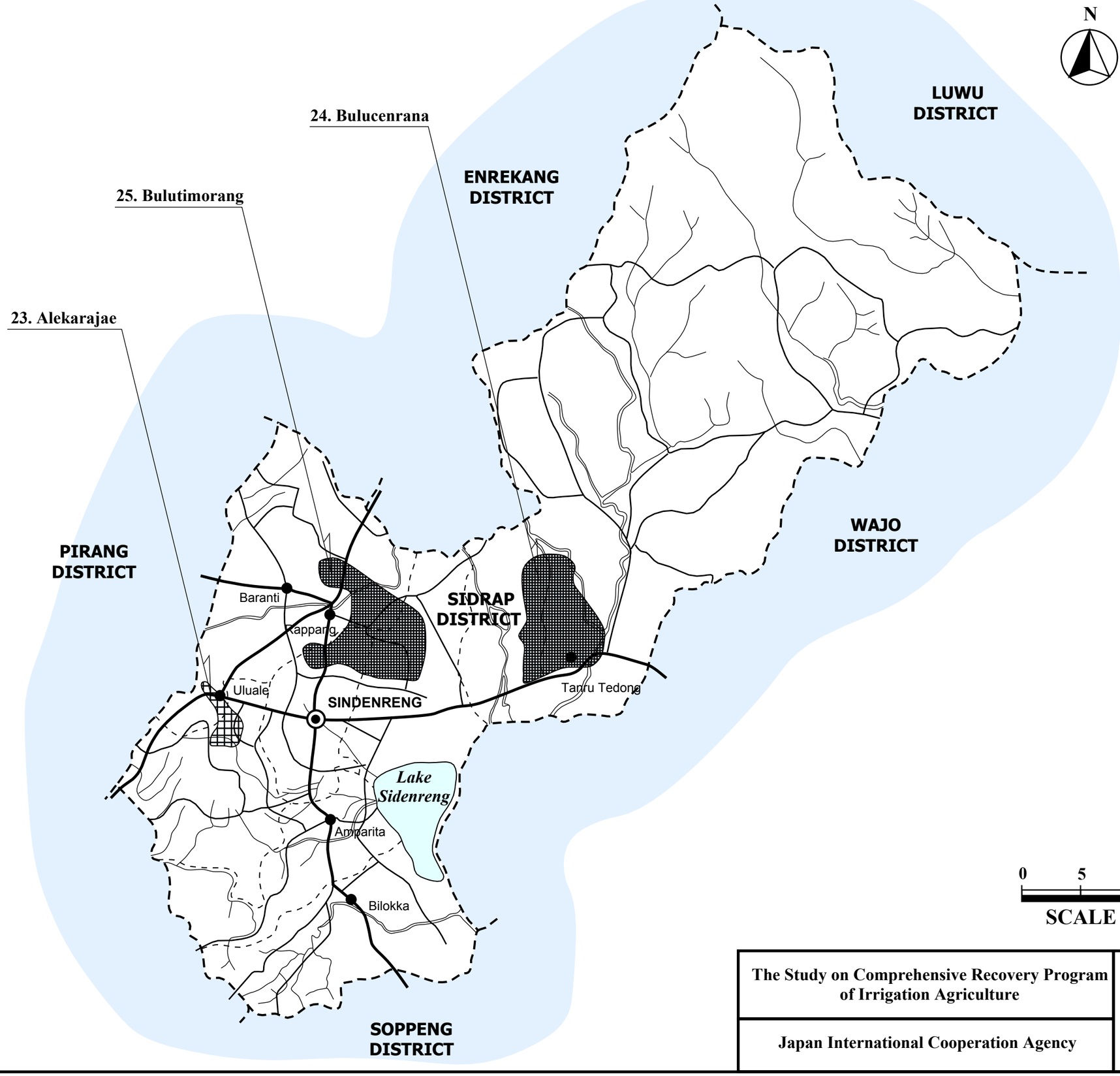
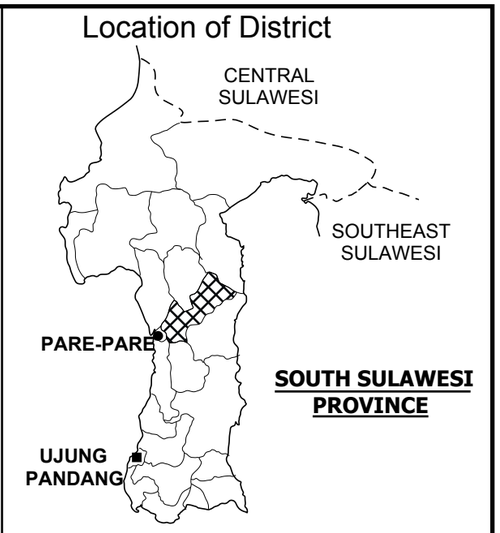




LEGEND

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

0 5 10 Km

SCALE

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
23. Alekarajae	1,253	ST	1,253
24. Bulucenrana	5,999	T	5,583
25. Bulutimorang	5,692	T	4,950

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 Sidrap District

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73141209	(7)	Number of Farmers	: 630
(2)	Name of Irrigation Scheme	: Alekarajae	(8)	Water Resource River	: S. Alekarajae
(3)	District (Kabupaten)	: Sidrap	(9)	Catchment Area (km^2)	: 62.50
(4)	Sub-district (Kecamatan)	: Maritenggae, Wattang Pulu	(10)	Completion / Last Rehabilitation Year	: 1975
(5)	Registered Area (ha)	: 1,253			
(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	B	B	B
e. Rehabilitation plan & its references	f. Crops and yield data	g. Cropping Calender	h. WUAs data
C	A	A	2

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	1,253	1,253	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	1,253	1,253	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	1,253			1,253	100%	4.0	5,012		
Season II (dry I)		233		233	19%			583	
Season III (dry II)		53		53	4%			133	
Total/Annual	1,253	286	0	1,539	123%	4.0	5,012	716	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Irrigation water supply limited to dry season
- Only single cropping of paddy in wet season practiced; annual intensity low; paddy yield levels still low

B. Primary Constraint Identified through the Inventory Survey by the JICA Study

- Irrigation & Drainage: Water shortage at on-farm level in dry season
- Agronomic Issues: Damage caused by rat
- Paddy Marketing: Limited bargaining power of farmers
- Palawija Marketing: Low marketing prices
- Farmers Organizations: Most members are not active
- Extension Services: Implementation of extension programs is limited

III.2 Development Plan

(1) Development Approaches

- Expansion of irrigated area through rehabilitation & upgrading
- Introduction of double cropping of paddy; productivity increase of paddy through intensification; introduction of palawija in dry season I & 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	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	1,253			1,253	100%	5.0	6,265		
Season II (dry I)		188		188	15%			940	
Season III (dry II)	877	188		1,065	85%	5.0	4,385	940	
Total/Annual	2,130	376	0	2,506	200%	5.0	10,650	1,880	0
Annual Increment	877	90	0	967	77%	1.0	5,638	1,164	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;	2	c. Not yet;	2	Not yet registered	4

(2) Problems and Constraints

☑ Operation ☐ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Insufficient irrigation water distribution.

IV.2 Development Plan

(1) Proposed Countermeasures

- Strengthening O&M activities.

(2) Development Plan

- O&M 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 Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 18 m
d. Design intake discharge : 1.5 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 1 nos.
g. Settling basin : not provided
h. Inspection bridge : not provided
i. Condition : B
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	3,396	3,400	6,796	18	0	D
Secondary	0	4,823	4,823	12	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
  - Problem on management for flood/scouring sluice gate(s) operation
  - Difficulty on water distribution/discharge measurement
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Impassable of inspection road along canal
  - General O&M problems
  - Overage, lower strength of 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 maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - No provision of water level gauge/measuring facility
- Irrigation Canal and Related Structure
  - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
  - 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
  - Deterioration of canal, no or insufficient rehabilitation due to budget problem
  - 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) of headworks
  - Provision of water level gauge/measuring facility and equipment
- Irrigation Canal and Related Structure
  - Removal of sediment soil and foreign materials from canal, grass cutting
  - Provision of inspection road both main and secondary canal with pavement
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Replace and reconstruction of canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	6,796	680	7,476
	Secondary	0	4,823	965	5,788
Structure (nos)	Main	0	18	4	22
	Secondary	0	12	4	16

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

a. Potential Irrigated paddy field	1,253	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potenttial non-paddy field	0
c. Potential non-paddy field	0	Total	1,253

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,642	19,299	1,930	2,569	1,260	27,700	22.1

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

VI. PROJECT EVALUATION

VI.1 EIRR 16.1%

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 Group V: Acceralation of WUAs establishment **VI.4 Priority Ranking in the Province** -

Scheme	Alekarajae	District	Sidrap		
Technical Level	Semi-technical	Registered Area	1,253 ha	Year of Construction	1975

Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☑ B ☐ C ☐ D

Problems
Sedimentation in front of weir

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Totally damaged

Category
Irrigation (Main Canal)

Structure
Masonry Lined Canal

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.

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

Scheme	Alekarajae	District	Sidrap		
Technical Level	Semi-technical	Registered Area	1,253 ha	Year of Construction	1975

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Totally damaged.

Category
Agriculture, On-Farm

Activity
Paddy Cultivation

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Low density of on-farm canals and farm roads.

Category
Post-harvest Facility

Activity
Products Collecting Facility

Condition
☐ A ☐ B ☐ C ☑ D

Problems

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	: 73141404	(7)	Number of Farmers	: 3,865
(2)	Name of Irrigation Scheme	: Bulucenrana	(8)	Water Resource River	: Bulucenrana
(3)	District (Kabupaten)	: Sidrap	(9)	Catchment Area (km^2)	: 514.0
(4)	Sub-district (Kecamatan)	: Dua Pitue, Pitu Riawa	(10)	Completion / Last Rehabilitation Year	: 1948
(5)	Registered Area (ha)	: 5,999			
(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	A	A	52

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	4,618	5,583	965
b. Rainfed paddy field	965	0	-965
c. Upland Field	0	0	0
d. Uncultivated Land	0	0	0
e. Non-irrigable	0	0	0
Total	5,583	5,583	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)	4,311			4,311	93%	4.5	21,812		
Season II (dry I)	99			99	2%	5.0	495		
Season III (dry II)	3,358			3,358	73%	5.0	16,790	483	
Total/Annual	7,768	0	0	7,768	168%	4.7	39,097	483	0

1/: Irrigated & rainfed paddy & palawija

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Substantially high irrigation performances attained; existence of rainfed field (965ha); poor drainage problem reported
- Double cropping of paddy practiced in most of the irrigated area; paddy yield levels moderate to high; palawija not introduced yet

B. Primary Constraint Identified through the Inventory Survey by the JICA Study

- Irrigation & Drainage:	Poor drainage	- Palawija Marketing:	Low marketing prices
- Agronomic Issues:	Farmers not following recommended practices	- Farmers Organizations:	No collaboration among KTs
- Paddy Marketing	Low marketing prices	- Extension Services:	Capability & experiences of PPLs are 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 further intensification; introduction of palawija in dry season II
- Extension activities toward improvement of post-harvest & marketing; 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)	5,583			5,583	100%	5.5	30,707		
Season II (dry I)				0					
Season III (dry II)	5,025	558		5,583	100%	5.5	27,638	2,790	
Total/Annual	10,608	558	0	11,166	200%	5.5	58,344	2,790	0
Annual Increment	2,840	558	0	3,398	32%	0.8	19,247	2,307	0

IV. WUAs

IV.1 Existing Condition

(1)	Number	a. Target;	52	b. Established;	5	c. Not yet;	1	Registered	0
	Performance	a. Developed;	3	b. Under developing;	37	c. Not yet;	11	Not yet registered	51

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Less collaboration among WUA members.

IV.2 Development Plan

(1) Proposed Countermeasures

- Activation of WUA works.

(2) Development Plan

- WUA empowerment training.

V. IRRIGATION FACILITY

V.1 Existing Condition

(1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : C Secondary Canal System : D On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 81 m
d. Design intake discharge : 8.6 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 3 nos.
g. Settling basin : not provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	6,614	2,315	8,929	15	6,895	C
Secondary	14,772	18,874	33,646	79	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
  - Physical O&M problem due to overage facility
  - Fallen down, inclined, or washed away of retaining wall of weir
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Collapse of canal
  - General O&M problems
  - Difficulty on maintenance of earth canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Deterioration of weir, no or insufficient rehabilitation due to budget problem
  - Insufficient quality of concrete or masonry material, over acting earth pressure more than desigr
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
  - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
  - Fallen down and collapse of side slope, water plants or weed at inside of canal
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Replace and reconstruction of weir
  - Reconstruction of retaining wall of weir
  - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
  - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Provision of concrete lining
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	8,929	0	8,929
	Secondary	0	33,646	0	33,646
Structure (nos)	Main	0	15	2	17
	Secondary	0	79	16	95

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

a. Potential Irrigated paddy field	4,618	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	965	e. Non-potenttial non-paddy field	0
c. Potential non-paddy field	0	Total	5,583

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
15,312	71,152	7,115	11,940	2,590	108,109	19.4

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

VI. PROJECT EVALUATION

VI.1 EIRR 13.3%

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	70.8
	Urgency	25.0	21.0	Social Problem	15.0	12.0	
	Sustainability	15.0	11.3	Economic Impact	15.0	10.5	

VI.3 Priority Group Group I: First priority group **VI.4 Priority Ranking in the Province** 4

South Sulawesi Province
24. Bulucenrana Scheme
(3/4)

Scheme	Bulucenrana	District	Sidrap		
Technical Level	Technical	Registered Area	5,999 ha	Year of Construction	1948

Category
Irrigation (Headworks)

Structure
Stilling Basin, Ripraps

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Washed away of stilling basin; washed away of ripraps or gabions at downstream of stilling basin.

Category
Irrigation (Headworks)

Structure
Intake and Trash Rack

Condition
☐ A ☐ B ☐ C ☑ D

Problems
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; broken of gates.

Category
Irrigation (Main Canal)

Structure
Masonry Lined Canal

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.

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

Scheme	Bulucenrana	District	Sidrap		
Technical Level	Technical	Registered Area	5,999 ha	Year of Construction	1948

Category
Irrigation (Main Canal)

Structure
Masonry Lined Canal

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.

Category
Agriculture, On-Farm

Activity
Transplanting

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Low density of on-farm canals and farm roads.

Category
Water Users' Group

Activity
Water Users Association Office

Condition
☐ A ☐ B ☑ C ☐ D

Problems

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	: 73141505	(7)	Number of Farmers	: 3,300
(2)	Name of Irrigation Scheme	: Bulotimorang	(8)	Water Resource River	: Bulotimorang
(3)	District (Kabupaten)	: Sidrap	(9)	Catchment Area (km^2)	: 74.00
(4)	Sub-district (Kecamatan)	: Pancarijang	(10)	Completion / Last Rehabilitation Year	: 1937/1994
(5)	Registered Area (ha)	: 5,692			
(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	A	A	48

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	4,950	4,950	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	4,950	4,950	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	2,782	14		2,796	56%	3.5	9,737	35	
Season II (dry I)				0					
Season III (dry II)	2,870			2,870	58%	4.0	11,480		
Total/Annual	5,652	14	0	5,666	114%	3.8	21,217	35	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Irrigation performances still poor, reportedly due to insufficient labor forces & farm machinery; water shortage in dry season reported
- Double cropping of paddy introduced; paddy yield levels still low; palawija cultivation seldom practiced

B. Primary Constraint Identified through the Inventory Survey by the JICA Study

- Irrigation & Drainage:	Water shortage at on-farm level in dry season	- Palawija Marketing:	-
- Agronomic Issues:	Farmers not following recommended practices	- Farmers Organizations:	Managerial capacity of KTs are limited
- Paddy Marketing	Low marketing prices	- Extension Services:	Implementation of extension programs is limited

III.2 Development Plan

(1) Development Approaches

- Expansion of irrigated area & 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 KTs

(2) Planned Irrigation Performances and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	3,960			3,960	80%	4.5	17,820		
Season II (dry I)				0	0%				
Season III (dry II)	3,465	495		3,960	80%	5.0	17,325	2,475	
Total/Annual	7,425	495	0	7,920	160%	4.7	35,145	2,475	0
Annual Increment	1,773	481	0	2,254	46%	0.9	13,928	2,440	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	48	b. Established;	48	c. Not yet;	0	Registered		
Performance	a. Developed;	0	b. Under developing;	44	c. Not yet;	4	Not yet registered		48

(2) Problems and Constraints

☑ Operation ☑ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Low level O&M skill of WUA members.

IV.2 Development Plan

(1) Proposed Countermeasures

- Improvement of O&M skill.

(2) Development Plan

- O&M training.

V. IRRIGATION FACILITY

V.1 Existing Condition

(1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : C Secondary Canal System : D On-farm : D

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 30 m
d. Design intake discharge : 7.4 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 2 nos.
g. Settling basin : provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	1,909	0	1,909	2	1,909	C
Secondary	14,981	30,586	45,567	71	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 stilling basin of weir
  - Fallen down, inclined, or washed away of retaining wall of weir
  - Physical operational problem on intake gate(s)
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Impassable of inspection road along canal
  - General O&M problems
  - Difficulty on maintenance of earth canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of stilling basin
  - Insufficient quality of concrete or masonry material, over acting earth pressure more than desigr
  - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
- Irrigation Canal and Related Structure
  - Insufficient function of settling basin(sediments), improper management of canal (sediments, water plant)
  - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
  - No 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
  - Reconstruction of stilling basin of weir
  - Reconstruction of retaining wall of weir
  - Replacement of intake gate(s)
- Irrigation Canal and Related Structure
  - Removal of sediment soil and foreign materials from canal, grass cutting
  - Provision of inspection road both main and secondary canal with pavement
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Provision of concrete lining
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,661	0	1,661
	Secondary	0	39,643	0	39,643
Structure (nos)	Main	0	2	0	2
	Secondary	0	62	12	74

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

a. Potential Irrigated paddy field	4,950	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potenttial non-paddy field	0
c. Potential non-paddy field	0	Total	4,950

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,345	45,393	4,539	10,148	1,570	63,995	12.9

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

VI. PROJECT EVALUATION

VI.1 EIRR 15.7%

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	13.0	68.9
	Urgency	25.0	21.6	Social Problem	15.0	10.5	
	Sustainability	15.0	6.8	Economic Impact	15.0	12.0	

VI.3 Priority Group Group II: Second priority group **VI.4 Priority Ranking in the Province** 13

Scheme	Bulutimorang	District	Sidrap		
Technical Level	Technical	Registered Area	5,692 ha	Year of Construction	1937/94

Category
Irrigation (Headworks)

Structure
Retaining Wall and Scouring Sluice

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Fallen down, incline or washed away of retaining wall of weir; settlement or breakage of apron downstream

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Totally Damaged

Category
Irrigation (Secondary Canal)

Structure
Masonry Lined Canal

Condition
☐ A ☐ B ☐ C ☐ D

Problems
Sedimentation; leakage from lined canal; crack on lined canal; deflection of lining toward inside of canal; less maintenance; and no inspection road.

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

Scheme	Bulutimorang	District	Sidrap		
Technical Level	Technical	Registered Area	5,692 ha	Year of Construction	1937/94

SS.30.115

Category
Irrigation (Secondary Canal)

Structure
Check Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Damage on structure; lower function of check structure due to deflection of structure; physical operation problem on structure; deterioration of gate; sedimentation at inside of canal.

Category
Agriculture, On-Farm

Activity
Land Preparation by Hand Tractor

Condition
☐ A ☐ B ☐ C ☐ D

Problems
Low density of on-farm canals and farm roads.

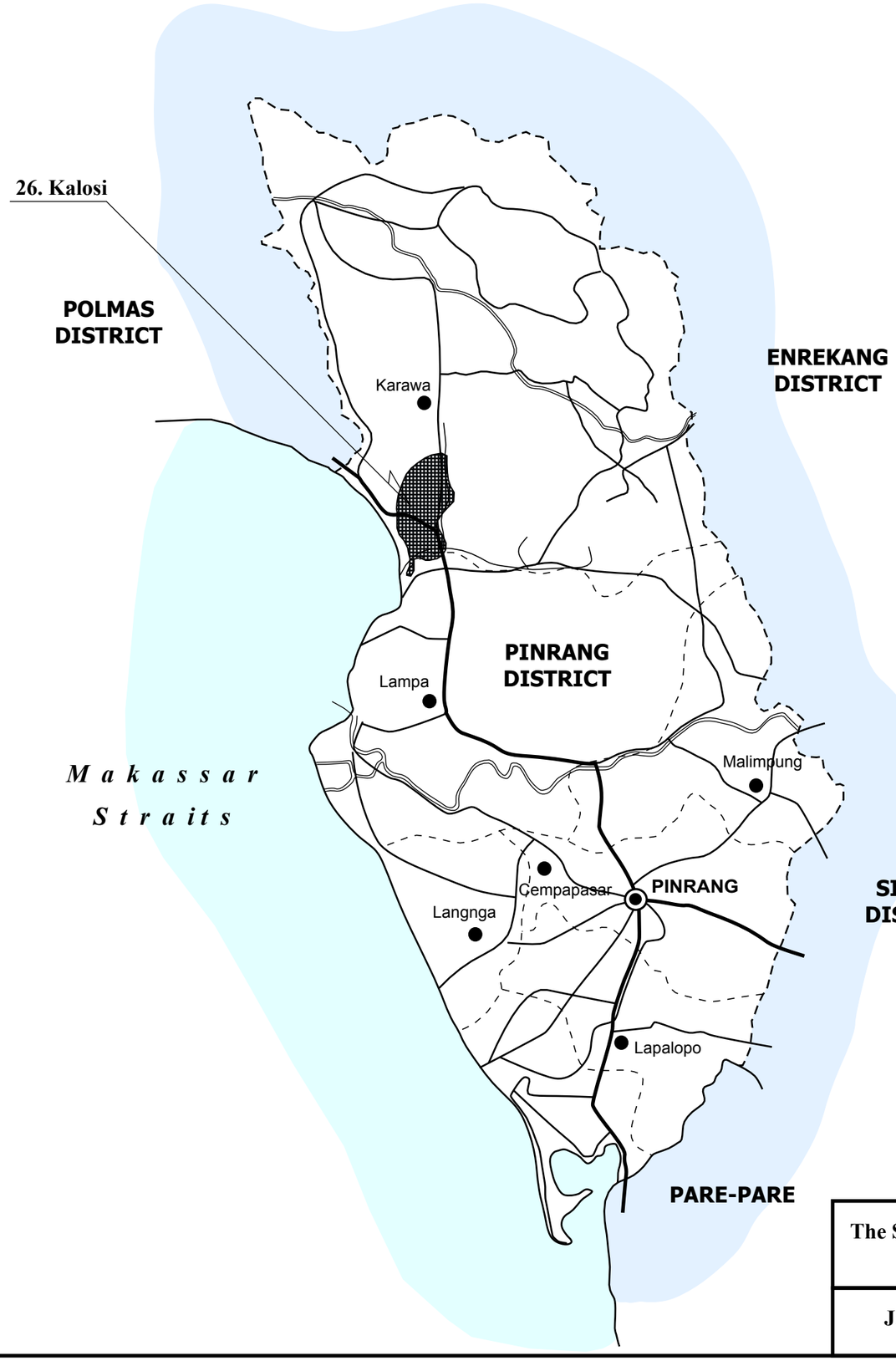
Category
Agriculture, On-Farm

Activity
Harvesting

Condition
☐ A ☐ B ☐ C ☐ D

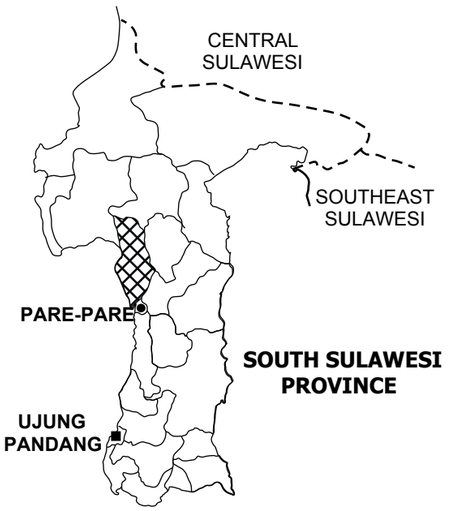
Problems
Low density of on-farm canals and farm roads.

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



N

Location of District



LEGEND

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

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
26. Kalosi	1,004	T	838

T : Technical Irrigation

0 5 10 Km

SCALE

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Pinrang District

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73158002	(7)	Number of Farmers	: 700
(2)	Name of Irrigation Scheme	: Kalosi	(8)	Water Resource River	: S. Kalosi-Losi
(3)	District (Kabupaten)	: Pinrang	(9)	Catchment Area (km^2)	: 17
(4)	Sub-district (Kecamatan)	: Lembang	(10)	Completion / Last Rehabilitation Year	: 1980
(5)	Registered Area (ha)	: 1,004			
(6)	Technical Level	: Technical			

I.2 Availability of Reports/Documents & References **(A : Available, B : Available but partially, C : Not available/ No plan)**

a. Design Reports of Existing System(Full set)	b. Irrigation diagram	c. As-built drawings	d. Structure lists & diagram
B	B	B	B
e. Rehabilitation plan & its references	f. Crops and yield data	g. Cropping Calender	h. WUAs data
C	A	A	14

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	751	812	61
b. Rainfed paddy field	0	0	0
c. Upland Field	0	0	0
d. Uncultivated Land	87	0	-87
e. Non-irrigable	0	26	26
Total	838	838	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	751			751	100%	4.5	3,380		
Season II (dry I)	442	116		558	74%	4.0	1,768	93	
Season III (dry II)		101		101	13%			81	
Total/Annual	1,193	217	0	1,410	188%	4.3	5,148	174	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Substantial irrigation performances attained; water shortage in dry season reported; existing of uncultivated land (87ha)
- Double cropping of paddy introduced; paddy yield levels low to moderate; palawija introduced substantially

B. Primary Constraint Identified through the Inventory Survey by the JICA Study

- Irrigation & Drainage: Water shortage at on-farm level in dry season
- Agronomic Issues: Damage caused by rat
- Paddy Marketing: Low marketing prices
- Palawija Marketing: Limited bargaining power of farmers
- Farmers Organizations: Managerial capacity of KTs are limited
- 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 & 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	Irrigated Paddy Yield	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	812			812	100%	5.5	4,466		
Season II (dry I)	568	162		730	90%	5.0	2,840	810	
Season III (dry II)		162		162	20%			810	
Total/Annual	1,380	324	0	1,704	210%	5.3	7,306	1,620	0
Annual Increment	187	107	0	294	22%	1.0	2,159	1,446	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	14	b. Established;	14	c. Not yet;	0	Registered	0
Performance	a. Developed;	0	b. Under developing;	14	c. Not yet;	0	Not yet registered	14

(2) Problems and Constraints

☑ Operation ☐ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Insufficient irrigation water distribution.

IV.2 Development Plan

(1) Proposed Countermeasures

- Encouragement of farmers for WUA establishment.

(2) Development Plan

- WUA empowerment training.

V. IRRIGATION FACILITY

V.1 Existing Condition

(1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
Water Resources Facility : C Main Canal System : D Secondary Canal System : D On-farm : D

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 44 m
d. Design intake discharge : 1.5 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 2 nos.
g. Settling basin : not provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined (m)	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	1,116	0	1,116	3	0	D
Secondary	7,732	600	8,332	10	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 stilling basin of weir
  - Insufficient diversion water due to sedimentation in front of intake
  - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
  - Impassable of inspection road along canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of stilling basin
  - Sedimentation in front of intake
  - 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 provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Reconstruction of stilling basin of weir
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - 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 or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	926	0	926
	Secondary	0	6,916	0	6,916
Structure (nos)	Main	0	2	0	3
	Secondary	0	8	2	10

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

a. Potential Irrigated paddy field	751	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potenttial non-paddy field	0
c. Potential non-paddy field	87	Total	838

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,311	8,049	805	1,985	1,260	14,411	17.2

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

VI. PROJECT EVALUATION

VI.1 EIRR 14.9%

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 Group VI: Development by other category (Subject area is less than 1,000 ha)

VI.4 Priority Ranking in the Province -

South Sulawesi Province
26. Kalosi Scheme
(3/4)

Scheme	Kalosi	District	Pinrang		
Technical Level	Technical	Registered Area	1,004 ha	Year of Construction	1980

Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Sedimentation in front of intake.

Category
Irrigation (Headworks)

Structure
Retaining Wall, Stilling Basin, Ripraps

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Falen down, incline or washed away of retaining wall of weir; settlement or washed away of stilling basin; washed away of ripraps at down stream of stilling basin.;

Category
Irrigation (Secondary Canal)

Structure
Masonry Lined Canal

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Sedimentation; leakage from lined canal; crack on lined canal; deflection of lining toward inside of canal; less maintenance; and no inspection road.

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

Scheme	Kalosi	District	Pinrang		
Technical Level	Technical	Registered Area	1,004 ha	Year of Construction	1980

☐

Category
Irrigation (Secondary Canal)

Structure
Earth Canal

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal; no inspection road.

☑

Category
Agriculture, On-Farm

Activity
Paddy and Secondary Crops Cultivation

Condition
☐ A ☐ B ☐ C ☑ D

Problems

☑

Category
Agriculture, Agro-economy

Activity
Cacao Cultivation

Condition
☐ A ☐ B ☐ C ☑ D

Problems

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