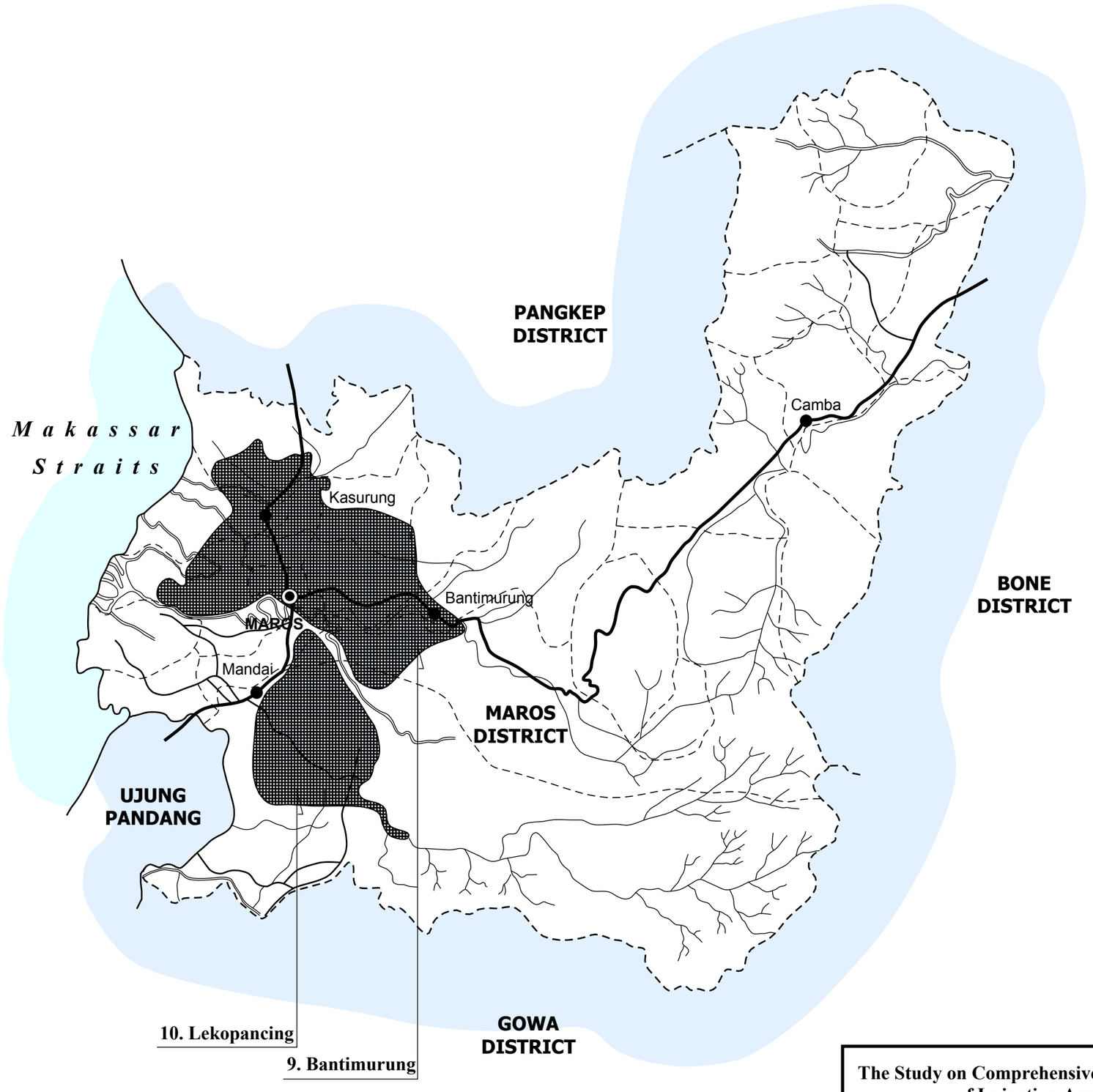
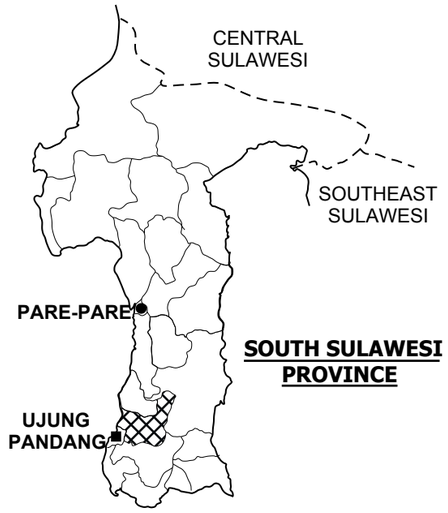


Location of District



LEGEND

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

0 5 10 Km

SCALE

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
9. Bantimurung	6,513	T	5,717
10. Lekopancing	3,626	T	2,483

T : Technical Irrigation

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Maros District

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73080053	(7)	Number of Farmers	: 10,514
(2)	Name of Irrigation Scheme	: Bantimurung	(8)	Water Resource River	: Bantimurung
(3)	District (Kabupaten)	: Maros	(9)	Catchment Area (km^2)	: 18
(4)	Sub-district (Kecamatan)	: Bantimurung, Maros Utara	(10)	Completion / Last Rehabilitation Year	: 1930/1986
(5)	Registered Area (ha)	: 6,513			
(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	63

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	5,717	5,717	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	5,717	5,717	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	5,717			5,717	100%	4.5	25,727		
Season II (dry I)	5,156			5,156	90%	4.5	23,202		
Season III (dry II)		700		700	12%			490	
Total/Annual	10,873	700	0	11,573	202%	4.5	48,929	490	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- High irrigation performances attained
- Double cropping of paddy practiced almost in the entire irrigated area; paddy yield levels moderate; palawija introduced extensively

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: Farmers not following recommended practices
- Paddy Marketing: Low marketing prices
- Palawija Marketing: Low marketing prices
- Farmers Organizations: Economic activities are limited
- 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 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)	5,717			5,717	100%	5.5	31,444		
Season II (dry I)	5,717			5,717	100%	5.5	31,444		
Season III (dry II)		1,143		1,143	20%			1,372	
Total/Annual	11,434	1,143	0	12,577	220%	5.5	62,887	1,372	0
Annual Increment	561	443	0	1,004	18%	1.0	13,959	882	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	80	b. Established;	13	c. Not yet;	17	Registered	0
Performance	a. Developed;	15	b. Under developing;	28	c. Not yet;	20	Not yet registered	51

(2) Problems and Constraints

☑ Operation ☐ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Insufficient irrigation water distribution.

IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA federation.

(2) Development Plan

- WUA membership 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 : C On-farm : D

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 25 m
d. Design intake discharge : 8.8 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 2 nos.
g. Settling basin : not provided
h. Inspection bridge : 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	870	13,130	14,000	68	11,000	D
Secondary	35,650	5,100	40,750	122	16,000	C

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Settlement or breakdown of 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
  - Cracks or partial damage on lined canal
  - Leakage from lined canal
  - Deflection of lining toward inside 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 design, installation and/or maintenance of flood/scouring sluice gate(s); breakdown of hoist, stem, guide frame or leaf
  - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
- Irrigation Canal and Related Structure
  - Improper regular maintenance or long leave of repair, insufficient provision of budget
  - Improper regular maintenance or long leave of repair, narrow wide of canal embankment
  - No treatment against groundwater, unstable slope gradient against soil property, no repair in long time
  - 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
  - Replace and reconstruction, provision of special treatment at cross drain to prevent settlement
  - Replace canal embankment material with impermeable soil and re-lining
  - Replace canal embankment material and re-lining; or provision of side drain, under drain, and weep holes
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

Dam/Headworks body : minor rehabilitation Intake, civil : large rehabilitation Intake, mechanical : 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	12,320	0	12,320
	Secondary	0	35,860	0	35,860
Structure (nos)	Main	0	60	6	66
	Secondary	0	107	21	129

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

a. Potential Irrigated paddy field	5,717	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	5,717

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
6,266	70,692	7,069	11,720	2,590	98,337	17.2

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

VI. PROJECT EVALUATION

VI.1 EIRR 11.4%

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	64.3
	Urgency	25.0	22.0	Social Problem	15.0	9.0	
	Sustainability	15.0	8.3	Economic Impact	15.0	9.0	

VI.3 Priority Group Group III: Third priority group **VI.4 Priority Ranking in the Province** 21

South Sulawesi Province
9. Bantimurung Scheme
(3/4)

Scheme	Bantimurung	District	Maros		
Technical Level	Technical	Registered Area	6,513 ha	Year of Construction	1930/86

Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Crack or damage on weir crest; settlement of weir body; deflection of pier of weir

Category
Irrigation (Headworks)

Structure
Intake

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

Category
Irrigation (Main Canal)

Structure
Concrete 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.

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

Scheme	Bantimurung	District	Maros		
Technical Level	Technical	Registered Area	6,513 ha	Year of Construction	1930/86

Category
Irrigation (Secondary Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Lower function of division structure; sedimentation at inside of canal; physical operation problem on structure.

Category
Agriculture, On-Farm

Activity
Paddy Field

Condition
☐ A ☐ B ☐ C ☑ D

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

Category
Post-harvest Facility

Activity
Drying Yard

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	: 73080054	(7)	Number of Farmers	: 5,242
(2)	Name of Irrigation Scheme	: Lekopancing	(8)	Water Resource River	: Sungai Lekopancing
(3)	District (Kabupaten)	: Maros	(9)	Catchment Area (km^2)	: 276.6
(4)	Sub-district (Kecamatan)	: Mandai, Tanralili	(10)	Completion / Last Rehabilitation Year	: 1982
(5)	Registered Area (ha)	: 3,626			
(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	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	2,483	2,483	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	2,483		

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)	2,264			2,264	91%	4.0	9,056		
Season II (dry I)				0	0%				
Season III (dry II)	1,304	73		1,377	55%	4.0	5,216	183	
Total/Annual	3,568	73	0	3,641	147%	4.0	14,272	183	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Irrigation water supply at on-farm level limited in dry season; water shortage in dry season reported
- Double cropping of paddy introduced; annual intensity still low; paddy yield levels still low; palawija introduced limitedly

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:	Unstable marketing prices
- Agronomic Issues:	Farmers not following recommended practices	- 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

- 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 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 Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	2,483			2,483	100%	5.0	12,415		
Season II (dry I)		248		248	10%			2,485	
Season III (dry II)	1,986	497		2,483	100%	5.0	9,930	298	
Total/Annual	4,469	745	0	5,214	210%	5.0	22,345	2,783	0
Annual Increment	901	672	0	1,573	63%	1.0	8,073	2,600	0

IV. WUAs

IV.1 Existing Condition

(1)	Number	a. Target;	67	b. Established;	62	c. Not yet;	62	Registered	0
	Performance	a. Developed;	0	b. Under developing;	5	c. Not yet;	0	Not yet registered	5

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Less attention to O&M activities.
- Internal management of WUA

IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA establishment.
- Improvement of WUA administration.

(2) Development Plan

- WUA empowerment training.
- Management training NGO/third party.

V. IRRIGATION FACILITY

V.1 Existing Condition

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

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 24 m
d. Design intake discharge : 4.4 m3/s
e. Scouring sluice gate : no info.
f. Intake gate : 3 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	5,057	699	5,756	38	0	D
Secondary	20,061	8,334	28,395	133	18,361	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
  - Physical operational problem on intake gate(s)
- Irrigation Canal and Related Structure
  - General O&M problems
  - Overage, lower strength of canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Sedimentation in front of intake
  - No provision of settling basin, no proper gate operation of intake during flood
  - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
- Irrigation Canal and Related Structure
  - 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
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of settling basin, proper gate operation of intake during flood
  - Replacement of intake gate(s)
- Irrigation Canal and Related Structure
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Replace and reconstruction of canal
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	3,914	0	3,914
	Secondary	0	19,309	0	19,309
Structure (nos)	Main	0	26	3	28
	Secondary	0	90	18	109

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

a. Potential Irrigated paddy field	2,483	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	2,483

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,403	33,020	3,302	5,090	1,570	46,385	18.7

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

VI. PROJECT EVALUATION

VI.1 EIRR 15.0%

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	67.7
	Urgency	25.0	20.4	Social Problem	15.0	9.0	
	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** 17

Scheme	Lekopancing	District	Maros		
Technical Level	Technical	Registered Area	3,626 ha	Year of Construction	1982

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of division structure; sedimentation at inside of canal; physical operation problem on structure.

Category
Irrigation (Main Canal)

Structure
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.

Category
Irrigation (Main Canal)

Structure
Earth Canal

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal.

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

Scheme	Lekopancing	District	Maros		
Technical Level	Technical	Registered Area	3,626 ha	Year of Construction	1982

Category
Irrigation (Secondary Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of division structure; sedimentation at inside of canal; physical operation problem on structure; damage on structure; deterioration of gates.

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.

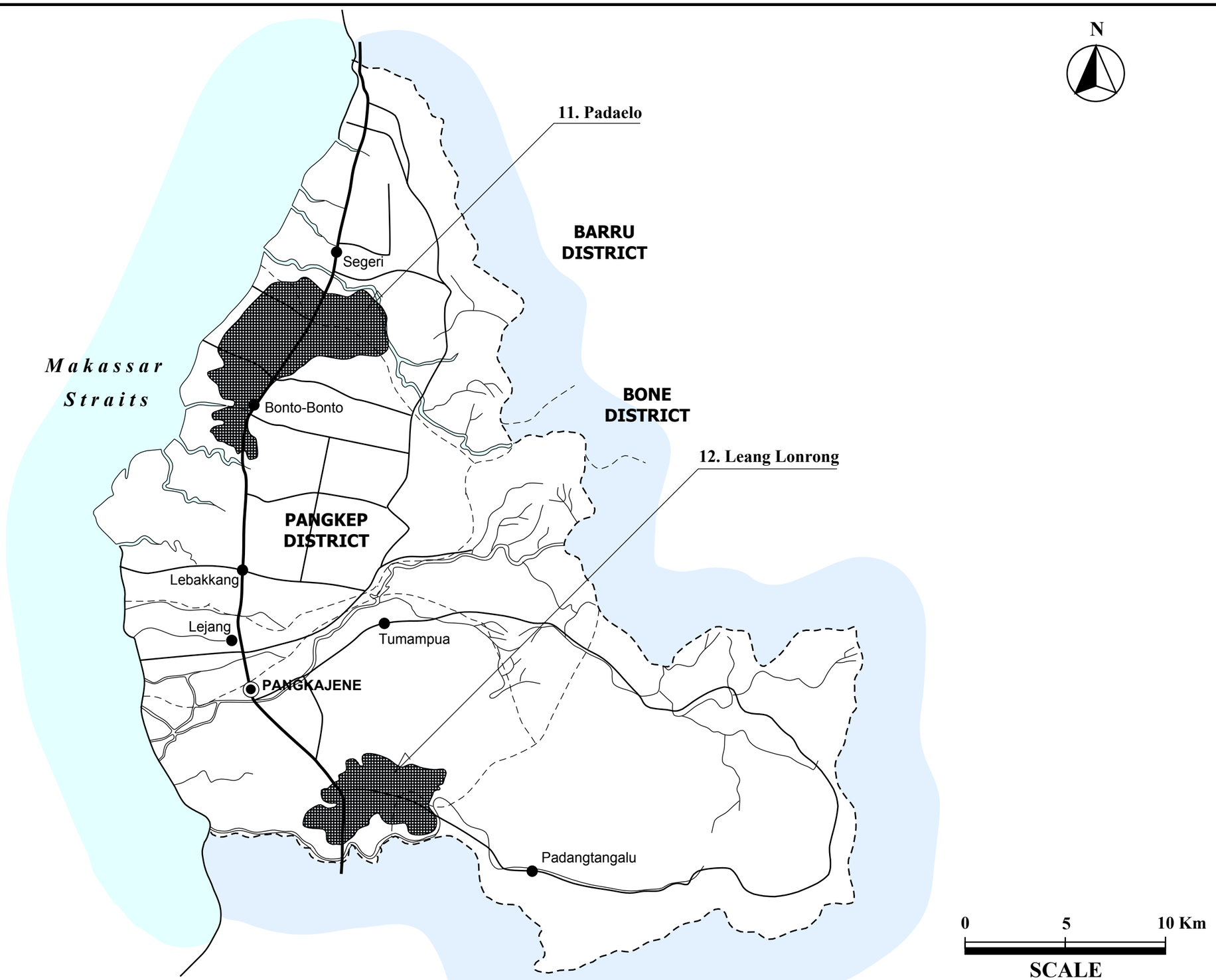
Category
Agriculture, On-Farm

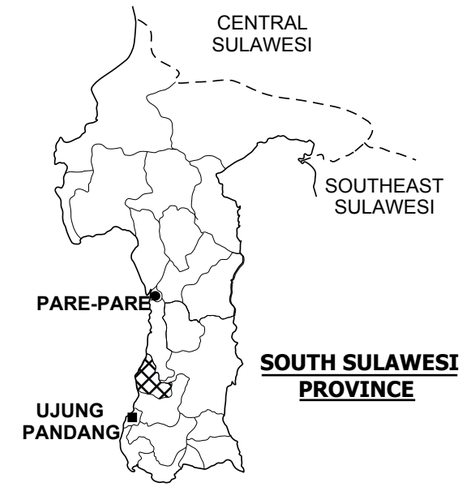
Activity
Transplanting

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





LEGEND

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

0 5 10 Km

SCALE

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
11. Padaelo	2,958	T	2,462
12. Leang Lonrong	1,229	T	1,229

T : Technical Irrigation

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Pangkep District

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73090179	(7)	Number of Farmers	: 4,730
(2)	Name of Irrigation Scheme	: Padaelo	(8)	Water Resource River	: Sungai Padaelo
(3)	District (Kabupaten)	: Pangkep	(9)	Catchment Area (km^2)	: 150
(4)	Sub-district (Kecamatan)	: Ma'rang & Segeri	(10)	Completion / Last Rehabilitation Year	: 1976
(5)	Registered Area (ha)	: 2,958			
(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	29

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	1,808	2,462	654
b. Rainfed paddy field	654	0	-654
c. Upland Field	0	0	0
d. Uncultivated Land	0	0	0
e. Non-irrigable	0	0	0
Total	2,462	2,462	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	1,808			1,808	100%	4.5	9,771		
Season II (dry I)	567			567	31%	4.5	2,552	328	
Season III (dry II)				0	0%				
Total/Annual	2,375	0	0	2,375	131%	4.5	12,323	328	0

1/: Irrigated & rainfed paddy & palawija

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Substantial irrigation performances achieved; however, irrigation water supply limited in dry season; existing of rainfed field & uncultivated land (654ha)
- Double cropping of paddy introduced; annual cropping intensity still low; existence of rainfed paddy; paddy yield levels moderate; no palawija introduced

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:	Limited bargaining power of farmers
- Agronomic Issues:	Farmers not following recommended practices	- Farmers Organizations:	Managerial capacity of KTs are limited
- Paddy Marketing	Unstable marketing prices	- Extension Services:	Shortage of operation funds of PPLs

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 II
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	2,462			2,462	100%	5.5	13,541		
Season II (dry I)	1,970	492		2,462	100%	5.5	10,835	2,460	
Season III (dry II)				0	0%				
Total/Annual	4,432	492	0	4,924	200%	5.5	24,376	2,460	0
Annual Increment	2,057	492	0	2,549	69%	1.0	12,054	2,132	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	30	b. Established;	30	c. Not yet;	0	Registered	0
Performance	a. Developed;	0	b. Under developing;	9	c. Not yet;	21	Not yet registered	37

(2) Problems and Constraints

☑ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- No O&M plan and program
- No coordination with District WRS office.

IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA establishment and federation.
- Increase in District WRS staff attention to O&M.

(2) Development Plan

- Capacity building of District WRS staff.

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 Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 65 m
d. Design intake discharge : 4.7 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 2 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	3,000	230	3,230	15	3,230	C
Secondary	5,000	16,679	21,679	85	17,453	D

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
  - Insufficient diversion water due to sedimentation in front of intake
  - Problem on management for intake gate(s) operation
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Collapse of canal
  - General O&M problems
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
  - Sedimentation in front of intake
  - Improper management or deterioration of intake gate(s)
- Irrigation Canal and Related Structure
  - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
  - Improper 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
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Replacement of control system or damaged equipment of intake
- Irrigation Canal and Related Structure
  - Removal of sediment soil and foreign materials from canal, grass cutting
  - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	2,681	0	2,681
	Secondary	0	17,994	0	17,994
Structure (nos)	Main	0	12	1	14
	Secondary	0	71	14	85

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

a. Potential Irrigated paddy field	1,808	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	654	e. Non-potenttial non-paddy field	0
c. Potential non-paddy field	0	Total	2,462

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,228	27,101	2,710	5,382	1,570	39,991	16.2

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

VI. PROJECT EVALUATION

VI.1 EIRR 21.6%

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	70.8
	Urgency	25.0	19.0	Social Problem	15.0	7.5	
	Sustainability	15.0	8.3	Economic Impact	15.0	15.0	

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

South Sulawesi Province
11. Padaelo Scheme
(3/4)

Scheme	Padaelo	District	Pangkep		
Technical Level	Technical	Registered Area	2,958 ha	Year of Construction	1976

Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☑ B ☐ C ☐ D

Problems
Crack or damage on weir crest; settlement of weir body.

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Totally damaged

Category
Irrigation (Main Canal)

Structure
Earth Canal

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal.

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

Scheme	Padaelo	District	Pangkep		
Technical Level	Technical	Registered Area	2,958 ha	Year of Construction	1976

Category
Irrigation (Main Canal)

Structure
Concrete Lined Canal

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Crack or damage on lined canal; deflection of lining toward inside of canal.

Category
Agriculture, On-Farm

Activity
Paddy Cultivation (just before harvesting)

Condition
☐ A ☐ B ☑ C ☐ D

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

Category
Agriculture, On-Farm

Activity
Treasher by Man Power

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

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73090179	(7)	Number of Farmers	: 2,137
(2)	Name of Irrigation Scheme	: Leang Lonrong	(8)	Water Resource River	: Liang Lanrong
(3)	District (Kabupaten)	: Pangkep	(9)	Catchment Area (km^2)	: 31
(4)	Sub-district (Kecamatan)	: Pangkajene/Bungoro	(10)	Completion / Last Rehabilitation Year	: 1932/1988
(5)	Registered Area (ha)	: 1,229			
(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	19

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	1,229	1,229	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	1,229	1,229	

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)	1,210			1,210	98%	4.5	5,445		
Season II (dry I)	582			582	47%	4.5	2,619		
Season III (dry II)				0	0%				
Total/Annual	1,792	0	0	1,792	146%	4.5	8,064	0	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- Irrigation performances yet to be improved
- Double cropping of paddy introduced; annual cropping intensity still low; paddy yield levels moderate; palawija introduced substantially

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

- Irrigation & Drainage:	Poor O&M at tertiary level and below	- Palawija Marketing:	Low competitiveness with other producing areas
- 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

- 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 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)	1,229			1,229	100%	5.5	6,760		
Season II (dry I)	1,229			1,229	100%	5.5	6,760		
Season III (dry II)		246		246	20%			1,230	
Total/Annual	2,458	246	0	2,704	220%	5.5	13,519	1,230	0
Annual Increment	666	246	0	912	74%	1.0	5,455	1,230	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	11	b. Established;	11	c. Not yet;	0	Registered		0
Performance	a. Developed;	0	b. Under developing;	11	c. Not yet;	0	Not yet registered		11

(2) Problems and Constraints

☑ Operation ☐ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Insufficient water supply.

IV.2 Development Plan

(1) Proposed Countermeasures

- Promotion of WUA federation.

(2) Development Plan

- Participation to rehabilitation plan formulation.

V. IRRIGATION FACILITY

V.1 Existing Condition

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

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 8 m
d. Design intake discharge : 0.9 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 2 nos. (L) + 2 nos. (R)
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	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	3,248	4,831	8,079	37	0	D
Secondary	0	0	0	0	0	D

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Physical operational problem on flood/scouring sluice gate(s) of headworks
  - Lower strength against design load due to rust, decay of steel materials of intake gate(s)
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Impassable of inspection road along canal
  - Lower function of regulating structure on canal
  - 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
  - No over coating on intake gate(s) to prevent rust and decay
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
  - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
  - 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
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s)
  - Provision of overcoat or replacement of intake gate(s) of headworks
  - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
  - Repair of leakage from canal, widen canal wide, recompaction of embankment
  - Provision of inspection road both main and secondary canal with pavement
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	8,079	0	8,079
	Secondary	0	0	0	0
Structure (nos)	Main	0	37	4	41
	Secondary	0	0	0	0

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

a. Potential Irrigated paddy field	1,229	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	1,229

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
4,213	14,638	1,464	2,519	1,260	24,095	19.6

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

VI. PROJECT EVALUATION

VI.1 EIRR 18.3%

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	13.0	69.2
	Urgency	25.0	20.4	Social Problem	15.0	10.5	
	Sustainability	15.0	8.3	Economic Impact	15.0	12.0	

VI.3 Priority Group Group I: First priority group **VI.4 Priority Ranking in the Province** 8

South Sulawesi Province
12. Leang Lonrong Scheme
(3/4)

Scheme	Leang Lonrong	District	Pangkep		
Technical Level	Technical	Registered Area	1,229 ha	Year of Construction	1932/88

Category
Irrigation (Secondary Canal)

Structure
Check Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of check structure; physical operation problem on structure; sedimentation at inside of canal; no gate.

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
Irrigation (Secondary Canal)

Structure
Drop

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Crack or damage on structure.

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

Scheme	Leang Lonrong	District	Pangkep		
Technical Level	Technical	Registered Area	1,229 ha	Year of Construction	1932/88

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; less function of inspection road.

Category
Agriculture, On-Farm

Activity
Land Preparation

Condition
☐ A ☐ B ☑ C ☐ D

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

Category
Agriculture, On-Farm

Activity
Transplanting

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