

LEGEND

- Capital Town of District
- 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)
26. Pentara	1,034	298
27. Simantan Pane Dame	1,000	1,000
28. Penambean/Panet Tongah BK	1,723	1,722
29. Raja Hombang/T. Manganraja	2,045	2,023
30. Kerasaan	5,000	4,144
31. Javacolonisasi/Purbogondo	1,030	1,015
32. Naga Sompah	1,360	1,015
47. Bah Korah II	1,995	1,723
49. Rambung Mera	1,104	944

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

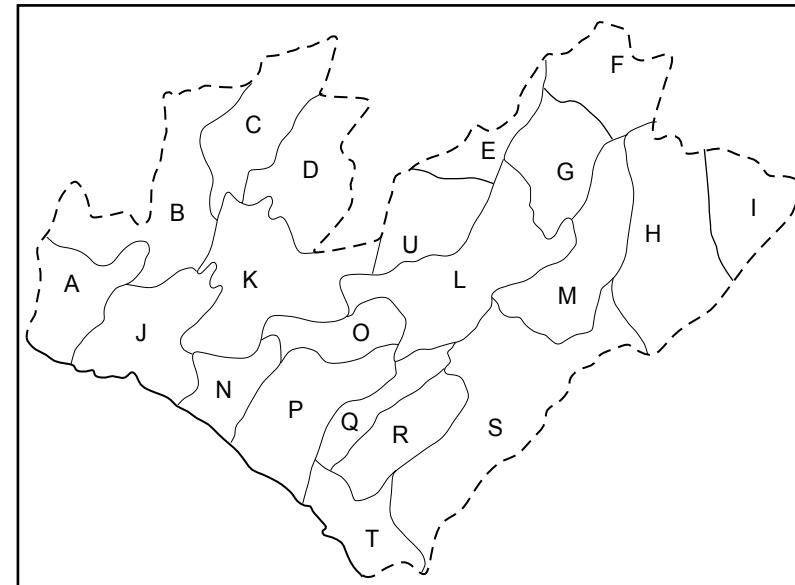
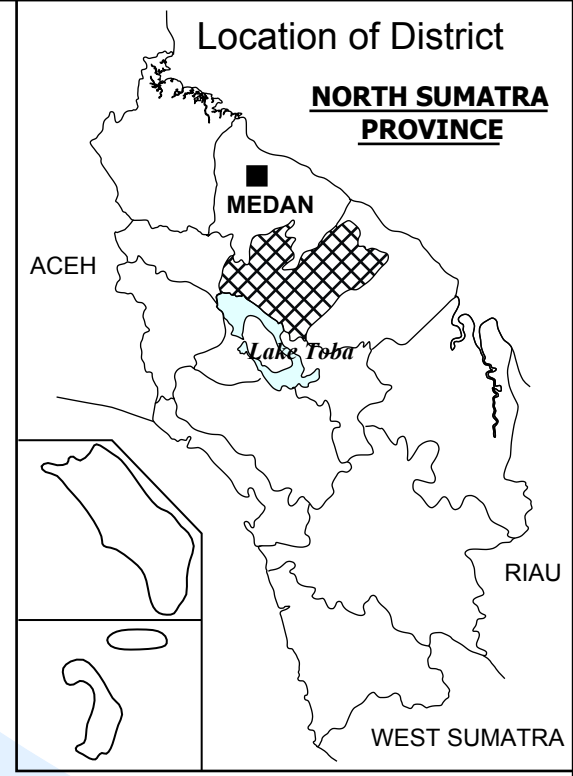
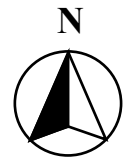
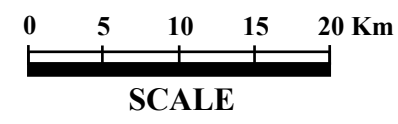
Location of Sub-District

A Kec. Silima Kuta	K Kec. Siantar
B Kec. Dolok Silau	M Kec. Huta bayu Raja
C Kec. Silau Kahean	N Kec. Dolok Pardamean
D Kec. Raya Kahean	O Kec. Panei
E Kec. Dolokbatunanggar	P Kec. Sidamanik
F Kec. Bandar	Q Kec. Joring Hataran
G Kec. Pematang Bandar	R Kec. Dolok Panribuan
H Kec. Bosar maligas	S Kec. Tanah Jawa
I Kec. Ujung Padang	T Kec. Girsang Sipangan Bolon
J Kec. Purb	U Kec. Tapan Dolok
K Kec. Raya	

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Simalungun District



I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	:	120123000	(7)	Number of Farmers	:	Not available			
(2) Name of Irrigation Scheme	:	Bah Korah II	(8)	Water Resource River	:	Bah Biak, Bah Korah, Bah Binoman			
(3) District (Kabupaten)	:	Simalungun/Siantar	(9)	Catchment Area (km ²)	:	335.9			
(4) Sub-district (Kecamatan)	:	Panai - Siantar	(10)	Original / Last Rehabilitation Year	:	1991			
(5) Registered Area (ha)	:	1,995							
(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		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	1,723	1,723	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	1,723	1,723	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)	1,485	8		1,493	87%	4.5	6,683	20	
Season II (dry I)				0					
Season III (dry II)	1,568			1,568	91%	4.5	7,056		
Total/Annual	3,053	8	0	3,061	178%	4.5	13,739	20	0
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- High irrigation performances attained; water shortage in dry season reported									
- Double cropping of paddy introduced ; paddy yield levels moderate; palawija limited									
<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:	Unstable marketing prices				
- Agronomic Issues:	Damage caused by rat			- Farmers Organizations:	Managerial capacity of KTs are limited				
- Paddy Marketing:	Unstable marketing prices			- Extension Services:	Implementation of extension programs is limited				
III.2 Development Plan									
(1) Development Approaches									
- Ensuring year round irrigation water supply at on-farm level through rehabilitation									
- 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 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)	1,723			1,723	100%	5.0	8,615		
Season II (dry I)		172		172				860	
Season III (dry II)	1,723			1,723	100%	5.5	9,477		
Total/Annual	3,446	172	0	3,618	210%	5.3	18,092	860	0
Annual Increment	393	164	0	557	32%	0.8	4,353	840	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	9	b. Established;	4	c. Not yet;	5	Registered		0
Performance	a. Developed;	0	b. Under developing;	4	c. Not yet;	0	Not yet registered		4
(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 WUA management among WUA members.									
- Less awareness of farmers to WUA establishment.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Improvement of WUA management system.									
- Acceleration of WUA establishment.									
(2) Development Plan									
- WUA management training.									
- 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 : C Secondary Canal System : D 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 | : 30 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 5.3 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	8,519	7,272	15,791	144	11,054	C
Secondary	893	3,403	4,296	65	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

- Irrigation Canal and Related Structure
Sedimentation or obstruction of water flow
Difficulty on maintenance of earth canal
Difficulty on water distribution

(5) Causes of Major Problems and Constraints

- Water Resources Facility
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)
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
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 concrete lining
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 : minor rehabilitation

(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		13,580		0		13,580	
	Secondary		0	3,695		0		3,695	
Structure (nos)									
	Main	0		124		12		136	
	Secondary		0	56		11		67	

(4) On-farm Development

		(Unit: ha)	
a. Potential Irrigated paddy field	1,723	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	1,723

(5) Rehabilitation Cost (Direct Cost)

							(Unit: Million Rp.)	
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha		
2,001	29,198	2,920	3,532	1,260	38,911	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	5.0	Agricultural Productivity	20.0	11.0	59.8	
	Urgency	25.0	19.0	Social Problem	15.0	10.5		
	Sustainability	15.0	6.8	Economic Impact	15.0	7.5		

VI.3 Priority Group

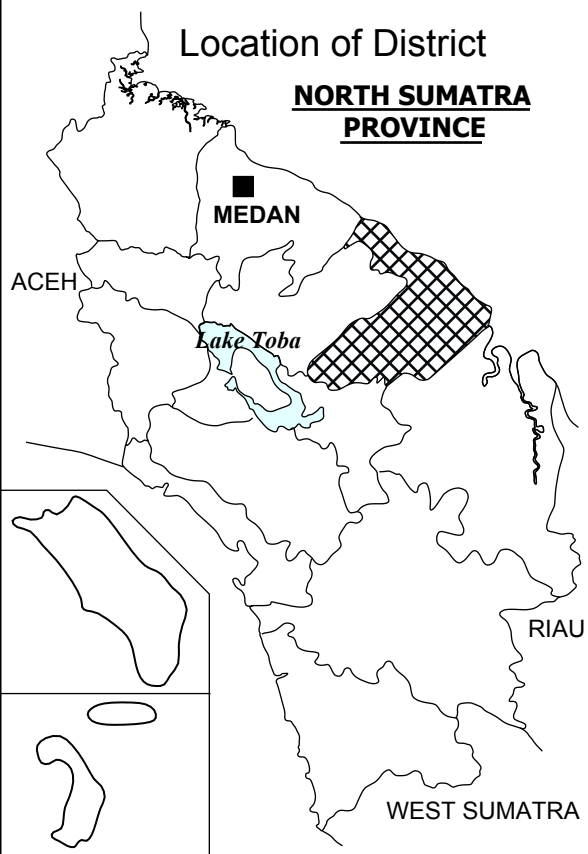
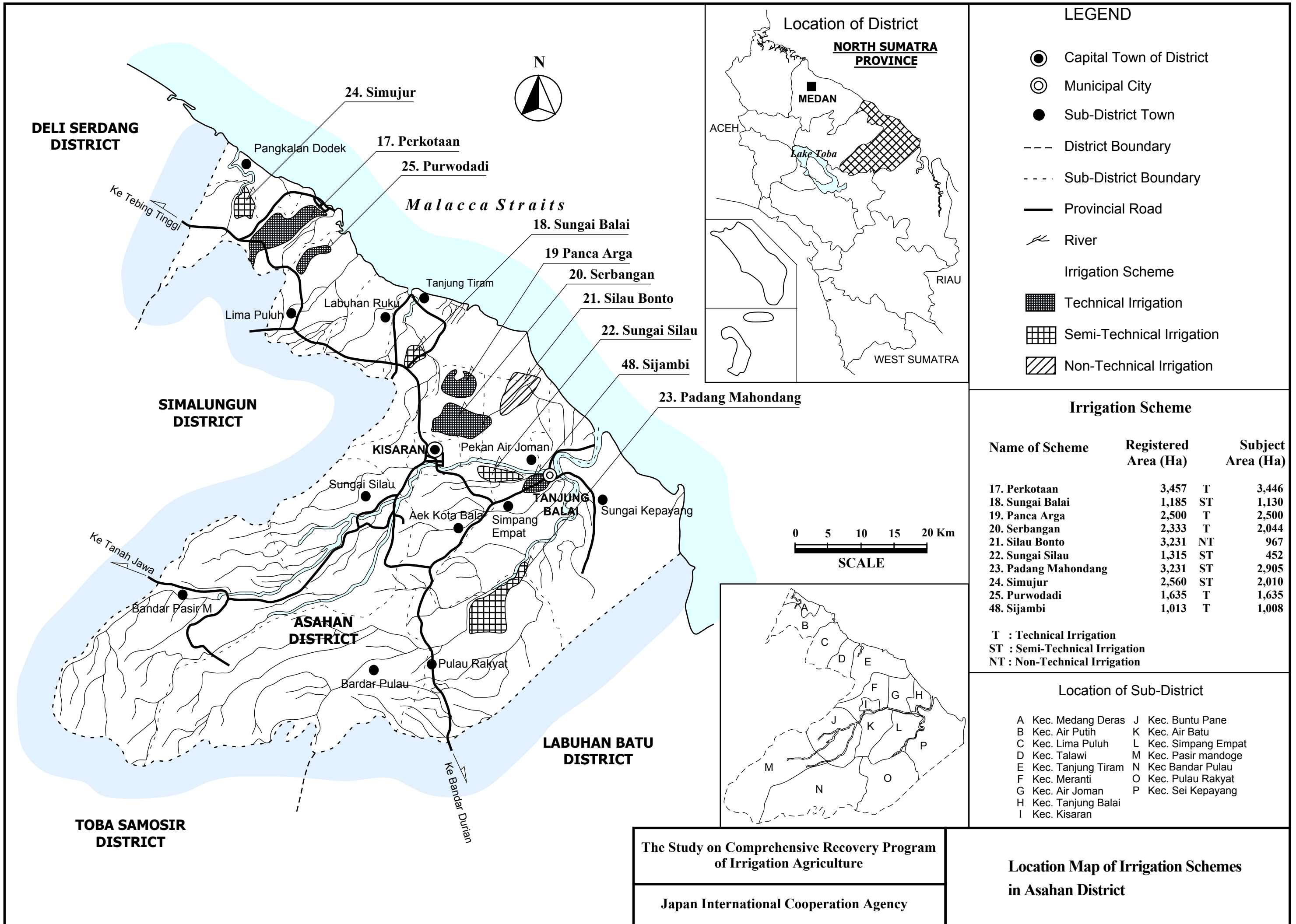
VI.4 Priority Ranking in the Province

Scheme	Bah Korah II	District	Simalungun /Siantar	
Technical Level	Technical	Registered Area	1,995 ha	Year of Construction 1991
		<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> Settlement or washed away of stilling basin; washed away of ripraps or blocks at downstream of stilling basin; sediment in front of intake.		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake Gate		
		<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 material; problem on management due to lack of periodically maintenance		
		<i>Category</i> Irrigation (Main 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; leakage from lined canal; deflection of lining toward inside of canal; crack or damage on lined canal		

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

Scheme	Bah Korah II	District	Simalungun /Siantar		
Technical Level	Technical	Registered Area	1,995 ha	Year of Construction	1991
		<p><u>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Division structure</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> No control gate is provided; difficulty on water management.</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; leakage from lined canal; deflection of lining toward inside of canal; crack or damage on lined 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



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. Kisaran
- J Kec. Buntu Pane
- K Kec. Air Batu
- L Kec. Simpang Empat
- M Kec. Pasir mandoge
- N Kec. Bandar Pulau
- O Kec. Pulau Rakyat
- P Kec. Sei Kepayang

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

Location Map of Irrigation Schemes in Asahan District

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 120310000	(7) Number of Farmers	: Not available						
(2) Name of Irrigation Scheme	: Sijambi	(8) Water Resource River	: Sei Silau						
(3) District (Kabupaten)	: Asahan/Tanjung Balai	(9) Catchment Area (km ²)	: 250						
(4) Sub-district (Kecamatan)	: Impang Empat	(10) Original / Last Rehabilitation Year	: 1993						
(5) Registered Area (ha)	: 1,013								
(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	885	1,000	115						
b. Rainfed paddy field	95	0	-95						
c. Upland field	28	0	-28						
d. Uncultivated land	0	0	0						
e. Non-irrigable land	0	8	8						
Total	1,008	1,008	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)	885			885	100%	4.5	3,778	31	
Season II (dry I)				0					
Season III (dry II)	443			443	50%	3.5	1,551		
Total/Annual	1,328	0	0	1,328	150%	3.8	5,329	31	0
1/: Irrigated/rainfed paddy & upland palawija									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply limited in dry season: existence of rainfed & upland field (123ha)									
- Double cropping of paddy introduced; paddy yield levels still low in dry season; 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: 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									
- 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)	1,000			1,000	100%	5.0	5,000		
Season II (dry I)		200		200				1,000	
Season III (dry II)	1,000			1,000	100%	4.5	4,500		
Total/Annual	2,000	200	0	2,200	220%	4.8	9,500	1,000	0
Annual Increment	672	200	0	872	70%	1.0	4,172	969	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									
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 : 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 | : 2 nos. | 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 | : 1.2 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	1,125	1,125	16	0	D
Secondary	0	9,005	9,005	31	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 river bed degradation
 - 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
 - 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
 - River bed degradation, no provision of weir
 - Sedimentation in front of intake
 - No provision of settling basin, no proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - 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
 - Provision of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - 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 Sungai Silau and Sijambi schemes)

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,125	0	1,125
	Secondary	0	9,005	0	9,005
Structure (nos)	Main	0	16	2	18
	Secondary	0	31	6	37

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	885	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	95	e. Non-potential non-paddy field	0
c. Potential non-paddy field	28	Total	1,008

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
21,476	11,082	1,108	2,201	1,260	37,127	36.8

(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

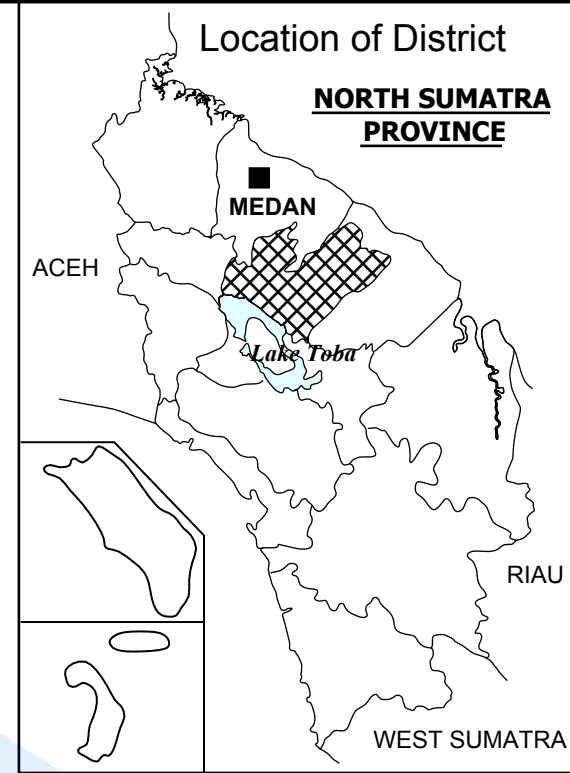
VI.4 Priority Ranking in the Province

Scheme	Sijambi	District	Asahan/Tanjung Balai	
Technical Level	Technical	Registered Area	1,013 ha	Year of Construction 1993
		<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>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>Category</i> Irrigation (Secondary 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> Insufficient diversion water due to sedimentation in front of intake; deflection of intake structure; less function of gates.		
		<i>Problems</i> Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; no inspection road.		
		<i>Problems</i> Lower function of division structure; physical operation problem on structure; damage on division structure; no control gate is provided.		

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

Scheme	Sijambi	District	Asahan/Tanjung Balai		
Technical Level	Technical	Registered Area	1,013 ha	Year of Construction	1993
		<p><u>Category</u> Irrigation (Secondary 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>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Canal Crossing</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></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>Problems</u></p>			
		<p><u>Problems</u></p>			

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



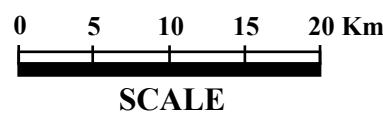
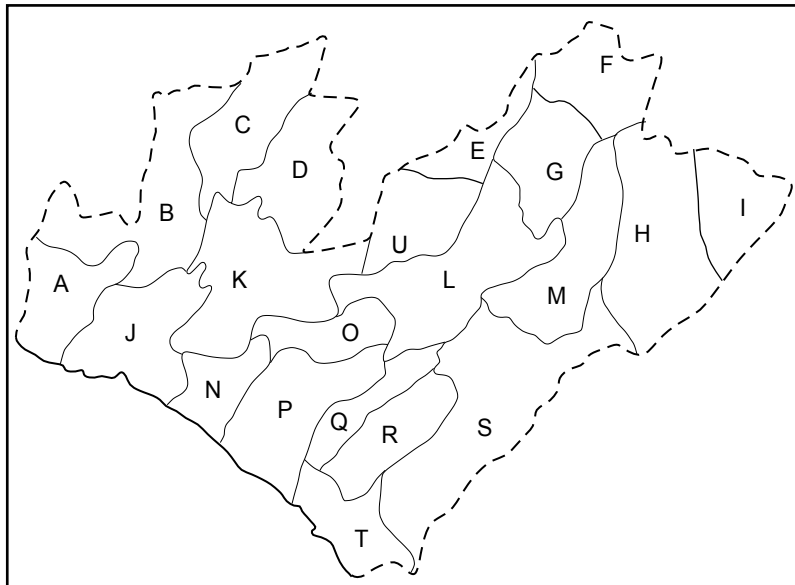
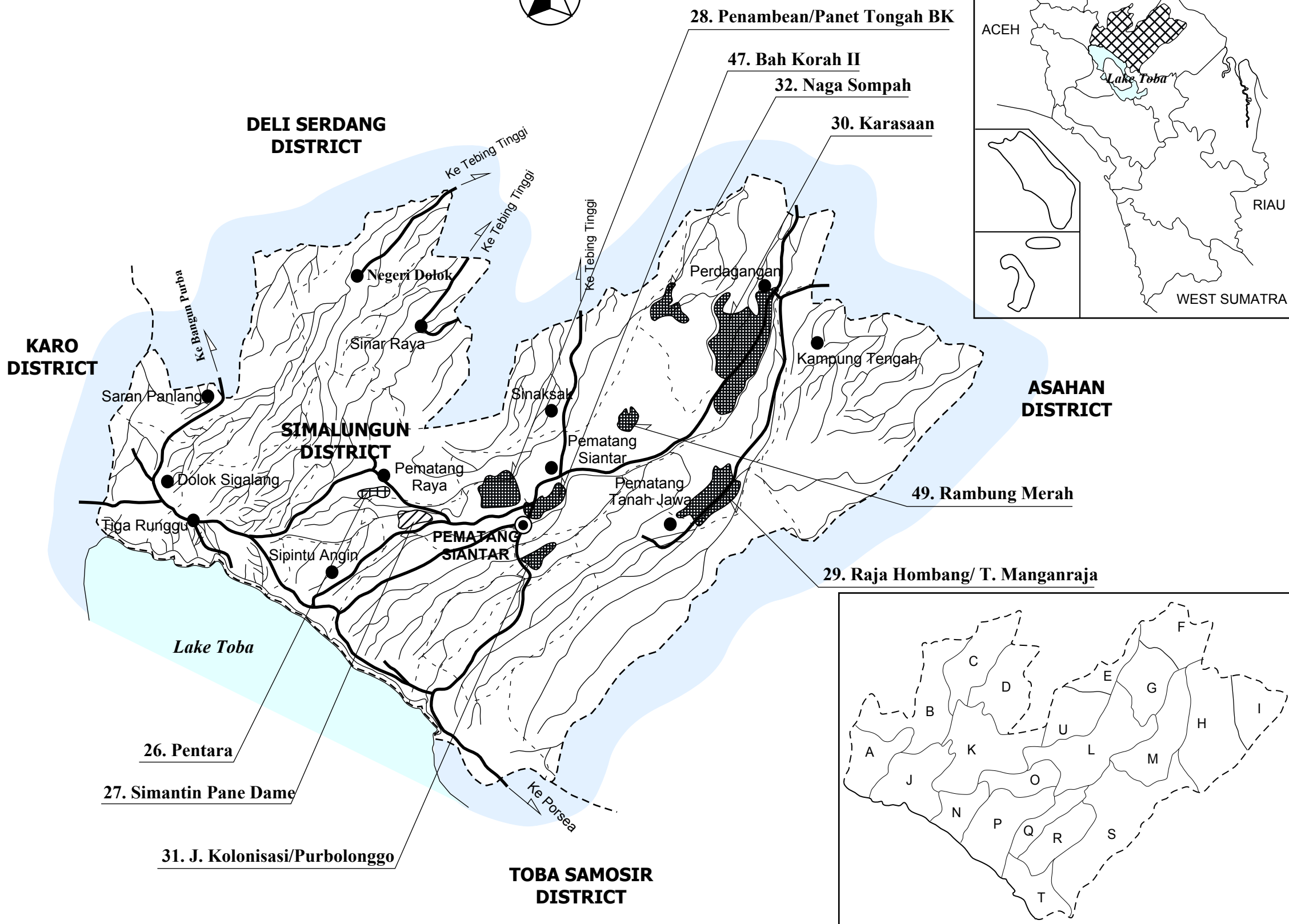
LEGEND

- Capital Town of District
- 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)
26. Pentara	1,034	ST	298
27. Simanten Pane Dame	1,000	NT	1,000
28. Penambean/Panet Tengah BK	1,723	T	1,722
29. Raja Hombang/T. Manganraja	2,045	T	2,023
30. Kerasaan	5,000	T	4,144
31. Javacolonisasi/Purbogondo	1,030	T	1,015
32. Naga Sompah	1,360	T	1,015
47. Bah Korah II	1,995	T	1,723
49. Rambung Mera	1,104	T	944

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

Location of Sub-District	
A Kec. Silima Kuta	K Kec. Siantar
B Kec. Dolok Silau	M Kec. Huta bayu Raja
C Kec. Silau Kahean	N Kec. Dolok Pardamean
D Kec. Raya Kahean	O Kec. Panei
E Kec. Dolokbatunanggar	P Kec. Sidamanik
F Kec. Bandar	Q Kec. Joring Hataran
G Kec. Pematang Bandar	R Kec. Dolok Panribuan
H Kec. Bosar maligas	S Kec. Tanah Jawa
I Kec. Ujung Padang	T Kec. Girsang Sipangan Bolon
J Kec. Purb	U Kec. Tapian Dolok
K Kec. Raya	



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

Location Map of Irrigation Schemes in Simalungun District

I. PROJECT FUNDAMENTALS											
I.1 General											
(1) Code Number	: 120155000			(7) Number of Farmers	: Not available						
(2) Name of Irrigation Scheme	: Rambung Mera			(8) Water Resource River	: Bah Bolon						
(3) District (Kabupaten)	: P. Siantar/Simalungun			(9) Catchment Area (km ²)	: 159.2						
(4) Sub-district (Kecamatan)	: Siantar - Siantar Marihat			(10) Original / Last Rehabilitation Year	: 1987						
(5) Registered Area (ha)	: 1,104										
(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		944		944		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		944		944		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)		944			944	100%	4.5	4,248			
Season II (dry I)					0						
Season III (dry II)		786	89		875	93%	4.5	3,537			
Total/Annual		1,730	89	0	1,819	193%	4.5	7,785	0	0	
(2) Problems and Constraints											
<i>A. Irrigation & Agriculture Performances</i>											
- High irrigation performances attained; water shortage in dry season reported											
- Double cropping of paddy introduced ; paddy yield levels moderate; palawija limited											
<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:		Unstable marketing prices			
- 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											
- Ensuring year round irrigation water supply at on-farm level through rehabilitation											
- 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)		944			944	100%	5.5	5,192			
Season II (dry I)			188		188				940		
Season III (dry II)		944			944	100%	5.5	5,192			
Total/Annual		1,888	188	0	2,076	220%	5.5	10,384	940	0	
Annual Increment		158	99	0	257	27%	1.0	2,599	940	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;	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 internal coordination in WUA.											
IV.2 Development Plan											
(1) Proposed Countermeasures											
- Calling attention of WUA members to WUA management.											
(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 : D
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 6 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 | : 60 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 2.1 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
Main	0	12,136	12,136	76	0	D
Secondary	279	2,212	2,491	49	2,491	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
 - 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
 - Insufficient function of settling basin, no proper gate operation of intake during flood
 - Irrigation Canal and Related Structure
 - 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
 - Rehabilitation of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
 - 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 : minor rehabilitation

(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	12,136	76	0	0	12,136	76
Secondary	0	0	2,491	49	0	0	2,491	49
Total	0	0	14,627	125	0	0	14,627	125

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	944	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	944

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
1,768	26,574	2,657	1,935	1,260	34,194	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)

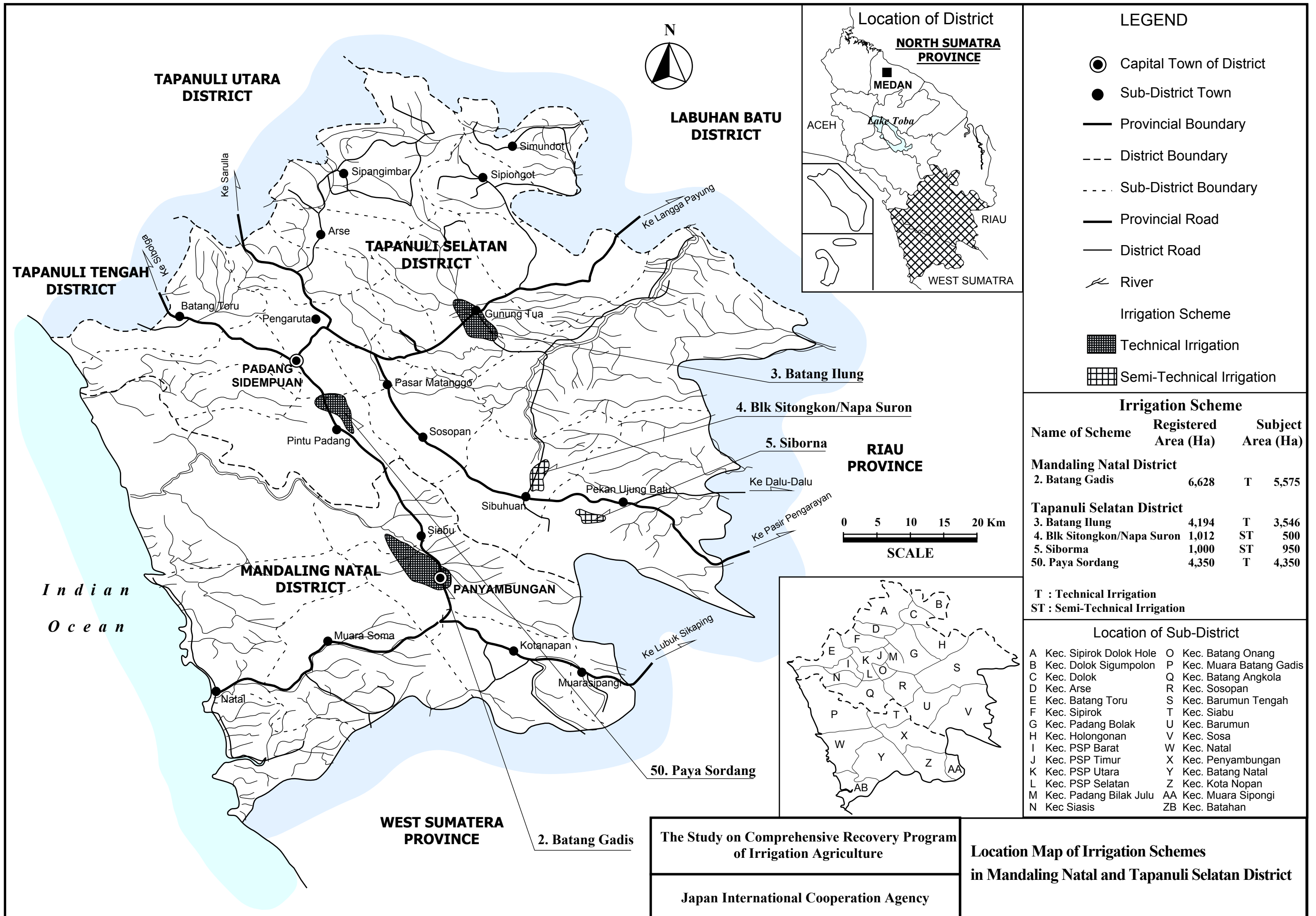
VI.4 Priority Ranking in the Province

Scheme	Rambung Mera	District	P.Siantar/Simalungun	
Technical Level	Technical	Registered Area	1,104 ha	Year of Construction 1987
		<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> Crack or damage on weir crest; settlement of weir body; deflection of pier of weir		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake Gate		
		<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 material; problem on management due to lack of periodically maintenance		
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake and Gauging Staff		
		<i>Condition</i> <input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D		
		<i>Problems</i> Sedimentation in front of intake.		

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

Scheme	Rambung Mera	District	P.Siantar/Simalungun		
Technical Level	Technical	Registered Area	1,104 ha	Year of Construction	1987
		<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; difficulty on maintenance of earth canal; no inspection road.		
		<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; leakage from canal; collapse of canal; difficulty on maintenance of earth canal		
		<u>Category</u>			
		<u>Structure</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



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. Barumon Tengah
F Kec. Sipirok	T Kec. Siabu
G Kec. Padang Bolak	U Kec. Barumon
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	: 120705000			(7) Number of Farmers	: Not available				
(2) Name of Irrigation Scheme	: Paya Sordang			(8) Water Resource River	: Aek Sibulele/Batang Angkola				
(3) District (Kabupaten)	: Tapanuli Sel/Mandarin Natal			(9) Catchment Area (km ²)	: 228				
(4) Sub-district (Kecamatan)	: PSP Timur - Batang Angkola			(10) Original / Last Rehabilitation Year	: 1991/1992				
(5) Registered Area (ha)	: 4,350								
(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			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	3,979		4,350		371				
b. Rainfed paddy field	371		0		-371				
c. Upland field	0		0		0				
d. Uncultivated land	0		0		0				
e. Non-irrigable land	0		0		0				
Total	4,350		4,350		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)	3,562			3,562	90%	4.5	16,957		
Season II (dry I)				0					
Season III (dry II)	2,862			2,862	72%	4.5	12,879		
Total/Annual	6,424	0	0	6,424	161%	4.5	29,836	0	0
1/: Irrigated & rainfed paddy									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- High irrigation performances attained									
- Double cropping of paddy introduced ; paddy yield levels moderate; palawija limited									
<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:		Low marketing prices			- Extension Services:		Implementation of extension programs is limited		
III.2 Development Plan									
(1) Development Approaches									
- Ensuring year round irrigation water supply at on-farm level 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)	4,350			4,350	100%	5.5	23,925		
Season II (dry I)				0					
Season III (dry II)	3,480	435		3,915	90%	5.5	19,140	2,175	
Total/Annual	7,830	435	0	8,265	190%	5.5	43,065	2,175	0
Annual Increment	1,406	435	0	1,841	29%	1.0	13,229	2,175	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	40	b. Established;	30	c. Not yet;	10	Registered		1
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	29	Not yet registered		29
(2) Problems and Constraints									
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Lack of knowledge on WUA management according to legal framework.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Improvement of WUA members' sense of responsibility for WUA management.									
(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 : C Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- | | | | | | |
|----------------------------|-------------------------|-------------------------|------------|---|-----|
| a. Type of facility | : Headworks | e. Scouring sluice gate | : 6 nos. | i. Condition | : B |
| b. Type of weir | : Fixed weir | f. Intake gate | : 6 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 72 m | g. Settling basin | : provided | (no info.: no information) | |
| d. Design intake discharge | : 3.2 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	5,930	7,146	13,076	153	7,846	C
Secondary	9,528	15,172	24,700	135	2,470	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
- Irrigation Canal and Related Structure
 - Impassable of inspection road along canal
 - Difficulty on maintenance of earth canal
 - No function of discharge measuring
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
 - Water Resources Facility
 - Sedimentation in front of intake
 - Insufficient function 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
 - Fallen down and collapse of side slope, water plants or weed at inside of canal
 - Improper regular maintenance of measuring device
 - 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
 - Rehabilitation 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 concrete lining
 - Replace, provision of measuring device
 - 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 : minor rehabilitation

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	13,076	0	13,076
	Secondary	0	24,700	0	24,700
Structure (nos)	Main	0	153	15	168
	Secondary	0	135	27	162

(4) On-farm Development

(Unit: ha)			
a. Potential Irrigated paddy field	3,979	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	371	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	4,350

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)						
W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,295	51,847	5,185	9,108	1,570	70,004	16.1

(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	59.8	
	Urgency	25.0	19.0	Social Problem	15.0	7.5		
	Sustainability	15.0	6.8	Economic Impact	15.0	10.5		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Paya Sordang	District	Tapanuli Selatan/Mandailing Natal		
Technical Level	Technical	Registered Area	4,350 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 checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Crack or damage on weir crest; settlement of weir body; deflection of pier of weir; sediments in front of intake</p>			
		<p><u>Category</u> Irrigation (Headworks)</p>			
		<p><u>Structure</u> Intake Gate (Rear View)</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 gate leaf; insufficient strength against design load due to rust, decay of steel material; problem on management due to lack of periodically maintenance</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> Lower function of division structure; physical operation problem on structure; less maintenance; and sedimentation in canal</p>			

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

Scheme	Paya Sordang	District	Tapanuli Selatan/Mandailing Natal	
Technical Level	Technical	Registered Area	4,350 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> Sedimentation; leakage from lined canal; deflection of lining toward inside of canal; crack or damage on lined canal; and no inspection road.</p>		
		<p><u>Category</u> Irrigation (Secondary 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> Sedimentation; leakage from lined canal; damage on lined canal; and no 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> Sediment in front of gate and damaged gates.</p>		

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