REPUBLIC OF THE PHILIPPINES
CABINET COORDINATING COMMITTEE

CAGAYAN INTEGRATED AGRICULTURAL DEVELOPMENT PROJECT

FEASIBILITY REPORT
(APPENDICES)

APRIL 1976

JAPAN INTERNATIONAL COOPERATION AGENCY

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FISCAL YEAR 1974 AND 1975
(At 1967 prices)

Industry	Value in Million Pesos FY 1974	Value in Million Pesos FY 1975	Per Cent Increase (Decrease) 1973-74	Per Cent Increase (Decrease) 1974-75
1. Agriculture, Fishery & Forestry	9,399	9,657	6.7	2.7
2. Mining and Quarrying	729	756	(0.4)	3.7
3. Manufacturing	6,577	6,850	6.6	4.2
4. Construction	1,061	1,225	9.7	15.5
5. Transportation, Communication Storage and Utilities	1,342	1,436	8.5	7.0
6. Commerce	5,122	5,412	8.1	5.7
7. Services	7,308	7,782	5.9	6.5
NET DOMESTIC PRODUCT at factor cost	31,538	33,118	6.7	5.0
Net Factor Income from Abroad	(36)	108	89.5	400.0
NET NATIONAL PRODUCT or NATIONAL INCOME	31,502	33,206	7.9	5.5
8. Indirect Taxes Net of Subsidies	3,806	4,199	11.6	10.4
9. Capital Consumption Allowance	4,425	4,690	6.2	6.0
GROSS NATIONAL PRODUCT	39,733	42,115	7.8	6.0

Source: National Accounts Staff, NEDA, Estimates as of September 10, 1975.

APPENDIX A-2. NATIONAL INCOME AND GROSS NATIONAL PRODUCT
FISCAL YEAR 1974 AND 1975
(At Current Prices)

Industry	Value in Million Pesos FY 1974	Value in Million Pesos FY 1975	Per Cent Increase (Decrease) 1973-74	Per Cent Increase (Decrease) 1974-75
1. Agriculture, Fishery and Forestry	24,847	29,258	42.3	17.8
2. Mining and Quarrying	2,204	1,863	71.4	(15.5)
3. Manufacturing	16,003	20,522	59.9	28.2
4. Construction	1,779	2,266	17.7	27.4
5. Transportation, Communication Storage and Utilities	2,232	2,871	25.9	28.6
6. Commerce	9,897	12,701	38.7	28.3
7. Services	12,187	14,275	17.8	17.1
NET DOMESTIC PRODUCT at Factor Cost	69,149	83,756	39.6	21.1
Net Factor Income from Abroad	39	375	4.7	861.5
NET NATIONAL PRODUCT or NATIONAL INCOME	69,188	84,131	42.1	21.6
8. Indirect Taxes Net of Subsidies	8,358	10,618	46.4	27.0
9. Capital Consumption Allowance	9,002	11,323	32.0	25.8
GROSS NATIONAL PRODUCT	86,548	106,072	41.4	22.6

Source: National Accounts Staff, NEDA Estimates as of September 10, 1975

APPENDIX A-3. MUNICIPALITIES OF CAGAYAN, POPULATION AND NO. OF BARANGAY (as of May, 1975)

	Name of Municipality	No. of Barangays	Total Population
1.	Abulung	17	21,081
2.	Alcalá	25	22,375
3.	Allacapan	27	15,704
4.	Amulung	47	25,107
5.	Aparri	42	42,093
6.	Baggao	44	40,756
7.	Ballesteros	19	19,663
8.	Buguey	23	19,861
9.	Calayan	8	8,189
10.	Camalaniugan	24	13,716
11.	Claveria	29	23,115
12.	Enrile	15	20,090
13.	Gattaran	52	33,688
14.	Gonzaga	25	19,044
15.	Iguig	23	14,073
16.	Lal-lo	35	24,830
17.	Lasam	25	22,025
18.	Pamplona	18	14,951
19.	Penablanca	24	21,253
20.	Piat	14	12,528
21.	Rizal	25	11,086
22.	Sanchez Mira	18	17,604
23.	Sta. Ana	15	11,164
24.	Sta. Praxedes	8	2,202
25.	Sta. Teresita	9	9,630
26.	Sto. Nino	31	18,300
27.	Solana	31	39,979
28.	Tuao	30	31,284
29.	Tuguegarao	34	61,985
	Total	737	637,376

Source: Bureau of Census & Statistics, Tuguegarao, Cagayan

APPENDIX A-4. ROAD CONDITIONS

	Municipality	Km. of Municipal Roads	Km. of Barangay Roads	Distance From Tuguegarao
1.	Abulung	9.840	15.110	122.6 km
2.	Alcala	8.200	25.200	38.2
3.	Allacapan	4.280	- *	118.3
4.	Amulung	0.740	58.440	26.3
5.	Aparri	1.847	50.483	103.9
6.	Baggao	1.230	95.000	45.6
7.	Ballesteros	14.470	- *	115.5
8.	Buguey	10.440	41.340	123.0
9.	Calayan	10.150	17.000	233.9
10.	Camalaniugan	1.746	8.724	95.6
11.	Claveria	17.000	61.500	185.3
12.	Enrile	11.150	29.640	17.9
13.	Sto. Nino (Faire)	7.100	13.150	59.0
14.	Gattaran	4.200	8.500	66.1
15.	Gonzaga	5.450	17.920	125.2
16.	Iguig	1.300	22.720	16.2
17.	Lal10	4.890	2.000	84.1
18.	Lasam	- *	80.000	71.6
19.	Pamplona	4.480	49.790	145.9
20.	Penablanca	3.830	23.100	9.5
21.	Piat	1.926	53.484	38.9
22.	Rizal	2.340	9.710	63.9
23.	Sanchez Mira	10.180	10.290	163.7
24.	Santa Ana	15.540	52.200	158.6
25.	Santa Praxedes	5.618	20.802	201.5
26.	Santa Teresita	3.600	23.000	135.0
27.	Solana	7.220	4.010	5.5
28.	Tuao	12.000	5.000	40.9
29.	Tuguegarao	6.611	18.184	0.0

* No Record Available as of Nov. 5, 1975

APPENDIX A-5. NO. OF AIRPORTS, SEAPORTS, SCHOOLHOUSES, HEALTH CLINICS, AND THEIR LOCATIONS

Location by Municipality	No. of Airports	No. of Seaports	No. of Schoolhouses	No. of Health Clinics
1. Abulung	-	-	21	2
2. Alcala	-	-	24	2
3. Allacapan	-	-	19	2
4. Amulung	-	-	31	2
5. Aparri	1	1	33	7
6. Baggao	-	-	39	4
7. Ballesteros	-	-	20	2
8. Buguey	-	-	19	5
9. Calayan	-	-	25	2
10. Camalaniugan	-	-	14	2
11. Claveria	-	1	28	8
12. Enrile	-	-	17	4
13. Sto. Nino	-	-	23	3
14. Gattaran	-	-	42	5
15. Gonzaga	-	-	21	3
16. Iguig	-	-	11	3
17. Lal-lo	-	-	69	2
18. Lasam	-	-	35	3
19. Pamplona	-	-	16	4
20. Penablanca	-	-	21	3
21. Piat	-	-	12	2
22. Rizal	-	-	18	2
23. Sanchez Mira	-	-	16	4
24. Santa Ana	-	1	13	2
25. Santa Praxedes	-	-	3	2
26. Santa Teresita	-	-	11	1
27. Solana	-	-	28	7
28. Tuao	-	-	26	4
29. Tuguegarao	1	-	29	6
Total	2	3	684	98

APPENDIX A-6. ELECTRIFICATION, IRRIGATION, & WATERWORKS AND THE NUMBER OF MUNICIPALITIES BEING SERVED BY EACH

	Municipality	Electrification	Irrigation		Waterworks	
			Classification	Area Irrigated	Classification	No.
1.	Abulung	-	National Irrig. System	7,008	-	-
2.	Alcala	-	-	-	-	-
3.	Allacapan	-	Communal - 1 System	25	-	-
4.	Amulung	-	Communal - 1 System	20	-	-
5.	Aparri	1	-	-	Elevated Water Tank	1
6.	Baggao	1	Communal - 1 System	175	-	-
7.	Ballesteros	-	-	-	-	-
8.	Buguey	-	National Irrig. System	910	-	-
			Communal - 6 Systems	1,361	-	-
9.	Calayan	-	-	-	-	-
10.	Camalaniugan	1	-	-	-	-
11.	Claveria	-	Communal - 33 Systems	4,363	-	-
12.	Enrile	-	Communal - 1 System	50	Reservoir - Gravity Type	1
13.	Sto. Nino (Faire)	-	Communal - 2 Systems	155	-	-
14.	Gattaran	-	Communal - 3 Systems	280	-	-
15.	Gonzaga	1	Communal - 23 Systems	4,578	Machine Pump Water Supply	1
16.	Iguig	-	Communal - 1 System	160	-	-
17.	Lal-lo	1	Communal - 5 Systems	901	-	-
18.	Lasam	-	Communal - 1 System	250	-	-
19.	Pamplona	-	Communal - 5 Systems	390	-	-
20.	Penablanca	-	Communal - 2 Systems	388	Machine Pump Water Supply	1
21.	Piat	-	Communal - 1 System	10	Machine Pump Water Supply	1
22.	Rizal	-	-	-	-	-
23.	Sanchez Mira	-	Communal - 20 Systems	3,255	-	-
24.	Santa Ana	-	Communal - 11 Systems	1,859	-	-
25.	Santa Praxedes	-	Communal - 13 Systems	469	-	-
26.	Santa Teresita	-	Communal - 7 Systems	1,361	-	-
27.	Solana	1	-	-	Elevated Water Tank	1
28.	Tuao	-	National Irrig. System	1,300	-	-
			Communal - 2 Systems	310	-	-
29.	Tuguegarao	1	-	-	Reservoir - Gravity Type	1
	Total	7	NIS - 3, CIS - 139	29,509		7

APPENDIX B CLIMATO AND HYDROLOGY

APPENDIX B-1 CLIMATOLOGICAL DATA

TABLE B-1-1 MONTHLY RAINFALL (Station - Tuguegarao)

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1949	N.R	4.3	12.7	43.4	4.1	92.7	225.6	149.9	136.4	246.1	225.3	90.4	N.A
1950	23.1	21.1	43.7	100.3	130.6	171.5	191.5	95.3	225.6	284.7	50.5	32.3	1,370.2
51	23.1	18.0	18.5	26.2	98.8	168.7	465.1	392.4	432.1	68.8	394.7	43.2	2,149.6
52	14.5	4.6	20.1	89.4	118.1	204.1	180.8	367.5	258.3	169.4	177.5	283.7	1,888.0
53	8.3	49.3	48.0	31.5	170.7	322.1	161.8	184.9	329.4	187.5	409.2	369.8	2,272.5
54	13.2	3.8	53.6	150.4	56.1	133.4	101.1	240.5	302.0	343.9	249.6	32.0	1,679.6
55	62.2	13.7	27.2	20.3	8.6	124.4	256.8	90.9	162.6	202.2	366.0	50.0	1,384.9
56	0	9.7	27.9	69.6	66.5	161.0	123.4	309.6	106.4	174.5	465.1	223.8	1,737.5
57	23.6	1.3	112.0	42.9	15.0	205.0	87.1	209.8	356.6	87.6	265.2	36.6	1,442.7
58	11.9	5.8	25.7	8.1	72.4	121.2	115.1	180.6	404.6	271.3	92.2	10.4	1,319.3
59	9.1	67.1	68.6	3.3	133.4	85.1	99.8	195.3	89.7	377.4	251.0	95.0	1,474.8
1960	99.3	107.7	27.9	51.8	59.7	141.5	139.4	125.0	224.5	486.2	28.4	23.6	1,515.0
61	3.6	0.5	46.2	66.5	57.9	N.R	352.8	437.4	123.4	269.2	380.5	40.6	N.A
62	12.2	0	20.3	72.4	159.5	150.9	299.0	153.4	85.3	160.3	156.7	5.3	1,275.3
63	7.1	12.2	5.8	1.0	8.1	235.0	291.8	55.1	247.9	15.7	15.5	258.6	1,153.8
64	4.8	44.3	36.5	7.1	78.4	157.0	230.1	473.1	181.2	234.1	958.8	122.3	2,527.7
65	35.6	9.3	9.0	10.0	126.4	123.2	429.0	119.4	254.9	73.6	126.0	20.5	1,336.9
66	5.1	21.1	52.0	36.2	407.9	152.8	207.1	N.R	43.3	167.1	614.4	218.8	N.A
67	12.3	3.9	3.9	238.8	74.1	363.5	47.3	442.2	126.7	647.3	136.6	13.8	2,110.4
68	8.2	1.1	9.4	75.3	69.2	203.8	232.3	512.5	325.9	48.6	12.4	0.3	1,499.0
69	0.8	0	1.5	52.9	83.4	160.9	N.R	72.5	203.3	95.5	187.5	68.5	N.A
1970	47.3	1.8	134.7	34.8	185.7	91.2	185.9	154.7	164.7	433.5	319.1	186.2	1,939.6
71	6.8	46.9	10.3	10.0	102.5	145.8	312.5	53.1	214.7	568.3	850.1	220.5	2,541.5
72	159.7	10.2	36.3	25.2	150.6	171.6	213.4	217.6	168.1	52.4	108.3	33.9	1,347.3
73	15.4	7.4	25.7	0	108.6	171.4	86.1	276.8	84.4	429.7	786.1	57.9	2,049.5
74	3.5	1.8	0	54.5	95.6	59.3	N.R	N.R	N.R	N.R	N.R	N.R	N.A
Total	610.7	466.9	877.5	1,321.9	2,641.9	4,117.1	5,034.8	5,509.5	5,252.0	6,094.9	7,626.7	2,538.0	
Ave.	25.4	18.7	35.1	52.9	105.7	171.5	209.8	239.5	218.8	254.0	317.8	105.8	1,755.0

Note: N.R; No Records N.A; Not Available

TABLE B-1-2 MONTHLY RAINFALL (Station — Aparri)

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1950	112.8	106.7	58.2	49.8	271.8	148.6	75.7	130.0	375.2	382.0	122.7	147.6	1,981.1
51	49.0	21.8	36.3	6.6	82.6	76.2	215.6	208.0	416.8	369.1	464.6	176.8	2,123.4
52	117.6	22.9	6.9	40.6	20.8	200.7	247.7	264.2	245.4	277.6	440.7	341.1	2,226.2
53	110.3	107.2	69.1	5.1	60.5	314.2	75.7	479.6	254.5	155.4	376.2	488.4	2,496.2
54	108.7	205.5	68.1	8.1	7.4	184.4	120.9	289.3	275.6	557.3	344.4	224.0	2,393.7
55	179.6	25.4	25.9	32.8	65.8	150.6	199.6	230.9	168.4	661.2	529.3	67.8	2,337.3
56	148.6	93.0	45.5	136.7	61.2	19.1	87.9	96.8	386.1	395.5	450.1	288.8	2,209.3
57	124.7	120.7	22.1	25.7	70.9	429.5	180.8	226.8	573.8	417.8	771.9	233.7	3,198.3
58	N.R	N.R	N.R	N.R	56.1	191.5	100.8	128.3	467.1	187.7	266.7	134.9	(N.A)
59	166.1	173.2	50.0	14.5	30.2	81.8	52.1	418.6	285.5	202.2	352.3	172.0	1,998.5
1960	306.6	229.4	9.1	69.6	146.8	158.8	48.8	67.8	110.5	487.9	139.2	207.3	1,981.8
61	95.3	132.8	24.1	33.0	180.8	48.3	576.8	616.5	209.8	365.3	307.8	139.7	2,730.3
62	194.3	41.1	67.3	30.7	176.0	188.2	696.2	401.1	148.8	111.5	186.4	107.2	2,348.8
63	213.6	108.5	0.8	49.3	1.3	311.9	169.2	60.2	233.9	135.1	107.7	312.2	1,703.7
64	14.5	57.6	5.7	0	136.8	92.1	20.1	290.5	394.5	404.7	1,028.2	391.9	2,836.6
65	418.5	9.7	18.9	6.7	114.1	276.3	232.5	112.9	271.2	147.7	158.6	144.7	1,911.8
66	13.4	41.2	33.5	50.8	270.6	66.3	90.3	70.1	272.8	368.0	699.5	282.4	2,258.9
67	93.4	66.9	30.8	84.6	10.7	420.4	81.9	577.7	356.7	534.7	192.6	302.8	2,753.2
68	63.7	45.3	51.5	65.1	40.2	165.7	450.5	407.9	443.8	85.5	33.5	33.4	1,886.1
69	N.R	23.7	33.7	5.2	45.9	129.6	285.3	17.5	393.6	329.5	298.4	218.7	N.A
1970	269.3	37.8	140.9	41.5	97.6	166.8	75.9	218.9	125.7	426.6	932.0	196.7	2,729.7
71	263.0	102.7	121.6	26.5	15.2	117.1	416.7	158.5	159.7	612.8	608.8	283.5	2,886.1
72	132.0	167.9	106.9	31.4	181.4	63.5	142.8	204.5	170.5	175.7	182.5	39.9	1,599.0
73	111.0	4.5	36.7	0.1	16.8	182.8	93.6	234.9	208.4	694.9	1,342.3	140.2	3,066.7
74	145.6	67.3	0.9	10.0	7.9	27.4	20.8	216.8	240.5	N.R	528.9	N.R	N.A
75	207.4	59.6	17.8	32.8	N.R	N.R	N.R	N.R	N.R	N.R	N.R	N.R	N.A
Total	3,659.0	2,072.4	1,082.3	857.2	2,169.4	4,211.8	4,758.2	6,128.3	7,188.8	8,485.7	10,865.3	5,075.7	
Ave.	152.5	82.9	43.3	32.3	86.8	168.5	190.3	245.1	287.6	353.6	434.6	211.5	2,289.0

Note: N.R; No Records N.A; Not Available

TABLE B-1-3 MONTHLY MINIMUM, MAXIMUM & MEAN TEMPERATURE

Station: TUGUEGARAO, CAGAYAN

(Unit: °C)

Year	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1949	12.6	31.8	22.2	14.3	35.0	24.6	18.9	36.1	27.5	19.4	38.9	29.2	21.0	40.4	30.7	22.8	39.2	31.0
1950	17.8	33.3	25.6	17.4	36.1	26.8	16.7	37.0	26.8	20.8	39.2	30.0	22.5	38.6	30.6	21.9	38.9	30.4
1951	15.7	33.4	24.6	16.7	35.3	26.0	16.4	37.2	26.8	20.0	38.6	29.3	22.0	38.8	30.4	22.9	38.3	30.6
1952	18.1	35.2	26.7	18.2	35.8	27.0	18.2	38.9	28.6	21.1	38.9	30.0	21.6	40.1	30.9	22.2	39.4	30.8
1953	16.9	33.8	25.4	18.2	34.9	26.6	18.5	36.9	27.7	22.1	38.1	30.1	22.8	38.2	30.5	22.0	38.0	30.0
1954	18.1	33.6	25.9	18.1	35.6	26.9	19.1	33.8	26.5	21.6	38.1	29.9	22.1	39.7	30.9	22.2	39.2	30.7
1955	17.2	33.9	25.6	14.2	35.0	24.6	17.6	36.2	26.9	21.1	38.6	29.9	21.2	40.4	30.8	22.0	41.7	31.9
1956	17.6	33.0	25.3	17.3	33.8	25.6	17.8	37.2	27.5	21.0	38.9	30.0	22.1	39.4	30.8	21.3	39.4	30.4
1957	17.7	33.0	25.5	16.6	34.4	25.5	20.6	36.1	28.4	17.8	38.9	28.4	19.4	40.2	29.8	22.8	40.2	31.5
1958	17.6	33.3	25.5	17.4	35.0	26.2	16.7	38.4	27.6	19.1	40.2	29.7	21.3	40.1	30.7	22.8	37.8	30.3
1959	15.3	34.7	25.0	17.2	36.0	26.6	18.8	34.7	26.8	19.3	38.9	29.1	21.9	38.4	30.2	22.0	40.1	31.1
1960	18.2	33.9	26.1	17.0	34.4	25.7	18.1	37.0	27.6	21.8	39.9	30.9	22.3	39.9	31.1	22.4	39.4	30.9
1961	15.4	34.4	24.9	15.8	38.4	27.1	17.1	38.9	28.0	18.9	40.0	29.4	21.9	41.3	31.6	21.8	41.1	31.4
1962	16.4	35.6	26.0	13.6	36.7	25.2	18.2	39.4	28.8	21.1	39.8	30.4	21.1	39.4	30.3	21.1	40.0	30.6
1963	15.0	33.3	24.2	15.2	35.0	25.1	15.7	37.8	26.8	16.3	41.9	29.1	21.0	42.1	31.6	22.2	41.7	31.9
1964	17.8	37.2	27.5	16.9	35.0	26.0	17.2	36.8	27.0	17.8	39.7	28.8	21.0	40.0	30.5	21.7	37.8	29.8
1965	15.0	32.3	23.6	16.1	35.6	25.8	17.8	37.9	27.8	20.0	38.9	29.4	22.3	40.6	31.4	23.3	38.3	30.8
1966	15.0	33.9	24.4	17.4	35.6	26.5	17.4	38.9	28.2	21.1	39.0	30.1	22.2	37.2	29.7	21.7	37.2	29.4
1967	16.4	32.2	24.3	12.9	33.9	23.4	16.4	37.6	27.0	20.3	37.3	28.8	20.6	39.4	30.0	20.6	38.3	29.4
1968	14.7	33.3	24.0	15.0	33.3	24.2	16.6	38.3	27.4	18.3	37.8	28.1	21.1	39.3	30.2	20.3	38.3	29.3
1969	16.1	35.6	25.8	16.7	36.9	26.8	17.0	39.4	28.2	20.5	40.3	30.4	21.8	42.2	32.0	21.7	40.0	30.8
1970	16.4	34.4	25.4	13.3	36.1	24.7	17.8	37.8	27.8	19.2	39.4	29.3	21.6	38.9	30.2	22.8	38.6	30.7
1971	15.0	32.8	23.9	16.1	35.6	25.8	14.0	38.3	26.2	17.8	38.9	28.4	22.2	37.8	30.0	22.2	37.8	30.0
1972	15.3	33.9	24.6	15.0	35.6	25.3	14.3	35.6	25.0	18.6	37.8	28.2	20.0	37.2	28.5	21.7	37.8	29.8
1973	17.2	33.3	25.2	15.3	35.8	25.6	16.3	36.7	26.5	19.4	39.4	29.4	21.8	40.2	31.0	22.2	40.1	31.4
Mean	16.3	33.8	25.1	16.1	35.4	25.7	17.3	37.3	27.3	19.8	39.1	29.4	21.6	39.6	30.6	22.0	39.1	30.6

Source: Temperature data prepared by Philippine CIADP Staff, 1975

TABLE B-1-4 MONTHLY MINIMUM, MAXIMUM & MEAN TEMPERATURE (Cont'd)

Station: TUGUEGARAO, CAGAYAN

(Unit: °C)

Year	Jul.			Aug.			Sept.			Oct.			Nov.			Dec.		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1949	21.6	38.7	30.2	22.2	37.7	30.0	21.4	35.8	28.6	20.7	35.7	28.2	18.9	34.4	26.6	17.2	33.3	25.2
1950	21.8	37.2	29.5	21.7	36.8	29.2	21.1	37.7	29.4	20.0	35.1	27.6	18.5	33.7	26.1	16.2	32.0	24.1
1951	27.4	38.3	32.9	22.2	37.8	30.0	19.9	37.1	28.5	19.6	36.8	28.2	19.3	35.0	27.2	18.1	33.3	25.7
1952	22.2	39.4	30.8	22.4	36.3	29.4	21.8	36.3	29.1	21.3	36.6	29.0	18.3	34.9	26.6	17.9	33.8	25.9
1953	21.3	37.2	29.3	22.4	37.0	29.7	21.3	36.6	29.0	21.0	35.1	26.1	21.0	36.7	28.9	19.6	31.8	25.7
1954	20.9	39.1	30.0	22.2	37.4	29.8	22.2	37.1	29.7	21.2	35.0	28.1	17.4	33.9	25.7	15.8	32.2	24.0
1955	22.0	37.7	29.9	22.2	37.2	29.7	22.1	38.7	30.4	21.1	35.6	28.4	19.2	33.9	26.6	15.1	32.3	23.7
1956	22.2	37.3	29.8	21.3	37.1	29.2	22.0	36.1	29.1	21.0	34.7	27.9	19.7	35.0	27.4	18.9	31.1	25.0
1957	22.1	37.6	29.9	22.1	37.9	30.0	21.7	36.7	29.2	19.4	36.1	27.8	16.2	35.0	25.6	18.8	33.4	26.1
1958	22.4	38.6	30.5	21.8	37.8	29.8	22.4	36.1	29.3	19.7	35.6	27.7	16.6	32.8	24.7	16.9	33.9	25.4
1959	21.1	39.0	30.1	22.4	39.3	30.4	22.1	37.6	29.9	19.3	37.4	28.4	17.3	36.4	27.0	17.4	35.0	26.2
1960	22.0	39.2	30.6	21.0	39.4	30.2	22.1	36.8	29.5	19.2	36.1	27.7	17.4	35.9	26.7	17.2	36.0	26.6
1961	21.2	37.8	29.5	22.0	37.4	29.7	21.3	37.2	29.2	17.3	36.7	27.0	19.4	36.8	28.1	17.7	35.7	26.7
1962	21.8	37.2	29.5	21.7	37.7	29.7	21.1	37.1	29.1	19.6	37.3	28.4	19.1	35.6	27.4	17.4	36.7	27.1
1963	21.7	36.7	29.2	22.4	37.8	30.1	20.6	38.9	29.8	20.6	36.1	28.4	16.7	37.8	27.2	16.7	35.6	26.2
1964	20.4	37.8	29.1	21.7	37.2	29.4	22.2	36.7	29.4	21.6	36.1	28.8	20.5	33.9	27.2	16.9	33.3	25.1
1965	21.1	37.2	29.2	22.2	37.8	30.0	21.0	36.1	28.6	16.7	35.6	26.2	19.1	36.7	27.9	16.9	32.2	24.6
1966	22.2	37.2	29.7	22.2	37.2	29.7	19.4	36.1	27.8	17.8	36.3	27.1	21.0	34.4	27.7	19.1	33.3	26.2
1967	22.8	38.9	30.8	22.7	35.6	29.2	20.6	35.6	28.1	18.2	34.4	26.3	17.8	33.0	25.4	14.7	31.7	23.2
1968	21.7	37.8	29.8	21.1	37.8	29.4	22.2	36.7	29.4	17.1	36.1	26.6	15.6	33.9	24.8	14.9	34.4	24.6
1969	21.1	38.9	30.0	21.1	38.3	29.7	22.2	38.3	30.2	19.4	37.1	28.2	17.7	35.6	26.6	23.0	33.3	28.2
1970	21.1	39.9	30.5	22.8	37.2	30.0	22.1	36.1	29.1	21.8	36.1	29.0	20.3	34.4	27.4	19.7	33.3	26.5
1971	22.2	37.2	29.7	21.7	37.7	29.7	21.7	38.3	30.0	21.0	36.1	28.6	20.0	32.8	26.4	19.4	32.2	25.8
1972	22.6	36.7	29.6	21.9	36.7	29.3	20.6	36.1	28.4	17.8	36.1	27.0	19.7	36.1	27.9	17.8	33.0	25.4
1973	21.1	37.3	29.2	21.7	35.6	28.6	22.0	35.9	29.0	21.1	34.7	27.9	18.9	33.0	26.1	16.7	31.1	23.9
Mean	21.9	38.0	30.0	22.0	37.4	29.7	21.5	36.9	29.2	19.7	35.9	27.8	18.6	34.9	26.8	17.6	33.4	25.5

Source: Temperature data prepared by Philippine CIADP Staff, 1975

TABLE B-1-5 MONTHLY MINIMUM, MAXIMUM & MEAN TEMPERATURE

Station: APARRI, CAGAYAN

(Unit: °C)

Year	Jan.			Feb.			Mar.			Apr.			May			Jun.		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1949	19.7	24.4	22.1	20.4	27.5	23.9	21.8	29.4	25.6	23.2	31.9	27.6	24.8	34.2	29.5	24.8	33.4	29.1
1950	21.0	27.3	25.7	21.1	27.9	24.6	22.1	29.1	25.6	23.6	31.8	27.7	24.1	33.6	28.8	24.7	33.1	28.9
1951	20.6	27.5	24.1	21.2	28.1	24.6	21.9	30.5	26.2	23.4	33.0	28.2	24.0	32.9	28.4	24.3	33.9	29.1
1952	20.8	27.1	24.0	21.4	28.9	25.2	22.8	31.5	27.2	28.7	32.6	28.2	24.8	34.9	29.9	25.1	34.4	29.7
1953	20.0	27.0	23.9	21.7	27.7	24.7	22.9	30.9	26.9	24.4	31.8	28.1	24.4	33.8	29.0	24.9	33.5	29.2
1954	21.7	28.7	25.2	21.8	27.9	24.9	22.4	29.2	25.8	24.2	33.6	28.9	25.1	35.5	30.3	24.9	34.9	29.9
1955	20.4	25.6	23.0	20.7	28.1	24.3	21.0	29.8	25.4	23.8	31.7	27.7	24.7	33.8	29.2	24.4	33.8	29.1
1956	20.8	26.6	23.7	21.2	27.5	24.4	22.2	29.5	25.8	23.6	31.4	27.5	24.5	33.5	29.0	24.6	34.7	29.6
1957	20.9	26.2	23.6	20.8	27.5	24.2	23.0	29.7	26.4	23.7	31.9	27.8	24.0	34.5	29.2	24.9	33.3	29.1
1958	20.7	26.5	22.2	20.5	27.3	23.9	22.1	30.3	26.2	23.0	31.8	27.4	24.6	34.0	29.3	24.6	32.4	28.5
1959	20.0	26.5	23.2	21.3	29.6	25.4	22.1	29.3	25.7	23.3	32.5	27.9	24.4	33.9	29.2	25.3	36.0	30.6
1960	21.5	26.4	24.0	21.1	26.3	23.7	22.8	31.4	27.1	24.3	31.9	28.1	25.1	33.8	29.5	25.2	33.4	29.3
1961	19.7	26.1	22.9	21.0	28.5	24.8	22.7	29.8	26.3	23.8	32.4	28.1	25.4	33.9	29.7	25.2	34.1	29.7
1962	20.1	25.0	22.6	19.5	26.9	23.2	22.6	29.5	26.1	23.7	30.8	27.3	24.8	34.3	29.6	24.5	34.3	29.4
1963	17.4	22.1	19.8	18.5	24.0	21.3	20.2	27.6	23.9	21.4	29.4	25.4	24.2	32.5	28.4	24.2	31.6	27.9
1964	21.5	27.4	24.5	20.5	26.4	23.5	21.8	28.3	25.1	22.7	31.0	26.9	24.4	32.1	28.2	24.8	32.8	28.3
1965	19.8	24.1	22.0	20.5	27.3	23.9	21.2	28.0	24.6	23.4	31.3	27.4	24.4	31.8	28.1	24.6	32.2	28.4
1966	21.3	27.7	24.5	21.9	28.3	25.1	22.5	30.0	26.3	24.5	31.6	28.1	24.6	30.7	27.7	25.1	32.4	28.8
1967	20.3	24.7	22.5	19.4	25.2	22.3	21.1	27.8	24.6	23.7	31.5	27.6	24.3	34.1	29.2	24.5	32.9	28.7
1968	20.0	25.6	22.8	19.5	25.6	22.7	22.0	28.6	25.3	22.4	29.8	26.1	24.6	32.9	28.8	24.6	33.1	28.9
1969	21.5	28.5	24.6	20.6	28.0	24.3	22.4	30.0	26.2	23.5	31.1	27.3	25.2	34.8	29.9	27.5	34.5	30.0
1970	20.8	25.4	23.0	20.3	27.0	23.7	23.3	29.6	26.5	23.9	30.9	27.4	24.7	34.0	29.4	25.4	33.4	29.4
1971	19.5	24.8	22.2	20.8	26.6	23.7	20.9	27.1	24.0	23.1	29.9	26.5	24.6	32.2	28.4	24.9	33.5	29.2
1972	21.1	26.2	23.7	20.7	27.8	24.3	20.2	27.1	23.7	23.3	30.5	27.0	24.1	33.1	28.7	25.1	33.9	29.5
1973	21.7	27.8	24.8	21.8	29.6	25.7	22.1	30.8	26.5	24.3	33.8	29.1	25.2	35.1	30.2	25.1	34.6	29.9
Mean	20.5	26.2	23.4	20.7	27.4	24.1	22.0	29.4	25.7	23.5	31.6	27.6	24.6	33.6	29.1	24.9	33.6	29.2

Source: Temperature data prepared by Philippine CIADP Staff, 1975

TABLE B — 1 — 6 MONTHLY MINIMUM, MAXIMUM & MEAN TEMPERATURE (Cont'd)

Station: APARRI, CAGAYAN

(Unit: °C)

Year	Jul.			Aug.			Setp.			Oct.			Nov.			Dec.		
	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.	Mean
1949	22.6	33.8	29.2	24.6	34.4	29.0	24.1	31.3	27.7	23.9	29.9	26.9	22.9	28.4	25.7	21.5	27.6	24.6
1950	24.3	32.9	28.7	24.2	32.2	28.1	24.2	31.9	28.1	23.3	29.9	26.6	22.4	28.7	25.6	20.2	26.2	23.2
1951	24.1	33.1	28.6	24.8	32.2	28.6	24.6	31.7	28.1	23.8	31.4	27.6	23.4	28.3	25.9	21.8	27.1	24.4
1952	25.4	34.0	29.7	24.6	32.3	28.4	24.2	31.7	27.9	24.4	31.2	27.8	23.4	29.4	26.4	22.1	26.8	24.4
1953	24.6	33.7	29.1	24.5	32.8	28.7	24.1	32.1	28.2	23.7	31.6	27.7	23.6	30.1	26.9	22.1	26.8	24.4
1954	24.7	34.6	29.4	24.8	33.3	28.5	24.3	31.9	28.1	23.6	29.4	26.4	22.4	28.3	25.3	21.3	26.5	23.9
1955	24.2	33.4	28.8	24.1	31.9	28.0	24.2	32.1	28.2	23.7	29.7	26.7	23.2	27.0	25.1	20.1	26.4	23.2
1956	24.6	23.8	29.2	24.6	32.7	28.6	24.1	31.8	27.7	23.5	30.3	26.9	22.6	27.1	24.8	22.2	26.0	24.1
1957	24.7	32.9	28.8	24.7	33.1	28.9	24.1	31.3	27.7	23.6	30.5	27.0	21.8	28.5	25.2	22.1	28.0	25.0
1958	24.4	33.4	28.9	23.9	32.5	28.2	24.2	31.2	27.7	23.9	30.9	27.4	22.5	28.5	25.5	20.9	27.8	24.4
1959	24.8	34.5	29.6	25.0	33.2	29.1	24.3	32.8	28.6	23.5	30.3	26.9	22.9	28.1	25.5	21.9	28.1	25.0
1960	24.9	34.0	29.5	25.3	33.2	29.3	24.3	31.9	28.1	24.0	30.8	27.4	23.0	29.8	26.4	21.6	27.0	24.3
1961	24.5	31.5	28.0	24.7	32.0	28.4	24.3	31.8	28.1	23.4	30.8	27.1	22.5	29.4	26.0	22.0	27.5	24.8
1962	24.1	31.5	28.1	24.1	32.2	28.2	24.5	31.0	27.7	23.8	29.8	26.8	22.2	28.3	25.3	20.6	26.3	23.5
1963	24.5	31.9	28.2	24.9	32.6	28.8	24.6	31.6	28.1	23.4	29.4	26.4	22.5	28.8	25.7	21.6	26.1	23.9
1964	24.7	32.7	28.7	24.5	31.2	27.9	24.3	30.9	27.6	24.1	29.9	27.0	22.9	26.0	24.5	21.2	25.6	23.3
1965	24.3	31.1	27.7	24.6	31.8	28.2	24.2	30.6	27.4	23.5	29.4	26.5	23.4	28.8	26.1	21.6	27.2	24.4
1966	24.8	31.7	28.3	24.9	31.4	28.2	24.0	30.1	27.1	23.6	28.3	26.0	23.1	27.0	25.1	22.3	26.4	24.3
1967	24.6	32.9	28.8	24.2	30.0	27.6	24.0	30.6	27.3	23.0	28.8	26.0	22.7	27.8	25.3	20.0	24.1	22.1
1968	25.3	32.7	29.0	25.1	31.7	28.4	24.7	30.7	27.7	23.3	28.8	26.1	21.5	27.1	24.3	20.6	26.6	23.6
1969	25.3	32.8	29.1	24.9	33.0	29.0	24.9	31.4	28.2	23.8	29.5	26.7	22.8	27.2	25.0	21.3	25.0	23.2
1970	25.4	33.5	29.5	24.5	32.5	28.5	24.5	31.6	28.1	24.2	30.3	27.2	23.3	28.1	25.8	22.7	28.0	25.4
1971	24.7	31.7	28.2	24.5	32.9	28.7	24.3	32.1	28.2	23.6	29.1	26.4	22.9	26.8	24.9	21.8	25.8	23.8
1972	25.2	32.5	28.9	24.8	32.2	28.5	24.6	31.4	28.0	28.9	31.0	27.5	23.3	29.8	26.6	22.4	28.0	25.2
1973	25.5	33.6	29.6	24.5	32.5	28.5	24.2	32.5	28.6	24.0	29.9	27.5	23.4	28.1	25.8	21.0	25.6	23.3
Mean	24.6	33.0	28.8	24.6	32.4	28.5	24.3	31.5	27.9	23.7	30.0	26.9	22.8	28.2	25.5	21.5	26.7	24.1

Source: Temperature data prepared by Philippine CIADP Staff, 1975

TABLE B—1—7

Alimanao Reservoir, Tuguegarao Cagayan

Evaporation (Open, Rim)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1957	129.0	181.4	236.5	267.0	309.6	246.1	202.2	192.0	192.0	156.7	150.1	125.1	2,387.8
1958		161.5	224.3	266.7	277.1	163.6	184.9	157.5	173.5	120.6	129.3	125.7	2,111.7
1959		153.9	154.7	253.0	218.4	196.6	211.3	137.4	159.8	161.8	135.6	122.7	2,040.3
1960	148.0	132.6	217.4	178.3	236.2	175.0	156.5	168.2	149.1	168.1	155.7	156.0	2,041.1
1961	156.2	146.3	208.3	211.3	204.5	199.9	173.7	151.6	141.5	156.7	149.9	146.0	2,045.9
1962	149.0	156.2	216.7	245.9	217.7	211.3	157.7	177.5	204.0	189.7	147.8	154.9	2,229.3
1963	152.9	139.4	143.8	242.1	267.2	185.2	206.6	212.6	208.3	216.4	185.2	164.8	2,324.4
1964	148.0	132.8	201.9	241.6	266.4	183.9	229.6	200.4	169.2	162.9	69.9	132.8	2,139.1
1965	145.0	136.6	227.3	237.7	179.3	155.4	161.8	146.8	166.6	147.3	163.8	67.1	1,934.7
1966	153.4	196.1	228.6	232.9	164.8	185.7	190.0	170.4	190.5	193.3	127.8	169.9	2,203.4
1967	183.6	169.7	212.1	187.7	213.6	194.6	180.1	168.2	167.2	118.1	56.6	135.5	1,987.0
1968	128.5	172.5	225.0	250.0	208.5	174.0	107.4	135.6	85.1	163.6	148.0	160.0	1,958.2
1969	159.0	182.4	221.0	250.5	280.0	230.1	184.1	187.0	156.5	144.0	134.6	136.5	2,265.6
1970	121.0	152.0	191.4	218.0	228.0	168.5	180.1	168.2	161.5	162.5	120.0	121.4	1,992.6

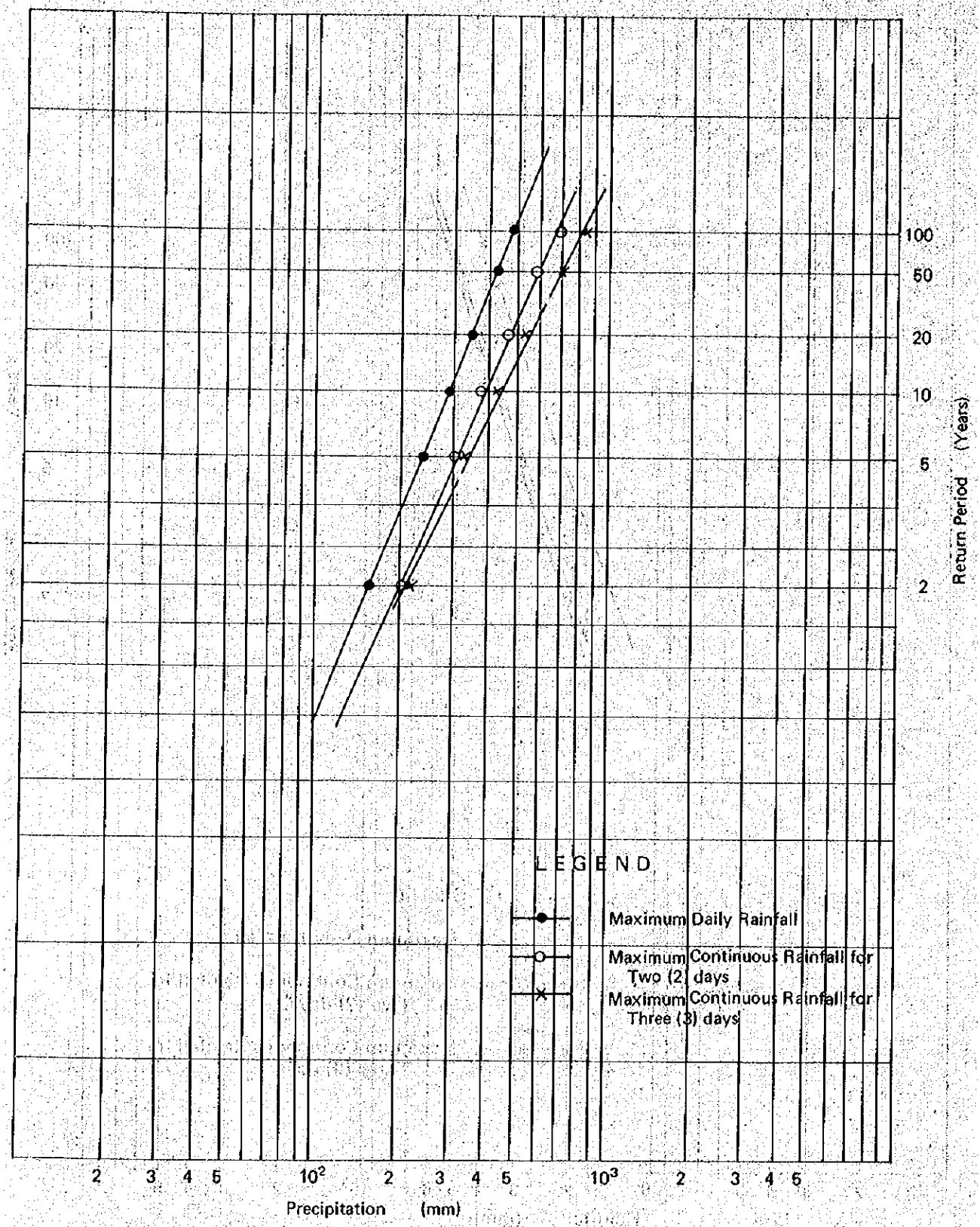
1. Estimated from record at Talictic Station, Ramon, Isabela.

TABLE B — 1 — 8 Alimanao Reservoir, Tuguegarao Cagayan

Evaporation (Open Rim)

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Mean													
1957-58	148.0	155.1	206.5	233.1	232.3	190.7	180.1	168.2	167.2	162.9	133.8	136.5	2,114.4
Darily	4.8	5.4	6.7	7.8	7.5	6.4	5.8	5.4	5.6	5.2	4.5	4.4	5.7
1957-70	145.4	158.1	207.7	234.4	133.6	190.7	180.3	169.4	165.9	161.5	133.8	136.9	2,117.7
Daily	4.6	5.6	6.7	7.8	7.5	6.4	5.8	5.4	5.5	5.2	4.4	4.4	5.8
1949	4.6	5.6	6.7	7.8	7.5	6.4	5.8	5.4	5.5	5.2	4.4	4.4	
1963	4.9	5.0	4.6	8.1	8.6	6.2	6.7	6.9	6.9	7.0	6.2	5.3	
1965	4.7	4.9	7.3	7.9	5.8	5.2	5.2	4.7	5.5	4.8	5.5	2.2	
1969	5.1	6.5	7.1	8.3	9.0	7.7	5.9	6.0	5.2	4.7	4.5	4.4	
1972	4.6	5.6	6.7	7.8	7.5	6.4	5.8	5.4	5.5	5.2	4.4	4.4	

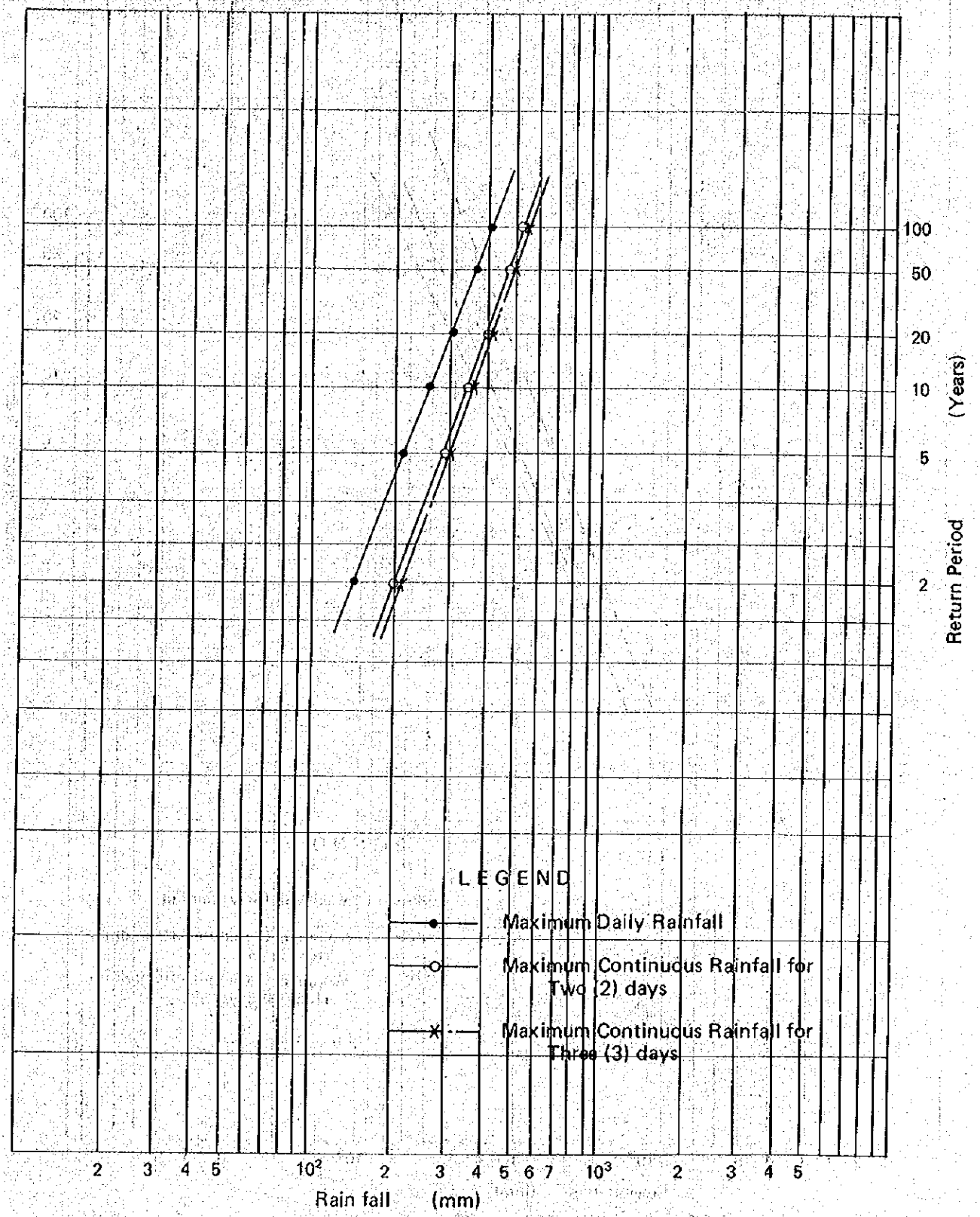
FIGURE B-1-1 PROBABILITY OF RAINFALL, APARRI



Note: Observation Period 1950 - 1973 25 years

Source: Rainfall data prepared by Philippine CIADP Staff, 1975

FIGURE B—1 — 2 PROBABILITY OF RAINFALL, TUGUEGARAO



Note: Observation Period 1949 to 1973 25 years
Source: Rainfall data prepared by Philippine CIADP Staff, 1975

TABLE B-1-9 Probability of Rainfall

Station	TUGUEGARAO			APARRI		
Return Period	Maximum Daily Rainfall (mm)	Max. Cont. Rainfall for 2 days (mm)	Max. Cont. Rainfall for 3 days (mm)	Maximum Daily Rainfall (mm)	Max. Cont. Rainfall for 2 days (mm)	Max. Cont. Rainfall for 3 days (mm)
2	146.5	198.7	205.3	157.8	200.4	218.2
5	211.6	284.0	292.6	231.3	298.6	329.5
10	256.7	341.1	351.2	285.5	377.4	426.2
20	301.2	396.2	407.7	341.2	462.9	536.7
50	360.6	468.3	481.8	418.8	588.3	707.1
100	406.7	523.2	538.2	481.0	693.7	856.7
200	454.1	578.9	595.4	546.7	808.9	1,025.9
500	519.1	654.0	672.6	639.4	977.6	1,282.9

Note: Probable rainfall was estimated by IWI method
Observation Period

Tuguegarao	1949 - 1973	25 years
Aparri	1950 - 1974	25 years

Source: Rainfall data prepared by Philippine CIADP staff, 1975.

TABLE B—1—10 Maximum Daily Rainfall

(Unit: mm)

No.	TUGUEGARAO Amount	TUGUEGARAO Occurrence Date	APARRI Amount	APARRI Occurrence Date
1	349.7	Nov. 22, 1973	453.1	Nov. 22, 1973
2	293.7	Aug. 6, 1964	381.0	Nov. 12, 1957
3	254.8	Aug. 23, 1961	271.5	Nov. 3, 1970
4	230.1	Oct. 16, 1967	243.5	Sept. 18, 1951
5	219.5	Nov. 16, 1953	241.3	Sept. 28, 1968
6	210.9	Sept. 18, 1951	226.5	Oct. 16, 1967
7	202.4	Oct. 12, 1960	222.7	Jul. 19, 1971
8	187.7	Jul. 19, 1965	211.9	Sept. 2, 1965
9	180.7	Nov. 20, 1971	188.7	Aug. 23, 1961
10	178.7	Aug. 19, 1968	161.8	Nov. 21, 1964
11	175.4	Oct. 4, 1959	158.8	Sept. 4, 1963
12	155.1	Sept. 7, 1958	158.5	Aug. 30, 1962
13	133.0	Jul. 13, 1970	148.6	Nov. 21, 1966
14	132.1	Dec. 14, 1952	148.0	Sept. 7, 1959
15	126.1	Nov. 15, 1956	144.3	Aug. 11, 1953
16	125.7	Nov. 17, 1954	130.3	Dec. 24, 1956
17	123.7	Nov. 13, 1957	125.4	Sept. 24, 1950
18	112.0	Jul. 20, 1963	125.0	Nov. 24, 1952
19	109.5	Sept. 25, 1950	124.8	Jul. 26, 1969
20	106.2	Nov. 26, 1966	117.1	Nov. 4, 1954
21	101.9	Oct. 2, 1949	116.3	Nov. 13, 1974
22	86.1	Jun. 2, 1969	95.1	Oct. 12, 1960
23	82.8	Oct. 12, 1955	89.9	Sept. 7, 1958
24	75.5	Jul. 24, 1962	87.7	Oct. 15, 1955
25	65.0	Aug. 11, 1972	84.6	Sept. 29, 1972

Source: Climatological Data Prepared by Philippine CIADP staff, 1975

TABLE 8—1—11 Maximum Continuous Rainfall for Two (2) Days

(Unit: mm)

No.	TUGUEGARAO Amount	TUGUEGARAO Occurrence Date	APARRI Amount	APARRI Occurrence Date
1	516.2	Nov. 21-22, 1973	654.6	Nov. 12-13, 1957
2	325.9	Oct. 16-17, 1967	496.9	Nov. 21-22, 1973
3	327.2	Nov. 15-16, 1964	340.8	Jul. 19-20, 1971
4	306.0	Oct. 11-12, 1960	321.7	Aug. 23-24, 1961
5	294.0	Jul. 28-29, 1951	320.9	Nov. 3-4, 1970
6	277.1	Aug. 18-19, 1968	299.6	Sept. 27-28, 1968
7	274.2	Nov. 16-17, 1953	288.7	Oct. 16-17, 1967
8	259.2	Oct. 3-4, 1959	280.8	Oct. 28-29, 1951
9	258.2	Aug. 22-23, 1961	244.2	Nov. 20-21, 1966
10	244.4	Jul. 18-19, 1965	220.3	Aug. 10-11, 1953
11	223.9	Nov. 12-13, 1957	219.0	Sept. 24-25, 1950
12	205.3	Nov. 20-21, 1966	194.0	Aug. 29-30, 1962
13	192.9	Oct. 9-10, 1971	191.5	Nov. 5-6, 1964
14	190.4	Sept. 7-8, 1958	176.1	Sept. 5-6, 1969
15	179.3	Nov. 17-18, 1954	168.1	Nov. 23-24, 1952
16	176.4	Nov. 15-16, 1956	165.9	Oct. 12-13, 1954
17	151.4	Dec. 14-15, 1952	162.8	Nov. 12-13, 1974
18	140.1	Oct. 2-3, 1949	162.4	Aug. 20-21, 1959
19	138.9	Nov. 9-10, 1955	162.4	Sept. 3-4, 1963
20	138.8	Oct. 26-27, 1970	146.5	Dec. 23-24, 1956
21	130.6	Dec. 8-9, 1963	137.9	Sept. 23-24, 1958
22	127.6	Sept. 25-26, 1950	132.8	Oct. 11-12, 1960
23	122.2	Sept. 30-Oct. 1, 1969	127.4	Oct. 18-19, 1955
24	110.3	Oct. 16-17, 1962	119.7	Jan. 7-8, 1965
25	75.7	Aug. 24-25, 1972	116.1	Sept. 28-29, 1972

Source: Climatological Data Prepared by Philippine CIADP Staff, 1975

TABLE B — 1 — 12

Maximum Continuous Rainfall for Three(3) Days

(Unit: mm)

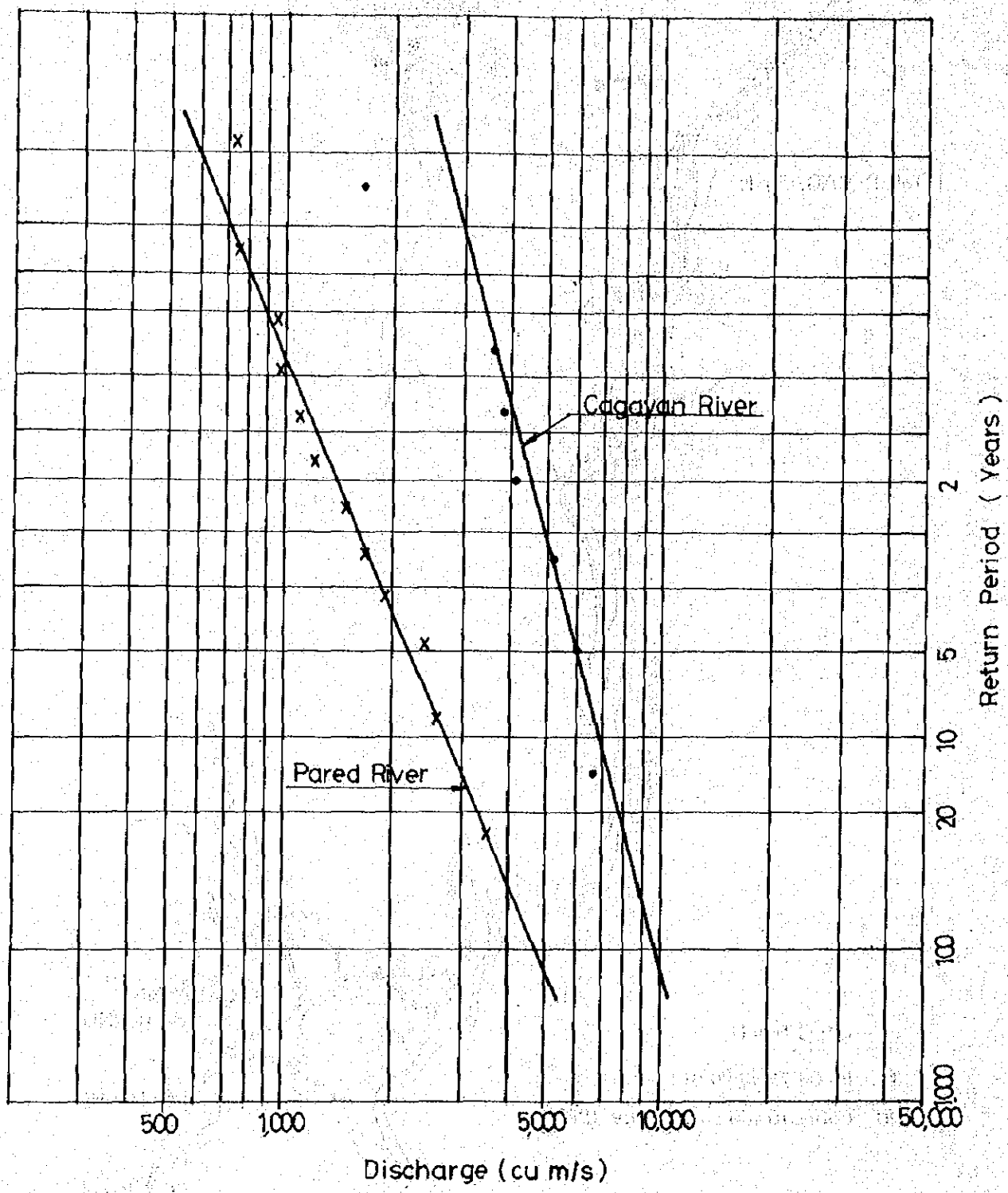
No.	TUGUEGARAO, CAGAYAN Amount	Occurrence Date	APARRI Amount	Occurrence Date
1	521.3	Nov. 20-22, 1973	682.3	Nov. 12-14, 1957
2	364.1	Nov. 15-17, 1964	513.7	Nov. 21-23, 1973
3	335.8	Oct. 15-17, 1967	418.1	Nov. 3- 5, 1970
4	309.2	Oct. 11-13, 1960	348.6	Jul. 19-21, 1971
5	280.2	Oct. 9-11, 1971	332.2	Aug. 22-24, 1961
6	280.0	Nov. 15-17, 1958	323.1	Sept. 27-29, 1968
7	276.9	Sept. 26-28, 1968	318.3	Oct. 27-29, 1951
8	273.2	Nov. 22-24, 1961	293.1	Nov. 20-22, 1966
9	264.4	Oct. 3- 5, 1959	291.5	Oct. 15-17, 1967
10	252.6	Nov. 11-13, 1957	239.6	Jul. 17-19, 1962
11	227.5	Nov. 20-22, 1966	223.4	Aug. 10-12, 1953
12	216.8	Sept. 16-18, 1951	222.7	Sept. 23-25, 1950
13	216.3	Sept. 7- 9, 1958	220.8	Dec. 14-16, 1964
14	208.5	Nov. 15-17, 1956	218.1	Sept. 5- 7, 1969
15	181.8	Nov. 16-18, 1954	197.7	Oct. 11-13, 1954
16	178.8	Oct. 28-30, 1970	188.9	Nov. 12-14, 1974
17	161.0	Aug. 6- 8, 1952	185.5	Sept. 7- 9, 1958
18	154.1	Jul. 22-24, 1949	180.1	Nov. 23-25, 1952
19	152.1	Nov. 9-11, 1955	178.9	Aug. 21-23, 1959
20	135.0	Sept. 24-26, 1950	168.3	Oct. 11-13, 1960
21	131.3	Dec. 8-10, 1963	165.4	Sept. 3- 5, 1963
22	126.8	Nov. 17-19, 1969	151.9	Dec. 23-25, 1956
23	118.3	Oct. 16-18, 1962	142.4	Oct. 14-16, 1955
24	112.3	Jul. 12-14, 1965	131.7	Jan. 7-19, 1965
25	85.1	May 12-14, 1972	127.2	Oct. 22-24, 1972

Source: Climatological Data Prepared by Philippine CIADP Staff, 1975

APPENDIX B – 2 HYDROLOGICAL DATA

PROBABILITY DISCHARGE OF CAGAYAN RIVER AND PARED RIVER

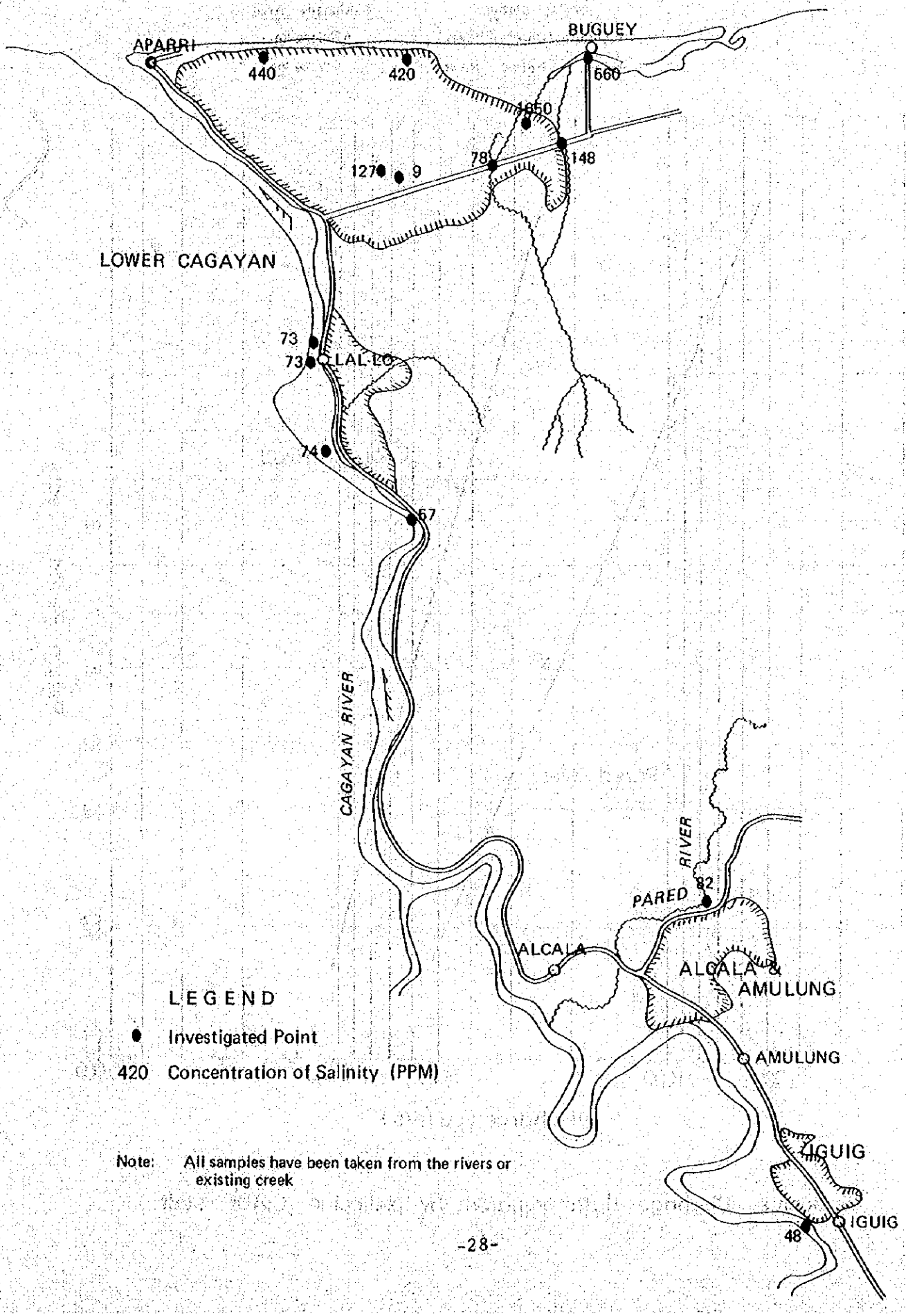
Gaging Station	Catchment Area
Nagullian (Cagayan River)	6,266 sq km
Alcala (Pared River)	907 sq km



Source : Dischage data prepared by philippine CIADP staff.

APPENDIX B-3 SALINTY

FIGURE B-3-1 RESULT OF SALINITY TEST (NOV. 1975)



Note: All samples have been taken from the rivers or existing creek

TABLE B — 3 — 1 Result of Salinity (1975)

Place	Date	Time	Trial	Depth of Observation from W.S. (M)	Temp. (°C)	Electrical Conductivity μυ/cm	Concentration of Salinity (PPM)	Remarks
Iguig P.S.	Nov. 4	3:30p.m.	1	5	27	105	47	
-do-		3:40p.m.	1	10	26.5	110	48	
-do-	Nov. 5	3:00p.m.	1	surface	27	47	22	
Pared P.S.	Nov. 5	3:45p.m.	1	surface	27	180	82	Sample taken near the Left Bank
			2	surface	26.5	180	82	-do-
Magapit P.S. Lal-lo	Nov. 5	5:00p.m.	1	-do-	26.0	120	56	
			2	-do-	26.0	110	57	
-do-	Nov. 5	5:15p.m.	1	-do-	26.0	120	56	
Catayuan Lal-lo	Nov. 6	9:35a.m.	1	-do-	25.0	150	71	Sample taken near the Right Bank
			2	-do-	25.5	135	65	-do-
-do-	Nov. 6	10:13a.m.	1	-do-	27.0	160	70	Approx. the Middle of river
-do-		10:17a.m.	1	6.0	26.7	150	68	-do-
			2	6.0	26.5	150	68	-do-
-do-		10:25a.m.	1	8.0	27.0	130	58	-do-
			2	8.0	27.0	145	68	-do-

(Cont'd)

Place	Date	Time	Trial	Depth of Observation from W.S. (M)	Temp. (°C)	Electrical Conductivity μυ/cm	Concentration of Salinity (PPM)	Remarks
Catayuan Lal-lo	Nov. 6	10:28a.m.	1	5.0	27.0	130	60	Near the Right Bank
-do-			2	5.0	26.5	160	74	-do-
-do-	Nov. 6	10:30a.m.	1	8.0	27.0	160	73	-do-
Lal-lo Proper			2	8.0	27.0	160	73	-do-
Lal-lo Proper	Nov. 6	10:49a.m.	1	surface	28.0	150	68	Near C.B.
Lal-lo Proper			2		28.0	145	68	
-do-	Nov. 6	10:50a.m.	1	5.0	28.0	160	70	-do-
			2		28.0	150	68	
-do-	Nov. 6	11:03a.m.	1	5.0	28.0	160	70	Middle of stream
			2		28.0	160	70	
-do-	Nov. 6	11:05a.m.	1	7.0	28.0	160	70	Middle of stream
			2		28.0	160	70	
San Jose Lal-lo	Nov. 6	11:12a.m.	1	surface	28.0	165	73	Near the Right Bank
	Nov. 6		2		28.0	165	73	
San Jose Lal-lo	Nov. 6	11:15a.m.	1	5.0	28.0	160	72	-do-
	Nov. 6		2		28.5	160	72	

(Cont'd)

Place	Date	Time	Trial	Depth of Observation from W.S. (M)	Temp. (°C)	Electrical Conductivity μo/cm	Concentration of Salinity (PPM)	Remarks
Dalaya Bridge	Nov. 7	10:18a.m.	1	surface	26.0	170	78	
			2		27.0	170	78	
Camannanwan Cr.	Nov. 7	10:25a.m.	1	surface	29.0	190	80	
			2		30.0	185	79	
Ziminila Cr.	Nov. 7		1	surface	27.0	20	9	
			2		28.0	19	8	
-do-			1	bottom	29.0	20	9	
			2		27.0	19	9	
Minanga	Nov. 7	11:40a.m.	1	surface	31.0	290	127	
			2		31.0	285	125	
Toodan	Nov. 7	1:28p.m.	1	surface	31.0	940	420	
			2		31.0	920	410	
	Nov. 7	1:35p.m.	1	surface	28.0	900	440	Well near the sea
			2		29.0	900	440	
Punta, Padaya	Nov. 7	2:05p.m.	1		27.0	860	420	Shallow well
			2		27.0	810	400	
	Nov. 7	2:10p.m.	1		27.0	310	145	Pump well
			2		27.0	310	145	
	Nov. 7	2:15p.m.	1	surface	30.0	490	210	Creek
			2		30.0	495	210	

(Cont'd)

Place	Date	Time	Trial	Depth of Observation from W.S. (M)	Temp. (°C)	Electrical Conductivity µ0/cm	Concentration of Salinity (PPM)	Remarks
Camannauan Cr. Buguey	Nov. 6	3:00p.m.	1	surface	29.0	325	148	At boundary
			2	-do-	29.0	320	145	-do-
	Nov. 6	3:06p.m.	1	bottom	29.0	295	135	-do-
			2	-do-	29.0	305	137	-do-
Buguey River	Nov. 6	3:30p.m.	1	1.0	30.0	1,260	560	At bridge
			2		30.0	1,260	560	-do-
-do-			1	surface	30.0	1,080	485	-do-
			2		30.0	1,050	480	-do-
Quinawegan			1	surface	28.0	3,300	1,650	Tributhry of Buguey River
Creek			2	-do-	28.0	3,300	1,650	
Quinawegan			1	surface	28.0	4,800	2,450	Sample from soil
			2	-do-	28.0	4,700	2,400	-do-
Dalaya	Nov. 7	9:35a.m.	1	surface	29.0	165	71	
			2		29.0	170	74	
-do-	Nov. 7	9:39a.m.	1	bottom	29.0	160	71	
			2		29.0	160	71	
	Nov. 7	9:50a.m.	1	surface	29.0	150	66	Taken at Paddy Field
			2		28.0	145	64	

FIGURE B—3—2 RESULT OF SALINITY TEST, CAGAYAN RIVER

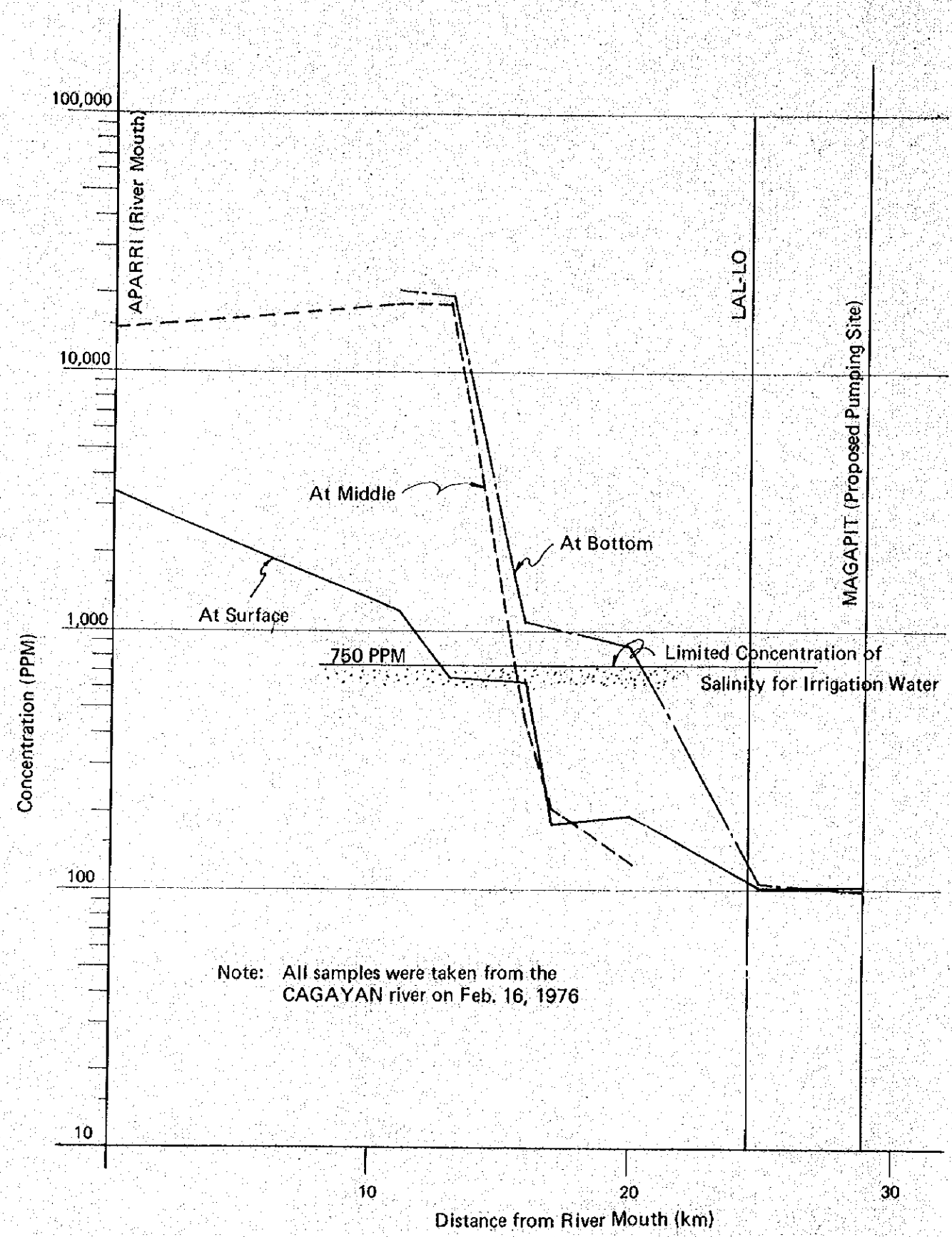


TABLE B-3-2 RESULT OF SALINITY TEST, CAGAYAN RIVER, 1976

Place	Date	Time	Trial	Depth of Observation (m)	Temperature (°C)	Electrical Conductivity (mℭ/cm)	Concentration of Salinity (PPM)	Remarks
Catayuan	Feb. 9	10:10 a.m.	1	0	24.5	180	85	- Water sample was taken at the middle of the river
		-do-	1	2.0	24.5	180	85	
		10:20 a.m.	1	4.0	24.5	190	90	
		10:40 a.m.	1	0	23.5	180	84	- Water sample was taken at the right side of the river
		-do-	2	0	23.5	180	84	
		-do-	1	3.5	23.5	190	88	
		-do-	2	3.5	23.5	180	84	
		10:50 a.m.	1	1.75	23.5	190	88	
		-do-	2	1.75	23.5	185	86	
Bisang Creek (at map)	Feb. 9	11:30 a.m.	1	0	23.5	190	88	- Water sample was taken at the right side of the river
		-do-	2	0	23.5	180	84	
		11:40 a.m.	1	3.0	23.5	175	80	
		-do-	2	3.0	23.5	180	84	
		-do-	1	1.5	23.5	180	84	
		-do-	2	1.5	23.5	185	86	
		11:50 a.m.	1	0	23.5	185	86	- Water sample was taken at the middle of the river
		-do-	2	0	23.5	185	86	
		-do-	1	2.5	23.5	185	86	
		-do-	2	2.5	23.5	185	86	
		-do-	1	1.25	23.5	190	88	
		-do-	2	1.25	23.5	175	80	
Lal-lo, proper	Feb. 9	0:30 p.m.	1	0	23.5	190	88	- Water sample was taken at the middle middle of the river
		-do-	2	0	23.5	185	86	
		-do-	1	2.5	23.5	190	88	
		-do-	2	2.5	23.5	185	86	
		-do-	1	1.25	23.5	180	84	
		-do-	2	1.25	23.5	185	86	
		0:40 p.m.	1	0	23.5	195	91	- Water sample was taken at the right side of the river
		-do-	2	0	23.5	195	91	
		-do-	1	13.0	23.0	215	98	
		-do-	2	13.0	23.0	215	98	
		-do-	1	6.5	23.5	215	99	
		-do-	2	6.5	23.5	215	99	

Notes: 1. All samples were taken from Cagayan River

2. Tidal Data

Time	W. Height
5:06	-0.15
11:39	0.27
19:19	-0.36

3. mℭ/cm : micromhos per centimeter

RESULT OF SALINITY TEST, CAGAYAN RIVER, 1976 (cont'd)

Place	Date	Time	Trial	Depth of Observation (m)	Temperature (°C)	Electrical Conductivity (mℳ/cm)	Concentration of Salinity (PPM)	Remarks
Aparri	Feb. 16	3:00 p.m.	1	0	26.5	6,400	3,400	- Sample water was taken near the right bank of the river
		-do-	2	0	26.5	6,300	3,350	
		3:05 p.m.	1	4	27.0	26,800	14,500	
		-do-	2	4	28.0	27,600	15,300	
		-do-	1	8	25.0	9,000	5,000	
		-do-	2	8	25.5	8,900	5,000	
Camalaniugan, Proper	Feb. 16	3:38 p.m.	1	0	17.5	2,500	1,240	
		-do-	2	0	27.5	2,400	1,190	
		3:40 p.m.	1	9	25.5	35,000	20,500	
		-do-	2	9	25.5	35,000	20,000	
		3:47 p.m.	1	4.5	27.5	34,000	19,000	
		-do-	2	4.5	28.5	34,000	18,400	
Barrio Jurisdiccion Dugo	Feb. 16	4:00 p.m.	1	0	26.0	1,350	660	
		-do-	2	0	27.0	1,340	660	
		4:02 p.m.	1	8.5	28.0	34,000	18,500	
		-do-	2	8.5	28.5	36,000	20,000	
		4:06 p.m.	1	4.25	27.5	30,000	16,500	
		-do-	2	4.25	28.5	31,600	17,200	
Barrio Maxngal, Lal-lo		4:25 p.m.	1	0	27.5	340	158	
		-do-	2	0	27.5	370	172	
		-do-	3	0	27.5	420	195	
		4:30 p.m.	1	3	27.5	470	220	
		-do-	2	3	27.0	470	220	
		-do-	1	1.5	27.5	460	215	
Bet. Jurisdiccion & Maxingal	Feb. 16	4:48 p.m.	1	0	27.5	1,300	620	
		-do-	2	0	27.5	1,300	620	
		-do-	1	3.0	27.5	2,500	1,230	
		-do-	2	3.0	27.0	2,300	1,140	
		4:50 p.m.	1	1.5	27.5	970	460	
		-do-	2	1.5	27.0	960	460	
Lal-lo, proper	Feb. 16	5:15 p.m.	1	0	28.0	420	190	
		-do-	2	0	27.5	410	190	
		-do-	3	0	27.5	280	128	
		5:17 p.m.	1	5	27.5	1,800	870	- Sample water was taken with sand
		-do-	2	5	27.0	1,800	870	

Notes: 1. All samples were taken near the right bank of the river

2. Tidal Datal: Feb. 16 (Full Moon)

Time	W. Height
6:49	0.51
12:29	-0.54
18:42	0.60

3. mℳ/cm : micromhos per centimeter

RESULT OF SALINITY TEST, CAGAYAN RIVER, 1976 (cont'd)

Place	Date	Time	Trial	Depth of Observation (m)	Temperature (°C)	Electrical Conductivity (mℭ/cm)	Concentration of Salinity (PPM)	Remarks
Lal-lo, proper	Feb. 16	5:19	3	5.5	27.5	1,800	870	
		-do-	1	2.5	27.5	270	125	
		-do-	2	2.5	27.5	280	130	
Bo. Catauan, Lal-lo	Feb. 16	5:55 p.m.	1	0	27.5	215	104	
		-do-	2	0	27.0	220	100	
		-do-	1	4	26.5	220	105	
		-do-	2	4	26.5	220	105	
Magapit, Pumpsite	Feb. 16	5:15 p.m.	1	0	26.5	220	105	
		-do-	2	0	26.5	210	100	
		-do-	1	18	26.5	210	100	
		-do-	2	18	27.0	220	97	

Notes: 1. All samples were taken near the right bank of the river

2. Tidal Datal: Feb. 16 (Full Moon)

Time	W. Height
6:49	0.51
12:29	-0.54
18:42	0.60

3. mℭ/cm : micromhos per centimeter

APPENDIX C AGRICULTURE

APPENDIX C-1 SOIL AND LAND CLASSIFICATION

1) Method of Detailed Soil Survey

The Bureau of Soil has made detailed soil survey about an area of 12,000 hectares included in the Project Area for serving CIADP. The said soil survey was carried out in the following manners.

a) Survey method and period

The soil survey was made in accordance with the standards of a detailed soil survey applying the USDA and FAO methods, this involves soil samplings for the period from October to December, 1975. Auger boring was carried out for surface sampling in every 300 m meshes, and test pits were dug for observation on soil layer profiles at one pit per 300 hectares. Chemical analyses were conducted for those sampling materials.

b) Survey area is as follows:

Surveyed Area	Acreage
Iguig	521 ha
Alcala-Amulung	2,460
Lower Cagayan, Lal-lo	1,419
Lower Cagayan, Aparri	7,600
Total:	12,000 ha

c) Land classification

Land classification was conducted on each division by soil series, soil texture, slope, soil erosion, drainage capacity, and so forth. The above data availed to develop the following 4 kinds of land classification maps covering each objective area.

i)	Soil map	1 : 15,000
ii)	Land capability map	1 : 15,000
iii)	Soil suitability map for irrigated paddy rice	1 : 15,000

iv) Soil suitability map for diversified crops 1:15,000

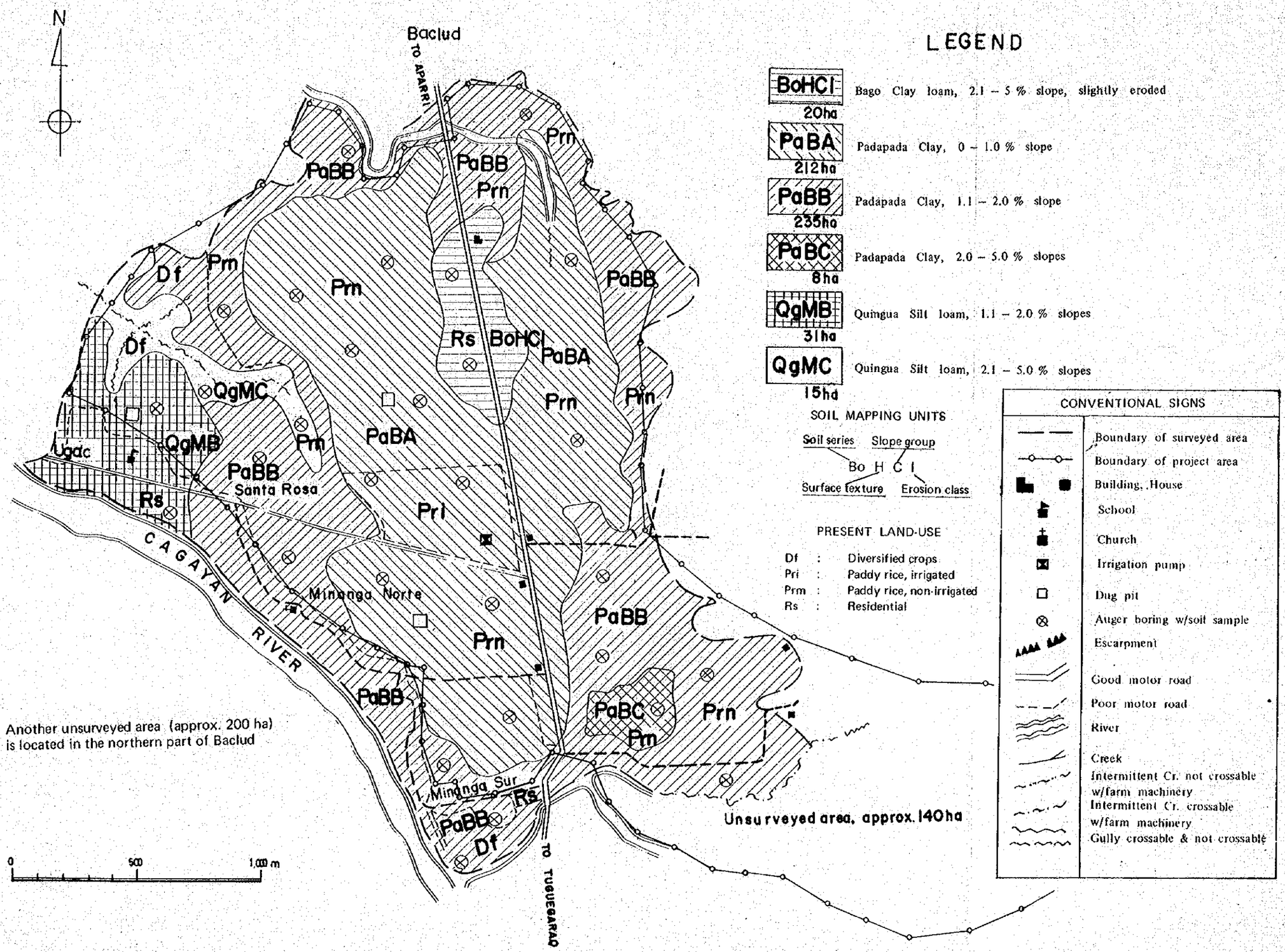
d) Chemical analysis of soil

Chemical analysis of soil was carried out regarding with the following items; pH, cation exchange capacity, organic matter contents, contents of P_2O_5 and K_2O, and minor nutrient elements.

2) Soil salinity test

In Aparri area in Lower Cagayan, there are some creeks where the adverse tide would come up. Under the circumstances, the Burea of soil, Region II, has conducted soil salinity survey covering the whole Aparri area.

FIGURE C-1-1 **SOIL MAP, IGUIG**



REMARK: Another unsurveyed area (approx. 200 ha) is located in the northern part of Baclud

FIGURE C-1-2 LAND CAPABILITY MAP, IGUIG

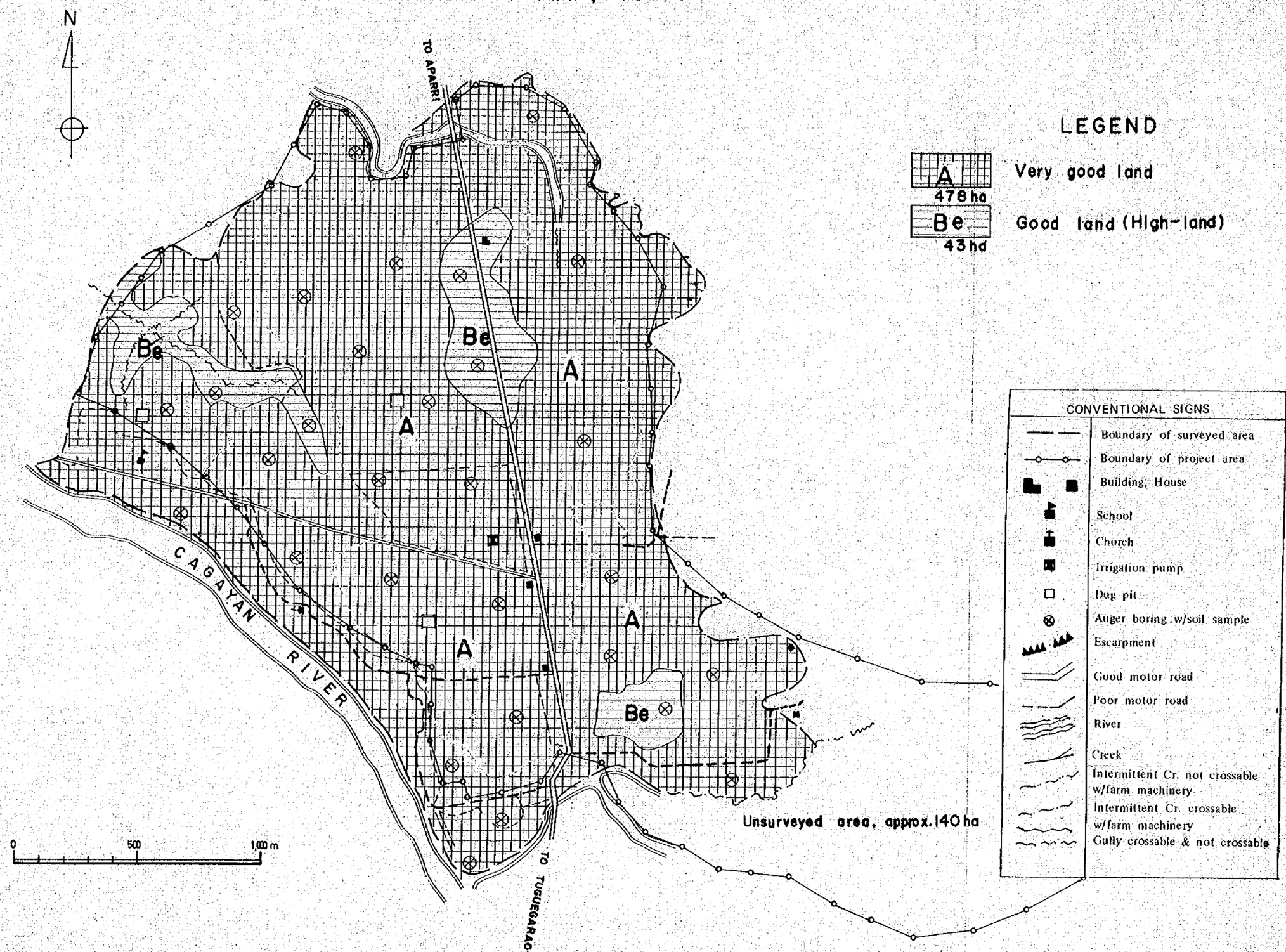


FIGURE C-1-3 SOIL SUITABILITY MAP FOR PADDY RICE, IGUIG

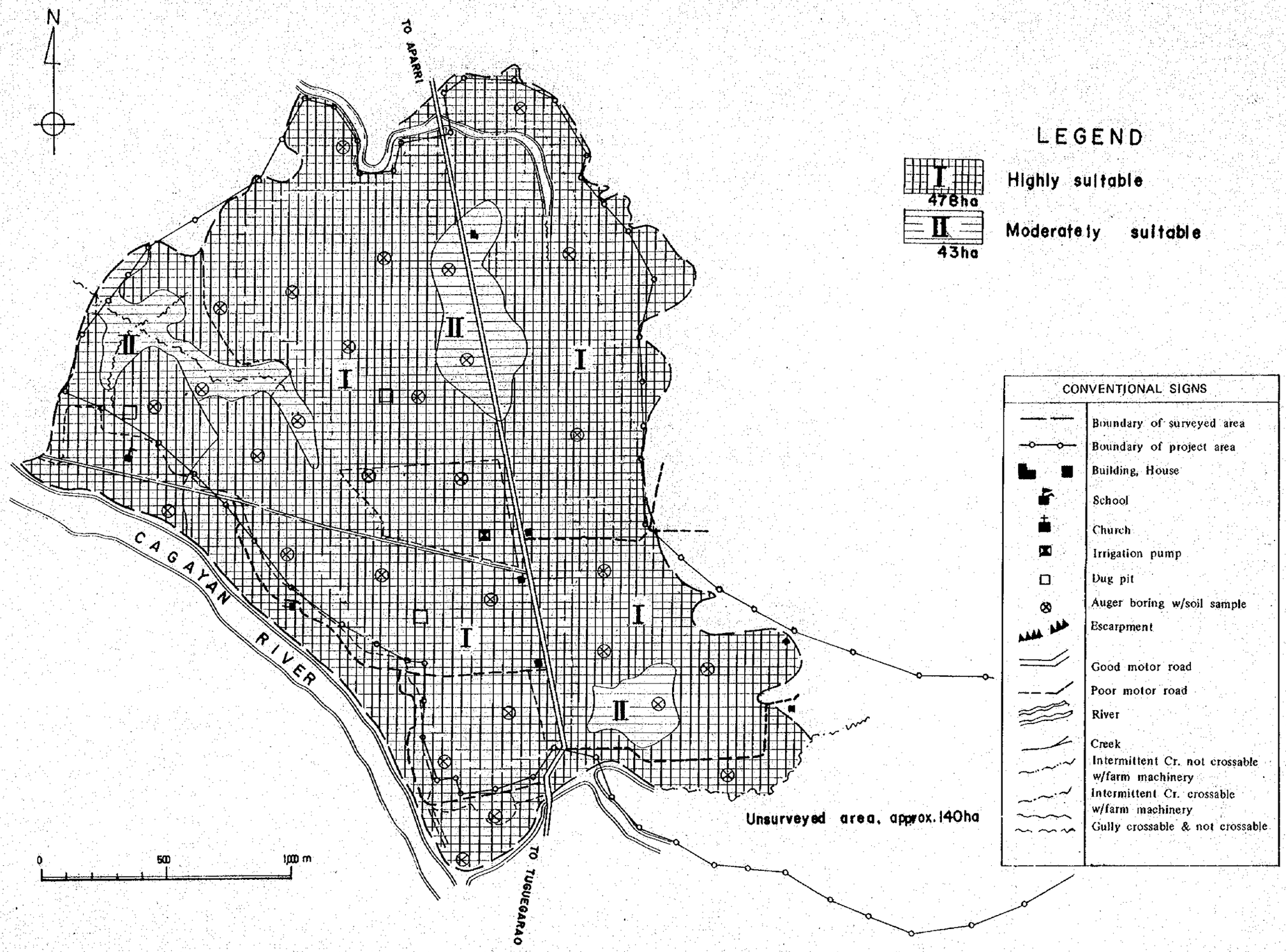


FIGURE C-1-4 SOIL SUITABILITY MAP FOR DIVERSIFIED CROPS, IGUIG

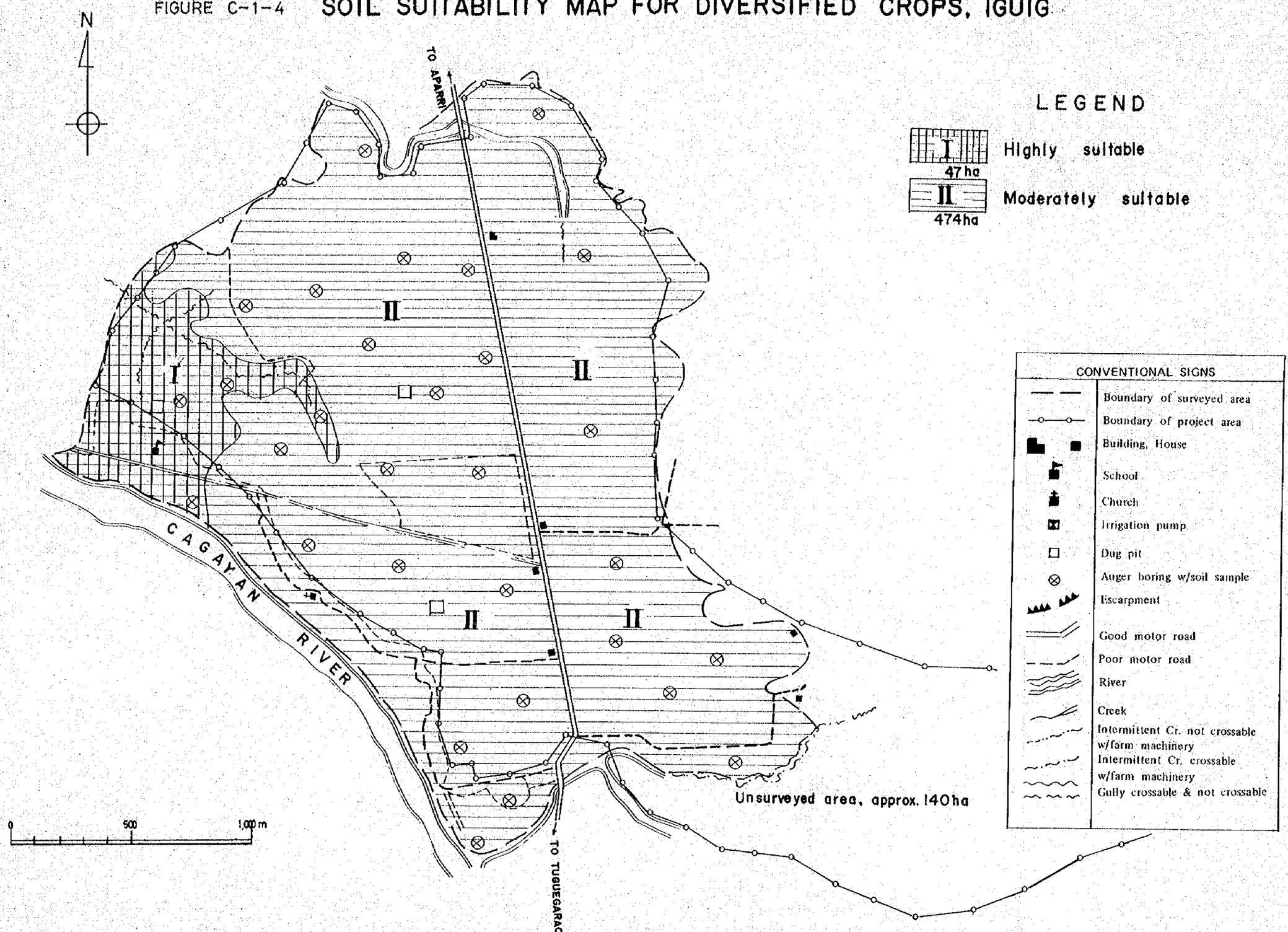


FIGURE C-1-5 SOIL MAP , ALCALA – AMULUNG

LEGEND

PaMAO1	Padapada silt loam, 0.1 – 1.0 % slopes, slight seasonal run-off flooding	(239 ha)
PaMA	Padapada silt loam, 0.1 – 1.0 % slopes	(140 ha)
PaMB	Padapada silt loam, 1.1 – 2.0 % slopes	(11 ha)
QgGA	Quingua silty clay loam, 0 – 1.0 % slopes	(27 ha)
QgGB	Quingua silty clay loam, 1.1 – 2.0 % slopes	(680 ha)
QgGC	Quingua silty clay loam, 2.1 – 5.0 % slopes	(139 ha)
SmPCO4	San manuel fine sandy loam, 2.1 – 5.0 % slopes severe seasonal river flooding	(234 ha)
TgHA	Tagulod clay loam, 0 – 1.0 % slopes	(451 ha)
TgMAO3	Tagulod silt loam, 0 – 1.0 % slopes severe deep seasonal run-off flooding	(130 ha)
TgHB	Tagulod clay loam, 1.1 – 2.0 % slopes	(355 ha)
TgHC	Tagulod clay loam, 1.1 – 2.0 % slopes	(39 ha)
Ws	Wet spot	(15 ha)

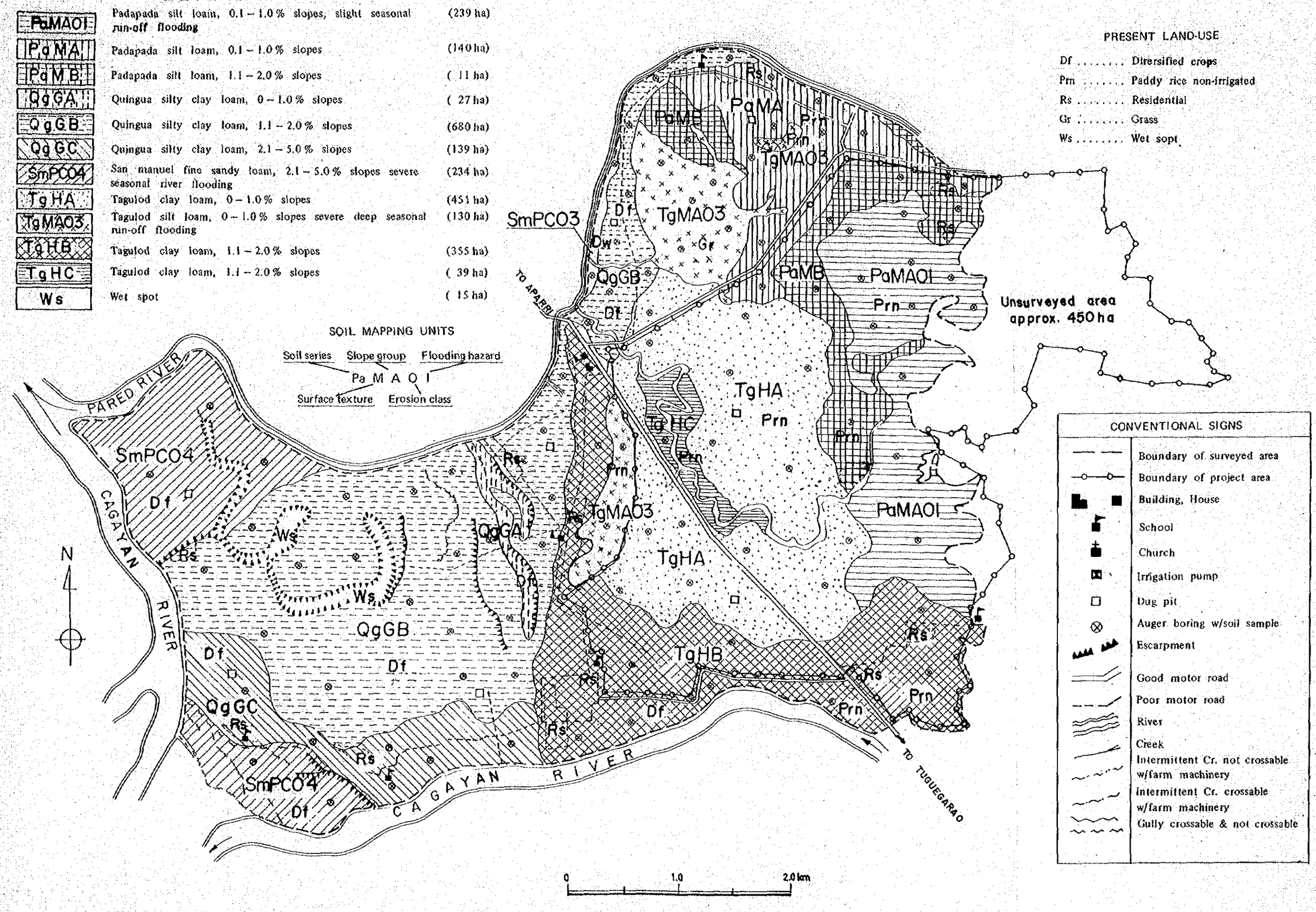


FIGURE C-1-6 LAND CAPABILITY MAP, ALCALA-AMULUNG

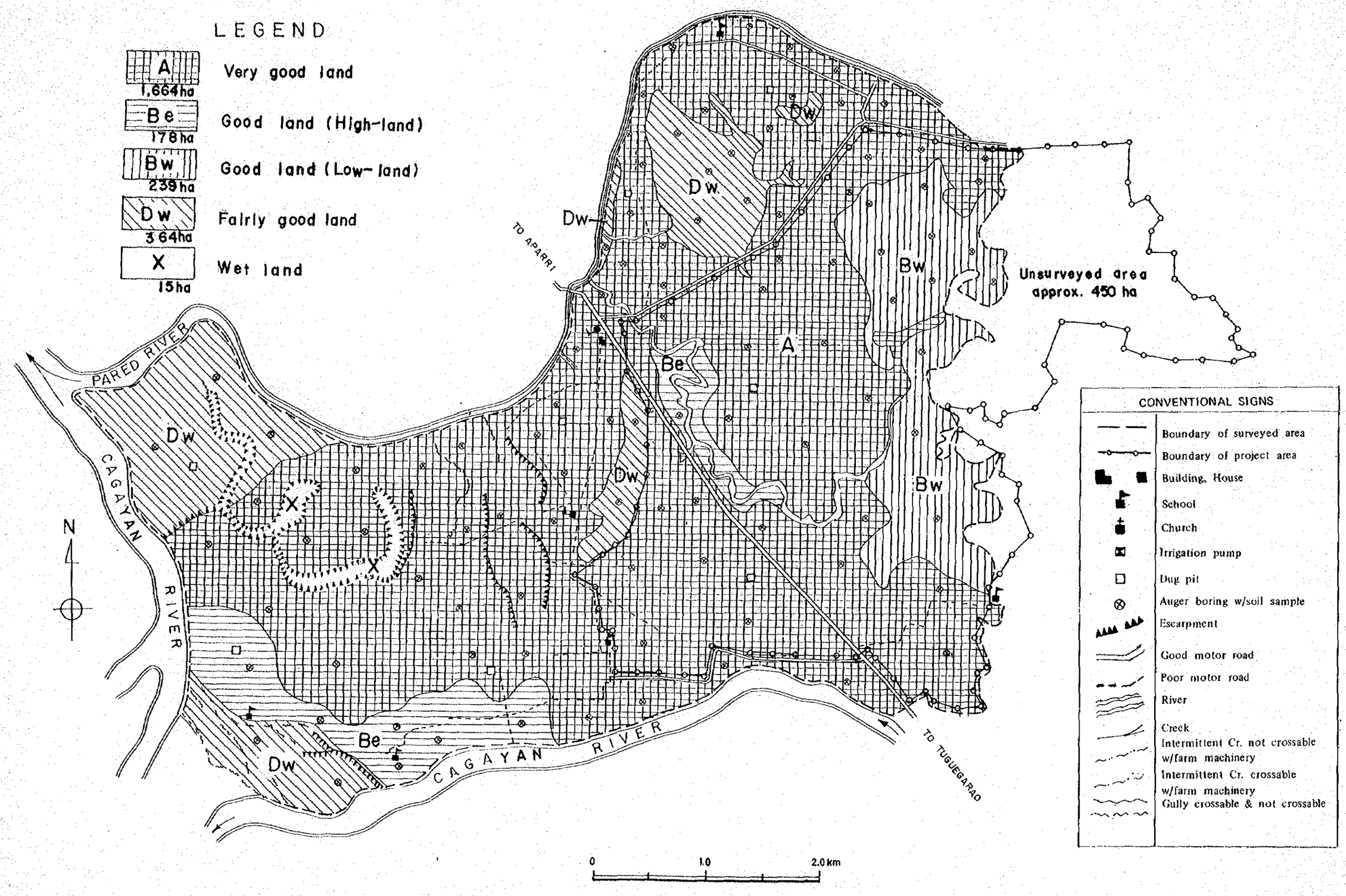


FIGURE C-1-7 SOIL SUITABILITY MAP FOR PADDY RICE, ALCALA-AMULUNG

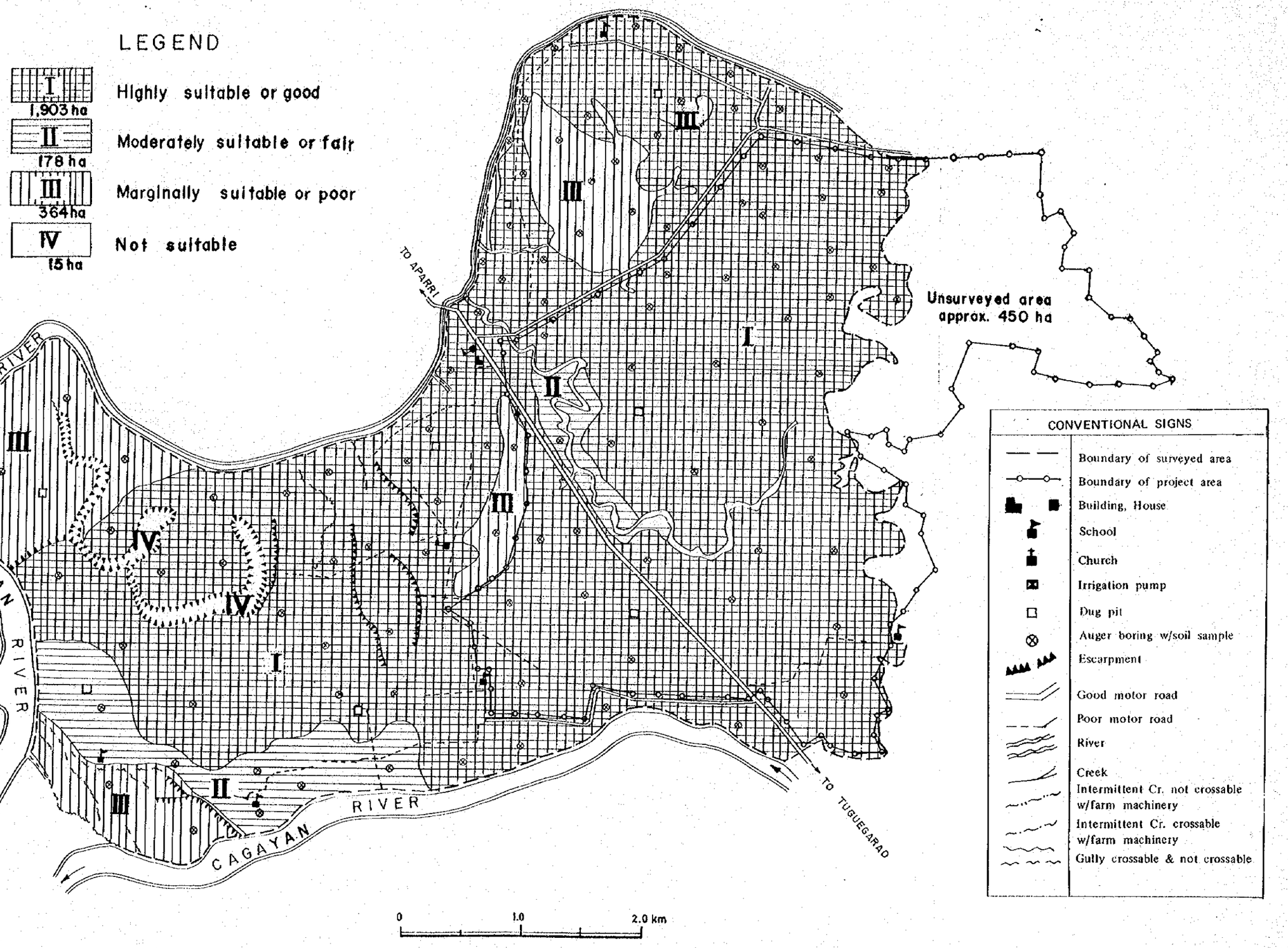


FIGURE C-1-8 SOIL SUITABILITY MAP FOR DIVESIFIED CROPS, ALCALA-AMULUNG

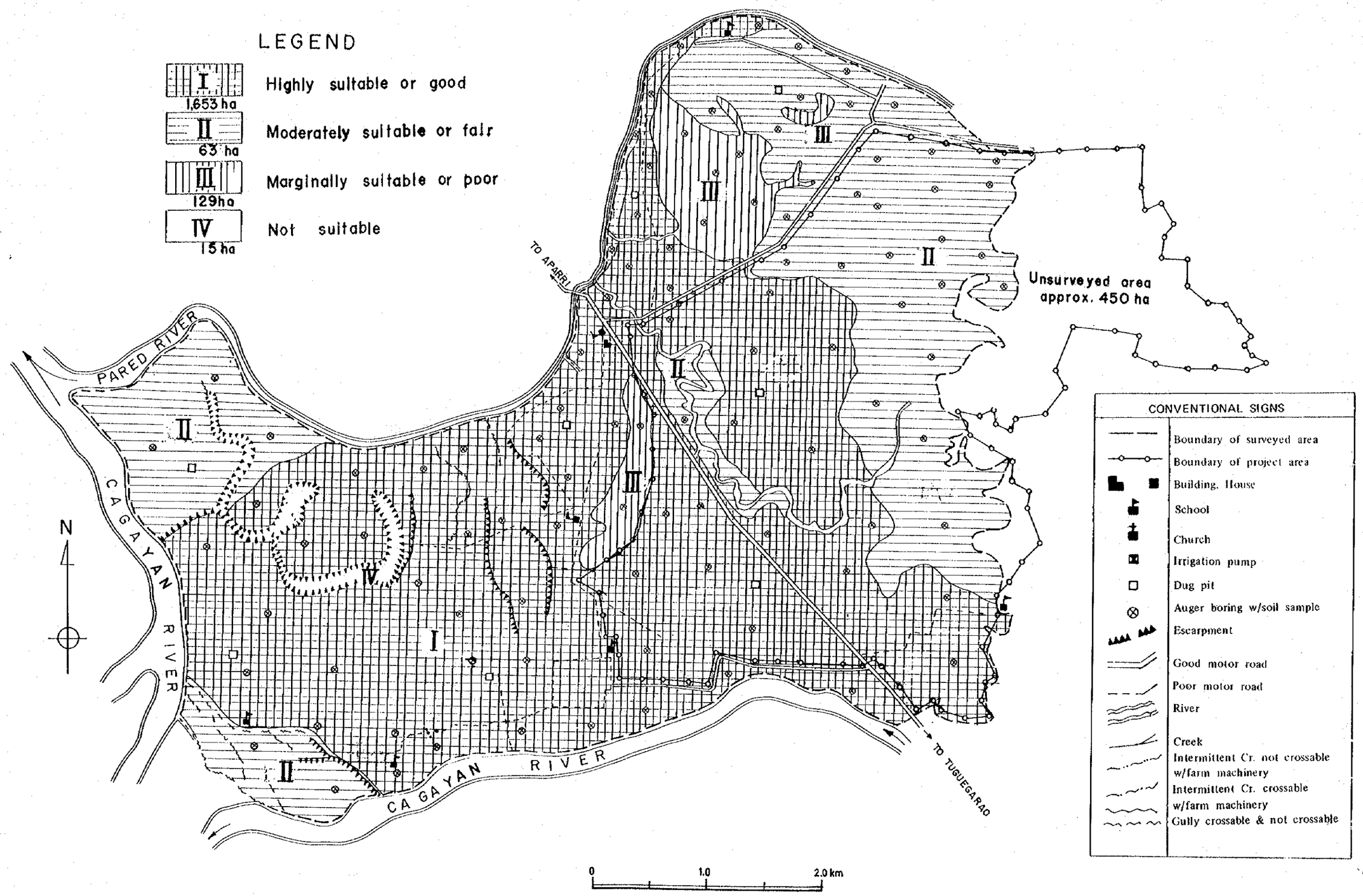


FIGURE C-1-9 SOIL MAP, LOWER CAGAYAN (LAL-LO)

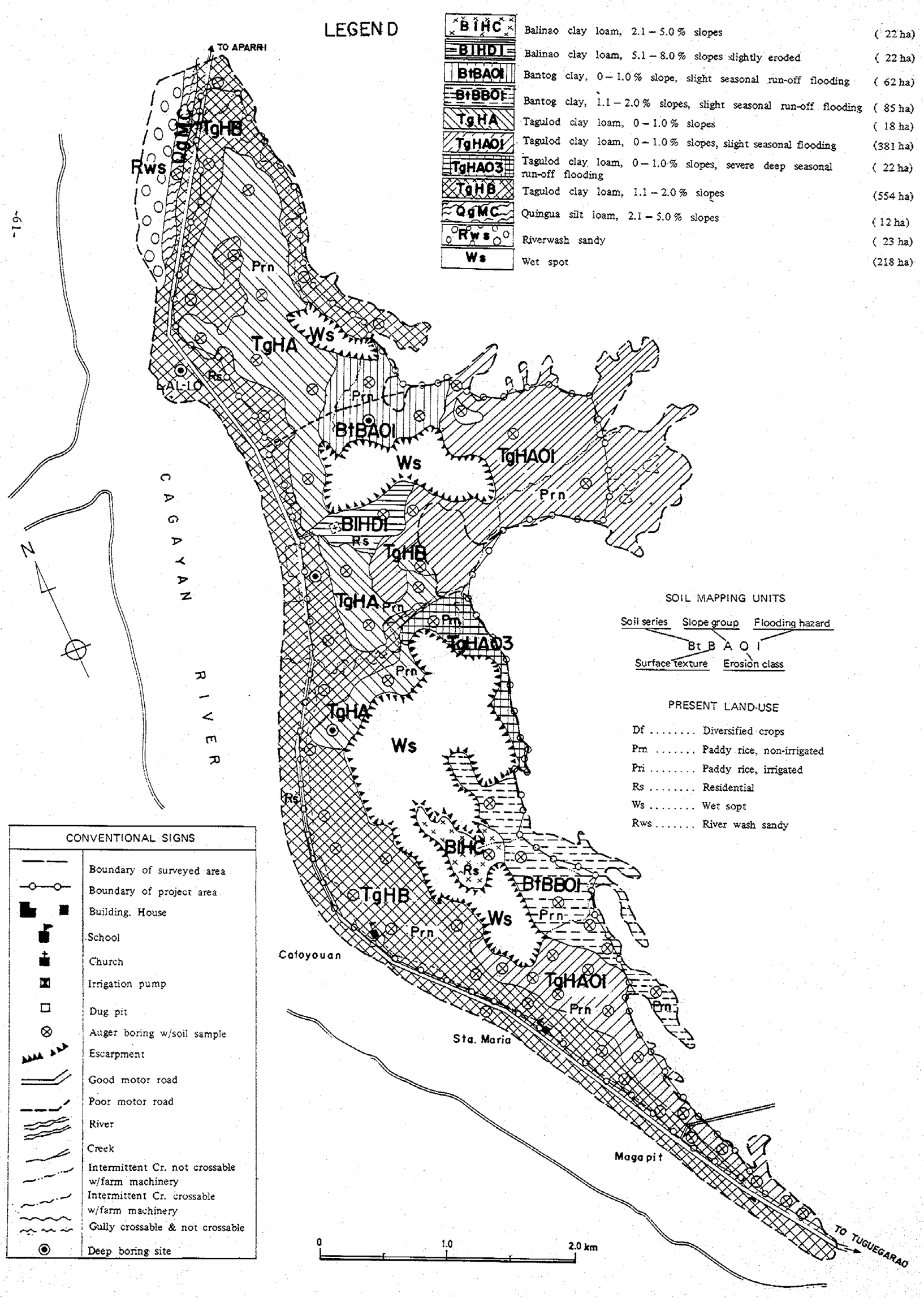


FIGURE C-1-10

LAND CAPABILITY MAP LOWER CAGAYAN (LAL-LO)

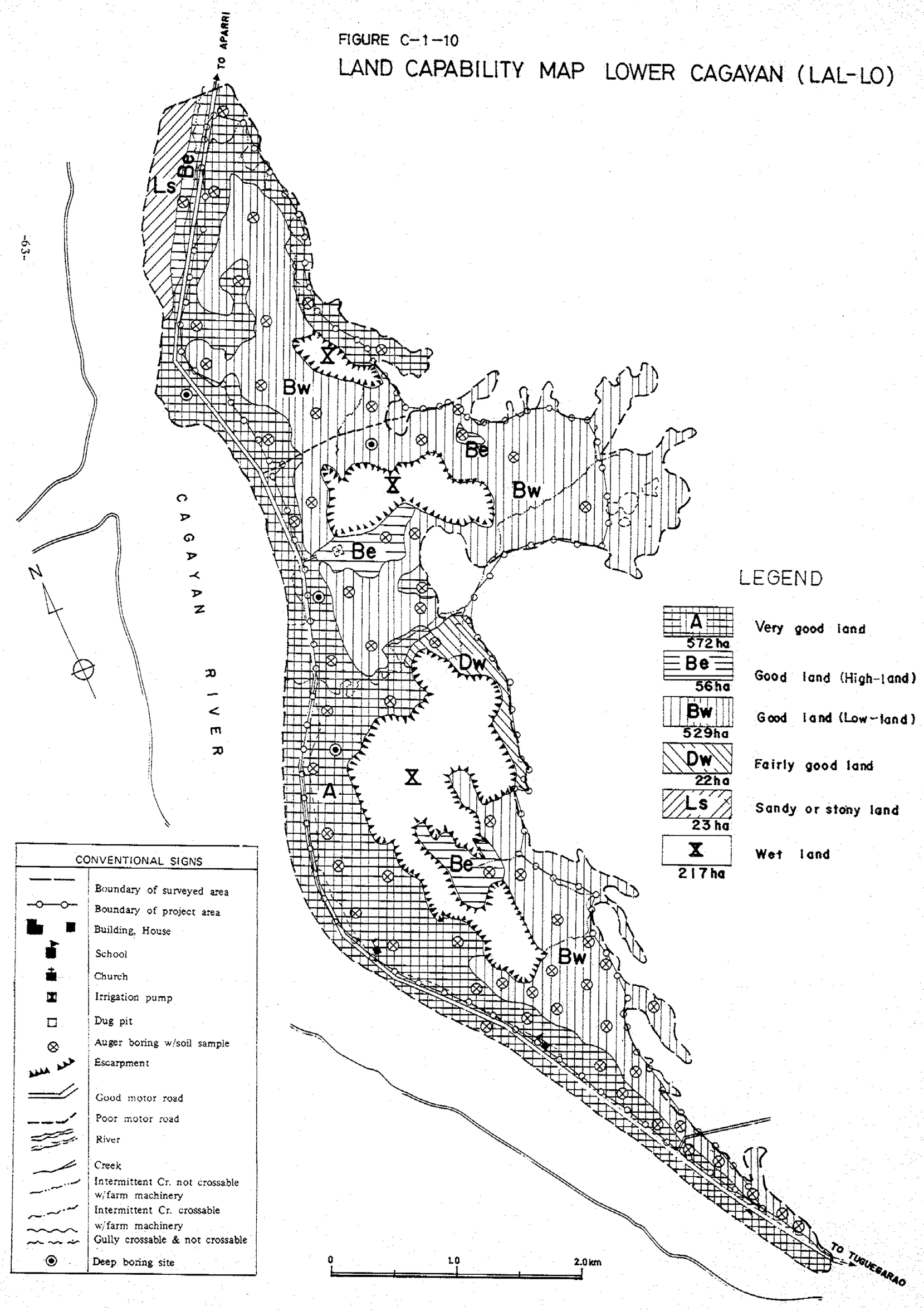


FIGURE C-1-11 SOIL SUITABILITY MAP FOR PADDY RICE, LOWER CAGAYAN (LAL-LO)

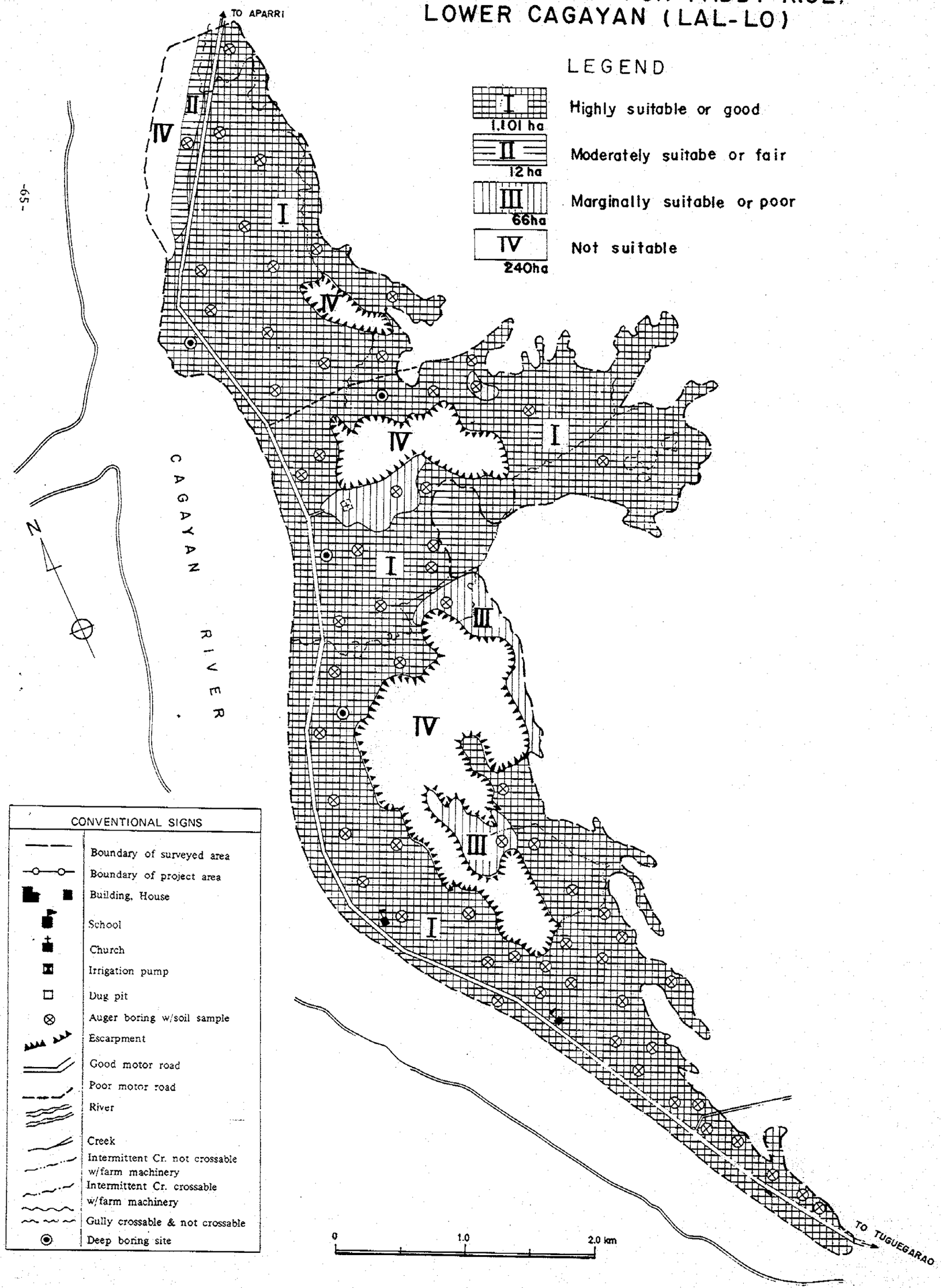


FIGURE C-1-12 SOIL SUITABILITY MAP FOR DIVERSFIED CROPS, LOWER CAGAYAN (LAL-LO)

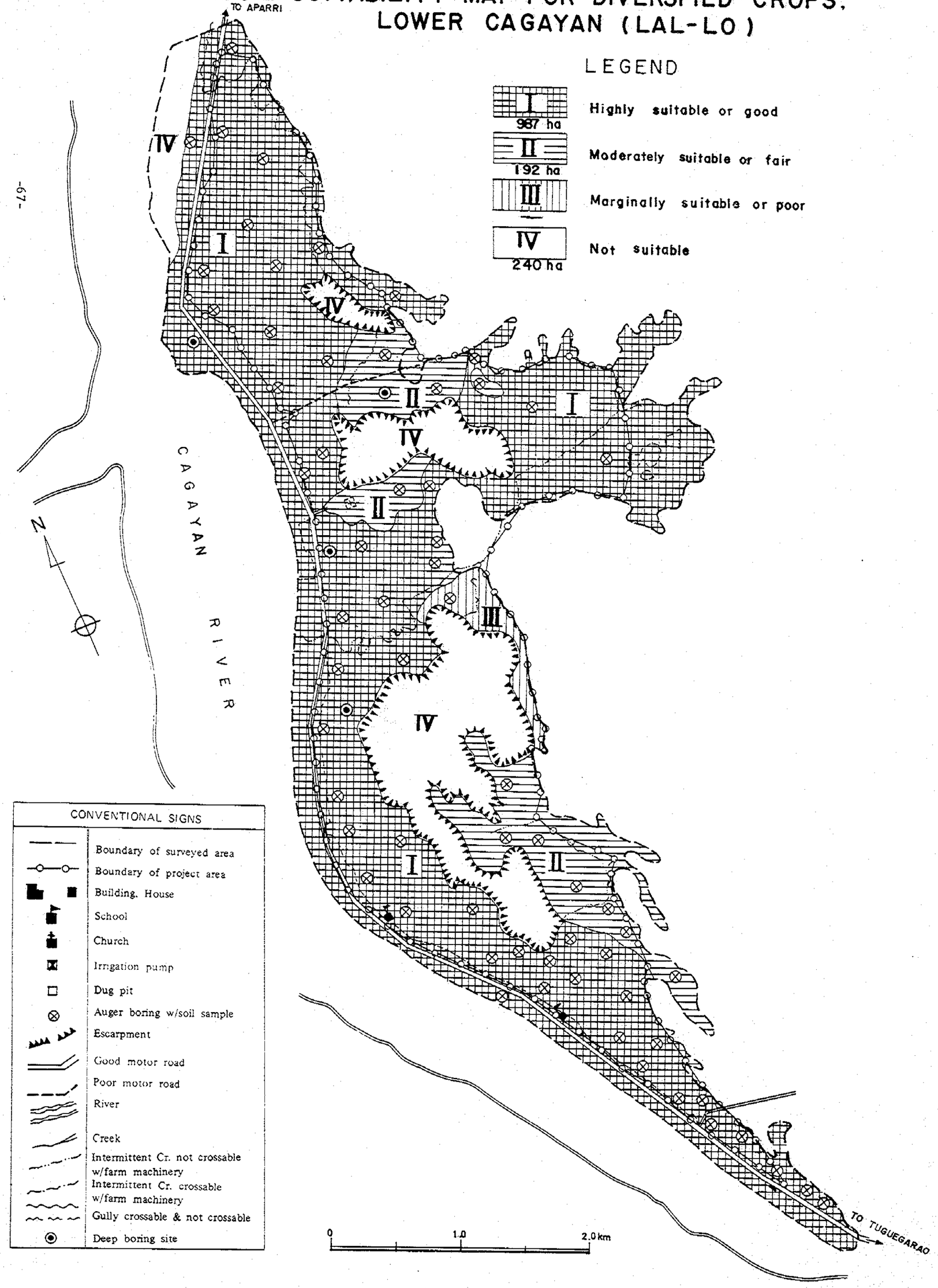


FIGURE C-1-13 SOIL MAP, LOWER CAGAYAN (APARRI)

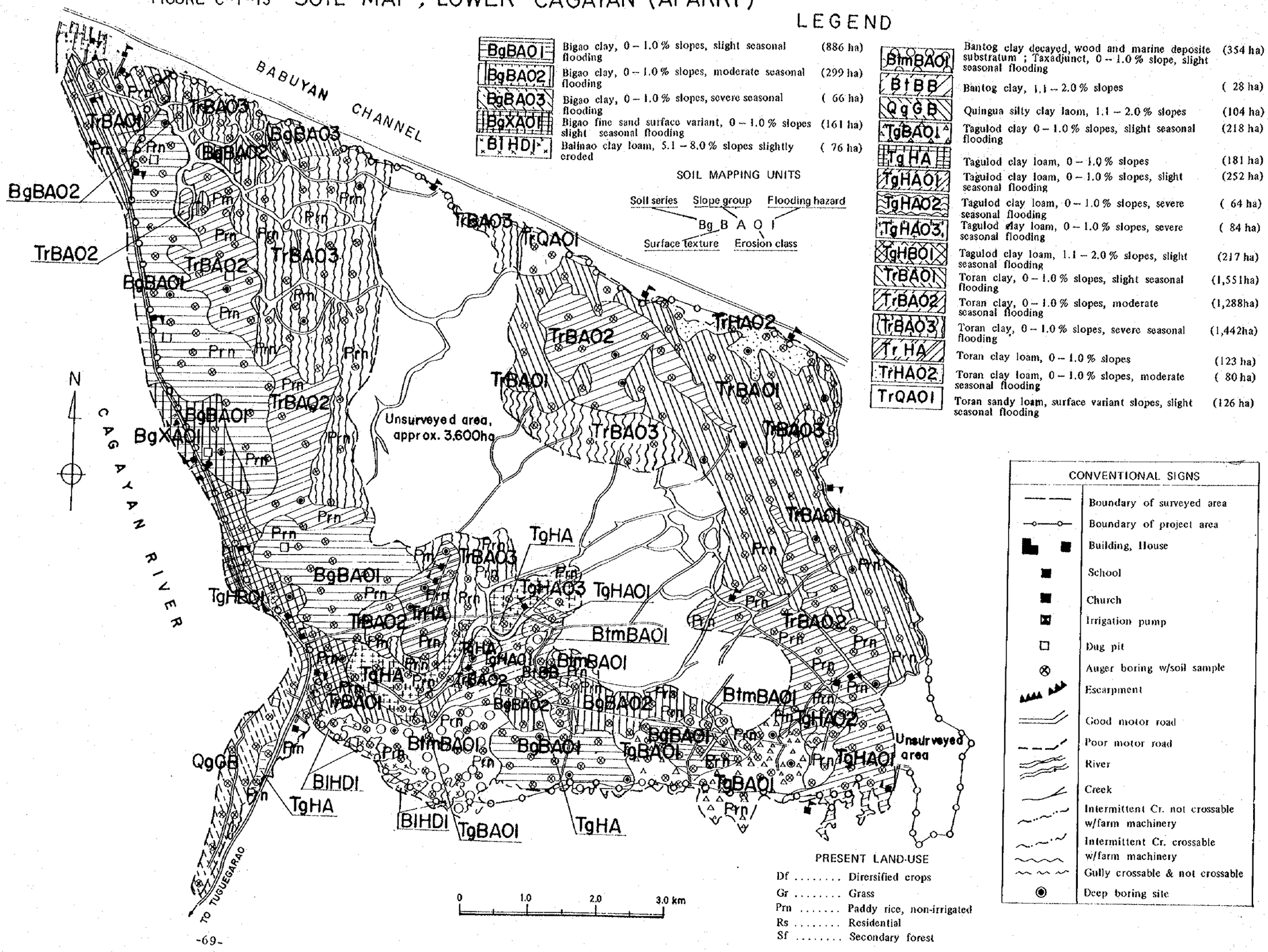


FIGURE C-1-14 LAND CAPABILITY MAP, LOWER CAGAYAN (APARRI)

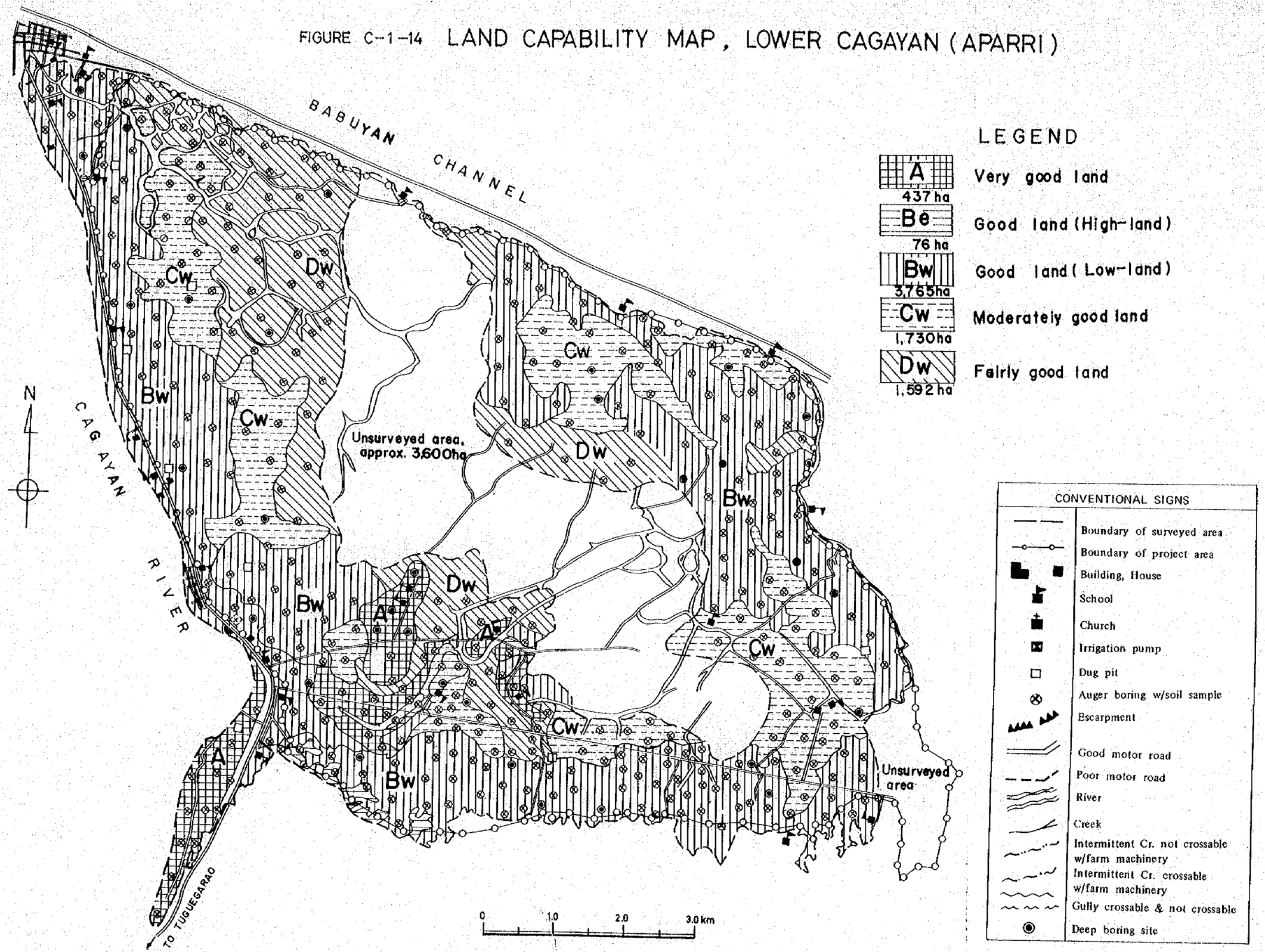


FIGURE C-1-15 SOIL SUITABILITY MAP FOR PADDY RICE, LOWER CAGAYAN (APARRI)

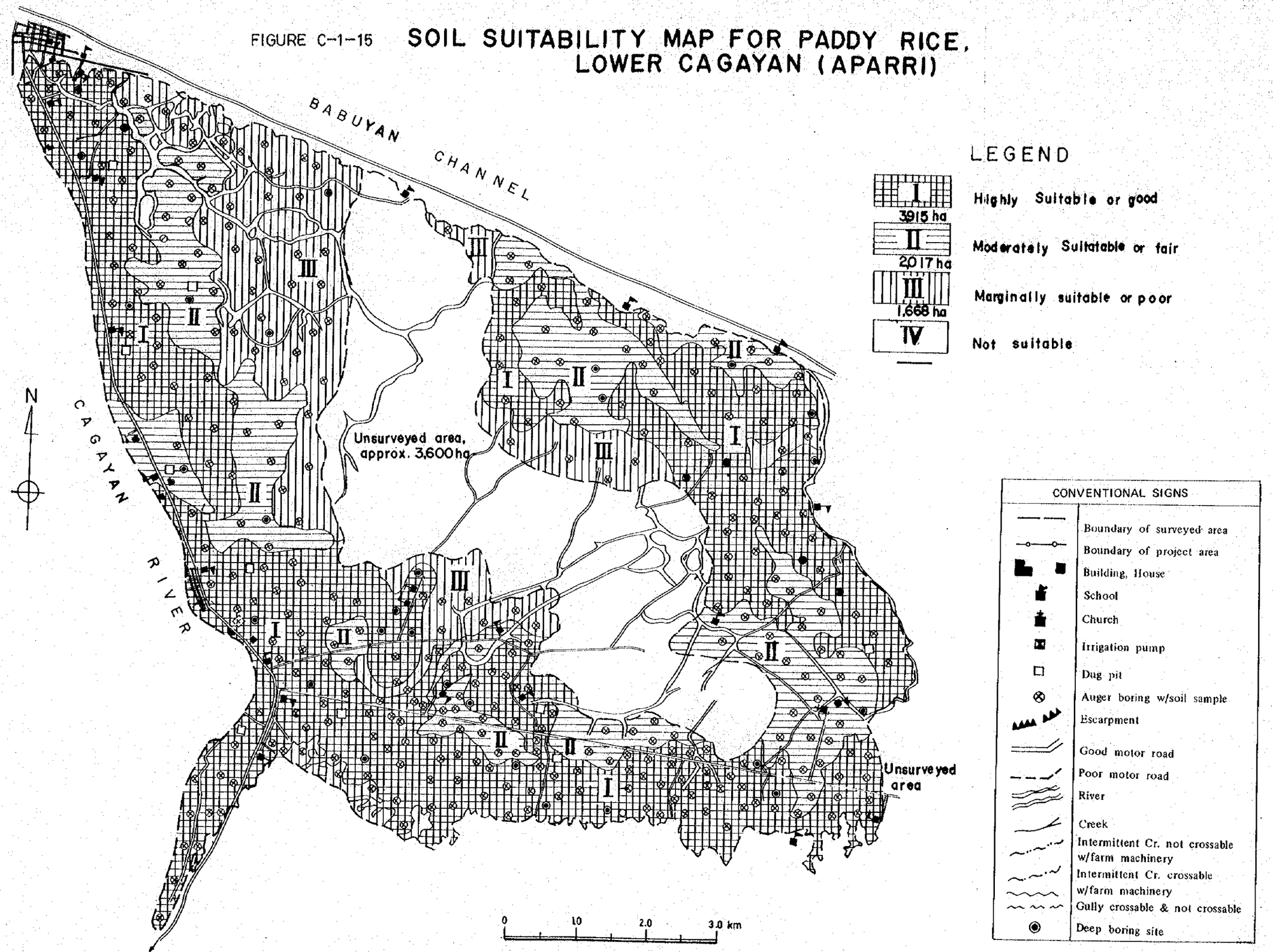


FIGURE C-1-16 SOIL SUITABILITY MAP FOR DIVERSIFIED CROPS, LOWER CAGAYAN (APARRI)

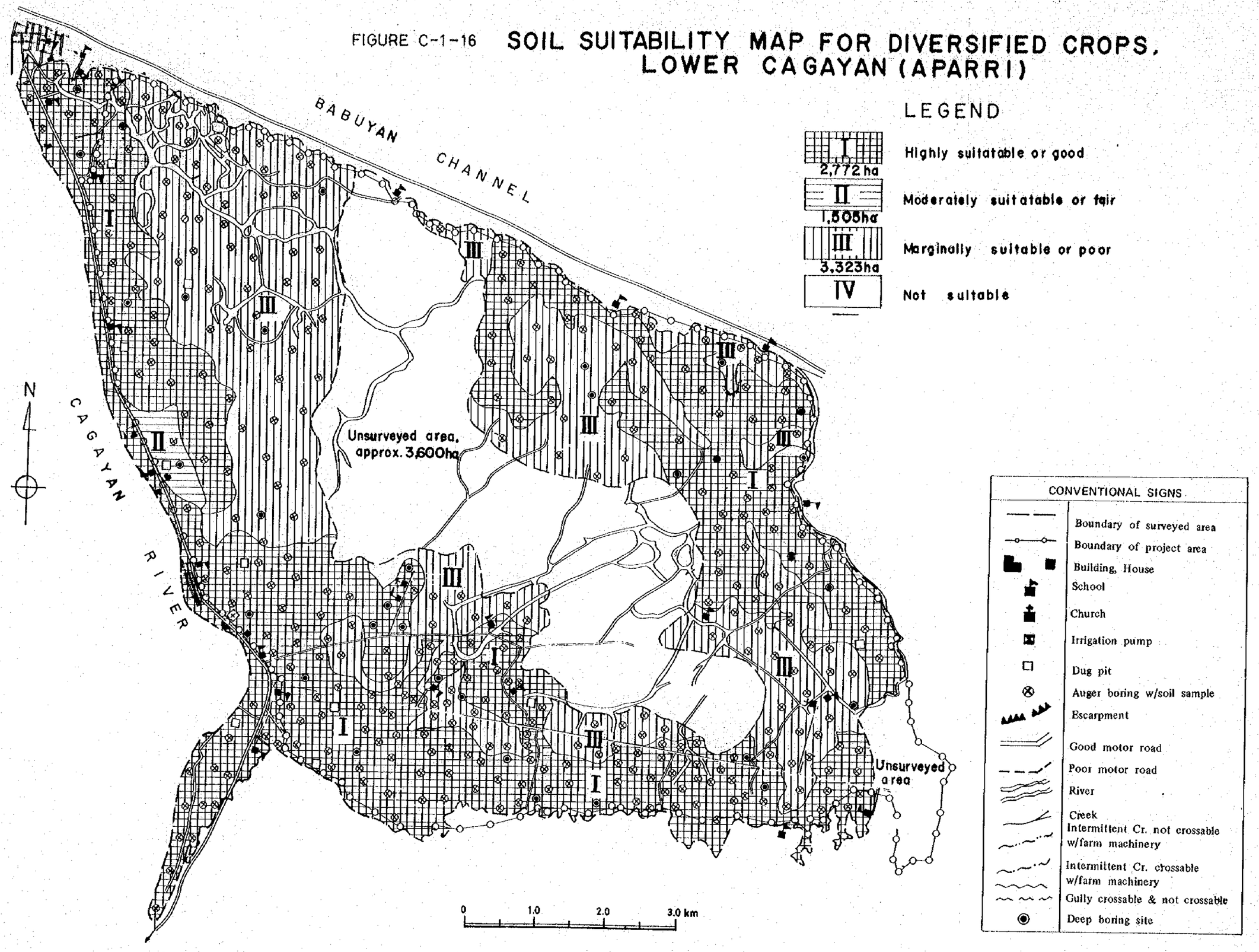


TABLE C-1-1 SUITABILITY FOR RICE GROWING IN PROJECT AREA

(Unit: ha, %)

Project	Suitability for Irrigated Rice						General Profile of the Soils			
	Highly	Moderately	Marginally	Sub-Total	Not Suitable	Total	Soil Texture	Soil Depth	PH	Main limitation for the soil of "Marginally" and "Moderately"
Iguig	478	43	-	521	-	521	Clay	Deep	6.1-6.6	Gently sloping and ill-drainage
Alcala-Amulung	1,903	178	364	2,445	15	2,460	Clay loam	Deep	5.7-6.8	Ill-drainage
Lower-Cagayan										
(Lal-lo)	1,101	12	66	1,179	240	1,419	Clay loam	Deep	4.9-6.6	Gently sloping and ill-drainage
(Aparri)	3,915	2,017	1,668	7,600	-	7,600	Clay loam	Deep	4.5-6.8	Ill-drainage
Total	7,397 (64)	2,250 (19)	2,098 (17)	11,745 (100)	255	12,000				

Note: (1) Besides 12,000 ha of the total soil survey area conducted by Buruau of Soil , there is about 3,000 ha of unserveyed swampy area in Aparri area.

(2) The area to be belong to "Not suitable" was eliminated to select irrigable area in the final feasibility study.

Data Source: The report on detailed soil survey of project area under CIADP.

APPENDIX C-2 SOIL SALINITY

TABLE C-2-1 ELECTRICAL CONDUCTIVITY & SALINITY (SOIL)

Station No.	Temperature (°C)	Electrical Conductivity (m℧/cm)*	Salinity (ppm)	Station No.	Temperature (°C)	Electrical Conductivity (m℧/cm)	Salinity (ppm)
27	25.5	2,350	1,250	28	25.5	4,100	2,150
147	25.5	70	34	13	25.0	1,200	600
102	26.0	65	30	78	25.5	920	460
70	26.0	1,800	880	61*	26.0	3,600	1,850
113	26.0	430	210		28.0	3,500	1,750
89	26.0	1,700	840	124	25.0	710	350
75	25.5	2,200	1,140	90	25.0	1,720	860
127	26.5	750	370	117	24.5	420	210
41	26.5	2,400	1,200	57	25.0	2,110	1,090
37	26.5	2,550	1,300	85	25.0	660	330
46	26.5	3,200	1,650	43	25.0	1,600	800
63	25.0	205	99	3*	25.5	285	135
					25.5	270	130
33	24.5	2,250	1,200	49	25.5	820	410
98	24.5	335	170	31	25.5	4,450	2,400
131	25.0	370	185	22	25.5	620	300
51	24.5	1,880	980	44	25.5	1,100	530
108	24.5	800	410	20	26.0	1,100	540
111	24.5	950	480	35	26.5	2,300	1,200
94	24.5	1,010	520	50	26.5	620	300
119	24.5	120	59	4	26.0	1,750	880
96	24.5	238	115	62	26.0	310	150
83	24.5	350	175	59	26.0	1,550	760
30	24.5	4,200	2,250	2*	26.0	140	65
					26.0	130	60
56	24.5	2,400	1,250	141	25.5	110	50
135	24.5	740	370	19	28.0	1,800	840
106	25.0	510	255	123	27.0	530	250
				149	28.0	300	140

Note: 1. $\frac{\text{Weight of } H_2O}{\text{Weight of Soil}} = 2.5$

2. * two trials made

m℧/cm : Micromhos per centimeter

Analyzed soil samples on January 30 and February 2nd at Bureau of Soils, Region II, Tuguegarao, Cagayan

APPENDIX C-3 NUMBER OF FARMS AND AREA BY TYPE AND TENURE

(CAGAYAN PROVINCE)

(Unit: Unmber: Number of Farm, Area: ha)

Type of Farm	Total		Full-Owner		Part-Owner		Tenants		Manager		Other Form	
	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area	Number	Area
Palay	34,603	97,140	16,263	47,996	8,306	24,673	9,698	21,426	16	1,897	320	1,159
Corn	12,244	25,903	5,747	12,810	2,671	6,445	3,773	5,954	13	556	40	317
Coconut	322	1,143	276	896	26	149	13	56	7	41	-	-
Tobacco	363	722	164	401	76	159	123	161	-	-	-	-
Sugarcane	15	52	11	32	-	-	-	-	-	-	4	20
Vegetable	29	90	21	45	4	6	13	16	1	23	-	-
Rootcrops	23	63	13	33	5	13	5	18	-	-	-	-
Banana	81	237	61	161	15	70	5	5	-	-	-	-
Other Fruits	171	136	165	116	-	-	-	-	6	20	-	-
Pig	241	1,233	166	1,083	27	52	47	47	1	51	-	-
Cattle	204	58,881	149	9,061	13	1,740	34	80	8	48,000	-	-
Others	5,108	17,560	2,500	9,198	1,147	4,240	1	2,110	5	2,000	23	52
Total	53,414	203,200	25,536	81,833	12,576	37,584	14,853	29,863	57	52,587	387	1,367

Source: 1971 Census of Agriculture, Preliminary

APPENDIX C-4 RECOMMENDED LOWLAND RICE VARIETIES FOR PROJECT AREA

Character	IR 26	IR 28	IR 29	IR 30	IR 32	C4-63G	C4-137	C4-168	BPI-3-2	IR 20
Plant Maturity(day)	(Dry)(Wet) 125-135	105-105	115-115	106-109	130-140	125-135	130-140	125-130	125-130	120-130
Reaction to photoperiod	No	No	No	No	No	No	No	No	No	No
Height	Short	Short	Short	Short	Short	Medium	Medium	Medium	Medium	Short
Lodging	Resistant	Moderately resistant	Moderately resistant	Moderately resistant	Moderately resistant	Resistant	Resistant	Resistant	Resistant	Moderately resistant
Tillering ability	High	Moderate	High	High	High	Medium	Medium	High	Moderate	High
Position of leaves at harvest	Erect	Erect	Erect	Erect	Erect	Semierect	Semierect	Semierect	Semierect	Erect
Blast diesease	Moderately resistant	Resistant	Resistant	Moderate susceptible	Resistant	Moderately resistant	Moderately resistant	Moderately resistant	Resistant	Resistant
Bacterial leaf blight disease	Resistant	Resistant	Resistant	Resistant	Moderately resistant	Intermediate	Moderately susceptible	Intermediate	Moderately resistant	Intermediate
Tungro virus	Resistant	Resistant	resistant	Resistant	Susceptible	Resistant	Resistant	Moderately resistant	Resistant	Resistant
Grassy stung	Moderately resistant	Resistant	Resistant	Resistant	Resistant	Susceptible	Susceptible	Moderately resistant	Resistant	Susceptible
Threshing characteristic	Medium	Medium	Medium	Medium	Medium	Easy	Easy	Medium	Medium	Medium
Head rice recovery	High	High	High	High	High	High	High	High	High	High
Grain dormancy (weeks)	3-4	3-4	3-4	3-4	3-4	3-4	3-4	3-4	-	3-4
Amylose content	High	High	Waxy	High	High	Intermediate	High	Intermediate	Intermediate	High
Eating quality	Good	Fair	Good	Good	very good	Excellent	Very good	Good	Very good	Good
Coverage in Project area	30%	15%	5%	15%	5%	5%	5%	5%	5%	10%

Note: All these varieties belongs to the recommended varieties by Seed Board

APPENDIX C-5 PADDY CULTURE AND INPUTS

TABLE C-5-1 PADDY CULTURE AND INPUTS

Field Operation	Recommended Practice	Inputs per ha
a) Sowing (First day after sowing)	Prepare wet-seedbed (400 m^2 per ha) and sow soaked and incubated seeds. Soaking in clean water or in insecticide-treated water for 24 hr. Incubation by keeping seeds moist and warm in half filled, loosely tied sacks for 36 to 48 hr.	Seeds: 1 cavan (44 kg) Fungecide for seed treatment: 1.5 kg of carbofuran, (3%) granular or any other kind of chemicals
b) Care of Seedlings (8 - 15 days)	Apply recommended insecticides at 8 to 10 and at 17 days after sowing	Insecticides for seedling 0.6 kg of carbofuran, (3%) granular or any other kind of chemicals
c) Land Preparation (1st - 25 days)	Prepare land by soaking, plowing and harrowing. The harrowing is to be performed as: 1st step: after flooding with enough water, harrow the field longitudinal and cross-wise. 2nd step: more than 6 days after 1st harrowing, apply basal fertilizer and harrow finally. Repair the dike after plowing	Basal fertilizer: (Wet) Ammosul, 119 kg (N; 25kg) Superphosphate of lime, 177 kg (P_2O_5; 30kg) (Dry) Ammosul, 143kg (N; 30kg) Superphosphate of lime, 177 kg (P_2O_5; 30kg)

(Cont'd)

Field of Operation	Recommended Practice	Inputs per ha
d) Transplanting	After final harrowing, transplant immediately in the way as: Straight-row planting (25 cm x 25 cm, 16 hills/m^2, using 3 to 3 seedlings per hill) Replant for missing hills 7 days after transplanting	
e) Spraying herbicide (28 days)	3 days after transplanting, broadcast herbicide, maintain water 3 to 5 cm deep for 10 days at least	Herbicide: 2-4 Diethylester (3.2%) granular, 25 kg or any other kind of herbicides
f) Weeding/cultivation (45 days)	Use rotary weeder between hills	
g) Additional Fertilizing (55-75 days)	1st: 30 days after transplanting, (tillering stage) 2nd: 45 days to 50 days after transplanting	1st: additional fertilizer; (Wet) Urea, 28 kg (N; 13 kg) (Dry) Urea, 34 kg (N; 15 kg) 2nd: additional fertilizer; (Wet) Urea, 28 kg (N; 12 kg) (Dry) Urea, 33 kg (N; 15 kg)
h) Spraying insecticide (55-90 days)	1st: 30 days after transplanting 2nd: 65 days after transplanting These insecticide should be applied after checking the number of each harmful insects in the field.	Insecticide: 1st: 17 kg of Cloroimeforn (30%) granular, or any other kind of insecticides 2nd: 14 kg of Diazinon (10%), granular or any other kind of insecticides

(Cont'd)

	Field Operation	Recommended Practice	Inputs per ha
i)	Drainage (111 days)	After milk-ripe stage, (14 days before harvesting) stop irrigation and drain the water from the field.	
j)	Harvest (125 days)	When 80% of panicle turns yellowish and becomes firm to touch, harvest the rice.	
k)	Drying	Dry up harvested paddy hills in the field for 1 to 2 days by sunshine. Bring them to dry place and pile.	
l)	Threshing	After drying paddy hills, thresh them. Threshed paddy must be reduced in their moisture contents to 14% by sunshine.	

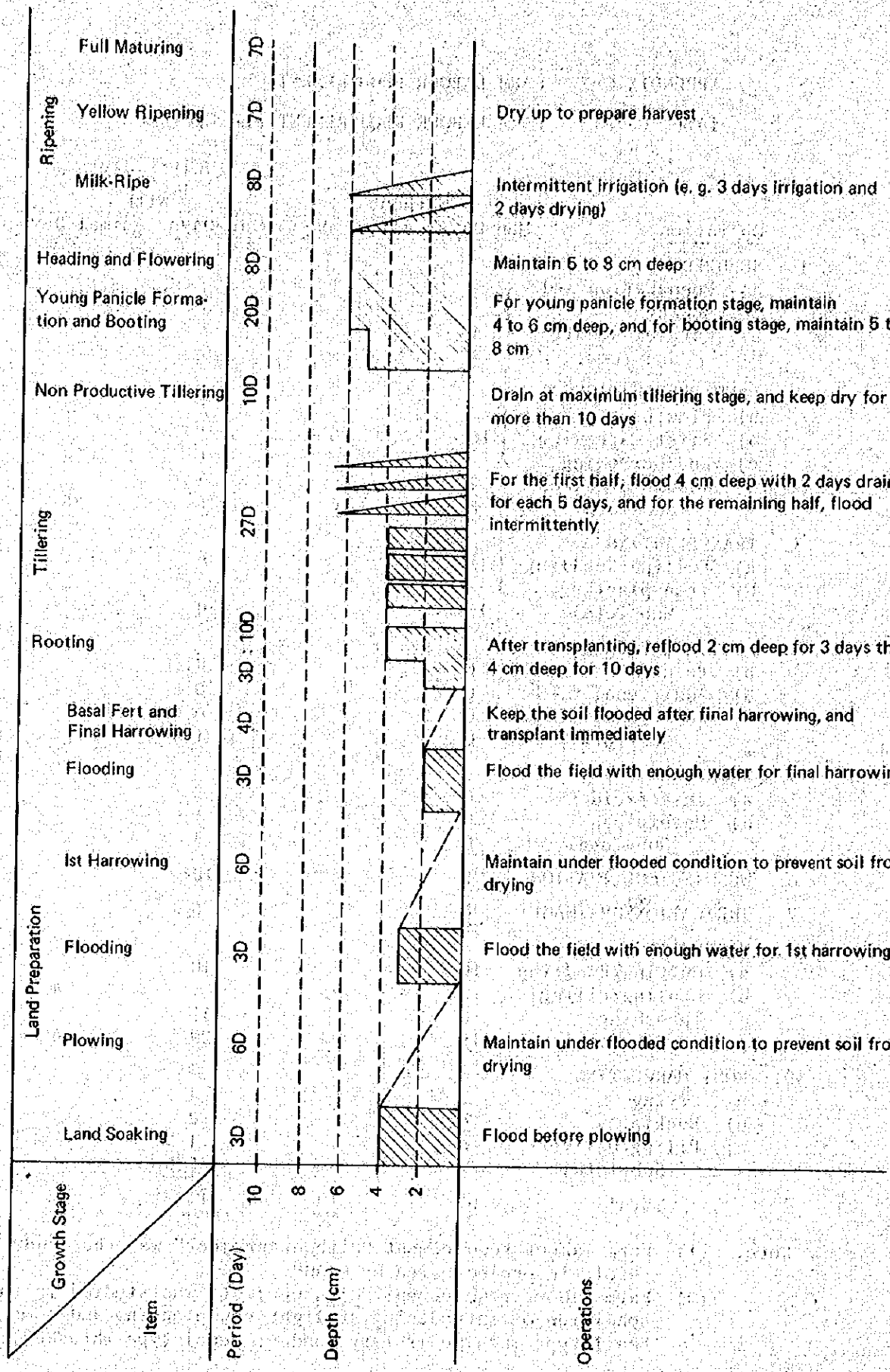
Note: Besides above mentioned chemical substance, 250 g/ha of Disphacinone (powder) or any other kind of rodenticides will be needed to apply rodenticide throughout the growth stage

TABLE C-5-2 AMOUNT OF FERTILIZER AND ANOTHER CHEMICALS TO CULTIVATE RICE "WITHOUT" AND "WITH" PROJECT

Item	Without: Chemical	(1) Amount (t)	Unit Price (₱)	Sum (1,000₱)	With: Chemical	(2) Amount (t)	Unit Price (₱)	Sum (1,000₱)
I. Fertilizer	Urea	50	1,880	94	Urea	1,600	1,880	3,008
	Ammonium sulphate (16-20-10)	100	1,120	112	Ammonium sulphate	3,410	1,120	3,819
	Compound f. (14-14-14)	25	1,520	38	Superphosphat of lime	4,600	1,520	6,992
	Compound f.	73	1,420	104				
Sub-Total				442				13,819
II. Insecticide	Liquid	(x1,000Qt) 4	23	92	Carbofuran, G	60	6,200	372
	Granular	1	3,000	3	Chloroimeforn, G	442	4,800	2,122
					Diazinon, G	364	8,900	3,240
					Diphacinone, P	65	48,000	312
Sub-Total				95				6,046
III. Herbicide	Liquid	(x1,000Qt) 2	28	56	2-4D Ethylestel, G	650	2,800	1,820
	Granular	1	2,720	3				
Sub-Total				59				1,820
IV. Total				596				

Note: (1) Amounts are based on the data on the present agricultural situation
(2) Amounts of chemicals "with project", refer to TABLE C-5-1

APPENDIX C-6 WATER CONTROL IN THE FIELD



APPENDIX C-7 FARM LABOUR REQUIREMENT

TABLE C-7-1 FARM LABOUR REQUIREMENT PER HECTARE

(Unit: day)

Operation	Without Man-Days	Without Animal Days	With Man-Days	With Animal Days
1. SEEDBED:				
a) Preparation and sowing			3	
b) Care of seedling	4		2	
Sub-Total	4		5	
2. LAND-PREPARATION				
a) Plowing			7	7
b) First Harrowing	16	16	7	7
c) 2nd Harrowing			4	4
d) Repair of dikes	2		3	
Sub-Total	18	16	21	18
3. TRANSPLANTING				
a) Pulling seedlings	13		8	
b) Transplanting			22	
Sub-Total	13		30	
4. FERTILIZATION				
a) Basal	0		0.5	
b) Additional F. I	0		0.5	
c) Additional F. II	0		0.5	
Sub-Total	0		1.5	
5. SPRAYING				
a) Insecticides	0		3	
b) Herbicides	0		1	
Sub-Total	0		4	
6. WEEDING/CULTIVATION	5		10	
7. IRRIGATION/DRAINAGE	0		6	
8. HARVESTING				
a) Cutting/Bundling	10		10	
b) Hauling/Piling	3	3	4	4
c) Threshing	6		15	
Sub-Total	19	3	29	4
9. POST HARVESTING				
a) Drying	3		4	
b) Sacking	0.5		2	
c) Piling/Delivery	0.5		1.5	
Sub-Total	4		7.5	
Total	63	19	114	22

Note: (1) Farm labour requirement "without project" was the study result in project area by CIADP.

(2) Farm labour requirement "with project" was studied in the condition of introducing straight row planting and some small type machine (rotary weeder, pedal type thresher).

TABLE C-7-2 ON-FARM LABOUR BALANCE (1.5 hectares)

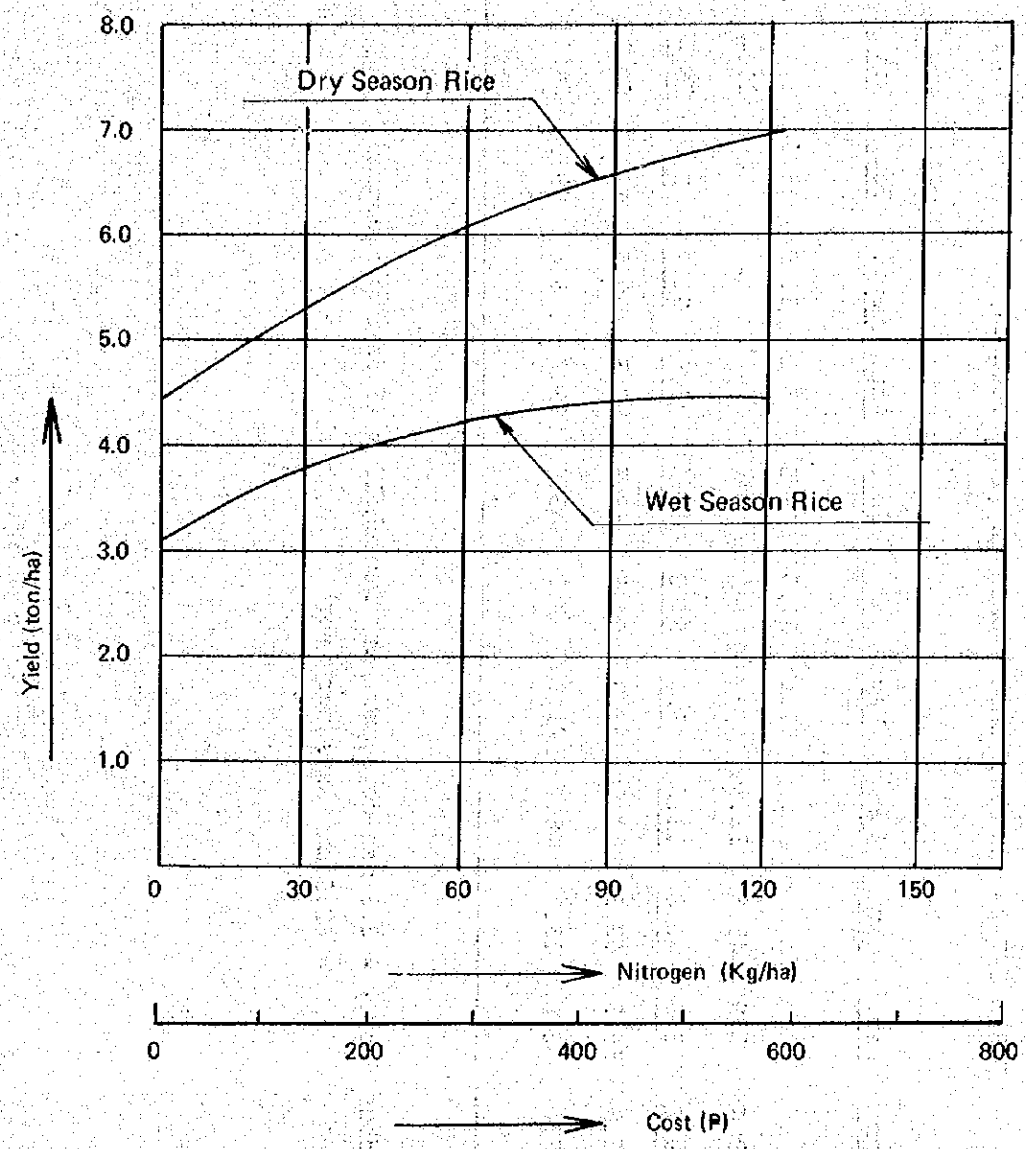
(Unit: man-day)

Items	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Labour Requirement													
1st Cropping	-	-	-	-	41.4	51.3	19.5	3.5	51.9	3.4	-	-	171.0
2nd Cropping	19.4	3.9	43.8	12.3	-	-	-	-	-	-	26.4	65.2	171.0
Total	19.4	3.9	43.8	12.3	41.4	51.3	19.5	3.5	51.9	3.4	26.4	65.2	342.0
Labour Supply	62.5	56.5	62.5	60.5	62.5	60.5	62.5	62.5	60.5	62.5	60.5	62.5	736.0
Balance	43.1	52.6	18.7	48.2	21.1	9.2	43.0	59.0	8.6	59.1	34.1	-2.7	394.0

Note: Labour Supply = 2.5 man-days per Farm Household x 25 days per month
= 62.5 man-days per month

APPENDIX C-8 PRODUCTIVITY

FIGURE C-8-1 YIELD OF HIGH YIELDING RICE VARIETIES AT EACH NITROGEN LEVELS



Notes: (1) Data Source; IRRI (Average yield of three replications in each level of (1975) applied nitorgen amount)

(2) High yielding varieties of this data; IR-20, IR-26, IR-28, IR-29, IR-30 and IR-32

(3) Cost of nitrogen was calculated by ₱ 4.75 per kilogram.

TABLE C-8-1 YIELD OF RICE UNDER OTHER IRRIGATION PROJECTS

(Unit; ha, ton/ha)

Project	Dry Season Area	Dry Season Unit Yield ton/ha	Dry Season Year	Wet Season Area	Wet Season Unit Yield ton/ha	Wet Season Year
1) AMIADP, compact farm Banga-Tabang	About 50ha	3.1	'73-'74 and '74-'75 Dry season	About 50ha	3.7	'74 and '75 Wet season
Pinagbarilan	-do-	3.6	-do-	-do-	3.5	-do-
2) LAGNA, PROJECT						
Diezmo irrigation area with diezmo system	-	-	-	159	4.4	'73, 1st crop

Data Source:

(I) AMIADP, Evaluation and statistics section, Tambulong, San Rafael, Bulacan, Romdom survey

(2) DIEZMO IRRIGATION PILOT AREA, Working document prepared for the Government of the Philippines, FAO-UNDP

TABLE C-8-2 AREA HARVESTED AND AVERAGE YIELD OF RICE WITH MASAGANA, 99 (PHASE I - V)

Item		Cagayan Province			National Level		
		Production (1,000t)	Area (1,000ha)	Ave. (t)	Production (1,000t)	Area (1,000ha)	Ave. (t)
Phase I (1973, Wet)	Irrigated	11.9	5.4	2.2	1,581.5	444.4	3.6
	Rainfed	2.1	1.0	2.1	534.8	175.8	3.0
	Total	14.0	6.4	2.2	2,115.8	620.2	3.4
Phase II (1973/1974, Dry)	Irrigated	54.2	22.7	2.4	1,498.5	435.7	3.4
	Rainfed	10.2	7.0	1.5	184.8	65.4	2.8
	Total	64.4	29.7	2.2	1,683.3	501.1	3.4
Phase III (1974, Wet)	Irrigated	13.2	4.6	2.9	2,051.3	639.2	3.2
	Rainfed	1.8	0.9	2.0	742.9	286.9	2.6
	Total	15.0	5.5	2.7	2,794.2	926.1	3.0
Phase IV (1974/1975, Dry)	Irrigated	23.1	7.3	3.2	684.2	184.0	3.7
	Rainfed	6.5	2.6	2.5	85.6	34.0	2.5
	Total	29.6	9.9	2.9	769.8	218.0	3.5
Phase V (1975, Wet)	Irrigated	19.4	5.4	3.6	2,080.1	515.7	4.0
	Rainfed	8.7	3.3	2.6	935.5	266.2	3.5
	Total	28.1	8.7	3.6	3,015.6	781.9	3.9
Mean Yield	Irrigated			2.9			3.6
	Rainfed			2.1			2.9
	Total			2.7			3.4

Note: Production and harvesting areas of upland rice are excluded.
Source: NFAC, Central Office.

APPENDIX C-9 AGRICULTURE PROGRAM AND AGRICULTURAL PILOT CENTER

FIGURE C-9-1 FUNCTION CHART OF CIADP AGRICULTURE PROGRAM

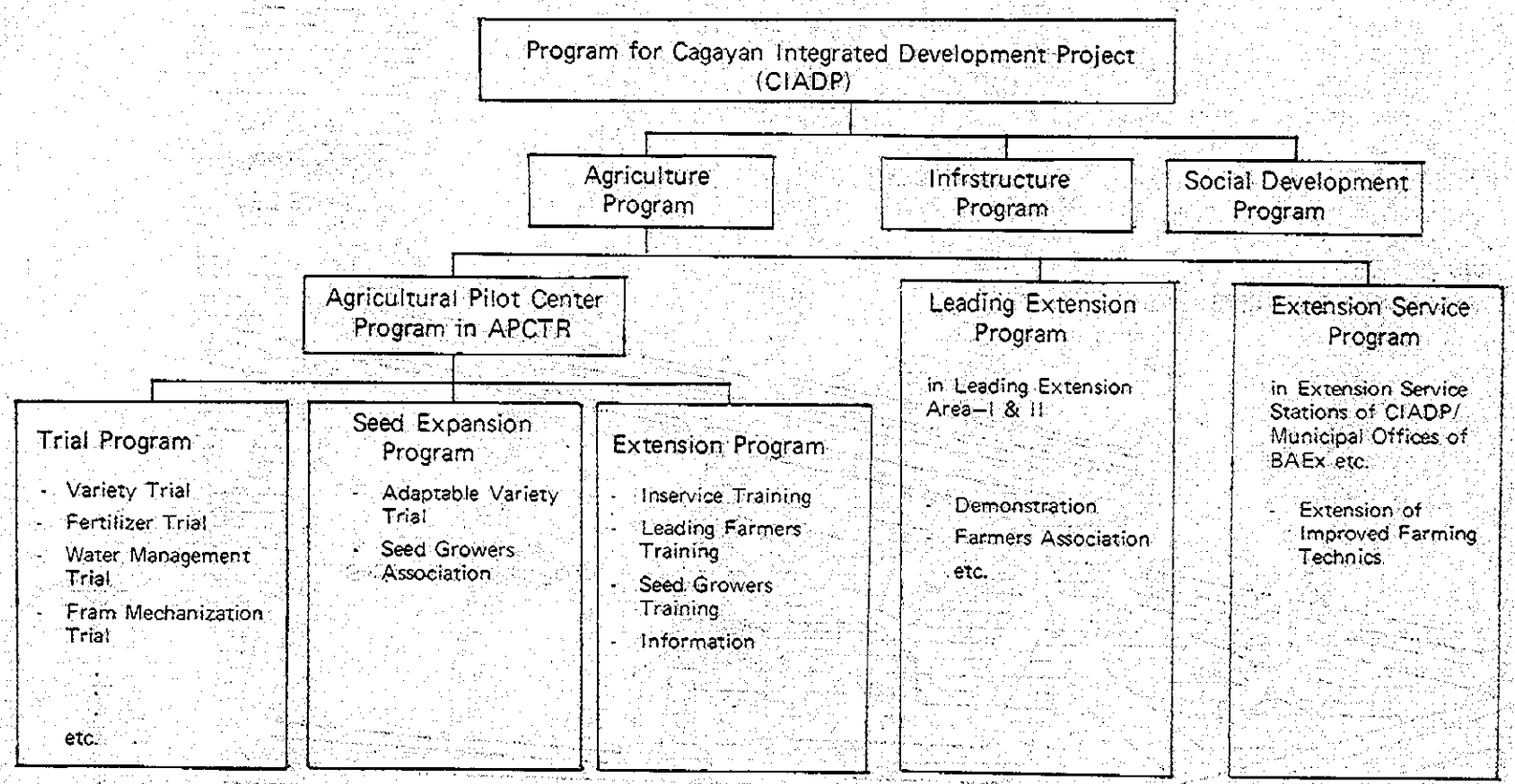
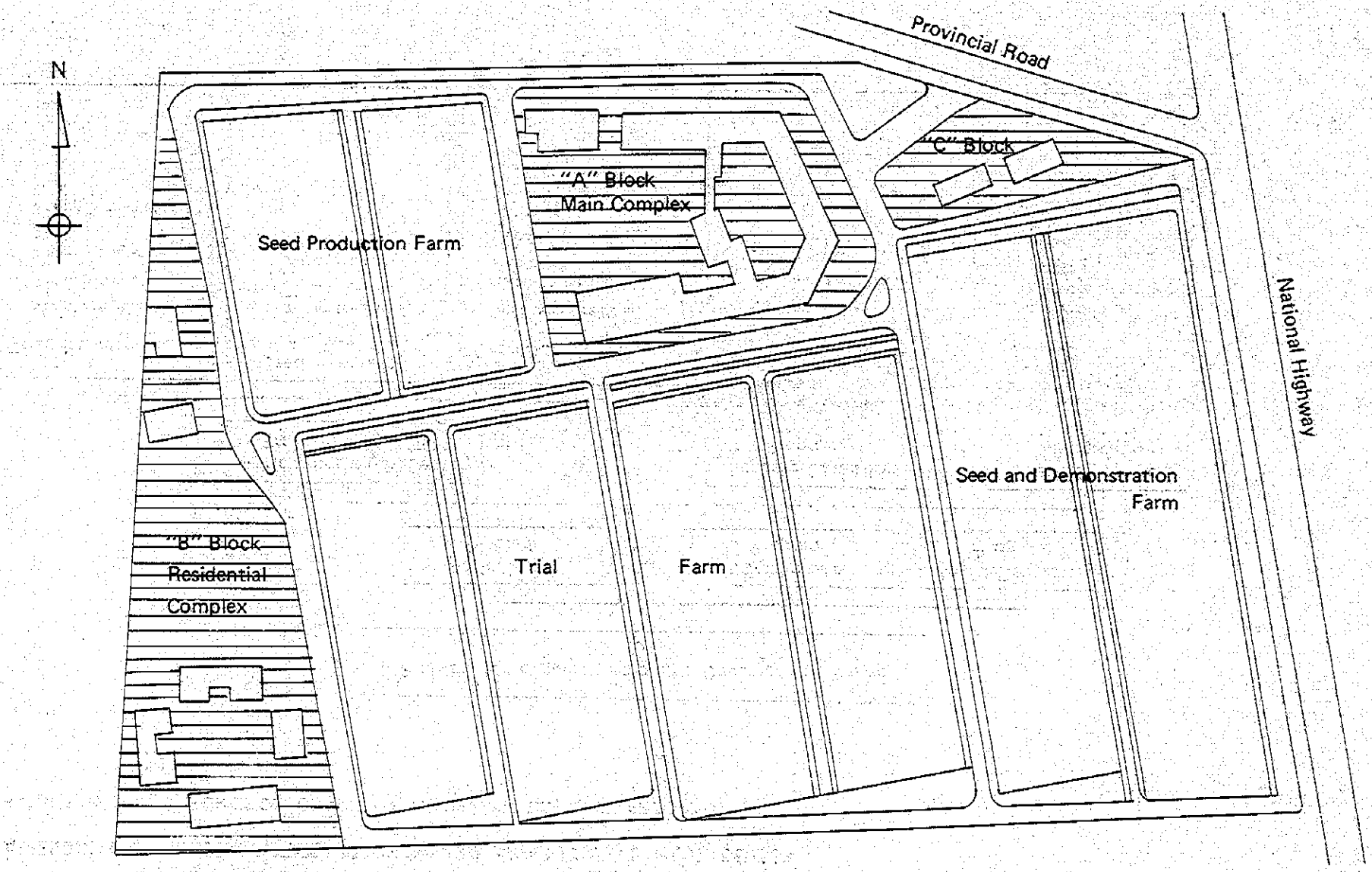


FIGURE C-9-2 PLAN OF AGRICULTURAL PILOT CENTER



Notes: (1) Site area: 11 ha (6 ha for 3 farms, 5 ha for building lots)
(2) Building lots: In "A" & "B" block, buildings have a total floor area 6 approx. 5,750 sq m
It consits of main office, laboratories, workshop, warehouse, paddy drying & processing factory guest house, domitory, office residence, etc.