THE KINGDOM OF THAILAND
MINISTRY OF AGRICULTURE AND COOPERATIVES
DEPARTMENT OF LAND DEVELOPMENT

THE MASTER PLAN STUDY
ON
THE INTEGRATED RURAL DEVELOPMENT
OF SALT-AFFECTED LAND IN NORTHEAST THAILAND

DATABASE MAPS AND DRAWINGS

OCTOBER 1991

JAPAN INTERNATIONAL COOPERATION AGENCY

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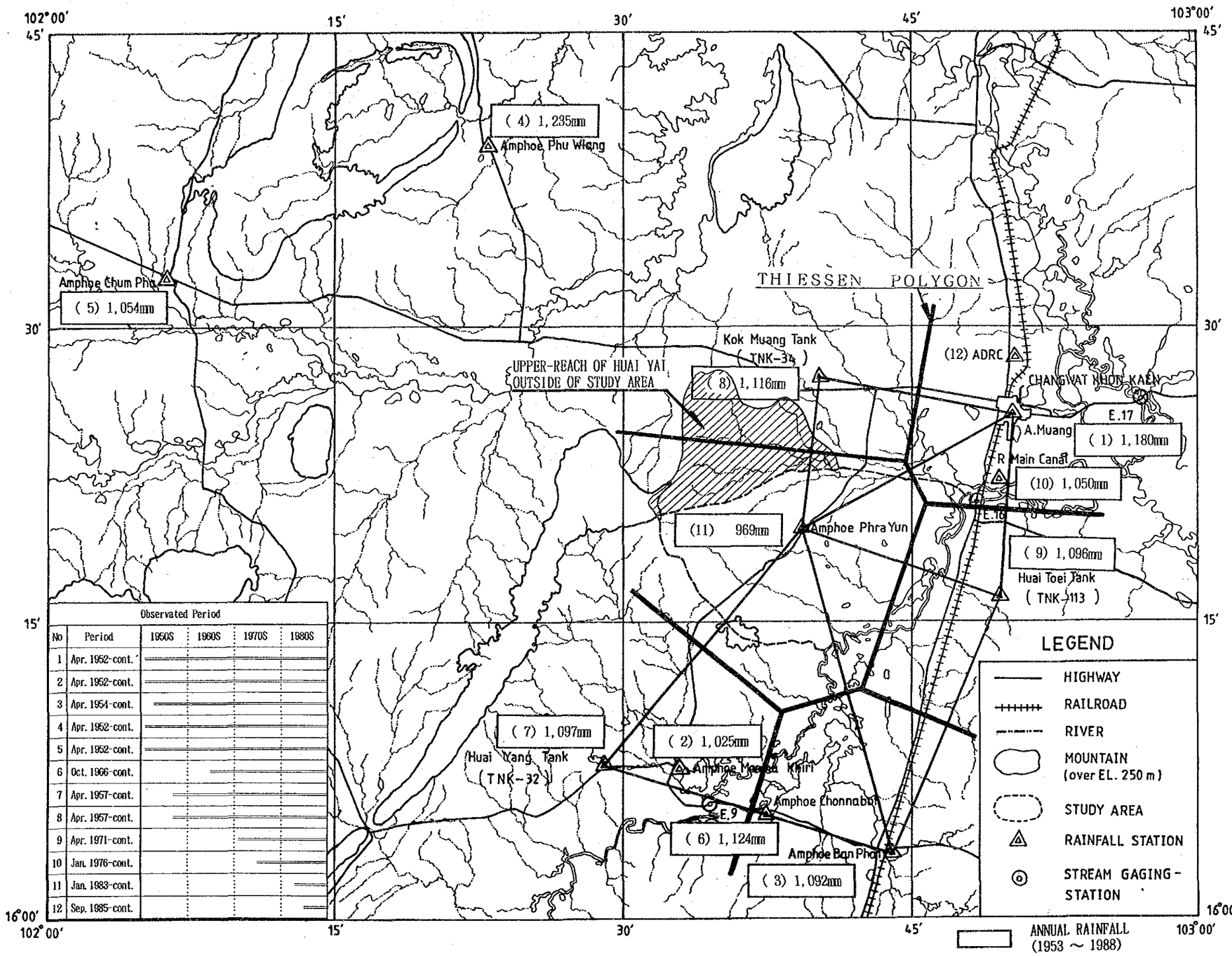
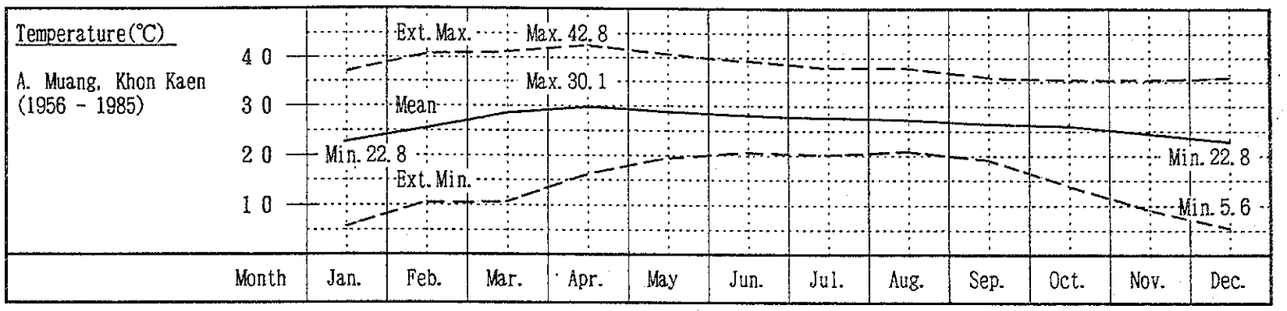
DATABASE MAPS

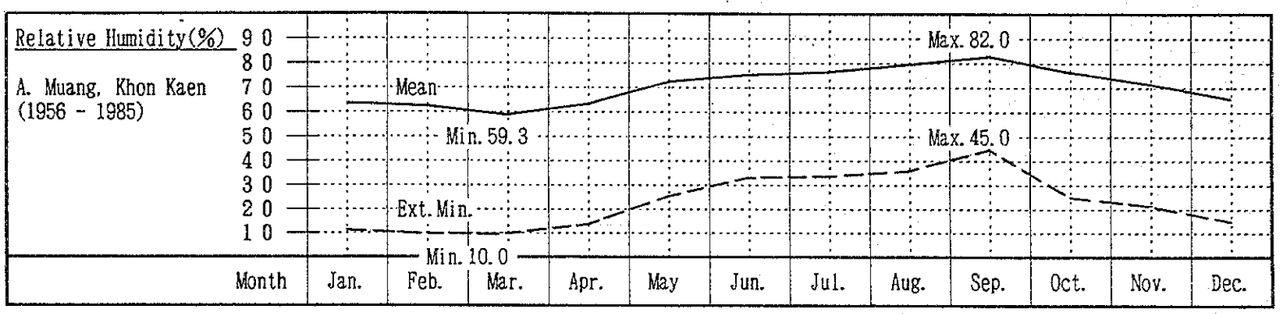
CONTENTS

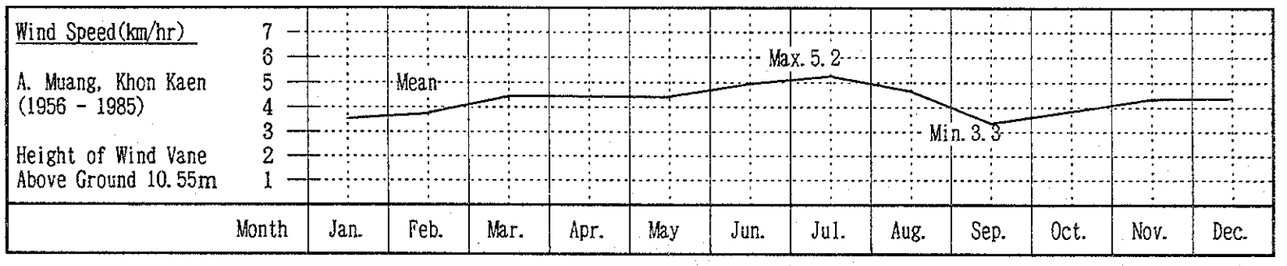
1. LOCATION OF RAINFALL STATIONS

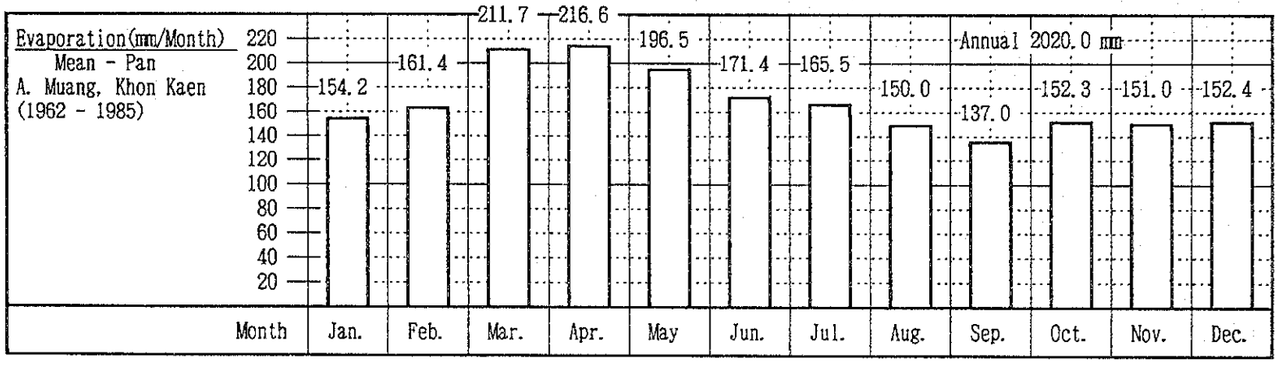


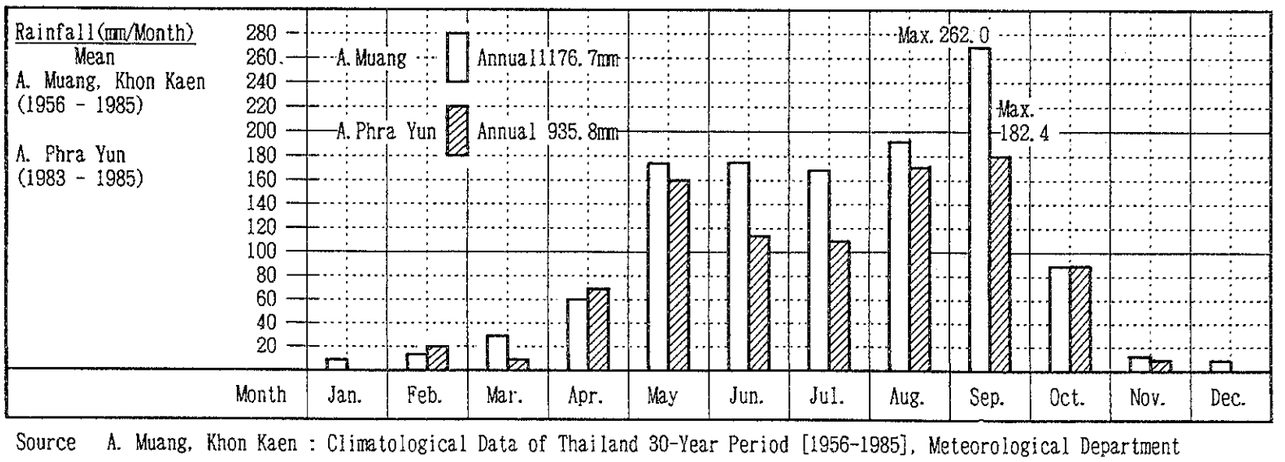
2. GENERAL CLIMATE FACTOR







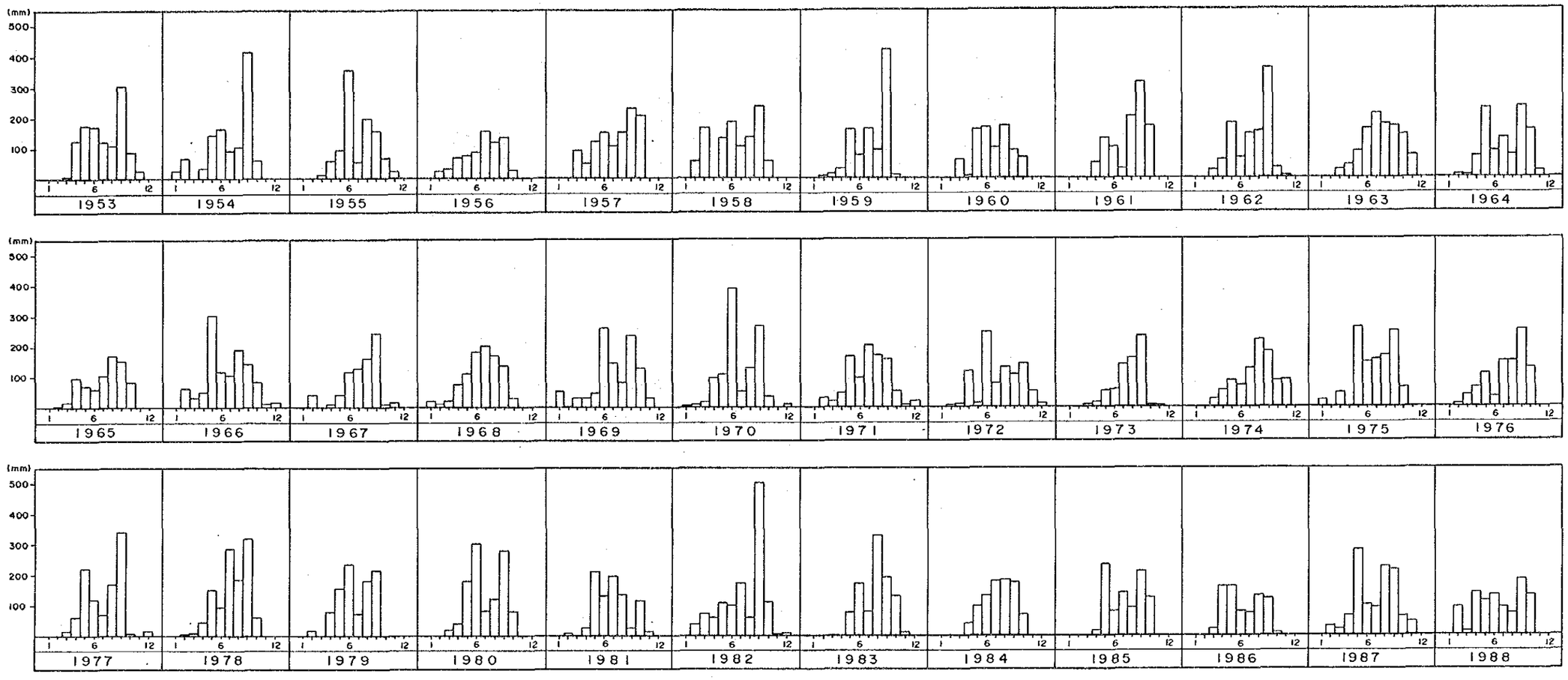


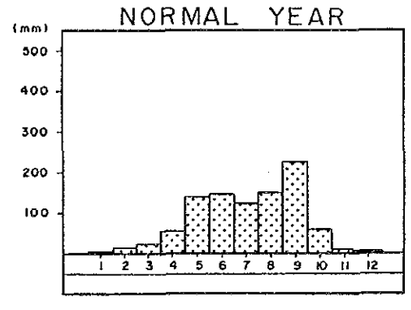


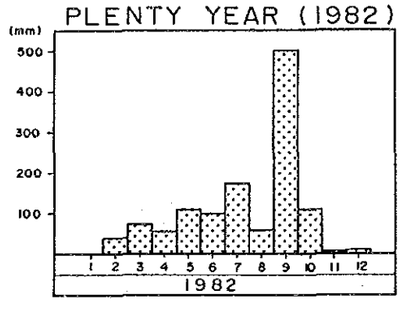
Source A. Muang, Khon Kaen : Climatological Data of Thailand 30-Year Period [1956-1985], Meteorological Department

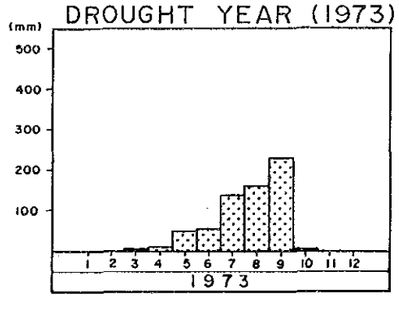
A. Phra Yun : A. Phra Yun Agricultural Extension Office

3. RAINFALL CHARACTER







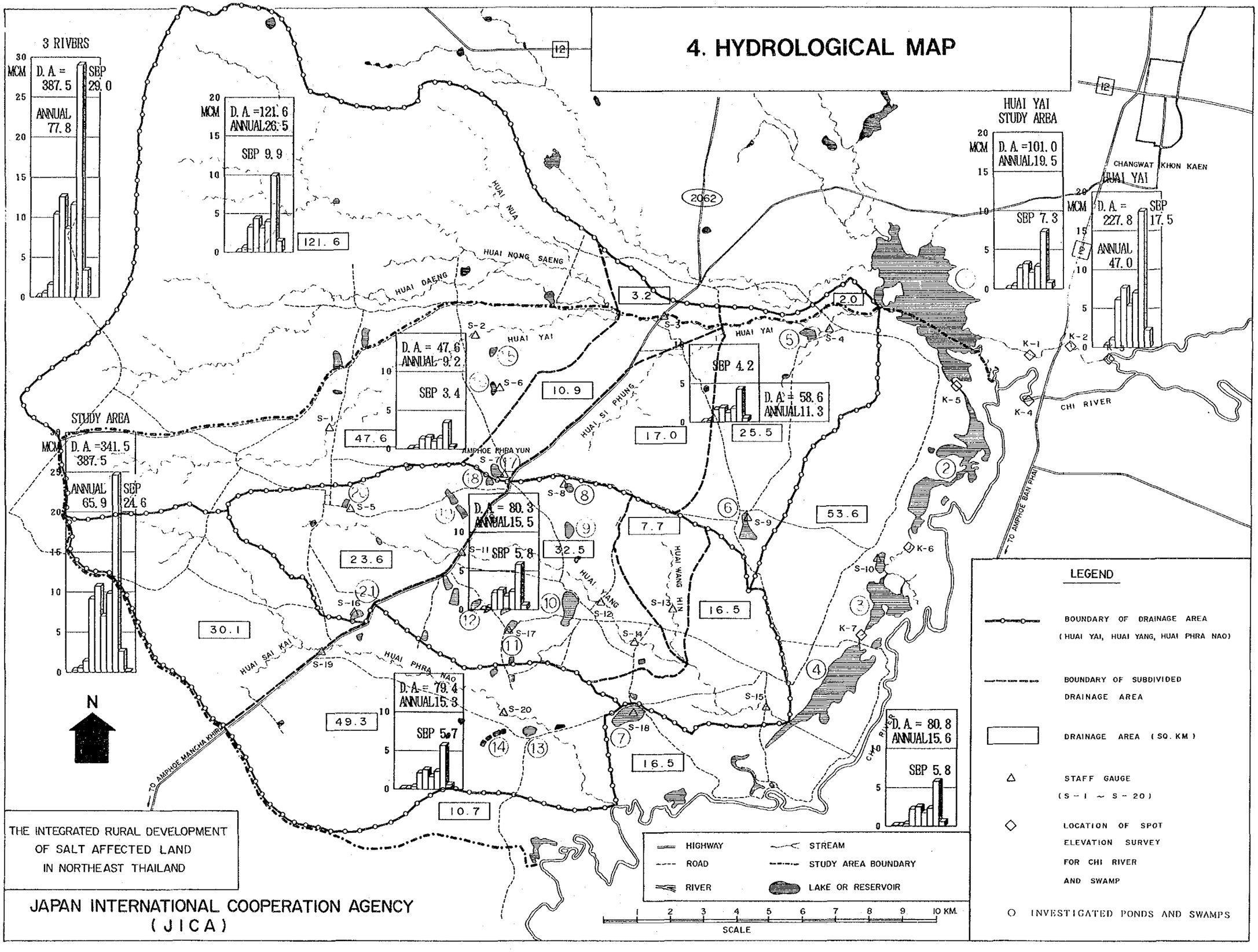


STATION : A. PHRA YUN

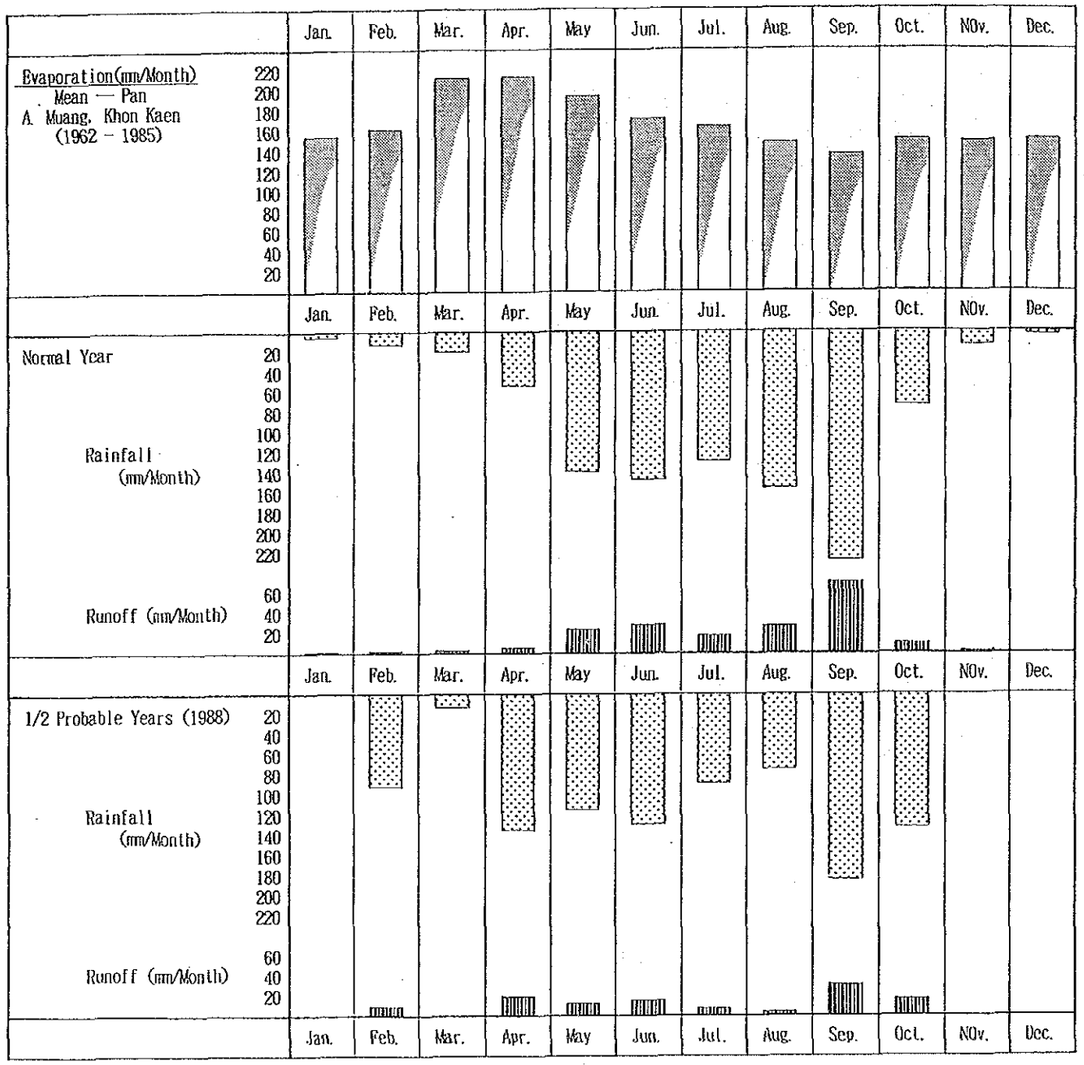
1953 – 1982 : COMPLEMENTED RAINFALL

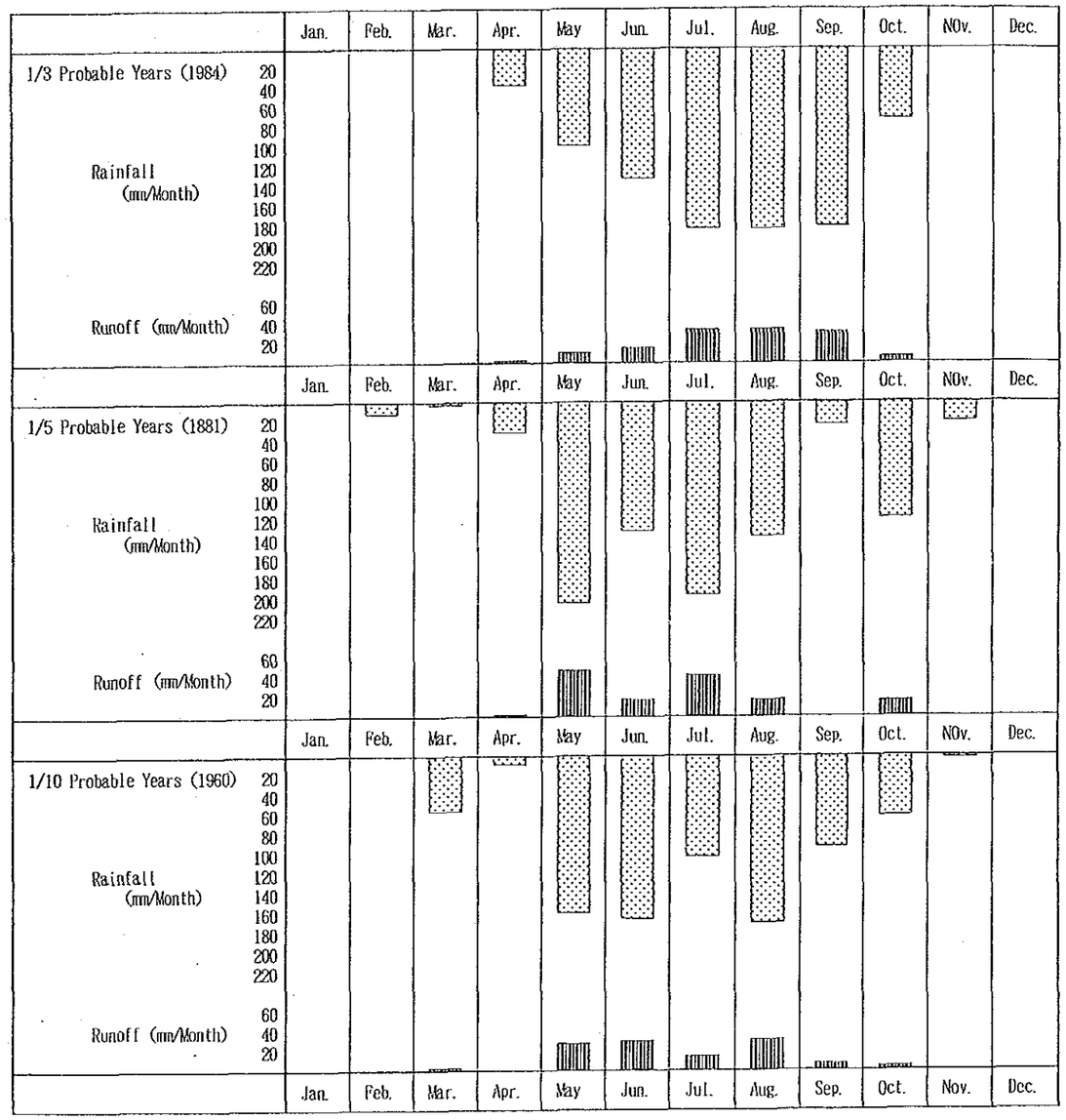
1983 – 1988 : OBSERVATED RAINFALL

4. HYDROLOGICAL MAP

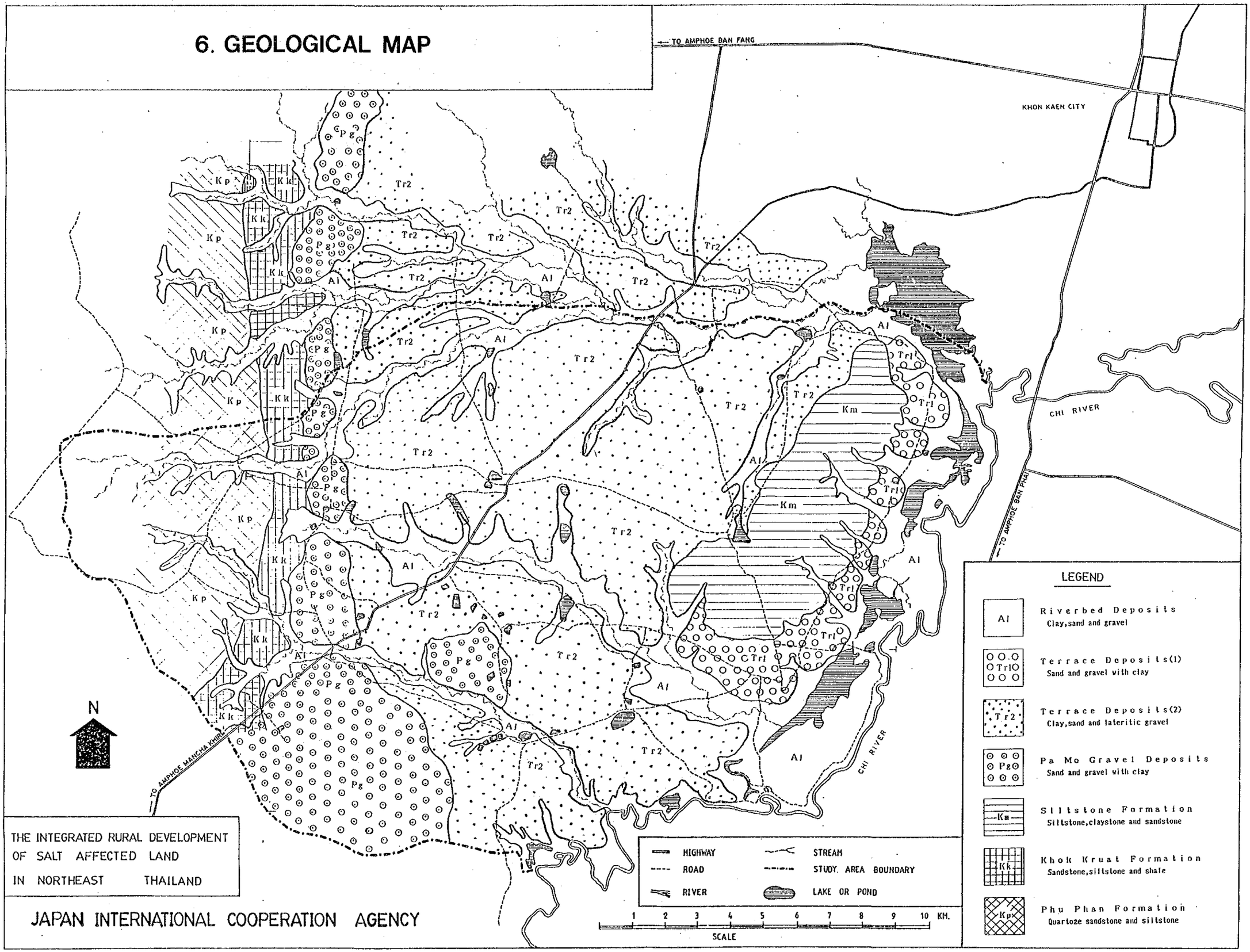


5. RUNOFF DISCHARGE CHARACTER

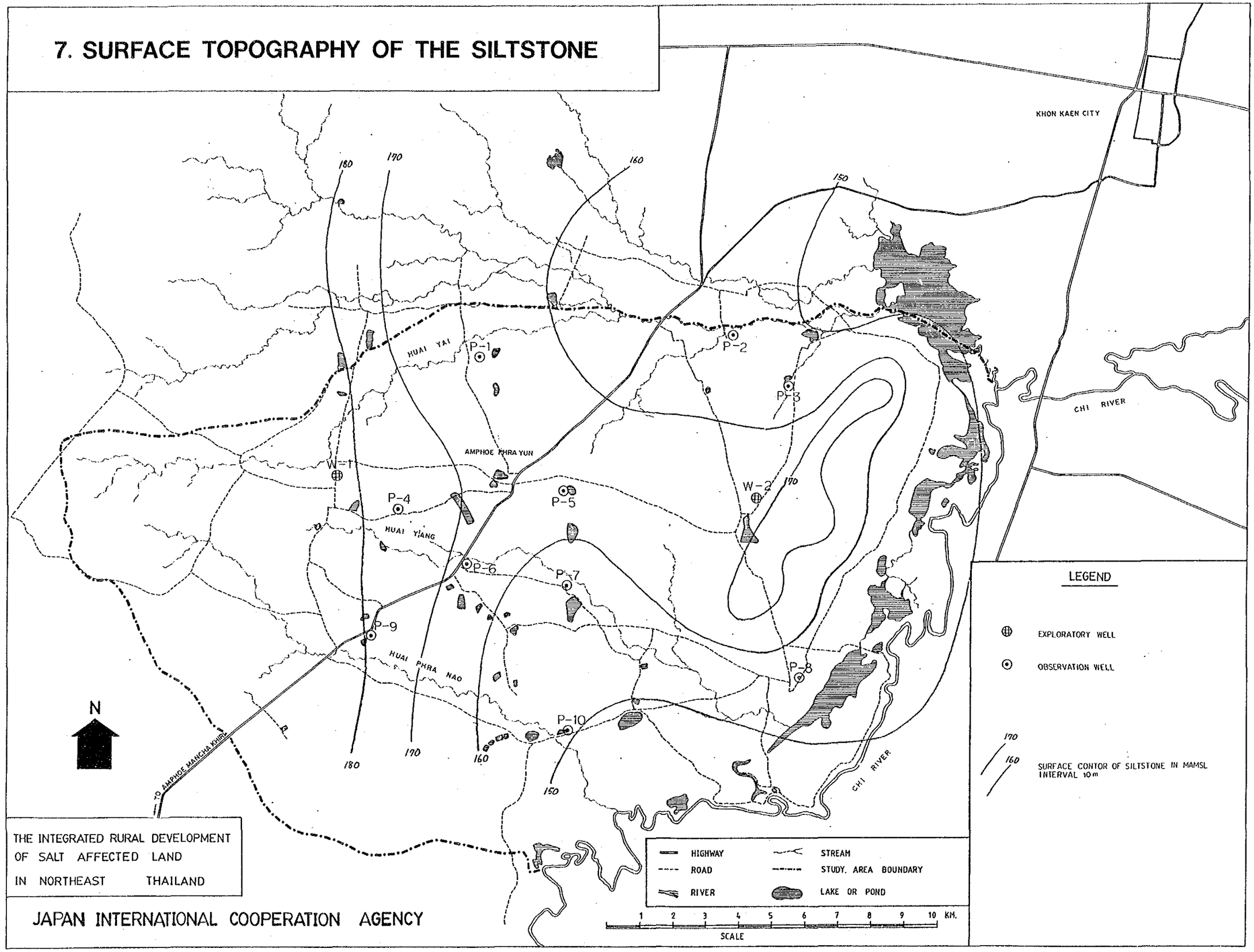




6. GEOLOGICAL MAP



7. SURFACE TOPOGRAPHY OF THE SILTSTONE



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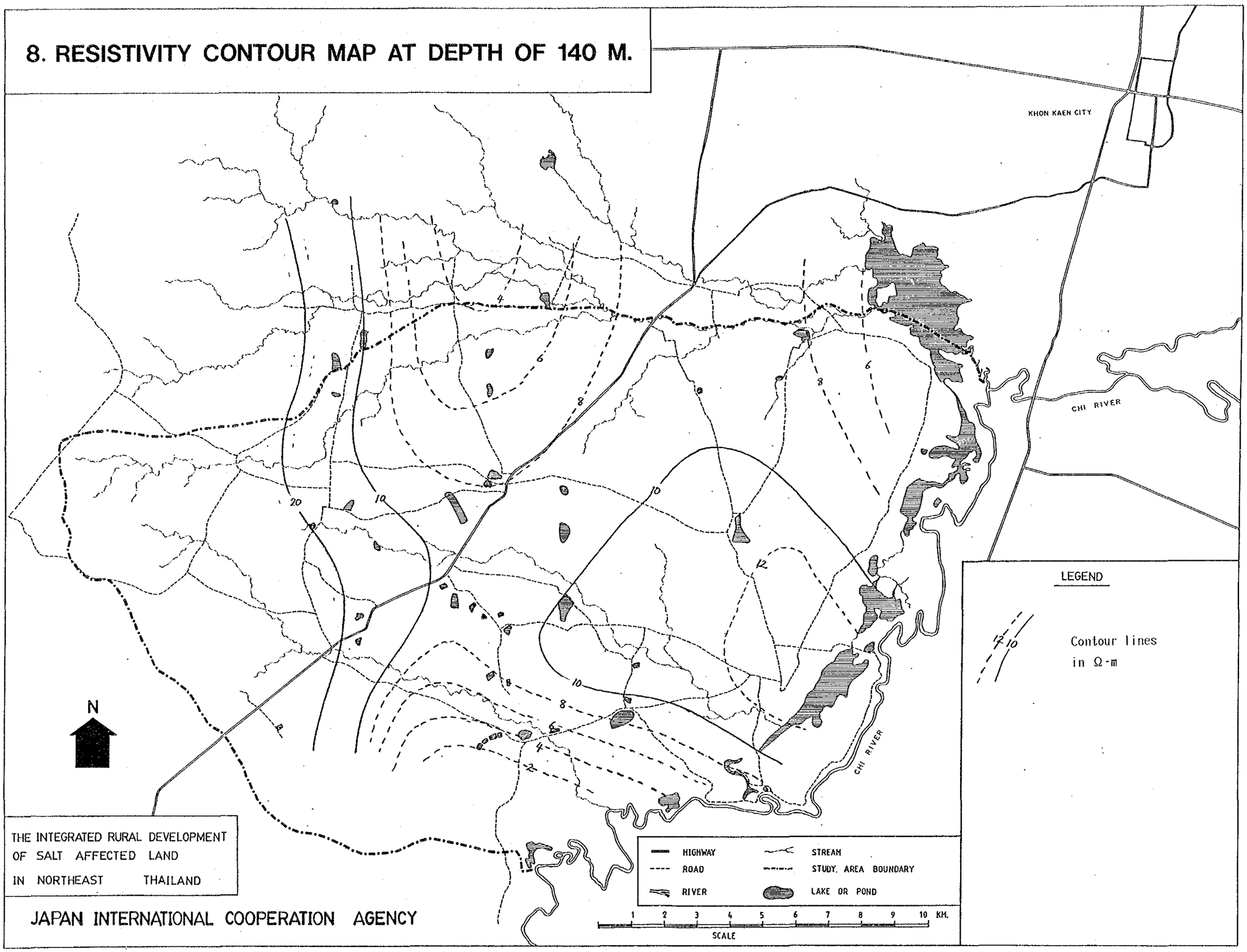
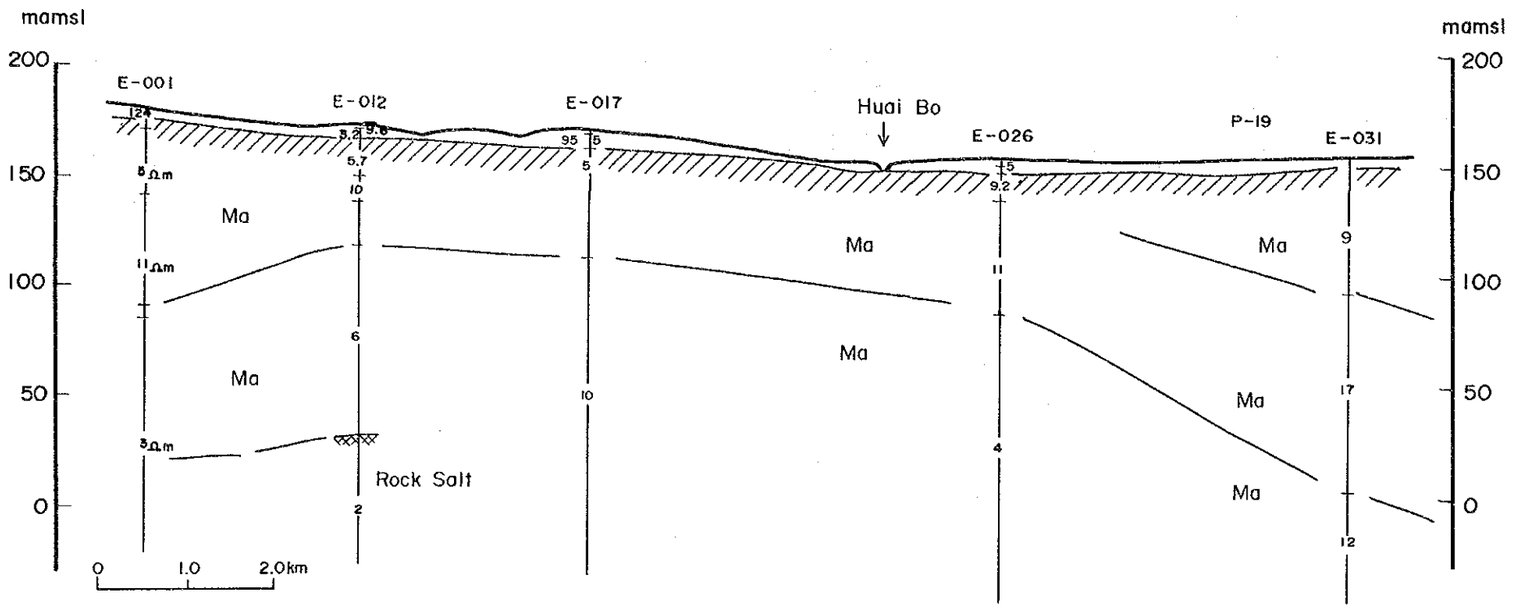
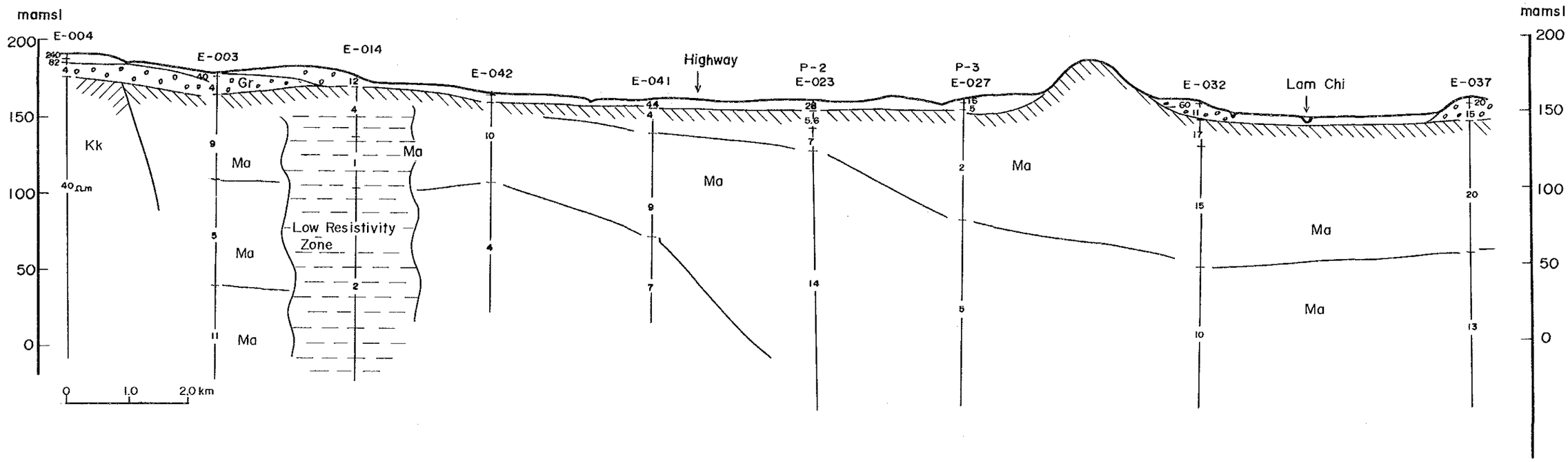
8. RESISTIVITY CONTOUR MAP AT DEPTH OF 140 M.



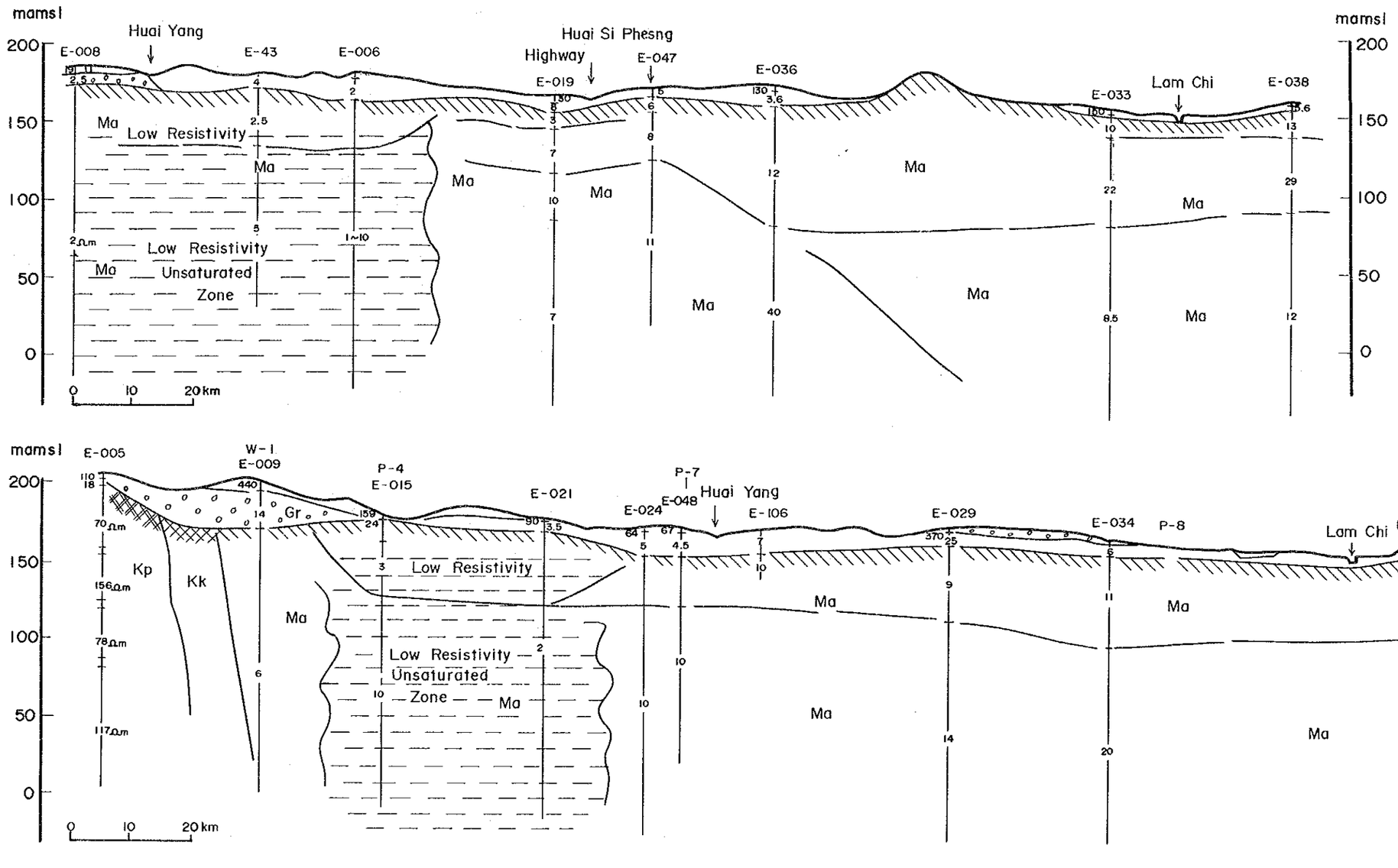
9. RESISTIVITY PROFILES (1), (2), (3)

(1)

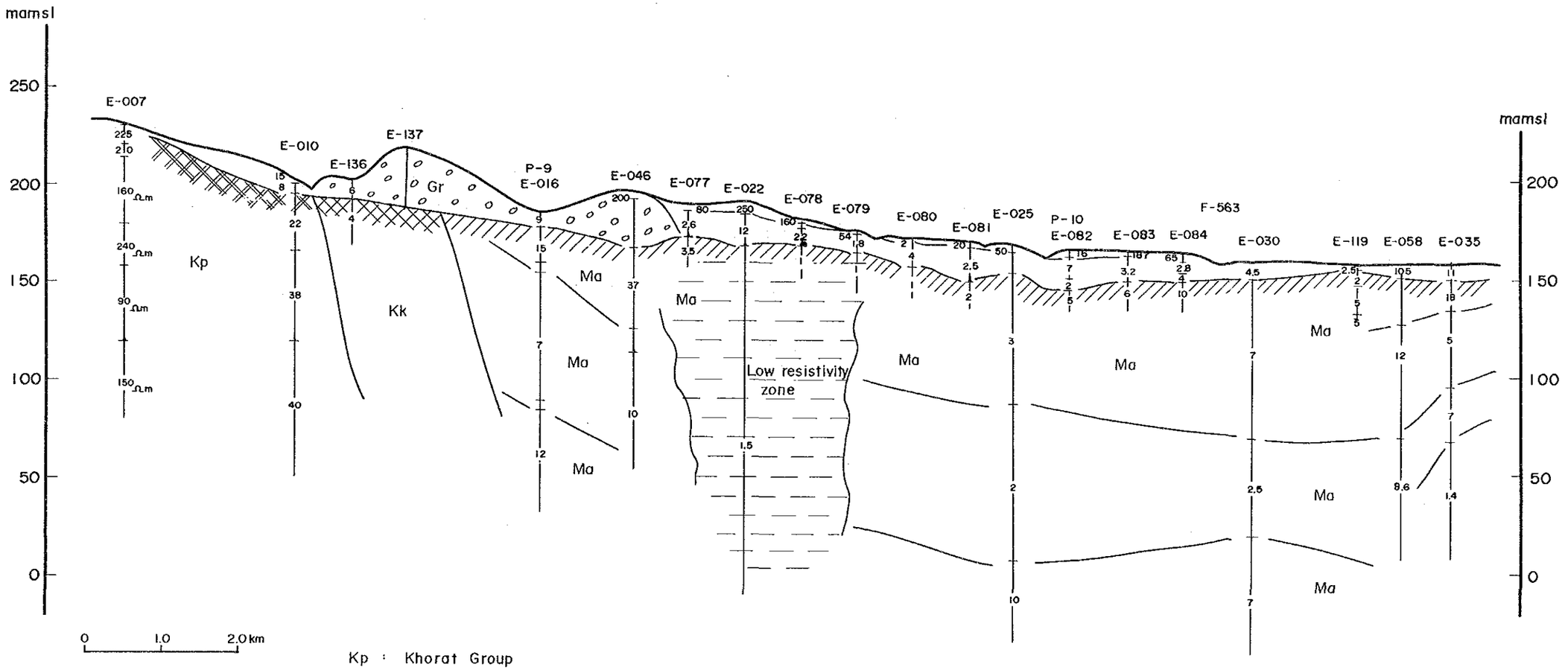




(2)


mamsl
200
150
100
50
0
E-008
Huai Yang
E-43
E-006
Huai Si Phesng
Highway
E-019
E-047
E-036
E-033
Lam Chi
E-038
Ma
Low Resistivity
Unsaturated
Zone
2Ω.m
1~10
0 10 20km
E-005
W-1
E-009
P-4
E-015
E-021
P-7
E-048
E-024
Huai Yang
E-106
E-029
E-034
P-8
Lam Chi
E-039
Gr
Kp
Kk
70Ω.m
156Ω.m
78Ω.m
117Ω.m

(3)

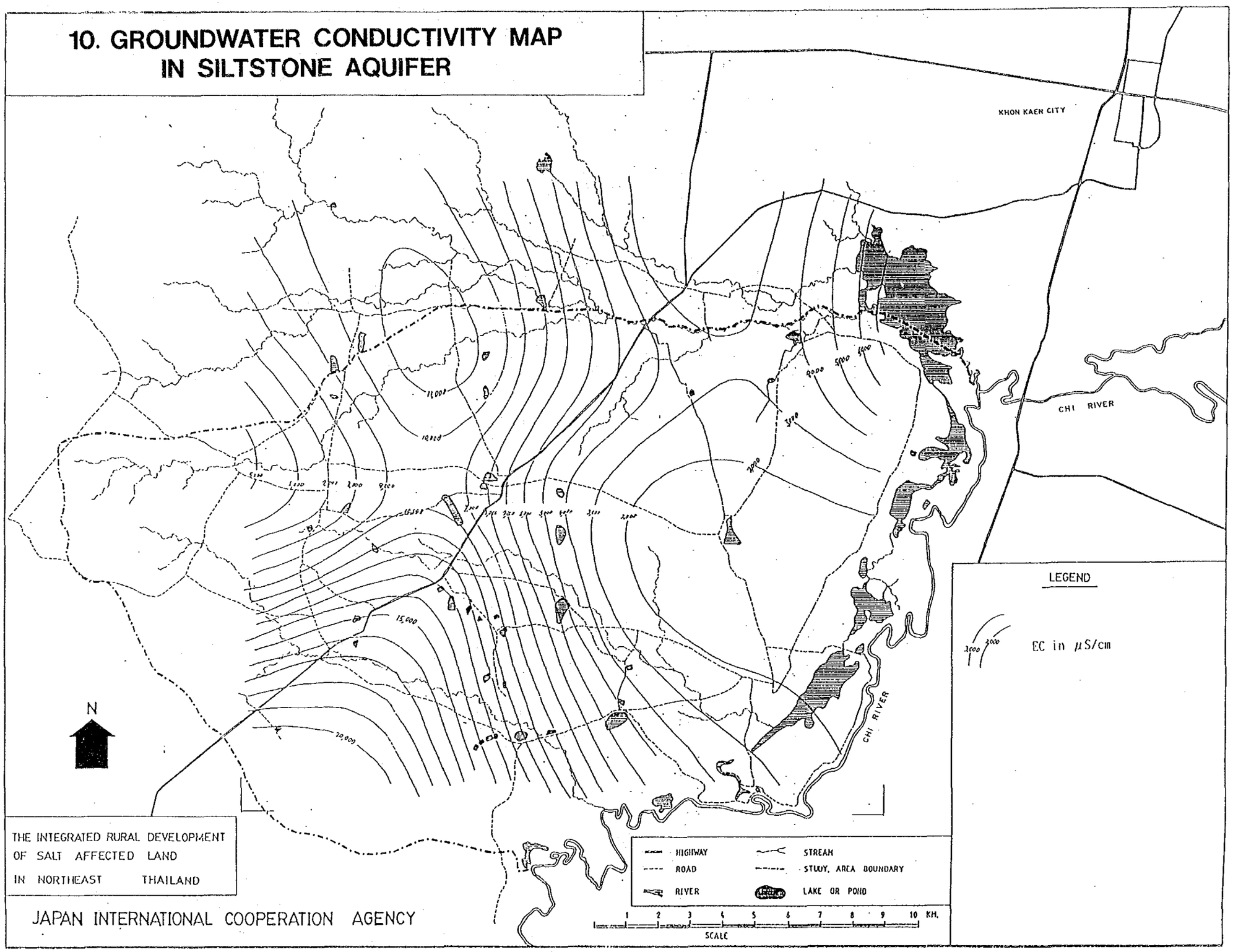


Kp : Khorat Group

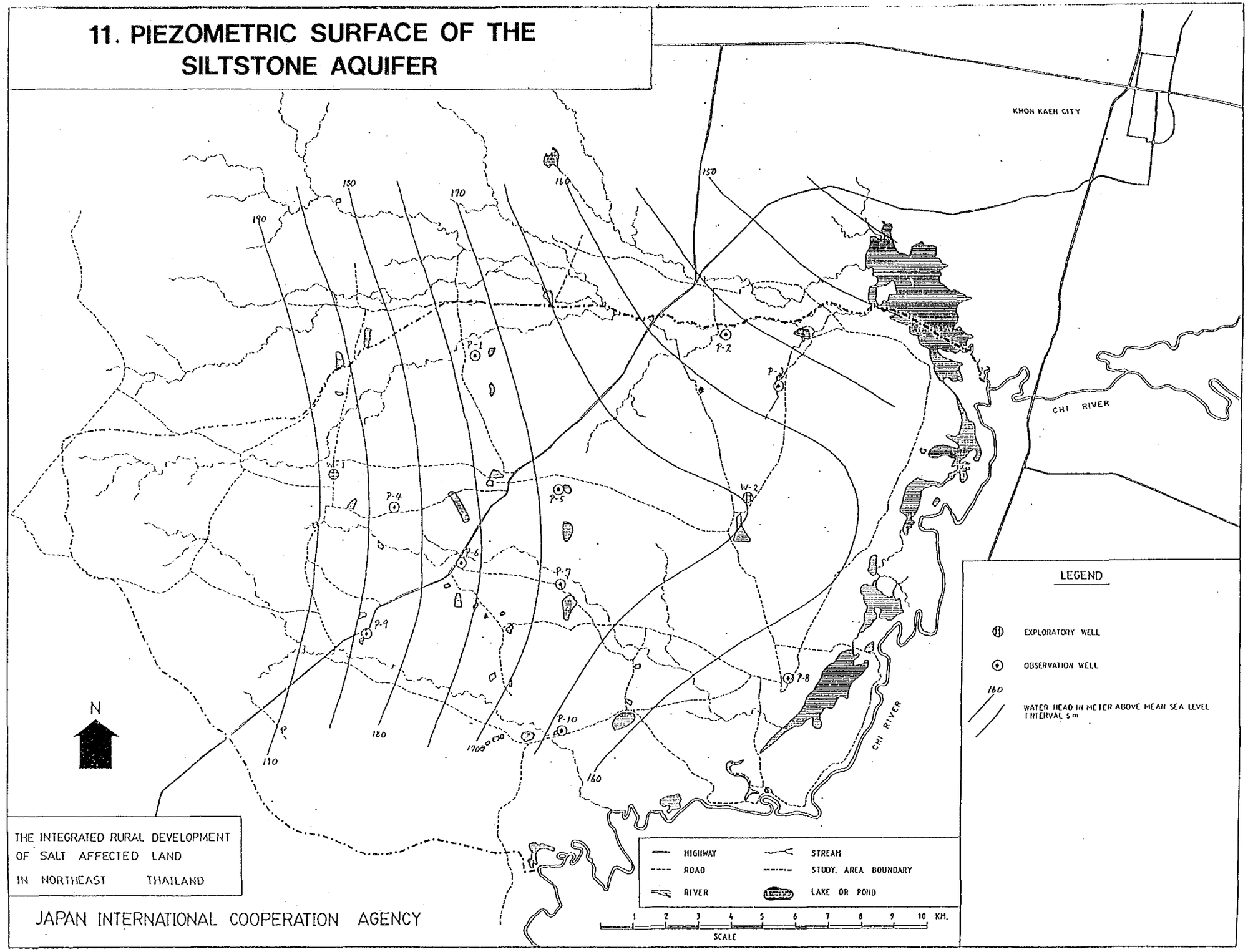
Kk : Khok Kruat Formation

Ma : Siltstone Formation

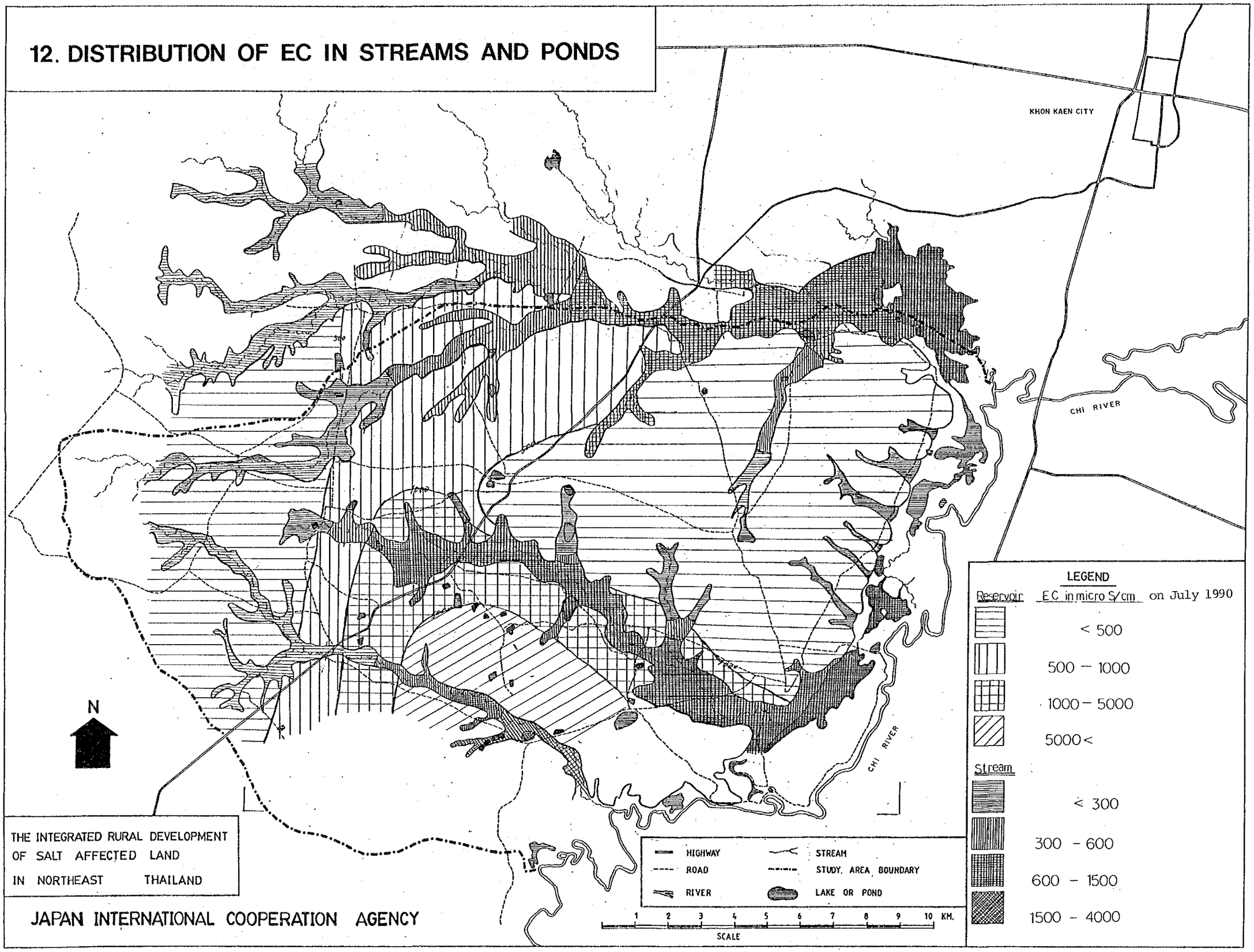
10. GROUNDWATER CONDUCTIVITY MAP IN SILTSTONE AQUIFER



11. PIEZOMETRIC SURFACE OF THE SILTSTONE AQUIFER



12. DISTRIBUTION OF EC IN STREAMS AND PONDS



13. HYDROGEOLOGICAL MAP OF THE PILOT AREA

LEGEND

- Alluvial Deposit (Al)
- Lower Terrace Deposits (TL)
- Upper Terrace Deposits (TU)
- Pa Mo Gravel Bed (Pg)
- W-1 Exploratory Well
- P-5 Observation Well
- Formation Boundary
- EC break of Pond Quality
- 160 Groundwater Contour Lines Upper Terrace Deposits in mamsl
- (10,000) EC Contour Lines in Siltstone Aquifer in μS/cm
- (1800) EC in Pond Water in μS/cm

----- Expected Well Yield -----

< Quaternary Aquifer >

20/48
5

<Siltstone Aquifer > Well Depth (m) / Yield(m³/day) / Drawdown (m)

(20/12/5)

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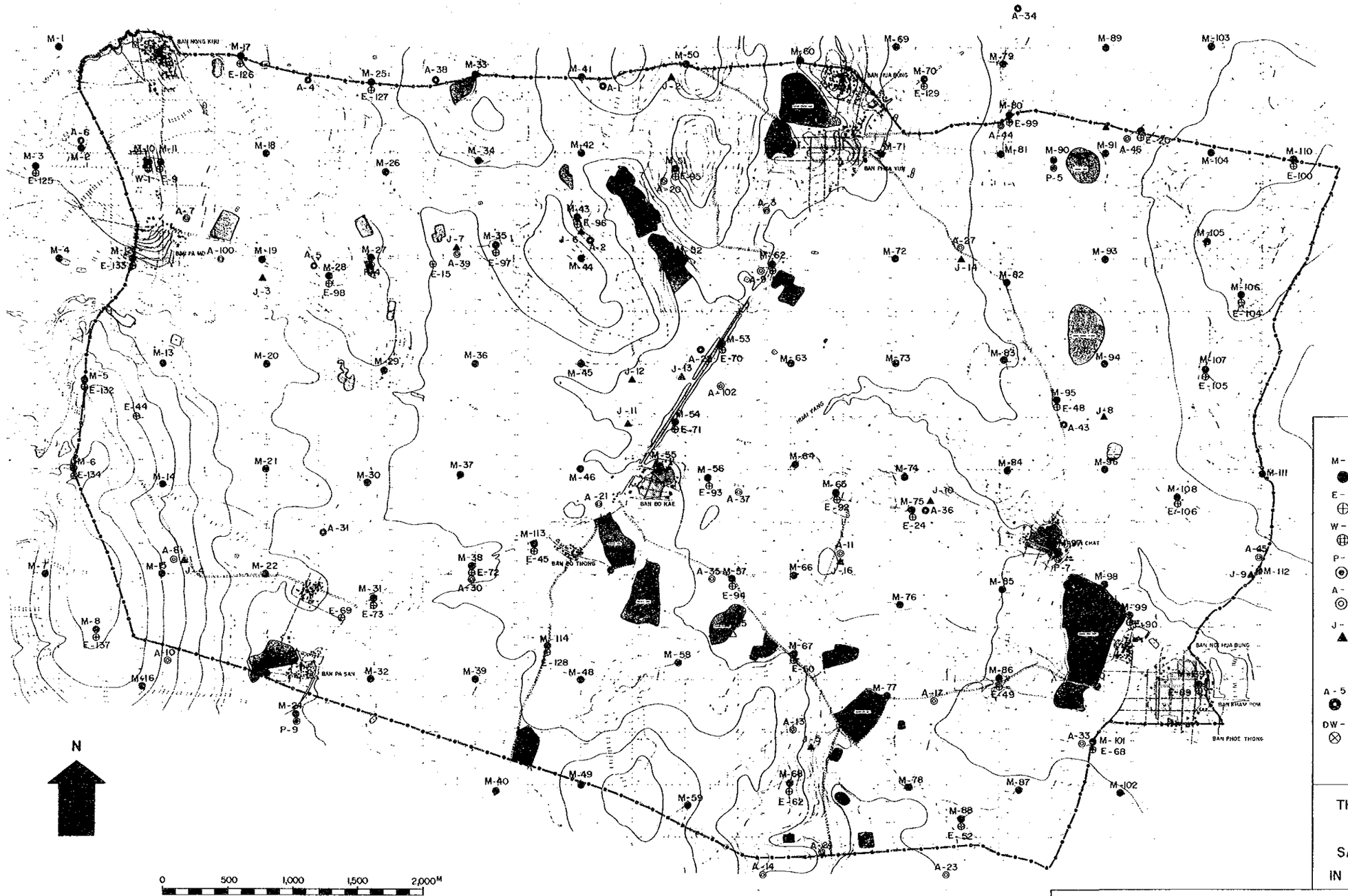
14. LOCATION MAP OF HYDROGEOLOGICAL SURVEY IN THE PILOT AREA



LEGEND

- M-1 ● EM SURVEY
- E-1 ⊕ GEO-RESISTIVITY SURVEY
- W-1 ⊕ EXPLORATORY WELL
- P-1 ⊙ OBSERVATION WELL
- A-1 ◎ PIEZOMETER
- J-1 ▲ SOIL ANALYSES
- A-5 ◎ PERMEABILITY TEST
- DW-1 ⊗ DUG WELL FOR AQUIFER TEST

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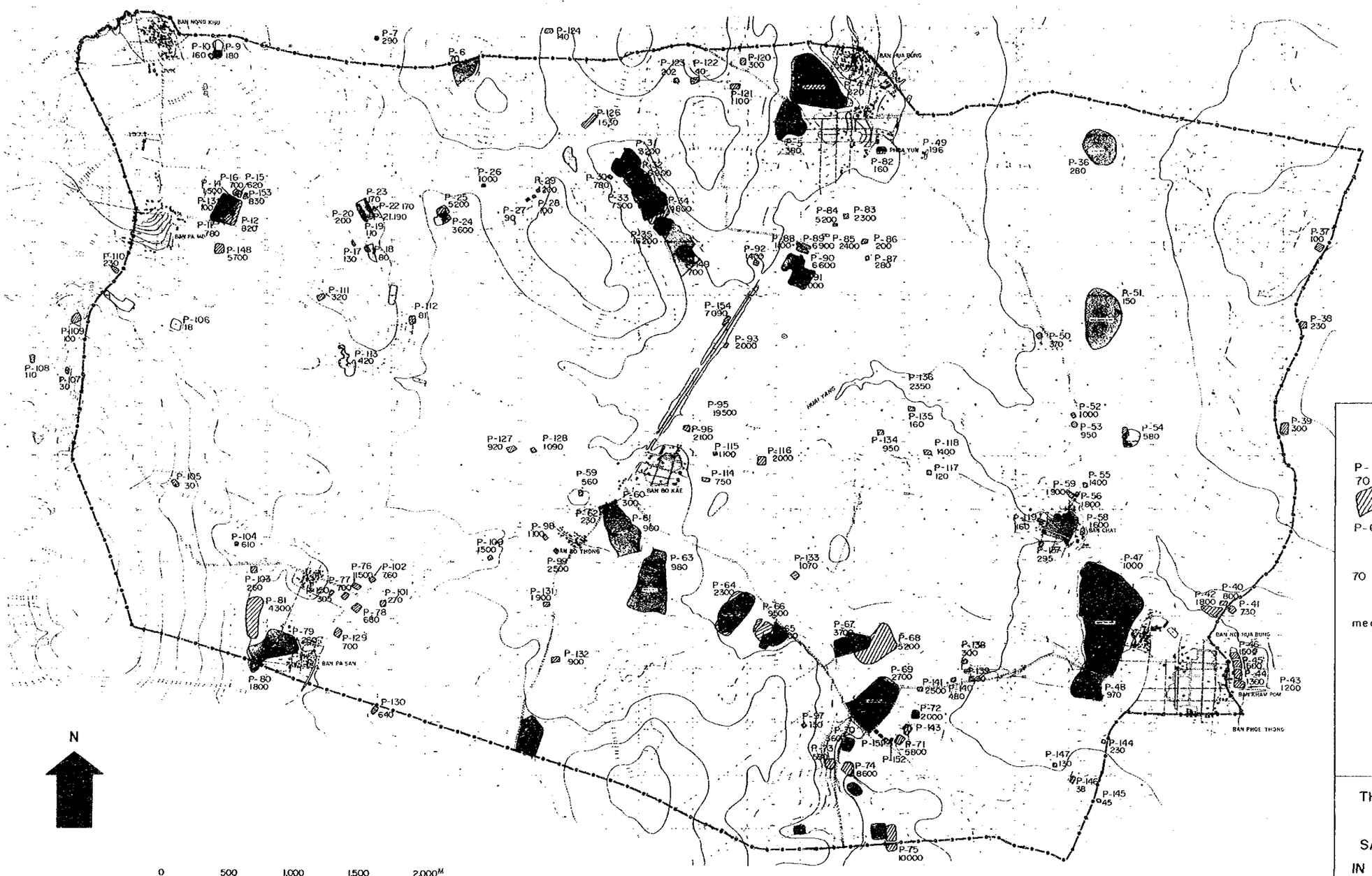
15. EC IN EXISTING PONDS IN THE PILOT AREA



LEGEND

P-6
70

P-6 : No. of pond

70 : Conductivity in μmho/cm

measured in Jan. 1990

THE INTEGRATED RURAL DEVELOPMENT OF SALT-AFFECTED LAND IN NORTHEAST THAILAND

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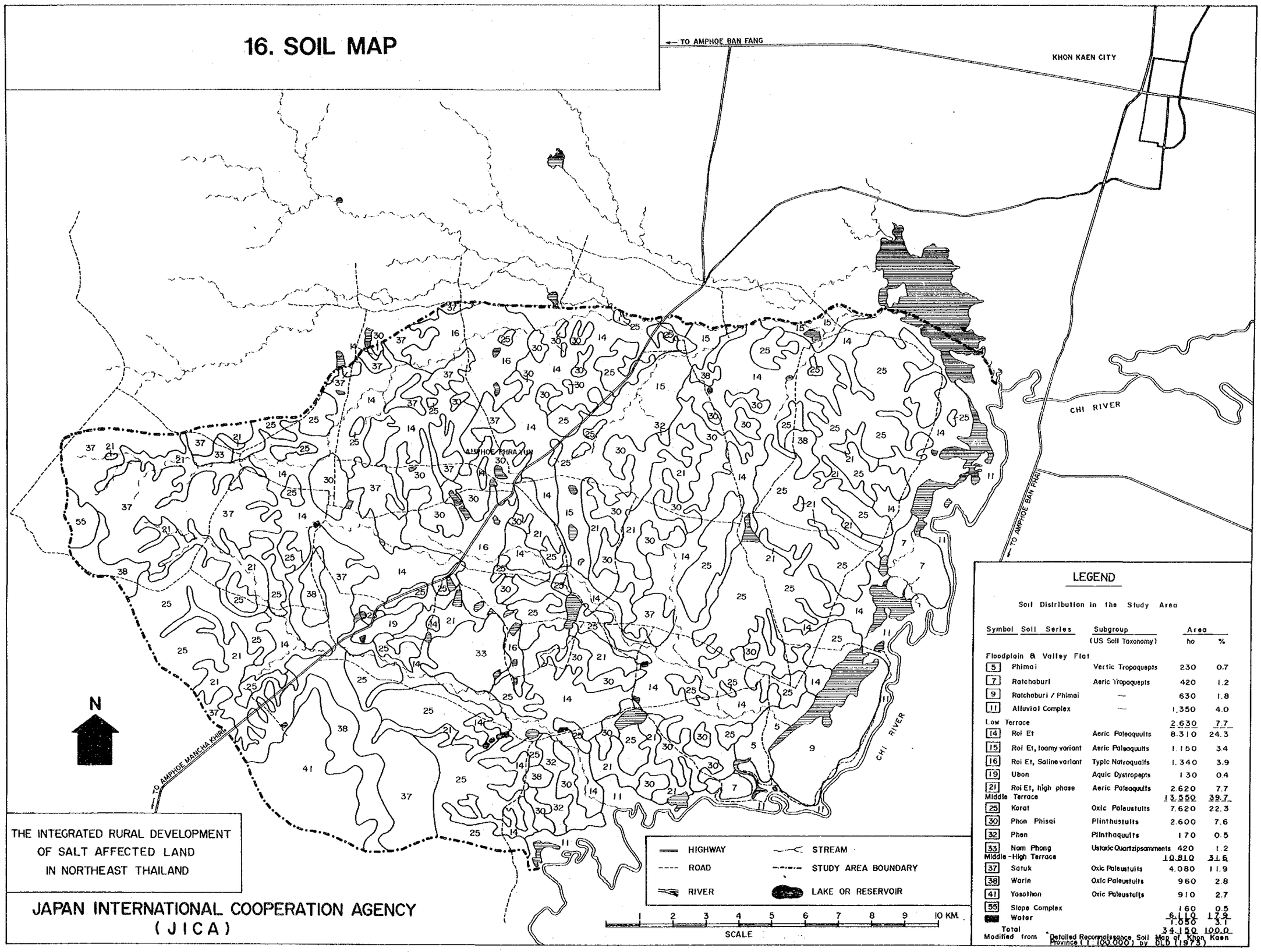
16. SOIL MAP



THE INTEGRATED RURAL DEVELOPMENT OF SALT AFFECTED LAND IN NORTHEAST THAILAND

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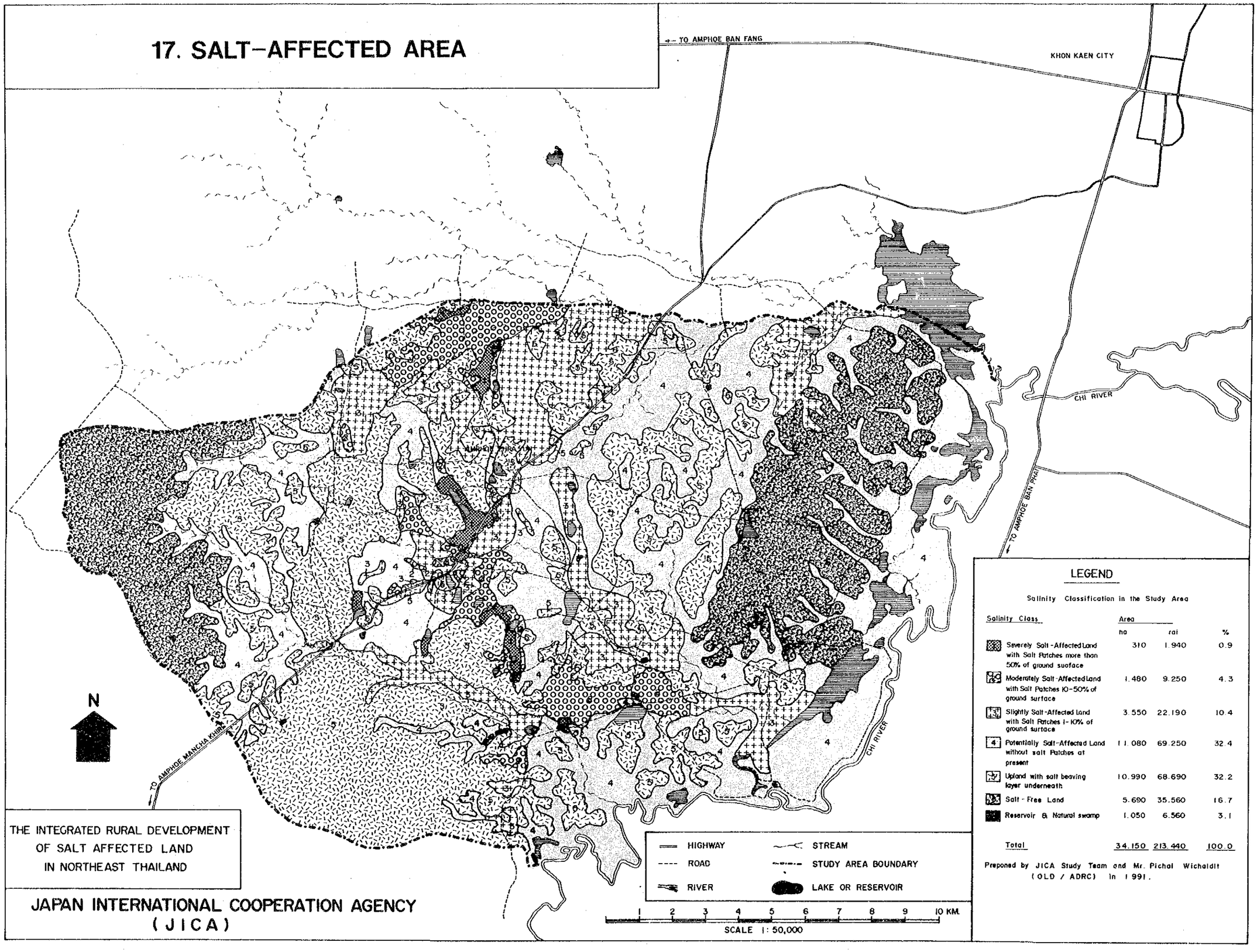
LEGEND

Soil Distribution in the Study Area

Symbol	Soil Series	Subgroup (US Soil Taxonomy)	Area ha	Area %
Floodplain & Valley Flat				
5	Phimai	Vertic Tropaquepts	230	0.7
7	Ratchaburi	Aeric Tropaquepts	420	1.2
9	Ratchaburi / Phimai	—	630	1.8
11	Alluvial Complex	—	1,350	4.0
			2,630	7.7
Low Terrace				
14	Roi Et	Aeric Paleaquults	8,310	24.3
15	Roi Et, loamy variant	Aeric Paleaquults	1,150	3.4
16	Roi Et, Saline variant	Typic Natraqualfs	1,340	3.9
19	Ubon	Aquic Dystropepts	130	0.4
21	Roi Et, high phase	Aeric Paleaquults	2,620	7.7
			13,550	39.7
Middle Terrace				
25	Korat	Oxic Paleustults	7,620	22.3
30	Phon Phisai	Plinthustults	2,600	7.6
32	Phen	Plinthaquults	170	0.5
33	Nam Phong	Ustalfic Quartzipsamments	420	1.2
			10,810	31.6
Middle-High Terrace				
37	Satuk	Oxic Paleustults	4,080	11.9
38	Warin	Oxic Paleustults	960	2.8
41	Yasothon	Oxic Paleustults	910	2.7
55	Slope Complex		160	0.5
	Water		6,110	17.9
			1,050	3.1
Total			34,150	100.0

Modified from Detailed Reconnaissance Soil Map of Khon Kaen Province (1:100,000) by LDD (1973)

17. SALT-AFFECTED AREA



LEGEND

Salinity Classification in the Study Area

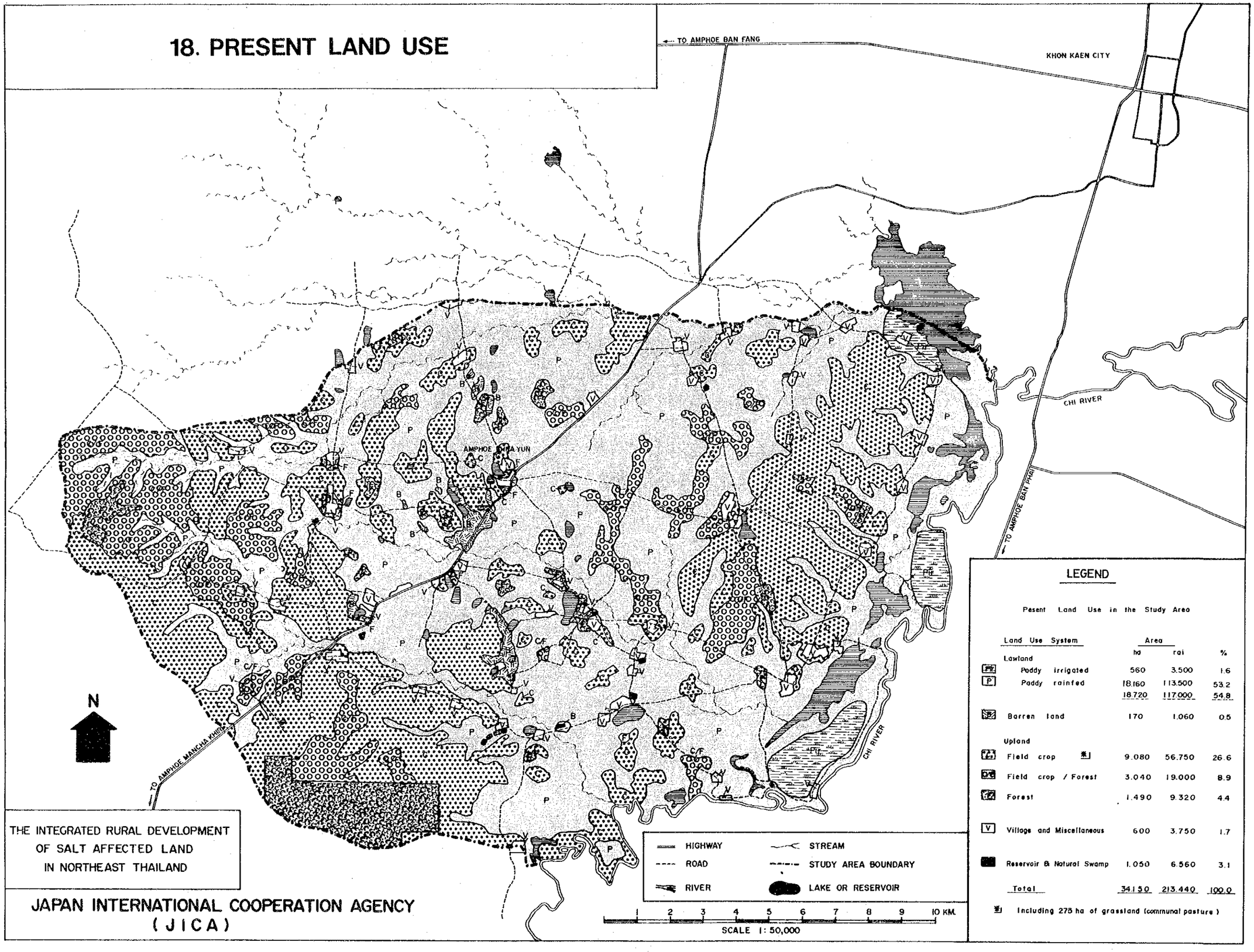
Salinity Class	Area ha	Area rai	%
Severely Salt-Affected Land with Salt Patches more than 50% of ground suoface	310	1.940	0.9
Moderately Salt-Affected Land with Salt Patches 10-50% of ground surface	1.480	9.250	4.3
Slightly Salt-Affected Land with Salt Patches 1-10% of ground surface	3.550	22.190	10.4
Potentially Salt-Affected Land without salt Patches at present	11.080	69.250	32.4
Upland with salt beaving layer underneath	10.990	68.690	32.2
Salt-Free Land	5.690	35.560	16.7
Reservoir & Natural swamp	1.050	6.560	3.1
Total	34.150	213.440	100.0

Preponed by JICA Study Team and Mr. Pichai Wichaidit (OLD / ADRC) in 1991.

THE INTEGRATED RURAL DEVELOPMENT OF SALT AFFECTED LAND IN NORTHEAST THAILAND

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

18. PRESENT LAND USE



LEGEND

Pesent Land Use in the Study Area

Land Use System		Area ha	Area rai	%
Lowland				
Paddy irrigated		560	3.500	1.6
Paddy rainfed		18.160	113.500	53.2
		18.720	117.000	54.8
Barren land		170	1.060	0.5
Upland				
Field crop	*1	9.080	56.750	26.6
Field crop / Forest		3.040	19.000	8.9
Forest		1.490	9.320	4.4
Village and Miscellaneous		600	3.750	1.7
Reservoir & Natural Swamp		1.050	6.560	3.1
Total		34.150	213.440	100.0

*1 Including 275 ha of grassland (communal pasture)

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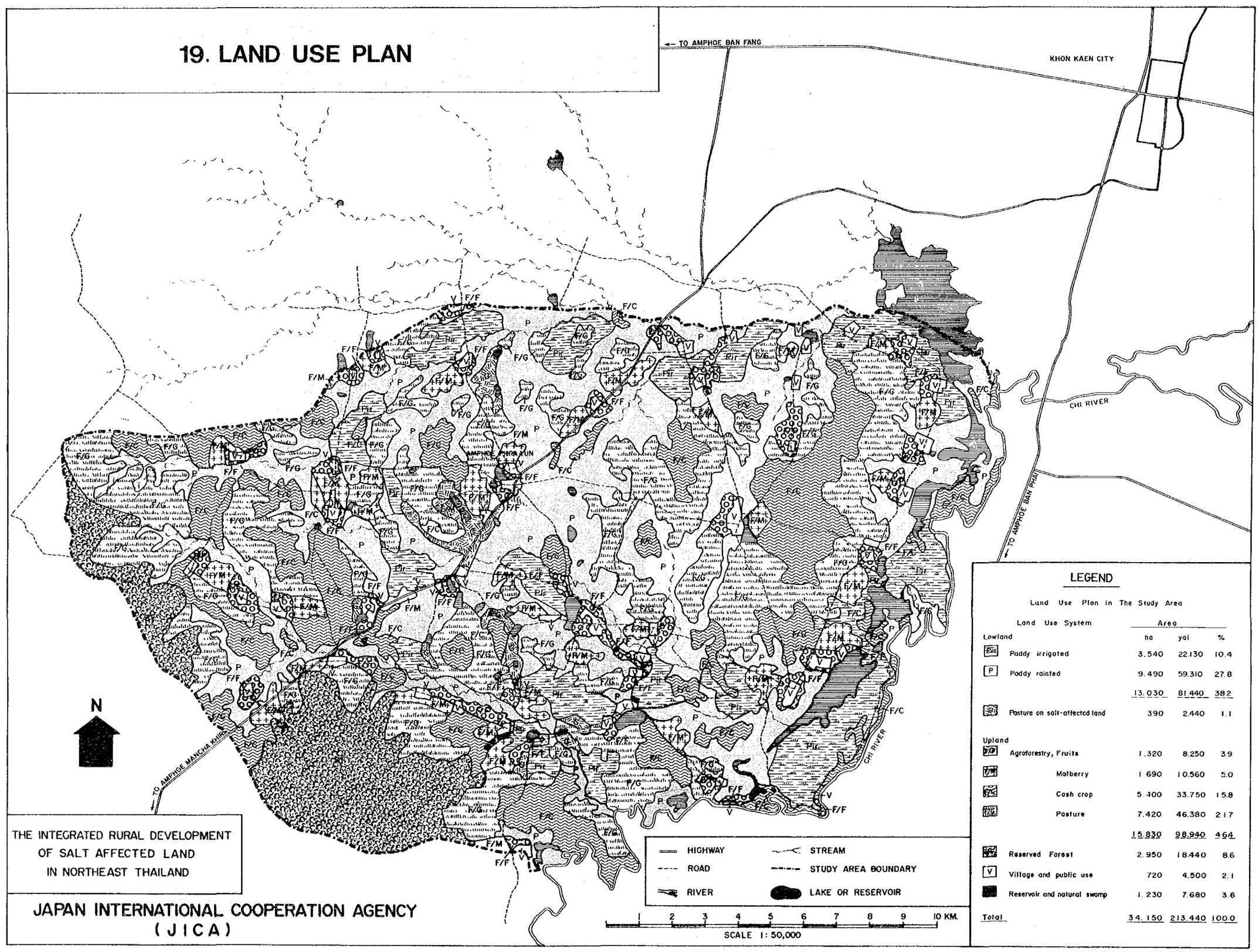
19. LAND USE PLAN



LEGEND

Land Use Plan in The Study Area

Land Use System		Area ha	Area yai	Area %
Lowland				
Pir	Paddy irrigated	3,540	22,130	10.4
P	Paddy rainfed	9,490	59,310	27.8
		13,030	81,440	38.2
Pir	Pasture on salt-affected land	390	2,440	1.1
Upland				
F/F	Agroforestry, Fruits	1,320	8,250	3.9
F/M	Mulberry	1,690	10,560	5.0
F/C	Cash crop	5,400	33,750	15.8
F/M	Pasture	7,420	46,380	21.7
		15,830	98,940	46.4
F/C	Reserved Forest	2,950	18,440	8.6
V	Village and public use	720	4,500	2.1
	Reservoir and natural swamp	1,230	7,680	3.6
Total		34,150	213,440	100.0

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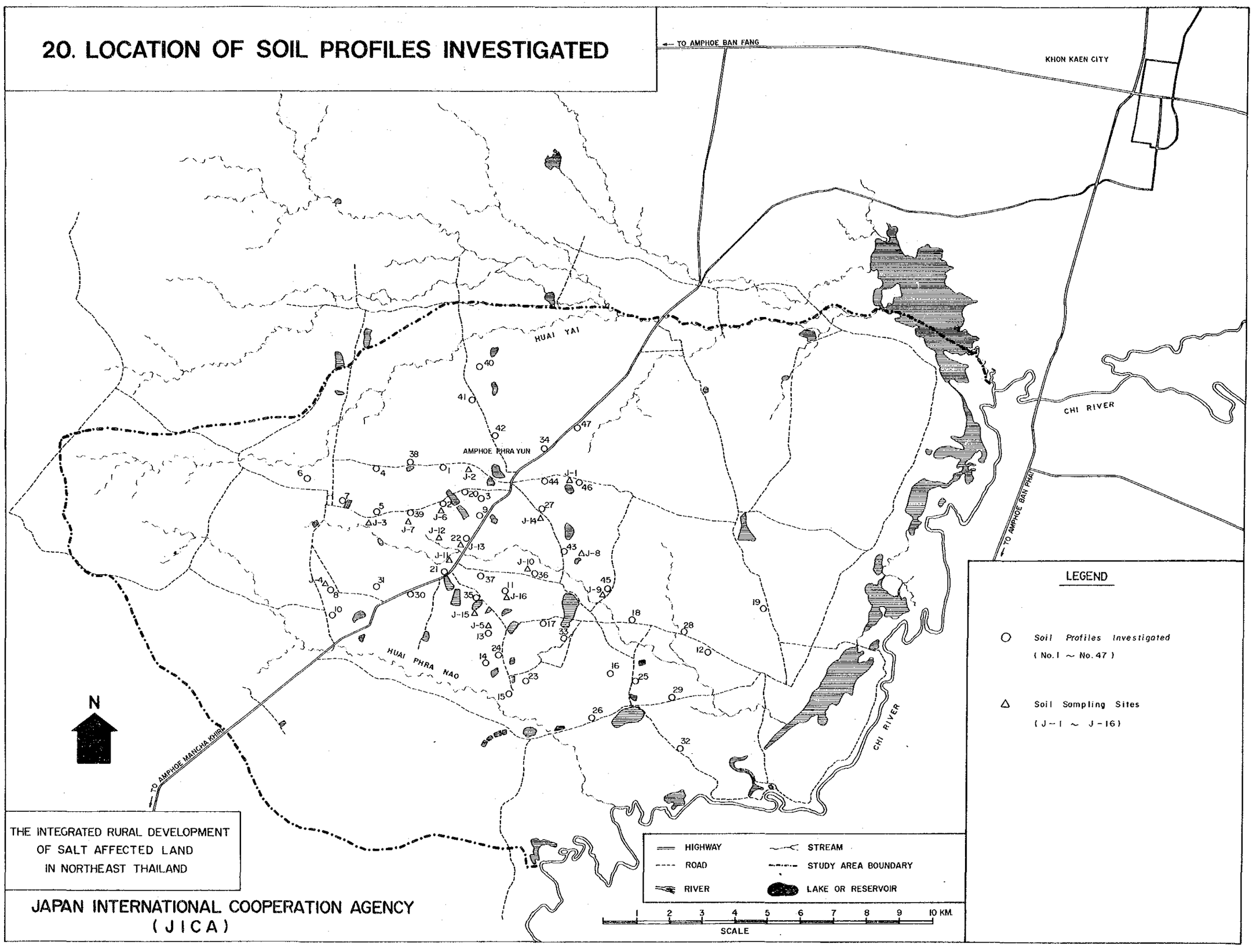
20. LOCATION OF SOIL PROFILES INVESTIGATED



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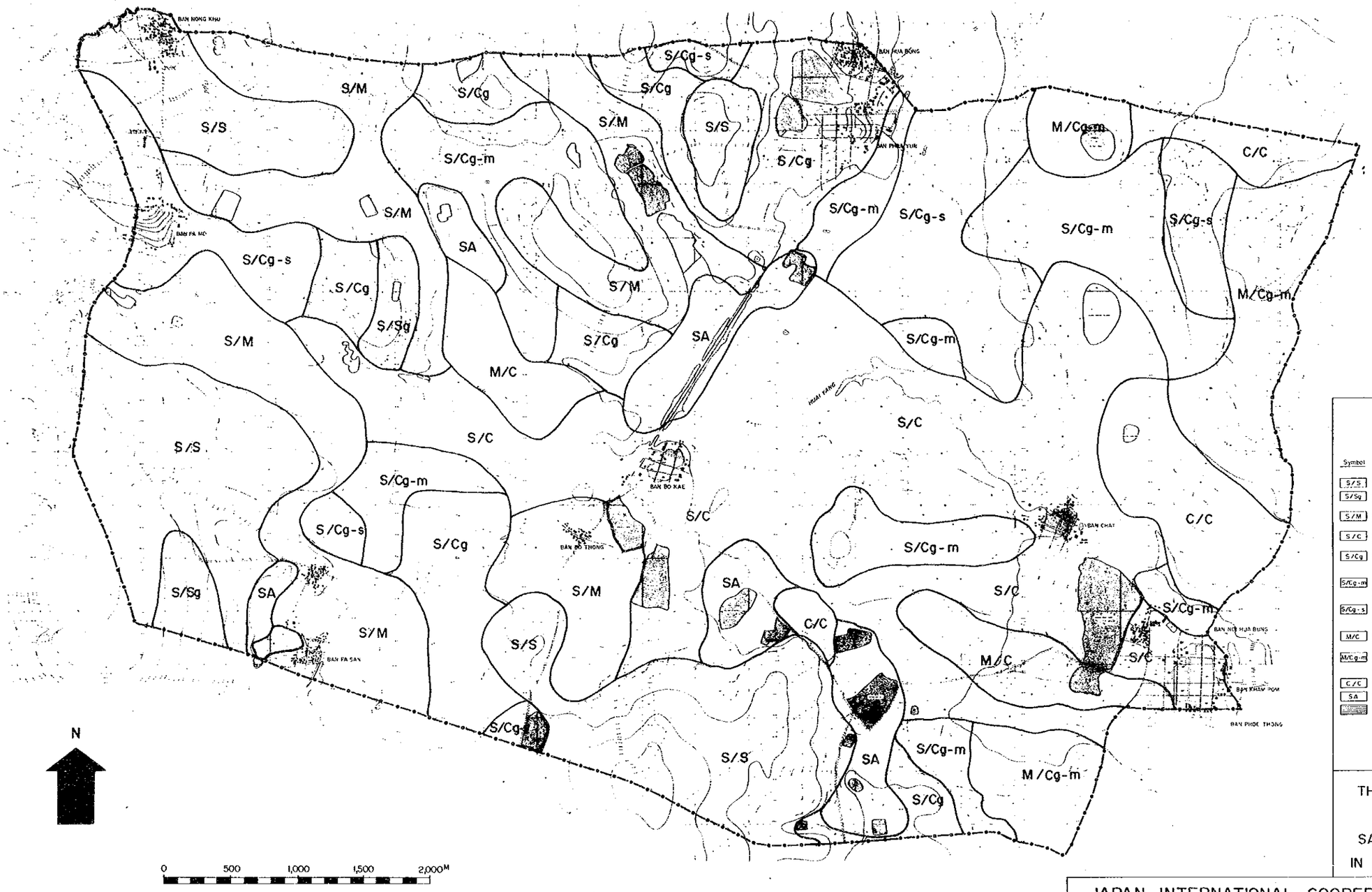
21. SOIL MAP OF THE PILOT AREA



LEGEND

Soils in the Pilot Area

Symbol	Description	Area ha	Area rai	Area %
S/S	Sandy texture in entire profil	680	4,250	14.9
S/Sg	Sandy texture in entire profil with laterite gravel layer	60	370	1.3
S/M	Sandy surface soil and loamy substrata	690	4,310	15.1
S/C	Sandy surface soil but clayey substrata	880	5,500	19.3
S/Cg	Sandy surface soil but clayey substrata with lateritel gravel layer at moderately deep depth	400	2,500	8.8
S/Cg-m	Sandy surface soil but clayey substrata with lateritel gravel layer at moderately shallow depth	510	3,190	11.2
S/Cg-s	Sandy surface soil but clayey substrata with lateritel gravel layer at shallow depth	390	2,440	8.5
M/C	Loamy surface soil and clayey substrata	140	870	3.1
M/Cg-m	Loamy surface soil and clayey substrata with lateritel gravel layer at moderately shallow depth	270	1,690	5.9
C/C	Clayey texture in entire profile	190	1,190	4.2
SA	Saline-sodic soil	200	1,250	4.4
	Reservoir	150	940	3.3
	Total	4,560	28,500	100.0

THE INTEGRATED RURAL DEVELOPMENT OF SALT-AFFECTED LAND IN NORTHEAST THAILAND

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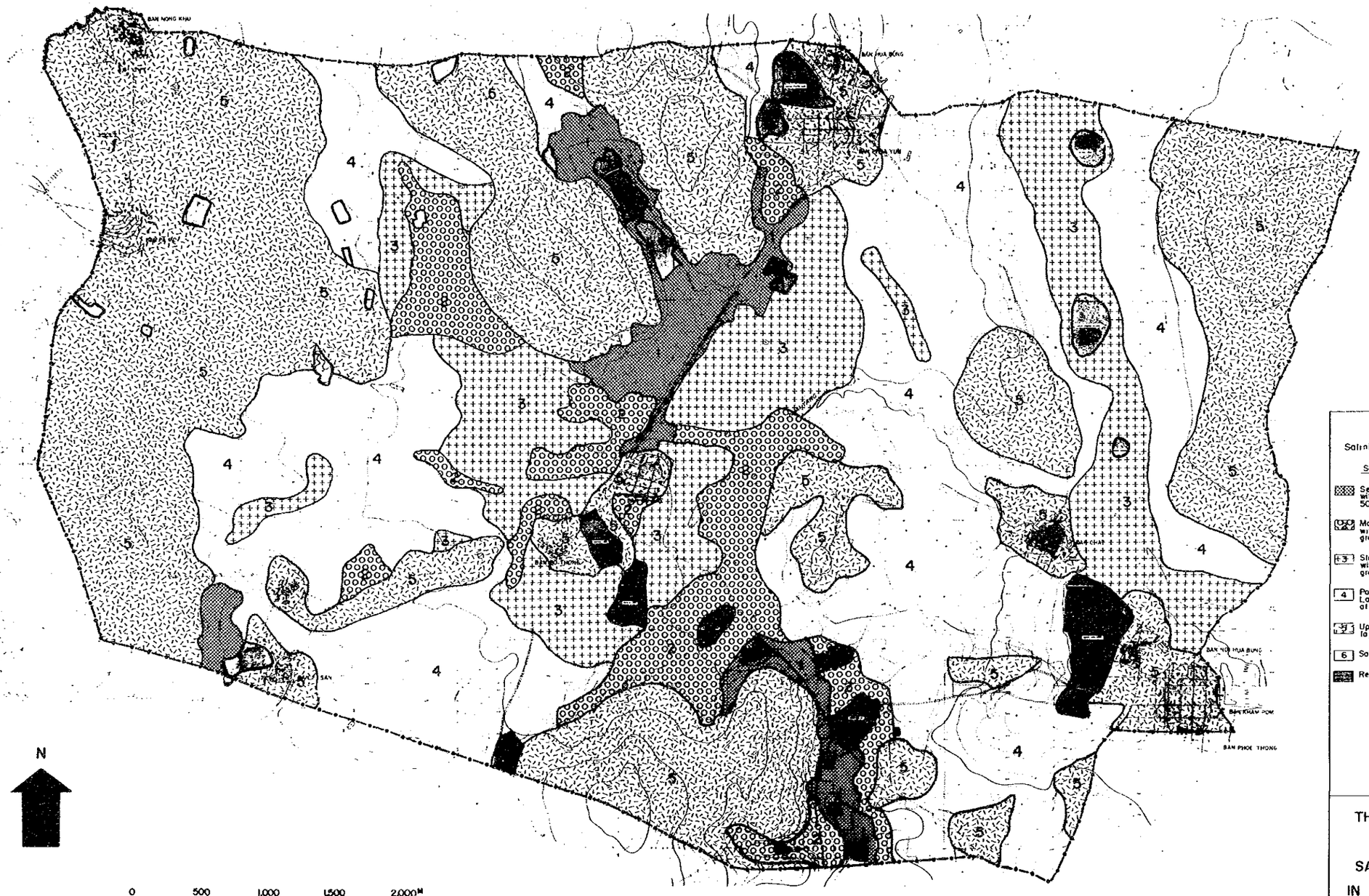
22. SALINITY CLASSIFICATION IN THE PILOT AREA



LEGEND

Salinity Classification in the Pilot Area

Salinity Class	Area ha	rai	%
Severely Salt-Affected Land with salt patches more than 50% of ground surface	190	1,190	4.2
Moderately Salt-Affected Land with salt patches 10-50 % of ground surface	340	2,120	7.5
Slightly Salt-Affected Land with salt patches 1-10% of ground surface	590	3,690	12.9
Potentially Salt-Affected Land without salt patches at present	1,370	8,560	30.0
Upland with salt bearing layer underneath	1,920	12,000	42.9
Salt-Free Land	—	—	—
Reservoir & Natural swamp	150	940	3.3
Total	4,560	28,500	100.0

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23. PRESENT LAND USE IN THE PILOT AREA

LEGEND

Present Land Use in the Pilot Area

Land Use		Area ha	Area rai	Area %
Lowland				
Pir	Paddy irrigated	0	0	0
P	Paddy rainfed	3,020	18,870	66.2
B	Barren	100	690	2.4
Upland				
C	Field crops	840	5,250	18.4
F	Forest	320	2,000	7.0
V	Village and Miscellaneous	120	750	2.7
	Reservoir	150	940	3.3
	Total	4,560	28,500	100.0

THE INTEGRATED RURAL DEVELOPMENT OF SALT-AFFECTED LAND IN NORTHEAST THAILAND

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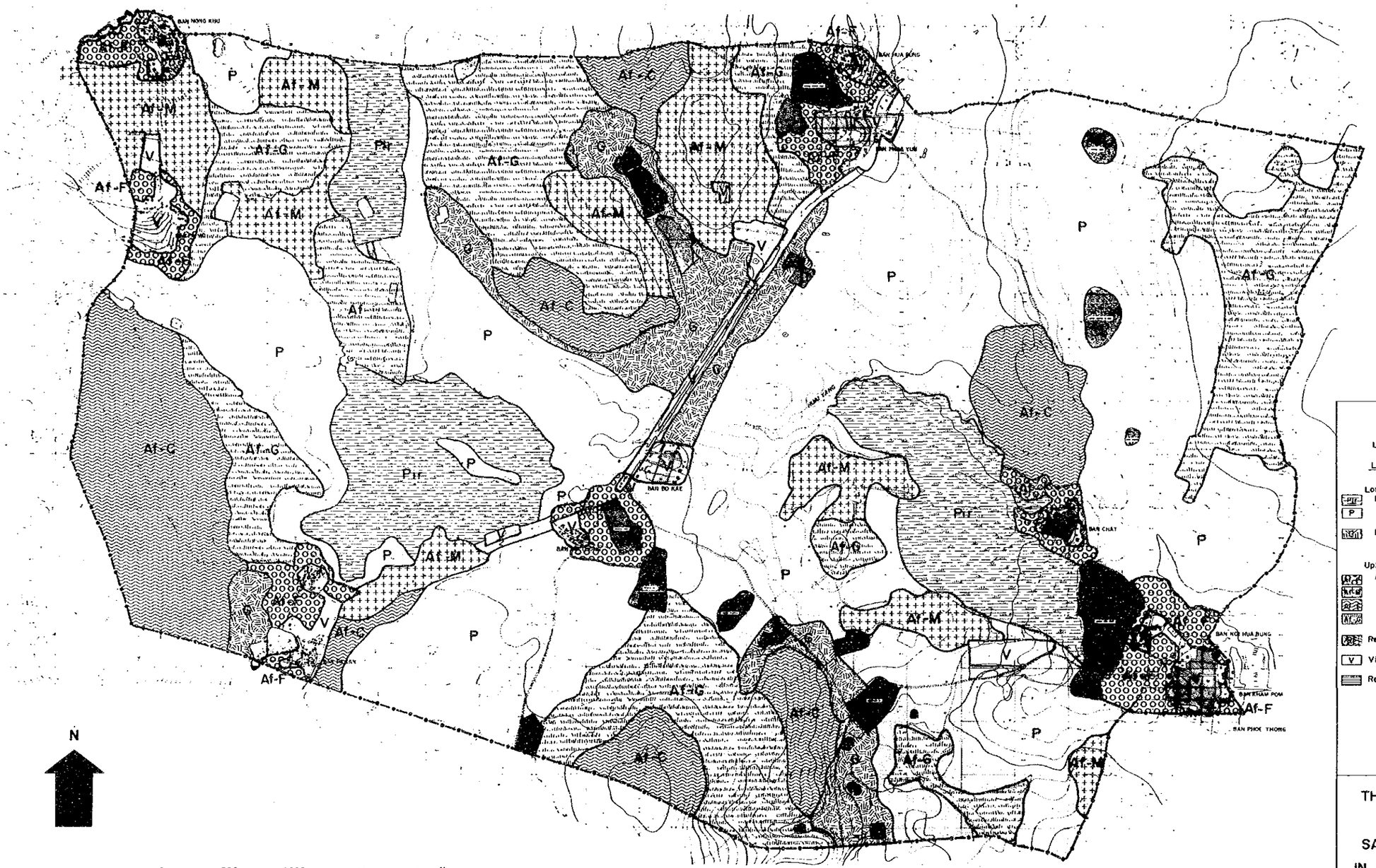
(J I C A)

24. LAND USE PLAN IN THE PILOT AREA



LEGEND

Land Use Plan in the Pilot Area

Land Use System		Area ha	Area rai	%
Lowland				
Ptr	Paddy, irrigated	390	2,440	8.6
P	" rainfed	1,760	10,990	38.6
		2,150	13,430	47.2
Ptr/P	Pasture on salt-affected land	210	1,310	4.6
Upland				
Af-C	Agroforestry, Fruits	180	1,130	3.9
Af-M	Mulberry	360	2,250	7.9
Af-G	Cash crop	500	3,120	11.0
Af-P	Pasture	800	5,000	17.5
		1840	11,530	40.3
Af-F	Reserved Forest	-	-	-
V	Village and public use	180	1,130	39
	Reservoir	180	1,130	39
	Total	4,560	28,500	100.0

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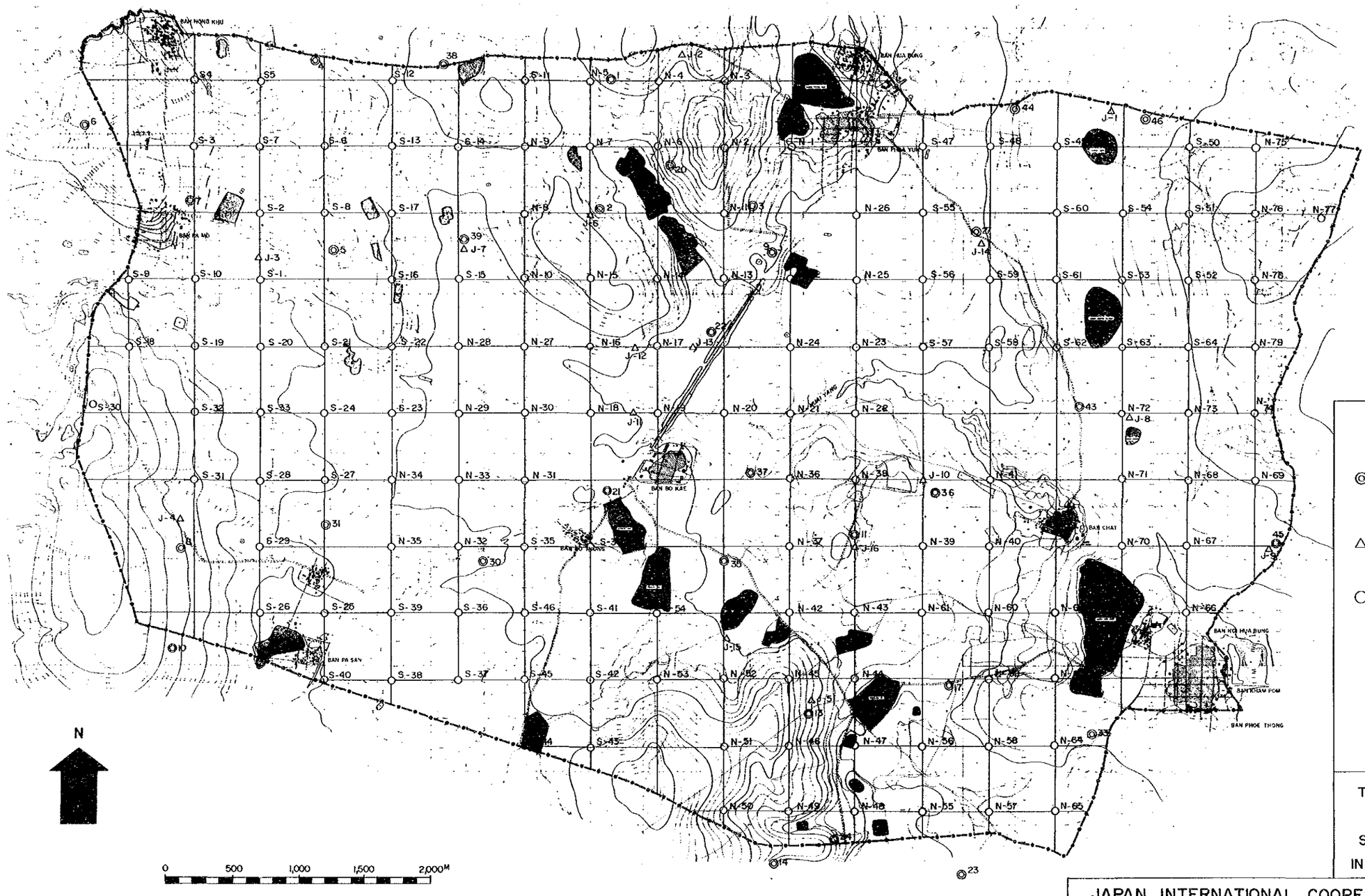
25. SOIL PROFILES INVESTIGATED IN THE PILOT AREA



LEGEND

- ◎ Deep Boring (Piezometer)
  4.0 m deep in Lowland
  8.0 m deep in Upland
- △ Auger Boring with Sampling
  J - 1 ~ J - 16
- ○ Auger Boring (1.8 m deep)
  S - 1 ~ S - 64
  N - 1 ~ N - 79

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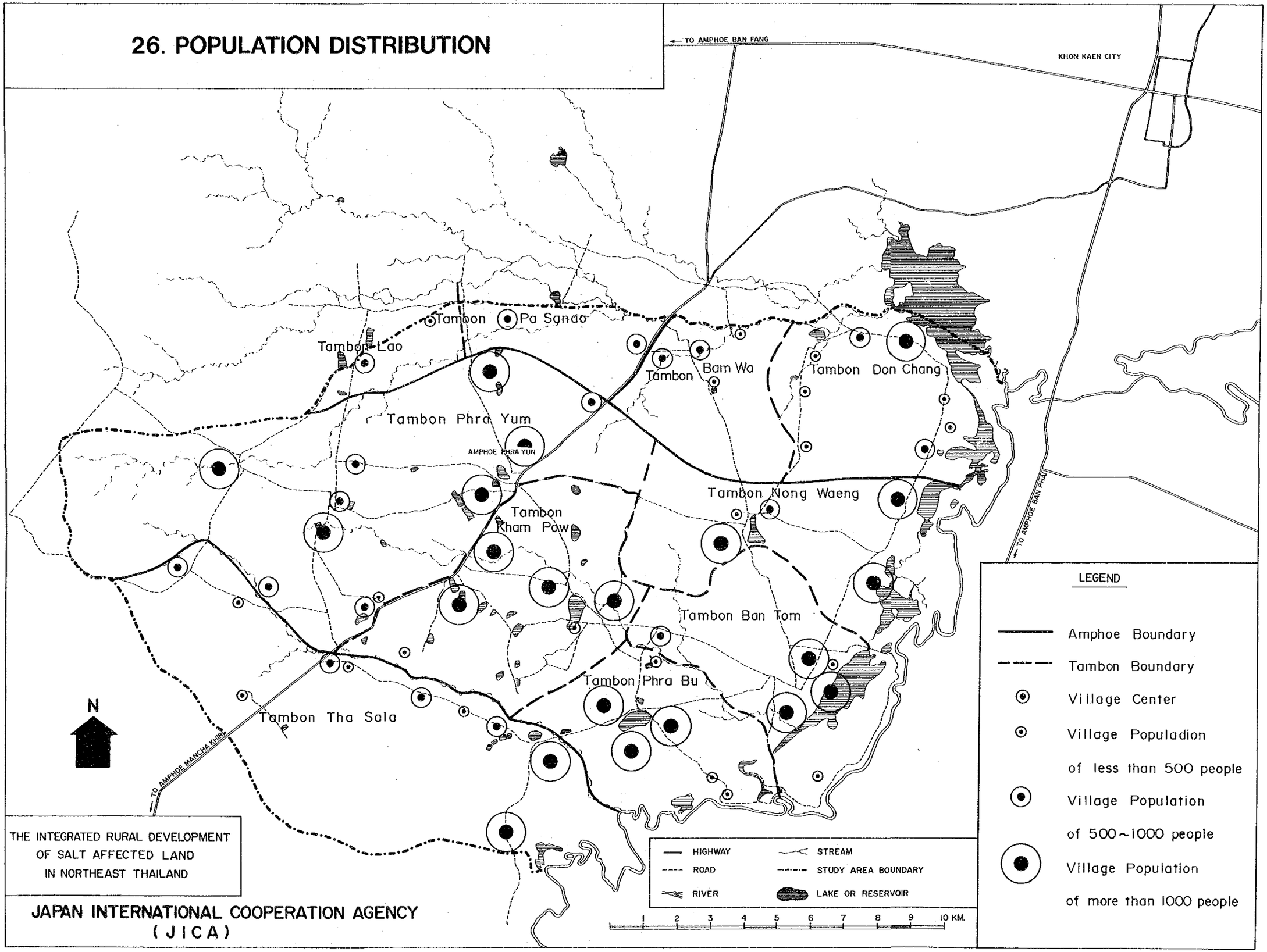
26. POPULATION DISTRIBUTION



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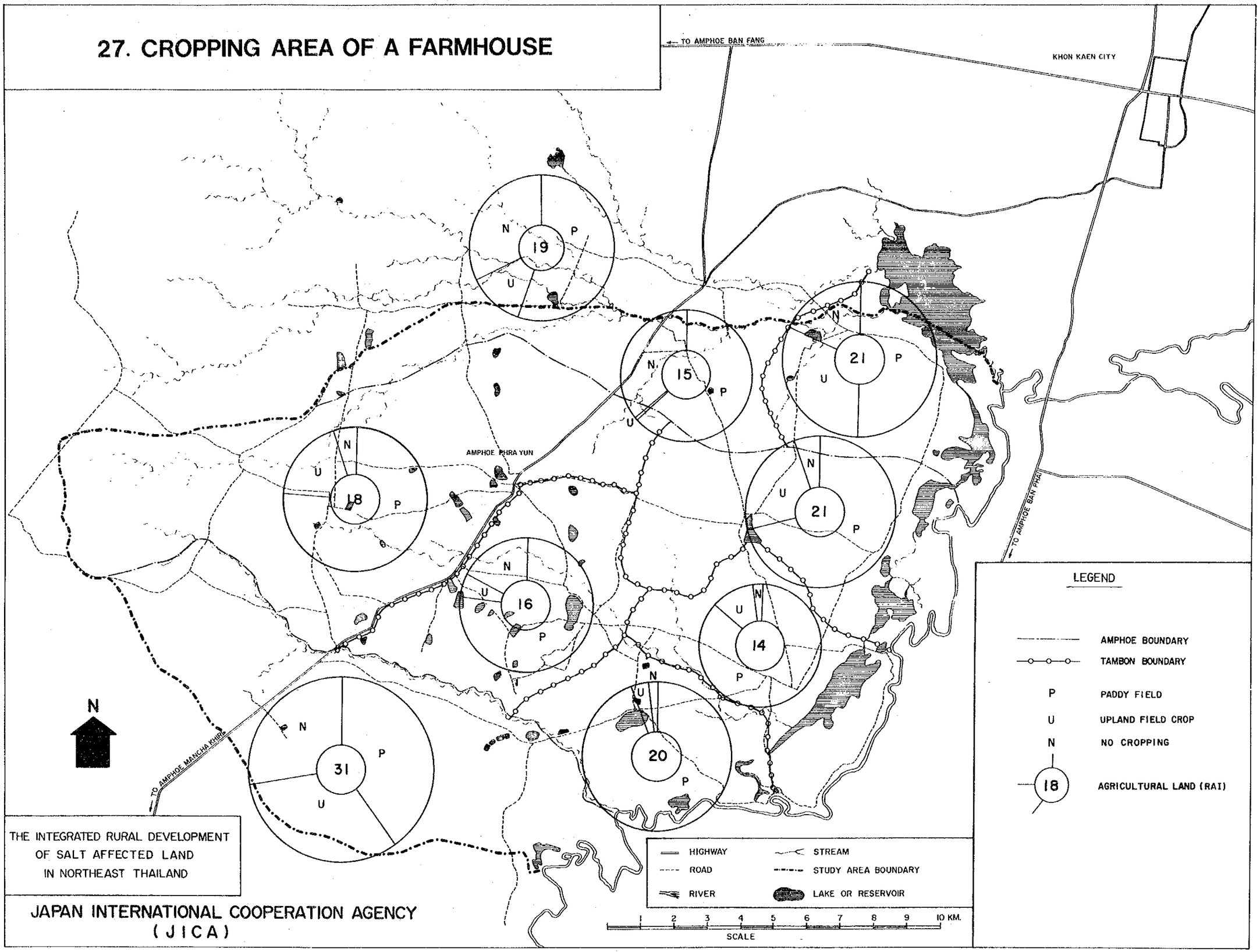
27. CROPPING AREA OF A FARMHOUSE



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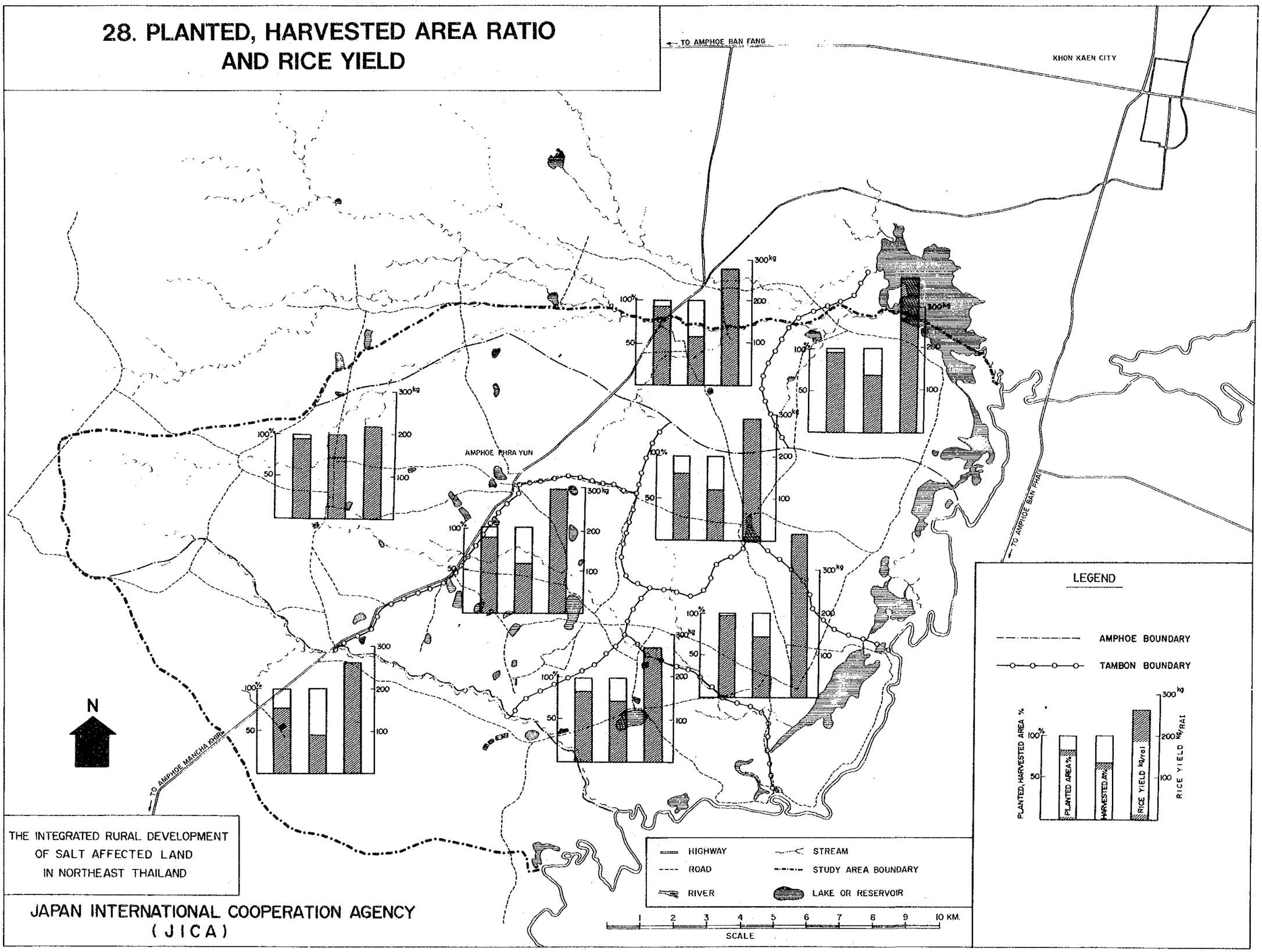
28. PLANTED, HARVESTED AREA RATIO AND RICE YIELD



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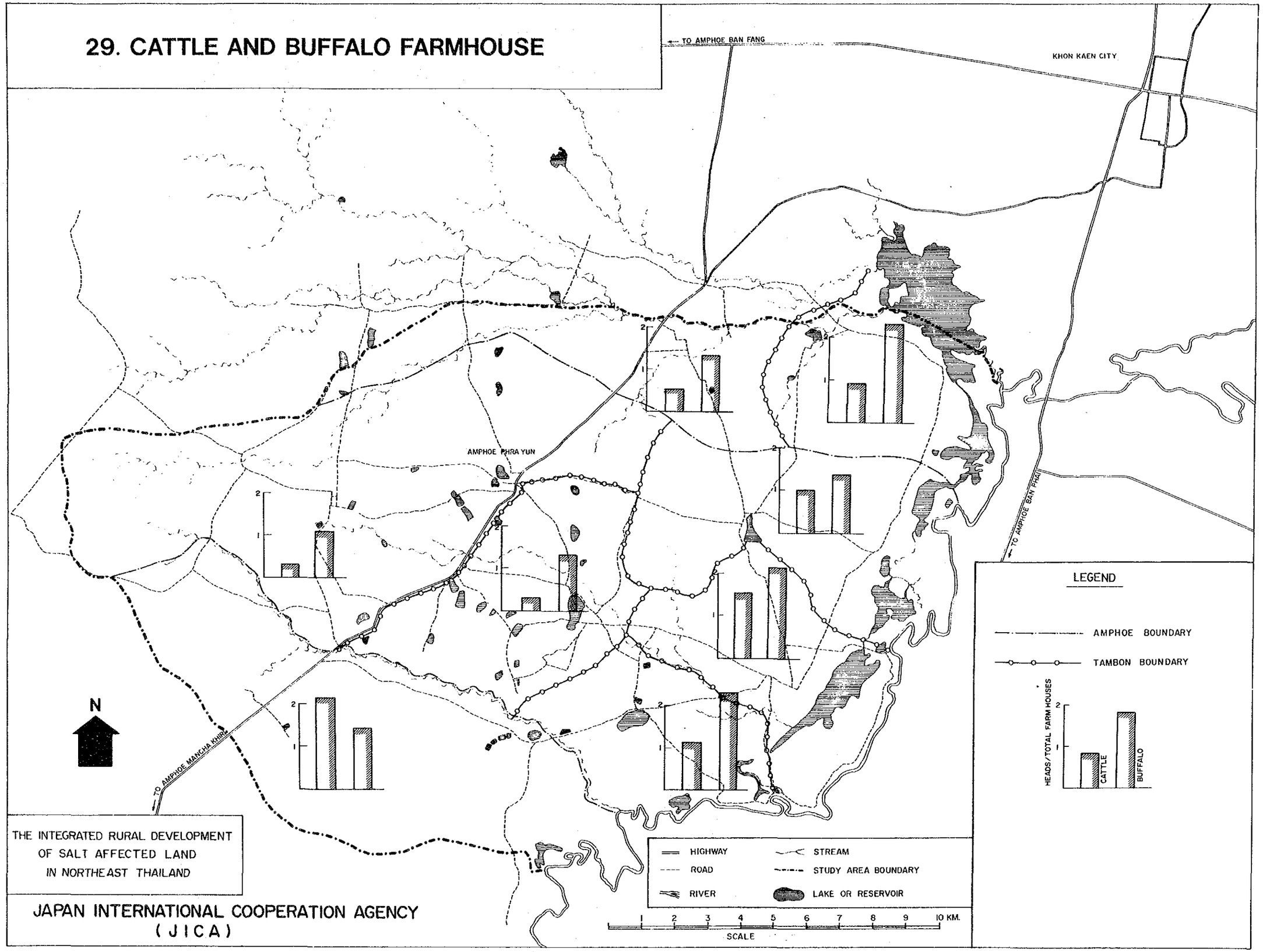
29. CATTLE AND BUFFALO FARMHOUSE



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