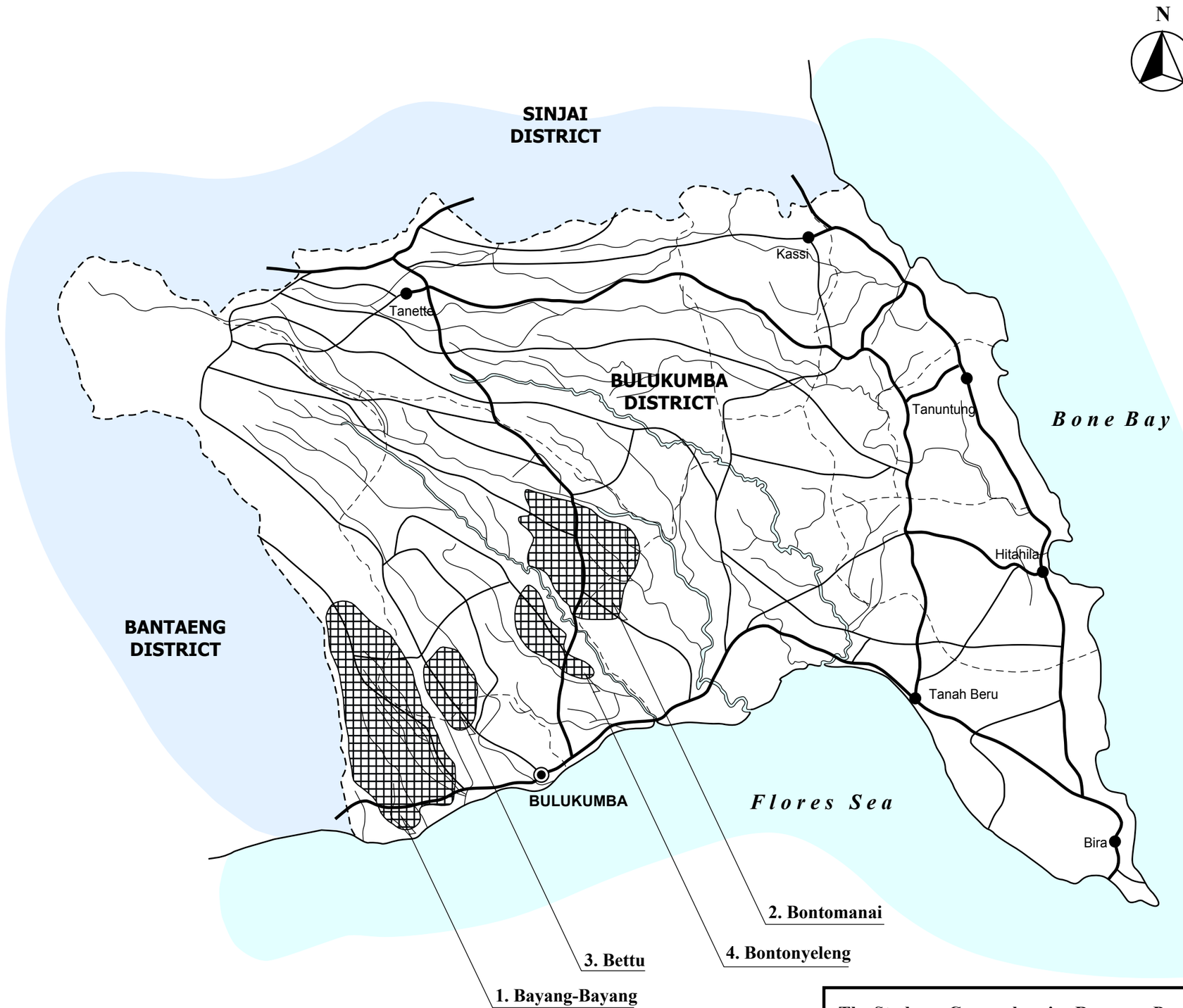
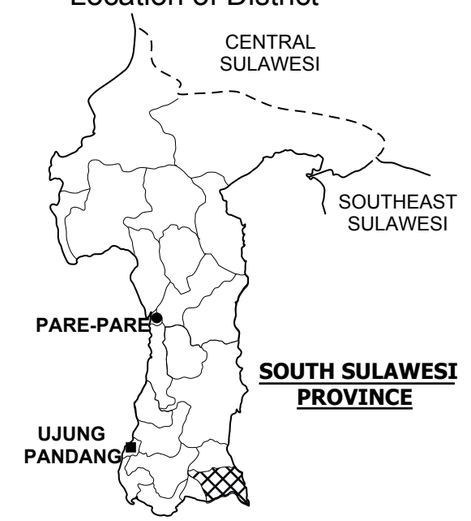
PART-III

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





LEGEND

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

Irrigation Scheme

Name of Scheme	Registered Area (Ha)		Subject Area (Ha)
1. Bayang-Bayang	5,030	ST	4,121
2. Bontomanai	3,976	ST	3,297
3. Bettu	1,817	ST	1,802
4. Bontonyelang	1,096	ST	1,079

ST : Semi-Technical Irrigation

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Bulukumba District

South Sulawesi Province
1. Bayang-Bayang Scheme
(1/4)

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73020102	(7)	Number of Farmers	: 4,469
(2)	Name of Irrigation Scheme	: Bayang-Bayang	(8)	Water Resource River	: Bialo
(3)	District (Kabupaten)	: Bulukumba	(9)	Catchment Area (km^2)	: 49.70
(4)	Sub-district (Kecamatan)	: Gangking	(10)	Completion / Last Rehabilitation Year	: 1930/1974
(5)	Registered Area (ha)	: 5,030			
(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
A	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	3,500	4,053	553
b. Rainfed paddy field	394	0	-394
c. Upland Field	0	0	0
d. Uncultivated Land	227	0	-227
e. Non-irrigable	0	68	68
Total	4,121	4,121	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) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)	Intensity	(GKG ton/ha)	Paddy	Palawija	Others
Season I (wet)	3,006			3,006	86%	4.0	13,009		
Season II (dry I)	2,593	151		2,744	78%	4.0	10,372	576	
Season III (dry II)		376		376	11%			940	
Total/Annual	5,599	527	0	6,126	175%	4.0	23,381	1,516	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 (621ha)
- Double cropping of paddy introduced; annual cropping intensity moderate to high; 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: Poor quality of products
- Palawija Marketing: Unstable marketing prices
- Farmers Organizations: Economic activities are limited
- 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 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)	4,053			4,053	100%	5.0	20,265		
Season II (dry I)	2,837	608		3,445	85%	5.0	14,185	3,040	
Season III (dry II)		608		608	15%			730	
Total/Annual	6,890	1,216	0	8,106	200%	5.0	34,450	3,770	0
Annual Increment	1,291	689	0	1,980	25%	1.0	11,069	2,254	0

IV. WUAs

IV.1 Existing Condition

(1)

Number	a. Target;	35	b. Established;	5	c. Not yet;	30	Registered		0
Performance	a. Developed;	0	b. Under developing;	1	c. Not yet;	4	Not yet registered		5

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☐ Management

(3) Causes of Problems and Constraints

Low attention to organization of farmers into WUA

IV.2 Development Plan

(1) Proposed Countermeasures

Acceleration of WUA establishement

(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 : Free Intake
b. Type of weir : -
c. Length of weir : -
d. Design intake discharge : 5.6 m3/s
e. Scouring sluice gate : -
f. Intake gate : 0 nos.
g. Settling basin : not provided
h. Inspection bridge : -
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	3,265	2,735	6,000	14	0	D
Secondary	0	33,810	33,810	25	0	D

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Unstable diversion water due to river water level fluctuation
  - Incline, settlement, or deflection of intake structure
  - Physical operational problem on intake gate(s)
- 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
  - No provision of diversion weir
  - Improper foundation treatment for structure
  - 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
  - Fallen down and collapse of side slope, water plants or weed at inside of canal
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Provision of diversion weir
  - Reconstruction of intake structure of intake
  - 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 of concrete lining
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	4,920	492	5,412
	Secondary	0	27,724	5,545	33,269
Structure (nos)	Main	0	11	2	14
	Secondary	0	21	7	28

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

a. Potential Irrigated paddy field	3,500	d. Non-potential paddy field	312
b. Potential non-irrigated paddy field	82	e. Non-potenttial non-paddy field	227
c. Potential non-paddy field	0	Total	4,121

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
7,141	54,653	5,465	9,348	1,570	78,177	19.0

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

VI. PROJECT EVALUATION

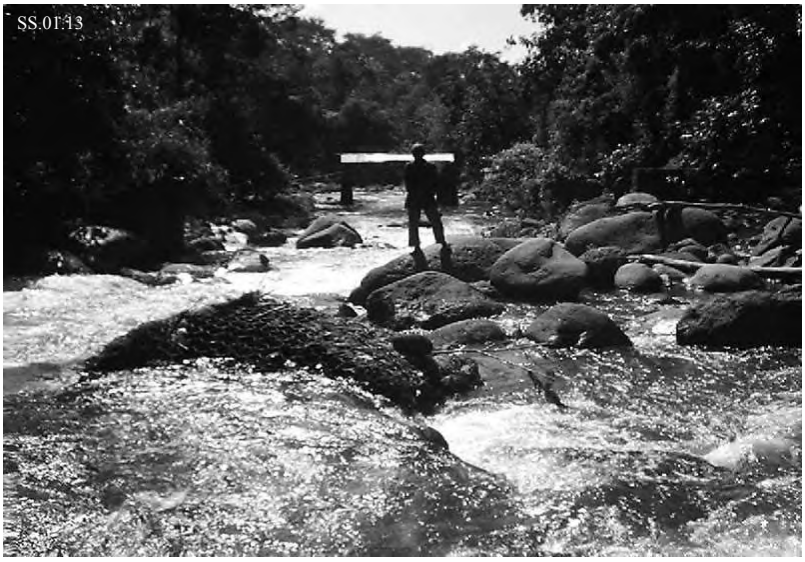
VI.1 EIRR 12.1%

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	Bayang-Bayang	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	5,030 ha	Year of Construction	1930/74



Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☐ B ☑ C ☐ D

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

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; crack on retaining wall of weir.

Category
Irrigation (Headworks)

Structure
Intake

Condition
☐ A ☐ B ☑ C ☐ D

Problems
No intake gate was provided

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

Scheme	Bayang-Bayang	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	5,030 ha	Year of Construction	1930/74

Category
Irrigation (Main Canal)

Structure
Main Canal

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Sedimentation; leakage from canal; collapse of canal; difficulty on maintenance of earth canal; no 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
Paddy Field

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	: 73020109	(7)	Number of Farmers	: 1,764
(2)	Name of Irrigation Scheme	: Bontomanai	(8)	Water Resource River	: S. Balantieng
(3)	District (Kabupaten)	: Bulukumba	(9)	Catchment Area (km^2)	: 57.0
(4)	Sub-district (Kecamatan)	: Rilau Ale/Bulukumpa	(10)	Completion / Last Rehabilitation Year	: 1997/1998
(5)	Registered Area (ha)	: 3,976			
(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	2,212	3,094	882
b. Rainfed paddy field	408	0	-408
c. Upland Field	0	0	0
d. Uncultivated Land	677	0	-677
e. Non-irrigable	0	203	203
Total	3,297	3,297	0

III. AGRICULTURE

III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton) 1/		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	2,195			2,195	99%	4.0	9,800		
Season II (dry I)	2,212			2,212	100%	4.0	8,848	57	
Season III (dry II)		1,200		1,200	54%			840	
Total/Annual	4,407	1,200	0	5,607	253%	4.0	18,648	897	0

1/: Irrigated & rainfed paddy & palawija

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- High irrigation performances attained; however still exist rainfed field (408ha) & uncultivated land (677ha)
- Double cropping of paddy practiced in the entire irrigated area; paddy yield levels still low; palawija introduced extensively

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

- Irrigation & Drainage: Poor O&M at tertiary level and below
- Agronomic Issues: Infestation of pest & diseases
- Paddy Marketing: Unstable marketing prices
- Palawija Marketing: Unstable marketing prices
- Farmers Organizations: No collaboration among KTs
- 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 Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	3,094			3,094	100%	5.0	15,470		
Season II (dry I)	2,475	619		3,094	100%	5.0	12,375	743	
Season III (dry II)		1,238		1,238	40%			1,114	
Total/Annual	5,569	1,857	0	7,426	240%	5.0	27,845	1,857	0
Annual Increment	1,162	657	0	1,819	-13%	1.0	9,197	960	0

IV. WUAs

IV.1 Existing Condition

(1)	Number	a. Target;	48	b. Established;	6	c. Not yet;	42	Registered	0
	Performance	a. Developed;	0	b. Under developing;	6	c. Not yet;	0	Not yet registered	13

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low attention to WUA establishment among farmers
- No membership fee collection system

IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA establishment
- Strengthening of WUA financial management system

(2) Development Plan

- WUA empowerment training
- Management training of WUA staff

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 : 50 m
d. Design intake discharge : 6.0 m3/s
e. Scouring sluice gate : 3 nos.
f. Intake gate : 4 nos.
g. Settling basin : 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	1,587	5,213	6,800	30	0	D
Secondary	9,886	7,702	17,588	66	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 intake gate(s)
- Irrigation Canal and Related Structure
  - Impassable of inspection road along canal
  - Difficulty on maintenance of earth canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient strength of weir foundation, not enough foundation treatment, or insufficient length of apron
  - 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
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Reconstruction of apron of weir
  - 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
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	5,644	564	6,208
	Secondary	0	14,598	2,920	17,518
Structure (nos)	Main	0	25	5	30
	Secondary	0	55	19	74

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

a. Potential Irrigated paddy field	2,212	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	408	e. Non-potenttial non-paddy field	148
c. Potential non-paddy field	529	Total	3,297

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,732	35,540	3,554	9,050	1,570	53,445	16.2

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

VI. PROJECT EVALUATION

VI.1 EIRR 14.2%

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	Bontomanai	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	3,976 ha	Year of Construction	1997/98

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
Gabion on Right of Weir

Condition
☐ A ☐ B ☑ C ☐ D

Problems
Washed away of riprap or blocks at downstream of stilling basin; sedimentation.

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of division structure due to sedimentation in front of structure.

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

Scheme	Bontomanai	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	3,976 ha	Year of Construction	1997/98

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Physical operation problem on structure due to deterioration of gates, sedimentation at inside of canal.

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
Paddy Cultivation

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	: 73020117	(7)	Number of Farmers	: 2,600
(2)	Name of Irrigation Scheme	: Bettu	(8)	Water Resource River	: Biola
(3)	District (Kabupaten)	: Bulukumba	(9)	Catchment Area (km^2)	: 65.93
(4)	Sub-district (Kecamatan)	: Gangking	(10)	Completion / Last Rehabilitation Year	: 1983
(5)	Registered Area (ha)	: 1,817			
(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	20

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	1,802	1,802	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	1,802	1,802	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)	1,802			1,802	100%	4.0	7,208		
Season II (dry I)	1,802			1,802	100%	4.0	7,208		
Season III (dry II)		700		700	39%			1,750	
Total/Annual	3,604	700	0	4,304	239%	4.0	14,416	1,750	0

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- High irrigation performances attained; however water shortage in dry season reported
- Double cropping of paddy practiced in the entire irrigated area; paddy yield levels still low; 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: Damage caused by rat
- Paddy Marketing: Unstable marketing prices
- Palawija Marketing: Low marketing prices
- Farmers Organizations: Managerial capacity of KTs 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)	1,802			1,802	100%	5.0	9,010		
Season II (dry I)	1,802			1,802	100%	5.0	9,010		
Season III (dry II)		901		901	50%			4,505	
Total/Annual	3,604	901	0	4,505	250%	5.0	18,020	4,505	0
Annual Increment	0	201	0	201	11%	1.0	3,604	2,755	0

IV. WUAs

IV.1 Existing Condition

(1)	Number	a. Target;	28	b. Established;	12	c. Not yet;	16	Registered	0
	Performance	a. Developed;	0	b. Under developing;	4	c. Not yet;	8	Not yet registered	12

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Less attention to WUA establishment among farmers and district WRS staff.

IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA establishment.

(2) Development Plan

- WUA empowerment training.

V. IRRIGATION FACILITY

V.1 Existing Condition

(1) Overall Irrigation System : 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 : 36 m
d. Design intake discharge : 2.9 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	1,007	0	1,007	1	0	D
Secondary	11,220	0	11,220	51	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
  Difficulty on water distribution/discharge measurement

- Irrigation Canal and Related Structure
  Impassable of inspection road along canal
  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
  No provision of water level gauge/measuring facility

- 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
  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
  Provision of water level gauge/measuring facility and equipment

- Irrigation Canal and Related Structure
  Provision of inspection road both main and secondary canal with pavement
  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 : minor rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

Works		No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	1,007	101	1,108
	Secondary	0	11,220	2,244	13,464
Structure (nos)	Main	0	1	0	1
	Secondary	0	51	18	69

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

a. Potential Irrigated paddy field	1,802	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	1,802

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
3,112	20,221	2,022	3,694	1,260	30,308	16.8

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

VI. PROJECT EVALUATION

VI.1 EIRR 14.2%

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** -

South Sulawesi Province
3. Bettu Scheme
(3/4)

Scheme	Bettu	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	1,817 ha	Year of Construction	1983

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Damage or breakdown of division structure; lower function of structure due to sedimentation and damage.

Category
Irrigation (Secondary Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Damage or breakdown of division structure; lower function of structure due to sedimentation in front of structure; and deterioration of gates.

Category
Irrigation (Secondary 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

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

Scheme	Bettu	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	1,817 ha	Year of Construction	1983

Category
Irrigation (Secondary 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

Category
Agriculture, On-Farm

Activity
Seedling

Condition
☐ A ☐ B ☐ C ☑ D

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

Category
Agriculture, On-Farm

Activity
Land Preparation by Horse 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

South Sulawesi Province
4. Bontonyeleng Scheme
(1/4)

I. PROJECT FUNDAMENTALS

I.1 General

(1)	Code Number	: 73020119	(7)	Number of Farmers	: 930
(2)	Name of Irrigation Scheme	: Bontonyeleng	(8)	Water Resource River	: Bijawang
(3)	District (Kabupaten)	: Bulukumba	(9)	Catchment Area (km^2)	: 67.90
(4)	Sub-district (Kecamatan)	: Gangking	(10)	Completion / Last Rehabilitation Year	: 1960/1990
(5)	Registered Area (ha)	: 1,096			
(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	10

II. SUBJECT AREA FOR REHABILITATION PLAN

II.1 Present and Planned Land Use

Category	Present (ha)	Plan (ha)	Increment (ha)
a. Irrigated paddy field	815	1,000	185
b. Rainfed paddy field	0	0	0
c. Upland Field	264	0	-264
d. Uncultivated Land	0	0	0
e. Non-irrigable	0	79	79
Total	1,079	1,079	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)	815			815	100%	4.0	3,260	660	
Season II (dry I)	749			749	92%	4.0	2,996		
Season III (dry II)		332		332	41%			830	
Total/Annual	1,564	332	0	1,896	233%	4.0	6,256	1,490	0

1/: Irrigated paddy & palawija

(2) Problems and Constraints

A. Irrigation & Agriculture Performances

- High irrigation performances attained; however water shortage in dry season reported; existing of upland field (264ha)
- Double cropping of paddy practiced almost in the entire irrigated area; paddy yield levels still low; 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: Unstable marketing prices
- Palawija Marketing: Low marketing prices
- 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; 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)	1,000			1,000	100%	5.0	5,000		
Season II (dry I)	1,000			1,000	100%	5.0	5,000		
Season III (dry II)		500		500	50%			2,500	
Total/Annual	2,000	500	0	2,500	250%	5.0	10,000	2,500	0
Annual Increment	436	168	0	604	17%	1.0	3,744	1,010	0

IV. WUAs

IV.1 Existing Condition

(1)	Number	a. Target;	15	b. Established;	6	c. Not yet;	9	Registered	0
	Performance	a. Developed;	0	b. Under developing;	0	c. Not yet;	6	Not yet registered	6

(2) Problems and Constraints

☐ Operation ☑ Maintenance ☐ Management

(3) Causes of Problems and Constraints

- Less guidance activities on O&M to WUA members.

IV.2 Development Plan

(1) Proposed Countermeasures

- Strengthening O&M guidance.

(2) Development Plan

- WUA 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 : 40 m
d. Design intake discharge : 2.0 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 : 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	4,394	0	4,394	11	0	D
Secondary	4,528	0	4,528	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
  - Crack or damage on weir crest
  - 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
  - Leakage from lined 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
  - 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
  - Improper regular maintenance or long leave of repair, narrow wide of canal embankment
  - 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
  - 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
  - Replace canal embankment material with impermeable soil and re-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	4,394	439	4,833
	Secondary	0	4,528	906	5,434
Structure (nos)	Main	0	11	2	13
	Secondary	0	10	4	14

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

a. Potential Irrigated paddy field	815	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	264	Total	1,079

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

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,797	10,314	1,031	3,024	1,260	18,427	17.1

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

VI. PROJECT EVALUATION

VI.1 EIRR 17.2%

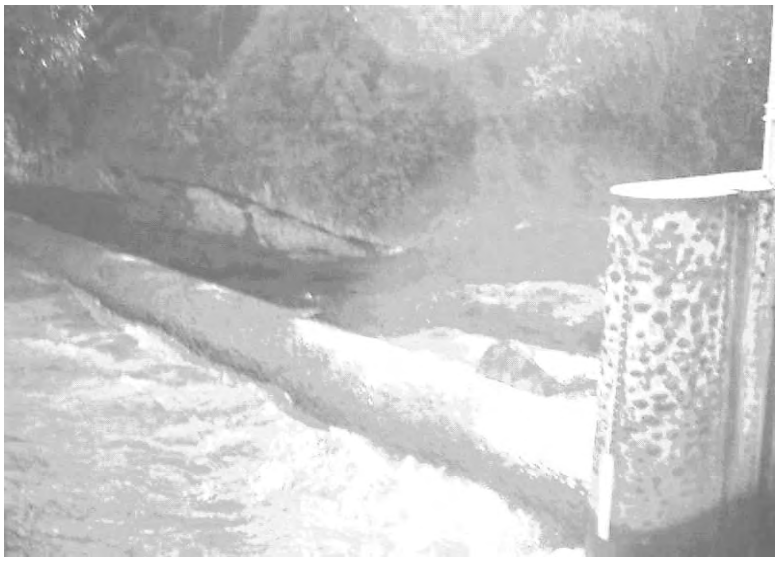
VI.2 Prioritization Scoring

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** -

South Sulawesi Province
4. Bontonyeleng Scheme
(3/4)

Scheme	Bontonyeleng	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	1,096 ha	Year of Construction	1960/90



Category
Irrigation (Headworks)

Structure
Fixed Weir

Condition
☐ A ☑ B ☐ C ☐ D

Problems
Crack or damage on weir crest (some masonry are lost)

Category
Irrigation (Headworks)

Structure
Scouring Sluice

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; sedimentation in front of scouring sluice.

Category
Irrigation (Main Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of division structure due to sedimentation in front of gate; damage of structure; physical operation problem on structure; deterioration of gates.

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

Scheme	Bontonyeleng	District	Bulukumba		
Technical Level	Semi-technical	Registered Area	1,096 ha	Year of Construction	1960/90

Category
Irrigation (Secondary Canal)

Structure
Division Structure

Condition
☐ A ☐ B ☐ C ☑ D

Problems
Lower function of division structure due to sedimentation in front of gate; damage of structure; physical operation problem on structure; deterioration of gates.

Category
Agriculture, On-Farm

Activity
Ready for Harvest

Condition
☐ A ☐ B ☐ C ☑ D

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

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.

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