170	5	150	5	5	0	0	0
MK	11	2	2					Pump Irrigation MKD11-2(1)		SSIP	Pump		548-495	5942-III		500		Proposed			ALRO					0	0	0	0
MK	11	2	2					Pump Irrigation MKD11-2(2)		SSIP	Pump		613-489	5942-III		500		Proposed			ALRO					0	0	0	0
SK	1	0	0	3					1	SSIP	Reservoir		338-370	5644-I	0.35	370		Proposed			ALRO	160	5	400	14	0	0	0	14
SK	2	0	1	2.3					1	SSIP	Reservoir		399-606	5644-II	0.38	390		Proposed			ALRO	180	5	350	15	0	15	0	0
SK	2	0	2	11					2	SSIP	Reservoir		368-557	5644-II	1.20	940		Proposed			ALRO	160	5	400	48	0	10	0	38
SK	2	0	2	1.2					3	SSIP	Reservoir		353-586	5644-II	0.10	140		Proposed			ALRO	160	5	250	4	0	4	0	0
SK	2	0	1	0.1	Sawang Da	Khok See	Nong Phai	Nam Sub2 res.		SSIP	Reservoir	Royal	48QUE393-528	5644II	0.07	110	1984	Proposed		1	ALRO								
SK	2	0	1	0.1	Sawang Da	Khok See	Nong Phai	Nam Sub3 res.		SSIP	Reservoir	Royal	48QUE397-518	5644II	0.04	70	1984	Proposed		1	ALRO								
SK	2	0	1	0.5	Sawang Da	Khok See	Nong Phai	Nong Phai2 res.		SSIP	Reservoir	Royal	48QUE390-515	5644II	0.13	200	1985	Proposed		2	ALRO								
SK	2	0	1	0.5	Sawang Da	Khok See	Nong Phai	Nam sub4 res.		SSIP	Reservoir	Royal	48QUE396-509	5644II	0.15	200	1987	Proposed		2	ALRO								
SK	3	1	4	44.5	Muang	Huay Yang	Lat Kra Ch	Huai Kra Chee res.		MSIP	Reservoir	Royal	48QVD649-885	5743III	11.00	7,000	1997	Const			RID	225.8	28.4	525	140	140			
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Nong Pa Jae Re-ex		SSIP	Dredge	Common	696-930	5743-II	0.07		1997	Plan			RID								

Table 6.1-2 List of Proposed Irrigation Projects in the Study LRAs

					Location				Project Category			Coordination						Rehabilitation			Dam Dimensions				Occupation by Reservoir (ha)			
Province	LRA	Sub-LRA	Topo-LRA	Catchment Area (km2)	Amphoe	Tambon	Muban	Project's names	Project Scale	Project Type	Project Category	Coordinate	Map No	Capacity (MCM)	Irrigation Area (rai)	Construction Year	Exist / Const / Plan / Proposed	Dredging Depth (MCM)	Installation of intakes	Agency	Water Level (m)	Height (m)	Length (m)	Surface Area (ha)	Conservation Forest	Economic Forest	Economic Zone in LRA	Agricultural Zone in LRA
SK	3	1	4		Kut Bak	Kut Hai	Kho Yai	Nong Song Pee Nong Re-ex.	SSIP	Dredge	Common	690-930	5743-II	0.20		1997	Plan			RID								
SK	3	1	1	8	Panna Nikh	Na Nai	Pak Kham	Huai Suan Pan res.	SSIP	Reservoir	Royal	48QUE810-007	5743II	1.10	860	1980	Proposed		2	ALRO								
SK	3	3	6	0.7				2	SSIP	Reservoir		832-046	5743-II	0.17	220		Proposed			ALRO	213	8	100	4	0	0	0	0
SK	3	3	6	2	Panna Nikh	Na Hau Bo	Na Sao Nai	Huai Wong Rua res.	SSIP	Reservoir	Royal	48QUE871-045	5743II	0.90	760	1982	Proposed		2	ALRO								
SK	4	0	2	1	Panna Nikh	Na Nai	Pak Kham	Huai Khok res.	SSIP	Reservoir	Common	48QVE839-906	5743II	0.21	250	1980	Proposed		2	ALRO								
SK	4	0	2	0.6	Kut Bak	Na Mong	Phon Ngam	Pone Ngam Weir	SSIP	Weir	Royal	48QUD821-900	5743II	0.12	160	1979	Proposed		2	ALRO								
SK	5	1	4					Pump Irrigation SKN5(1)	SSIP	Pump		948-769	5842-IV		500		Proposed			ALRO					0	0	0	0
SK	5	1	4					Pump Irrigation SKN5(2)	SSIP	Pump		959-759	5842-IV		500		Proposed			ALRO					0	0	0	0
SK	5	1	5					Pump Irrigation SKN5(3)	SSIP	Pump		962-750	5842-IV		500		Proposed			ALRO					0	0	0	0
SK	6	1	1	0.4	Wanch Phi	Kham Bo	Ban Pa Mi	Huai Dia Dang weir	SSIP	Weir	Common	48 QUE 477-023	5743-III			1998	Plan			RID								
SK	6	2	4	10				1	SSIP	Reservoir		611-905	5743-III	0.30	330		Proposed			ALRO	300	10	150	6	6	0	0	0
SK	7	0	0	1	Kham Takl	Patt	Ban Fang	Huai Khu res.	SSIP	Reservoir	Common	48QUE780-675	57441	0.52	500	1987	Proposed		2	ALRO								
SK	7	0	0	1	Kham Takl	Patt	Ban Fang	Huai Khu res.	SSIP	Reservoir	Common	48QU8780-657	57441	0.51	500	1977	Proposed		2	ALRO								
													Total=	59.29	61,650									1,666	801	339	33	492
163			163	438.66									Ave=	0.40	385						201	6	202	14	34	37	10	58

CHAPTER 7. BACK DATA OF STUDY FOR THE PRIORITY AREAS

7.1 Back Data for On-Farm and Water Resources Development

7.1.1 Project Map and Cadastral Blocks of the Priority Areas

1) Project Map

Proposed projects in each priority area are summarized in Figure 7.1-1.1 to Figure 7.1-4.1 respectively.

2) Cadastral Map

Cadastral maps are prepared by the Cadastral Survey and Mapping Branch in each Provincial Land Reform Office (PLRO). Cadastral map is compiled in accordance with each cadastral block which is composed of several farm lots owned by individual farmers. Each farm lot is surveyed along its boundary with attendance of concerned farmers. This cadastral survey work is one of critical works in the process of ALRO work.

After survey in the field, cadastral boundaries of farm lots are compiled into each cadastral block map in scale of 1: 4,000. Each farm lot is numbered and name of owner farmer is registered in ALRO.

Cadastral blocks of each priority area are shown in Figure 7.1-1.2 to Figure 7.1-4.2.

3) Farming Type Classification

Farming types are classified into three types by the ratio of upland field in each cadastral block. Ratio of upland field has been investigated on 1: 4,000 topograpyical maps which were newly surveyed for this study. Ratio of upland field for farm type classification are as follows:

Upland Type: upland field more than 70%
Mixed Type: upland field from 30% to 70%
Lowland Type: upland field less than 30%

Classification of Farming type in each priority area is shown in Figure 7.1-1.2 to Figure 7.1-4.2.

Figure 7.1-1.1 Project Location Map of Khon Kaen Priority Area

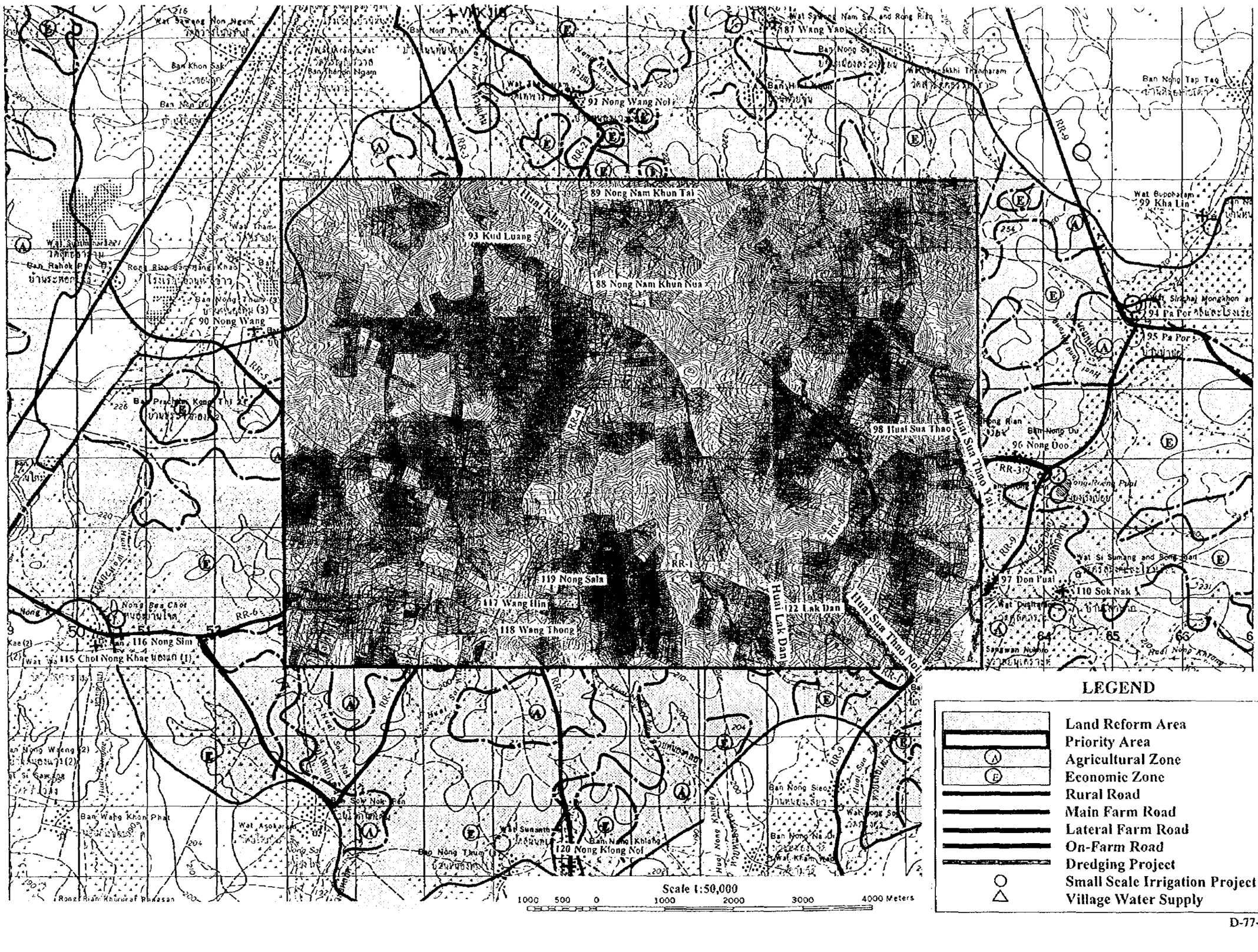

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Figure 7.1-1.2 Location Map of Cadastral Blocks and Farming Type Classification of Khon Kaen Priority Area

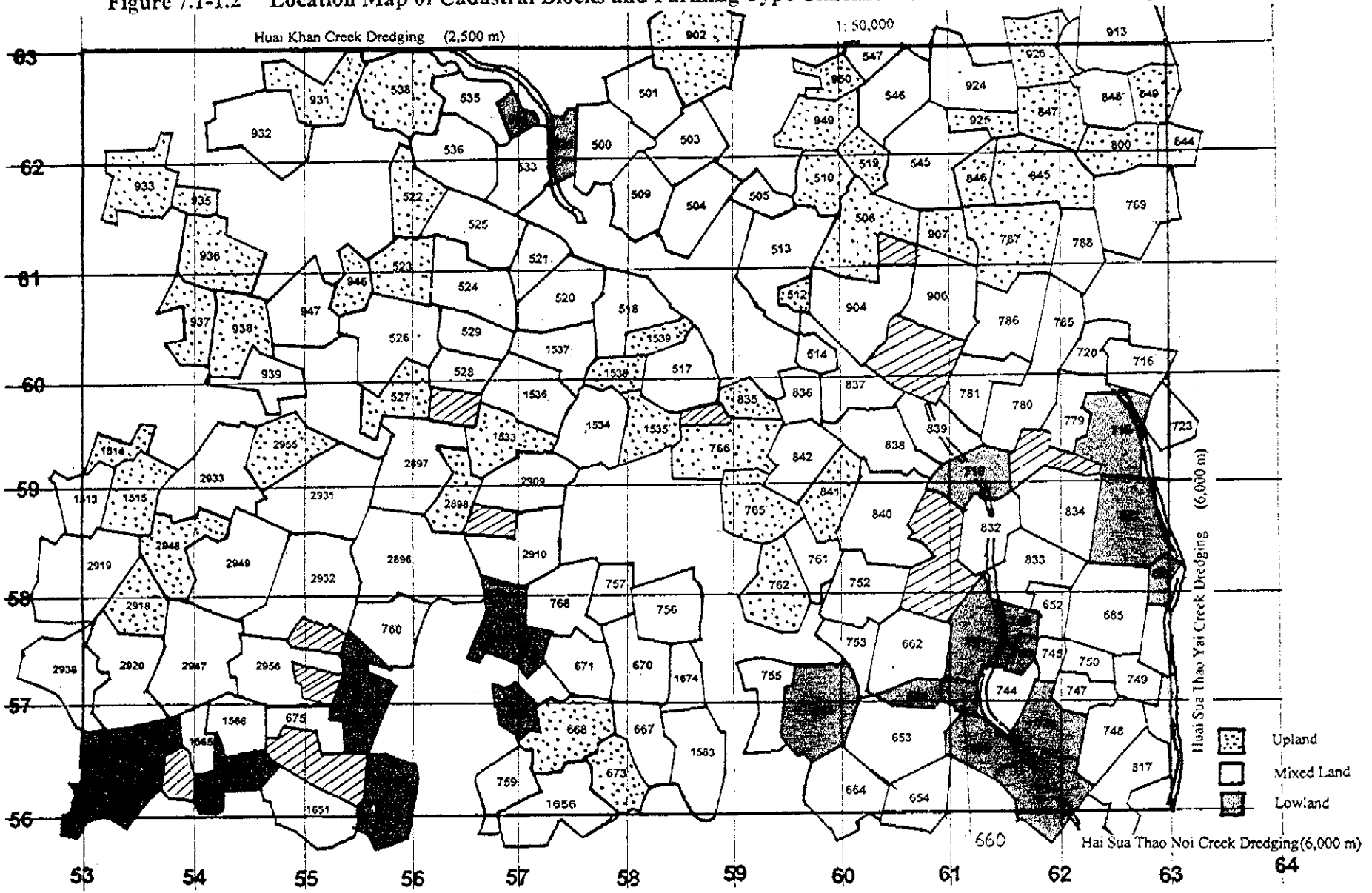

Figure 7.1-1.2 Location Map of Cadastral Blocks and Farming Type Classification of Khon Kaen Priority Area

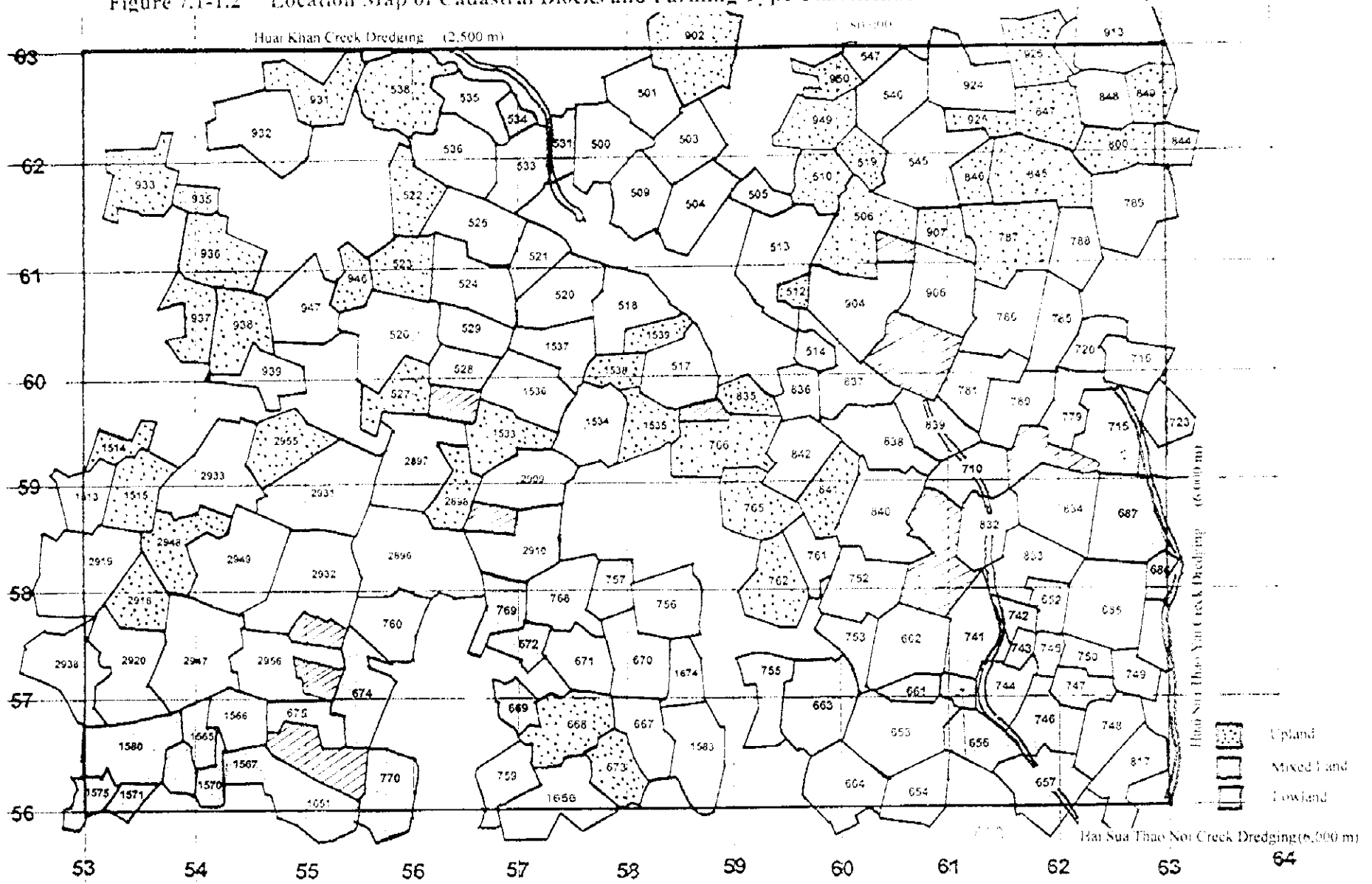

Figure 7.1-2.1 Project Location Map of Mahasarakham Priority Area

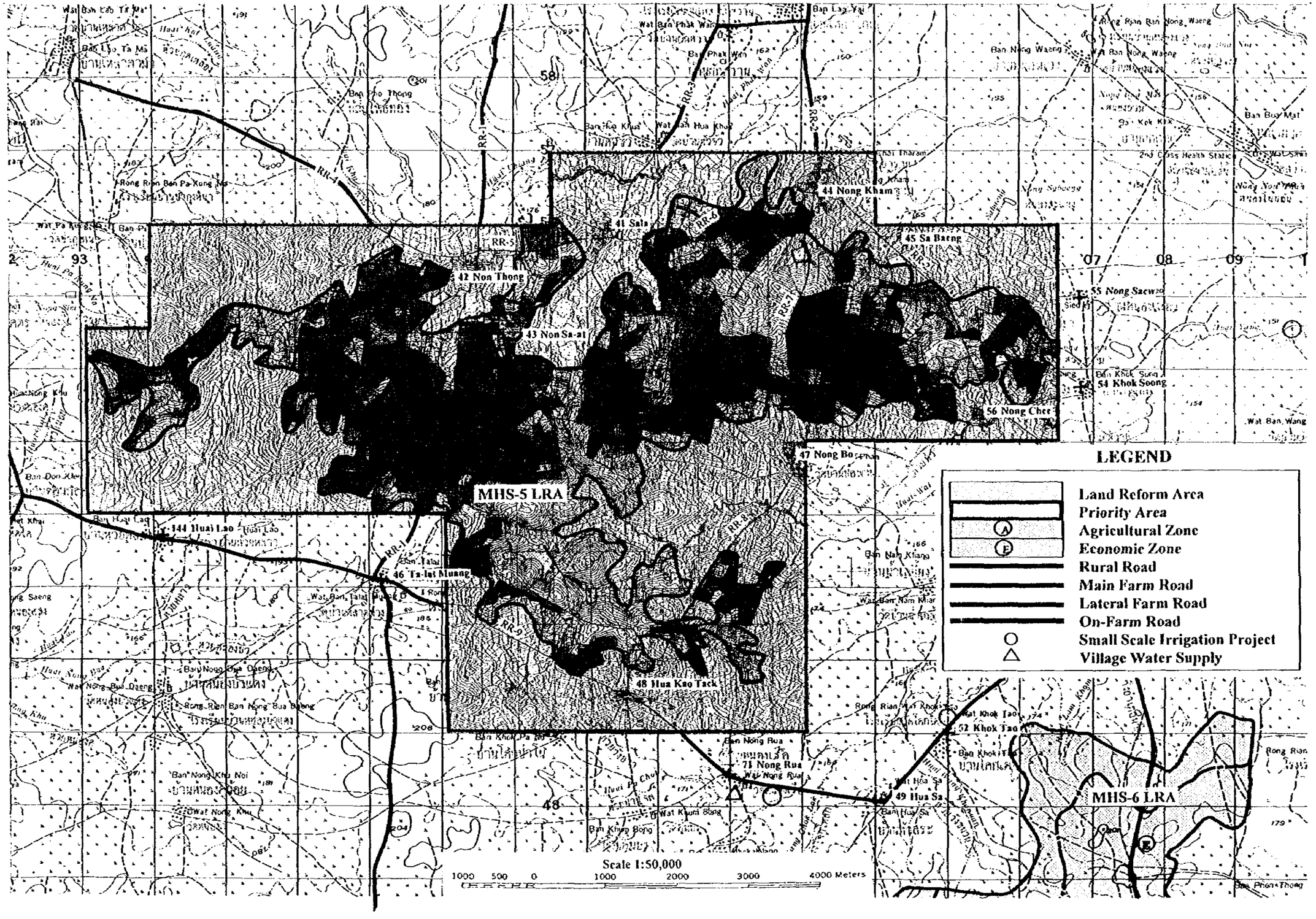

Figure 7.1-2.2 Location Map of Cadastral Blocks and Farming Type Classification of Mahasarakham Priority Area

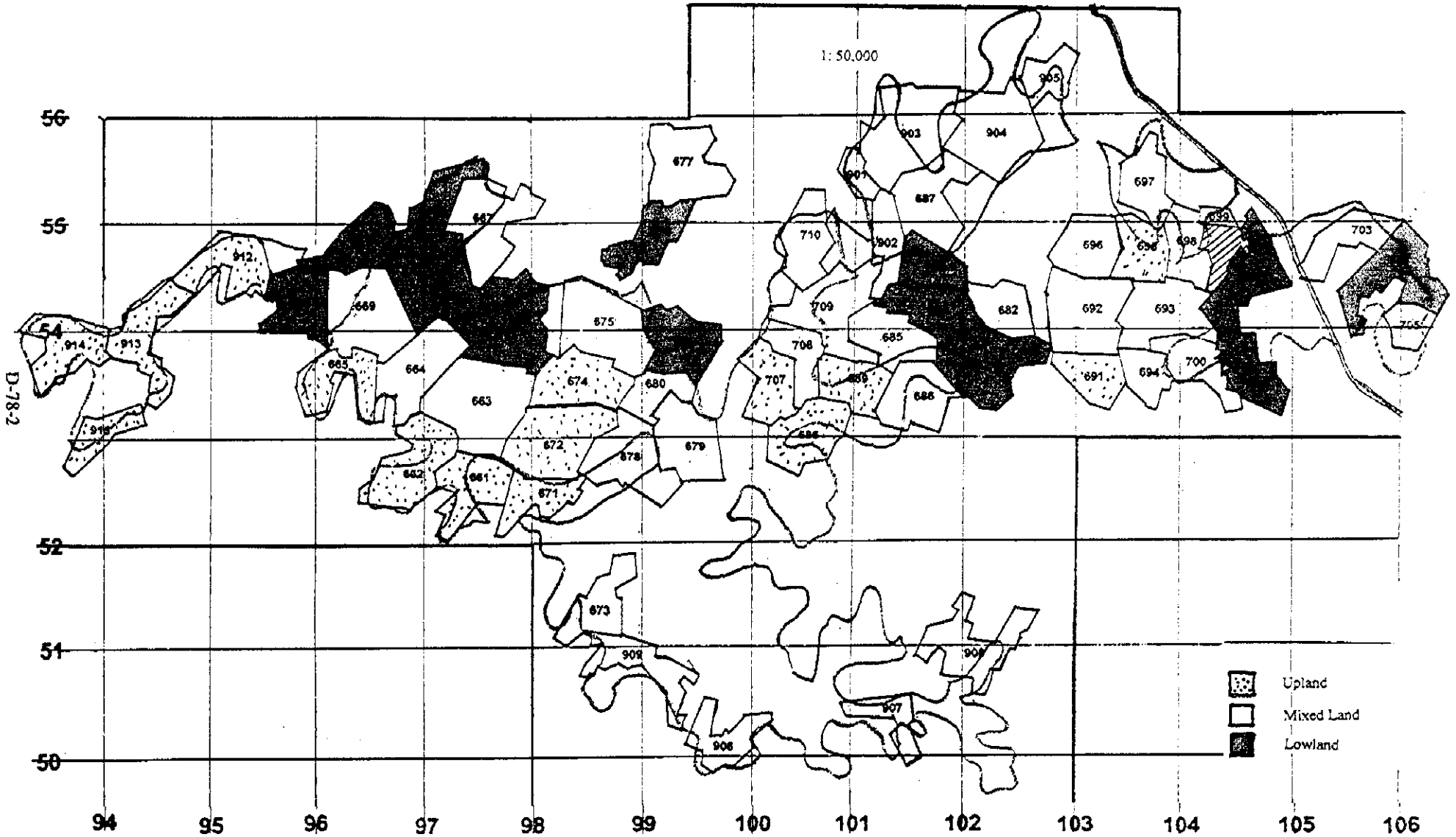

Figure 7.1-2.2 Location Map of Cadastral Blocks and Farming Type Classification of Mahasarakham Priority Area

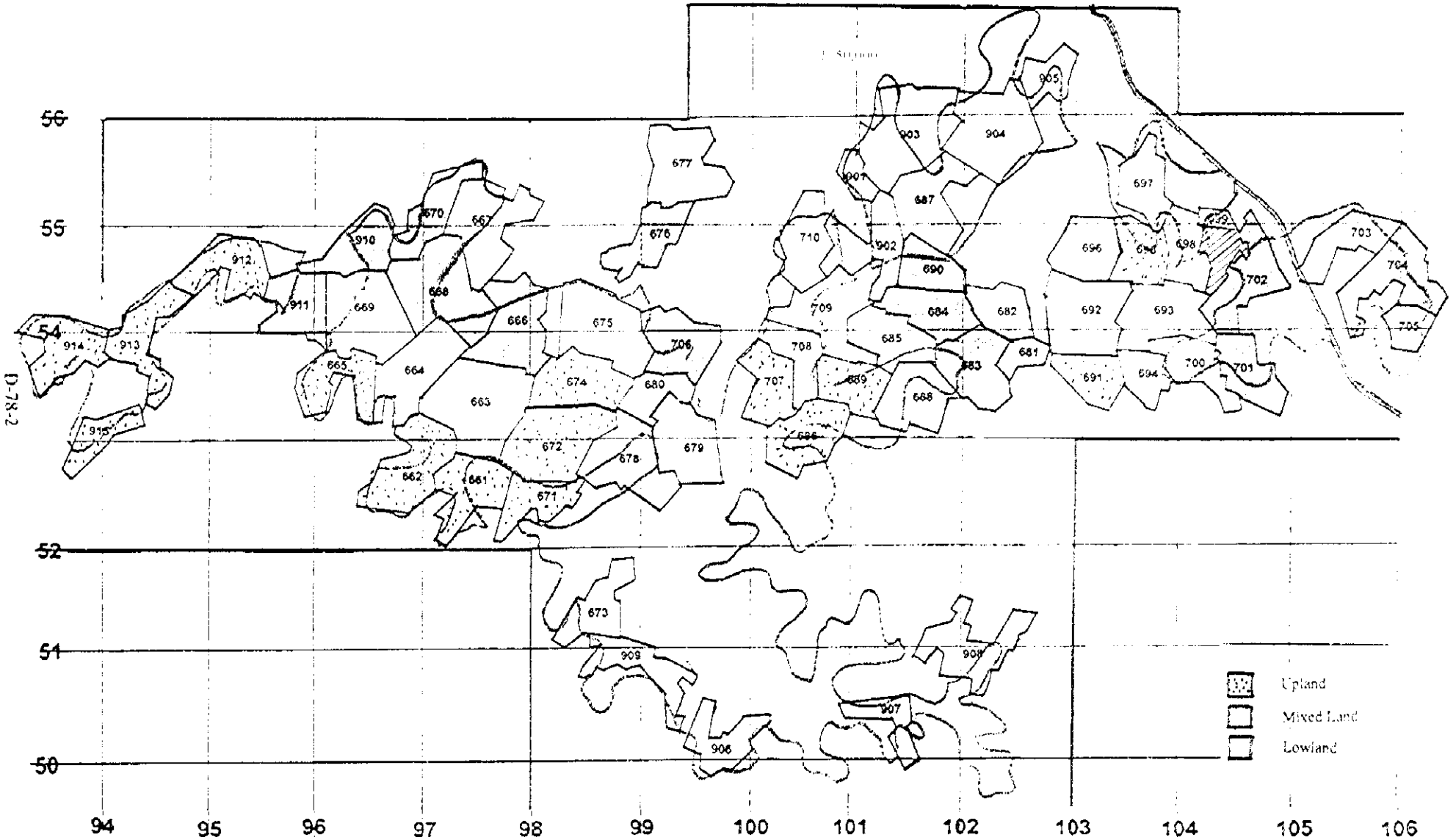

Figure 7.1-3.1 Project Location Map of Sakon Nakhon Priority Area

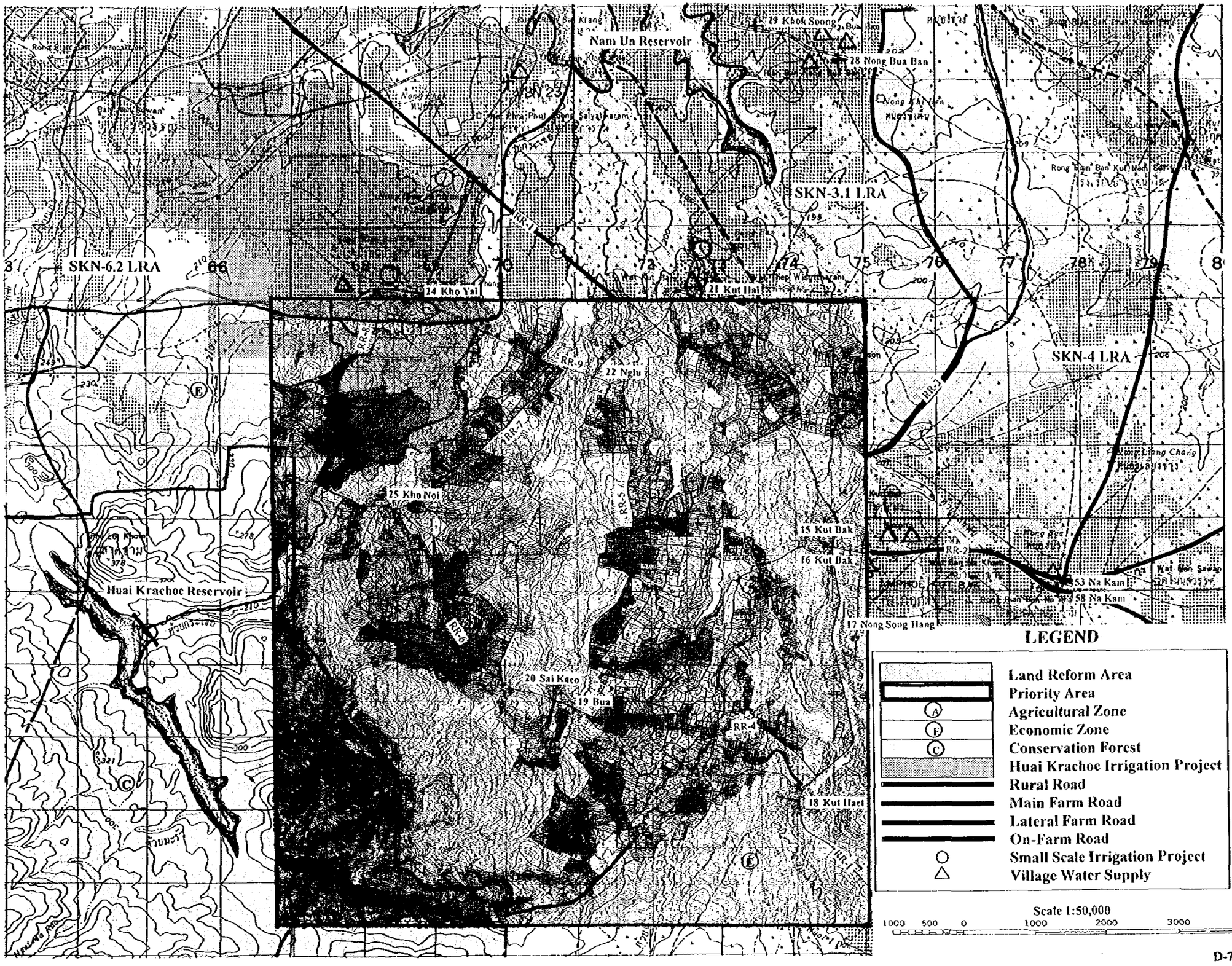

Figure 7.1-3.2 Location Map of Cadastral Blocks and Farming Type Classification of Sakon Nakhon Priority Area

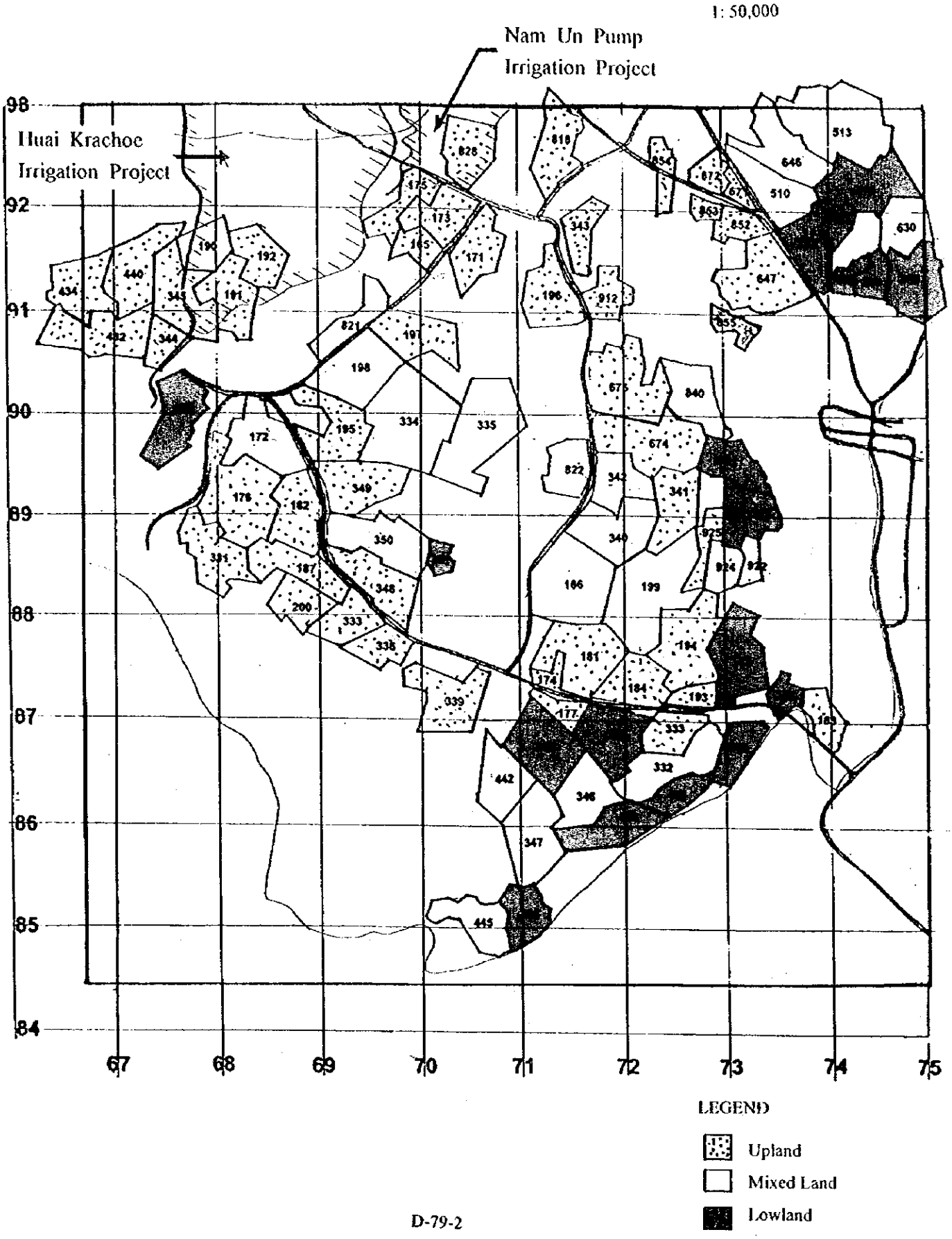

Figure 7.1-3.2 Location Map of Cadastral Blocks and Farming Type Classification of Sakon Nakhon Priority Area

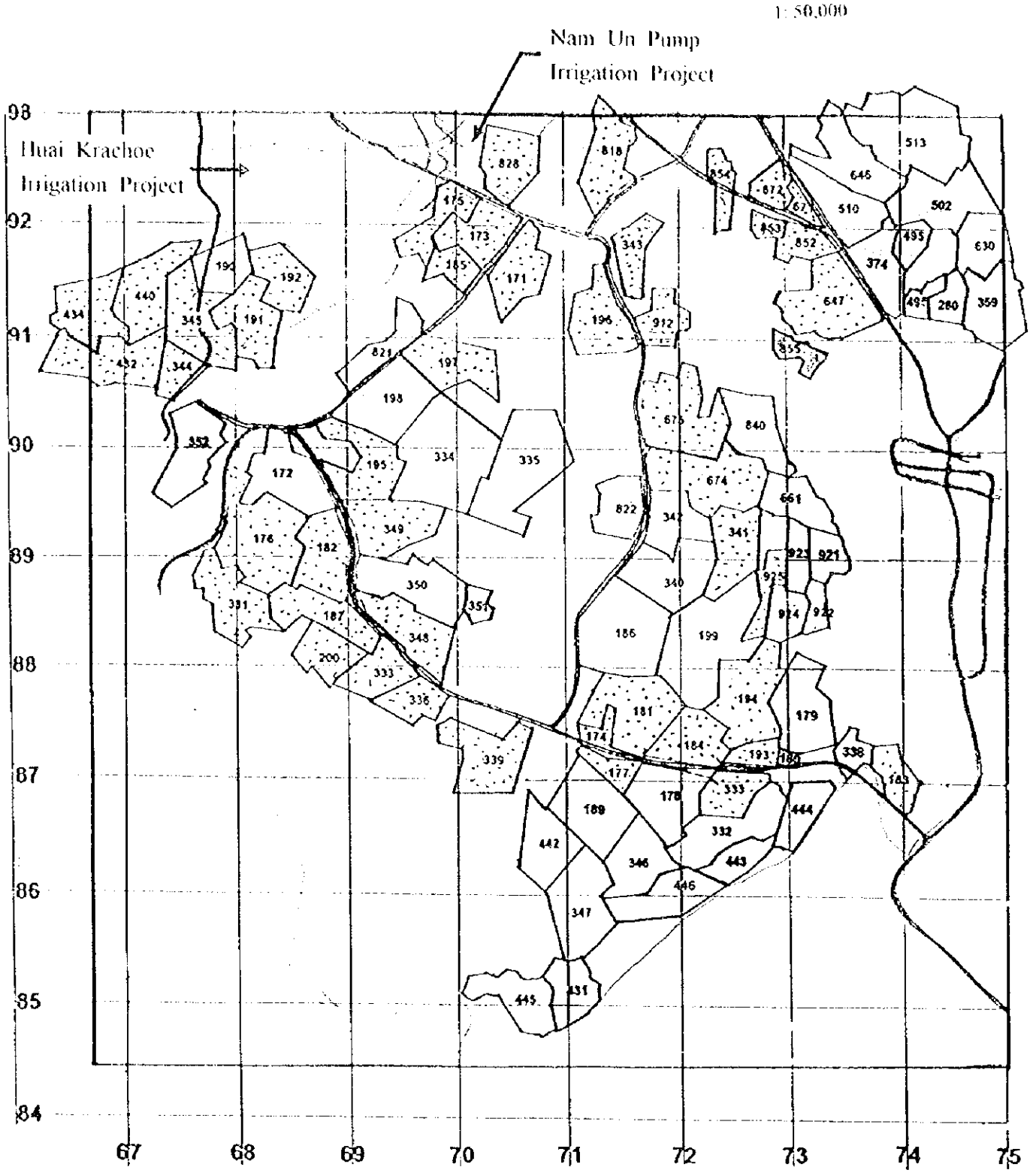

Figure 7.1-4.1 Project Location Map of Mukdahan Priority Area

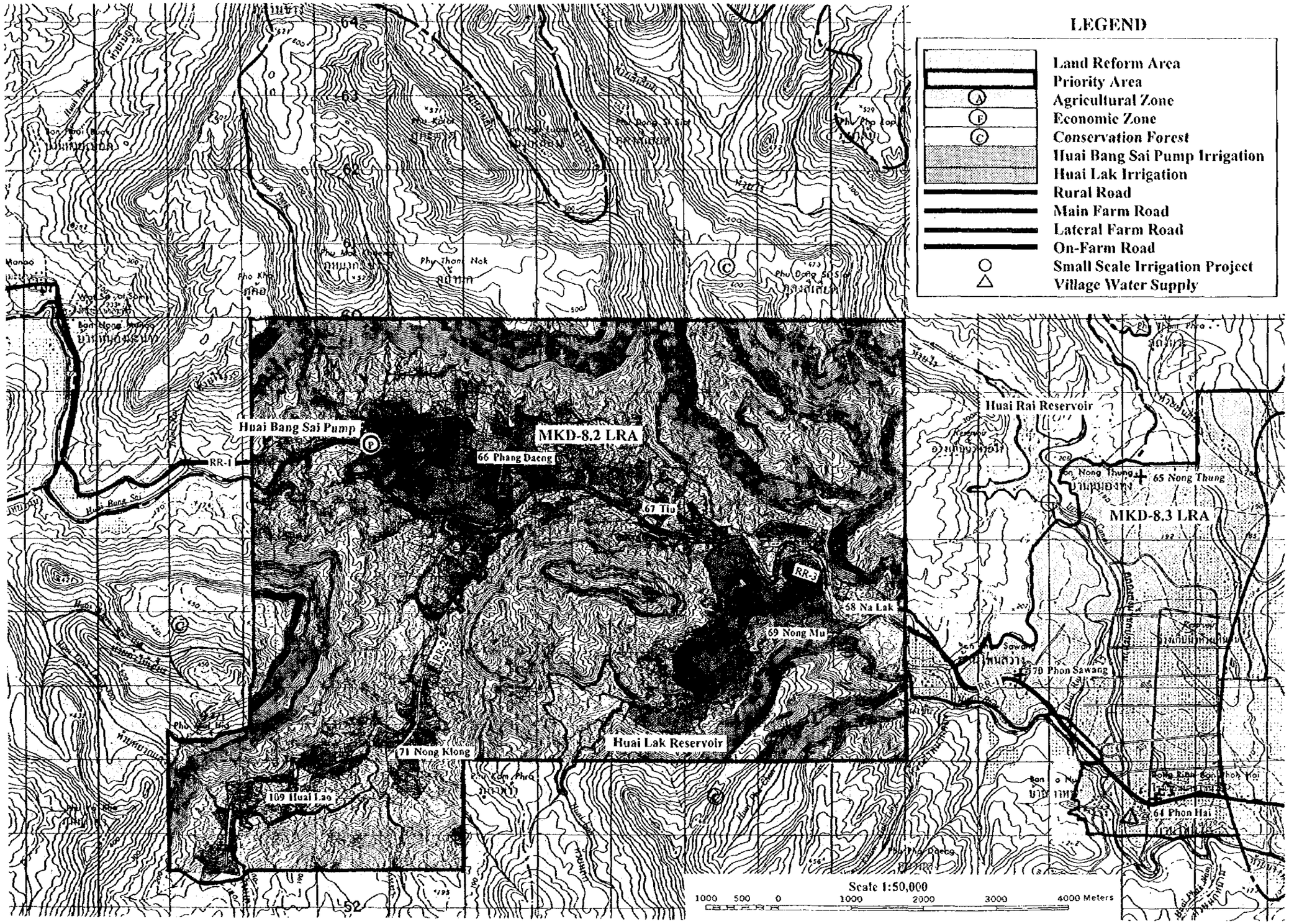

Figure 7.1-4.2 Location Map of Cadastral Blocks and Farming Type Classification of Mukdahan Priority Area

1: 50,000

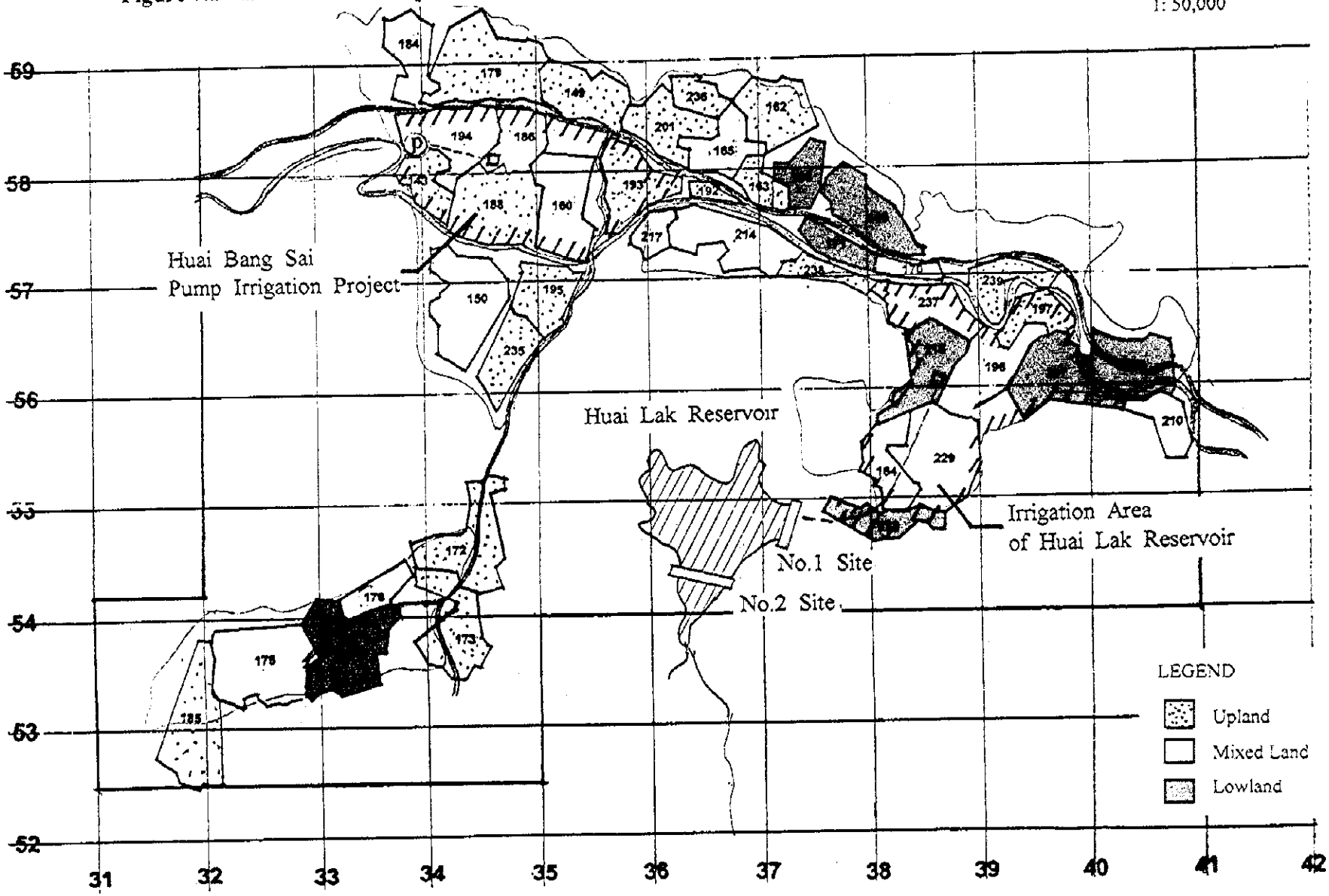

Figure 7.1-4.2 Location Map of Cadastral Blocks and Farming Type Classification of Mukdahan Priority Area

1 : 50,000