

LEGEND

- Capital Town of District
- Sub-District Town
- 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)
5. Jenemarrung	1,052 ST	975
6. Pamukulu	4,526 T	4,480

T : Technical Irrigation
ST : Semi-Technical Irrigation

The Study on Comprehensive Recovery Program
of Irrigation Agriculture

Japan International Cooperation Agency

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

I. PROJECT FUNDAMENTALS										
I.1 General										
(1) Code Number	: 73050051	(7) Number of Farmers	: 782							
(2) Name of Irrigation Scheme	: Jenemarrung	(8) Water Resource River	: Jenemarrung							
(3) District (Kabupaten)	: Takalar	(9) Catchment Area (km ²)	: 43.50							
(4) Sub-district (Kecamatan)	: Polombangkeng Selatan	(10) Completion / Last Rehabilitation Year	: 1961/1975							
(5) Registered Area (ha)	: 1,052									
(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)	A		b. Irrigation diagram	A		c. As-built drawings	B		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		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	975	975	0							
b. Rainfed paddy field	0	0	0							
c. Upland Field	0	0	0							
d. Uncultivated Land	0	0	0							
e. Non-irrigable	0	0	0							
Total	975	975	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)	975			975	100%	4.0	3,900			
Season II (dry I)		200		200	21%			160		
Season III (dry II)				0	0%					
Total/Annual	975	200	0	1,175	121%	4.0	3,900	160	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:	Water shortage at on-farm level in dry season				- Palawija Marketing:	Limited bargaining power of farmers				
- Agronomic Issues:	Damage caused by rat				- 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										
- Expansion of irrigated area 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)	975			975	100%	5.0	4,875			
Season II (dry I)	975			975	100%	5.0	4,875			
Season III (dry II)		195		195	20%			2,500		
Total/Annual	1,950	195	0	2,145	220%	5.0	9,750	2,500	0	
Annual Increment	975	-5	0	970	99%	1.0	5,850	2,340	0	
IV. WUAs										
IV.1 Existing Condition										
(1) Number	a. Target;	10	b. Established;	10	c. Not yet;	0	Registered		0	
Performance	a. Developed;	0	b. Under developing;	10	c. Not yet;	0	Not yet registered		10	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Less frequency of WUA internal meeting.										
IV.2 Development Plan										
(1) Proposed Countermeasures										
- Promotion of WUA federation.										
(2) Development Plan										
- 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 : 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 | : 45 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.2 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	634	0	634	2	0	D
Secondary	1,977	7,143	9,120	21	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
 - Crack or damage on weir crest
 - 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
 - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
- Water Resources Facility
 - Collision of foreign materials against weir crest, low quality of concrete/masonry
 - 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
 - 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
 - Repair of weir crest by cement/chemical grouting or filling concrete
 - 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
 - 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 : 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	634	63	697
	Secondary	0	9,120	1,824	10,944
Structure (nos)	Main	0	2	0	2
	Secondary	0	21	7	28

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	975	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	975

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,777	11,815	1,181	1,999	1,260	19,032	19.5

(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	-	-
	Urgency	25.0	- Social Problem	15.0	-	-
	Sustainability	15.0	- Economic Impact	15.0	-	-

VI.3 Priority Group

(Subject area is less than 1,000 ha)

VI.4 Priority Ranking in the Province

Scheme	Jenemarrung	District	Takalar		
Technical Level	Semi-technical	Registered Area	1,052 ha	Year of Construction	1961/75
		<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> Crack or damage on weir crest; settlement of weir body; deflection of pier of weir</p>			
		<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> Crack or damage on weir crest; settlement of weir body; sedimentation.</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 type="checkbox"/> C <input checked="" type="checkbox"/> D</p> <p><u>Problems</u> Sedimentation; crack or damage on lined canal; collapse of canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.</p>			

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

Scheme	Jenemarrung	District	Takalar		
Technical Level	Semi-technical	Registered Area	1,052 ha	Year of Construction	1961/75
 <p>SS.10.117</p>		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Check 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 check structure due to sedimentation in front of structure; damage of structure; physical operation problem on structure; deterioration of gate.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Land Preparation by Hand Tractor</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 canals and farm roads.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Secondary Crop 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 canals 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	: 73050051			(7) Number of Farmers	: 3,996				
(2) Name of Irrigation Scheme	: Pamukulu			(8) Water Resource River	: Pamukulu				
(3) District (Kabupaten)	: Takalar			(9) Catchment Area (km ²)	: 110				
(4) Sub-district (Kecamatan)	: Palang Bangky Utara			(10) Completion / Last Rehabilitation Year	: 1985				
(5) Registered Area (ha)	: 4,526								
(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			B		A		
e. Rehabilitation plan & its references		f. Crops and yield data			g. Cropping Calender		h. WUAs data		
C		A			A		40		
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field	4,133		4,480		347				
b. Rainfed paddy field	347		0		-347				
c. Upland Field	0		0		0				
d. Uncultivated Land	0		0		0				
e. Non-irrigable	0		0		0				
Total	4,480		4,480		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)	4,133			4,133	100%	4.0	17,400		
Season II (dry I)	1,332	223		1,555	38%	4.0	5,328	731	
Season III (dry II)				0					
Total/Annual	5,465	223	0	5,688	138%	4.0	22,728	731	0
1/: Irrigated & rainfed paddy & palawija									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- Irrigation water supply at on-farm level limited in dry season; existing of rainfed paddy field (347ha)									
- Double cropping of paddy still limited; paddy yield levels still low; palawija introduced to some extent									
<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:		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									
- Expansion of irrigated area & ensuring year round irrigation water supply at on-farm level through rehabilitation & upgrading									
- Expansion of double cropped area of paddy; productivity increase of paddy through 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)	4,480			4,480	100%	4.0	17,920		
Season II (dry I)	3,584	896		4,480	100%	5.5	19,712	2,778	
Season III (dry II)				0	0%				
Total/Annual	8,064	896	0	8,960	200%	5.2	37,632	2,778	0
Annual Increment	2,599	673	0	3,272	62%	1.2	14,904	2,047	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	36	b. Established;	35	c. Not yet;	1	Registered		0
Performance	a. Developed;	0	b. Under developing;	33	c. Not yet;	2	Not yet registered		35
(2) Problems and Constraints									
<input checked="" type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- No available irrigation water in dry season.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Acceleration of WUA establishment and federation									
(2) Development Plan									
- WUA activity 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 : 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
 d. Design intake discharge : 7.0 m³/s h. Inspection bridge : not provided (no info.: no information)

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	7,509	9,790	17,299	101	17,299	C
Secondary	15,292	21,539	36,831	121	36,831	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 operational problem on flood/scouring sluice gate(s) of headworks
 Physical operational problem on intake gate(s)
 Difficulty on O&M

- Irrigation Canal and Related Structure

- Sedimentation or obstruction of water flow
 Difficulty on maintenance of earth canal
 Clogging of barrel of cross drain
 Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility

- 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
 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)
 Fallen down and collapse of side slope, water plants or weed at inside of canal
 Improper regular maintenance, insufficient capacity of barrel area against design discharge
 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 control system or damaged equipment of flood/scouring sluice gate(s)
 Replacement of intake gate(s)
 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 concrete lining
 Removal of foreign materials from inside, or provision of screen, blow-off for maintenance
 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 : 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	17,299	0	17,299
	Secondary	0	36,831	0	36,831
Structure (nos)	Main	0	101	10	111
	Secondary	0	121	24	145

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	4,133	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	347	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	4,480

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
4,343	74,428	7,443	9,362	1,570	97,146	21.7

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

VI. PROJECT EVALUATION

VI.1 EIRR 13.7%

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	21.0	Social Problem	15.0	6.0
	Sustainability	15.0	8.3	Economic Impact	15.0	12.0

VI.3 Priority Group

Group II: Second priority group

VI.4 Priority Ranking in the Province

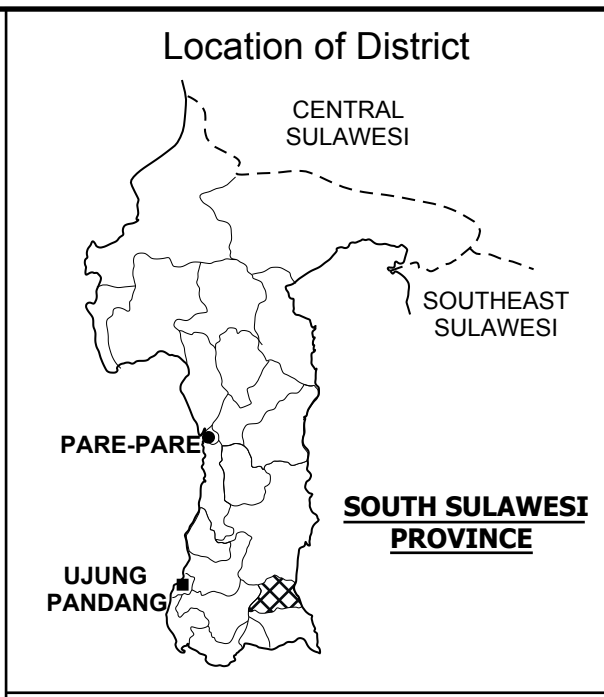
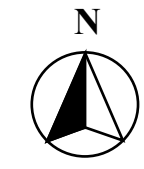
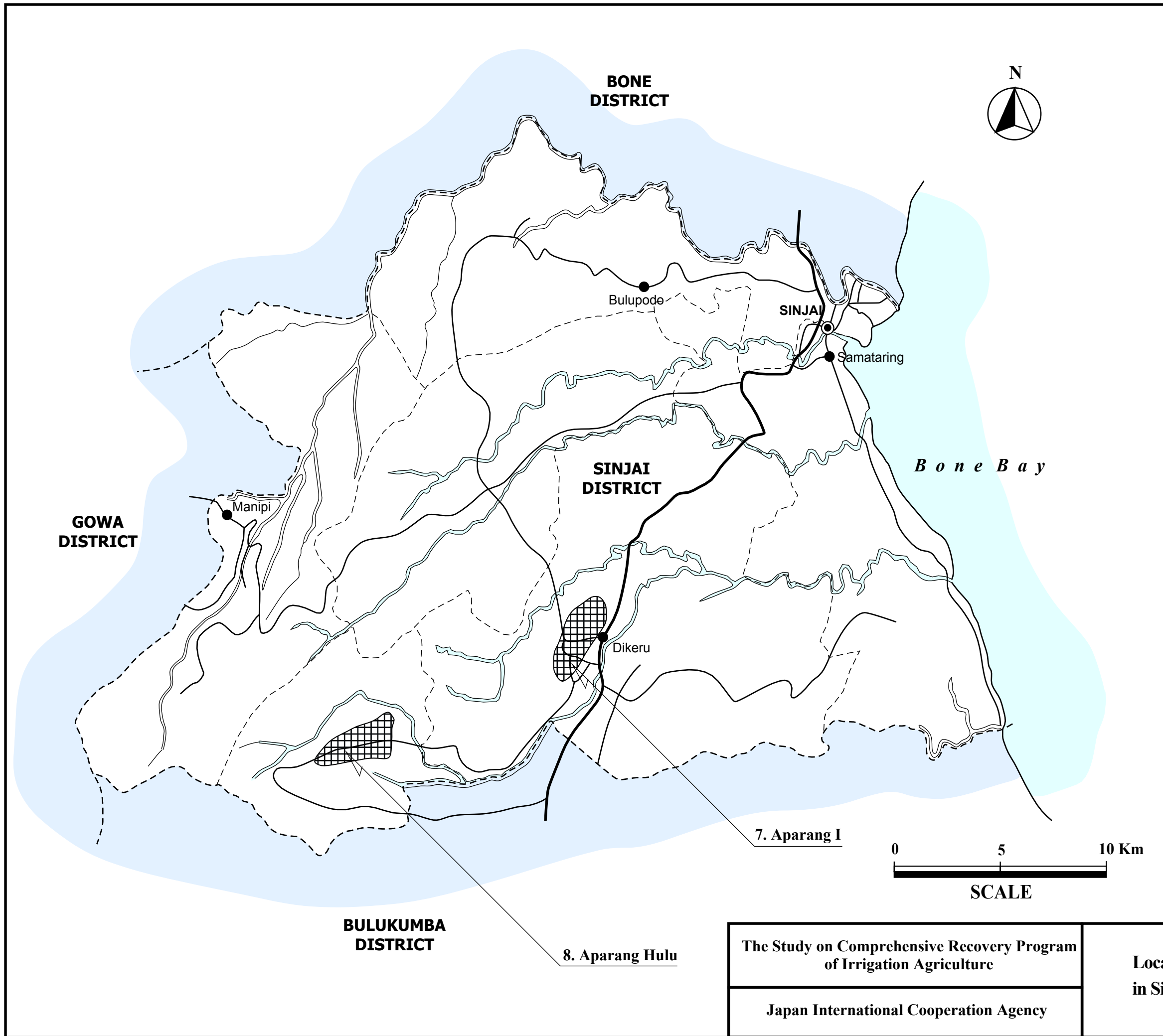
16

Scheme	Pamukulu	District	Takalar	
Technical Level	Technical	Registered Area	4,526 ha	Year of Construction 1985
		<i>Category</i> Irrigation (Headworks)		
		<i>Structure</i> Intake		
		<i>Condition</i> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<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>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> 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>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>Problems</i> Lower function of division structure due to sedimentation in front of structure; physical operation problem on structure; deterioration of gate.		

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

Scheme	Pamukulu	District	Takalar
Technical Level	Technical	Registered Area	4,526 ha Year of Construction 1985
		<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 due to sedimentation in front of gates; physical operation problem on structure.</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 checked="" type="checkbox"/> C <input type="checkbox"/> D</p> <p><u>Problems</u> Low density of on-farm canals and farm roads.</p>	
		<p><u>Category</u> Agriculture, Agro-economy</p> <p><u>Activity</u> Farmers' Group Shop</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



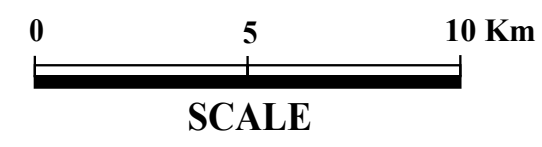
LEGEND

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

Irrigation Scheme

Name of Scheme	Registered Area (Ha)	Subject Area (Ha)
7. Aparang I	1,049 ST	1,049
8. Aparang Hulu	1,094 ST	1,094

ST : Semi-Technical Irrigation



The Study on Comprehensive Recovery Program
of Irrigation Agriculture

Japan International Cooperation Agency

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

I. PROJECT FUNDAMENTALS									
I.1 General									
(1) Code Number	: 73070121			(7) Number of Farmers	: 1,587				
(2) Name of Irrigation Scheme	: Aparang I			(8) Water Resource River	: S. Aparang				
(3) District (Kabupaten)	: Sinjai			(9) Catchment Area (km ²)	: 62.0				
(4) Sub-district (Kecamatan)	: Sinjai Selatan			(10) Completion / Last Rehabilitation Year	: 1975				
(5) Registered Area (ha)	: 1,049								
(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		A			A		3		
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field	1,049		1,049		0				
b. Rainfed paddy field	0		0		0				
c. Upland Field	0		0		0				
d. Uncultivated Land	0		0		0				
e. Non-irrigable	0		0		0				
Total	1,049		1,049		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)	1,049			1,049	100%	4.0	4,196		
Season II (dry I)	1,048			1,048	100%	4.0	4,192		
Season III (dry II)		74		74	7%			52	
Total/Annual	2,097	74	0	2,171	207%	4.0	8,388	52	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 practiced almost in the entire irrigated area; paddy yield levels still low; palawija introduced to some extent									
<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:		Infestation of pest & diseases			- 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									
- Productivity increase of paddy through intensification; expansion 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)	1,049			1,049	100%	5.0	5,245		
Season II (dry I)	1,049			1,049	100%	5.0	5,245		
Season III (dry II)		420		420	40%			504	
Total/Annual	2,098	420	0	2,518	240%	5.0	10,490	504	0
Annual Increment	1	346	0	347	33%	1.0	2,102	452	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	8	b. Established;	8	c. Not yet;	0	Registered		0
Performance	a. Developed;	0	b. Under developing;	8	c. Not yet;	0	Not yet registered		2
(2) Problems and Constraints									
<input checked="" type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Less sense of responsibility for duties by O&M workers.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Encouragement of WUA membership.									
(2) Development Plan									
- 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 : 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 | : 46 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.4 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	3,542	250	3,792	8	0	D
Secondary	2,650	5,548	8,198	19	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
 - Settlement or breakdown of apron 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
 - 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, not enough foundation treatment, or insufficient length of apron
 - 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 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 apron of weir
 - Replacement of control system or damaged equipment of flood/scouring sluice gate(s)
 - Replacement of intake gate(s)
- Irrigation Canal and Related Structure
 - 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 : 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	3,792	379	4,171
	Secondary	0	8,198	1,640	9,838
Structure (nos)	Main	0	8	2	10
	Secondary	0	19	7	26

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,049	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	1,049

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,661	17,118	1,712	2,150	1,260	24,901	23.7

(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	5.0	Agricultural Productivity	20.0	11.0
	Urgency	25.0	21.0	Social Problem	15.0	10.5
	Sustainability	15.0	10.5	Economic Impact	15.0	7.5

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Aparang I	District	Sinjai		
Technical Level	Semi-technical	Registered Area	1,049 ha	Year of Construction	1975
		<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</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 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; no inspection road.</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 due to sedimentation in front of gate; physical operation problem on structure; deterioration of gates.</p>			

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

Scheme	Aparang I	District	Sinjai		
Technical Level	Semi-technical	Registered Area	1,049 ha	Year of Construction	1975
		<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 due to sedimentation in front of gate; physical operation problem on structure; deterioration of gates.</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 canals and farm roads.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Land Preparation by Hand Tractor</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 canals 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	: 73070194			(7) Number of Farmers	: 1,960				
(2) Name of Irrigation Scheme	: Aparang Hulu			(8) Water Resource River	: S. Aparang				
(3) District (Kabupaten)	: Sinjai			(9) Catchment Area (km ²)	: 48.98				
(4) Sub-district (Kecamatan)	: Sinjai Borong			(10) Completion / Last Rehabilitation Year	: 1985				
(5) Registered Area (ha)	: 1,094								
(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		A			A		5		
II. SUBJECT AREA FOR REHABILITATION PLAN									
II.1 Present and Planned Land Use									
Category	Present (ha)		Plan (ha)		Increment (ha)				
a. Irrigated paddy field	941		1,048		107				
b. Rainfed paddy field	0		0		0				
c. Upland Field	153		0		-153				
d. Uncultivated Land	0		0		0				
e. Non-irrigable	0		46		46				
Total	1,094		1,094		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)	941			941	100%	4.0	3,764		
Season II (dry I)	941			941	100%	4.0	3,764		
Season III (dry II)				0	0%				
Total/Annual	1,882	0	0	1,882	200%	4.0	7,528	0	0
1/: Irrigated paddy & upland palawija									
(2) Problems and Constraints									
<i>A. Irrigation & Agriculture Performances</i>									
- High irrigation performances attained; existing of upland field (153ha)									
- Double cropping of paddy practiced in the entire 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 tertiary level and below			- Palawija Marketing:		Unstable marketing prices		
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		No collaboration among KTs		
- 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									
- 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)	1,048			1,048	100%	5.0	5,240		
Season II (dry I)	1,048			1,048	100%	5.0	5,240		
Season III (dry II)		210		210	20%			504	
Total/Annual	2,096	210	0	2,306	220%	5.0	10,480	504	0
Annual Increment	214	210	0	424	20%	1.0	2,952	504	0
IV. WUAs									
IV.1 Existing Condition									
(1) Number	a. Target;	7	b. Established;	4	c. Not yet;	3	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 O&M works among WUA members.									
IV.2 Development Plan									
(1) Proposed Countermeasures									
- Activation of WUA O&M works.									
(2) Development Plan									
- O&M training for WUA membership.									

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 | : 1 nos. | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) | |
| c. Length of weir | : 13 m | g. Settling basin | : not provided | (no info.: no information) | |
| d. Design intake discharge | : 1.3 m ³ /s | h. Inspection bridge | : not provided | | |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	1,755	200	1,955	11	0	D
Secondary	2,873	3,000	5,873	13	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
 - Settlement or breakdown of apron 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
 - Impassable of inspection road along canal
 - General O&M problems
 - 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 apron
 - 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 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
 - 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 apron of weir
 - Replacement of control system or damaged equipment of flood/scouring sluice gate(s)
 - Replacement of intake gate(s)
- 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 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 : 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	1,955	196	2,151
	Secondary	0	5,873	1,175	7,048
Structure (nos)	Main	0	11	2	13
	Secondary	0	13	5	18

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	941	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	153
c. Potential non-paddy field	0	Total	1,094

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,710	9,589	959	2,713	1,260	17,232	15.8

(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	5.0	Agricultural Productivity	20.0	11.0
	Urgency	25.0	23.0	Social Problem	15.0	10.5
	Sustainability	15.0	10.5	Economic Impact	15.0	9.0

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Aparang Hulu	District	Sinjai		
Technical Level	Semi-technical	Registered Area	1,049 ha	Year of Construction	1985
		<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> Crack or damage on weir crest; settlement of weir body; deflection of pier of weir</p>			
<p>SS.13.34</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</p>			
<p>SS.13.40</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; deterioration of gates; sedimentation at inside of canal; physical operation problem on structure.</p>			

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

Scheme	Aparang Hulu	District	Sinjai		
Technical Level	Semi-technical	Registered Area	1,049 ha	Year of Construction	1985
		<p><u>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Secondary 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.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Land Preparation by Horse Power</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 canals and farm roads.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Threshing by Power</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></p>			

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