

**LEGEND**

- ⊙ Capital Town of District
- Sub-District Town
- District Boundary
- - - Sub-District Boundary
- Provincial Road
- District Road
- ~ River
- ▨ Irrigation Scheme
- ▩ Technical Irrigation
- ▧ Semi-Technical Irrigation

**Irrigation Scheme**

Name of Scheme	Registered Areal (Ha)	Subject Areal (Ha)
13. Pala a	,633 T	3,260
1. Pattiro	,970 T	,739
15. nyi	1,310 T	1,136
16. Jalling	1,777 T	1,301
17. Lanca	1,08 ST	676
18. Sanrego	9, 57 T	5,676

T : Technical Irrigation  
ST : Semi Technical Irrigation

The Study on Comprehensive Recovery Program  
of Irrigation Agriculture

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Japan International Cooperation Agency

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

I. PROJECT FUNDAMENTALS										
<b>I.1 General</b>										
(1) Code Number	: 73110063	(7)	Number of Farmers	: 1,304						
(2) Name of Irrigation Scheme	: Palakka	(8)	Water Resource River	: S. Palakka						
(3) District (Kabupaten)	: Bone	(9)	Catchment Area (km <sup>2</sup> )	: 4,637						
(4) Sub-district (Kecamatan)	: T. Riantang Barat	(10)	Completion / Last Rehabilitation Year	: 1925/1980						
(5) Registered Area (ha)	: 4,633									
(6) Technical Level	: Technical									
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	B		c. As-built drawings	B		d. Structure lists & diagram	B
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		h. WUAs data	48
<b>II. SUBJECT AREA FOR REHABILITATION PLAN</b>										
<b>II.1 Present and Planned Land Use</b>										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	3,260	3,260	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	3,260	3,260	0							
<b>III. AGRICULTURE</b>										
<b>III.1 Present/Before Project Condition</b>										
(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)	3,260			3,260	100%	4.0	13,040			
Season II (dry I)				0	0%					
Season III (dry II)	1,048	296		1,344	41%	4.0	4,192	740		
Total/Annual	4,308	296	0	4,604	141%	4.0	17,232	740	0	
(2) Problems and Constraints										
<i>A. Irrigation &amp; Agriculture Performances</i>										
- Irrigation performances yet to be improved										
- Double cropping of paddy introduced; annual cropping intensity still low; paddy yield levels still low; palawija introduced substantially										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage: Water shortage at on-farm level in dry season			- Palawija Marketing: -							
- Agronomic Issues: Farmers not following recommended practices			- Farmers Organizations: Most members are not active							
- Paddy Marketing: Low marketing prices			- Extension Services: Shortage of operation funds of PPLs							
<b>III.2 Development Plan</b>										
(1) Development Approaches										
- Ensuring year round irrigation water supply at on-farm level through rehabilitation										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification; expansion of palawija in dry season II										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	3,260			3,260	100%	5.0	16,300			
Season II (dry I)				0	0%					
Season III (dry II)	2,608	652		3,260	100%	5.0	13,040	3,260		
Total/Annual	5,868	652	0	6,520	200%	5.0	29,340	3,260	0	
Annual Increment	1,560	356	0	1,916	59%	1.0	12,108	2,520	0	
<b>IV. WUAs</b>										
<b>IV.1 Existing Condition</b>										
(1) Number	a. Target;	49	b. Established;	49	c. Not yet;	0	Registered		0	
	a. Developed;	0	b. Under developing;	22	c. Not yet;	27	Not yet registered		50	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input checked="" type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Lack of public awareness to WUA organization.										
- No WUA membership fee system.										
<b>IV.2 Development Plan</b>										
(1) Proposed Countermeasures										
- Acceleration of WUA federation.										
(2) Development Plan										
- Management training of WUA membership.										

**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 Facility
- |                            |                         |                         |                |   |     |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Headworks             | e. Scouring sluice gate | : 1 nos.       | i. Condition  | : B |
| b. Type of weir            | : Fixed weir            | f. Intake gate          | : 2 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 40 m                  | g. Settling basin       | : provided     | (no info.: no information)  |     |
| d. Design intake discharge | : 7.0 m <sup>3</sup> /s | h. Inspection bridge    | : not provided |   |     |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	11,092	2,923	14,015	87	7,297	D
Secondary	15,230	4,174	19,404	101	7,350	D

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Problem on management for flood/scouring sluice gate(s) operation
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Collapse of canal
  - Difficulty on maintenance of earth canal
  - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
  - Water Resources Facility
    - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
    - No provision of inspection/access road, no provision of inspection bridge/deck
  - Irrigation Canal and Related Structure
    - Insufficient function 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
    - 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
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Provision of inspection/access road, inspection bridge/deck
- 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 concrete lining
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

	Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)	Main	0	9,811	0	9,811
	Secondary	0	13,583	0	13,583
Structure (nos)	Main	0	61	6	67
	Secondary	0	71	14	85

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	3,260	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	3,260

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
1,910	44,794	4,479	6,683	1,570	59,436	18.2

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

**VI. PROJECT EVALUATION**




VI.1 EIRR

**VI.2 Prioritization Scoring**

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	13.0
	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

VI.4 Priority Ranking in the Province

Scheme	Palakka	District	Bone	
Technical Level	Technical	Registered Area	4,633 ha	Year of Construction 1925/80
SS.18.35			<p><u>Category</u> Irrigation (Headworks)</p> <p><u>Structure</u> Intake</p> <p><u>Condition</u>  <input type="checkbox"/> A    <input checked="" type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p> <p><u>Problems</u> Insufficient diversion water due to sedimentation in front of intake.</p>	
SS.18.36			<p><u>Category</u> Irrigation (Main Canal)</p> <p><u>Structure</u> Masonry Lined Canal</p> <p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p> <p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal</p>	
SS.18.40			<p><u>Category</u> Irrigation (Main Canal)</p> <p><u>Structure</u> Masonry Lined Canal</p> <p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p> <p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.</p>	

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

Scheme	Palakka	District	Bone		
Technical Level	Technical	Registered Area	4,633 ha	Year of Construction	1925/80
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Division Structure</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Lower function of division structure due to sedimentation in front of gate; physical operation problem on structure; damage on structure</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Structure</u> KUD Office</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			
		<p><u>Category</u> Agro-economy</p>			
		<p><u>Activity</u></p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			

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

I. PROJECT FUNDAMENTALS										
<b>I.1 General</b>										
(1) Code Number	: 73110064	(7)	Number of Farmers	: 2,572						
(2) Name of Irrigation Scheme	: Pattiro	(8)	Water Resource River	: Sungai Pattiro						
(3) District (Kabupaten)	: Bone	(9)	Catchment Area (km <sup>2</sup> )	: 143.0						
(4) Sub-district (Kecamatan)	: Cina Barebbo, Palakka	(10)	Completion / Last Rehabilitation Year	: 1927						
(5) Registered Area (ha)	: 4,970									
(6) Technical Level	: Technical									
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	B		c. As-built drawings	B		d. Structure lists & diagram	B
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		h. WUAs data	54
<b>II. SUBJECT AREA FOR REHABILITATION PLAN</b>										
<b>II.1 Present and Planned Land Use</b>										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	4,630	4,739	109							
b. Rainfed paddy field	109	0	-109							
c. Upland Field	0	0	0							
d. Uncultivated Land	0	0	0							
e. Non-irrigable	0	0	0							
Total	4,739	4,739	0							
<b>III. AGRICULTURE</b>										
<b>III.1 Present/Before Project Condition</b>										
(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)	4,630			4,630	100%	4.5	21,108			
Season II (dry I)				0	0%					
Season III (dry II)	3,325	83		3,408	74%	4.0	13,300	263		
Total/Annual	7,955	83	0	8,038	174%	4.3	34,408	263	0	
1/: Irrigated & rainfed paddy & palawija										
(2) Problems and Constraints										
<i>A. Irrigation &amp; Agriculture Performances</i>										
- Substantially high irrigation performances attained; existing of rainfed field (109ha)										
- Double cropping of paddy practiced almost in the entire irrigated area; paddy yield levels low to moderate; palawija introduced limitedly										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage:	Water shortage at on-farm level in dry season			- Palawija Marketing:	Low marketing prices					
- Agronomic Issues:	Damage caused by rat			- Farmers Organizations:	Most members are not active					
- Paddy Marketing	Low marketing prices			- Extension Services:	Implementation of extension programs is limited					
<b>III.2 Development Plan</b>										
(1) Development Approaches										
- Expansion of irrigated area & ensuring year round irrigation water supply at on-farm level through rehabilitation & upgrading										
- Double cropping of paddy in the entire scheme; productivity increase of paddy through further intensification; introduction of palawija in dry season I										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	4,739			4,739	100%	5.0	23,695			
Season II (dry I)		1,896		1,896	40%			5,878		
Season III (dry II)	4,739			4,739	100%	5.0	23,695			
Total/Annual	9,478	1,896	0	11,374	240%	5.0	47,390	5,878	0	
Annual Increment	1,523	1,813	0	3,336	66%	0.7	12,982	5,615	0	
<b>IV. WUAs</b>										
<b>IV.1 Existing Condition</b>										
(1) Number	a. Target;	56	b. Established;	54	c. Not yet;	2	Registered		0	
	a. Developed;	0	b. Under developing;	90	c. Not yet;	24	Not yet registered		54	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- District WRS office is not active.										
<b>IV.2 Development Plan</b>										
(1) Proposed Countermeasures										
- Acceleration of WUA establishment and federation.										
- Improvement of District WRS staff capability.										
(2) Development Plan										
- Capacity building for District WRS 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 : C
- (2) Water Resources Facility
- |                            |                         |                         |                |   |     |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Headworks             | e. Scouring sluice gate | : 1 nos.       | i. Condition  | : C |
| b. Type of weir            | : Fixed weir            | f. Intake gate          | : 2 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 37 m                  | g. Settling basin       | : not provided | (no info.: no information)  |     |
| d. Design intake discharge | : 8.1 m <sup>3</sup> /s | h. Inspection bridge    | : not provided |   |     |
- (3) Irrigation Canal and Inspection Road
- | Canal     | Lined (m) | Unlined | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|-----------|-----------|---------|-----------|-----------------|---------------------|-----------|
| Main      | 9,708     | 2,900   | 12,608    | 36              | 5,335               | D         |
| Secondary | 14,804    | 22,595  | 37,399    | 97              | 2,509               | 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
    - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
    - Physical operational problem on intake gate(s)
  - Irrigation Canal and Related Structure
    - Sedimentation or obstruction of water flow
    - Difficulty on maintenance of earth canal
    - Clogging of barrel of cross drain
    - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
- Water Resources Facility
    - Deterioration of weir, no or insufficient rehabilitation due to budget problem
    - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
    - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
  - Irrigation Canal and Related Structure
    - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
    - Fallen down and collapse of side slope, water plants or weed at inside of canal
    - Improper regular maintenance, insufficient capacity of barrel area against design discharge
    - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

**V.2 Development Plan**

- (1) Proposed Countermeasures for Major Problems
- Water Resources Facility
    - Replace and reconstruction of weir
    - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
    - Replacement of intake gate(s)
  - Irrigation Canal and Related Structure
    - Removal of sediment soil and foreign materials from canal, grass cutting
    - Provision of concrete lining
    - Removal of foreign materials from inside, or provision of screen, blow-off for maintenance
    - Provision or repair of inspection road with all weather type/pavement
- (2) Water Resources Facility
- Dam/Headworks body : 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	12,608	0	12,608
	Secondary	0	37,399	0	37,399
Structure (nos)	Main	0	36	4	40
	Secondary	0	97	19	116

**(4) On-farm Development**

(Unit: ha)

a. Potential Irrigated paddy field	4,630	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	109	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	4,739

**(5) Rehabilitation Cost (Direct Cost)**

(Unit: Million Rp.)




W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
8,646	101,667	10,167	9,771	1,570	131,821	27.8

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

**VI. PROJECT EVALUATION****VI.1 EIRR** 9.4%**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		69.2
	Urgency	25.0	22.4	Social Problem	15.0	10.5		
	Sustainability	15.0	11.3	Economic Impact	15.0	9.0		

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

Scheme		District	
Pattiro	Bone		
Technical Level	Technical	Registered Area	4,970 ha
		Year of Construction	1927
 <p>SS.19.62</p>		<p><u>Category</u> Irrigation (Headworks)</p> <hr/> <p><u>Structure</u> Scouring Sluice</p> <hr/> <p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p> <hr/> <p><u>Problems</u> Crack or damage on scouring sluice</p>	
 <p>SS.19.65</p>		<p><u>Category</u> Irrigation (Headworks)</p> <hr/> <p><u>Structure</u> Intake, Rear View</p> <hr/> <p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p> <hr/> <p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; problem on management due to lack of periodically maintenance</p>	
 <p>SS.19.31</p>		<p><u>Category</u> Irrigation (Main Canal)</p> <hr/> <p><u>Structure</u> Check Structure</p> <hr/> <p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p> <hr/> <p><u>Problems</u> Lower function of check structure; sedimentation at inside of canal; physical operation problem on structure.</p>	

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



Scheme	Pattiro	District	Bone	
Technical Level	Technical	Registered Area	4,970 ha	Year of Construction 1927
 <p>SS.19.70</p>		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Masonry Lined Canal</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal.</p>		
		<p><u>Category</u> Irrigation (Secondary Canal)</p>		
		<p><u>Activity</u> Masonry Lined Canal</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal.</p>		
		<p><u>Category</u> Agriculture, On-Farm</p>		
		<p><u>Activity</u> Transplanting</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>		
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>		

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

I. PROJECT FUNDAMENTALS										
<b>I.1 General</b>										
(1) Code Number	: 73110066	(7)	Number of Farmers	: 710						
(2) Name of Irrigation Scheme	: Unyi	(8)	Water Resource River	: Unyi						
(3) District (Kabupaten)	: Bone	(9)	Catchment Area (km <sup>2</sup> )	: -						
(4) Sub-district (Kecamatan)	: Dua Boccoe	(10)	Completion / Last Rehabilitation Year	: 1934/1984						
(5) Registered Area (ha)	: 1,310									
(6) Technical Level	: Technical									
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	B		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		h. WUAs data	24
<b>II. SUBJECT AREA FOR REHABILITATION PLAN</b>										
<b>II.1 Present and Planned Land Use</b>										
Category	Present (ha)		Plan (ha)		Increment (ha)					
a. Irrigated paddy field	1,136		1,136		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	1,136		1,136		0					
<b>III. AGRICULTURE</b>										
<b>III.1 Present/Before Project Condition</b>										
(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)	1,136			1,136	100%	4.5	5,112			
Season II (dry I)				0	0%					
Season III (dry II)	848	266		1,114	98%	4.5	3,816	213		
Total/Annual	1,984	266	0	2,250	198%	4.5	8,928	213	0	
(2) Problems and Constraints										
<i>A. Irrigation &amp; Agriculture Performances</i>										
- High irrigation performances attained; however water shortage in dry season reported										
- Double cropping of paddy introduced; paddy yield levels moderate; palawija introduced substantially										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage: Water shortage at on-farm level in dry season			- Palawija Marketing: Unstable marketing prices							
- Agronomic Issues: Farmers not following recommended practices			- Farmers Organizations: Economic activities are limited							
- Paddy Marketing: Limited bargaining power of farmers			- Extension Services: Implementation of extension programs is limited							
<b>III.2 Development Plan</b>										
(1) Development Approaches										
- Ensuring year round irrigation water supply at on-farm level through rehabilitation										
- Double cropping of paddy in the entire scheme; productivity increase of paddy through further intensification; introduction of palawija in dry season I										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	1,136			1,136	100%	5.5	6,248			
Season II (dry I)		454		454	40%			1,407		
Season III (dry II)	1,136			1,136	100%	5.5	6,248			
Total/Annual	2,272	454	0	2,726	240%	5.5	12,496	1,407	0	
Annual Increment	288	188	0	476	42%	1.0	3,568	1,194	0	
<b>IV. WUAs</b>										
<b>IV.1 Existing Condition</b>										
(1) Number	a. Target;	34	b. Established;	34	c. Not yet;	0	Registered		0	
	Performance	a. Developed;	1	b. Under developing;	9	c. Not yet;	24	Not yet registered	34	
(2) Problems and Constraints										
<input checked="" type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- Insufficient water distribution in dry season.										
- Low level of O&M skill of WUA members.										
<b>IV.2 Development Plan</b>										
(1) Proposed Countermeasures										
- Improvement of skill level.										
(2) Development Plan										
- Training by 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 Facility
- |                            |                         |                         |                |   |     |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Headworks             | e. Scouring sluice gate | : 1 nos.       | i. Condition  | : B |
| b. Type of weir            | : Fixed weir            | f. Intake gate          | : 2 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 22 m                  | g. Settling basin       | : not provided | (no info.: no information)  |     |
| d. Design intake discharge | : 2.0 m <sup>3</sup> /s | h. Inspection bridge    | : not provided |   |     |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	9,053	0	9,053	45	0	D
Secondary	5,734	1,500	7,234	26	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
  - Fallen down, inclined, or washed away of retaining wall of weir
  - Difficulty on water distribution/discharge measurement
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Impassable of inspection road along canal
  - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
  - Water Resources Facility
    - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
    - 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 provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

**V.2 Development Plan**

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Reconstruction of retaining wall of weir
  - 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 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	7,876	0	7,876
	Secondary	0	6,294	0	6,294
Structure (nos)	Main	0	39	4	43
	Secondary	0	23	5	27

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,136	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,136

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,758	23,151	2,315	2,329	1,260	31,813	28.0

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

**VI. PROJECT EVALUATION**

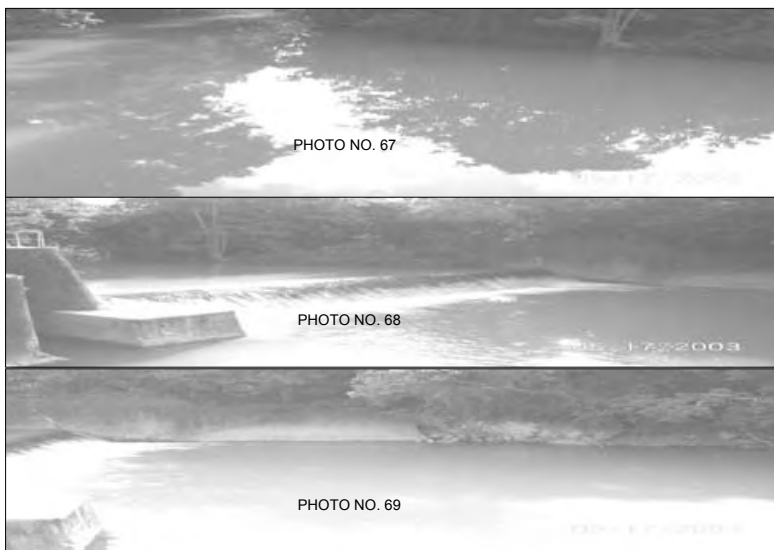


VI.1 EIRR

**VI.2 Prioritization Scoring**

Evaluation Index		Full Score	Score	Evaluation Index		Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	11.0	64.2	
	Urgency	25.0	20.4	Social Problem	15.0	10.5		
	Sustainability	15.0	8.3	Economic Impact	15.0	9.0		

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme	Unyi	District	Bone	
Technical Level	Technical	Registered Area	1,310 ha	Year of Construction 1934/84
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Fixed Weir</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input checked="" type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Headworks)</p>		
		<p><u>Structure</u> Retaining Wall</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>		
		<p><u>Category</u> Irrigation (Main Canal)</p>		
		<p><u>Structure</u> Masonry Lined Canal</p>		
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>		
		<p><u>Problems</u> Crack or damage on weir crest; settlement of weir body.</p>		
		<p><u>Problems</u> Fallen down, incline or washed away of retaining wall of weir</p>		
		<p><u>Problems</u> Sedimentation; crack or damage on lined canal; leakage from lined canal; deflection of lining toward inside of canal; no inspection road.</p>		

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

Scheme	Unyi	District	Bone		
Technical Level	Technical	Registered Area	1,310 ha	Year of Construction	1934/84
		<p><u>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Division Structure</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Lower function of division structure due to sedimentation in front of gate; physical operation problem on structure; damage on structure; deterioration of gate.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Paddy and Upland Crop Cultivation</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Land Preparation by Hand Tractor</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>			
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>			

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

I. PROJECT FUNDAMENTALS										
<b>I.1 General</b>										
(1) Code Number	: 73110068	(7)	Number of Farmers	: 813						
(2) Name of Irrigation Scheme	: Jalling	(8)	Water Resource River	: Lapuse						
(3) District (Kabupaten)	: Bone	(9)	Catchment Area (km <sup>2</sup> )	: -						
(4) Sub-district (Kecamatan)	: Awangpone	(10)	Completion / Last Rehabilitation Year	: 1983/1985						
(5) Registered Area (ha)	: 1,777									
(6) Technical Level	: Technical									
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	B		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		h. WUAs data	11
II. SUBJECT AREA FOR REHABILITATION PLAN										
<b>II.1 Present and Planned Land Use</b>										
Category	Present (ha)	Plan (ha)	Increment (ha)							
a. Irrigated paddy field	1,301	1,301	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	1,301	1,301	0							
III. AGRICULTURE										
<b>III.1 Present/Before Project Condition</b>										
(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)	1,301			1,301	100%	4.0	5,204			
Season II (dry I)				0	0%					
Season III (dry II)	557	430		987	76%	4.0	2,228	1,075		
Total/Annual	1,858	430	0	2,288	176%	4.0	7,432	1,075	0	
(2) Problems and Constraints										
<i>A. Irrigation &amp; Agriculture Performances</i>										
- Irrigation performances yet to be improved; water shortage in dry season reported										
- Double cropping of paddy introduced; annual cropping intensity of paddy still low; paddy yield levels still low; palawija introduced substantially										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage: Water shortage at on-farm level in dry season			- Palawija Marketing: Low marketing prices							
- Agronomic Issues: Farmers not following recommended practices			- Farmers Organizations: Economic activities are limited							
- Paddy Marketing: Unstable marketing prices			- Extension Services: Shortage of operation funds of PPLs							
<b>III.2 Development Plan</b>										
(1) Development Approaches										
- Ensuring year round irrigation water supply at on-farm level through rehabilitation										
- Expansion of double cropped area of paddy; productivity increase of paddy through intensification										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	1,301			1,301	100%	5.0	6,505			
Season II (dry I)				0	0%					
Season III (dry II)	1,041	260		1,301	100%	5.0	5,205	1,300		
Total/Annual	2,342	260	0	2,602	200%	5.0	11,710	1,300	0	
Annual Increment	484	-170	0	314	24%	1.0	4,278	225	0	
IV. WUAs										
<b>IV.1 Existing Condition</b>										
(1) Number	a. Target;	22	b. Established;	8	c. Not yet;	14	Registered		0	
	a. Developed;	0	b. Under developing;	1	c. Not yet;	7	Not yet registered		8	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- No O&M plan.										
- Low management of WUA under Federation.										
<b>IV.2 Development Plan</b>										
(1) Proposed Countermeasures										
- Improvement of management activities.										
(2) Development Plan										
- WUA management training.										

**V. IRRIGATION FACILITY**

**V.1 Existing Condition**

- (1) Overall Irrigation System : C (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)  
Water Resources Facility : B Main Canal System : C Secondary Canal System : D On-farm : C
- (2) Water Resources Facility
- |                            |                         |                         |                |   |     |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Headworks             | e. Scouring sluice gate | : 1 nos.       | i. Condition  | : B |
| b. Type of weir            | : Fixed weir            | f. Intake gate          | : 1 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 21 m                  | g. Settling basin       | : not provided | (no info.: no information)  |     |
| d. Design intake discharge | : 2.7 m <sup>3</sup> /s | h. Inspection bridge    | : not provided |   |     |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	13,516	0	13,516	75	7,150	C
Secondary	0	3,950	3,950	5	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
  - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
  - Physical operational problem on intake gate(s)
  - Difficulty on water distribution/discharge measurement
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Leakage from canal
  - Collapse of 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
    - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
    - 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 regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
    - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope 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 overcoat or replacement of flood/scouring sluice gate(s) of headworks
  - Replacement of intake gate(s)
  - 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
  - Repair of leakage from canal, widen canal wide, recompaction of embankment
  - Redesign of canal section; provision of cross drain, proper width of berm, catch drain, and/or proper slope
  - 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	9,867	0	9,867
Secondary	0	2,884	0	2,884
Structure (nos)				
Main	0	55	5	60
Secondary	0	4	1	4

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	1,301	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	1,301

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,661	18,270	1,827	2,667	1,260	26,685	20.5

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

**VI. PROJECT EVALUATION**




VI.1 EIRR

**VI.2 Prioritization Scoring**

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	13.0
	Urgency	25.0	19.0	Social Problem	15.0	10.5
	Sustainability	15.0	8.3	Economic Impact	15.0	10.5



VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme		District	
Jalling	Bone	Registered Area	Year of Construction
Technical Level	Technical	1,777 ha	1983/85
		<p><u>Category</u> Irrigation (Headworks)</p>	
		<p><u>Structure</u> Fixed Weir</p>	
		<p><u>Condition</u>  <input type="checkbox"/> A    <input checked="" type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p>	
 <p style="text-align: center;">PHOTO NO. 51</p>		<p><u>Category</u> Irrigation (Headworks)</p>	
		<p><u>Structure</u> Intake, Rear View</p>	
		<p><u>Condition</u>  <input type="checkbox"/> A    <input checked="" type="checkbox"/> B    <input type="checkbox"/> C    <input type="checkbox"/> D</p>	
		<p><u>Category</u> Irrigation (Main Canal)</p>	
		<p><u>Structure</u> Masonry Lined Canal</p>	
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>	
<p><u>Problems</u> Crack or damage on weir crest; settlement of weir body.</p>		<p><u>Problems</u> Leakage from gate leaf; insufficient strength against design load due to rust, decay of steel material; problem on management due to lack of periodically maintenance</p>	
		<p><u>Problems</u> Canal is totally damaged.</p>	

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



Scheme		District	
Jalling		Bone	
Technical Level	Technical	Registered Area	1,777 ha
		Year of Construction	1983/85
		<p><u>Category</u> Irrigation (Secondary Canal)</p>	
		<p><u>Structure</u> Earth Canal</p>	
		<p><u>Condition</u> <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>	
		<p><u>Problems</u> Canal is totally damaged.</p>	
		<p><u>Category</u> Agriculture, On-Farm</p>	
		<p><u>Condition</u> Paddy for Harvest</p>	
		<p><u>Condition</u> <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>	
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>	
		<p><u>Category</u> Agriculture, On-Farm</p>	
		<p><u>Activity</u> Secondary Crops (Maize) Cultivation</p>	
		<p><u>Condition</u> <input type="checkbox"/> A    <input type="checkbox"/> B    <input checked="" type="checkbox"/> C    <input type="checkbox"/> D</p>	
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>	

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

I. PROJECT FUNDAMENTALS										
<b>I.1 General</b>										
(1) Code Number	: 73110076	(7)	Number of Farmers	: 422						
(2) Name of Irrigation Scheme	: Lanca	(8)	Water Resource River	: Lanca						
(3) District (Kabupaten)	: Bone	(9)	Catchment Area (km <sup>2</sup> )	: -						
(4) Sub-district (Kecamatan)	: Telu Siattinge	(10)	Completion / Last Rehabilitation Year	: 1983/1992						
(5) Registered Area (ha)	: 1,084									
(6) Technical Level	: Semi Technical									
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>										
a. Design Reports of Existing System(Full set)	B		b. Irrigation diagram	A		c. As-built drawings	B		d. Structure lists & diagram	A
e. Rehabilitation plan & its references	C		f. Crops and yield data	A		g. Cropping Calender	A		h. WUAs data	5
II. SUBJECT AREA FOR REHABILITATION PLAN										
<b>II.1 Present and Planned Land Use</b>										
Category	Present (ha)		Plan (ha)		Increment (ha)					
a. Irrigated paddy field	676		676		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	676		676		0					
III. AGRICULTURE										
<b>III.1 Present/Before Project Condition</b>										
(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)	676			676	100%	4.0	2,704			
Season II (dry I)				0						
Season III (dry II)	515	119		634	94%	4.0	2,060	298		
Total/Annual	1,191	119	0	1,310	194%	4.0	4,764	298	0	
1/: Irrigated & rainfed paddy & palawija										
(2) Problems and Constraints										
<i>A. Irrigation &amp; Agriculture Performances</i>										
- High irrigation performances attained; however water shortage in dry season reported										
- Double cropping of paddy introduced; paddy yield levels still low; palawija introduced to some extent										
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>										
- Irrigation & Drainage: Water shortage at on-farm level in dry season			- Palawija Marketing: Limited market outlet							
- Agronomic Issues: Farmers not following recommended practices			- Farmers Organizations: Economic activities are limited							
- Paddy Marketing: Low marketing prices			- Extension Services: Implementation of extension programs is limited							
<b>III.2 Development Plan</b>										
(1) Development Approaches										
- Ensuring year round irrigation water supply at on-farm level through rehabilitation										
- Double cropping of paddy in the entire scheme; productivity increase of paddy through further intensification; introduction of palawija in dry season I										
- Strengthening of extension activities tailored to area specific needs; empowerment of farmer groups (KTs) to establish agri-business oriented KT's										
(2) Planned Irrigation Performances and Crop Production										
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)			
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others	
Season I (wet)	676			676	100%	5.0	3,380			
Season II (dry I)		203		203	30%			1,015		
Season III (dry II)	676			676	100%	5.0	3,380			
Total/Annual	1,352	203	0	1,555	230%	5.0	6,760	1,015	0	
Annual Increment	161	84	0	245	36%	1.0	1,996	717	0	
IV. WUAs										
<b>IV.1 Existing Condition</b>										
(1) Number	a. Target;	15	b. Established;	5	c. Not yet;	10	Registered		0	
	Performance	a. Developed;	0	b. Under developing;	0	c. Not yet;	5	Not yet registered	5	
(2) Problems and Constraints										
<input type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input checked="" type="checkbox"/> Management										
(3) Causes of Problems and Constraints										
- No O&M work plan.										
- Lack of management skills.										
<b>IV.2 Development Plan</b>										
(1) Proposed Countermeasures										
- Improvement of management capability.										
(2) Development Plan										
- WUA management training.										

**V. IRRIGATION FACILITY**

**V.1 Existing Condition**

- (1) Overall Irrigation System : D (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)  
Water Resources Facility : C Main Canal System : D Secondary Canal System : D On-farm : D
- (2) Water Resources Facility
- |                            |                         |                         |                |   |     |
|----------------------------|-------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Spring Water Intake   | e. Scouring sluice gate | : -            | i. Condition  | : C |
| b. Type of weir            | : -                     | f. Intake gate          | : 2 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 5 m                   | g. Settling basin       | : not provided | (no info.: no information)  |     |
| d. Design intake discharge | : 1.2 m <sup>3</sup> /s | h. Inspection bridge    | : not provided |   |     |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	0	0	0	0	0	D
Secondary	1,506	8,127	9,633	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
    - Fallen down, inclined, or washed away of retaining wall of intake
    - Physical operational problem on intake gate(s)
    - Difficulty on water distribution/discharge measurement
  - Irrigation Canal and Related Structure
    - Sedimentation or obstruction of water flow
    - Impassable of inspection road along canal
    - Overage, lower strength of canal
    - Difficulty on O&M
- (5) Causes of Major Problems and Constraints
- Water Resources Facility
    - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
    - Improper design, installation and/or maintenance of intake gate(s); breakdown of hoist, stem, guide frame or leaf
    - 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
    - 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 retaining wall of intake
  - Replacement of intake gate(s)
  - 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
  - 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 : 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	0	0	0
	Secondary	0	5,972	1,194	7,167
Structure (nos)	Main	0	0	0	0
	Secondary	0	32	11	43

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	676	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	0	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	676

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
2,767	9,569	957	1,386	1,260	15,938	23.6

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

**VI. PROJECT EVALUATION**

VI.1 EIRR




**VI.2 Prioritization Scoring**

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	- Agricultural Productivity	20.0	-	-
	Urgency	25.0	- Social Problem	15.0	-	-
	Sustainability	15.0	- Economic Impact	15.0	-	-


VI.3 Priority Group

(Subject area is less than 1,000 ha)

VI.4 Priority Ranking in the Province

Scheme	Lanca	District	Bone	
Technical Level	Semi-technical	Registered Area	1,084 ha	Year of Construction 1983/92
		<u>Category</u> Spring Water Intake		
		<u>Structure</u> Intake		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input checked="" type="checkbox"/> C <input type="checkbox"/> D		
		<u>Problems</u> Insufficient diversion water due to sedimentation in front of structure.		
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Check Structure		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Lower function of check structure due to sedimentation in front of gate; physical operation problem on structure; damage on structure; deterioration of gate.		
		<u>Category</u> Irrigation (Secondary Canal)		
		<u>Structure</u> Masonry Lined Canal		
		<u>Condition</u> <input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D		
		<u>Problems</u> Not in use		

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

Scheme	Lanca	District	Bone		
Technical Level	Semi-technical	Registered Area	1,084 ha	Year of Construction	1983/92
		<p><u>Category</u> Irrigation (Secondary Canal)</p>			
		<p><u>Structure</u> Earth Canal</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Sedimentation; collapse of canal; leakage from canal; difficulty on maintenance of earth canal; no inspection road.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Land Preparation by Hand Tractor</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>			
		<p><u>Category</u> Post-harvest Facility</p>			
		<p><u>Activity</u> Drying Yard</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			

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

I. PROJECT FUNDAMENTALS									
<b>I.1 General</b>									
(1) Code Number	: 73110081	(7) Number of Farmers	: 8,228						
(2) Name of Irrigation Scheme	: Sanrego	(8) Water Resource River	: Sanrego						
(3) District (Kabupaten)	: Bone	(9) Catchment Area (km <sup>2</sup> )	: 176.00						
(4) Sub-district (Kecamatan)	: Kahu, Libureng, Patimpeng	(10) Completion / Last Rehabilitation Year	: 1990						
(5) Registered Area (ha)	: 9,457								
(6) Technical Level	: Technical								
<b>I.2 Availability of Reports/Documents &amp; References (A : Available, B : Available but partially, C : Not available/ No plan)</b>									
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		123			
II. SUBJECT AREA FOR REHABILITATION PLAN									
<b>II.1 Present and Planned Land Use</b>									
Category	Present (ha)	Plan (ha)	Increment (ha)						
a. Irrigated paddy field	4,751	5,676	925						
b. Rainfed paddy field	925	0	-925						
c. Upland Field	0	0	0						
d. Uncultivated Land	0	0	0						
e. Non-irrigable	0	0	0						
Total	5,676	5,676	0						
III. AGRICULTURE									
<b>III.1 Present/Before Project Condition</b>									
(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)	4,751			4,751	100%	4.5	23,692		
Season II (dry I)				0					
Season III (dry II)	3,442	908		4,350	92%	4.5	15,489	1,099	
Total/Annual	8,193	908	0	9,101	192%	4.5	39,181	1,099	0
1/: Irrigated & rainfed paddy & palawija									
(2) Problems and Constraints									
<i>A. Irrigation &amp; Agriculture Performances</i>									
- High irrigation performances attained; existing of rainfed field (925ha); water shortage in dry season reported									
- Double cropping of paddy practiced almost in the entire irrigated area; paddy yield levels low to moderate; palawija introduced limitedly									
<i>B. Primary Constraint Identified through the Inventory Survey by the JICA Study</i>									
- Irrigation & Drainage:		Water shortage at on-farm level in dry season			- Palawija Marketing:		Low marketing prices		
- Agronomic Issues:		Farmers not following recommended practices			- Farmers Organizations:		Most members are not active		
- Paddy Marketing		Low marketing prices			- Extension Services:		Shortage of operation funds of PPLs		
<b>III.2 Development Plan</b>									
(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; expansion 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 KT's									
(2) Planned Irrigation Performances and Crop Production									
Season	Cropped Area in Irrigated Paddy Field				Annual Intensity	Irrigated Paddy Yield (GKG ton/ha)	Crop Production (ton)		
	Paddy (ha)	Palawija	Others (ha)	Total (ha)			Paddy	Palawija	Others
Season I (wet)	5,676			5,676	100%	5.5	31,218		
Season II (dry I)		1,135		1,135	20%			1,021	
Season III (dry II)	4,825	851		5,676	100%	5.5	26,538	5,675	
Total/Annual	10,501	1,986	0	12,487	220%	5.5	57,756	6,696	0
Annual Increment	2,308	1,078	0	3,386	28%	1.0	18,575	5,597	0
IV. WUAs									
<b>IV.1 Existing Condition</b>									
(1) Number	a. Target;	123	b. Established;	123	c. Not yet;	0	Registered		0
	Performance	a. Developed;	9	b. Under developing;	114	c. Not yet;	0	Not yet registered	123
(2) Problems and Constraints									
<input checked="" type="checkbox"/> Operation <input type="checkbox"/> Maintenance <input type="checkbox"/> Management									
(3) Causes of Problems and Constraints									
- Rehabilitation of irrigation systems.									
- Lack of government financial support.									
<b>IV.2 Development Plan</b>									
(1) Proposed Countermeasures									
- WUA's involvement in rehabilitation planning.									
(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 Facility
- |                            |                          |                         |                |   |     |
|----------------------------|--------------------------|-------------------------|----------------|---|-----|
| a. Type of facility        | : Headworks              | e. Scouring sluice gate | : 2 nos.       | i. Condition  | : B |
| b. Type of weir            | : Fixed weir             | f. Intake gate          | : 3 nos.       | (A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation) |     |
| c. Length of weir          | : 46 m                   | g. Settling basin       | : not provided | (no info.: no information)  |     |
| d. Design intake discharge | : 12.9 m <sup>3</sup> /s | h. Inspection bridge    | : provided     |   |     |

(3) Irrigation Canal and Inspection Road

Canal	Lined (m)	Unlined	Total (m)	Structure (nos)	Inspection road (m)	Condition
Main	4,000	7,490	11,490	24	11,490	D
Secondary	2,488	52,605	55,093	339	13,467	D

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Fallen down, inclined, or washed away of retaining wall of weir
  - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Difficulty on maintenance of earth canal
  - Difficulty on water distribution

(5) Causes of Major Problems and Constrains

- Water Resources Facility
  - Insufficient quality of concrete or masonry material, over acting earth pressure more than design
  - Sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Fallen down and collapse of side slope, water plants or weed at inside of canal
  - No provision of water level gauge/facility

**V.2 Development Plan**

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Reconstruction of retaining wall of weir
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
  - Provision of concrete lining
  - Provision of water level gauge/facility

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

Works	No rehabilitation	Rehabilitation	New construction	Total
Canal (m)				
Main	0	9,881	0	9,881
Secondary	0	47,380	0	47,380
Structure (nos)				
Main	0	21	2	23
Secondary	0	292	58	350

(4) On-farm Development

(Unit: ha)

a. Potential Irrigated paddy field	4,751	d. Non-potential paddy field	0
b. Potential non-irrigated paddy field	925	e. Non-potential non-paddy field	0
c. Potential non-paddy field	0	Total	5,676

(5) Rehabilitation Cost (Direct Cost)

(Unit: Million Rp.)

W.R.F	Irrigation	Drainage	On-Farm Develop.	Project Facility	Total	Cost per ha
4,832	95,021	9,502	12,110	2,590	124,055	21.9

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

**VI. PROJECT EVALUATION**




VI.1 EIRR

**VI.2 Prioritization Scoring**

Evaluation Index	Full Score	Score	Evaluation Index	Full Score	Score	Total Score
Irrigation System	Utilization of Irrigation Potential	10.0	5.0	Agricultural Productivity	20.0	14.0
	Urgency	25.0	21.0	Social Problem	15.0	12.0
	Sustainability	15.0	6.8	Economic Impact	15.0	10.5
						69.3

VI.3 Priority Group

VI.4 Priority Ranking in the Province

Scheme		Sanrego		District		Bone					
Technical Level		Technical		Registered Area		9,457 ha	Year of Construction 1990				
				<u>Category</u>				Irrigation (Headworks)			
				<u>Structure</u>				Fixed Weir, Upstream View			
				<u>Condition</u>				<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
				<u>Problems</u>				Sedimentation at weir.			
				<u>Category</u>				Irrigation (Headworks)			
				<u>Structure</u>				Retaining Wall and Stilling Basin			
				<u>Condition</u>				<input type="checkbox"/> A <input checked="" type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D			
				<u>Problems</u>				Fallen down, incline or washed away of retaining wall of weir; washed away of stilling basin			
				<u>Category</u>				Irrigation (Main Canal)			
				<u>Structure</u>				Masonry Lined Canal			
				<u>Condition</u>				<input type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input checked="" type="checkbox"/> D			
				<u>Problems</u>				Sedimentation; 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	Sanrego	District	Bone		
Technical Level	Technical	Registered Area	9,457 ha	Year of Construction	1990
		<p><u>Category</u> Irrigation (Main Canal)</p>			
		<p><u>Structure</u> Inspection Road</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Impossible for passing</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Paddy Field</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u> Low density of on-farm canals and farm roads.</p>			
		<p><u>Category</u> Agriculture, On-Farm</p>			
		<p><u>Activity</u> Transportation by Hand Tractor</p>			
		<p><u>Condition</u>  <input type="checkbox"/> A    <input type="checkbox"/> B    <input type="checkbox"/> C    <input checked="" type="checkbox"/> D</p>			
		<p><u>Problems</u></p>			

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