

Japan International Cooperation Agency (JICA)

**Ministry of Settlement and Regional Infrastructure (MOSRI)
The Republic of Indonesia**

**THE STUDY
ON
COMPREHENSIVE RECOVERY PROGRAM
OF
IRRIGATION AGRICULTURE**

VOLUME-3

ANNEX-II (1/3)

**Priority List
of
Irrigation Schemes
for
Rehabilitation
(North Sumatra Province)**

February 2004

Nippon Koei Co., Ltd.

AFA

JR

04-18

Irrigation Scheme

Name of Scheme	Resgitered Area (Ha)	Subject Area (Ha)
1. Gido Sebu	1,258	T 883
2. Batang Gadis	6,628	T 5,575
3. Batang Ilung	4,194	T 3,546
4. Blk Sitongkon/Napa Suron	1,012	ST 500
5. Siborna	1,000	ST 950
6. Siaili Tukka	1,057	T 600
7. Badiri Lopian	1,283	T 899
8. Pandurangan	1,769	T 1,334
9. Sihiong	2,000	NT 779
10. Aek Silang	1,500	ST 1,500
11. Sarulla	2,692	ST 1,692
12. Parmihan Hutapaung	1,000	ST 1,000
13. Sinamo	1,000	ST 930
14. Aek Mandosi I	1,060	ST 1,059
15. Simangatasi II	1,515	T 1,514
16. Bulung Ihit	5,000	T 1,355
17. Perkotaan	3,457	T 3,446
18. Sungai Balai	1,185	ST 1,130
19. Panca Arga	2,500	T 2,500
20. Serbangan	2,333	T 2,044
21. Silau Bonto	3,231	NT 967
22. Sungai Silau	1,315	ST 452
23. Padang Mahondang	3,231	ST 2,905
24. Simujur	2,560	ST 2,010
25. Purwodadi	1,635	T 1,635
26. Pentera	1,034	ST 298
27. Simanten Pane Dame	1,000	NT 1,000
28. Penambe/Panet Tengah BK	1,723	T 1,722
29. Raja Hombang/T. Mangaraja	2,045	T 2,023
30. Kerasaan	5,000	T 4,144
31. Javacolonisasi Prubolonggo	1,030	T 1,015
32. Naga Sompah	1,360	T 1,015
33. Risma Duma	1,522	ST 1,522
34. Lae Ordi	1,200	ST 1,200
35. Parit Lompaten	1,242	ST 1,242
36. Bandar Sidoras	3,017	ST 3,457
37. Namu Rambe	1,036	T 1,036
38. Sei Belutu	5,082	ST 5,076
39. Langau	2,000	ST 1,900
40. Medan Krio	3,016	T 3,000
41. Rantau Panjang	2,309	ST 2,309
42. Pekan Kamis	1,100	ST 1,100
43. Secanggang	1,400	ST 1,400
44. Paya Lobang	1,558	ST 1,558
45. Namu Sira-Sira Kiri	1,350	T 1,350
46. Namu Sira-Sira Kanan	3,953	T 3,953
47. Bah Korah II	1,995	T 1,723
48. Sijambi	1,013	T 1,008
49. Rambung Mera	1,104	T 944
50. Paya Sordang	4,350	T 4,350

T : Technical Irrigation
 ST: Semi-Technical Irrigation
 NT: Non-Technical Irrigation

LEGEND

- Capital City of Province
- Capital Town of District
- Provincial Boundary
- District Boundary
- Provincial Road
- River
- Irrigation Scheme
- Technical Irrigation
- Semi-Technical Irrigation
- Non-Technical Irrigation

Study Area: North Sumatra Province



The Study on Comprehensive Recovery Program
 of Irrigation Agriculture
 Japan International Cooperation Agency

Location Map of Irrigation Schemes
 in North Sumatra Province

**THE STUDY
ON
COMPREHENSIVE RECOVERY PROGRAM
OF
IRRIGATION AGRICULTURE
IN
THE REPUBLIC OF INDONESIA**

Volume-3

**ANNEX-II (1/3)
PRIORITY LIST OF THE IRRIGATION SCHEMES FOR REHABILITATION
(North Sumatra Province)**

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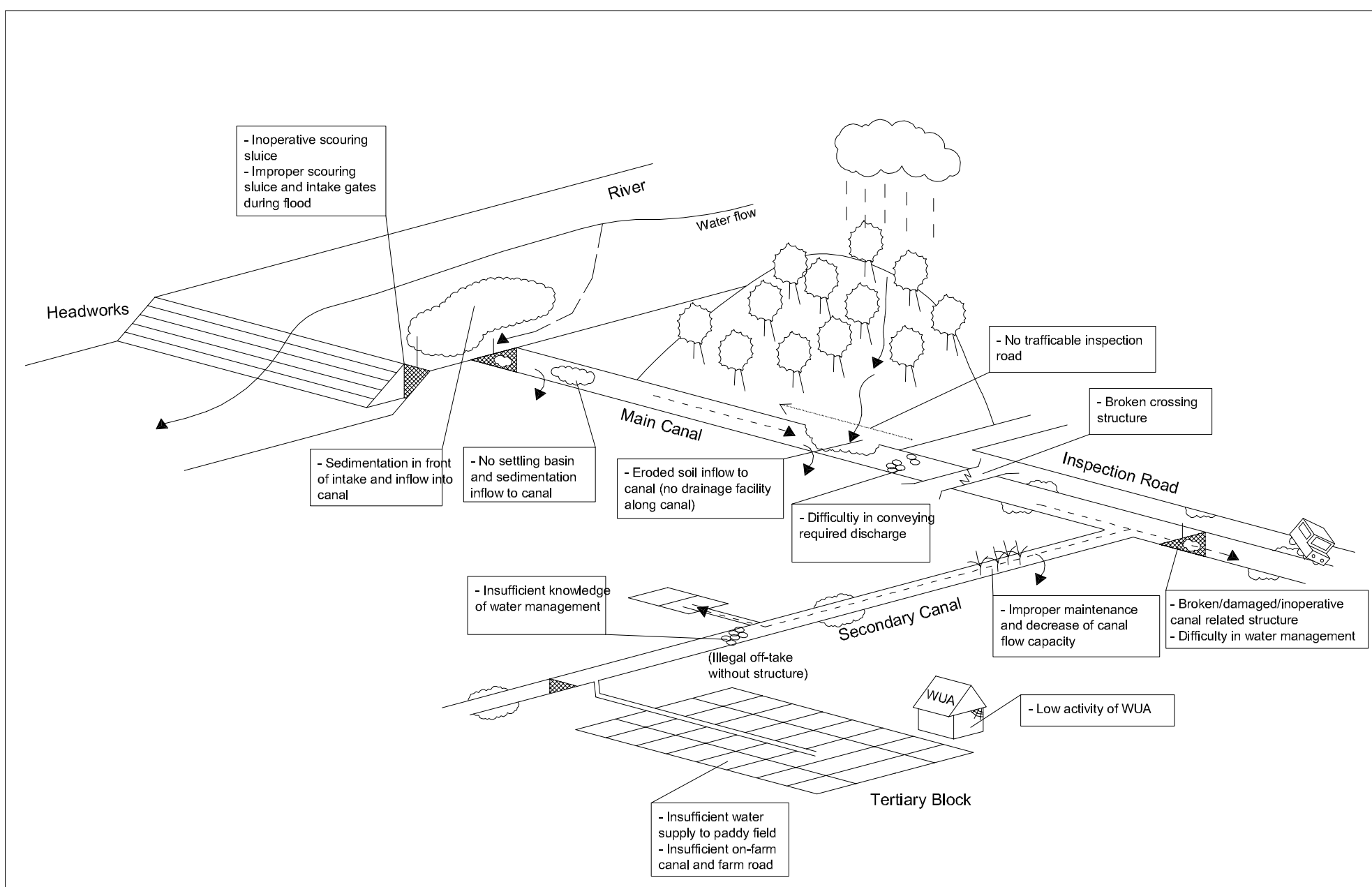
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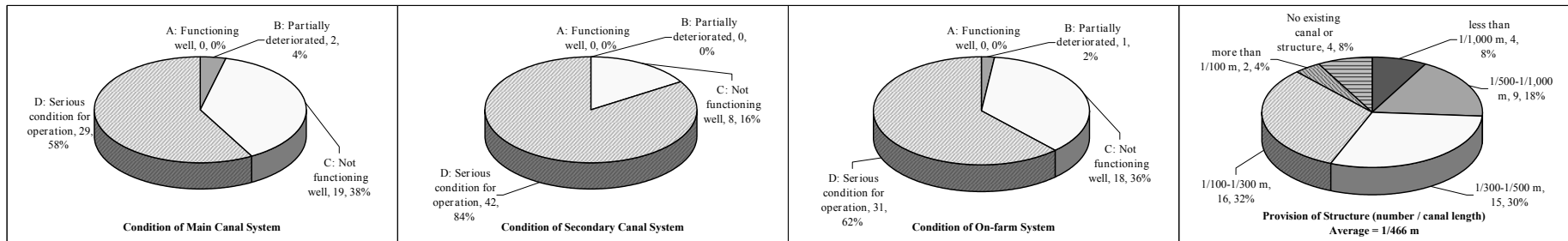
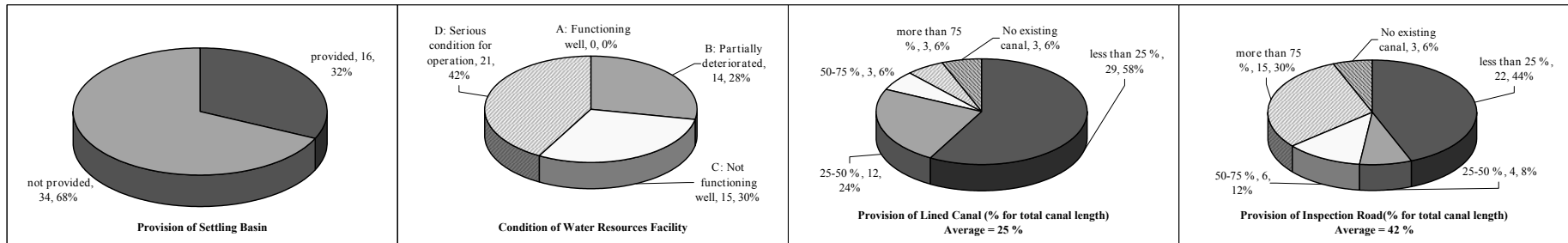
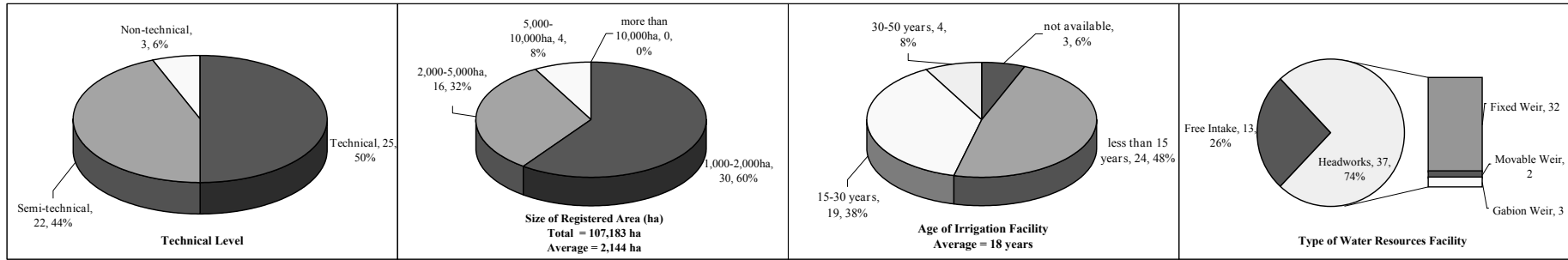
PART-I

Present Condition of the Irrigation Schemes (Provincial Summary)



Identified Common Problems on Irrigation System

Provincial Summary of Irrigation Schemes (North Sumatra Province)



Remarks: Explanation of graph shows 1) Classification, 2) Number of schemes, and 3) percentage.

**Present Condition of Water Resource Facility
North Sumatra Province**

No.	Irrigation Scheme	District	Technical Level ¹⁾	Registered Area (ha)	Age of the Facility (years)	Catchment Area (km ²)	Type of Facility	Type of Weir	Length of Weir (m)	Design Intake Discharge (m ³ /s)	No. of Scouring Sluice Gate	No. of Intake Gate	Provision of Settling Basin	Provision of Inspection Bridge	Condition	
1.	Gido Sebu	Nias	T	1,258	11	156	Headworks	Fixed weir	56	1.1	1	1	provided	provided	B	
2.	Batang Gadis	Mandailing Natal	T	6,628	11	880	Headworks	Fixed weir	63	5.7	4	4	not provided	not provided	B	
3.	Batang Ilung	Tapanuli Selatan	T	4,194	11	302	Headworks	Fixed weir	40	5.7	2	3	provided	provided	B	
4.	Blk Sitongkon/Napa Suron	Tapanuli Selatan	ST	1,012	27	143	Headworks	Gabion weir	51	2.6	0	2	not provided	not provided	D	
5.	Siborna	Tapanuli Selatan	ST	1,000	19	135	Headworks	Gabion weir	66	1.6	0	2	not provided	not provided	D	
6.	Siaili Tukka	Tapanuli Tengah	T	1,057	17	100	Headworks	Fixed weir	17	1.7	1	2	not provided	not provided	D	
7.	Badiri Lopian	Tapanuli Tengah	T	1,283	14	225	Free Intake	-	-	3.4	-	2	not provided	-	D	
8.	Pandurangan	Tapanuli Tengah	T	1,769	19	306	Headworks	Fixed weir	30	2.3	1	3	not provided	not provided	D	
9.	Sihiong	Tapanuli Tengah	NT	2,000	19	400	Headworks	Fixed weir	7	N/A	2	2	not provided	not provided	D	
10.	Aek Silang	Tapanuli Utara	ST	1,500	13	164	Free Intake	-	-	3.0	-	1	not provided	-	C	
11.	Sarulla	Tapanuli Utara	ST	1,692	-	228	Headworks	Gabion weir	25	1.5	0	1	not provided	not provided	C	
12.	Parmiahan Hutapaung	Tapanuli Utara	ST	1,000	10	164	Headworks	Fixed weir	11	0.7	1	1	not provided	not provided	B	
13.	Sinamo	Tapanuli Utara	ST	1,000	34	144	Headworks	Fixed weir	20	2.7	1	1	not provided	not provided	D	
14.	Aek Mandos I	Toba Samosir	ST	1,060	10	155	Headworks	Fixed weir	55	0.9	1	2	not provided	not provided	C	
15.	Simangatasi II	Toba Samosir	T	1,515	11	170	Headworks	Fixed weir	15	0.7	1	1	not provided	not provided	C	
16.	Bulung Iht	Labuhan Batu	T	5,000	5	420	Headworks	Fixed weir	17	6.0	2	2	provided	not provided	B	
17.	Perkotaan	Asahan	T	3,457	14	850	Headworks	Movable weir	19	6.5	1	4	provided	provided	B	
18.	Sungai Balai	Asahan	ST	1,185	5	290	Headworks	Fixed weir	30	1.7	1	2	not provided	not provided	C	
19.	Panca Arga	Asahan	T	2,500	10	375	Headworks	Fixed weir	25	1.0	1	2	not provided	provided	C	
20.	Serbangan	Asahan	T	2,333	10	88	Headworks	Fixed weir	35	2.4	2	5	not provided	provided	C	
21.	Silau Bonto	Asahan	NT	3,231	10	85	Free Intake	-	-	N/A	-	-	not provided	not provided	D	
22.	Sungai Silau	Asahan	ST	1,315	32	106	Free Intake	-	-	2.0	-	3	not provided	-	D	
23.	Padang Mahondang	Asahan	ST	3,231	22	500	Free Intake	-	-	0.6	-	2	not provided	-	D	
24.	Simujur	Asahan	ST	2,560	18	125	Free Intake	-	-	1.0	-	4	not provided	-	D	
25.	Purwodadi	Asahan	T	1,635	14	154	Headworks	Movable weir	30	10.0	1	2	not provided	provided	C	
26.	Pentara	Simalungun	ST	1,034	12	120	Headworks	Fixed weir	15	1.5	1	1	provided	not provided	C	
27.	Simantin Pane Dame	Simalungun	NT	1,000	14	58	Free Intake	-	-	1.5	-	1	not provided	-	D	
28.	Panambean / Panet Tengah BK	Simalungun	T	1,723	12	131	Headworks	Fixed weir	50	3.0	2	4	provided	not provided	B	
29.	Raja Hombang / T. Mangaraja	Simalungun	T	2,045	9	229	Headworks	Fixed weir	20	4.5	2	4	provided	provided	B	
30.	Kerasaan	Simalungun	T	5,000	15	636	Headworks	Fixed weir	125	7.4	4	3	provided	not provided	C	
31.	Javacolonisasi/Purbogondo	Simalungun	T	1,030	14	200	Headworks	Fixed weir	30	5.6	1	2	provided	not provided	B	
32.	Naga Sompah	Simalungun	T	1,360	16	588	Free Intake	-	-	2.0	-	1	not provided	-	D	
33.	Risma Duma	Dairi	ST	1,522	21	193	Headworks	Fixed weir	15	N/A	N/A	1	not provided	not provided	C	
34.	Lae Ordi	Dairi	ST	1,200	14	178	Headworks	Fixed weir	20	0.8	1	2	not provided	provided	C	
35.	Parit Lompaten	Karo	ST	1,242	20	200	Headworks	Fixed weir	25	1.5	0	1	not provided	not provided	D	
36.	Bandar Sidoras	Deli Serdang	ST	3,457	18	166	Headworks	Fixed weir	73	6.8	2	4	not provided	provided	D	
37.	Namu Rambe	Deli Serdang	T	1,036	37	260	Headworks	Fixed weir	50	2.1	2	2	provided	not provided	D	
38.	Sei Belutu	Deli Serdang	ST	5,082	40	930	Free Intake	-	-	10.0	-	3	not provided	-	D	
39.	Langau	Deli Serdang	ST	2,000	24	893	Free Intake	-	-	2.6	-	2	not provided	-	D	
40.	Medan Krio	Deli Serdang	T	3,016	25	43	Headworks	Fixed weir	42	2.8	1	3	provided	provided	C	
41.	Rantau Panjang	Deli Serdang	ST	2,309	-	1,031	Headworks	Fixed weir	N/A	N/A	N/A	N/A	not provided	not provided	D	
42.	Pekan Kamis	Deli Serdang	ST	1,100	-	178	Free Intake	-	-	N/A	-	1	not provided	-	D	
43.	Secanggih	Langkat	ST	1,400	18	88	Free Intake	-	-	7.5	-	2	not provided	-	D	
44.	Paya Lobang	Deli Serdan/Tebing Tinggi	ST	1,558	22	883	Headworks	Fixed weir	70	1.8	N/A	3	not provided	-	C	
45.	Namu Sira-sira Kiri	Langkat/Binjai	T	2,250	24	970	Headworks	Fixed weir	43	4.2	2	2	provided	provided	B	
46.	Namu Sira-sira Kanan	Langkat/Binjai	T	4,100	24	970	Headworks	Fixed weir	43	7.5	2	2	provided	not provided	B	
47.	Bah Korah II	Simalungun/Siantar	T	1,995	12	336	Headworks	Fixed weir	30	5.3	4	4	provided	not provided	B	
48.	Sijambi	Asahan/Tanjung Balai	T	1,013	10	250	Free Intake	-	-	1.2	2	2	not provided	-	D	
49.	Rambung Mera	P. Siantar/Simalungun	T	946	16	159	Headworks	Fixed weir	60	2.1	6	3	provided	provided	B	
50.	Paya Sordang	Tapanuli Sel/Mandailing Natal	T	4,350	11	228	Headworks	Fixed weir	72	3.2	6	6	provided	provided	B	
Total				107,183												
Average				2,144	17	332			39							
Itemized Total			T : 25 ST : 22 NT : 3				dam: 0 headworks: 37 free intake: 13	fixed weir: 32 movable weir: 2 gabion weir: 3					provided: 16 not provided: 34	provided: 13 not provided: 24	A : 0 B : 14 C : 15 D : 21	

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical

N/A : no information was available

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Source: Inventory Survey Works for the Study on Comprehensive Recovery Program of Irrigation Agriculture

**Present Condition of Irrigation Canal
North Sumatra Province**

No.	Irrigation Scheme	District	Technical Level ¹⁾	Registered Area (ha)	Age of the Facilities (years)	Main Canal					Secondary Canal					On-farm Condition
						Lined Length (m)	Unlined Length (m)	No. of Related Structures	Length of Inspection Road (m)	Condition	Lined Length (m)	Unlined Length (m)	No. of Related Structures	Length of Inspection Road (m)	Condition	
1.	Gido Sebua	Nias	T	1,258	11	2,702	0	11	0	D	3,477	8,113	29	0	D	C
2.	Batang Gadis	Mandaling Natal	T	6,628	11	21,325	950	67	22,275	B	41,768	2,000	424	35,014	C	C
3.	Batang Ilung	Tapanuli Selatan	T	4,194	11	6,360	0	33	3,180	C	48,910	4,600	238	32,106	C	C
4.	Blk Sitongkon/Napa Suron	Tapanuli Selatan	ST	1,012	27	0	5,443	18	0	D	0	8,261	17	0	D	D
5.	Siborna	Tapanuli Selatan	ST	1,000	19	0	7,426	16	0	D	0	5,131	3	0	D	D
6.	Sialli Tukka	Tapanuli Tengah	T	1,057	17	0	1,783	5	1,426	D	4,668	1,764	21	5,146	C	C
7.	Badiri Lopian	Tapanuli Tengah	T	1,283	14	350	1,630	8	0	D	1,390	5,639	44	351	D	C
8.	Pandurangan	Tapanuli Tengah	T	1,769	19	200	2,065	7	0	D	1,545	18,739	48	0	D	C
9.	Sihiong	Tapanuli Tengah	NT	2,000	19	100	200	0	0	D	100	500	0	0	D	D
10.	Aek Silang	Tapanuli Utara	ST	1,500	13	1,500	0	2	900	C	0	4,500	4	2,700	D	D
11.	Sarulla	Tapanuli Utara	ST	1,692	-	210	724	3	0	D	845	1,975	3	0	D	D
12.	Parmiah Hutapaung	Tapanuli Utara	ST	1,000	10	2,840	1,573	14	3,530	C	3,544	4,918	34	4,231	C	D
13.	Sinamo	Tapanuli Utara	ST	1,000	34	500	325	4	825	C	0	7,620	3	7,620	D	D
14.	Aek Mandos I	Toba Samosir	ST	1,060	10	360	0	2	180	B	0	4,944	13	2,966	D	D
15.	Simangatasi II	Toba Samosir	T	1,515	11	4,658	0	2	466	C	3,754	0	21	375	C	C
16.	Bulung Ihit	Labuhan Batu	T	5,000	5	450	5,070	10	4,416	D	2,875	23,675	41	23,865	D	C
17.	Perkotaan	Asahan	T	3,457	14	2,452	17,128	44	19,580	C	7,500	32,903	81	40,403	C	B
18.	Sungai Balai	Asahan	ST	1,185	5	2,039	1,300	7	0	D	0	8,267	28	0	D	C
19.	Panca Arga	Asahan	T	2,500	10	157	0	3	0	D	2,172	5,328	18	0	D	D
20.	Serbangan	Asahan	T	2,333	10	2,100	4,690	17	6,790	C	3,400	13,311	32	16,711	D	C
21.	Silau Bonto	Asahan	NT	3,231	10	0	0	0	0	D	0	0	0	0	D	D
22.	Sungai Silau	Asahan	ST	1,315	32	0	1,650	3	0	D	0	16,500	47	0	D	D
23.	Padang Mahondang	Asahan	ST	3,231	22	0	3,575	6	3,575	D	0	9,225	18	9,225	D	D
24.	Simujur	Asahan	ST	2,560	18	0	2,300	4	1,840	D	0	15,700	3	15,700	D	D
25.	Purwodadi	Asahan	T	1,635	14	0	12,972	55	12,972	D	0	12,362	93	12,362	D	C
26.	Pentara	Simalungun	ST	1,034	12	0	10,769	8	3,231	D	0	7,200	17	0	D	D
27.	Simantin Pane Dame	Simalungun	NT	1,000	14	0	2,000	3	2,000	D	0	0	0	0	D	D
28.	Panambean / Panet Tengah BK	Simalungun	T	1,723	12	2,214	4,136	52	4,445	C	3,081	11,665	248	2,212	D	C
29.	Raja Hombang / T. Mangaraja	Simalungun	T	2,045	9	8,080	14,200	138	11,140	C	0	10,800	92	0	D	D
30.	Kerasaan	Simalungun	T	5,000	15	7,245	23,061	51	30,306	C	9,500	43,605	98	53,105	D	D
31.	Javacolonisasi/Purbogondo	Simalungun	T	1,030	14	5,770	5,510	78	11,280	C	604	3,446	18	0	D	C
32.	Naga Sompah	Simalungun	T	1,360	16	8,000	5,417	63	6,709	C	3,000	6,712	54	0	D	C
33.	Risma Duma	Dairi	ST	1,522	21	0	0	0	0	D	0	0	0	0	D	D
34.	Lae Ordi	Dairi	ST	1,200	14	3,000	9,000	16	12,000	C	0	6,000	5	6,000	D	D
35.	Parit Lompaten	Karo	ST	1,242	20	1,800	9,980	46	11,780	C	256	14,262	14	14,518	D	D
36.	Bandar Sidoras	Deli Serdang	T	3,457	18	491	899	3	0	D	9,365	28,096	35	0	D	D
37.	Namu Rambe	Deli Serdang	ST	1,036	37	2,193	3,597	65	0	D	200	10,836	23	0	D	D
38.	Sei Belutu	Deli Serdang	ST	5,082	40	100	150	1	0	D	9,000	16,750	20	0	D	D
39.	Langau	Deli Serdang	ST	2,000	24	0	1,900	2	0	D	350	2,750	9	0	D	D
40.	Medan Krio	Deli Serdang	T	3,016	25	2,750	0	42	0	C	600	22,700	58	0	D	D
41.	Rantau Panjang	Deli Serdang	ST	2,309	-	0	0	2	0	D	0	0	2	0	D	D
42.	Pekan Kamis	Deli Serdang	ST	1,100	-	0	400	4	0	D	0	6,200	19	0	D	D
43.	Secanggang	Langkat	ST	1,400	18	1,446	10,954	15	0	D	250	13,740	51	0	D	D
44.	Paya Lobang	Deli Serdan/Tebing Tinggi	ST	1,558	22	1,500	3,400	5	0	D	500	4,900	17	0	D	D
45.	Namu Sira-sira Kiri	Langkat/Binjai	T	2,250	24	6,189	811	41	7,000	C	19,126	9,830	152	28,956	C	D
46.	Namu Sira-sira Kanan	Langkat/Binjai	T	4,100	24	1,200	1,500	7	2,700	C	31,000	16,266	315	37,781	C	C
47.	Bah Korah II	Simalungun/Siantar	T	1,995	12	8,519	7,272	144	11,054	C	893	3,403	65	0	D	C
48.	Sijambi	Asahan/Tanjung Balai	T	1,013	10	0	1,125	16	0	D	0	9,005	31	0	D	C
49.	Rambung Mera	P. Siantar/Simalungun	T	946	16	0	12,136	76	0	D	279	2,212	49	2,491	D	D
50.	Paya Sordang	Tapanuli Sel/Mandailing Natal	T	4,350	11	5,930	7,146	153	7,846	C	9,528	15,172	135	2,470	D	C
Total				107,183		114,730	206,167	1,372	203,446		223,480	481,525	2,790	356,308		
Average				2,144	17	2,295	4,123	27	4,069		4,470	9,631	56	7,126		
Itemized Total			T : 25							A : 0					A : 0	
			ST : 22							B : 2					B : 1	
			NT : 3							C : 19					C : 8	
										D : 29					D : 31	

Note: 1) T: Technical, ST: Semi-technical, NT: Non-technical
Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation
Source: Inventory Survey Works for the Study on Comprehensive Recovery Program of Irrigation Agriculture

**Present Ratio of Irrigation Facilities Provision
North Sumatra Province**

No.	Irrigation Scheme	District	Technical Level ¹⁾	Registered Area (ha)	Age of the Facilities (years)	Density of Canal (m/ha)			Lined Canal Provision Ratio			Inspection Road Provision Ratio			Structure Provision Ratio (m/nos)		
						MC	SC	Total	MC	SC	Total	MC	SC	Total	MC	SC	Total
1.	Gido Sebau	Nias	T	1,258	11	3.1	13.1	16.2	100%	30%	43%	0%	0%	0%	246	400	357
2.	Batang Gadis	Mandailing Natal	T	6,628	11	4.0	7.9	11.8	96%	95%	96%	100%	80%	87%	332	103	135
3.	Batang Ilung	Tapanuli Selatan	T	4,194	11	1.8	15.1	16.9	100%	91%	92%	50%	60%	59%	193	225	221
4.	Blk Sitongkon/Napa Suron	Tapanuli Selatan	ST	1,012	27	10.9	16.5	27.4	0%	0%	0%	0%	0%	0%	302	486	392
5.	Siborna	Tapanuli Selatan	ST	1,000	19	7.8	5.4	13.2	0%	0%	0%	0%	0%	0%	464	1,710	661
6.	Siaili Tukka	Tapanuli Tengah	T	1,057	17	3.0	10.7	13.7	0%	73%	57%	80%	80%	80%	357	306	316
7.	Badiri Lopian	Tapanuli Tengah	T	1,283	14	2.2	7.8	10.0	18%	20%	19%	0%	5%	4%	248	160	173
8.	Pandurangan	Tapanuli Tengah	T	1,769	19	1.7	15.2	16.9	9%	8%	8%	0%	0%	0%	324	423	410
9.	Sihiong	Tapanuli Tengah	NT	2,000	19	0.4	0.8	1.2	33%	17%	22%	0%	0%	0%	No structure		
10.	Aek Silang	Tapanuli Utara	ST	1,500	13	1.0	3.0	4.0	100%	0%	25%	60%	60%	60%	750	1,125	1,000
11.	Sarulla	Tapanuli Utara	ST	1,692	-	0.6	1.7	2.2	22%	30%	28%	0%	0%	0%	311	940	626
12.	Parmihan Hutapaung	Tapanuli Utara	ST	1,000	10	4.4	8.5	12.9	64%	42%	50%	80%	50%	60%	315	249	268
13.	Sinamo	Tapanuli Utara	ST	1,000	34	0.9	8.2	9.1	61%	0%	6%	100%	100%	100%	206	2,540	1,206
14.	Aek Mandos I	Toba Samosir	ST	1,060	10	0.3	4.7	5.0	100%	0%	7%	50%	60%	59%	180	380	354
15.	Simangatasi II	Toba Samosir	T	1,515	11	3.1	2.5	5.6	100%	100%	100%	10%	10%	10%	2,329	179	366
16.	Bulung Ihit	Labuhan Batu	T	5,000	5	4.1	19.6	23.7	8%	11%	10%	80%	90%	88%	552	648	629
17.	Perkotaan	Asahan	T	3,457	14	5.7	11.7	17.4	13%	19%	17%	100%	100%	100%	445	499	480
18.	Sungai Balai	Asahan	ST	1,185	5	3.0	7.3	10.3	61%	0%	18%	0%	0%	0%	477	295	332
19.	Panca Arga	Asahan	T	2,500	10	0.1	3.0	3.1	100%	29%	30%	0%	0%	0%	52	417	365
20.	Serbangan	Asahan	T	2,333	10	3.3	8.2	11.5	31%	20%	23%	100%	100%	100%	399	522	480
21.	Silau Bonto	Asahan	NT	3,231	10	No Canal			No canal			No canal			No canal		
22.	Sungai Silau	Asahan	ST	1,315	32	3.7	36.5	40.2	0%	0%	0%	0%	0%	0%	550	351	363
23.	Padang Mahondang	Asahan	ST	3,231	22	1.2	3.2	4.4	0%	0%	0%	100%	100%	100%	596	513	533
24.	Simujur	Asahan	ST	2,560	18	1.1	7.8	9.0	0%	0%	0%	80%	100%	97%	575	5,233	2,571
25.	Purwodadi	Asahan	T	1,635	14	7.9	7.6	15.5	0%	0%	0%	100%	100%	100%	236	133	171
26.	Pentara	Simalungun	ST	1,034	12	36.1	24.2	60.3	0%	0%	0%	30%	0%	18%	1,346	424	719
27.	Simantin Pane Dame	Simalungun	NT	1,000	14	2.0	0.0	2.0	0%	No canal	0%	100%	No canal	100%	667	No canal	667
28.	Panamban / Panet Tongah BK	Simalungun	T	1,723	12	3.7	8.6	12.3	35%	21%	25%	70%	15%	32%	122	59	70
29.	Raja Hombang / T. Mangaraja	Simalungun	T	2,045	9	11.0	5.3	16.4	36%	0%	24%	50%	0%	34%	161	117	144
30.	Kerasaan	Simalungun	T	5,000	15	7.3	12.8	20.1	24%	18%	20%	100%	100%	100%	594	542	560
31.	Javacolonisasi/Purbogondo	Simalungun	T	1,030	14	11.1	4.0	15.1	51%	15%	42%	100%	0%	74%	145	225	160
32.	Naga Sompah	Simalungun	T	1,360	16	13.2	9.6	22.8	60%	31%	48%	50%	0%	29%	213	180	198
33.	Risma Duma	Dairi	ST	1,522	21	0.0	0.0	0.0	No canal			No canal			No canal		
34.	Lae Ordi	Dairi	ST	1,200	14	10.0	5.0	15.0	25%	0%	17%	100%	100%	100%	750	1,200	857
35.	Parit Lompaten	Karo	ST	1,242	20	9.5	11.7	21.2	15%	2%	8%	100%	100%	100%	256	1,037	438
36.	Bandar Sidoras	Deli Serdang	ST	3,457	18	0.4	10.8	11.2	35%	25%	25%	0%	0%	0%	463	1,070	1,022
37.	Namu Rambe	Deli Serdang	T	1,036	37	5.6	10.7	16.2	38%	2%	14%	0%	0%	0%	89	480	191
38.	Sei Belutu	Deli Serdang	ST	5,082	40	0.0	5.1	5.1	40%	35%	35%	0%	0%	0%	250	1,288	1,238
39.	Langau	Deli Serdang	ST	2,000	24	1.0	1.6	2.6	0%	11%	7%	0%	0%	0%	950	344	455
40.	Medan Krio	Deli Serdang	T	3,016	25	0.9	7.8	8.7	100%	3%	13%	0%	0%	0%	65	402	261
41.	Rantau Panjang	Deli Serdang	ST	2,309	-	0.0	0.0	0.0	No canal			No canal			No canal		
42.	Pekan Kamis	Deli Serdang	ST	1,100	-	0.4	5.6	6.0	0%	0%	0%	0%	0%	0%	100	326	287
43.	Secanggih	Langkat	ST	1,400	18	8.9	10.0	18.9	12%	2%	6%	0%	0%	0%	827	274	400
44.	Paya Lobang	Deli Serdang/Tebing Tinggi	ST	1,558	22	3.1	3.5	6.6	31%	9%	19%	0%	0%	0%	980	318	468
45.	Namu Sira-sira Kiri	Langkat/Binjai	T	2,250	24	5.2	21.4	26.6	88%	66%	70%	100%	100%	100%	171	191	186
46.	Namu Sira-sira Kanan	Langkat/Binjai	T	4,100	24	0.7	12.0	12.6	44%	66%	64%	100%	80%	81%	386	150	155
47.	Bah Korah II	Simalungun/Siantar	T	1,995	12	9.2	2.5	11.7	54%	21%	47%	70%	0%	55%	110	66	96
48.	Sijambi	Asahan/Tanjung Balai	T	1,013	10	1.1	8.9	10.0	0%	0%	0%	0%	0%	0%	70	290	216
49.	Rambung Mera	P. Siantar/Simalungun	T	946	16	12.9	2.6	15.5	0%	11%	2%	0%	100%	17%	160	51	117
50.	Paya Sordang	Tapanuli Sei/Mandailing Natal	T	4,350	11	3.0	5.7	8.7	45%	39%	41%	60%	10%	27%	85	183	131
Total				107,183													
Average				2,144	17	4.7	8.5	13.2	37%	21%	25%	45%	37%	42%	422	601	466
Itemized Total			T : 25 ST : 22 NT : 3														

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical

MC: Main Canal, SC: Secondary Canal

Source: Inventory Survey Works for the Study on Comprehensive Recovery Program of Irrigation Agriculture

**Summary of Existing Condition and Development Plan
North Sumatra Province**

No.	Irrigation Scheme	District	Existing Condition											Development Plan									
			Technical Level ¹⁾	Registered Area (ha)	Age of Facility as of year 2003 (years)	Water Resources Facility			Canal and Related Facility				Terminal Facility and On Farm	Water Resources Facility			Canal and Related Facility			Terminal Facility and On Farm			
						Facility	Settling Basin	Condition	MC length (km)	SC length (km)	Nos. of Related Structures (nos.)	Condition		Subject Area (ha)	Grade of Rehabilitation	Settling Basin	Grade of Rehabilitation	MC length (km)	SC length (km)	Nos. of Related Structures (nos.)	Land/On-farm Development (ha)		
												MC									SC	Potential Area	Non-Potential Area
1	Gido Sebau	Nias	T	1,258	11	Headworks	provided	B	2.702	11.590	40	D	D	C	883	minor rehabili.		1,891	8,113	33	883	-	
2	Batang Gadis	Mandailing Natal	T	6,628	11	Headworks	not provided	B	22.275	43.768	491	B	C	C	5,575	new construction		18,711	36,765	489	5,575	-	
3	Batang Ilung	Tapanuli Selatan	T	4,194	11	Headworks	provided	B	6.360	53.510	271	C	C	C	3,546	replacement		5.406	45.484	274	3,546	-	
4	Bik Sitongkon/Napa Suron	Tapanuli Selatan	ST	1,012	27	Headworks	not provided	D	5.443	8.261	35	D	D	D	500	new construction		2.934	4.857	22	500	-	
5	Siborna	Tapanuli Selatan	ST	1,000	19	Headworks	not provided	C	7.426	5.131	19	D	D	D	950	new construction		8.169	6.157	23	950	-	
6	Sialli Tukka	Tapanuli Tengah	T	1,057	17	Headworks	not provided	D	1.783	6.432	26	D	C	C	600	new construction		1.016	3.666	17	600	-	
7	Badiri Lopian	Tapanuli Tengah	T	1,283	14	Free Intake	not provided	D	1.980	7.029	52	D	D	C	899	new construction		1.386	4.920	43	899	-	
8	Pandurungan	Tapanuli Tengah	T	1,769	19	Headworks	not provided	D	2.265	20.284	55	D	D	C	1,334	new construction		1.699	15,213	49	1,334	-	
9	Sihiong	Tapanuli Tengah	NT	2,000	19	Headworks	not provided	D	0.300	0.600	0	D	D	D	779	new construction		883	7.911	25	255	524	
10	Aek Silang	Tapanuli Utara	ST	1,500	13	Free Intake	not provided	C	1.500	4.500	6	C	D	D	1,500	new construction		1.650	1.400	8	1,500	-	
11	Sarulla	Tapanuli Utara	ST	1,692	14	Headworks	not provided	C	0.934	2.820	6	D	D	D	1,692	new construction		1.027	3.384	8	1,692	-	
12	Parmiahna Hutapaung	Tapanuli Utara	ST	1,000	10	Headworks	not provided	B	4.413	8.462	48	C	C	D	1,000	new construction		4.854	10.154	63	1,000	-	
13	Sinamo	Tapanuli Utara	ST	1,000	34	Headworks	not provided	D	0.825	7.620	7	C	D	D	930	new construction		908	9.144	42	930	-	
14	Aek Mandos I	Toba Samosir	ST	1,060	10	Headworks	not provided	C	0.360	4.944	15	B	D	D	1,059	new construction		396	5.933	20	1,059	-	
15	Simangatasi II	Toba Samosir	T	1,515	11	Headworks	not provided	C	4.658	3.754	23	C	C	C	1,514	new construction		4.658	3.754	27	1,514	-	
16	Buluh Ihit	Labuhan Batu	T	5,000	5	Headworks	provided	B	5.520	26.550	51	D	D	C	1,355	minor rehabili.		1.490	7.169	16	1,355	-	
17	Perkotan	Asahan	T	3,457	14	Headworks	provided	B	19.580	40.403	125	C	C	B	3,446	large rehabili.		19.580	40.403	146	3,446	-	
18	Sungai Balai	Asahan	ST	1,185	5	Headworks	not provided	C	3.339	8.267	35	D	D	C	1,130	new construction		3.673	9.920	46	1,130	-	
19	Panca Arga	Asahan	T	2,500	10	Headworks	not provided	C	0.157	7.500	21	D	D	D	2,500	new construction	2)	157	7.500	25	2,500	-	
20	Serhangan	Asahan	T	2,333	10	Headworks	not provided	C	6.790	16.711	49	C	D	C	2,044	new construction	2)	5.975	16.202	50	2,044	-	
21	Silau Bonto	Asahan	NT	3,231	10	Free Intake	not provided	D	0.000	0.000	0	D	D	D	967	new construction	2)	825	6.990	35	967	-	
22	Sungai Silau	Asahan	ST	1,315	32	Free Intake	not provided	D	1.650	16.500	50	D	D	D	452	new construction	3)	617	6.732	23	452	-	
23	Padang Mahondang	Asahan	ST	3,231	22	Free Intake	not provided	D	3.575	9.225	24	D	D	D	2,905	new construction		3.539	9.963	28	2,905	-	
24	Simujur	Asahan	ST	2,560	18	Free Intake	not provided	D	2.300	15.700	7	D	D	D	2,010	new construction		1.999	14.884	21	1,200	810	
25	Purwodadi	Asahan	T	1,635	14	Headworks	not provided	C	12.972	12.362	148	D	D	C	1,635	new construction		12.972	12.362	172	1,635	-	
26	Pentara	Simalungun	ST	1,034	12	Headworks	provided	C	10.769	7.200	25	D	D	D	298	no rehabili.		3.435	2.506	9	298	-	
27	Simantin Pane Dame	Simalungun	NT	1,000	14	Free Intake	not provided	D	2.000	0.000	3	D	D	D	1,000	new construction		2.400	-	4	1,000	-	
28	Panambean / Panet Tengah BK	Simalungun	T	1,723	12	Headworks	provided	B	6.350	14.746	300	C	D	C	1,722	no rehabili.		6.350	14.746	355	1,722	-	
29	Raja Hombang / T. Mangaraja	Simalungun	T	2,045	9	Headworks	provided	B	22.280	10.800	230	C	D	D	2,023	no rehabili.		22.280	10.800	262	2,023	-	
30	Kerasaan	Simalungun	T	5,000	15	Headworks	provided	C	30.306	53.105	149	C	D	D	4,144	replacement		25.154	44.077	144	4,144	-	
31	Javacolonisasi/Purbogondo	Simalungun	T	1,030	14	Headworks	provided	B	11.280	4.050	96	C	D	C	1,015	minor rehabili.		11.280	4.050	107	1,015	-	
32	Naga Sompah	Simalungun	T	1,360	16	Free Intake	not provided	D	13.417	9.712	117	C	D	C	1,015	new construction		10.063	7.284	101	1,015	-	
33	Risma Duma	Dairi	ST	1,522	21	Headworks	not provided	C	0.000	0.000	0	D	D	D	1,522	new construction		2.265	22.128	65	1,522	-	
34	Lae Ordi	Dairi	ST	1,200	14	Headworks	not provided	C	12.000	6.000	21	C	D	D	1,200	new construction		13.200	7.200	26	607	593	
35	Parit Lompaten	Karo	ST	1,242	20	Headworks	not provided	D	11.780	14.518	60	C	D	D	1,242	new construction		12.958	17.422	74	1,242	-	
36	Bandar Sidoras	Deli Serdang	ST	3,457	18	Headworks	not provided	D	1.390	37.461	38	D	D	D	3,457	new construction		1.529	44.953	51	3,457	-	
37	Namu Rambe	Deli Serdang	T	1,036	37	Headworks	provided	D	5.790	11.036	88	D	D	D	1,036	replacement		5.790	11.036	99	1,036	-	
38	Sei Belutu	Deli Serdang	ST	5,082	40	Free Intake	not provided	D	0.250	25.750	21	D	D	D	5,076	new construction		275	30.900	28	5,076	-	
39	Langau	Deli Serdang	ST	2,000	24	Free Intake	not provided	D	1.900	3.100	11	D	D	D	1,900	new construction		2.090	3.720	15	1,900	-	
40	Medan Krio	Deli Serdang	T	3,016	25	Headworks	provided	C	2.750	23.300	100	C	D	D	3,000	replacement		2.750	23.300	116	3,000	-	
41	Rantau Panjang	Deli Serdang	ST	2,309	-	Headworks	not provided	D	0.000	0.000	4	D	D	D	2,309	new construction		6.790	16.711	57	2,309	-	
42	Pekan Kamis	Deli Serdang	ST	1,100	-	Free Intake	not provided	D	0.400	6.200	23	D	D	D	1,100	new construction		440	7.440	30	1,100	-	
43	Secanggang	Langkat	ST	1,400	18	Free Intake	not provided	D	12.400	13.990	66	D	D	D	1,400	new construction		13.640	16.788	87	1,400	-	
44	Paya Lobang	Deli Serdan/Tebing Tinggi	ST	1,558	22	Headworks	not provided	C	4.900	5.400	22	D	D	D	1,558	new construction		5.390	6.480	29	1,558	-	
45	Namu Sira-sira Kiri	Langkat/Binjai	T	2,250	24	Headworks	provided	B	7.000	28.956	193	C	C	D	1,350	minor rehabili.		4.200	17.374	137	1,350	-	
46	Namu Sira-sira Kanan	Langkat/Binjai	T	4,100	24	Headworks	provided	B	2.700	47.266	322	C	C	C	3,953	minor rehabili.		2.700	47.266	386	3,953	-	
47	Bah Korah II	Simalungun/Siantar	T	1,995	12	Headworks	provided	B	15.791	4.296	209	C	D	C	1,723	minor rehabili.		13.580	3.695	203	1,723	-	
48	Sijambi	Asahan/Tanjung Balai	T	1,013	10	Free Intake	not provided	D	1.125	9.005	47	D	D	C	1,008	new construction	3)	1.125	9.005	55	1,008	-	
49	Rambung Mera	P. Siantar/Simalungun	T	946	16	Headworks	provided	B	12.136	2.491	125	D	D	D	944	minor rehabili.		12.136	2.491	142	944	-	
50	Paya Sordang	Tapanuli Sei/Mandailing Natal	T	4,350	11	Headworks	provided	B	13.076	24.700	288	C	D	C	4,350	minor rehabili.		13.076	24.700	330	4,350	-	

Note: 1) T: Technical, ST: Semi-technical, NT: Non-technical

2) Water will be supplied from integrated headworks for Panca Arga, Serhangan, and Silau Bonto schemes.

3) Water will be supplied from integrated headworks for Sungai Silau and Sijambi schemes.

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

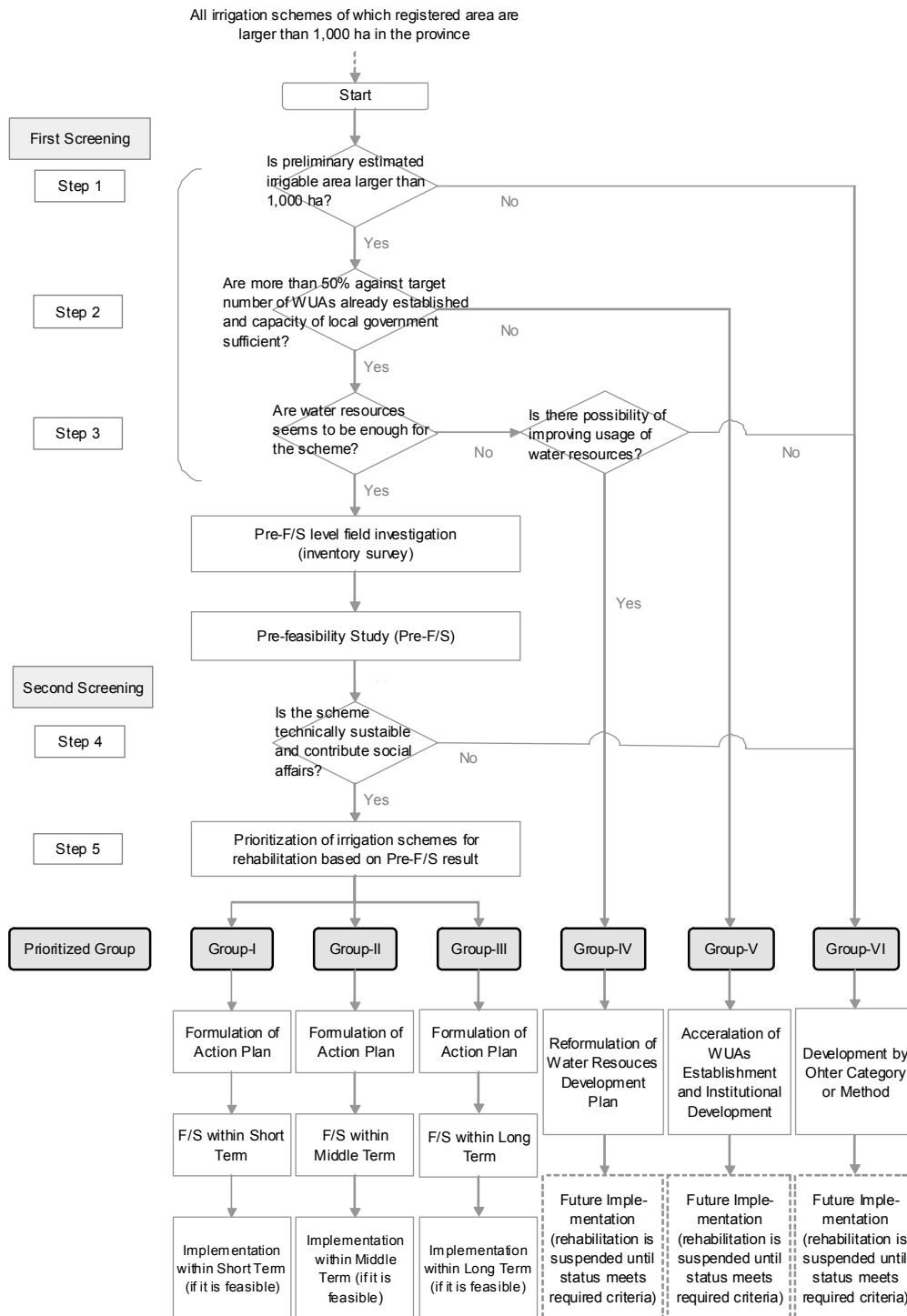
PART-II

Method and Result of Prioritization of Irrigation Schemes for Rehabilitation

METHOD AND PROCESS FLOW OF PRIORITIZATION

General Flow

General flow of prioritization of irrigation schemes for rehabilitation is shown below and detail descriptions of the flow are presented in following sections.



First Screening

Step-1

- 1.1 Collection of data on existing irrigation schemes with a registered area of more than 1,000 ha.
- 1.2 If the area of both the registered area and the estimated area were more than 1,000 ha proceeded to Step-2. If an estimated area was less than 1,000 ha, such scheme has been categorized into Group-VI.

Step-2

- 2.1 Evaluation of capacities of WUA of each irrigation schemes and related district governments.
- 2.2 If more than 50% against target number of WUAs has been already established as well as the post of head of water resources and irrigation service office has been fulfilled by the third or higher rank officer, proceeded to Step-3 (1). On the other hand, if more than 50% against target number of WUAs has not been established or the said post has been vacant or fulfilled by the fourth rank officer, the scheme has been categorized into Group-V.

Step-3

- 3.1 Information on water resources and irrigable area of the scheme furnished by the Dinas PSDA/project office has been adopted for the determination of the possibility for water supply for the scheme.
- 3.2 If the water resources was considered to be sufficient for the scheme according to such information, an inventory survey and pre-F/S have been carried out.
- 3.3 If the water resources were considered to be insufficient for the scheme according to the information, proceeded to Step-3 (2).
- 3.4 In case that there was a possibility of reformulation of water resources development plan, the scheme has been categorized into Group-IV. On the other hand, if there was no possibility of reformulation of water resources development plan, the scheme has been categorized into Group-VI.

Second Screening

Step-4

4.1 If there are such problems as low technical sustainability (high construction cost and low economic feasibility) and less contribution to the society, such scheme has been categorized into Group-VI.

Prioritization by Weighted Scoring Method

Step-5

5.1 Evaluation indicators for prioritization consist of issues of: (a) irrigation, (b) agricultural productivity, (c) society, and (d) economic and financial impacts. Weight of indicators are as follows and detail is shown in page 2-4 “Evaluation Indicators for Weighted Scoring”.

Evaluation Indicators for Weighted Scoring		
	Evaluation Indicator	Weighted Score
1.	Issue of Irrigation Indicator	50
1.1	Utilization of irrigation potential	(10)
1.2	Urgency of rehabilitation	(25)
1.3	Sustainability	(15)
2.	Issue of Agriculture Productivity	20
2.1	Current cropping intensity	(10)
2.2	Current unit yield of paddy	(10)
3.	Issue of Society	15
3.1	Number of beneficiaries	(7.5)
3.2	Provision of social infrastructure	(7.5)
4.	Issue of Economic and Financial Impact	15
4.1	Feasibility (Pre-F/S level EIRR)	(7.5)
4.2	Agriculture return per hectare	(7.5)

5.2 Based on the comprehensive examination of the above evaluation indicators in pre-F/S, priority of the schemes to be rehabilitated has been determined and listed.

Priority

Based on the priority list thus prepared, recommendation of implementation procedure is made as follows:

- Group-I: Recommended as the first priority
- Group-II: Recommended as the second priority
- Group-III: Recommended as the third priority
- Group-IV: Recommended to reformulate water resources development plan
- Group-V: Recommended to accelerate WUA establishment and to empower

district government officials concerned

Group-VI: Recommended to formulate development method by other categories

The priority list classified into Groups-I to VI is presented in page 2-5 “Priority List of Irrigation Schemes for Rehabilitation”.

Evaluation Indicators for Weighted Scoring

Issue for Evaluation	Full Score	Evaluation Index	Weight	Weighted Score	Situation for High Priority
1 Issue of Irrigation System	50.0				
1.1 Rate of Utilization of Irrigation Potential (= present irrigation paddy area / irrigated paddy area with project x 100)	10.0	(1) Less than 50 % (2) 50 - 69 % (3) 70 - 100 %	1.0 0.8 0.5	10.0 8.0 5.0	Severe problem on irrigation program achievement.
1.2 Urgency of Rehabilitation	25.0				Severe problem on irrigation facilities
1.2.1 Function of Water Resources Facility	10.0	(1) Serious condition for operation (Evaluation: D) (2) Not functioning well (Evaluation: C) (3) Partially deteriorated (Evaluation: B) (4) Functioning well (Evaluation: A)	1.0 0.8 0.6 0.4	10.0 8.0 6.0 4.0	
1.2.2 Function of Main Canal System	7.0	(1) Serious condition for operation (Evaluation: D) (2) Not functioning well (Evaluation: C) (3) Partially deteriorated (Evaluation: B) (4) Functioning well (Evaluation: A)	1.0 0.8 0.6 0.4	7.0 5.6 4.2 2.8	
1.2.3 Function of Secondary Canal System	5.0	(1) Serious condition for operation (Evaluation: D) (2) Not functioning well (Evaluation: C) (3) Partially deteriorated (Evaluation: B) (4) Functioning well (Evaluation: A)	1.0 0.8 0.6 0.4	5.0 4.0 3.0 2.0	
1.2.4 Function of On-farm System	3.0	(1) Serious condition for operation (Evaluation: D) (2) Not functioning well (Evaluation: C) (3) Partially deteriorated (Evaluation: B) (4) Functioning well (Evaluation: A)	1.0 0.8 0.6 0.4	3.0 2.4 1.8 1.2	
1.3 Sustainability of Irrigation System	15.0				Severe problem on sustainability
1.3.1 Age of the Facility	7.5	(1) More than 50 years (2) 30 - 49 years (3) 15 - 29 years (4) Less than 15 years	1.0 0.8 0.6 0.4	7.5 6.0 4.5 3.0	
1.3.2 Technical Level	7.5	(1) Non-technical level (2) Semi-technical level (3) Technical level	1.0 0.8 0.5	7.5 6.0 3.8	
2 Issue of Agricultural Productivity	20.0				
2.1 Current Cropping Intensity of Paddy (= annual cropped area of paddy / subject area x 100)	10.0	(1) Less than 100 % (2) 100 - 149 % (3) 150 - 199 % (4) More than 200 %	1.0 0.8 0.6 0.4	10.0 8.0 6.0 4.0	Severe problem on agriculture (low productivity)
2.2 Current Unit Yield of Paddy (= weighted average unit yield of irrigated & rainfed paddy in the scheme)	10.0	(1) Less than 60 % of planned target yield (2) 60 - 79 % of planned target yield (3) 80 - 100 % of planned target yield	1.0 0.8 0.5	10.0 8.0 5.0	Severe problem on agriculture (low productivity)
3 Issue of Society	15.0				Severe social problem
3.1 Contribution to Regional Economy (Current Number of Beneficiaries)	7.5	(1) Less than 30 % of with project beneficiaries (2) 30 - 59 % of with project beneficiaries (3) 60 - 89 % of with project beneficiaries (4) More than 90 % of with project beneficiaries	1.0 0.8 0.6 0.4	7.5 6.0 4.5 3.0	
3.2 Provision of Social Infrastructure (Current ratio of Inspection Road Provision)	7.5	(1) Less than 40 % of total canal length of main & secondary canal (2) 40 - 59 % of total canal length of main & secondary canal (3) 60 - 79 % of total canal length of main & secondary canal (4) 80 - 100 % of total canal length of main & secondary canal	1.0 0.8 0.6 0.4	7.5 6.0 4.5 3.0	
4 Issue of Economic and Financial Impact	15.0				High economic and financial impact
4.1 Feasibility (Pre-F/S level EIRR)	7.5	(1) More than 20 % (2) 15 - 19 % (3) 10 - 14 % (4) Less than 10 %	1.0 0.8 0.6 0.4	7.5 6.0 4.5 3.0	
4.2 Rate of Increase of Agricultural Return per ha (= planned annual gross return per ha / current annual gross return per ha x 100)	7.5	(1) More than 200 % (2) 150 - 199 % (3) Less than 150 %	1.0 0.8 0.6	7.5 6.0 4.5	
TOTAL	100.0				

Priority List of Irrigation Schemes for Rehabilitation (North Sumatra Province)

Irrigation Scheme	Utilization of Irrigation Potential	Function of Water Resources Facility	Function of Main Canal	Function of Secondary Canal	Function of On-farm	Factor of Deterioration by Year of Construction	Technical Level	Current Cropping Intensity	Current Unit Yield of Paddy	Contribution to Regional Economy	Provision of social infrastructure	EIRR	Rate of Increase of Gross Agricultural Return	Total Score	Ranking	Classified Group
1 Gido Sebu	Group VI (Subject area is less than 1,000 ha)														Group VI	
2 Batang Gadis	(3)	(3)	(2)	(4)	(3)	(3)	(3)	(4)	(4)	(3)	(3)	(3)	(3)	54.4	17	Group III
3 Batang Ilung	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(2)	(3)	(3)	58.8	15	Group III
4 Blk Sitongkon/Napa Suron	Group VI (Subject area is less than 1,000 ha)														Group VI	
5 Siborna	Group VI (Subject area is less than 1,000 ha)														Group VI	
6 Sialii Tukka	Group VI (Subject area is less than 1,000 ha)														Group VI	
7 Badiri Lopian	Group VI (Subject area is less than 1,000 ha)														Group VI	
8 Pandurangan	(3)	(1)	(1)	(1)	(2)	(3)	(3)	(2)	(2)	(3)	(1)	(3)	(2)	76.2	2	Group I
9 Sihiong	Group VI (Subject area is less than 1,000 ha)														Group VI	
10 Aek Silang	Group V (Accerlation of WUAs establishment)														Group V	
11 Sarulla	Group V (Accerlation of WUAs establishment)														Group V	
12 Parmiahan Hutapaung	Group V (Accerlation of WUAs establishment)														Group V	
13 Sinamo	Group VI (Subject area is less than 1,000 ha)														Group VI	
14 Aek Mandos I	(3)	(2)	(3)	(1)	(1)	(4)	(2)	(1)	(2)	(4)	(2)	(2)	(1)	74.7	4	Group I
15 Simangatasi II	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(2)	(2)	(4)	(1)	(1)	(1)	73.3	5	Group I
16 Bulung Ihit	(3)	(3)	(1)	(2)	(4)	(3)	(3)	(3)	(4)	(4)	(2)	(3)	(3)	59.7	14	Group III
17 Perkotaan	(3)	(3)	(2)	(2)	(3)	(4)	(3)	(3)	(3)	(4)	(4)	(4)	(3)	53.7	18	Group III
18 Sungai Balai	(3)	(2)	(1)	(1)	(2)	(4)	(2)	(3)	(3)	(4)	(1)	(3)	(3)	66.9	6	Group I
19 Panca Arga	Group IV (Reformulation of development plan)														Group IV	
20 Serbangan	Group IV (Reformulation of development plan)														Group IV	
21 Silau Bonto	Group V (Accerlation of WUAs establishment)														Group V	
22 Sungai Silau	Group IV (Reformulation of development plan)														Group IV	
23 Padang Mahondang	(1)	(1)	(1)	(1)	(3)	(2)	(2)	(1)	(1)	(4)	(2)	(1)	(1)	87.5	1	Group I
24 Simujur	(2)	(1)	(1)	(1)	(1)	(3)	(2)	(2)	(2)	(4)	(4)	(3)	(2)	76.0	3	Group I
25 Purwodadi	(3)	(2)	(1)	(1)	(2)	(4)	(3)	(3)	(3)	(1)	(4)	(4)	(3)	63.2	9	Group II
26 Pentara	Group VI (Subject area is less than 1,000 ha)														Group VI	
27 Simantin Pane Dame	Group V (Accerlation of WUAs establishment)														Group V	
28 Panambean / Panet Tengah BK	(3)	(3)	(2)	(1)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	59.8	12	Group II
29 Raja Hombang / T. Mangaraja	(3)	(3)	(2)	(1)	(1)	(4)	(3)	(3)	(3)	(4)	(1)	(3)	(2)	63.4	8	Group II
30 Kerasaan	(3)	(2)	(1)	(1)	(3)	(3)	(2)	(3)	(4)	(4)	(3)	(2)	(2)	64.4	7	Group II
31 Javacolonisasi/Purbogondo	(3)	(3)	(2)	(1)	(2)	(4)	(3)	(3)	(3)	(4)	(3)	(4)	(3)	56.8	16	Group III
32 Naga Sompah	Group VI (High rehabilitation cost)														Group VI	
33 Risma Duma	Group VI (Less facility was provided)														Group VI	
34 Lae Ordi	Group V (Accerlation of WUAs establishment)														Group V	
35 Parit Lompaten	Group VI (High rehabilitation cost)														Group VI	
36 Bandar Sidoras	Group V (Accerlation of WUAs establishment)														Group V	
37 Namu Rambe	Group VI (High rehabilitation cost)														Group VI	
38 Sei Belutu	Group V (Accerlation of WUAs establishment)														Group V	
39 Langau	Group V (Accerlation of WUAs establishment)														Group V	
40 Medan Krio	Group V (Accerlation of WUAs establishment)														Group V	
41 Rantau Panjang	Group VI (Less facility was provided)														Group VI	
42 Pekan Kamis	Group V (Accerlation of WUAs establishment)														Group V	
43 Secanggang	Group VI (High rehabilitation cost)														Group VI	
44 Paya Lombang	Group V (Accerlation of WUAs establishment)														Group V	
45 Namu Sira-sira Kiri	(3)	(3)	(2)	(2)	(1)	(3)	(3)	(2)	(3)	(4)	(4)	(3)	(2)	61.4	10	Group II
46 Namu Sira-sira Kanan	(3)	(3)	(2)	(2)	(2)	(3)	(3)	(2)	(3)	(4)	(4)	(3)	(2)	60.8	11	Group II
47 Bah Korah II	Group V (Accerlation of WUAs establishment)														Group V	
48 Sijambi	Group V (Accerlation of WUAs establishment)														Group V	
49 Rambung Mera	Group VI (Subject area is less than 1,000 ha)														Group VI	
50 Paya Sordang	(3)	(3)	(2)	(1)	(2)	(4)	(3)	(3)	(3)	(3)	(4)	(3)	(2)	59.8	12	Group II
Average													64.8			
Itemized Total	(1)	1	3	6	12	6	0	0	1	1	2	5	1	3	Group I :	6
	(2)	1	5	10	6	11	0	4	7	4	0	2	3	7	Group II :	7
	(3)	16	10	2	0	1	6	14	10	13	2	1	10	8	Group III :	5
	(4)	0	0	0	0	0	12	0	0	0	14	10	4	0	Group IV :	3
													Group V :	14		
													Group VI :	15		

Source: JICA Study Team for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Group I: First priority group (Ranking 1 - 6)

Group II: Second priority group (Ranking 7 - 12)

Group III: Third priority group (Ranking 13 - 18)

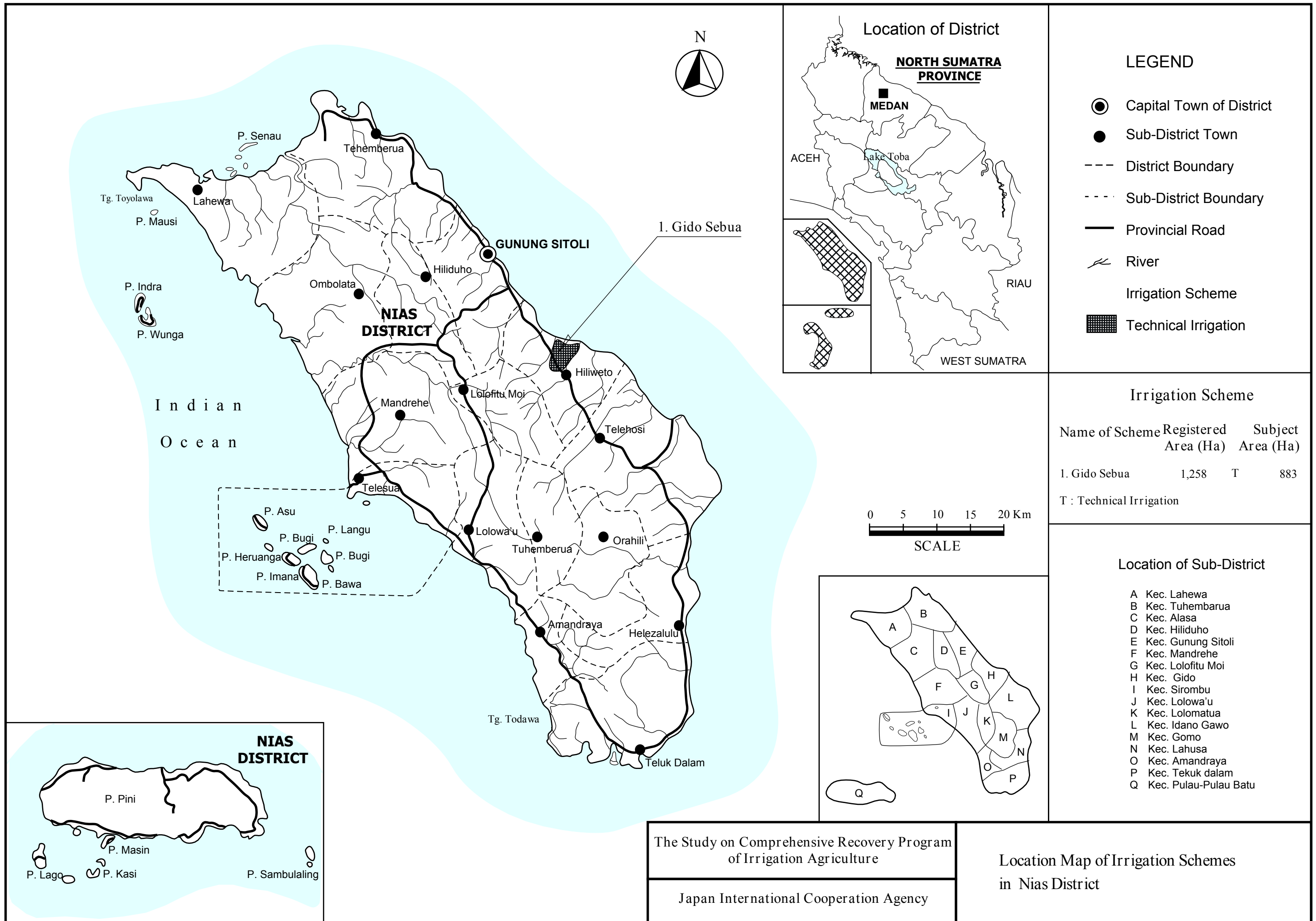
Group IV: Reformulation of water resources development plan

Group V: Accerlation of WUAs establishment

Group VI: Development by other category or method

PART-III

***Present Condition and
Pre-F/S level Development Plan
for Each Irrigation Scheme***



LEGEND

- Capital Town of District
- Sub-District Town
- - - District Boundary
- - - Sub-District Boundary
- Provincial Road
- ~ River
- Irrigation Scheme
- Technical Irrigation

Irrigation Scheme

Name of Scheme Registered	Subject Area (Ha)	Registered Area (Ha)
1. Gido Sebua	1,258	T 883

T : Technical Irrigation

Location of Sub-District

- A Kec. Lahewa
- B Kec. Tuhemberua
- C Kec. Alasa
- D Kec. Hiliduho
- E Kec. Gunung Sitoli
- F Kec. Mandrehe
- G Kec. Lolofitu Moi
- H Kec. Gido
- I Kec. Sirombu
- J Kec. Lolowa'u
- K Kec. Lolomatua
- L Kec. Idano Gawo
- M Kec. Gomo
- N Kec. Lahusa
- O Kec. Amandraya
- P Kec. Tekuk dalam
- Q Kec. Pulau-Pulau Batu




The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency



Location Map of Irrigation Schemes in Nias District

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120541000			(7) Number of Farmers	: Not available				
(2) Name of Irrigation Scheme	: Gido Sebua			(8) Water Resource River	: Gido Sebua				
(3) District (Kabupaten)	: Nias			(9) Catchment Area (km ²)	: 156.25				
(4) Sub-district (Kecamatan)	: Gido			(10) Original / Last Rehabilitation Year	: 1992				
(5) Registered Area (ha)	: 1,258								
(6) Technical Level	: Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram		
B		B			C		B		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data		
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category		Present (ha)		Plan (ha)		Increment (ha)			
a. Irrigated paddy field		883		883		0			
b. Rainfed paddy field		0		0		0			
c. Upland field		0		0		0			
d. Uncultivated land		0		0		0			
e. Non-irrigable land		0		0		0			
Total		883		883		0			
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field 1/				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	883			883	100%	3.0	2,433		
Season II (dry I)				0					
Season III (dry II)	450			450	51%	3.0	1,350		
Total/Annual	1,333	0	0	1,333	151%	3.0	3,783	0	0
					1/: Include paddy grown under rainfed condition (433ha)		2/: Irrigated & rainfed paddy		
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply limited even in wet season (433ha)									
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Low marketing prices		
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		Most members are not active		
- Paddy Marketing:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Expansion of irrigated area in dry season through rehabilitation									
- Expansion of double cropped area of paddy; productivity increase of paddy through further intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	883			883	100%	4.5	3,974		
Season II (dry I)				0					
Season III (dry II)	618	88		706		4.5	2,781	440	
Total/Annual	1,501	88	0	1,589	180%	4.5	6,755	440	0
Annual Increment	168	88	0	256	29%	1.5	2,972	440	0
IV. WUAs									
IV.1 Existing Condition									
(1)	Number	a. Target;	5	b. Established;	5	c. Not yet;	0	Registered	0
	Performance	a. Developed;	0	b. Under developing;	5	c. Not yet;	0	Not yet registered	5
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Low level internal management of WUA.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Encouragement of WUA members' positive action.									
(2) Development Plan									
- WUA management training.									

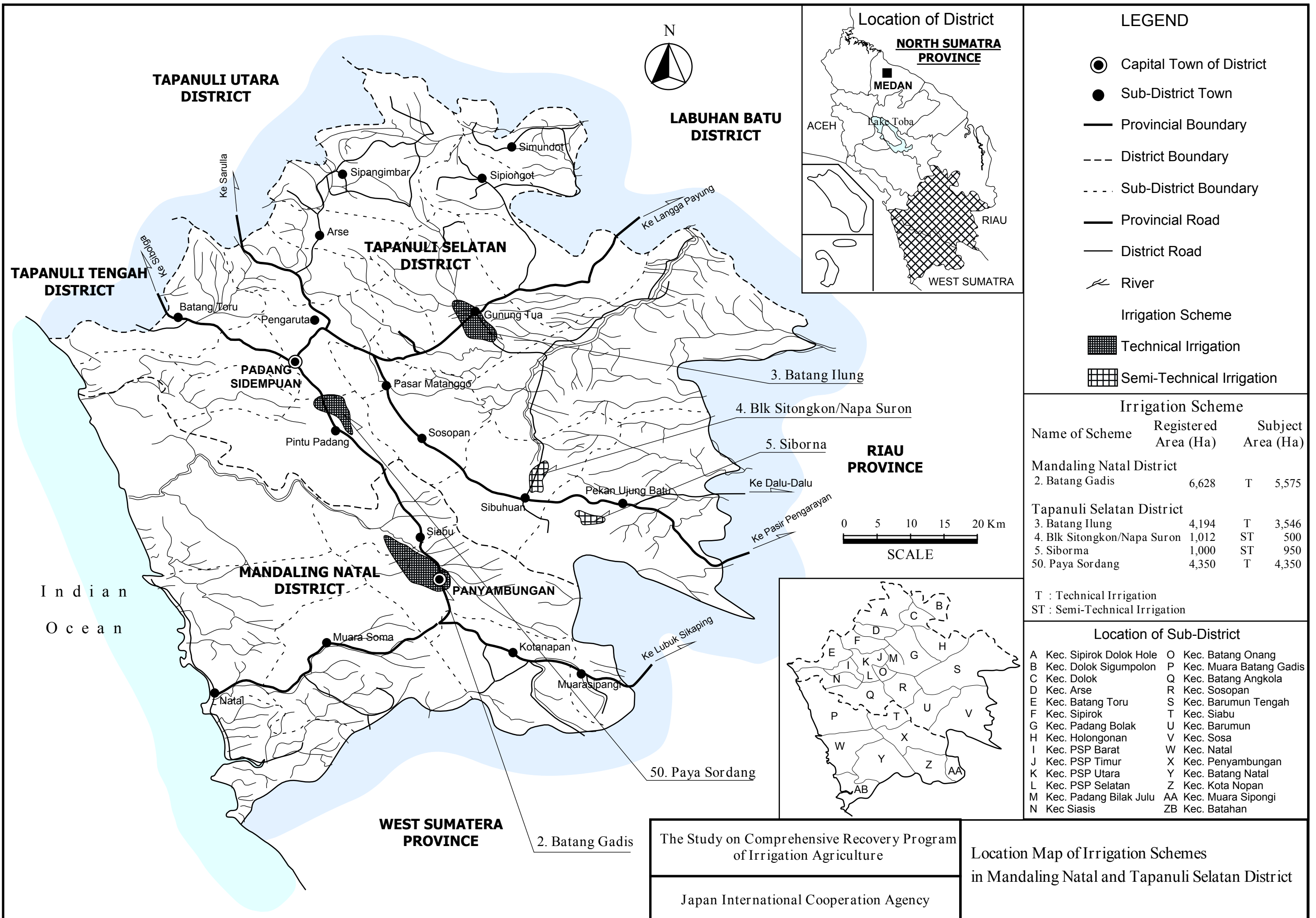
V. IRRIGATION FACILITY								
V.1 Existing Condition								
(1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)								
Water Resources Facility : B		Main Canal System : D		Secondary Canal System : D		On-farm : C		
(2) Water Resources Facility								
a. Type of facility	: Headworks	e. Scouring sluice gate	: 1 nos.	i. Condition	: B			
b. Type of weir	: Fixed weir	f. Intake gate	: 1 nos.	(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)				
c. Length of weir	: 56 m	g. Settling basin	: provided	(no info.: no information)				
d. Design intake discharge	: 1.1 m ³ /s	h. Inspection bridge	: provided					
(3) Irrigation Canal and Inspection Road								
Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition	(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)	
Main	2,702	0	2,702	11	0	D		
Secondary	3,477	8,113	11,590	29	0	D		
(4) Major Problems and Constrains								
- Water Resources Facility								
Washed away of ripraps or blocks after stilling basin								
Insufficient diversion water due to sedimentation in front of intake								
Inflow of bed loads into canal and decrease canal flow capacity								
- Irrigation Canal and Related Structure								
Sedimentation or obstruction of water flow								
Impassable of inspection road along canal								
Difficulty on O&M								
(5) Causes of Major Problems and Constraints								
- Water Resources Facility								
Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin								
Sedimentation in front of intake								
Insufficient function of settling basin, no proper gate operation of intake during flood								
- Irrigation Canal and Related Structure								
Insufficient function of settling basin(sediments), improper management of canal (sediments, water plant)								
Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal								
No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken								
V.2 Development Plan								
(1) Proposed Countermeasures for Major Problems								
- Water Resources Facility								
Provision of additional ripraps or blocks after stilling basin of weir as required								
Dredging or flushing of sediment, proper gate operation of headworks and intake								
Rehabilitation of settling basin, proper gate operation of intake during flood								
- Irrigation Canal and Related Structure								
Removal of sediment soil and foreign materials from canal, grass cutting								
Provision of inspection road both main and secondary canal with pavement								
Provision or repair of inspection road with all weather type/pavement								
(2) Water Resources Facility								
Dam/Headworks body		: minor rehabilitation		Intake, civil		: minor rehabilitation		
Settling basin		: minor rehabilitation		Intake, mechanical		: large rehabilitation		
(3) Irrigation Canal and Related Structure								
	Works	No rehabilitation	Rehabilitation	New construction	Total			
Canal (m)	Main	0	1,891	0	1,891			
	Secondary	0	8,113	0	8,113			
Structure (nos)	Main	0	8	1	8			
	Secondary	0	20	4	24			
(4) On-farm Development (Unit: ha)								
a. Potential Irrigated paddy field	883		d. Non-potential paddy field	0				
b. Potential non-irrigated paddy field	0		e. Non-potential non-paddy field	0				
c. Potential non-paddy field	0		Total	883				
(5) Rehabilitation Cost (Direct Cost) (Unit: Million Rp.)								
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha	(W.R.F: Water Resources Facility, Develop.: Development)	
1,632	10,308	1,031	1,810	1,260	16,041	18.2		
VI. PROJECT EVALUATION								
VI.1 EIRR	14.5%							
VI.2 Prioritization Scoring								
Evaluation Index	Full Score			Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential			10.0	-	Agricultural Productivity		
	Urgency			25.0	-	Social Problem		
	Sustainability			15.0	-	Economic Impact		
VI.3 Priority Group	Group VI: Development by other category (Subject area is less than 1,000ha)				VI.4 Priority Ranking in the Province	-		

Scheme	Gido Sebuah	District	Nias	
Technical Level	Technical	Registered Area	1,258 ha	Year of Construction 1992
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Weir with Settling Basin in Downstream		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Settlement or washed away of stilling basin; fallen down, incline or washed away of retaining wall of weir; sedimentation of sand at upstream of weir.		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Fixed Weir		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Washed away of ripraps or blocks at downstream of stilling basin		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake Gate with Trash Rack		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Leakage from gate leaf, insufficient strength against design load due to rust, decay of steel materials; sediment in front of inlet of intake		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme		Gido Sebua		District		Nias	
Technical Level	Technical	Registered Area	1,258 ha	Year of Construction	1992		
				<i>Category</i> Irrigation (Main Canal)			
				<i>Structure</i> Division Structure			
				<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D			
				<i>Problems</i> Lower function of structure; physical operation problem; sedimentation.			
				<i>Category</i> Irrigation (Main Canal)			
				<i>Structure</i> Concrete Lined Canal			
				<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
				<i>Problems</i> Lower strength of lined canal; sedimentation; inflow into canal during rain, no inspection road.			
				<i>Category</i>			
				<i>Structure</i>			
				<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
				<i>Problems</i>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation



LEGEND

- Capital Town of District
- Sub-District Town
- Provincial Boundary
- - - District Boundary
- - - Sub-District Boundary
- Provincial Road
- District Road
- ~ River
- Irrigation Scheme
- Technical Irrigation
- ▩ Semi-Technical Irrigation

Irrigation Scheme

Name of Scheme	Registered Area (Ha)	Subject Area (Ha)
Mandaling Natal District		
2. Batang Gadis	6,628	T 5,575
Tapanuli Selatan District		
3. Batang Ilung	4,194	T 3,546
4. Blk Sitongkon/Napa Suron	1,012	ST 500
5. Siborna	1,000	ST 950
50. Paya Sordang	4,350	T 4,350

T : Technical Irrigation
ST : Semi-Technical Irrigation

Location of Sub-District

- | | |
|---------------------------|---------------------------|
| A Kec. Sipirok Dolok Hole | O Kec. Batang Onang |
| B Kec. Dolok Sigumpolon | P Kec. Muara Batang Gadis |
| C Kec. Dolok | Q Kec. Batang Angkola |
| D Kec. Arse | R Kec. Sosopan |
| E Kec. Batang Toru | S Kec. Barumun Tengah |
| F Kec. Sipirok | T Kec. Siabu |
| G Kec. Padang Bolak | U Kec. Barumun |
| H Kec. Holongonan | V Kec. Sosa |
| I Kec. PSP Barat | W Kec. Natal |
| J Kec. PSP Timur | X Kec. Penyambungan |
| K Kec. PSP Utara | Y Kec. Batang Natal |
| L Kec. PSP Selatan | Z Kec. Kota Nopan |
| M Kec. Padang Bilak Julu | AA Kec. Muara Sipongi |
| N Kec. Siasis | ZB Kec. Batahan |

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Mandaling Natal and Tapanuli Selatan District

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120493000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Batang Gadis	(8)	Water Resource River	:	Batang Gadis			
(3) District (Kabupaten)	:	Mandaling Natal	(9)	Catchment Area (km ²)	:	880			
(4) Sub-district (Kecamatan)	:	Panyabungan	(10)	Original / Last Rehabilitation Year	:	1992			
(5) Registered Area (ha)	:	6,628							
(6) Technical Level	:	Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
B		A		C		C			
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data			
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	5,575	5,575	0						
b. Rainfed paddy field	0	0	0						
c. Upland field	0	0	0						
d. Uncultivated land	0	0	0						
e. Non-irrigable land	0	0	0						
Total	5,575	5,575	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	5,575			5,575	100%	4.0	22,300		
Season II (dry I)				0					
Season III (dry II)	3,899			3,899	70%	4.0	15,596		
Total/Annual	9,474	0	0	9,474	170%	4.0	37,896	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Expansion of irrigated area in dry season through rehabilitation									
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Poor O&M at main & 2ry canals			- Palawija Marketing:		-		
- Agronomic Issues:		Damage caused by rat			- Farmers Organizations:		Most members are not active		
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		Extension activities of PPLs are limited		
III.2 Development Plan									
(1) Development Approaches									
- Sustainable irrigation water supply at on-farm level throughout a year through rehabilitation									
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	5,575			5,575	100%	5.0	27,875		
Season II (dry I)				0					
Season III (dry II)	5,018	279		5,297	95%	5.0	25,090	1,395	
Total/Annual	10,593	279	0	10,872	195%	5.0	52,965	1,395	0
Annual Increment	1,119	279	0	1,398	25%	1.0	15,069	1,395	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	40	b. Established;	23	c. Not yet;	17	Registered		0
Performance	a. Developed;	0	b. Under developing;	23	c. Not yet;	0	Not yet registered		23
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Multifunction of irrigation system.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Calling attention to O&M activities among farmers.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : B (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : B Main Canal System : B Secondary Canal System : C On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 4 nos. | i. Condition | : B |
| b. Type of weir | : Fixed weir | f. Intake gate | : 4 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 63 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 5.7 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	21,325	950	22,275	67	22,275	B
Secondary	41,768	2,000	43,768	424	35,014	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Deflection of lining toward inside of canal

(5) Causes of Major Problems and Constraints

- Water Resources Facility
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - No treatment against groundwater, unstable slope gradient against soil property, no repair in long time

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Replace canal embankment material and re-lining; or provision of side drain, under drain, and weep holes

(2) Water Resources Facility

Dam/Headworks body : no rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	18,711	0
	Secondary	0	36,765	0
Structure (nos)	Main	0	56	6
	Secondary	0	356	71

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	5,575	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	5,575

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,843	69,979	6,998	11,429	2,590	94,838	17.0

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0
	Urgency	25.0	16.6	Social Problem	15.0	6.0
	Sustainability	15.0	6.8	Economic Impact	15.0	9.0

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Batang Gadis	District	Mandaling Natal	
Technical Level	Technical	Registered Area	6,628 ha	Year of Construction 1992
		<i>Structure</i> Irrigation (headworks)		
		<i>Structure</i> Fixed Weir		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Division Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Earth Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Retaining wall is damaged		
		<i>Problems</i> Sedimentation; lower function and operation problem at steel gate		
		<i>Problems</i> Sedimentation; collapse of canal; no inspection road; and difficulty on maintenance of earth canal.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Batang Gadis	District	Mandaling Natal		
Technical Level	Technical	Registered Area	6,628 ha	Year of Construction	1992
		<i>Category</i> Irrigation (Secondary Canal)			
		<i>Structure</i> Masonry Lined Canal			
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D			
		<i>Problems</i> Sediment; no drainage ditch along canal; and no maintenance.			
		<i>Category</i> Irrigation (Secondary Canal)			
		<i>Structure</i> Canal			
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D			
		<i>Problems</i> Sediment; collapse of canal; and no maintenance.			
		<i>Category</i>			
		<i>Structure</i>			
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
		<i>Problems</i>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120480000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Batang Ilung	(8)	Water Resource River	:	Batang Ilung			
(3) District (Kabupaten)	:	Tapanuli Selatan	(9)	Catchment Area (km ²)	:	302			
(4) Sub-district (Kecamatan)	:	Padang Bolak	(10)	Original / Last Rehabilitation Year	:	1992			
(5) Registered Area (ha)	:	4,194							
(6) Technical Level	:	Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
A		A		A		A			
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data			
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	3,546	3,546	0						
b. Rainfed paddy field	0	0	0						
c. Upland field	0	0	0						
d. Uncultivated land	0	0	0						
e. Non-irrigable land	0	0	0						
Total	3,546	3,546	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	3,546			3,546	100%	5.0	17,730		
Season II (dry I)				0					
Season III (dry II)	2,566			2,566	72%	4.5	11,547		
Total/Annual	6,112	0	0	6,112	172%	4.8	29,277	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply still limited in dry season									
- Double cropping of paddy introduced; paddy yield levels moderate; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage: Water shortage at on-farm level in dry season - Palawija Marketing: -									
- Agronomic Issues: Damage caused by rat - Farmers Organizations: -									
- Paddy Marketing: Low marketing prices - Extension Services: Extension activities of PPLs are limited									
III.2 Development Plan									
(1) Development Approaches									
- Expansion of irrigated area in dry season through rehabilitation									
- Double cropping of paddy in the entire scheme; productivity increase of paddy through further intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	3,546			3,546	100%	5.5	19,503		
Season II (dry I)		177		177	5%			885	
Season III (dry II)	3,546			3,546	100%	5.5	19,503		
Total/Annual	7,092	177	0	7,269	205%	5.5	39,006	885	0
Annual Increment	980	177	0	1,157	33%	0.7	9,729	885	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	40	b. Established;	40	c. Not yet;	0	Registered		0
Performance	a. Developed;	0	b. Under developing;	40	c. Not yet;	0	Not yet registered		40
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
IV.2 Development Plan									
(1) Proposed Countermeasures									
(2) Development Plan									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : B (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : B Main Canal System : C Secondary Canal System : C On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 2 nos. | i. Condition | : B |
| b. Type of weir | : Fixed weir | f. Intake gate | : 3 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 40 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 5.7 m ³ /s | h. Inspection bridge | : provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	6,360	0	6,360	33	3,180	C
Secondary	48,910	4,600	53,510	238	32,106	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
Inflow of bed loads into canal and decrease canal flow capacity

- Irrigation Canal and Related Structure

Collapse of canal
Difficulty on maintenance of earth canal
Difficulty on water distribution

(5) Causes of Major Problems and Constraints

- Water Resources Facility
Insufficient function of settling basin, no proper gate operation of intake during flood

- Irrigation Canal and Related Structure

Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
Fallen down and collapse of side slope, water plants or weed at inside of canal
No provision of water level gauge/facility

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
Replacement of settling basin, proper gate operation of intake during flood

- Irrigation Canal and Related Structure

Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
Provision of concrete lining
Provision of water level gauge/facility

(2) Water Resources Facility

Dam/Headworks body : no rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : minor rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	5,406	0	5,406
	Secondary	0	45,484	0	45,484
Structure (nos)	Main	0	28	3	31
	Secondary	0	202	40	243

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	3,546	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	3,546

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,786	50,848	5,085	7,269	1,570	67,559	19.1

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0	58.8	
	Urgency	25.0	18.0	Social Problem	15.0	9.0		
	Sustainability	15.0	6.8	Economic Impact	15.0	9.0		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Batang Ilung	District	Tapanuli Selatan		
Technical Level	Technical	Registered Area	4,194 ha	Year of Construction	1992
		<p><u>Structure</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Fixed Weir</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Intake Gate</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Division Structure</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Washed away of ripraps or blocks at downstream of stilling basin</p>			
		<p><u>Problems</u> Leakage from gate leaf; problem on management due to lack of periodically maintenance.</p>			
		<p><u>Problems</u> Lower function of division structure due to sedimentation in front of gate; physical operation problem on division structure due to O&M problem and structure damage.</p>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Batang Ilung	District	Tapanuli Selatan	
Technical Level	Technical	Registered Area	4,194 ha	Year of Construction 1992
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Masonry Lined Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Cracks or partial damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; sedimentation; and no inspection road.</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Masonry Lined Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Lower strength of lined canal; leakage from lined canal; sedimentation; and no maintenance of inspection road.</p>		
		<p><u>Category</u></p>		
		<p><u>Structure</u></p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u></p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120497000			(7) Number of Farmers	: Not available					
(2) Name of Irrigation Scheme	: Blk Sitongkon/Napa Suron			(8) Water Resource River	: Aek Batang Taris					
(3) District (Kabupaten)	: Tapanuli Selatan			(9) Catchment Area (km ²)	: 143					
(4) Sub-district (Kecamatan)	: Barumon			(10) Original / Last Rehabilitation Year	: 1976					
(5) Registered Area (ha)	: 1,012									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram			
B		A			B		A			
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data			
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		500		500		0				
b. Rainfed paddy field		0		0		0				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		500		500		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		500			500	100%	4.0	2,000		
Season II (dry I)					0					
Season III (dry II)		473			473	95%	4.0	1,892		
Total/Annual		973	0	0	973	195%	4.0	3,892	0	0
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigation water supply in dry season ensured; poor drainage problem reported										
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Poor drainage			- Palawija Marketing:		-			
- Agronomic Issues:		Damage caused by rat			- Farmers Organizations:		Most members are not active			
- Paddy Marketing:		Unstable marketing prices			- Extension Services:		Implementation of extension programs is limited			
III.2 Development Plan										
(1) Development Approaches										
- Sustainable irrigation water supply at on-farm level throughout a year & drainage improvement through rehabilitation										
- Introduction of double cropping of paddy in the entire scheme; productivity increase of paddy through further intensification; introduction of palawija in dry season I										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		500			500	100%	5.0	2,500		
Season II (dry I)			100		100				500	
Season III (dry II)		500			500	100%	5.0	2,500		
Total/Annual		1,000	100	0	1,100	220%	5.0	5,000	500	0
Annual Increment		27	100	0	127	25%	1.0	1,108	500	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	16	b. Established;	1	c. Not yet;	15	Registered		0	
Performance	a. Developed	0	b. Under developing;	0	c. Not yet;	1	Not yet registered		1	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Continuation of WUA members's awareness to O&M activities.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Strengthening of federation activities.										
(2) Development Plan										
- WUA management training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : not provided | i. Condition | : D |
| b. Type of weir | : Gabion weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 51 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 2.6 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	5,443	5,443	18	0	D
Secondary	0	8,261	8,261	17	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Leakage from foundation and/or settlement of weir
 - Washed away of ripraps or blocks after stilling basin
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Collapse of canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on water distribution
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient length of weir apron, not enough foundation treatment
 - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision of water level gauge/facility

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Replacement of headwoks
 - Provision of settling basin
- Irrigation Canal and Related Structure
 - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision of water level gauge/facility

(2) Water Resources Facility

- Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

	Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	2,667	267	2,934
	Secondary	0	4,048	810	4,857
Structure (nos)	Main	0	9	2	11
	Secondary	0	8	3	11

(4) On-farm Development

				(Unit: ha)
a. Potential Irrigated paddy field	500	d. Non-potential paddy field		0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field		0
c. Potential non-paddy field	0	Total		500

(5) Rehabilitation Cost (Direct Cost)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
8,782	9,674	967	1,025	1,260	21,709	43.4

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	- Agricultural Productivity	20.0	-	-
	Urgency	25.0	- Social Problem	15.0	-	-
	Sustainability	15.0	- Economic Impact	15.0	-	-




VI.3 Priority Group

(Subject area is less than 1,000ha)

VI.4 Priority Ranking in the Province

Scheme	Blk Sitongkon/Napa Suron	District	Tapanuli Selatan	
Technical Level	Semi-technical	Registered Area	1,012 ha	Year of Construction 1976
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Fixed Weir (Gabion)		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Very serious condition; urgent measures are required		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Structure is totally damaged and require urgent measures for new construction.		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Division Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Lower function of structure; physical operation problem due to no provision and/or less function of steel gates.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Blk Sitongkon/Napa Suron	District	Tapanuli Selatan	
Technical Level	Semi-technical	Registered Area	1,012 ha	Year of Construction 1976
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Concrete Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from lined canal; crack or damage on lined canal; and no inspection road.		
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Earth Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; and no inspection road.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120503000			(7) Number of Farmers	: Not available					
(2) Name of Irrigation Scheme	: Siborna			(8) Water Resource River	: Sungai Aek Sosa					
(3) District (Kabupaten)	: Tapanuli Selatan			(9) Catchment Area (km ²)	: 135					
(4) Sub-district (Kecamatan)	: Sosa			(10) Original / Last Rehabilitation Year	: 1984					
(5) Registered Area (ha)	: 1,000									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings			d. Structure lists & diagram		
B		A			B			A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender			h. WUAs data		
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		595		950		355				
b. Rainfed paddy field		355		0		-355				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		950		950		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field 1/				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		595			595	100%		2,375		
Season II (dry I)					0					
Season III (dry II)					0					
Total/Annual		595	0	0	595	100%		2,375	0	0
					1/: Include paddy grown under rainfed condition (595ha)		2/: Irrigated & rainfed paddy			
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- No irrigation water supply even in wet season in the entire scheme										
- Paddy cultivation under rainfed condition; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		-			
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		-			
- Paddy Marketing:		-			- Extension Services:		Capability & experiences of PPLs are limited			
III.2 Development Plan										
(1) Development Approaches										
- Ensuring irrigation water supply at on-farm level both in wet & dry season through rehabilitation										
- Introduction of double cropping of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		950			950	100%	4.5	4,275		
Season II (dry I)					0					
Season III (dry II)		475	95		570	60%	4.5	2,138	475	
Total/Annual		1,425	95	0	1,520	160%	5.0	6,413	475	0
Annual Increment		830	95	0	925	60%	5.0	4,038	475	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	1	b. Established;	1	c. Not yet;	0	Registered		0	
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	0	Not yet registered		1	
(2) Problems and Constraints										
<input checked="" type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Less active mind of WUA members.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA's O&M works.										
(2) Development Plan										
- WUA O&M training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : not provided | i. Condition | : D |
| b. Type of weir | : Gabion weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 66 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.6 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	7,426	7,426	16	0	D
Secondary	0	5,131	5,131	3	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Leakage from foundation and/or settlement of weir
 - Washed away of ripraps or blocks after stilling basin
 - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Impassable of inspection road along canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
 - Difficulty on water distribution
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient length of weir apron, not enough foundation treatment
 - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
 - Sedimentation in front of intake
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken
 - No provision of water level gauge/facility

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Replacement of headwoks
 - Provision of settling basin
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of inspection road both main and secondary canal with pavement
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement
 - Provision of water level gauge/facility

(2) Water Resources Facility

- Dam/Headworks body : replacement or new Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	7,426	743	8,169
	Secondary	0	5,131	1,026	6,157
Structure (nos)	Main	0	16	3	19
	Secondary	0	3	1	4

(4) On-farm Development (Unit: ha)

a. Potential Irrigated paddy field	595	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	355	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	950

(5) Rehabilitation Cost (Direct Cost) (Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
10,432	18,702	1,870	2,129	1,260	34,394	36.2

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-



VI.3 Priority Group

(Subject area is less than 1,000ha)

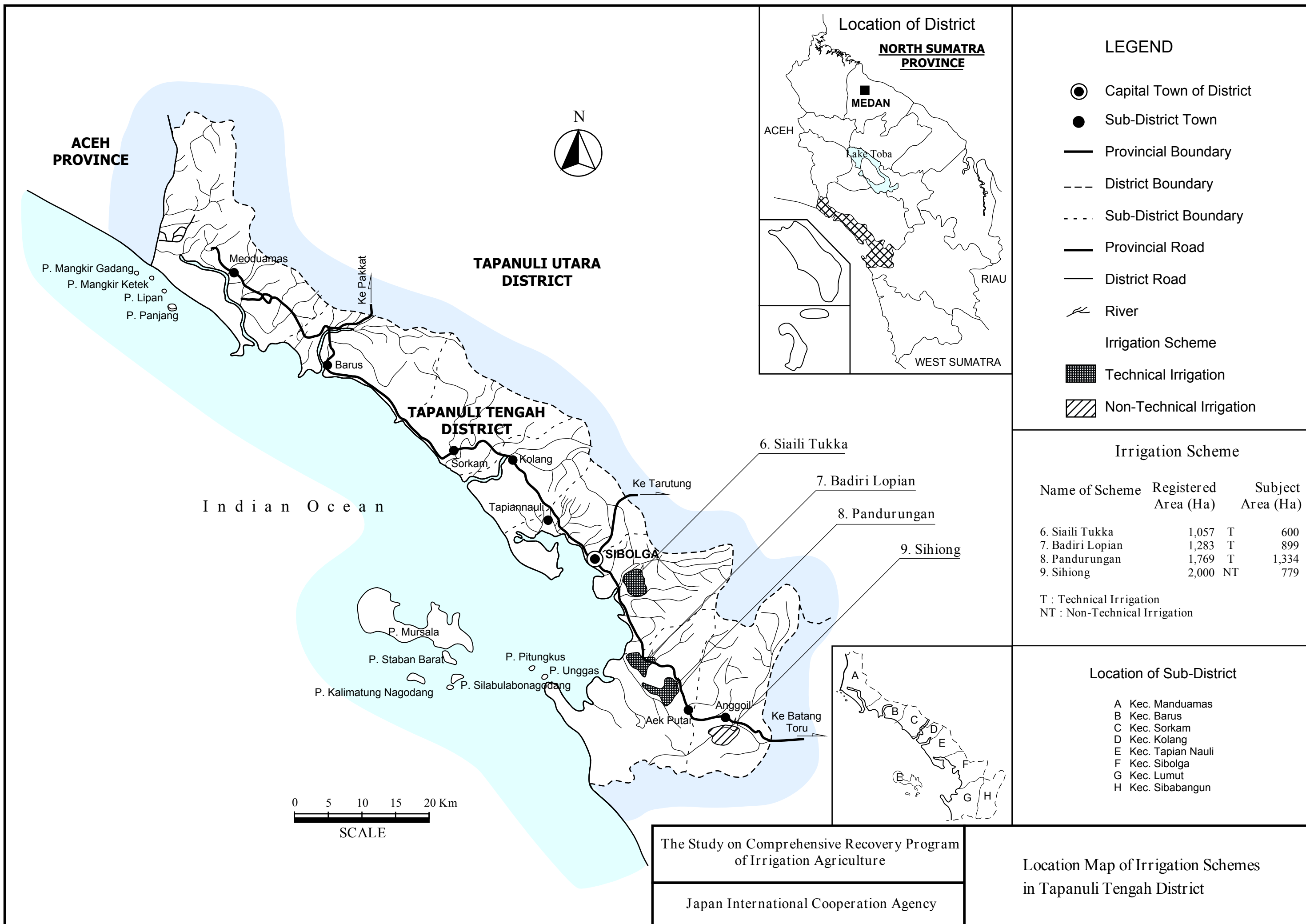
VI.4 Priority Ranking in the Province

Scheme	Siborna	District	Tapanuli Selatan		
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction	1984
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Fixed Weir (Gabion)</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Weir is totally damaged, urgent measures are required.</p>			
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Retaining Wall</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Retaining wall is totally damaged.</p>			
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p>Irrigation (Headworks) Intake and Spillway Gate</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Out of function.</p>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Siborna	District	Tapanuli Selatan	
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction 1984
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Division Structure		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Not in use		
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Concrete Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from lined canal; crack or damage on lined canal; and no inspection road.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation



LEGEND

- Capital Town of District
- Sub-District Town
- Provincial Boundary
- - - District Boundary
- - - - Sub-District Boundary
- Provincial Road
- District Road
- ~ River
- Irrigation Scheme
- Technical Irrigation
- ▨ Non-Technical Irrigation

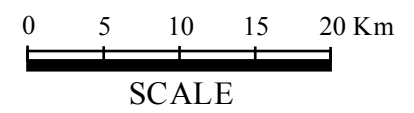
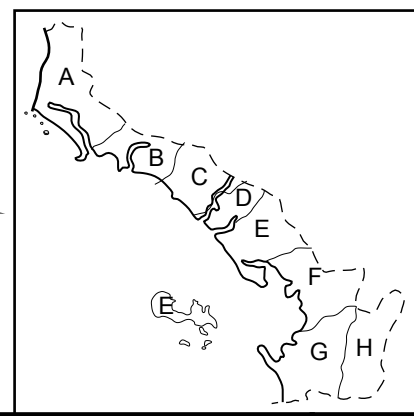
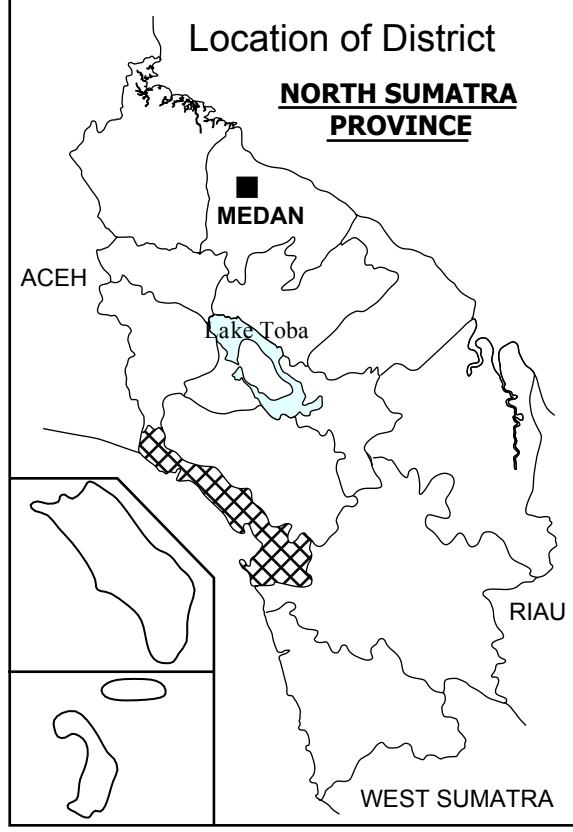
Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
6. Siaili Tukka	1,057	T	600
7. Badiri Lopian	1,283	T	899
8. Pandurangan	1,769	T	1,334
9. Sihiong	2,000	NT	779

T : Technical Irrigation
 NT : Non-Technical Irrigation

Location of Sub-District

- A Kec. Manduamas
- B Kec. Barus
- C Kec. Sorkam
- D Kec. Kolang
- E Kec. Tapan Nauli
- F Kec. Sibolga
- G Kec. Lumut
- H Kec. Sibabangun



The Study on Comprehensive Recovery Program
 of Irrigation Agriculture
 Japan International Cooperation Agency

Location Map of Irrigation Schemes
 in Tapanuli Tengah District

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120524000	(7) Number of Farmers	: Not available						
(2) Name of Irrigation Scheme	: Sialiti Tukka	(8) Water Resource River	: Sialiti Tukka						
(3) District (Kabupaten)	: Tapanuli Tengah	(9) Catchment Area (km ²)	: 100						
(4) Sub-district (Kecamatan)	: Sibolga	(10) Original / Last Rehabilitation Year	: 1986						
(5) Registered Area (ha)	: 1,057								
(6) Technical Level	: Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
C		A		B		A			
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data			
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category		Present (ha)		Plan (ha)		Increment (ha)			
a. Irrigated paddy field		255		600		345			
b. Rainfed paddy field		345		0		-345			
c. Upland field		0		0		0			
d. Uncultivated land		0		0		0			
e. Non-irrigable land		0		0		0			
Total		600		600		0			
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	255			255	100%	4.0	1,883		
Season II (dry I)				0					
Season III (dry II)	128			128	50%	4.0	512		
Total/Annual	383	0	0	383	150%	4.0	2,395	0	0
1/: Irrigated & rainfed paddy									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply limited in dry season; existing of rainfed field									
- Double cropping of paddy introduced; existing of rainfed paddy field; paddy yield levels still low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Poor O&M at tertiary level and below			- Palawija Marketing:		Low marketing prices		
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		Most members are not active		
- Paddy Marketing:		Low marketing prices			- Extension Services:		Shortage of operation funds of PPLs		
III.2 Development Plan									
(1) Development Approaches									
- Expansion of irrigated area and ensuring irrigation water supply at on-farm level through rehabilitation & upgrading									
- Introduction of double cropping of paddy; productivity increase of paddy through further intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	600			600	100%	5.0	3,000		
Season II (dry I)				0					
Season III (dry II)	300	60		360	60%	5.0	1,500	300	
Total/Annual	900	60	0	960	160%	5.0	4,500	300	0
Annual Increment	517	60	0	577	10%	1.0	2,105	300	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	3	b. Established;	3	c. Not yet;	0	Registered		0
Performance	a. Developed;	0	b. Under developing;	3	c. Not yet;	0	Not yet registered		3
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Less awareness of WUA members to O&M activities.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Activation of WUA's O&M works.									
(2) Development Plan									
- WUA O&M training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : C On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : D |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 17 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.7 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	1,783	1,783	5	1,426	D
Secondary	4,668	1,764	6,432	21	5,146	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Settlement or breakdown of stilling basin of weir
 - Insufficient diversion water due to sedimentation in front of intake
 - Physical operational problem on intake gate(s)
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Overage, lower strength of canal
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of stilling basin
 - Sedimentation in front of intake
 - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Deterioration of canal, no or insufficient rehabilitation due to budget problem
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of stilling basin of weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Replacement of intake gate(s) of intake
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Replace and reconstruction of canal
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,016	0
	Secondary	0	3,666	0
Structure (nos)	Main	0	3	0
	Secondary	0	12	2

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	255	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	345	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	600

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
4,363	5,195	520	1,407	1,260	12,745	21.2

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	- Agricultural Productivity	20.0	-	-
	Urgency	25.0	- Social Problem	15.0	-	-
	Sustainability	15.0	- Economic Impact	15.0	-	-




VI.3 Priority Group

(Subject area is less than 1,000ha)

VI.4 Priority Ranking in the Province

Scheme	Siaili Tukka	District	Tapanuli Tengah	
Technical Level	Technical	Registered Area	1,057 ha	Year of Construction 1986
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Crack or damage on weir crest; settlement of weir body; sedimentation at weir; settlement or breakage of apron;</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake; problem on management due to lack of periodically maintenance; and low function of gates.</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Division Structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Lower function on division structure; physical operation problem due to less or no function of steel gates.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Siaili Tukka	District	Tapanuli Tengah	
Technical Level	Technical	Registered Area	1,057 ha	Year of Construction 1986
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Concrete Lined Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Crack on lined canal; leakage from lined canal; sedimentation in canal; and no inspection road.</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Canal and Foot Bridge</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from canal; sedimentation in canal; collapse on canal; difficulty on maintenance of earth canal; and no inspection road.</p>		
		<p><u>Category</u></p>		
		<p><u>Structure</u></p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u></p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120530000	(7)	Number of Farmers	: Not available						
(2) Name of Irrigation Scheme	: Badiri Lopian	(8)	Water Resource River	: Aek Badiri						
(3) District (Kabupaten)	: Tapanuli Tengah	(9)	Catchment Area (km ²)	: Not available						
(4) Sub-district (Kecamatan)	: Lumut	(10)	Original / Last Rehabilitation Year	: 1989						
(5) Registered Area (ha)	: 1,283									
(6) Technical Level	: Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	C		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data			g. Cropping Calender			h. WUAs data	
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	899	899	0							
b. Rainfed paddy field	0	0	0							
c. Upland field	0	0	0							
d. Uncultivated land	0	0	0							
e. Non-irrigable land	0	0	0							
Total	899	899	0							
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	899			899	100%	4.0	3,596			
Season II (dry I)				0						
Season III (dry II)	270			270	30%	4.0	1,080			
Total/Annual	1,169	0	0	1,169	130%	4.0	4,676	0	0	
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigation water supply limited in dry season										
- Double cropping of paddy still limited; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:	Water shortage at on-farm level in dry season				- Palawija Marketing:	Limited bargaining power of farmers				
- Agronomic Issues:	Damage caused by rat				- Farmers Organizations:	Managerial capacity of KT's are limited				
- Paddy Marketing:	-				- Extension Services:	Extension activities of PPL's are limited				
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area in dry season through rehabilitation										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KT's) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	899			899	100%	5.0	4,495			
Season II (dry I)				0						
Season III (dry II)	629	90		719	80%	5.0	3,145	450		
Total/Annual	1,528	90	0	1,618	180%	5.0	7,640	450	0	
Annual Increment	359	90	0	449	50%	1.0	2,964	450	0	
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	5	b. Established;	3	c. Not yet;	2	Registered		0	
Performance	a. Developed;	0	b. Under developing;	3	c. Not yet;	0	Not yet registered		0	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Less attention to O&M works among WUA members.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Encouragement of WUA members to participate in O&M activities more active.										
(2) Development Plan										
- WUA O&M training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : D |
| b. Type of weir | : - | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 3.4 m ³ /s | h. Inspection bridge | : - | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	350	1,630	1,980	8	0	D
Secondary	1,390	5,639	7,029	44	351	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Unstable diversion water due to river water level fluctuation
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Collapse of canal
 - Impassable of inspection road along canal
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No provision of diversion weir
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Provision of diversion weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,386	0	1,386
	Secondary	0	4,920	0	4,920
Structure (nos)	Main	0	6	1	6
	Secondary	0	31	6	37

(4) On-farm Development

		(Unit: ha)	
a. Potential Irrigated paddy field	899	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	899

(5) Rehabilitation Cost (Direct Cost)

							(Unit: Million Rp.)
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha	
6,170	8,894	889	1,843	1,260	19,057	21.2	

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-

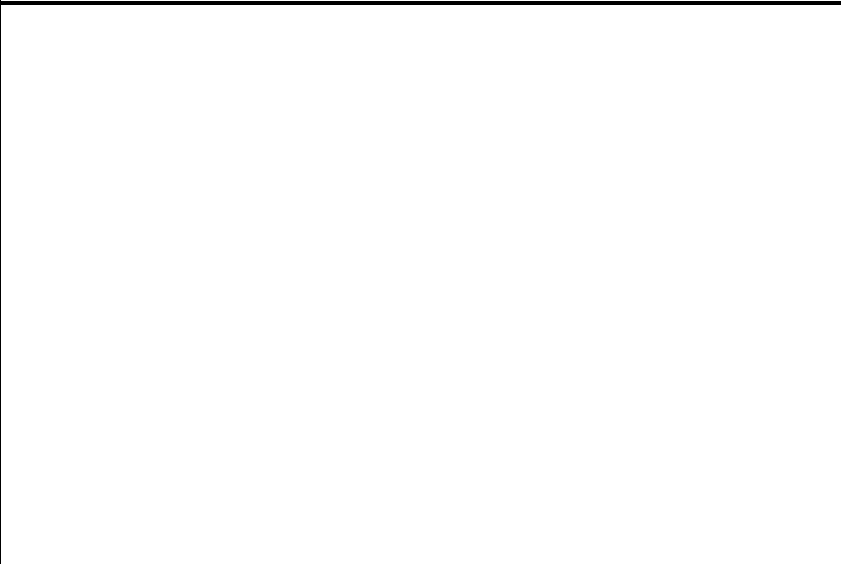
VI.3 Priority Group

(Subject area is less than 1,000ha)

VI.4 Priority Ranking in the Province

Scheme	Badiri Lopian	District	Tapanuli Tengah	
Technical Level	Technical	Registered Area	1,283 ha	Year of Construction 1989
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Masonry Construction</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
<p><u>Problems</u> Insufficient diversion water due to river bed degradation; insufficient diversion water due to sedimentation in front of intake; settlement of intake structure; and washed away of wing wall.</p>		<p><u>Problems</u> Insufficient diversion water due to river bed degradation; insufficient diversion water due to sedimentation in front of intake; settlement of intake structure; and deterioration of steel gates.</p>		
		<p><u>Problems</u> Leakage from intake gate; insufficient strength against design load due to rust, decay of steel materials; physical operational problems due to trouble; problem on management due to lack of periodically maintenance.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Badiri Lopian	District	Tapanuli Tengah	
Technical Level	Technical	Registered Area	1,283 ha	Year of Construction 1989
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Masonry Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; and no inspection road.		
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Masonry Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Leakage from lined canal; deflection of lining toward inside of canal; crack on lined canal; and no inspection road.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS											
I.1 General											
(1) Code Number	: 120532000			(7) Number of Farmers	: Not available						
(2) Name of Irrigation Scheme	: Pandurungan			(8) Water Resource River	: Aek Pinang Sori						
(3) District (Kabupaten)	: Tapanuli Tengah			(9) Catchment Area (km ²)	: 306.25						
(4) Sub-district (Kecamatan)	: Lumut			(10) Original / Last Rehabilitation Year	: 1984						
(5) Registered Area (ha)	: 1,769										
(6) Technical Level	: Technical										
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)											
a. Design Reports of Existing System(Full set)		B		b. Irrigation diagram		A		c. As-built drawings		C	
e. Rehabilitation plan & its references		C		f. Crops and yield data		g. Cropping Calender		h. WUAs data		A	
II. SUBJECT AREA FOR REHABILITATION PLAN											
II.1 Present and Planned Land Use											
Category		Present (ha)		Plan (ha)		Increment (ha)					
a. Irrigated paddy field		1,034		1,334		300					
b. Rainfed paddy field		300		0		-300					
c. Upland field		0		0		0					
d. Uncultivated land		0		0		0					
e. Non-irrigable land		0		0		0					
Total		1,334		1,334		0					
III. AGRICULTURE											
III.1 Present/Before Project Condition											
(1) Irrigation Performance and Crop Production											
Season		Cropped Area in Irrigated Paddy Field				Annual Irrigated Paddy Yield (GKG ton/ha)		Crop Production (ton) 1/			
		Paddy (ha)		Palawija Others (ha)		Intensity		Paddy		Palawija	Others
Season I (wet)		1,034				100%		4,886			
Season II (dry I)						0					
Season III (dry II)		520				50%		2,080			
Total/Annual		1,554		0		150%		6,966		0	0
1/: Irrigated & rainfed paddy											
(2) Problems and Constraints											
<i>A. Irrigation & Agriculture Performances</i>											
- Irrigation water supply limited in dry season; existing of rainfed field (300ha)											
- Double cropping of paddy introduced; existing of rainfed paddy; paddy yield levels still low; palawija not yet introduced											
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>											
- Irrigation & Drainage:		Water shortage at on-farm level in dry season				- Palawija Marketing:		Low marketing prices			
- Agronomic Issues:		Infestation of pest & diseases				- Farmers Organizations:		Economic activities are limited			
- Paddy Marketing:		Low marketing prices				- Extension Services:		Implementation of extension programs is limited			
III.2 Development Plan											
(1) Development Approaches											
- Expansion of irrigated area in dry season through rehabilitation & upgrading											
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II											
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's											
(2) Planned Irrigation Performances and Crop Production											
Season		Cropped Area in Irrigated Paddy Field				Annual Irrigated Paddy Yield (GKG ton/ha)		Crop Production (ton)			
		Paddy (ha)		Palawija Others (ha)		Intensity		Paddy		Palawija	Others
Season I (wet)		1,334				100%		6,670			
Season II (dry I)						0					
Season III (dry II)		934		133		80%		4,670		665	
Total/Annual		2,268		133		180%		11,340		665	0
Annual Increment		714		133		30%		4,374		665	0
IV. WUAs											
IV.1 Existing Condition											
(1) Number	a. Target;	4		b. Established;	1		c. Not yet;	3		Registered	0
Performance	a. Developed;	0		b. Under developing;	0		c. Not yet;	1		Not yet registered	1
(2) Problems and Constraints											
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management											
(3) Causes of Problems and Constraints											
- Limited awareness of farmers to O&M activities.											
IV.2 Development Plan											
(1) Proposed Countermeasures											
- Acceleration of WUA establishment.											
(2) Development Plan											
- WUA empowerment training.											

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : D |
| b. Type of weir | : Fixed weir | f. Intake gate | : 3 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 30 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 2.3 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	200	2,065	2,265	7	0	D
Secondary	1,545	18,739	20,284	48	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Incline, settlement, or deflection of pier of weir
 - Inflow of bed loads into canal and decrease canal flow capacity
 - Problem on management for intake gate(s) operation
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Impassable of inspection road along canal
 - Leakage from lined canal
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient strength of weir foundation or not enough foundation treatment
 - No provision of settling basin, no proper gate operation of intake during flood
 - Improper management or deterioration of intake gate(s)
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - Improper regular maintenance or long leave of repair, narrow wide of canal embankment
 - Fallen plants and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of pier of weir
 - Provision of settling basin, proper gate operation of intake during flood
 - Replacement of control system or damaged equipment of intake/free intake
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of inspection road both main and secondary canal with pavement
 - Replace canal embankment material with impermeable soil and re-lining
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,699	0	1,699
	Secondary	0	15,213	0	15,213
Structure (nos)	Main	0	5	1	6
	Secondary	0	36	7	43

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,034	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	300	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,334

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,754	20,674	2,067	2,888	1,260	29,644	22.2

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	16.0	76.2	
	Urgency	25.0	24.4	Social Problem	15.0	12.0		
	Sustainability	15.0	8.3	Economic Impact	15.0	10.5		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Pandurungan	District	Tapanuli Tengah	
Technical Level	Technical	Registered Area	1,769 ha	Year of Construction 1984
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Crack or damage on weir crest; settlement of weir body; sedimentation at weir; settlement or breakage of apron</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake with Trash Rack</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake; problem on management due to lack of periodically maintenance; leakage from gate leaf, insufficient strength against design load due to rust, decay of steel material</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Off-take Structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Lower function of turn out structure; physical operation problem on turn out structure due to sedimentation; and deterioration of steel gates.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Pandurungan	District	Tapanuli Tengah		
Technical Level	Technical	Registered Area	1,769 ha	Year of Construction	1984
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Concrete Culvert</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation; crack on culvert.</p>			
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Lined Main Canal</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.</p>			
		<p><u>Category</u></p>			
		<p><u>Structure</u></p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120621000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Sihiong	(8)	Water Resource River	:	Aek Gundur			
(3) District (Kabupaten)	:	Tapanuli Tengah	(9)	Catchment Area (km ²)	:	Not available			
(4) Sub-district (Kecamatan)	:	Sibagangun	(10)	Original / Last Rehabilitation Year	:	1984			
(5) Registered Area (ha)	:	2,000							
(6) Technical Level	:	Non Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
B		A		C		A			
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calendar		h. WUAs data			
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	0	622	622						
b. Rainfed paddy field	255	0	-255						
c. Upland field	0	0	0						
d. Uncultivated land	524	0	-524						
e. Non-irrigable land	0	157	157						
Total	779	779	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)				0			638		
Season II (dry I)				0					
Season III (dry II)				0					
Total/Annual	0	0	0	0			638	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- No irrigated area; existing of rainfed field (255ha) & uncultivated area (524ha)									
- Only rainfed paddy cultivated; paddy yield levels very low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Poor O&M at main & 2ry canals			- Palawija Marketing:		Low marketing prices		
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		-		
- Paddy Marketing:		Low marketing prices			- Extension Services:		Extension activities of PPLs are limited		
III.2 Development Plan									
(1) Development Approaches									
- Development of irrigated area through rehabilitation & upgrading									
- Introduction of double cropping of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	622			622	80%	4.5	2,799		
Season II (dry I)				0					
Season III (dry II)	311	62		373	48%	4.5	1,400	310	
Total/Annual	933	62	0	995	128%	4.5	4,199	310	0
Annual Increment	933	62	0	995	128%	4.5	3,561	310	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	3	b. Established;	1	c. Not yet;	2	Registered		0
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	0	Not yet registered		1
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Low attention to O&M activities among farmers.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Acceleration of WUA establishment.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|--------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 2 nos. | i. Condition | : D |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 7 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : no info. | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	100	200	300	0	0	D
Secondary	100	500	600	0	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Leakage from foundation and/or settlement of weir
 - Insufficient diversion water due to sedimentation in front of intake
 - Difficulty on O&M
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M
 - Difficulty on water distribution
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient length of weir apron, not enough foundation treatment
 - Sedimentation in front of intake
 - No provision of inspection/access road, no provision of inspection bridge/deck
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken
 - No provision of water level gauge/facility

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Grouting or adding concrete for weir crest
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement
 - Provision of water level gauge/facility

(2) Water Resources Facility

- Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

	Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	300	583	883
	Secondary	0	600	7,311	7,911
Structure (nos)	Main	0	0	3	3
	Secondary	0	0	22	22

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	0	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	255	e. Non-potential non-paddy field	524
c. Potential non-paddy field	0	Total	779

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,181	11,453	1,145	3,339	1,260	20,379	26.2

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-


VI.3 Priority Group

(Subject area is less than 1,000ha)

VI.4 Priority Ranking in the Province

Scheme	Sihiong	District	Tapanuli Tengah		
Technical Level	Non-technical	Registered Area	2,000 ha	Year of Construction	1984
		<u>Category</u> Irrigation (Headworks)			
		<u>Structure</u> Fixed Weir			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Crack or damage on weir crest; sedimentation; and no access to site.			
		<u>Category</u> Irrigation (Headworks)			
		<u>Structure</u> Intake Gate			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Insufficient strength against design load due to rust, decay of steel material; problem on management due to lack of periodically maintenance			
		<u>Category</u> Irrigation (Main Canal)			
		<u>Structure</u> Masonry Lined Canal			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Sedimentation; crack on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road; and no maintenance.			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Sihiong	District	Tapanuli Tengah		
Technical Level	Non-technical	Registered Area	2,000 ha	Year of Construction	1984
		<u>Category</u> Irrigation (Secondary Canal)			
		<u>Structure</u> Earth Canal			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Sedimentation; leakage from canal; collapse on canal; difficulty on maintenance of earth canal; and no inspection road.			
		<u>Category</u>			
		<u>Structure</u>			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
		<u>Problems</u>			
		<u>Category</u>			
		<u>Structure</u>			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
		<u>Problems</u>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

12. Pamiahan Hutapaung

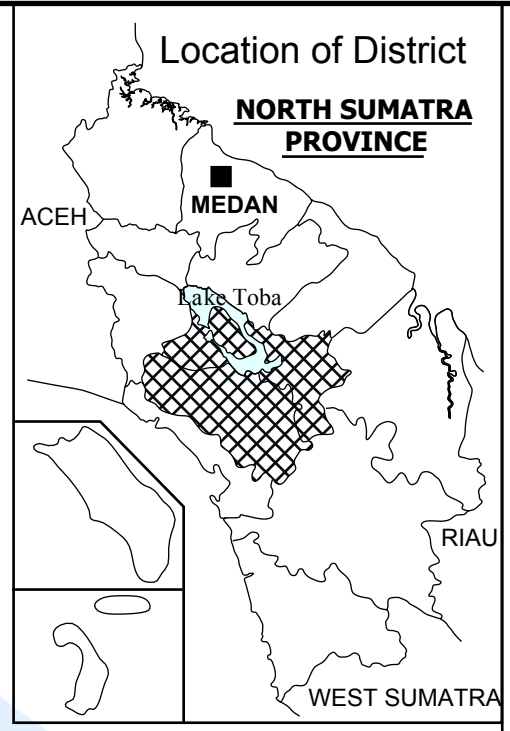
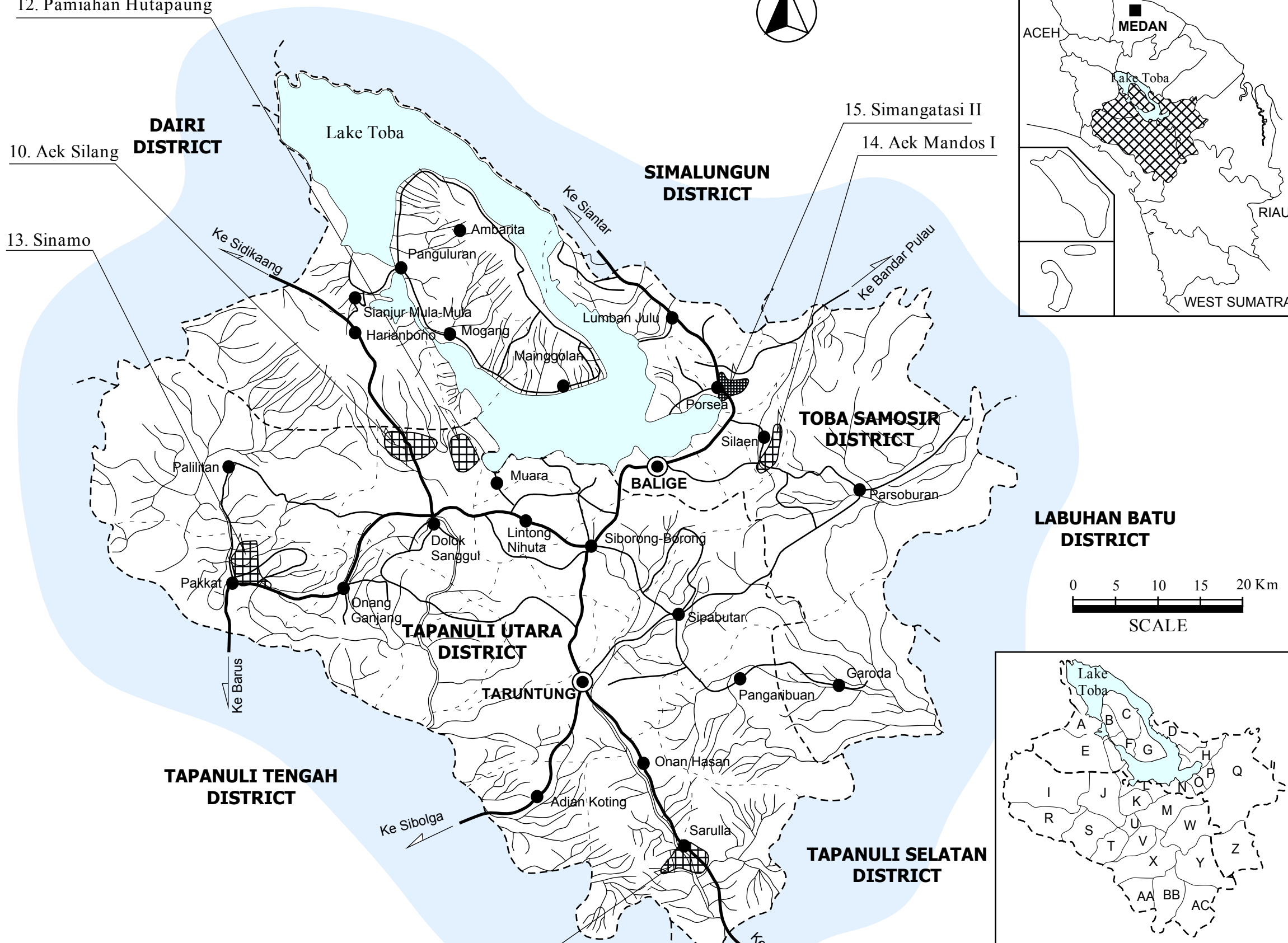
10. Aek Silang

13. Sinamo

11. Sarulla

15. Simangatasi II

14. Aek Mandos I



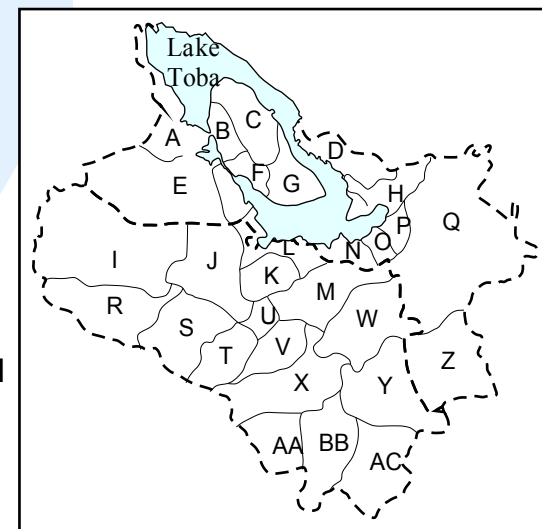
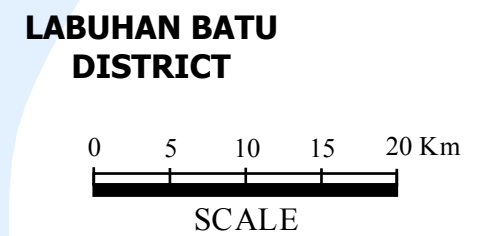
LEGEND

- Capital Town of District
- Sub-District Town
- District Boundary
- ... Sub-District Boundary
- Provincial Road
- ~ River
- Irrigation Scheme
- Technical Irrigation
- ▤ Semi-Technical Irrigation

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
Tapanuli Utara District			
10. Aek Silang	1,500	ST	1,500
11. Sarulla	2,692	ST	1,692
12. Pamiahan Hutapaung	1,000	ST	1,000
13. Sinamo	1,000	ST	930
Toba Samosir District			
14. Aek Mandosi I	1,060	ST	1,059
15. Simangatasi II	1,515	T	1,514

T : Technical Irrigation
ST : Semi-Technical Irrigation



Location of Sub-District

Kab. Toba Samosir	Kab. Tapanuli Utara
A Kec. Sianjur Mula-Mula	K Kec. Lintong Nihuta
B Kec. Panguruan	L Kec. Muara
C Kec. Simanindo	M Kec. Siborong-Borong
D Kec. Lumban Julu	R Kec. Pakkat
E Kec. Harian	S Kec. Onan Ganjang
F Kec. Palipi	T Kec. Parmonangan
G Kec. Onan Runggu	U Kec. Pagaran
H Kec. Porsea	V Kec. Sipoholon
N Kec. Balige	W Kec. Sipahutar
O Kec. Laguboti	X Kec. Tarutung
P Kec. Silaen	Y Kec. Pangaribuan
Q Kec. Habinsaran	AA Kec. Adian Koting
Z Kec. Garoga	BB Kec. Pahae Julu
I Kec. Parilitan	AC Kec. Pahae Jae
J Kec. Dolok Sanggul	

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Tapanuli Utara and Toba Samosir District

I. PROJECT FUNDAMENTALS												
I.1 General												
(1) Code Number	: 120377000	(7) Number of Farmers	: Not available									
(2) Name of Irrigation Scheme	: Aek Silang	(8) Water Resource River	: Aek Silang									
(3) District (Kabupaten)	: Tapanuli Utara	(9) Catchment Area (km ²)	: 163.8									
(4) Sub-district (Kecamatan)	: Dolok Sanggul	(10) Original / Last Rehabilitation Year	: 1990									
(5) Registered Area (ha)	: 1,500											
(6) Technical Level	: Semi Technical											
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)												
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	C			d. Structure lists & diagram	A	
e. Rehabilitation plan & its references	C		f. Crops and yield data			g. Cropping Calender	h. WUAs data					
II. SUBJECT AREA FOR REHABILITATION PLAN												
II.1 Present and Planned Land Use												
Category	Present (ha)	Plan (ha)	Increment (ha)									
a. Irrigated paddy field	200	1,260	1,060									
b. Rainfed paddy field	500	0	-500									
c. Upland field	0	0	0									
d. Uncultivated land	800	0	-800									
e. Non-irrigable land	0	240	240									
Total	1,500	1,500	0									
III. AGRICULTURE												
III.1 Present/Before Project Condition												
(1) Irrigation Performance and Crop Production												
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/					
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others			
Season I (wet)	200			200	100%	3.5	1,950					
Season II (dry I)				0								
Season III (dry II)		20		20	10%			50				
Total/Annual	200	20	0	220	110%	3.5	1,950	50	0			
1/: Irrigated & rainfed paddy												
(2) Problems and Constraints												
<i>A. Irrigation & Agriculture Performances</i>												
- Irrigated area limited (200ha); existing of rainfed field (500ha) & uncultivated area (800ha)												
- Double cropping of paddy not yet introduced; existing of rainfed paddy; annual intensity low; paddy yield levels still low;												
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>												
- Irrigation & Drainage: Water shortage at on-farm level in dry season												
- Palawija Marketing: Low marketing prices												
- Agronomic Issues: Infestation of pest & diseases												
- Farmers Organizations: Most members are not active												
- Paddy Marketing: Low marketing prices												
- Extension Services: Implementation of extension programs is limited												
III.2 Development Plan												
(1) Development Approaches												
- Expansion of irrigated area through rehabilitation & upgrading												
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II												
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's												
(2) Planned Irrigation Performances and Crop Production												
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)					
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others			
Season I (wet)	1,260			1,260	100%	4.5	5,670					
Season II (dry I)				0								
Season III (dry II)	630	126		756	60%	4.5	2,835	630				
Total/Annual	1,890	126	0	2,016	160%	4.5	8,505	630	0			
Annual Increment	1,690	106	0	1,796	50%	1.0	6,555	580	0			
IV. WUAs												
IV.1 Existing Condition												
(1) Number	a. Target;	5	b. Established;	1	c. Not yet;	4	Registered		0			
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	0	Not yet registered		1			
(2) Problems and Constraints												
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management												
(3) Causes of Problems and Constraints												
(No activity)												
IV.2 Development Plan												
(1) Proposed Countermeasures												
- Activation of WUA O&M works.												
(2) Development Plan												
- WUA empowerment training.												

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : C Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|---------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : C |
| b. Type of weir | : - | f. Intake gate | : 1 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 3.0 m3/s | h. Inspection bridge | : - | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	1,500	0	1,500	2	900	C
Secondary	0	4,500	4,500	4	2,700	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Unstable diversion water due to river water level fluctuation
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Impassable of inspection road along canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No provision of diversion weir
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Provision of diversion weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : replacement or new Intake, civil : large rehabilitation Intake, mechanical : minor rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation		Rehabilitation		New construction		Total	
	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)
Main	0	0	1,500	2	150	0	1,650	2
Secondary	0	0	4,500	4	900	1	5,400	5

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	200	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	500	e. Non-potential non-paddy field	0
c. Potential non-paddy field	800	Total	1,500

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
7,442	6,935	693	5,791	1,260	22,121	14.7

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring


Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Aek Silang	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	1,500 ha	Year of Construction 1990
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to river bed degradation; insufficient diversion water due to sedimentation in front of intake</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Division Structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Totally damaged and no function.</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Earth Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation or obstruction of water flow; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; and no inspection road.</p>		




Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Aek Silang	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	1,500 ha	Year of Construction 1990
		<u>Category</u> Agriculture, On-Farm		
		<u>Activity</u> Paddy Cultivation		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Low density of on-farm canal and farm roads.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		


Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120407000	(7) Number of Farmers	: Not available							
(2) Name of Irrigation Scheme	: Sarulla	(8) Water Resource River	: Aek Sarulla							
(3) District (Kabupaten)	: Tapanuli Utara	(9) Catchment Area (km ²)	: 228							
(4) Sub-district (Kecamatan)	: Pahae Jae	(10) Original / Last Rehabilitation Year	: Unknown							
(5) Registered Area (ha)	: 2,692									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	C		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data			g. Cropping Calender	h. WUAs data			
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	1,214	1,549	335							
b. Rainfed paddy field	0	0	0							
c. Upland field	0	0	0							
d. Uncultivated land	478	0	-478							
e. Non-irrigable land	0	143	143							
Total	1,692	1,692	0							
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season	Cropped Area in Irrigated Paddy Field 1/				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	1,214			1,214	100%	3.5	3,799			
Season II (dry I)				0						
Season III (dry II)	164			164	14%	3.5	574			
Total/Annual	1,378	0	0	1,378	114%	3.5	4,373	0	0	
					1/: Include paddy grown under rainfed condition (450ha)		2/: Irrigated & rainfed paddy			
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigation water supply limited even in wet season (400ha)										
- Double cropping of paddy still limited; paddy grown under rainfed condition in irrigated area; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage: Poor O&M at main & 2ry canals										
- Palawija Marketing: -										
- Agronomic Issues: Farmers not following recommended practices										
- Farmers Organizations: Most members are not active										
- Paddy Marketing: Low marketing prices										
- Extension Services: Implementation of extension programs is limited										
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area through rehabilitation & upgrading										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	1,549			1,549	100%	4.5	6,971			
Season II (dry I)				0						
Season III (dry II)	775	135		910	59%	4.5	3,488	775		
Total/Annual	2,324	135	0	2,459	195%	4.5	10,458	775	0	
Annual Increment	946	135	0	1,081	82%	1.0	6,085	775	0	
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	4	b. Established;	1	c. Not yet;	3	Registered		1	
Performance	a. Developed;	1	b. Under developing;	0	c. Not yet;	0	Not yet registered		0	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
IV.2 Development Plan										
(1) Proposed Countermeasures										
(2) Development Plan										

V. IRRIGATION FACILITY							
V.1 Existing Condition							
(1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)							
Water Resources Facility : C		Main Canal System : D		Secondary Canal System : D		On-farm : D	
(2) Water Resources Facility							
a. Type of facility : Headworks		e. Scouring sluice gate : not provided		i. Condition : C			
b. Type of weir : Gabion weir		f. Intake gate : 1 nos.		(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)			
c. Length of weir : 25 m		g. Settling basin : not provided		(no info.: no information)			
d. Design intake discharge : 1.5 m ³ /s		h. Inspection Bridge : not provided					
(3) Irrigation Canal and Inspection Road							
Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition	
Main	210	724	934	3	0	D	
Secondary	845	1,975	2,820	3	0	D	
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)							
(4) Major Problems and Constrains							
- Water Resources Facility							
Incline, settlement, or deflection of weir							
Insufficient diversion water due to sedimentation in front of intake							
Inflow of bed loads into canal and decrease canal flow capacity							
- Irrigation Canal and Related Structure							
Sedimentation or obstruction of water flow							
Impassable of inspection road along canal							
General O&M problems							
Difficulty on maintenance of earth canal							
Difficulty on O&M							
(5) Causes of Major Problems and Constraints							
- Water Resources Facility							
Insufficient strength of weir and weir foundation or not enough foundation treatment							
Sedimentation in front of intake							
No provision of settling basin, no proper gate operation of intake during flood							
- Irrigation Canal and Related Structure							
No provision of settling basin(sediments), improper management of canal (sediments, water plant)							
Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal							
No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance							
Fallen down and collapse of side slope, water plants or weed at inside of canal							
No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken							
V.2 Development Plan							
(1) Proposed Countermeasures for Major Problems							
- Water Resources Facility							
Replacement of weir							
Dredging or flushing of sediment, proper gate operation of headworks and intake							
Provision of settling basin, proper gate operation of intake during flood							
- Irrigation Canal and Related Structure							
Removal of sediment soil and foreign materials from canal, grass cutting							
Provision of inspection road both main and secondary canal with pavement							
Provision of kilo, hect-m posts, marking to each structure with structure name							
Provision of concrete lining							
Provision or repair of inspection road with all weather type/pavement							
(2) Water Resources Facility							
Dam/Headworks body : minor rehabilitation		Intake, civil : large rehabilitation		Intake, mechanical : large rehabilitation			
Settling basin : replacement or new							
(3) Irrigation Canal and Related Structure							
	Works	No rehabilitation	Rehabilitation	New construction	Total		
Canal (m)	Main	0	934	93	1,027		
	Secondary	0	2,820	564	3,384		
Structure (nos)	Main	0	3	1	4		
	Secondary	0	3	1	4		
(4) On-farm Development (Unit: ha)							
a. Potential Irrigated paddy field		1,214	d. Non-potential paddy field		0		
b. Potential non-irrigated paddy field		0	e. Non-potential non-paddy field		0		
c. Potential non-paddy field		478	Total		1,692		
(5) Rehabilitation Cost (Direct Cost) (Unit: Million Rp.)							
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha	
3,175	6,307	631	4,938	1,260	16,310	9.6	
(W.R.F: Water Resources Facility, Develop.: Development)							
VI. PROJECT EVALUATION							
VI.1 EIRR		23.0%					
VI.2 Prioritization Scoring							
Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity		20.0	-
	Urgency	25.0	-	Social Problem		15.0	-
	Sustainability	15.0	-	Economic Impact		15.0	-
VI.3 Priority Group		Group V: Acceralation of WUAs establishment			VI.4 Priority Ranking in the Province		
					-		

Scheme	Sarulla	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	2,692 ha	Year of Construction 1975
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Fixed Weir		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Crack or damage on weir crest; settlement of weir body; sedimentation in front of intake.		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake and Intake Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Less function and urgent measures are needed.		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; and less related structure.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Sarulla	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	2,692 ha	Year of Construction 1975
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Earth Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; and less related structure.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120366000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Parmiahan Hutapaung	(8)	Water Resource River	:	Aek Silang			
(3) District (Kabupaten)	:	Tapanuli Utara	(9)	Catchment Area (km ²)	:	163.8			
(4) Sub-district (Kecamatan)	:	Dolok Sanggul	(10)	Original / Last Rehabilitation Year	:	1993			
(5) Registered Area (ha)	:	1,000							
(6) Technical Level	:	Semi Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)			b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram	
C			A			C		A	
e. Rehabilitation plan & its references			f. Crops and yield data			g. Cropping Calender		h. WUAs data	
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	200	970	770						
b. Rainfed paddy field	700	0	-700						
c. Upland field	0	0	0						
d. Uncultivated land	100	0	-100						
e. Non-irrigable land	0	30	30						
Total	1,000	1,000	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	200			200	100%	3.5	2,450		
Season II (dry I)				0					
Season III (dry II)		40		40	20%			100	
Total/Annual	200	40	0	240	120%	3.5	2,450	100	0
1/: Irrigated & rainfed paddy									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigated area limited (200ha); existing of rainfed field (700ha) & uncultivated area (100ha)									
- Double cropping of paddy not yet introduced; existing of rainfed paddy; annual intensity low; paddy yield levels still low;									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:	Poor O&M at main & 2ry canals			- Palawija Marketing:	Low marketing prices				
- Agronomic Issues:	Damage caused by rat			- Farmers Organizations:	No collaboration among KTs				
- Paddy Marketing:	Low marketing prices			- Extension Services:	-				
III.2 Development Plan									
(1) Development Approaches									
- Expansion of irrigated area through rehabilitation & upgrading									
- Introduction of double cropping of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	970			970	100%	4.5	4,365		
Season II (dry I)				0					
Season III (dry II)	485	97		582	60%	4.5	2,183	485	
Total/Annual	1,455	97	0	1,552	160%	4.5	6,548	485	0
Annual Increment	1,255	57	0	1,312	40%	1.0	4,098	385	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	4	b. Established;	1	c. Not yet;	3	Registered		0
Performance	a. Developed;	0	b. Under developing;	0	c. Not yet;	1	Not yet registered		1
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
'(No activity)									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Activation of WUA O&M works.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : B (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : B Main Canal System : C Secondary Canal System : C On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : B |
| b. Type of weir | : Fixed weir | f. Intake gate | : 1 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 11 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 0.7 m ³ /s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	2,840	1,573	4,413	14	3,530	C
Secondary	3,544	4,918	8,462	34	4,231	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Insufficient diversion water due to sedimentation in front of intake
 - Difficulty on water distribution/discharge measurement
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Sedimentation in front of intake
 - No provision of water level gauge/measuring facility
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of water level gauge/measuring facility and equipment
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- Dam/Headworks body : minor rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : minor rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation			Rehabilitation		New construction		Total	
	Canal (m)	Main	Secondary	Main	Secondary	Main	Secondary	Main	Secondary
Canal (m)									
	Main	0		4,413		441		4,854	
	Secondary		0	8,462		1,692		10,154	
Structure (nos)									
	Main	0		14		3		17	
	Secondary		0	34		12		46	

(4) On-farm Development

		(Unit: ha)	
a. Potential Irrigated paddy field	200	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	700	e. Non-potential non-paddy field	0
c. Potential non-paddy field	100	Total	1,000

(5) Rehabilitation Cost (Direct Cost)

							(Unit: Million Rp.)	
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha		
2,524	14,676	1,468	2,716	1,260	22,645	22.6	(W.R.F: Water Resources Facility, Develop.: Development)	

VI. PROJECT EVALUATION



VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Parmiahan Hutapaung	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction 1993
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from foundation or settlement of weir body; settlement or washed away of stilling basin; washed away of retaining wall of weir</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake; leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Masonry Lined Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; crack on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Parmiahan Hutapaung	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction 1993
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Earth Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; collapse of canal; leakage from canal, crack or damage on lined canal; and less function of inspection road.</p>		
		<p><u>Category</u> Agriculture, On-Farm</p>		
		<p><u>Activity</u> Paddy Cultivation</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Low density of on-farm canal and farm roads.</p>		
		<p><u>Category</u> Agriculture, On-Farm</p>		
		<p><u>Type</u> Paddy Cultivation</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Low density of on-farm canal and farm roads.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	:	120367000	(7)	Number of Farmers	:	Not available				
(2) Name of Irrigation Scheme	:	Sinamo	(8)	Water Resource River	:	Aek Sirahar				
(3) District (Kabupaten)	:	Tapanuli Utara	(9)	Catchment Area (km ²)	:	143.5				
(4) Sub-district (Kecamatan)	:	Pakkat	(10)	Original / Last Rehabilitation Year	:	1969				
(5) Registered Area (ha)	:	1,000								
(6) Technical Level	:	Semi Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram				
B		A		B		A				
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data				
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	100	930	830							
b. Rainfed paddy field	830	0	-830							
c. Upland field	0	0	0							
d. Uncultivated land	0	0	0							
e. Non-irrigable land	0	0	0							
Total	930	930	0							
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	100			100	100%	3.5	2,075			
Season II (dry I)				0						
Season III (dry II)		10		10	10%			25		
Total/Annual	100	10	0	110	110%	3.5	2,075	25	0	
1/: Irrigated & rainfed paddy										
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigated area limited (100ha); existing of rainfed field (830ha)										
- Double cropping of paddy not yet introduced; existing of rainfed paddy; annual intensity low; paddy yield levels still low										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Poor O&M at main & 2ry canals		- Palawija Marketing:		Low marketing prices				
- Agronomic Issues:		Damage caused by rat		- Farmers Organizations:		Most members are not active				
- Paddy Marketing:		Low marketing prices		- Extension Services:		-				
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area through rehabilitation & upgrading										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTIs										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	930			930	100%	4.5	4,185			
Season II (dry I)				0						
Season III (dry II)	465	93		558	60%	4.5	2,093	465		
Total/Annual	1,395	93	0	1,488	160%	4.5	6,278	465	0	
Annual Increment	1,295	83	0	1,378	50%	1.0	4,203	440	0	
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	4	b. Established;	0	c. Not yet;	4	Registered		0	
	a. Developed;	0	b. Under developing;	0	c. Not yet;	0	Not yet registered		0	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
(No activity)										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA O&M works.										
(2) Development Plan										
- WUA empowerment training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : C Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : D |
| b. Type of weir | : Fixed weir | f. Intake gate | : 1 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 20 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 2.7 m ³ /s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	500	325	825	4	825	C
Secondary	0	7,620	7,620	3	7,620	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Physical O&M problem due to overage facility
 - Leakage from foundation and/or settlement of weir
 - Difficulty on O&M
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Collapse of canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Deterioration of weir, no or insufficient rehabilitation due to budget problem
 - Insufficient length of weir apron, not enough foundation treatment
 - No provision of inspection/access road, no provision of inspection bridge/deck
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Replace and reconstruction of weir
 - Grouting or adding concrete for weir crest
 - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : large rehabilitation Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	825	83	908
	Secondary	0	7,620	1,524	9,144
Structure (nos)	Main	0	4	1	5
	Secondary	0	3	34	37

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	100	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	830	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	930

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,340	12,573	1,257	2,332	1,260	19,762	21.2

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-



VI.3 Priority Group

(Subject area is less than 1,000ha)

VI.4 Priority Ranking in the Province

Scheme	Sinamo	District	Tapanuli Utara		
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction	1969
		<u>Category</u> Irrigation (Headworks)			
		<u>Structure</u> Fixed Weir (Gabion)			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Category</u> Irrigation (Headworks)			
		<u>Structure</u> Weir and Retaining Wall			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Category</u> Irrigation (Headworks)			
		<u>Structure</u> Intake Facility			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Weir was washed away, no function.			
		<u>Problems</u> Totally damaged and no function for intake.			
		<u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; deflection or settlement of intake structure; sediment in front of gates (no use).			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Sinamo	District	Tapanuli Utara	
Technical Level	Semi-technical	Registered Area	1,000 ha	Year of Construction 1969
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Masonry Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.		
		<u>Category</u> Agriculture, On-Farm		
		<u>Activity</u> Paddy Cultivation		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Low density of on-farm canal and farm roads.		
		<u>Category</u>		
		<u>Activity</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	:	120328000	(7)	Number of Farmers	:	Not available				
(2) Name of Irrigation Scheme	:	Aek Mandos I	(8)	Water Resource River	:	Aek Mandos				
(3) District (Kabupaten)	:	Toba Samosir	(9)	Catchment Area (km ²)	:	154.8				
(4) Sub-district (Kecamatan)	:	Silaen	(10)	Original / Last Rehabilitation Year	:	1993				
(5) Registered Area (ha)	:	1,060								
(6) Technical Level	:	Semi Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram			
B		A			C		A			
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data			
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		999		1,041		42				
b. Rainfed paddy field		0		0		0				
c. Upland field		0		0		0				
d. Uncultivated land		60		0		-60				
e. Non-irrigable land		0		18		18				
Total		1,059		1,059		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		999			999	100%	3.5	3,497		
Season II (dry I)					0					
Season III (dry II)					0					
Total/Annual		999	0	0	999	100%	3.5	3,497	0	0
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- No irrigation water supply in dry season										
- Only single cropping of paddy in wet season practiced; annual intensity low; paddy yield levels still low;										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Poor O&M at main & 2ry canals			- Palawija Marketing:		Limited market outlet			
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		Most members are not active			
- Paddy Marketing:		Low marketing prices			- Extension Services:		-			
III.2 Development Plan										
(1) Development Approaches										
- Development of irrigated area through rehabilitation & upgrading										
- Introduction of double cropping of paddy; productivity increase of paddy throughintensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		1,041			1,041	100%	4.5	4,685		
Season II (dry I)					0					
Season III (dry II)		521	104		625	60%	4.5	2,345	520	
Total/Annual		1,562	104	0	1,666	160%	4.5	7,029	520	0
Annual Increment		563	104	0	667	60%	1.0	3,533	520	0
IV. WUAs										
IV.1 Existing Condition										
(1)	Number	a. Target;	4	b. Established;	2	c. Not yet;	2	Registered		0
	Performance	a. Developed;	0	b. Under developing;	2	c. Not yet;	0	Not yet registered		2
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints (No activity)										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA O&M works.										
(2) Development Plan										
- WUA empowerment training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : B Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|--------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : C |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 55 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 0.9 m3/s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	360	0	360	2	180	B
Secondary	0	4,944	4,944	13	2,966	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Leakage from foundation and/or settlement of weir
 - Settlement or breakdown of stilling basin of weir
 - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - Impassable of inspection road along canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient length of weir apron, not enough foundation treatment
 - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of stilling basin
 - Sedimentation in front of intake
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Grouting or adding concrete for weir crest
 - Reconstruction of stilling basin of weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation			Rehabilitation		New construction		Total	
	Canal (m)	Structure (nos)	Inspection Road (m)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Inspection Road (m)	Structure (nos)
Main	0	0	0	360	2	0	0	0	0
Secondary	0	0	0	4,944	13	0	0	0	0
Total	0	0	0	5,304	15	0	0	0	0

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	999	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	60	Total	1,059

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,428	6,574	657	2,355	1,260	13,276	12.5

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	18.0	74.7	
	Urgency	25.0	20.2	Social Problem	15.0	9.0		
	Sustainability	15.0	9.0	Economic Impact	15.0	13.5		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Aek Mandos I	District	Toba Samosir	
Technical Level	Semi-technical	Registered Area	1,060 ha	Year of Construction 1993
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sediment in front of weir; damage of retaining wall.</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Earth Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation ; leakage from canal; collapse on canal; difficulty on maintenance of earth canal; no maintenance; and no inspection road.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Aek Mandos I	District	Toba Samosir	
Technical Level	Semi-technical	Registered Area	1,060 ha	Year of Construction 1993
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Concrete Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal		
		<u>Category</u> Agriculture, On-Farm		
		<u>Activity</u> Paddy Cultivation		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Low density of on-farm canal and farm roads.		
		<u>Category</u> 		
		<u>Activity</u> 		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> 		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS												
I.1 General												
(1) Code Number	:	120607000	(7)	Number of Farmers	:	Not available						
(2) Name of Irrigation Scheme	:	Simangatasi Silaen II	(8)	Water Resource River	:	Aek Bolon						
(3) District (Kabupaten)	:	Toba Samosir	(9)	Catchment Area (km ²)	:	169.5						
(4) Sub-district (Kecamatan)	:	Porsea	(10)	Original / Last Rehabilitation Year	:	1992						
(5) Registered Area (ha)	:	1,515										
(6) Technical Level	:	Technical										
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)												
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	C			d. Structure lists & diagram	A	
e. Rehabilitation plan & its references	C		f. Crops and yield data			g. Cropping Calender	h. WUAs data					
II. SUBJECT AREA FOR REHABILITATION PLAN												
II.1 Present and Planned Land Use												
Category	Present (ha)		Plan (ha)		Increment (ha)							
a. Irrigated paddy field	1,514		1,514		0							
b. Rainfed paddy field	0		0		0							
c. Upland field	0		0		0							
d. Uncultivated land	0		0		0							
e. Non-irrigable land	0		0		0							
Total	1,514		1,514		0							
III. AGRICULTURE												
III.1 Present/Before Project Condition												
(1) Irrigation Performance and Crop Production												
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/					
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others			
Season I (wet)	1,514			1,514	100%	3.5	5,299					
Season II (dry I)				0								
Season III (dry II)				0								
Total/Annual	1,514	0	0	1,514	100%	3.5	5,299	0	0			
					1/: Include paddy grown under rainfed condition (714ha)		2/: Irrigated & rainfed paddy					
(2) Problems and Constraints												
<i>A. Irrigation & Agriculture Performances</i>												
- Irrigation water supply limited even in wet season (800ha)												
- Only single cropping of paddy in wet season; paddy grown under rainfed condition in irrigated area; paddy yield levels still low; palawija not introduced yet												
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>												
- Irrigation & Drainage:		Poor O&M at main & 2ry canals			- Palawija Marketing:		Low marketing prices					
- Agronomic Issues:		-			- Farmers Organizations:		Most members are not active					
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		-					
III.2 Development Plan												
(1) Development Approaches												
- Ensuring irrigation water supply in dry season at on-farm level through rehabilitation												
- Introduction of double cropping of paddy; productivity increase of paddy throughintensification; introduction of palawija in dry season II												
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's												
(2) Planned Irrigation Performances and Crop Production												
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)					
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others			
Season I (wet)	1,514			1,514	100%	4.5	6,813					
Season II (dry I)				0								
Season III (dry II)	757	151		908	60%	4.5	3,407	755				
Total/Annual	2,271	151	0	2,422	160%	4.5	10,220	755	0			
Annual Increment	757	151	0	908	60%	1.0	4,921	755	0			
IV. WUAs												
IV.1 Existing Condition												
(1) Number	a. Target;	6	b. Established;	6	c. Not yet;	0	Registered		0			
Performance	a. Developed;	0	b. Under developing;	6	c. Not yet;	0	Not yet registered		6			
(2) Problems and Constraints												
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management												
(3) Causes of Problems and Constraints												
(No activity)												
IV.2 Development Plan												
(1) Proposed Countermeasures												
- Activation of WUA O&M works.												
(2) Development Plan												
- WUA empowerment training.												

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : C Secondary Canal System : C On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : C |
| b. Type of weir | : Fixed weir | f. Intake gate | : 1 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 15 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 0.7 m ³ /s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	4,658	0	4,658	2	466	C
Secondary	3,754	0	3,754	21	375	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Fallen down, inclined, or washed away of retaining wall of weir
 - Insufficient diversion water due to sedimentation in front of intake
 - Physical operational problem on intake gate(s)
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on O&M
 - Difficulty on water distribution
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
 - Sedimentation in front of intake
 - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken
 - No provision of water level gauge/facility

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of retaining wall of weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Replacement of intake gate(s) of intake
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision or repair of inspection road with all weather type/pavement
 - Provision of water level gauge/facility

(2) Water Resources Facility

- Dam/Headworks body : minor rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : minor rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	4,658	0
	Secondary	0	3,754	0
Structure (nos)	Main	0	2	0
	Secondary	0	21	4

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,514	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,514

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,112	10,199	1,020	3,104	1,260	18,694	12.3

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	16.0
	Urgency	25.0	20.0	Social Problem	15.0	10.5
	Sustainability	15.0	6.8	Economic Impact	15.0	15.0

VI.3 Priority Group

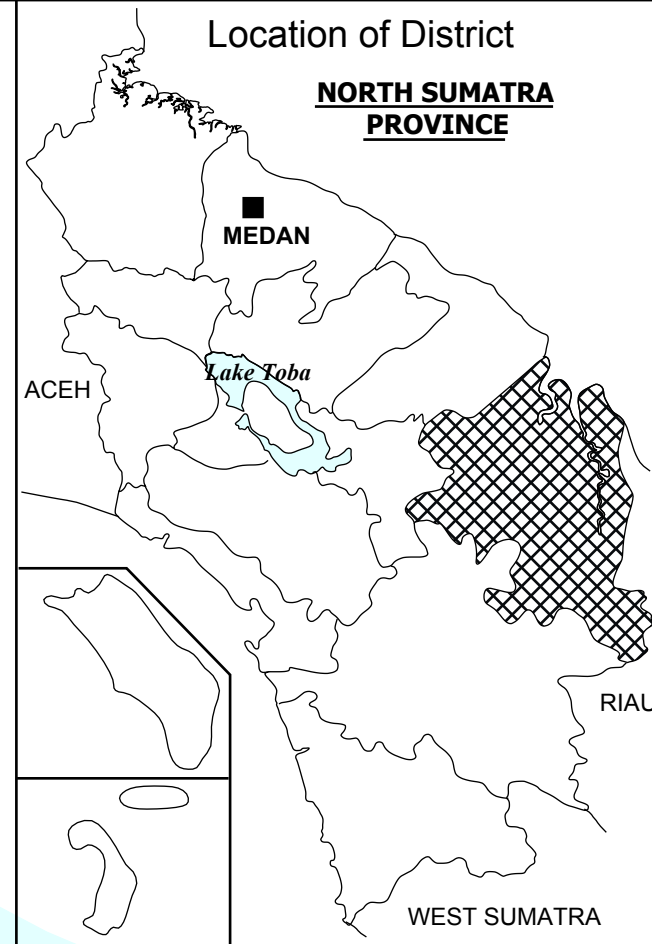
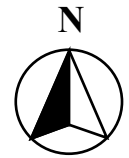
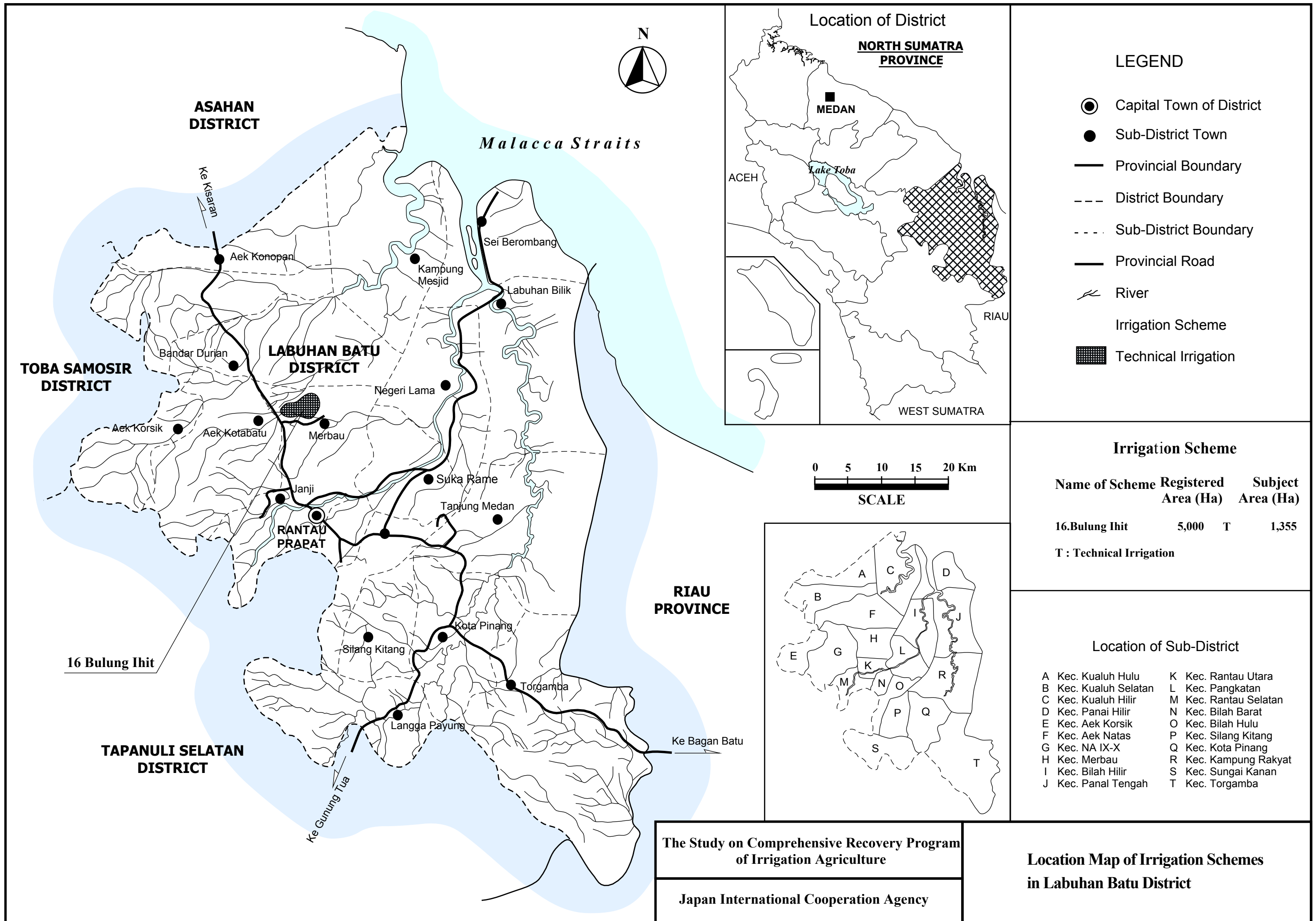
VI.4 Priority Ranking in the Province

Scheme	Simangatasi II	District	Toba Samosir		
Technical Level	Technical	Registered Area	1,515 ha	Year of Construction	1992
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Fixed Weir</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Washed away of stilling basin and retaining wall; sediment in front of intake.</p>			
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Division structure</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Lower function of division structure; damage of division structure; physical operation problem on division structure on canal (no use).</p>			
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Masonry Lined Canal</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.</p>			

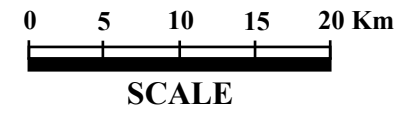
Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme		District			
Simangatasi II		Toba Samosir			
Technical Level	Technical	Registered Area	1,515 ha	Year of Construction	1992
		<u>Category</u> Irrigation (Secondary Canal)			
		<u>Structure</u> Masonry Lined Canal			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D			
		<u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.			
		<u>Category</u> Agriculture, On-Farm			
		<u>Activity</u> Paddy Cultivation			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
		<u>Problems</u> Low density of on-farm canal and farm roads.			
		<u>Category</u>			
		<u>Activity</u>			
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
		<u>Problems</u>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation



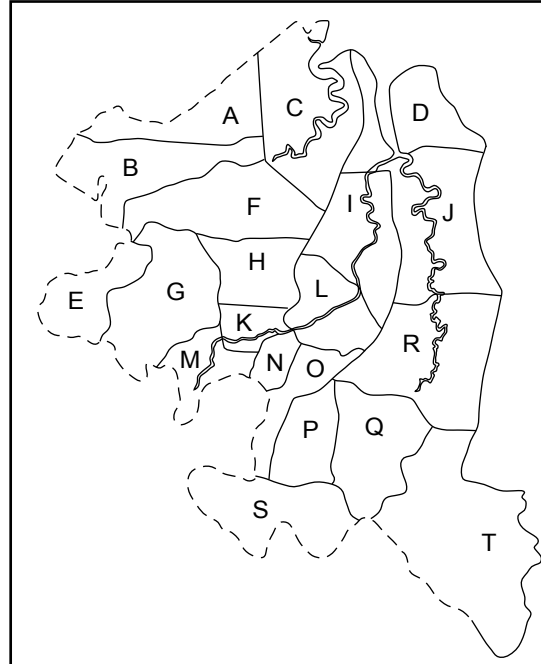
- ### LEGEND
- ⊙ Capital Town of District
 - Sub-District Town
 - Provincial Boundary
 - - - District Boundary
 - . . . Sub-District Boundary
 - Provincial Road
 - ~ River
 - ▨ Irrigation Scheme
 - ▩ Technical Irrigation



Irrigation Scheme

Name of Scheme	Registered Area (Ha)	Subject Area (Ha)
16.Bulung Ihit	5,000	T 1,355

T : Technical Irrigation



- ### Location of Sub-District
- | | |
|-----------------------|-----------------------|
| A Kec. Kualuh Hulu | K Kec. Rantau Utara |
| B Kec. Kualuh Selatan | L Kec. Pangkatan |
| C Kec. Kualuh Hilir | M Kec. Rantau Selatan |
| D Kec. Panai Hilir | N Kec. Bilah Barat |
| E Kec. Aek Korsik | O Kec. Bilah Hulu |
| F Kec. Aek Natas | P Kec. Silang Kitang |
| G Kec. NA IX-X | Q Kec. Kota Pinang |
| H Kec. Merbau | R Kec. Kampung Rakyat |
| I Kec. Bilah Hilir | S Kec. Sungai Kanan |
| J Kec. Panal Tengah | T Kec. Torgamba |

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Labuhan Batu District

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120319000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Bulung Ihit	(8)	Water Resource River	:	Sei Merbau			
(3) District (Kabupaten)	:	Labuhan Batu	(9)	Catchment Area (km ²)	:	420			
(4) Sub-district (Kecamatan)	:	Merbau	(10)	Original / Last Rehabilitation Year	:	1998			
(5) Registered Area (ha)	:	5,000							
(6) Technical Level	:	Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
B		A		C		A			
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data			
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	1,355	1,355	0						
b. Rainfed paddy field	0	0	0						
c. Upland field	0	0	0						
d. Uncultivated land	0	0	0						
e. Non-irrigable land	0	0	0						
Total	1,355	1,355	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,355			1,355	100%	4.0	5,420		
Season II (dry I)				0					
Season III (dry II)	678			678	50%	4.0	2,712		
Total/Annual	2,033	0	0	2,033	150%	4.0	8,132	0	0
1/: Irrigated & rainfed paddy									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply limited in dry season									
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage: Water shortage at on-farm level in dry season - Palawija Marketing: -									
- Agronomic Issues: Farmers not following recommended practices - Farmers Organizations: Most members are not active									
- Paddy Marketing: Low marketing prices - Extension Services: Extension activities of PPLs are limited									
III.2 Development Plan									
(1) Development Approaches									
- Expansion of irrigated area in dry season through rehabilitation									
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,355			1,355	100%	5.0	6,775		
Season II (dry I)				0					
Season III (dry II)	949	136		1,085	80%	5.0	4,745	860	
Total/Annual	2,304	136	0	2,440	180%	5.0	11,520	860	0
Annual Increment	271	136	0	407	30%	1.0	3,388	860	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	5	b. Established;	5	c. Not yet;	0	Registered		0
Performance	a. Developed;	0	b. Under developing;	5	c. Not yet;	0	Not yet registered		5
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- No attention to continue O&M works among WUA members.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Re-activation of WUA's performance.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : B Main Canal System : D Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 2 nos. | i. Condition | : B |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 17 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 6.0 m ³ /s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	450	5,070	5,520	10	4,416	D
Secondary	2,875	23,675	26,550	41	23,865	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Impassable of inspection road along canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Sedimentation in front of intake
 - Irrigation Canal and Related Structure
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- Dam/Headworks body : no rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : large rehabilitation
Settling basin : minor rehabilitation

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,490	0	1,490
	Secondary	0	7,169	0	7,169
Structure (nos)	Main	0	3	0	3
	Secondary	0	11	2	13

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,355	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,355

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
897	8,431	843	2,778	1,260	14,209	10.5

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0	59.7	
	Urgency	25.0	20.4	Social Problem	15.0	6.0		
	Sustainability	15.0	6.8	Economic Impact	15.0	10.5		

VI.3 Priority Group

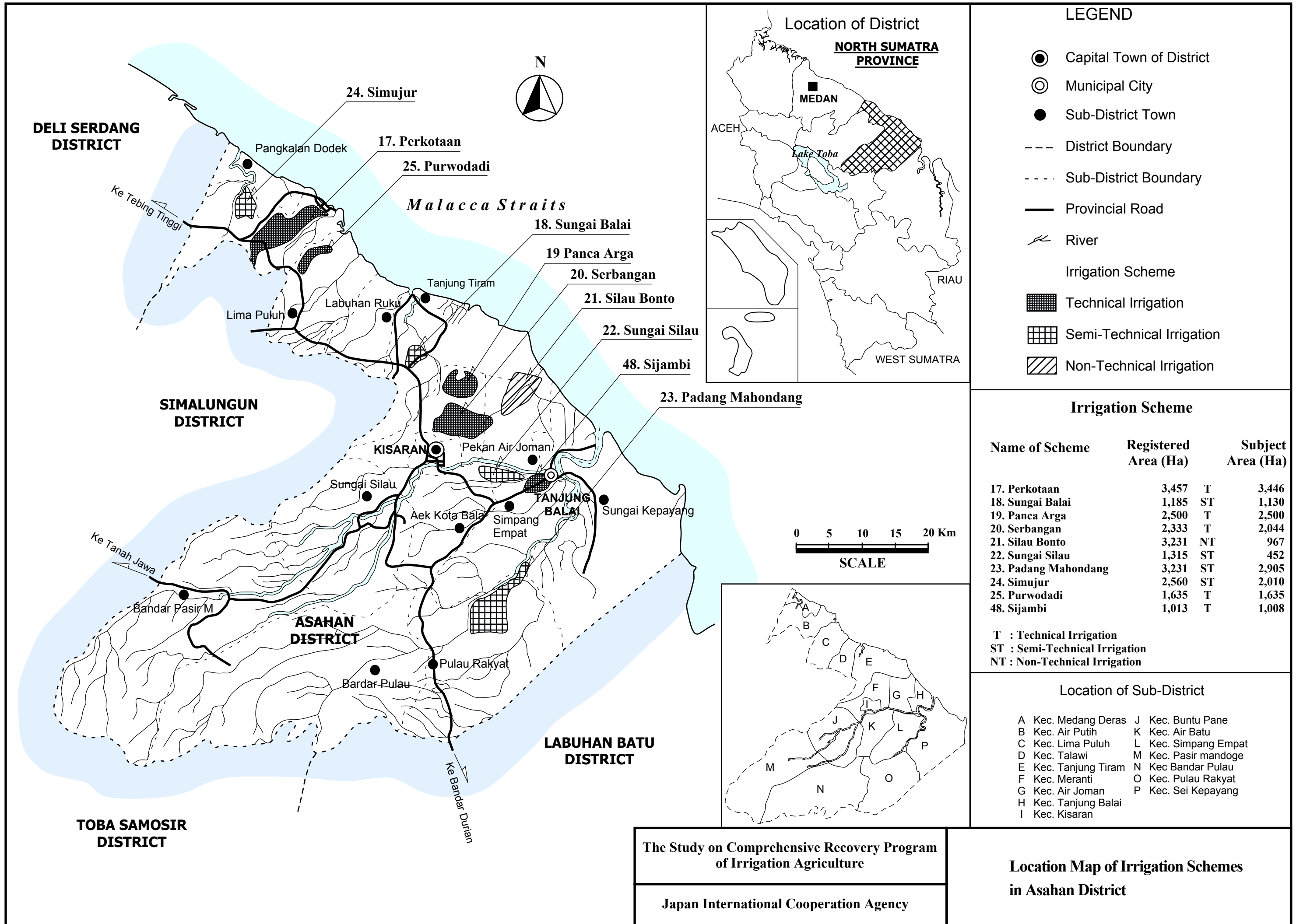
VI.4 Priority Ranking in the Province

Scheme	Bulung Ihit	District	Labuhan Batu	
Technical Level	Technical	Registered Area	5,000 ha	Year of Construction 1998
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Fixed Weir		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Damage or collapse of side wall at up and downstream of weir.		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Insufficient diversion water due to sedimentation in front of intake; settlement or deflection of intake structure; physical operation problem due to deflection; problem on management due to lack of periodically maintenance.		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Off-take Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Lower function of off-take structure; settlement or damage on off-take structure; physical operation problem on off-take structure.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Bulung Ihit	District	Labuhan Batu		
Technical Level	Technical	Registered Area	5,000 ha	Year of Construction	1998
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Masonry Lined Canal</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation, crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal</p>			
		<p><u>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Masonry Lined Canal</p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation, crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and less control facility.</p>			
		<p><u>Category</u></p>			
		<p><u>Structure</u></p>			
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation



LEGEND

- Capital Town of District
- Municipal City
- Sub-District Town
- - - District Boundary
- . . . Sub-District Boundary
- Provincial Road
- ~ River
- Irrigation Scheme
- Technical Irrigation
- ▩ Semi-Technical Irrigation
- ▨ Non-Technical Irrigation

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
17. Perkotaan	3,457	T	3,446
18. Sungai Balai	1,185	ST	1,130
19. Panca Arga	2,500	T	2,500
20. Serbangan	2,333	T	2,044
21. Silau Bonto	3,231	NT	967
22. Sungai Silau	1,315	ST	452
23. Padang Mahondang	3,231	ST	2,905
24. Simujur	2,560	ST	2,010
25. Purwodadi	1,635	T	1,635
48. Sijambi	1,013	T	1,008

T : Technical Irrigation
 ST : Semi-Technical Irrigation
 NT : Non-Technical Irrigation

Location of Sub-District

- A Kec. Medang Deras
- B Kec. Air Putih
- C Kec. Lima Puluh
- D Kec. Talawi
- E Kec. Tanjung Tiram
- F Kec. Meranti
- G Kec. Air Joman
- H Kec. Tanjung Balai
- I Kec. Kisanan
- J Kec. Buntu Pane
- K Kec. Air Batu
- L Kec. Simping Empat
- M Kec. Pasir mandoge
- N Kec. Bandar Pulau
- O Kec. Pulau Rakyat
- P Kec. Sei Kepayang

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 of Irrigation Agriculture
 Japan International Cooperation Agency

**Location Map of Irrigation Schemes
 in Asahan District**

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120295000	(7) Number of Farmers	: Not available							
(2) Name of Irrigation Scheme	: Perkotaan	(8) Water Resource River	: Sipare-pare							
(3) District (Kabupaten)	: Asahan	(9) Catchment Area (km ²)	: 850							
(4) Sub-district (Kecamatan)	: Air Putih	(10) Original / Last Rehabilitation Year	: 1989							
(5) Registered Area (ha)	: 3,457									
(6) Technical Level	: Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)			b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram			
B			A		C		A			
e. Rehabilitation plan & its references			f. Crops and yield data		g. Cropping Calender		h. WUAs data			
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		3,339		3,446		107				
b. Rainfed paddy field		107		0		-107				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		3,446		3,446		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		2,812			2,812	84%	4.0	11,516		
Season II (dry I)					0					
Season III (dry II)		2,812			2,812	84%	4.0	11,248		
Total/Annual		5,624	0	0	5,624	168%	4.0	22,764	0	0
1/: Irrigated & rainfed paddy										
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Wet & dry season irrigation attained in the entire irrigated area, however rainfed fields (107ha) still exist										
- Double cropping of paddy in the entire irrigated area practiced; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Water shortage at on-farm level in dry season		- Palawija Marketing:		Low marketing prices				
- Agronomic Issues:		Infestation of pest & diseases		- Farmers Organizations:		Economic activities are limited				
- Paddy Marketing:		Low marketing prices		- Extension Services:		Shortage of operation funds of PPLs				
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area through rehabilitation & upgrading										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		3,446			3,446	100%	5.0	17,230		
Season II (dry I)					0					
Season III (dry II)		3,101	172		3,273	95%	5.0	15,505	860	
Total/Annual		6,547	172	0	6,719	195%	5.0	32,735	860	0
Annual Increment		923	172	0	1,095	27%	1.0	9,971	860	0
IV. WUAs										
IV.1 Existing Condition										
(1)	Number	a. Target;	10	b. Established;	9	c. Not yet;	1	Registered		3
	Performance	a. Developed;	3	b. Under developing;	6	c. Not yet;	0	Not yet registered		6
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- No awareness of WUA members to implementation of O&M works.										
- No coordination between District WRS and WUA.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Encouragement of WUA members for positive involvement in O&M activities.										
(2) Development Plan										
- WUA O&M training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : B (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : B Main Canal System : C Secondary Canal System : C On-farm : B
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : - | i. Condition | : B |
| b. Type of weir | : Movable weir | f. Intake gate | : 4 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 19 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 6.5 m ³ /s | h. Inspection Bridge | : provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	2,452	17,128	19,580	44	19,580	C
Secondary	7,500	32,903	40,403	81	40,403	C

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Fallen down, inclined, or washed away of retaining wall of weir
 - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - General O&M problems
 - Difficulty on O&M
 - Lower function of regulating structure on canal

(5) Causes of Major Problems and Constraints

- Water Resources Facility
 - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
 - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
 - Insufficient function of settling basin, no proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken
 - Deterioration of regulating structure on canal, especially gate and metal works

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of retaining wall of weir
 - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
 - Rehabilitation of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision or repair of inspection road with all weather type/pavement
 - Replacement and reconstruction of regulating structure on canal

(2) Water Resources Facility

- Dam/Headworks body : minor rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : minor rehabilitation
Settling basin : large rehabilitation

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	19,580	0
	Secondary	0	40,403	0
Structure (nos)	Main	0	44	4
	Secondary	0	81	16

(4) On-farm Development

				(Unit: ha)
a. Potential Irrigated paddy field	3,339	d. Non-potential paddy field		0
b. Potential non-irrigated paddy field	107	e. Non-potential non-paddy field		0
c. Potential non-paddy field	0	Total		3,446

(5) Rehabilitation Cost (Direct Cost)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,653	66,325	6,633	7,119	1,570	84,300	24.5

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring




Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	Agricultural Productivity	20.0	11.0	53.7
	Urgency	25.0	Social Problem	15.0	6.0	
	Sustainability	15.0	Economic Impact	15.0	7.5	

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Perkotaan	District	Asahan	
Technical Level	Technical	Registered Area	3,457 ha	Year of Construction 1989
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Movable Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Off-take Structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sediment in front of intake; clogging by foreign materials.</p>		
		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; insufficient diversion water due to sedimentation in front of intake</p>		
		<p><u>Problems</u> Lower function of off-take structure; physical operation problem on off-take structure, both structure and wooden gate work</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Perkotaan	District	Asahan	
Technical Level	Technical	Registered Area	3,457 ha	Year of Construction 1989
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Check Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Lower function of structure; physical operation problem on structure, both structure and gate work		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Concrete Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal;		
		<i>Category</i> Irrigation (Secondary Canal)		
		<i>Structure</i> Masonry Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal;		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120298000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Sungai Balai	(8)	Water Resource River	:	Balai			
(3) District (Kabupaten)	:	Asahan	(9)	Catchment Area (km ²)	:	290			
(4) Sub-district (Kecamatan)	:	Tanjung Tiram	(10)	Original / Last Rehabilitation Year	:	1998			
(5) Registered Area (ha)	:	1,185							
(6) Technical Level	:	Semi Technical							
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram		
C		A			C		A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data		
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	1,130	1,130	0						
b. Rainfed paddy field	0	0	0						
c. Upland field	0	0	0						
d. Uncultivated land	0	0	0						
e. Non-irrigable land	0	0	0						
Total	1,130	1,130	0						
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,130			1,130	100%	4.0	4,520		
Season II (dry I)				0					
Season III (dry II)	1,000			1,000	88%	4.0	4,000		
Total/Annual	2,130	0	0	2,130	188%	4.0	8,520	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- High irrigation performances attained, however poor drainage problem reported									
- Double cropping of paddy in almost all the irrigated area practiced; however paddy yield levels still low & palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Poor drainage			- Palawija Marketing:		-		
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		Economic activities are limited		
- Paddy Marketing:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Ensuring irrigation water supply in dry season at on-farm level & drainage improvement through rehabilitation									
- Introduction of double cropping of paddy in the entire scheme; productivity increase of paddy through intensification; introduction of palawija									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTIs									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,130			1,130	100%	5.0	5,650		
Season II (dry I)		113		113					
Season III (dry II)	1,130			1,130	100%	5.0	5,650	565	
Total/Annual	2,260	113	0	2,373	210%	5.0	11,300	565	0
Annual Increment	130	113	0	243	22%	1.0	2,780	565	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	12	b. Established;	10	c. Not yet;	2	Registered		3
Performance	a. Developed;	0	b. Under developing;	10	c. Not yet;	0	Not yet registered		7
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- No attention to pay membership fees among WUA members.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Encouragement of WUA members for financial involvement in WUA management.									
(2) Development Plan									
- WUA management training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : D Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : C |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 30 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.7 m ³ /s | h. Inspection Bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	2,039	1,300	3,339	7	0	D
Secondary	0	8,267	8,267	28	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Fallen down, inclined, or washed away of retaining wall of weir
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Impassable of inspection road along canal
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of retaining wall of weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- Dam/Headworks body : minor rehabilitation Intake, civil : minor rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	3,339	334
	Secondary	0	8,267	1,653
Structure (nos)	Main	0	7	1
	Secondary	0	28	10

(4) On-farm Development

		(Unit: ha)	
a. Potential Irrigated paddy field	1,130	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,130

(5) Rehabilitation Cost (Direct Cost)

							(Unit: Million Rp.)
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha	
2,797	13,861	1,386	2,317	1,260	21,620	19.1	

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring



Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0	66.9	
	Urgency	25.0	22.4	Social Problem	15.0	10.5		
	Sustainability	15.0	9.0	Economic Impact	15.0	9.0		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Sungai Balai	District	Asahan	
Technical Level	Semi-technical	Registered Area	1,185 ha	Year of Construction 1998
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Fixed Weir		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Fallen down, incline or washed away of retaining wall of weir; washed away of ripraps or blocks at downstream of stilling basin		
		<i>Category</i> Intake Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Insufficient diversion water due to sedimentation in front of intake; leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Masonry Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road; and less maintenance.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Sungai Balai	District	Asahan	
Technical Level	Semi-technical	Registered Area	1,185 ha	Year of Construction 1998
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Division structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Damaged and no function.</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal; and no inspection road.</p>		
		<p><u>Category</u></p>		
		<p><u>Structure</u></p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u></p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120304000			(7) Number of Farmers	: Not available				
(2) Name of Irrigation Scheme	: Panca Arga			(8) Water Resource River	: Bunut				
(3) District (Kabupaten)	: Asahan			(9) Catchment Area (km ²)	: 375				
(4) Sub-district (Kecamatan)	: Meranti			(10) Original / Last Rehabilitation Year	: 1993				
(5) Registered Area (ha)	: 2,500								
(6) Technical Level	: Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings			d. Structure lists & diagram	
B		A			C			A	
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender			h. WUAs data	
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field	1,829		2,500		671				
b. Rainfed paddy field	671		0		-671				
c. Upland field	0		0		0				
d. Uncultivated land	0		0		0				
e. Non-irrigable land	0		0		0				
Total	2,500		2,500		0				
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field 1/				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,829			1,829	100%	3.5	7,250		
Season II (dry I)				0					
Season III (dry II)	786			786	43%	3.5	2,751		
Total/Annual	2,615	0	0	2,615	143%		10,001	0	0
					1/: Include paddy grown under rainfed condition (829ha)		2/: Irrigated & rainfed paddy		
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply limited even in wet season (829ha); dry season irrigated area also limited (786ha)									
- Double cropping of paddy introduced; existing of paddy grown under rainfed condition; paddy yield levels still low; palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		-		
- Agronomic Issues:		Damage caused by rat			- Farmers Organizations:		Economic activities are limited		
- Paddy Marketing:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Ensuring irrigation water supply at on-farm level both in wet & dry season through rehabilitation									
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	2,500			2,500	100%	4.5	11,250		
Season II (dry I)				0					
Season III (dry II)	1,500	250		1,750	70%	4.5	6,750	1,250	
Total/Annual	4,000	250	0	4,250	170%	4.5	18,000	1,250	0
Annual Increment	1,385	250	0	1,635	27%	4.5	7,999	1,250	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	4	b. Established;	4	c. Not yet;	0	Registered		1
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	3	Not yet registered		3
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- No attention of WUA members to O&M activities.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Encouragement of WUA members to participate positively in O&M activities.									
(2) Development Plan									
- WUA O&M training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 1 nos. | i. Condition | : C |
| b. Type of weir | : Fixed weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 25 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.0 m ³ /s | h. Inspection bridge | : provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	157	0	157	3	0	D
Secondary	2,172	5,328	7,500	18	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Incline, settlement, or deflection of pier of weir
 - Physical operational problem on flood/scouring sluice gate(s) of headworks
 - Physical operational problem on intake gate(s)
- Irrigation Canal and Related Structure
 - Leakage from canal
 - Impassable of inspection road along canal
 - Difficulty on maintenance of earth canal
 - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
 - Insufficient strength of weir foundation or not enough foundation treatment
 - Improper design, installation and/or maintenance of flood/scouring sluice gate(s); breakdown of hoist, stem, guide frame or leaf
 - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
- Irrigation Canal and Related Structure
 - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
 - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of pier of weir
 - Replacement of control system or damaged equipment of flood/scouring sluice gate(s)
 - Replacement of intake gate(s) of intake
- Irrigation Canal and Related Structure
 - Repair of leakage from canal, widen canal wide, recompaction of embankment
 - Provision of inspection road both main and secondary canal with pavement
 - Provision of concrete lining
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- | | | | | | |
|--------------------|----------------------|--|----------------------|--------------------|----------------------|
| Dam/Headworks body | : replacement or new | Intake, civil | : replacement or new | Intake, mechanical | : replacement or new |
| Settling basin | : replacement or new | (New construction of integrate headworks for Panca Arga, Serbangan, and Silau Bonto schemes) | | | |

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	157	0	157
	Secondary	0	7,500	0	7,500
Structure (nos)	Main	0	3	0	3
	Secondary	0	18	4	22

(4) On-farm Development

(Unit: ha)			
a. Potential Irrigated paddy field	1,829	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	671	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	2,500

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)						
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,077	9,864	986	5,469	1,570	20,967	8.4

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-




VI.3 Priority Group

(Reformulation of development plan with integrated headworks)

VI.4 Priority Ranking in the Province

Scheme	Panca Arga	District	Asahan	
Technical Level	Technical	Registered Area	2,500 ha	Year of Construction 1993
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Washed away of stilling basin</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Scouring Sluice Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; problem on management due to lack of periodically maintenance; and insufficient diversion water due to sedimentation in front of intake.</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Intake and Intake Gate</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; insufficient diversion water due to sedimentation in front of intake</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Panca Arga	District	Asahan	
Technical Level	Technical	Registered Area	2,500 ha	Year of Construction 1993
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Division Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Lower function of division structure due to sedimentation in front of division structure; settlement or damage on division structure; physical operation problem on division structure.		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Concrete Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; and no inspection road.		
		<i>Category</i> Irrigation (Secondary Canal)		
		<i>Structure</i> Earth Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal; and no inspection road.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120305000			(7) Number of Farmers	: Not available				
(2) Name of Irrigation Scheme	: Serbangan			(8) Water Resource River	: Bunut				
(3) District (Kabupaten)	: Asahan			(9) Catchment Area (km ²)	: 87.5				
(4) Sub-district (Kecamatan)	: Meranti			(10) Original / Last Rehabilitation Year	: 1993				
(5) Registered Area (ha)	: 2,333								
(6) Technical Level	: Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram		
B		A			C		A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data		
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field	2,044		2,044		0				
b. Rainfed paddy field	0		0		0				
c. Upland field	0		0		0				
d. Uncultivated land	0		0		0				
e. Non-irrigable land	0		0		0				
Total	2,044		2,044		0				
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,842			1,842	90%	4.0	7,368		
Season II (dry I)				0					
Season III (dry II)	1,760			1,760	86%	4.0	7,040		
Total/Annual	3,602	0	0	3,602	176%	4.0	14,408	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- High irrigation performances attained, however water shortage in dry season reported									
- Double cropping of paddy in almost all the irrigated area practiced; however paddy yield levels still low & palawija not yet introduced									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Limited bargaining power of farmers		
- Agronomic Issues:		Infestation of pest & diseases			- Farmers Organizations:		Economic activities are limited		
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Ensuring irrigation water supply in dry season at on-farm level									
- Introduction of double cropping of paddy in the entire scheme; productivity increase of paddy through intensification; introduction of palawija									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	2,044			2,044	100%	5.0	10,220		
Season II (dry I)				0					
Season III (dry II)	2,044	204		2,248	110%	5.0	10,220	1,020	
Total/Annual	4,088	204	0	4,292	210%	5.0	20,440	1,020	0
Annual Increment	486	204	0	690	34%	1.0	6,032	1,020	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	19	b. Established;	17	c. Not yet;	2	Registered	6	
Performance	a. Developed;	0	b. Under developing;	6	c. Not yet;	11	Not yet registered	11	
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Less understanding of WUA members about importance of O&M activities.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Encouragement of WUA members to participate positively in O&M works.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : C Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 2 nos. | i. Condition | : C |
| b. Type of weir | : Fixed weir | f. Intake gate | : 5 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 35 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 2.4 m ³ /s | h. Inspection bridge | : provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	2,100	4,690	6,790	17	6,790	C
Secondary	3,400	13,311	16,711	32	16,711	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Settlement or breakdown of stilling basin of weir
 - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
 - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Collapse of canal
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
 - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of stilling basin
 - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
 - Sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Reconstruction of stilling basin of weir
 - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
 - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

- | | | | | | |
|--------------------|----------------------|--|----------------------|--------------------|----------------------|
| Dam/Headworks body | : replacement or new | Intake, civil | : replacement or new | Intake, mechanical | : replacement or new |
| Settling basin | : replacement or new | (New construction of integrate headworks for Panca Arga, Serbangan, and Silau Bonto schemes) | | | |

(3) Irrigation Canal and Related Structure

Works	No rehabilitation		Rehabilitation		New construction		Total	
	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)
Main	0	0	5,975	15	0	1	5,975	16
Secondary	0	0	14,706	28	1,496	6	16,202	34

(4) On-farm Development

(Unit: ha)			
a. Potential Irrigated paddy field	2,044	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	2,044

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)						
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,898	24,342	2,434	4,190	1,570	35,435	17.3

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-




VI.3 Priority Group

(Reformulation of development plan with integrated headworks)

VI.4 Priority Ranking in the Province

Scheme	Serbangan	District	Asahan	
Technical Level	Technical	Registered Area	2,333 ha	Year of Construction 1993
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Movable Weir (Rear View)		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Leakage from gate leaf; insufficient strength against design load due to decay of wood (wooden gate); insufficient diversion water due to sedimentation in front of intake		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Movable Weir (Front View)		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Cracks and incline of walls.		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Retaining Wall		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Fallen down, incline or washed away of retaining wall of weir.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Serbangan	District	Asahan	
Technical Level	Technical	Registered Area	2,333 ha	Year of Construction 1993
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Division structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation in canal; low function of steel gates; and no water measuring structure.</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Concrete Lined Canal</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; leakage from lined canal; crack or damage on lined canal; deflection of lining toward inside of canal; and no function of inspection road.</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Structure</u> Division structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Lower function of division structure; physical operation problem due to gate problem.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120306000			(7) Number of Farmers	: Not available				
(2) Name of Irrigation Scheme	: Silau Bonto			(8) Water Resource River	: Drainage Canal				
(3) District (Kabupaten)	: Asahan			(9) Catchment Area (km ²)	: 85				
(4) Sub-district (Kecamatan)	: Air Joman			(10) Original / Last Rehabilitation Year	: 1993				
(5) Registered Area (ha)	: 3,231								
(6) Technical Level	: Non Technical								
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)									
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram		
C		A			C		A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data		
C									
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category		Present (ha)		Plan (ha)		Increment (ha)			
a. Irrigated paddy field		20		683		663			
b. Rainfed paddy field		0		0		0			
c. Upland field		0		0		0			
d. Uncultivated land		947		0		-947			
e. Non-irrigable land		0		284		284			
Total		967		967		0			
III. AGRICULTURE									
III.1 Present/Before Project Condition									
(1) Irrigation Performance and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	20			20	100%	3.5	70		
Season II (dry I)				0					
Season III (dry II)	20			20	100%	3.5	70		
Total/Annual	40	0	0	40	200%	3.5	140	0	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigated area limited to 20ha & existing of uncultivated area 947ha									
- Double cropping of paddy introduced, but area extremely limited; existing of extensive uncultivated land to be developed									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Limited bargaining power of farmers		
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Most members are not active		
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Development of irrigated area through rehabilitation & upgrading									
- Introduction of double cropping of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II									
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	683			683	100%	4.5	3,074		
Season II (dry I)				0					
Season III (dry II)	478	68		546	80%	4.5	2,151	340	
Total/Annual	1,161	68	0	1,229	180%	4.5	5,225	340	0
Annual Increment	1,121	68	0	1,189	-20%	1.0	5,085	340	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	3	b. Established;	1	c. Not yet;	2	Registered		0
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	0	Not yet registered		1
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
(No activity)									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Activation of WUA O&M works.									
(2) Development Plan									
- WUA empowerment training.									

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|---------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : D |
| b. Type of weir | : - | f. Intake gate | : - | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : no info. | h. Inspection bridge | : not provided | | |
- (3) Irrigation Canal and Inspection Road
- | Canal | Lined (m) | Unlined | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|-----------|-----------|---------|-----------|-----------------|---------------------|-----------|
| Main | 0 | 0 | 0 | 0 | 0 | D |
| Secondary | 0 | 0 | 0 | 0 | 0 | D |
- (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
- (4) Major Problems and Constrains
- Water Resources Facility
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
 - Problem on management for intake gate(s) operation
 - Irrigation Canal and Related Structure
 - Totally damaged and not functioning
- (5) Causes of Major Problems and Constraints
- Water Resources Facility
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Improper management or deterioration of intake gate(s)
 - Irrigation Canal and Related Structure
 - Totally damaged and not functioning

V.2 Development Plan

- (1) Proposed Countermeasures for Major Problems
- Water Resources Facility
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
 - Replacement of control system or damaged equipment of intake/free intake
 - Irrigation Canal and Related Structure
 - Provision of new canal system
- (2) Water Resources Facility
- Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new (New construction of integrate headworks for Panca Arga, Serbangan, and Silau Bonto schemes)
- (3) Irrigation Canal and Related Structure
- | Works | No rehabilitation | Rehabilitation | New construction | Total |
|-----------------|-------------------|----------------|------------------|-------|
| Canal (m) | Main | 0 | 825 | 825 |
| | Secondary | 0 | 6,990 | 6,990 |
| Structure (nos) | Main | 0 | 14 | 14 |
| | Secondary | 0 | 21 | 21 |
- (4) On-farm Development (Unit: ha)
- | | | | |
|--|-----|----------------------------------|-----|
| a. Potential Irrigated paddy field | 20 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 0 | e. Non-potential non-paddy field | 0 |
| c. Potential non-paddy field | 947 | Total | 967 |
- (5) Rehabilitation Cost (Direct Cost) (Unit: Million Rp.)
- | W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|-------|------------|----------|------------------|------------------|--------|-------------|
| 6,170 | 13,168 | 1,317 | 4,894 | 1,260 | 26,809 | 27.7 |
- (W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring


Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Silau Bonto	District	Asahan	
Technical Level	Non-technical	Registered Area	3,231 ha	Year of Construction 1993
		<u>Category</u> Irrigation (Free Intake)		
		<u>Structure</u> Intake		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Total damage on intake structure; no functional facility is provided.		
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Earth Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; less maintenance; no inspection road.		
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Earth Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; less maintenance; no inspection road.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Silau Bonto	District	Asahan	
Technical Level	Non-technical	Registered Area	3,231 ha	Year of Construction 1993
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Earth Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation; leakage from canal; collapse of canal; less maintenance; no inspection road.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120309000			(7) Number of Farmers	: Not available					
(2) Name of Irrigation Scheme	: Sungai Silau			(8) Water Resource River	: Sungai Silau					
(3) District (Kabupaten)	: Asahan			(9) Catchment Area (km ²)	: 106.25					
(4) Sub-district (Kecamatan)	: Sp. Empat/Air Batu			(10) Original / Last Rehabilitation Year	: 1971					
(5) Registered Area (ha)	: 1,315									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings		d. Structure lists & diagram			
C		A			C		A			
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data			
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		200		376		176				
b. Rainfed paddy field		0		0		0				
c. Upland field		0		0		0				
d. Uncultivated land		252		0		-252				
e. Non-irrigable land		0		76		76				
Total		452		452		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 2/		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		200			200	100%		500		
Season II (dry I)					0					
Season III (dry II)			35		35	18%			88	
Total/Annual		200	35	0	235	118%		500	88	0
					1/: Include paddy grown under rainfed condition (200ha)		2/: Rainfed paddy			
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- No irrigation water supply even in wet season; existing of uncultivated land (252ha)										
- Only single cropping of paddy in wet season under rainfed condition practiced; annual intensity low; paddy yield levels very low;										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Poor O&M at main & 2ry canals			- Palawija Marketing:		Limited bargaining power of farmers			
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Most members are not active			
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		Implementation of extension programs is limited			
III.2 Development Plan										
(1) Development Approaches										
- Development of irrigated area through rehabilitation & upgrading										
- Introduction of double cropping of paddy; productivity increase of paddy throughintensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		376			376	100%	4.5	1,692		
Season II (dry I)					0					
Season III (dry II)		263	38		301	80%	4.5	1,184	190	
Total/Annual		639	38	0	677	180%	4.5	2,876	190	0
Annual Increment		439	3	0	442	63%	4.5	2,376	102	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	3	b. Established;	3	c. Not yet;	0	Registered		0	
Performance	a. Developed;	0	b. Under developing;	3	c. Not yet;	0	Not yet registered		3	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
(No activity)										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA O&M works.										
(2) Development Plan										
- WUA empowerment training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : D |
| b. Type of weir | : - | f. Intake gate | : 3 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 2.0 m ³ /s | h. Inspection bridge | : - | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	1,650	1,650	3	0	D
Secondary	0	16,500	16,500	47	0	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Unstable diversion water due to river water level fluctuation
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No provision of diversion weir
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Provision of diversion weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement
- (2) Water Resources Facility

Dam/Headworks body	: replacement or new	Intake, civil	: replacement or new	Intake, mechanical	: large rehabilitation
Settling basin	: replacement or new	(New construction of integrate headworks for Sungai Silau and Sijambi schemes)			
- (3) Irrigation Canal and Related Structure

Works	No rehabilitation			Rehabilitation		New construction		Total	
	Canal (m)	Main	Secondary	Main	Secondary	Main	Secondary	Main	Secondary
Canal (m)	Main	0	561	56	617				
	Secondary	0	5,610	1,122	6,732				
Structure (nos)	Main	0	1	0	1				
	Secondary	0	16	6	22				

(4) On-farm Development

(Unit: ha)			
a. Potential Irrigated paddy field	200	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	252	Total	452

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)						
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
15,052	8,429	843	1,702	1,260	27,285	60.4

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR




VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	-	Agricultural Productivity	20.0	-	-	-
	Urgency	25.0	-	Social Problem	15.0	-	-	-
	Sustainability	15.0	-	Economic Impact	15.0	-	-	-


VI.3 Priority Group

(Reformulation of development plan with integrated headworks)

VI.4 Priority Ranking in the Province

Scheme	Sungai Silau	District	Asahan	
Technical Level	Semi-technical	Registered Area	1,315 ha	Year of Construction 1971
		<i>Category</i> Irrigation (Free Intake)		
		<i>Structure</i> Intake Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Insufficient diversion water due to sedimentation in front of intake; Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material (two of three gates are damaged)		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Division structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Lower function of division structure on canal; damage of division structure; and no inspection road.		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Masonry Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; leakage from canal; crack or damage on canal; less maintenance; and no inspection road.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Sungai Silau	District	Asahan	
Technical Level	Semi-technical	Registered Area	1,315 ha	Year of Construction 1971
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Sedimentation (canal is covered by grass); leakage from canal; collapse of canal, difficulty on maintenance of earth canal; and no inspection road.		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		
		<u>Category</u>		
		<u>Structure</u>		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120312000			(7) Number of Farmers	: Not available					
(2) Name of Irrigation Scheme	: Padang Mahondang			(8) Water Resource River	: Sungai Asahan					
(3) District (Kabupaten)	: Asahan			(9) Catchment Area (km ²)	: 500					
(4) Sub-district (Kecamatan)	: Pulo Rakyat			(10) Original / Last Rehabilitation Year	: 1981					
(5) Registered Area (ha)	: 3,231									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram			c. As-built drawings			d. Structure lists & diagram		
B		A			C			A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender			h. WUAs data		
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		724		2,905		2,181				
b. Rainfed paddy field		2,181		0		-2,181				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		2,905		2,905		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		724			724	100%	4.0	8,349		
Season II (dry I)					0					
Season III (dry II)		300			300	41%	3.5	1,050		
Total/Annual		1,024	0	0	1,024	141%	3.9	9,399	0	0
1/: Irrigated & rainfed paddy										
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigation water supply limited in dry season; existing rainfed field of 2,181ha										
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Low marketing prices			
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Managerial capacity of KTs are limited			
- Paddy Marketing:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited			
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area through rehabilitation & upgrading										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		2,905			2,905	100%	5.0	14,525		
Season II (dry I)					0					
Season III (dry II)		1,452	145		1,597	55%	5.0	7,260	725	
Total/Annual		4,357	145	0	4,502	155%	5.0	21,785	725	0
Annual Increment		3,333	145	0	3,478	14%	1.1	12,386	725	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	2	b. Established;	1	c. Not yet;	1	Registered		0	
Performance	a. Developed;	0	b. Under developing;	0	c. Not yet;	1	Not yet registered		1	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- No practice of irrigation water distribution plan.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Encouragement of WUA members to take an initiative position in planning stage for irrigation water distribution.										
(2) Development Plan										
- WUA capacity building.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : D |
| b. Type of weir | : - | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 4.4 m ³ /s | h. Inspection bridge | : - | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	3,575	3,575	6	3,575	D
Secondary	0	9,225	9,225	18	9,225	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Unstable diversion water due to river water level fluctuation
 - Insufficient diversion water due to sedimentation in front of intake
 - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No provision of diversion weir
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Provision of diversion weir
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement
- (2) Water Resources Facility

Dam/Headworks body	: replacement or new	Intake, civil	: large rehabilitation	Intake, mechanical	: large rehabilitation
Settling basin	: replacement or new				
- (3) Irrigation Canal and Related Structure

Works	No rehabilitation			Rehabilitation		New construction		Total	
	Canal (m)	Main	Secondary	Structure (nos)	Main	Secondary	Structure (nos)	Main	Secondary
Canal (m)		0	3,218		322			3,539	
Structure (nos)		0	8,303		1,661			9,963	
		0	5		1			6	
		0	16		6			22	

(4) On-farm Development (Unit: ha)

a. Potential Irrigated paddy field	724	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	2,181	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	2,905

(5) Rehabilitation Cost (Direct Cost) (Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
15,907	15,896	1,590	7,073	1,570	42,036	14.5

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring


Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	10.0	Agricultural Productivity	20.0	18.0	87.5	
	Urgency	25.0	25.0	Social Problem	15.0	10.5		
	Sustainability	15.0	10.5	Economic Impact	15.0	13.5		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Padang Mahondang	District	Asahan	
Technical Level	Semi-technical	Registered Area	3,231 ha	Year of Construction 1981
		<i>Category</i> Irrigation (Free Intake)		
		<i>Structure</i> Intake Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Insufficient diversion water due to sedimentation in front of intake; and deterioration of gates.		
		<i>Category</i> Irrigation (Free Intake)		
		<i>Structure</i> Intake Gate, Steel Gate		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; physical operation problem due to deflection/trouble; problem on management due to lack of periodically maintenance		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Division structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Lower function of division structure on canal; damage of division structure; physical operation problem on diversion gate; sedimentation in canal.		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Padang Mahondang	District	Asahan	
Technical Level	Semi-technical	Registered Area	3,231 ha	Year of Construction 1981
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Off-take Structure</p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Lower function of off-take structure on canal; damage of off-take structure; physical operation problem on off-take gate; and no maintenance of canal and structure.</p>		
		<p><u>Category</u></p>		
		<p><u>Structure</u></p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u></p>		
		<p><u>Category</u></p>		
		<p><u>Structure</u></p>		
		<p><u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>		
		<p><u>Problems</u></p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120670000	(7) Number of Farmers	: Not available							
(2) Name of Irrigation Scheme	: Simujur	(8) Water Resource River	: Sungai Suka							
(3) District (Kabupaten)	: Asahan	(9) Catchment Area (km ²)	: 125							
(4) Sub-district (Kecamatan)	: Air Putih	(10) Original / Last Rehabilitation Year	: 1985							
(5) Registered Area (ha)	: 2,560									
(6) Technical Level	: Semi Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram				
C		A		C		A				
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data				
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		1,200		2,010		810				
b. Rainfed paddy field		810		0		-810				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		2,010		2,010		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		1,200			1,200	100%	4.0	6,825		
Season II (dry I)					0					
Season III (dry II)		712			712	59%	4.0	2,848		
Total/Annual		1,912	0	0	1,912	159%	4.0	9,673	0	0
1/: Irrigated & rainfed paddy										
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- Irrigation water supply limited in dry season; existing rainfed field of 810ha										
- Double cropping of paddy introduced; paddy yield levels still low; palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Limited bargaining power of farmers			
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Most members are not active			
- Paddy Marketing:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited			
III.2 Development Plan										
(1) Development Approaches										
- Expansion of irrigated area through rehabilitation & upgrading										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		2,010			2,010	100%	5.0	10,050		
Season II (dry I)					0					
Season III (dry II)		1,206	201		1,407	70%	5.0	6,030	1,005	
Total/Annual		3,216	201	0	3,417	170%	5.0	16,080	1,005	0
Annual Increment		1,304	201	0	1,505	11%	1.0	6,407	1,005	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	3	b. Established;	6	c. Not yet;	0	Registered		0	
Performance	a. Developed;	0	b. Under developing;	2	c. Not yet;	4	Not yet registered		6	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
(No activity)										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA O&M works.										
(2) Development Plan										
- WUA O&M training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : D Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Free Intake | e. Scouring sluice gate | : - | i. Condition | : D |
| b. Type of weir | : - | f. Intake gate | : 4 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : - | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.0 m ³ /s | h. Inspection bridge | : - | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	2,300	2,300	4	1,840	D
Secondary	0	15,700	15,700	3	15,700	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Unstable diversion water due to river water level fluctuation
 - Insufficient diversion water due to river bed degradation
 - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No provision of diversion weir
 - River bed degradation, no provision of weir
 - Sedimentation in front of intake
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Change of intake method from free intake to weir type division structure, enlarge inlet capacity of intake/free intake
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : replacement or new Intake, civil : replacement or new Intake, mechanical : replacement or new
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

	Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,817	182	1,999
	Secondary	0	12,403	2,481	14,884
Structure (nos)	Main	0	3	1	4
	Secondary	0	2	15	17

(4) On-farm Development

				(Unit: ha)
a. Potential Irrigated paddy field	1,200	d. Non-potential paddy field		810
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field		0
c. Potential non-paddy field	0	Total		2,010

(5) Rehabilitation Cost (Direct Cost)

		(Unit: Million Rp.)				
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
9,356	16,838	1,684	4,536	1,570	33,984	16.9

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION




VI.1 EIRR

VI.2 Prioritization Scoring

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	8.0	Agricultural Productivity		20.0	16.0	76.0
	Urgency	25.0	25.0	Social Problem		15.0	6.0	
	Sustainability	15.0	10.5	Economic Impact		15.0	10.5	

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Simujur	District	Asahan	
Technical Level	Semi-technical	Registered Area	2,560 ha	Year of Construction 1985
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Free Intake, Upstream View</p>		
		<p><u>Condition</u></p> <p><input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake; deflection of intake structure</p>		
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Free Intake, Downstream View</p>		
		<p><u>Condition</u></p> <p><input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake; deflection of intake structure</p>		
		<p><u>Category</u> Irrigation (Free Intake)</p>		
		<p><u>Structure</u> Spillway</p>		
		<p><u>Condition</u></p> <p><input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel materials; physical operation problem due to deflection; and no stability due to less back fill at back side of retaining wall.</p>		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Simujur	District	Asahan	
Technical Level	Semi-technical	Registered Area	2,560 ha	Year of Construction 1985
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Diversion Structure		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> No function		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Earth Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> No function		
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Earth Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> No function		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 120673000	(7) Number of Farmers	: Not available							
(2) Name of Irrigation Scheme	: Purwodadi	(8) Water Resource River	: Sei Gambus							
(3) District (Kabupaten)	: Asahan	(9) Catchment Area (km ²)	: 154.25							
(4) Sub-district (Kecamatan)	: Lima Puluh	(10) Original / Last Rehabilitation Year	: 1989							
(5) Registered Area (ha)	: 1,635									
(6) Technical Level	: Technical									
I.2 Availability of Reports/Documents & References (A : Available, B : Available but partially, C : Not available/ No plan)										
a. Design Reports of Existing System(Full set)		b. Irrigation diagram		c. As-built drawings		d. Structure lists & diagram				
C		C		C		C				
e. Rehabilitation plan & its references		f. Crops and yield data		g. Cropping Calender		h. WUAs data				
C										
II. SUBJECT AREA FOR REHABILITATION PLAN										
II.1 Present and Planned Land Use										
Category		Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field		1,635		1,635		0				
b. Rainfed paddy field		0		0		0				
c. Upland field		0		0		0				
d. Uncultivated land		0		0		0				
e. Non-irrigable land		0		0		0				
Total		1,635		1,635		0				
III. AGRICULTURE										
III.1 Present/Before Project Condition										
(1) Irrigation Performance and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		1,635			1,635	100%	4.0	6,540		
Season II (dry I)					0					
Season III (dry II)		1,619			1,619	99%	4.0	6,476		
Total/Annual		3,254	0	0	3,254	199%	4.0	13,016	0	0
(2) Problems and Constraints										
<i>A. Irrigation & Agriculture Performances</i>										
- High irrigation performances attained, however water shortage in dry season reported										
- Double cropping of paddy in almost all the irrigated area practiced; however paddy yield levels still low & palawija not yet introduced										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Limited bargaining power of farmers			
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Managerial capacity of KTs are limited			
- Paddy Marketing:		Limited bargaining power of farmers			- Extension Services:		Extension activities of PPLs are limited			
III.2 Development Plan										
(1) Development Approaches										
- Ensuring irrigation water supply in dry season at on-farm level										
- Introduction of double cropping of paddy in the entire scheme; productivity increase of paddy through intensification; introduction of palawija										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs										
(2) Planned Irrigation Performances and Crop Production										
Season		Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
		Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)		1,635			1,635	100%	5.0	8,175		
Season II (dry I)					0					
Season III (dry II)		1,635	328		1,963	120%	5.0	8,175	1,640	
Total/Annual		3,270	328	0	3,598	220%	5.0	16,350	1,640	0
Annual Increment		16	328	0	344	21%	1.0	3,334	1,640	0
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	5	b. Established;	5	c. Not yet;	0	Registered		2	
Performance	a. Developed;	0	b. Under developing;	5	c. Not yet;	0	Not yet registered		3	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Less awareness of WUA members to O&M activities.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Activation of WUA O&M works.										
(2) Development Plan										
- WUA O&M training.										

V. IRRIGATION FACILITY

V.1 Existing Condition

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : D Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|--------------------------|-------------------------|----------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : - | i. Condition | : C |
| b. Type of weir | : Movable weir | f. Intake gate | : 2 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 30 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 10.0 m ³ /s | h. Inspection bridge | : provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	12,972	12,972	55	12,972	D
Secondary	0	12,362	12,362	93	12,362	D

(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)

(4) Major Problems and Constrains

- Water Resources Facility
 - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
 - Insufficient diversion water due to sedimentation in front of intake
 - Difficulty on water distribution/discharge measurement
- Irrigation Canal and Related Structure
 - Sedimentation or obstruction of water flow
 - General O&M problems
 - Difficulty on maintenance of earth canal
 - Lower function of regulating structure on canal
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
 - Sedimentation in front of intake
 - No provision of water level gauge/measuring facility
 - Irrigation Canal and Related Structure
 - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
 - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Deterioration of regulating structure on canal, especially gate and metal works
 - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
 - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
 - Dredging or flushing of sediment, proper gate operation of headworks and intake
 - Provision of water level gauge/measuring facility and equipment
- Irrigation Canal and Related Structure
 - Removal of sediment soil and foreign materials from canal, grass cutting
 - Provision of kilo, hect-m posts, marking to each structure with structure name
 - Provision of concrete lining
 - Replacement and reconstruction of regulating structure on canal
 - Provision or repair of inspection road with all weather type/pavement
- (2) Water Resources Facility

Dam/Headworks body	: minor rehabilitation	Intake, civil	: large rehabilitation	Intake, mechanical	: large rehabilitation
Settling basin	: replacement or new				
- (3) Irrigation Canal and Related Structure

Works	No rehabilitation		Rehabilitation		New construction		Total	
	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)	Canal (m)	Structure (nos)
Main	0	0	12,972	55	0	6	12,972	61
Secondary	0	0	12,362	93	0	19	12,362	112

(4) On-farm Development

(Unit: ha)			
a. Potential Irrigated paddy field	1,635	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,635

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)						
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,354	32,134	3,213	3,352	1,260	43,313	26.5

(W.R.F: Water Resources Facility, Develop.: Development)

VI. PROJECT EVALUATION

VI.1 EIRR

VI.2 Prioritization Scoring



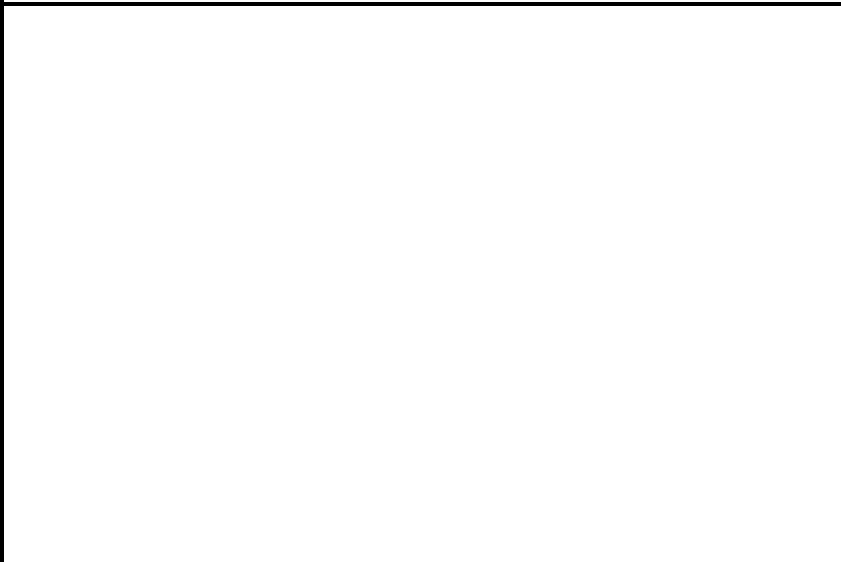
Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0	63.2	
	Urgency	25.0	22.4	Social Problem	15.0	10.5		
	Sustainability	15.0	6.8	Economic Impact	15.0	7.5		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Purwodadi	District	Asahan	
Technical Level	Technical	Registered Area	1,635 ha	Year of Construction 1989
		<u>Category</u> Irrigation (Headworks)		
		<u>Structure</u> Movable Weir		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u> Fallen down, incline or washed away of retaining wall of weir; settlement of weir body; settlement of stilling basin		
		<u>Category</u> Irrigation (Headworks)		
		<u>Structure</u> Intake Gate		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u> Insufficient diversion water due to sedimentation in front of intake gate; leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material		
		<u>Category</u> Irrigation (Main Canal)		
		<u>Structure</u> Check Structure		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Lower function of regulating structure; damage on regulating structure; physical operation problem on regulating structure; and less maintenance		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Scheme	Purwodadi	District	Asahan	
Technical Level	Technical	Registered Area	1,635 ha	Year of Construction 1989
		<i>Category</i> Irrigation (Main Canal)		
		<i>Structure</i> Masonry Lined Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Sedimentation; leakage from lined canal; crack or damage on lined canal; deflection of lining toward inside of canal; and no function of inspection road.		
		<i>Category</i> Irrigation (Secondary Canal)		
		<i>Structure</i> Earth Canal		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<i>Problems</i> Not in use		
		<i>Category</i> 		
		<i>Structure</i> 		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> 		

Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation