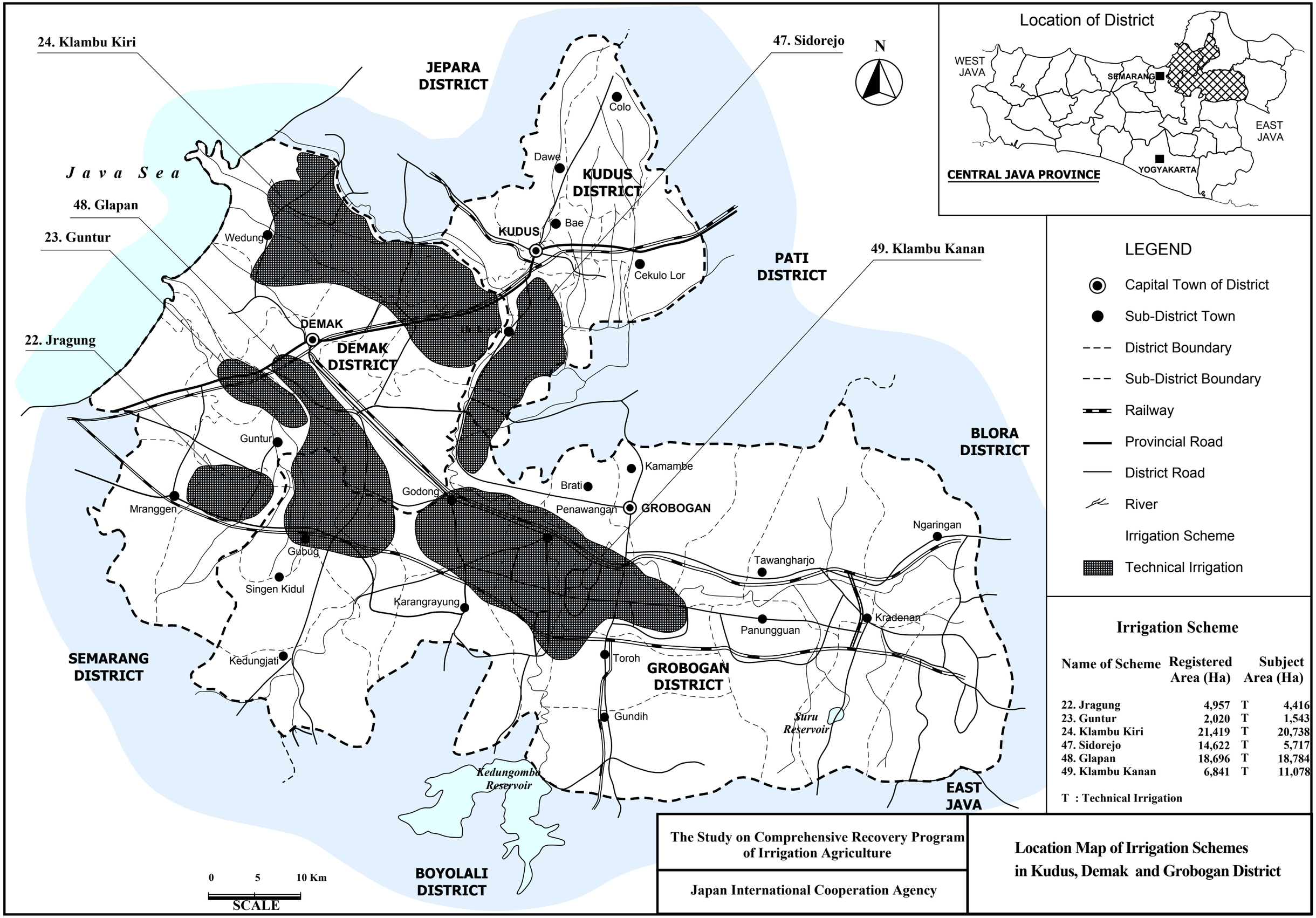



## Irrigation Scheme

| Name of Scheme | Registered Area (Ha) | | Subject Area (Ha) |
|---|---|---|---|
| 22. Jragung | 4,957 | T | 4,416 |
| 23. Guntur | 2,020 | T | 1,543 |
| 24. Klambu Kiri | 21,419 | T | 20,738 |
| 47. Sidorejo | 14,622 | T | 5,717 |
| 48. Glapan | 18,696 | T | 18,784 |
| 49. Klambu Kanan | 6,841 | T | 11,078 |

T : Technical Irrigation

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

**Location Map of Irrigation Schemes in Kudus, Demak and Grobogan District**

## I. PROJECT FUNDAMENTALS

**I.1 General**

| | | | | | |
|---|---|---|---|---|---|
| (1) | Code Number | : 33010020-22 | (7) | Number of Farmers | : 10,638 |
| (2) | Name of Irrigation Scheme | : Jragung | (8) | Water Resource River | : Jragung |
| (3) | District (Kabupaten) | : Demak | (9) | Catchment Area ($km^2$) | : 300 |
| (4) | Sub-district (Kecamatan) | : Guntur | (10) | Completion / Last Rehabilitation Year | : 1989 |
| (5) | Registered Area (ha) | : 4,597 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 4,416 | 4,416 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 4,416 | 4,416 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 2,333 | 2,081 | | 4,414 | 100% | 4.5 | 10,499 | 6,249 | |
| Season II (dry I) | 1,400 | 3,016 | | 4,416 | 100% | 4.5 | 6,300 | 9,048 | |
| Season III (dry II) | | 4,416 | | 4,416 | 100% | | | 5,290 | |
| Total/Annual | 3,733 | 9,513 | 0 | 13,246 | 300% | 4.5 | 16,799 | 20,587 | 0 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- Maximum irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Single cropping of paddy prevailing; paddy yield levels moderate; palawija cropped area larger then that of paddy

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

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

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Introduction of double cropping of paddy; productivity increase of paddy & palawija through further intensification
- 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 (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 4,416 | | | 4,416 | 100% | 5.0 | 22,080 | | |
| Season II (dry I) | 2,208 | 2,208 | | 4,416 | 100% | 5.0 | 11,040 | 11,040 | |
| Season III (dry II) | | 4,416 | | 4,416 | 100% | | | 6,182 | |
| Total/Annual | 6,624 | 6,624 | 0 | 13,248 | 300% | 5.0 | 33,120 | 17,222 | 0 |
| Annual Increment | 2,891 | -2,889 | 0 | 2 | 0% | 0.5 | 16,322 | -3,365 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 38 | b. Established; | 19 | c. Not yet; | 19 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 16 | c. Not yet; | 3 | Not yet registered | | 19 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Delay in administrative procedure for WUA establishment.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Acceleration of administrative process.

(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 : C Main Canal System : C Secondary Canal System : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 33 m
d. Design intake discharge : 8.0 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 1 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 | 7,325 | 0 | 7,325 | 13 | 2,391 | C |
| Secondary | 17,504 | 10,300 | 27,804 | 90 | 8,482 | C |

(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
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Impassable of inspection road along canal
  - General O&M problems
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- 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
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

**V.2 Development Plan**

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- 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
  - 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 : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 7,325 | 0 | 7,325 |
| | Secondary | 0 | 27,804 | 0 | 27,804 |
| Structure (nos) | Main | 0 | 13 | 1 | 14 |
| | Secondary | 0 | 90 | 18 | 108 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 4,416 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 0 | e. Non-potenttial non-paddy field | 0 |
| c. Potential non-paddy field | 0 | Total | 4,416 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 3,698 | 49,752 | 4,975 | 9,053 | 1,570 | 69,048 | 15.6 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 15.0%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 15.0 | 67.8 |
| | Urgency | 25.0 | 20.0 | Social Problem | 15.0 | 10.5 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 10.5 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 2

| Scheme | Jragung | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 4,597 ha | Year of Construction | 1989 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment in front of weir and intake

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Scouring Sluice

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment in front of weir and intake

*Category*
Irrigation (Main Canal)

*Structure*
Temporary Bridge

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Due to broken of weir bridge, bamboo bridge is provided

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

| Scheme | Jragung | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 4,597 ha | Year of Construction | 1989 |

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair and removal of sediment

*Category*
Irrigation (Main Canal)

*Structure*
Canal and Division Structure

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair and removal of sediment

*Category*
Irrigation (Secondary Canal)

*Structure*
Canal and Division Structure

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair, lining and removal of sediment

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 | : 33010019-20 | (7) | Number of Farmers | : 6,565 |
| (2) | Name of Irrigation Scheme | : D.I. Guntur Kiri | (8) | Water Resource River | : Kali K.R.I |
| (3) | District (Kabupaten) | : Demak | (9) | Catchment Area ($km^2$) | : 50 |
| (4) | Sub-district (Kecamatan) | : Karang Tengah | (10) | Completion / Last Rehabilitation Year | : 1979 |
| (5) | Registered Area (ha) | : 2,020 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 1,543 | 1,543 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 1,543 | 1,543 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 1,543 | | | 1,543 | 100% | 4.5 | 6,944 | | |
| Season II (dry I) | 1,543 | | | 1,543 | 100% | 4.5 | 6,944 | | |
| Season III (dry II) | | | | 0 | | | | | |
| Total/Annual | 3,086 | 0 | 0 | 3,086 | 200% | 4.5 | 13,887 | 0 | 0 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, water shortage in dry season reported
- Double cropping of paddy practiced in the entire irrigated area; paddy yield levels moderate; palawija not introduced yet

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Water shortage at on-farm level in dry season | - Palawija Marketing: | 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 |

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Introduction of palawija production in dry season II; productivity increase of paddy & palawija through further intensification
- 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 (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 1,543 | | | 1,543 | 100% | 5.0 | 7,715 | | |
| Season II (dry I) | 1,543 | | | 1,543 | 100% | 5.0 | 7,715 | | |
| Season III (dry II) | | 463 | | 463 | 30% | | | 648 | |
| Total/Annual | 3,086 | 463 | 0 | 3,549 | 230% | 5.0 | 15,430 | 648 | 0 |
| Annual Increment | 0 | 463 | 0 | 463 | 30% | 0.5 | 1,543 | 648 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 26 | b. Established; | 7 | c. Not yet; | 19 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 7 | c. Not yet; | 0 | Not yet registered | | 7 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Delay in administrative procedure for WUA establishment.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Acceleration of administrative process.

(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 : C Main Canal System : C Secondary Canal System : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Movable weir
c. Length of weir : 30 m
d. Design intake discharge : 3.5 m3/s
e. Scouring sluice gate : -
f. Intake gate : 3 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 | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 500 | 0 | 500 | 11 | 0 | C |
| Secondary | 3,000 | 12,303 | 15,303 | 57 | 3,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Problem on management for flood/scouring sluice gate(s) operation
  - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Overage, lower strength of canal
  - Cracks or partial damage on lined canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
- Irrigation Canal and Related Structure
  - 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
  - Deterioration of canal, no or insufficient rehabilitation due to budget problem
  - Improper regular maintenance or long leave of repair, insufficient provision of budget
  - 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 additional ripraps or blocks after stilling basin of weir as required
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
  - 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
  - Replace and reconstruction of canal
  - Replace and reconstruction, provision of special treatment at cross drain to prevent settlement
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 500 | 0 | 500 |
| | Secondary | 0 | 15,303 | 0 | 15,303 |
| Structure (nos) | Main | 0 | 11 | 1 | 12 |
| | Secondary | 0 | 57 | 11 | 68 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 1,543 | 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 | 1,543 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 3,077 | 20,662 | 2,066 | 3,163 | 1,260 | 30,229 | 19.6 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 4.7%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 9.0 | 60.3 |
| | Urgency | 25.0 | 20.0 | Social Problem | 15.0 | 10.5 | |
| | Sustainability | 15.0 | 8.3 | Economic Impact | 15.0 | 7.5 | |

**VI.3 Priority Group** Group II: Second priority group **VI.4 Priority Ranking in the Province** 17

| Scheme | D.I Guntur Kiri | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 2,020 ha | Year of Construction | 1979 |

*Category*
Irrigation (Headworks)

*Structure*
Movable Weir (Driven by Generator)

*Condition*
☐ A ☐ B ☑ C ☐ D

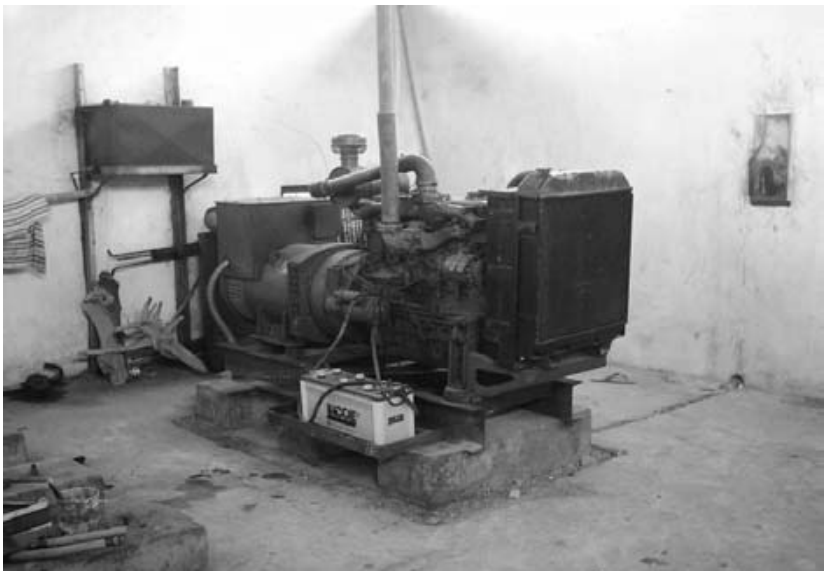
*Problems*
Require removal of sediment in front of weir and intake

*Category*
Irrigation (Headworks)

*Structure*
Movable Weir (Driven by Generator)

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment in front of weir and intake



*Category*
Irrigation (Headworks)

*Structure*
Diesel Generator

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require replacement

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

| Scheme | D.I Guntur Kiri | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 2,020 ha | Year of Construction | 1979 |

*Category*
Irrigation (Main Canal)

*Structure*
Canal and Bridge

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair and removal of sediment

*Category*
Irrigation (Secondary Canal)

*Structure*
Canal

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require provision of lining and inspection road

*Category*
Irrigation (Secondary Canal)

*Structure*
Division Structure

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require totally reconstruction including gates

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 | : 33010001-07 | (7) | Number of Farmers | : 60,994 |
| (2) | Name of Irrigation Scheme | : Klambu Kiri | (8) | Water Resource River | : Lusi |
| (3) | District (Kabupaten) | : Demak | (9) | Catchment Area ($km^2$) | : 2,101.11 |
| (4) | Sub-district (Kecamatan) | : Karanganyar | (10) | Completion / Last Rehabilitation Year | : 1992 |
| (5) | Registered Area (ha) | : 21,419 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

### II.1 Present and Planned Land Use

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 20,738 | 20,738 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 20,738 | 20,738 | 0 |

## III. AGRICULTURE

### III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 20,738 | | | 20,738 | 100% | 5.0 | 103,690 | | |
| Season II (dry I) | 20,738 | | | 20,738 | 100% | 5.0 | 103,690 | | |
| Season III (dry II) | | 12,028 | | 12,028 | 58% | | | 14,434 | |
| Total/Annual | 41,476 | 12,028 | 0 | 53,504 | 258% | 5.0 | 207,380 | 14,434 | 0 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, water shortage in dry season reported
- Double cropping of paddy practiced in the entire irrigated area; paddy yield levels high; 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 | - Palawija Marketing: | - |
| - Agronomic Issues: | Farmers not following recommended practices | - Farmers Organizations: | - |
| - Paddy Marketing | - | - Extension Services: | - |

### III.2 Development Plan

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Productivity increase of paddy & palawija through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 20,738 | | | 20,738 | 100% | 5.5 | 114,059 | | |
| Season II (dry I) | 20,738 | | | 20,738 | 100% | 5.5 | 114,059 | | |
| Season III (dry II) | 4,148 | 12,443 | | 16,591 | 80% | 5.0 | 20,740 | 17,420 | |
| Total/Annual | 45,624 | 12,443 | 0 | 58,067 | 280% | 5.5 | 248,858 | 17,420 | 0 |
| Annual Increment | 4,148 | 415 | 0 | 4,563 | 22% | 0.5 | 41,478 | 2,986 | 0 |

## IV. WUAs

### IV.1 Existing Condition

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | Number | a. Target; | 107 | b. Established; | 67 | c. Not yet; | 40 | Registered | 0 |
| | Performance | a. Developed; | 0 | b. Under developing; | 53 | c. Not yet; | 14 | Not yet registered | 67 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Delay in administrative procedure for WUA establishment.
- Low attention to O&M activities among farmers.

### IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of WUA establishment and administrative process.

(2) Development Plan

- WUA empowerment training.

## V. IRRIGATION FACILITY

**V.1 Existing Condition**

(1) Overall Irrigation System : B (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 : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 100 m
d. Design intake discharge : 21.0 m3/s
e. Scouring sluice gate : 6 nos.
f. Intake gate : 4 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 34,130 | 0 | 34,130 | 155 | 32,000 | C |
| Secondary | 105,689 | 0 | 105,689 | 373 | 32,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  Insufficient diversion water due to sedimentation in front of intake

- Irrigation Canal and Related Structure
  Sedimentation or obstruction of water flow
  Overage, lower strength of canal
  Cracks or partial damage on lined canal
  Settlement or damage (breakdown) of regulating structure on canal
  Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  Sedimentation in front of intake

- Irrigation Canal and Related Structure
  Insufficient function of settling basin(sediments), improper management of canal (sediments, water plant)
  Deterioration of canal, no or insufficient rehabilitation due to budget problem
  Improper regular maintenance or long leave of repair, insufficient provision of budget
  Insufficient strength of foundation, improper maintenance of regulating structure on 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
  Dredging or flushing of sediment, proper gate operation of headworks and intake

- Irrigation Canal and Related Structure
  Removal of sediment soil and foreign materials from canal, grass cutting
  Replace and reconstruction of canal
  Replace and reconstruction, provision of special treatment at cross drain to prevent settlement
  Repair or extension of stilling basin length 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 : minor rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 34,130 | 0 | 34,130 |
| | Secondary | 0 | 105,689 | 0 | 105,689 |
| Structure (nos) | Main | 0 | 155 | 16 | 171 |
| | Secondary | 0 | 373 | 75 | 448 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 20,738 | 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 | 20,738 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 5,357 | 249,573 | 24,957 | 42,513 | 3,600 | 326,000 | 15.7 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 8.7%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 9.0 | 55.3 |
| | Urgency | 25.0 | 18.0 | Social Problem | 15.0 | 9.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 7.5 | |

**VI.3 Priority Group** Group III: Third priority group **VI.4 Priority Ranking in the Province** 35

| Scheme | Klambu Kiri | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 21,419 ha | Year of Construction | 1992 |

*Category*
Irrigation (Headworks)

*Structure*
Movable Weir

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require minor repair for civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Movable Weir, Steel Gate (Radial Type)

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require minor repair for civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal floating debris in front of intake

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

| Scheme | Klambu Kiri | District | Demak | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 21,419 ha | Year of Construction | 1992 |

*Category*
Irrigation (Main Canal)

*Structure*
Concrete Lined Canal

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require removal of sediment

*Category*
Irrigation (Secondary Canal)

*Structure*
Lined Canal

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require removal of inspection road

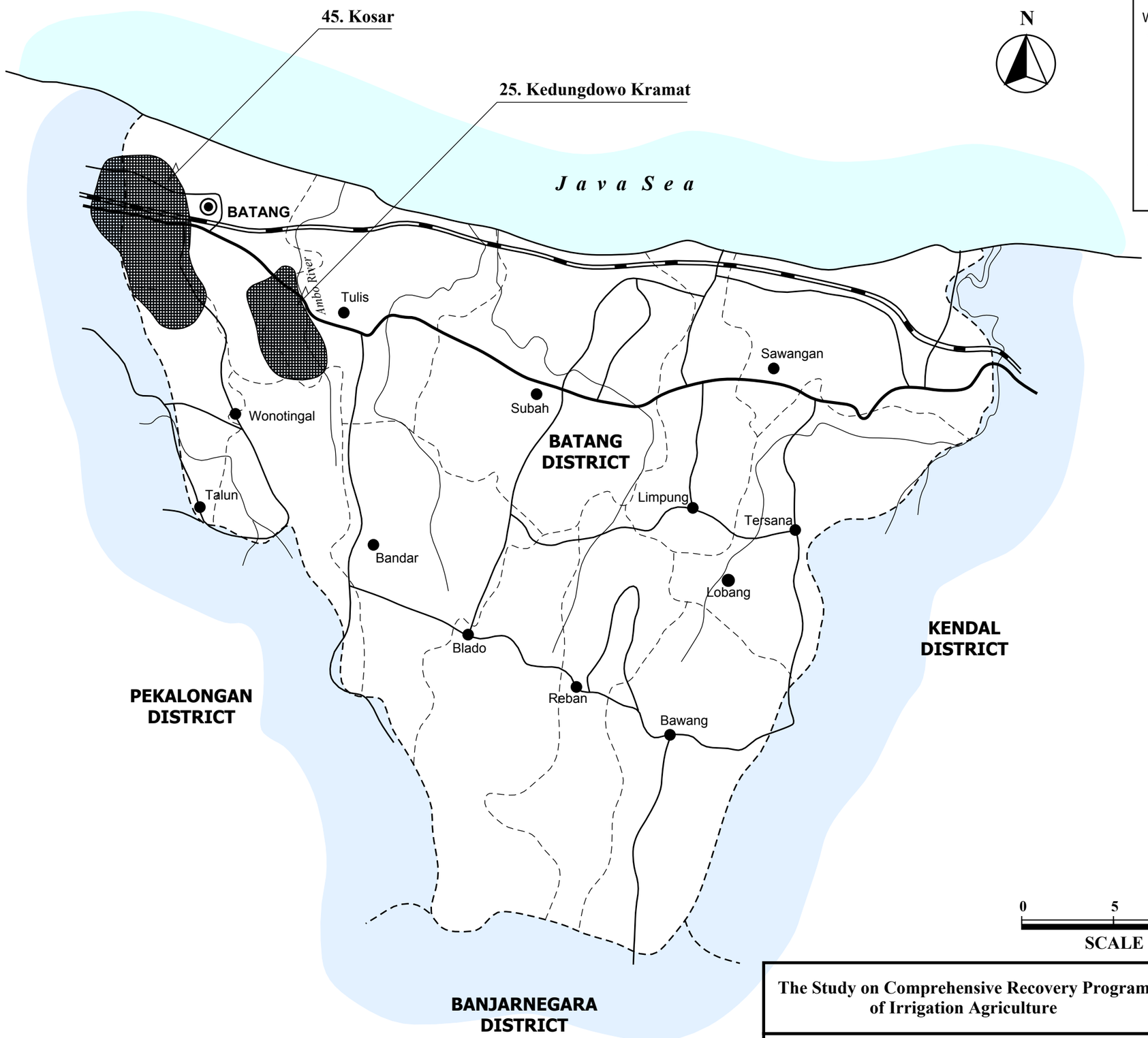
*Category*
Irrigation (Paddy Field)

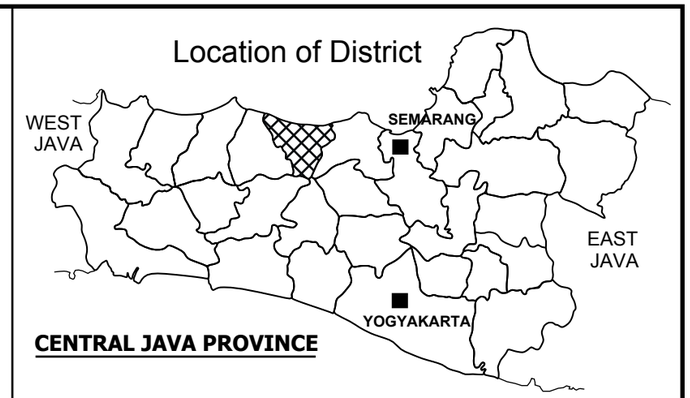
*Structure*
Paddy Field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require farm road and farm ditch

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




LEGEND

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

## Irrigation Scheme

| Name of Scheme | Registered Area (Ha) | | Subject Area (Ha) |
|---|---|---|---|
| 25. Kedungdowo Kramat | 1,250 | T | 1,250 |
| 45. Kosar | 1,617 | T | 3,243 |

T : Technical Irrigation

0 5 10 Km

SCALE

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

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

## I. PROJECT FUNDAMENTALS

**I.1 General**

| | | | | | |
|---|---|---|---|---|---|
| (1) | Code Number | : 33006277-78 | (7) | Number of Farmers | : 5,435 |
| (2) | Name of Irrigation Scheme | : Kedungdowo Kramat | (8) | Water Resource River | : Lojahan |
| (3) | District (Kabupaten) | : Batang | (9) | Catchment Area ($km^2$) | : 95.42 |
| (4) | Sub-district (Kecamatan) | : Batang & Tulis | (10) | Completion / Last Rehabilitation Year | : 1976 |
| (5) | Registered Area (ha) | : 1,250 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 1,250 | 1,250 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 1,250 | 1,250 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,079 | 68 | | 1,147 | 92% | 4.5 | 4,856 | 204 | |
| Season II (dry I) | 1,069 | 76 | | 1,145 | 92% | 4.5 | 4,811 | 228 | |
| Season III (dry II) | 10 | 1,063 | | 1,073 | 86% | 4.0 | 40 | 1,276 | |
| Total/Annual | 2,158 | 1,207 | 0 | 3,365 | 269% | 4.5 | 9,706 | 1,708 | 0 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; poor drainage problem reported
- Double cropping of paddy practiced in most of the irrigated area; paddy yield levels moderate; palawija introduced extensively

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Poor drainage | - Palawija Marketing: | Unstable marketing prices |
| - Agronomic Issues: | Damage caused by rat | - Farmers Organizations: | Managerial capacity of KTs are limited |
| - Paddy Marketing | Low marketing prices | - Extension Services: | Implementation of extension programs is limited |

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropped area of paddy; productivity increase of paddy & palawija through further intensification
- 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 (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,250 | | | 1,250 | 100% | 5.0 | 6,250 | | |
| Season II (dry I) | 1,250 | | | 1,250 | 100% | 5.0 | 6,250 | | |
| Season III (dry II) | | 1,125 | | 1,125 | 90% | | | 1,575 | |
| Total/Annual | 2,500 | 1,125 | 0 | 3,625 | 290% | 5.0 | 12,500 | 1,575 | 0 |
| Annual Increment | 342 | -82 | 0 | 260 | 21% | 0.5 | 2,794 | -133 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 11 | b. Established; | 6 | c. Not yet; | 5 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 5 | c. Not yet; | 1 | Not yet registered | | 6 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Delay in administrative procedure for WUA establishment.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Acceleration of administrative process.

(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 : C Main Canal System : C Secondary Canal System : D On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 50 m
d. Design intake discharge : 2.1 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 1 nos.
g. Settling basin : not provided
h. Inspection bridge : provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

| Canal | Lined (m) | Unlined (m) | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 700 | 2,140 | 2,840 | 25 | 932 | C |
| Secondary | 1,200 | 4,330 | 5,530 | 33 | 2,000 | 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
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Sedimentation or obstruction of water flow
  - Leakage from 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
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - No provision of settling basin(sediments), improper management of canal (sediments, water plant)
  - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
  - 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
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- 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
  - 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 : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : replacement or new

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 2,840 | 0 | 2,840 |
| | Secondary | 0 | 5,530 | 0 | 5,530 |
| Structure (nos) | Main | 0 | 25 | 3 | 28 |
| | Secondary | 0 | 33 | 7 | 40 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 1,250 | 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 | 1,250 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 4,387 | 12,874 | 1,287 | 2,563 | 1,260 | 22,371 | 17.9 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 9.3%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 11.0 | 63.3 |
| | Urgency | 25.0 | 21.0 | Social Problem | 15.0 | 10.5 | |
| | Sustainability | 15.0 | 8.3 | Economic Impact | 15.0 | 7.5 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 5

| **Scheme** | **Kedungdowo Kramat** | **District** | **Batang** | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,250 ha | Year of Construction | 1976 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Upstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Intake and Scouring Sluice

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of civil and gate works

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

| Scheme | Kedungdowo Kramat | District | Batang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,250 ha | Year of Construction | 1976 |


*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require minor repair for canal and provision of inspection road

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require minor repair for canal and provision of inspection road

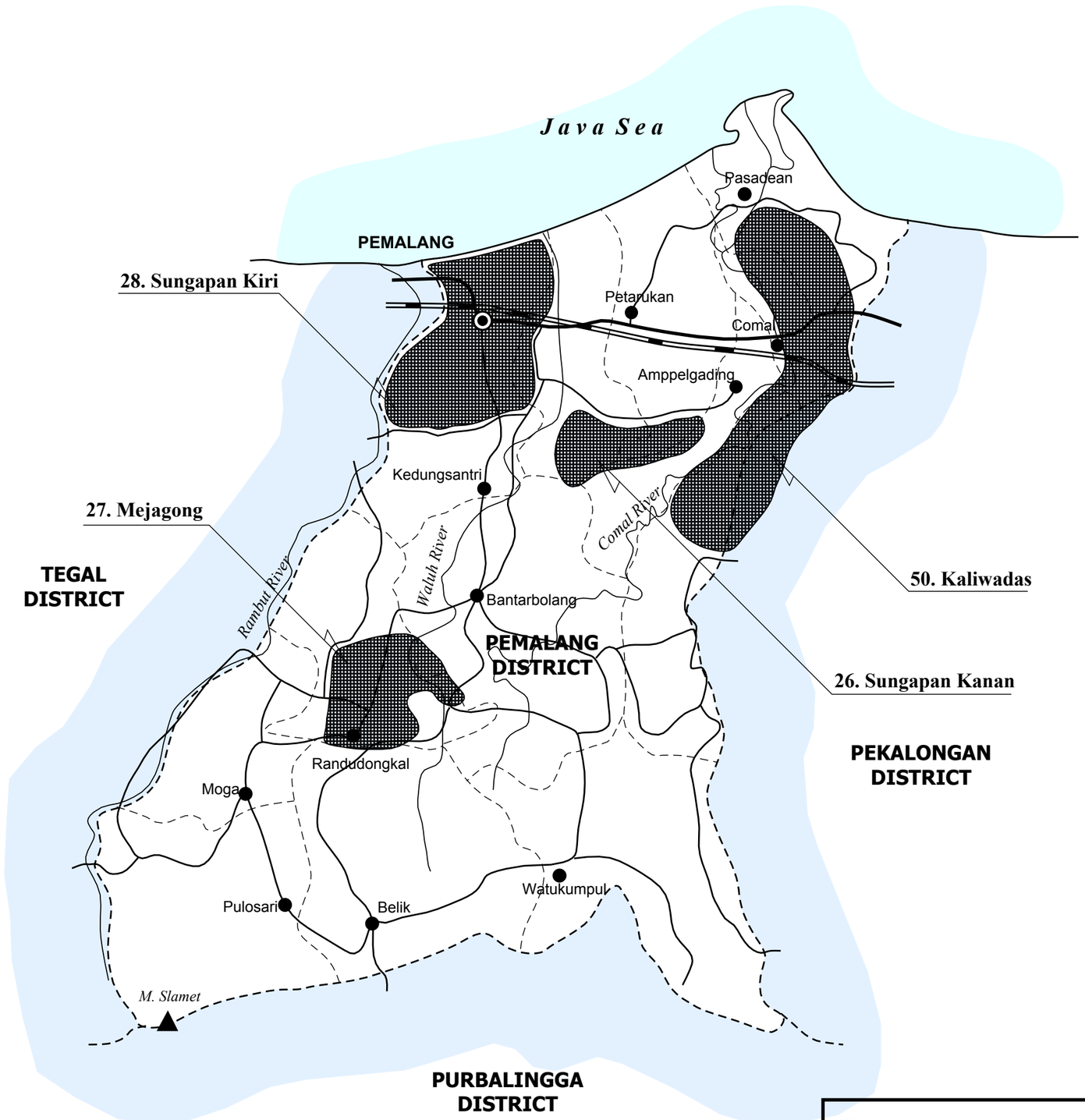
*Category*
Irrigation (Tertiary Canal)

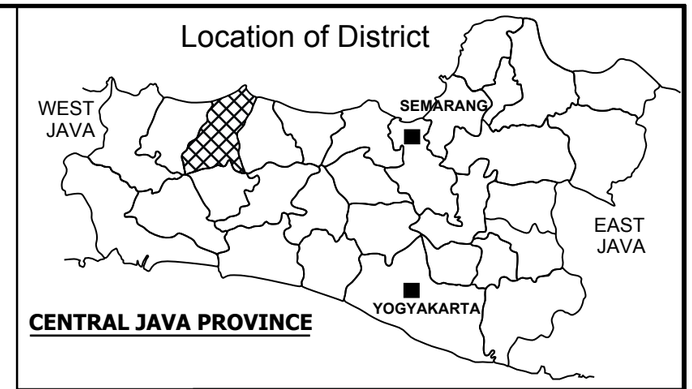
*Structure*
Tertiary Canal and Paddy Field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require division box and farm road

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




LEGEND

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

## Irrigation Scheme

| Name of Scheme | Registered Area (Ha) | | Subject Area (Ha) |
|---|---|---|---|
| 26. Sungapan Kanan | 1,851 | T | 1,851 |
| 27. Mejagong | 1,997 | T | 2,049 |
| 28. Sungapan Kiri | 5,229 | T | 5,570 |
| 50. Kaliwadas | 7,520 | T | 7,722 |

T : Technical Irrigation

0 5 10 Km

SCALE

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

# Location Map of Irrigation Schemes in Pemalang District

## I. PROJECT FUNDAMENTALS

### I.1 General

| | | | | | |
|---|---|---|---|---|---|
| (1) | Code Number | : 33004112-14 | (7) | Number of Farmers | : 5,784 |
| (2) | Name of Irrigation Scheme | : Sungapan Kanan | (8) | Water Resource River | : K. Waluh |
| (3) | District (Kabupaten) | : Pemalang | (9) | Catchment Area ($km^2$) | : 159.66 |
| (4) | Sub-district (Kecamatan) | : Ampelgading | (10) | Completion / Last Rehabilitation Year | : 2000 |
| (5) | Registered Area (ha) | : 1,851 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

### II.1 Present and Planned Land Use

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 1,851 | 1,851 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 1,851 | 1,851 | 0 |

## III. AGRICULTURE

### III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 1,487 | | | 1,487 | 80% | 4.5 | 6,692 | | |
| Season II (dry I) | 1,299 | | 491 | 1,790 | 97% | 4.5 | 5,846 | | 31,915 |
| Season III (dry II) | | 361 | | 361 | | | | 433 | |
| Total/Annual | 2,786 | 361 | 491 | 3,638 | 197% | 4.5 | 12,537 | 433 | 31,915 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Double cropping of paddy introduced; paddy yield levels moderate; palawija production still limited

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

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

### III.2 Development Plan

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropped area of paddy; productivity increase of paddy through further intensification
- 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 (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 1,851 | | | 1,851 | 100% | 5.0 | 9,255 | | |
| Season II (dry I) | 1,360 | | 491 | 1,851 | 100% | 5.0 | 6,800 | | 31,915 |
| Season III (dry II) | 491 | 185 | | 676 | 37% | 4.5 | 2,210 | 259 | |
| Total/Annual | 3,702 | 185 | 491 | 4,378 | 237% | 4.9 | 18,265 | 259 | 31,915 |
| Annual Increment | 916 | -176 | 0 | 740 | 40% | 0.4 | 5,728 | -174 | 0 |

## IV. WUAs

### IV.1 Existing Condition

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 26 | b. Established; | 26 | c. Not yet; | 0 | Registered | | 1 |
| Performance | a. Developed; | 15 | b. Under developing; | 11 | c. Not yet; | 0 | Not yet registered | | 25 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low collection of WUA membership fee.

### IV.2 Development Plan

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(2) Development Plan

- WUA management training

## V. IRRIGATION FACILITY

**V.1 Existing Condition**

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

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 72 m
d. Design intake discharge : 4.0 m3/s
e. Scouring sluice gate : 3 nos.
f. Intake gate : 4 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 2,004 | 4,676 | 6,680 | 18 | 6,680 | B |
| Secondary | 4,828 | 3,219 | 8,047 | 19 | 5,362 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  Insufficient diversion water due to sedimentation in front of intake

- Irrigation Canal and Related Structure
  Leakage from canal
  Collapse of canal
  Lower function of regulating structure on canal
  Settlement or damage (breakdown) of regulating structure on canal
  Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  Sedimentation in front of intake

- Irrigation Canal and Related Structure
  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
  Deterioration of regulating structure on canal, especially gate and metal works
  Insufficient strength of foundation, improper maintenance of regulating structure on 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
  Dredging or flushing of sediment, proper gate operation of headworks and intake

- Irrigation Canal and Related Structure
  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
  Replacement and reconstruction of regulating structure on canal
  Repair or extension of stilling basin length 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 : minor rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 400 | 6,280 | 0 | 6,680 |
| | Secondary | 966 | 7,081 | 0 | 8,047 |
| Structure (nos) | Main | 2 | 16 | 2 | 20 |
| | Secondary | 2 | 17 | 4 | 23 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 1,851 | 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 | 1,851 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 1,318 | 14,195 | 1,420 | 3,795 | 1,260 | 21,987 | 11.9 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 17.1%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 11.0 | 55.9 |
| | Urgency | 25.0 | 16.6 | Social Problem | 15.0 | 6.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 10.5 | |

**VI.3 Priority Group** Group III: Third priority group **VI.4 Priority Ranking in the Province** 32

| Scheme | Sungapan Kanan | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,851 ha | Year of Construction | 2000 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Intake and Settling Basin

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require remove of sediment and provision of inspection road

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

| Scheme | Sungapan Kanan | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,851 ha | Year of Construction | 2000 |

*Category*
Irrigation (Main Canal)

*Structure*
Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require remove of sediment, repair of lining and provision of bottom lining

*Category*
Irrigation (Main Canal)

*Structure*
Canal and Inspection Road

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require remove of sediment, repair of lining and provision of bottom lining

*Category*
Irrigation (Tertiary Canal)

*Structure*
Division Box

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require reconstruction

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 | : 33004023-25 | (7) | Number of Farmers | : 10,250 |
| (2) | Name of Irrigation Scheme | : Mejagong | (8) | Water Resource River | : K. Comal |
| (3) | District (Kabupaten) | : Pemalang | (9) | Catchment Area ($km^2$) | : 99.20 |
| (4) | Sub-district (Kecamatan) | : Randudongkal | (10) | Completion / Last Rehabilitation Year | : 1974~1992 |
| (5) | Registered Area (ha) | : 1,997 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

### II.1 Present and Planned Land Use

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 2,049 | 2,049 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 2,049 | 2,049 | 0 |

## III. AGRICULTURE

### III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 2,049 | | | 2,049 | 100% | 5.0 | 10,245 | | |
| Season II (dry I) | 2,045 | | | 2,045 | 100% | 4.5 | 9,203 | | |
| Season III (dry II) | 2,041 | | | 2,041 | 100% | 4.5 | 9,185 | | |
| Total/Annual | 6,135 | 0 | 0 | 6,135 | 299% | 4.7 | 28,632 | 0 | 0 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- Maximum irrigation performances achieved; poor drainage problem reported
- Triple cropping of paddy practiced in the entire irrigated area; paddy yield levels moderate to high

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Poor drainage | - Palawija Marketing: | Low marketing prices |
| - Agronomic Issues: | Infestation of pest & diseases | - Farmers Organizations: | Most members are not active |
| - Paddy Marketing | Low marketing prices | - Extension Services: | Implementation of extension programs is limited |

### III.2 Development Plan

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- 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 KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 2,049 | | | 2,049 | 100% | 5.5 | 11,270 | | |
| Season II (dry I) | 2,049 | | | 2,049 | 100% | 5.0 | 10,245 | | |
| Season III (dry II) | 2,049 | | | 2,049 | 100% | 5.0 | 10,245 | | |
| Total/Annual | 6,147 | 0 | 0 | 6,147 | 300% | 5.2 | 31,760 | 0 | 0 |
| Annual Increment | 12 | 0 | 0 | 12 | 1% | 0.5 | 3,128 | 0 | 0 |

## IV. WUAs

### IV.1 Existing Condition

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 19 | b. Established; | 9 | c. Not yet; | 10 | Registered | | 0 |
| Performance | a. Developed; | 1 | b. Under developing; | 8 | c. Not yet; | 0 | Not yet registered | | 9 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Delay in administrative procedure for WUA establishment.

### IV.2 Development Plan

(1) Proposed Countermeasures

- Acceleration of administrative process.

(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 : C Main Canal System : C Secondary Canal System : D On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 50 m
d. Design intake discharge : 8.0 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 2 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 218 | 0 | 218 | 37 | 218 | C |
| Secondary | 1,663 | 16,202 | 17,865 | 46 | 9,265 | D |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Problem on management for flood/scouring sluice gate(s) operation
  - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
- Irrigation Canal and Related Structure
  - 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
  - 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 additional ripraps or blocks after stilling basin of weir as required
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
  - 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
  - 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 : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : large rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 218 | 0 | 218 |
| | Secondary | 0 | 17,865 | 0 | 17,865 |
| Structure (nos) | Main | 0 | 37 | 4 | 41 |
| | Secondary | 0 | 46 | 9 | 55 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 2,049 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 0 | e. Non-potenttial non-paddy field | 0 |
| c. Potential non-paddy field | 0 | Total | 2,049 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 1,856 | 23,155 | 2,316 | 4,200 | 1,570 | 33,097 | 16.2 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 6.2%

**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** -

Central Java Province
27. Mejagong Scheme
(3/4)

| Scheme | Mejagong | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,997 ha | Year of Construction | 1974~1992 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair for weir and intake

*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair for weir and intake

*Category*
Irrigation (Headworks)

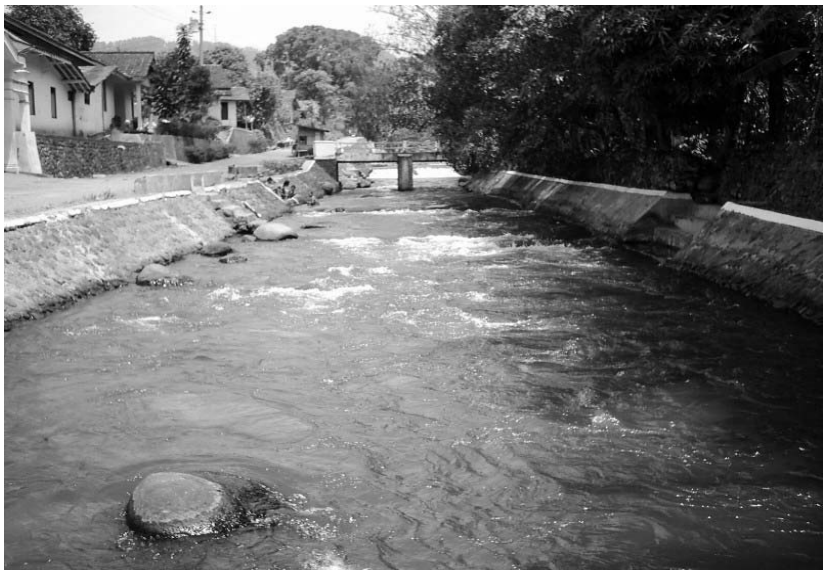
*Structure*
Intake and Settling Basin

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of stilling basin and retaining wall

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

| Scheme | Mejagong | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,997 ha | Year of Construction | 1974~1992 |



*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require remove of sediment, repair of lining and provision of bottom lining

*Category*
Irrigation (Secondary Canal)

*Structure*
Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair, lining and provision of inspection road

*Category*
Irrigation (Tertiary Canal)

*Structure*
Canal and Paddy Field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require farm road and farm ditch

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 | : 33004115-16 | (7) | Number of Farmers | : 27,850 |
| (2) | Name of Irrigation Scheme | : Sungapan Kiri | (8) | Water Resource River | : Kali Waluh |
| (3) | District (Kabupaten) | : Pemalang | (9) | Catchment Area ($km^2$) | : 159.66 |
| (4) | Sub-district (Kecamatan) | : Pemalang | (10) | Completion / Last Rehabilitation Year | : 1999/2000 |
| (5) | Registered Area (ha) | : 5,229 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

### II.1 Present and Planned Land Use

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 5,541 | 5,570 | 29 |
| b. Rainfed paddy field | 29 | 0 | -29 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 5,570 | 5,570 | 0 |

## III. AGRICULTURE

### III.1 Present/Before Project Condition

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) 1/ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 4,654 | | | 4,654 | 84% | 5.5 | 25,597 | 87 | |
| Season II (dry I) | 4,356 | | 1,185 | 5,541 | 100% | 5.5 | 23,958 | | 77,025 |
| Season III (dry II) | | 817 | | 817 | 15% | | | 980 | |
| Total/Annual | 9,010 | 817 | 1,185 | 11,012 | 199% | 5.5 | 49,555 | 1,067 | 77,025 |

1/: Include palawija in rainfed field

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, water shortage in dry season reported
- Double cropping of paddy practiced almost in the entire irrigated area; paddy yield levels high; sugarcane & palawija introduced substantially

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Water shortage at on-farm level in dry season | - Palawija Marketing: | Unstable 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 |

### III.2 Development Plan

(1) Development Approaches

- Expansion of irrigated area & ensuring year round irrigation water supply at on-farm level through rehabilitation
- Introduction of double cropping of paddy in the entire area (excluding sugarcane area); productivity increase of through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 5,570 | | | 5,570 | 100% | 6.0 | 33,420 | | |
| Season II (dry I) | 4,385 | | 1,185 | 5,570 | 100% | 6.0 | 26,310 | | 77,025 |
| Season III (dry II) | | 1,671 | | 1,671 | 30% | | | 2,339 | |
| Total/Annual | 9,955 | 1,671 | 1,185 | 12,811 | 230% | 6.0 | 59,730 | 2,339 | 77,025 |
| Annual Increment | 945 | 854 | 0 | 1,799 | 31% | 0.5 | 10,175 | 1,272 | 0 |

## IV. WUAs

### IV.1 Existing Condition

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| (1) | Number | a. Target; | 40 | b. Established; | 40 | c. Not yet; | 0 | Registered | 0 |
| | Performance | a. Developed; | 5 | b. Under developing; | 35 | c. Not yet; | 0 | Not yet registered | 40 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Not so active participation in O&M activities.

### IV.2 Development Plan

(1) Proposed Countermeasures

- Encouragement of WUA members to take positive action.

(2) Development Plan

- WUA O&M training.

## V. IRRIGATION FACILITY

### V.1 Existing Condition

(1) Overall Irrigation System : B (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 : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 72 m
d. Design intake discharge : 8.5 m3/s
e. Scouring sluice gate : 3 nos.
f. Intake gate : 4 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 4,396 | 3,529 | 7,925 | 28 | 7,925 | C |
| Secondary | 19,539 | 15,988 | 35,527 | 108 | 18,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Problem on management for flood/scouring sluice gate(s) operation
  - Inflow of bed loads into canal and decrease canal flow capacity
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Lower function of regulating structure on 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)
  - Insufficient function of settling basin, no proper gate operation of intake during flood
- Irrigation Canal and Related Structure
  - 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
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

### V.2 Development Plan

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Rehabilitation of settling basin, proper gate operation of intake during flood
- Irrigation Canal and Related Structure
  - 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
  - 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 : minor rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 879 | 7,046 | 0 | 7,925 |
| | Secondary | 3,908 | 31,619 | 0 | 35,527 |
| Structure (nos) | Main | 5 | 23 | 3 | 31 |
| | Secondary | 21 | 87 | 22 | 130 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 5,541 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 29 | e. Non-potenttial non-paddy field | 0 |
| c. Potential non-paddy field | 0 | Total | 5,570 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 2,220 | 42,988 | 4,299 | 11,433 | 2,590 | 63,530 | 11.4 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 13.0%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 11.0 | 58.8 |
| | Urgency | 25.0 | 18.0 | Social Problem | 15.0 | 9.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 9.0 | |

**VI.3 Priority Group** Group II: Second priority group **VI.4 Priority Ranking in the Province** 21

| Scheme | Sungapan Kiri | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 5,229 ha | Year of Construction | 1999/2000 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair of weir body and gate works, removal of debris and sediment

*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair of civil and gate works, removal of debris and sediment

*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair of civil and gate works, removal of debris and sediment

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

| Scheme | Sungapan Kiri | District | Pemalang | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 5,229 ha | Year of Construction | 1999/2000 |

*Category*
Irrigation (Main canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require minor repair of lining works

*Category*
Irrigation (Tertiary Canal)

*Structure*
Tertiary Canal and Paddy Field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of division box, farm road and farm ditch

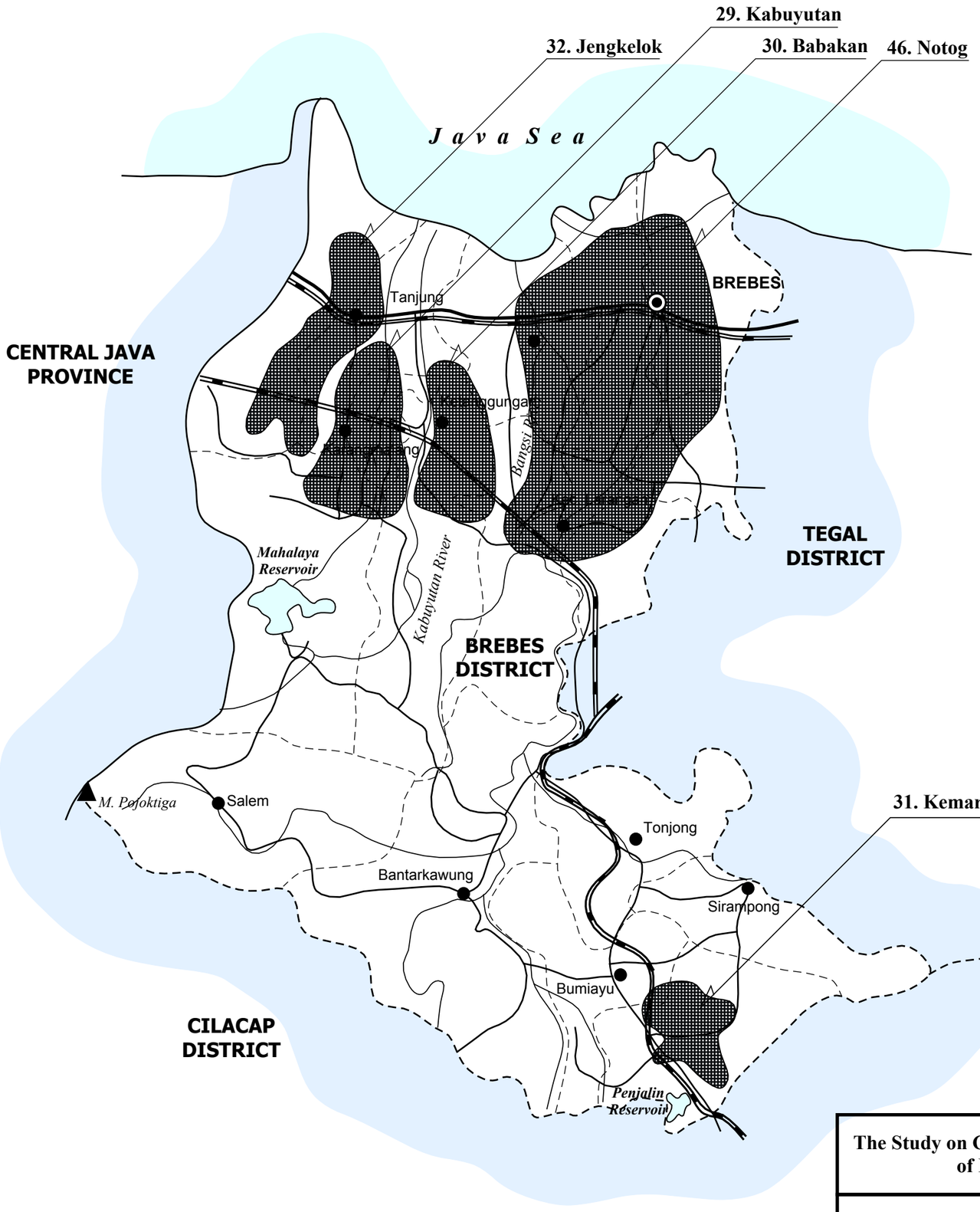
*Category*

*Structure*

*Condition*
☐ A ☐ B ☐ C ☐ D

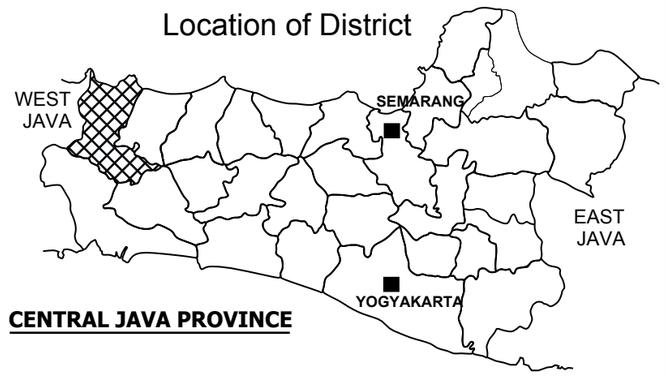
*Problems*

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




N

Location of District




LEGEND

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

## Irrigation Scheme

| Name of Scheme | Registered Area (Ha) | | Subject Area (Ha) |
|---|---|---|---|
| 29. Kabuyutan | 4,182 | T | 3,867 |
| 30. Babakan | 2,181 | T | 2,528 |
| 31. Kemaron Jambe | 1,026 | T | 1,483 |
| 32. Jengkelok | 6,505 | T | 6,173 |
| 46. Notog | 27,682 | T | 25,540 |

T : Technical Irrigation

0 5 10 Km

SCALE

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

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

## I. PROJECT FUNDAMENTALS

**I.1 General**

| | | | | | |
|---|---|---|---|---|---|
| (1) | Code Number | : 33001154-57 | (7) | Number of Farmers | : 20,400 |
| (2) | Name of Irrigation Scheme | : Kabuyutan | (8) | Water Resource River | : |
| (3) | District (Kabupaten) | : Brebes | (9) | Catchment Area ($km^2$) | : |
| (4) | Sub-district (Kecamatan) | : Banjarharjo | (10) | Completion / Last Rehabilitation Year | : 1986 |
| (5) | Registered Area (ha) | : 4,182 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 3,876 | 3,876 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 3,876 | 3,876 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 2,735 | 565 | 576 | 3,876 | 100% | 5.5 | 15,043 | 1,695 | 37,440 |
| Season II (dry I) | 1,105 | 1,554 | 369 | 3,028 | 78% | 5.5 | 6,078 | 4,662 | 23,985 |
| Season III (dry II) | 947 | 1,638 | | 2,585 | 67% | 5.0 | 4,735 | 1,966 | |
| Total/Annual | 4,787 | 3,757 | 945 | 9,489 | 245% | 5.4 | 25,855 | 8,323 | 61,425 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Double cropping of paddy introduced; paddy yield levels high; palawija production extensive

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Water shortage at on-farm level in dry season | - Palawija Marketing: | Low marketing prices |
| - Agronomic Issues: | Infestation of pest & diseases | - Farmers Organizations: | Economic activities are limited |
| - Paddy Marketing | Low marketing prices | - Extension Services: | Implementation of extension programs is limited |

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropped area of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 3,300 | | 576 | 3,876 | 100% | 6.0 | 19,800 | | 37,440 |
| Season II (dry I) | 1,560 | 1,371 | 369 | 3,300 | 85% | 6.0 | 9,360 | 6,855 | 23,985 |
| Season III (dry II) | 969 | 2,132 | | 3,101 | 80% | 5.5 | 5,330 | 2,985 | |
| Total/Annual | 5,829 | 3,503 | 945 | 10,277 | 265% | 5.9 | 34,490 | 9,840 | 61,425 |
| Annual Increment | 1,042 | -254 | 0 | 788 | 20% | 0.5 | 8,635 | 1,517 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 35 | b. Established; | 31 | c. Not yet; | 4 | Registered | | 1 |
| Performance | a. Developed; | 0 | b. Under developing; | 30 | c. Not yet; | 1 | Not yet registered | | 31 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low collection of WUA membership fee.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(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 : C Main Canal System : C Secondary Canal System : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 67 m
d. Design intake discharge : 8.5 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 3 nos.
g. Settling basin : provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

| Canal | Lined (m) | Unlined (m) | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 3,100 | 340 | 3,440 | 29 | 1,614 | C |
| Secondary | 30,707 | 12,440 | 43,147 | 139 | 20,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Problem on management for flood/scouring sluice gate(s) operation
  - Insufficient diversion water due to sedimentation in front of intake
  - Overage, Lower strength of intake gate(s)
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of 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
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
  - Deterioration of intake gate(s), no or insufficient rehabilitation due to budget problem
- Irrigation Canal and Related Structure
  - 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
  - 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
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Replace and reconstruction of intake gate(s)
- Irrigation Canal and Related Structure
  - 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
  - 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 : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : large rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 3,440 | 0 | 3,440 |
| | Secondary | 0 | 43,147 | 0 | 43,147 |
| Structure (nos) | Main | 0 | 29 | 3 | 32 |
| | Secondary | 0 | 139 | 28 | 167 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 3,876 | 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 | 3,876 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 2,270 | 68,095 | 6,810 | 7,946 | 1,570 | 86,691 | 22.4 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 8.4%

**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 | 13.0 | 62.8 |
| | Urgency | 25.0 | 20.0 | Social Problem | 15.0 | 9.0 | |
| | Sustainability | 15.0 | 8.3 | Economic Impact | 15.0 | 7.5 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 6

Central Java Province
29. Kabuyutan Scheme
(3/4)

| Scheme | Kabuyutan | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 4,182 ha | Year of Construction | 1986 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Upstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of retaining wall, removal of sediment in front of intake

*Category*
Irrigation (Headworks)

*Structure*
Intake and Scouring Sluice

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require minor repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Intake and Settling Basin

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment and redesign of settling basin

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

| Scheme | Kabuyutan | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 4,182 ha | Year of Construction | 1986 |

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require total repair of lining and provision of inspection road

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require total repair of lining and provision of inspection road

*Category*
Irrigation (Tertiary Canal)

*Structure*
Division Box

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require total repair

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 | : 33001012-14 | (7) | Number of Farmers | : 13,305 |
| (2) | Name of Irrigation Scheme | : Babakan | (8) | Water Resource River | : |
| (3) | District (Kabupaten) | : Brebes | (9) | Catchment Area ($km^2$) | : |
| (4) | Sub-district (Kecamatan) | : Ketanggungan | (10) | Completion / Last Rehabilitation Year | : 1936/1992 |
| (5) | Registered Area (ha) | : 2,181 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 2,528 | 2,528 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 2,528 | 2,528 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 2,295 | 35 | 198 | 2,528 | 100% | 5.0 | 11,475 | 105 | 12,870 |
| Season II (dry I) | 1,406 | 658 | 247 | 2,311 | 91% | 5.0 | 7,030 | 1,974 | 16,055 |
| Season III (dry II) | 475 | 1,276 | | 1,751 | 69% | 4.5 | 2,138 | 1,531 | |
| Total/Annual | 4,176 | 1,969 | 445 | 6,590 | 261% | 4.9 | 20,643 | 3,610 | 28,925 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, water shortage in dry season reported
- Double cropping of paddy practiced in most of the irrigated area; paddy yield levels high; 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 | - Palawija Marketing: | Low marketing prices |
| - Agronomic Issues: | Infestation of pest & diseases | - Farmers Organizations: | Most members are not active |
| - Paddy Marketing | Unstable marketing prices | - Extension Services: | Implementation of extension programs is limited |

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropped area of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual Intensity | Irrigated Paddy Yield (GKG ton/ha) | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | | | Paddy | Palawija | Others |
| Season I (wet) | 2,330 | | 198 | 2,528 | 100% | 5.5 | 12,815 | | 12,870 |
| Season II (dry I) | 1,517 | 566 | 247 | 2,330 | 92% | 5.5 | 8,344 | 2,830 | 16,055 |
| Season III (dry II) | 506 | 1,517 | | 2,023 | 80% | 5.0 | 2,530 | 2,124 | |
| Total/Annual | 4,353 | 2,083 | 445 | 6,881 | 272% | 5.4 | 23,689 | 4,954 | 28,925 |
| Annual Increment | 177 | 114 | 0 | 291 | 12% | 0.5 | 3,046 | 1,344 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 38 | b. Established; | 38 | c. Not yet; | 0 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 21 | c. Not yet; | 17 | Not yet registered | | 38 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low level of membership fee collection due to insufficient irrigation water supply.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(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 : C Main Canal System : C Secondary Canal System : D On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 68 m
d. Design intake discharge : 3.7 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 2 nos.
g. Settling basin : provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

| Canal | Lined (m) | Unlined (m) | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 2,547 | 0 | 2,547 | 5 | 1,200 | C |
| Secondary | 7,360 | 17,140 | 24,500 | 54 | 5,000 | D |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Lower strength against design load due to rust, decay of steel materials of flood/scouring sluice gate(s)
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Impassable of inspection road along canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - No over coating on flood/scouring sluice gate(s) to prevent rust and decay
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
  - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope of canal
  - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
  - Deterioration of regulating structure on canal, especially gate and metal works
  - No provision or damage of inspection road, difficulty on passing of inspection road due to damage, broken

**V.2 Development Plan**

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Provision of overcoat or replacement of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
  - 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 of inspection road both main and secondary canal with pavement
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 2,547 | 0 | 2,547 |
| | Secondary | 0 | 24,500 | 0 | 24,500 |
| Structure (nos) | Main | 0 | 5 | 1 | 6 |
| | Secondary | 0 | 54 | 11 | 65 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 2,528 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 0 | e. Non-potenttial non-paddy field | 0 |
| c. Potential non-paddy field | 0 | Total | 2,528 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 1,856 | 29,768 | 2,977 | 5,182 | 1,570 | 41,354 | 16.4 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 6.9%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 11.0 | 61.8 |
| | Urgency | 25.0 | 21.0 | Social Problem | 15.0 | 10.5 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 7.5 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 9

| Scheme | Babakan | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 2,181 ha | Year of Construction | 1936/1992 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Upstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair for civil and gate works and removal of sediment

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair for civil and gate works and removal of sediment

*Category*
Irrigation (Headworks)

*Structure*
Settling Basin

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require redesign of settling basin

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

| Scheme | Babakan | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 2,181 ha | Year of Construction | 1936/1992 |

*Category*
Irrigation (Main Canal)

*Structure*
Culvert

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require removal of sediment

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require removal of sediment

*Category*
Irrigation (Paddy Field)

*Structure*
Farm Ditch and Paddy Field

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require farm ditch and road

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 | : 33001118 | (7) | Number of Farmers | : 20,520 |
| (2) | Name of Irrigation Scheme | : Kemaron Jambe | (8) | Water Resource River | : |
| (3) | District (Kabupaten) | : Brebes | (9) | Catchment Area ($km^2$) | : |
| (4) | Sub-district (Kecamatan) | : Paguyangan | (10) | Completion / Last Rehabilitation Year | : 1991 |
| (5) | Registered Area (ha) | : 1,026 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 1,026 | 1,483 | 457 |
| b. Rainfed paddy field | 457 | 0 | -457 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 1,483 | 1,483 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) 1/ | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,026 | | | 1,026 | 100% | 5.0 | 5,130 | 1,371 | |
| Season II (dry I) | 1,026 | | | 1,026 | 100% | 5.0 | 5,130 | | |
| Season III (dry II) | 1,026 | | | 1,026 | 100% | 4.5 | 4,617 | | |
| Total/Annual | 3,078 | 0 | 0 | 3,078 | 300% | 4.8 | 14,877 | 1,371 | 0 |

1/: Include palawija in rainfed field

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- Maximum irrigation performances achieved; poor drainage problem reported; existence of rainfed field (457ha)
- Triple cropping of paddy practiced in the entire irrigated area; paddy yield levels high

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | - | - Palawija Marketing: | Unstable marketing prices |
| - Agronomic Issues: | Damage caused by rat | - Farmers Organizations: | Managerial capacity of KTs are limited |
| - Paddy Marketing | Low marketing prices | - Extension Services: | Implementation of extension programs is limited |

**III.2 Development Plan**

(1) Development Approaches

- Ensuring year round irrigation water supply at on-farm level through rehabilitation & upgrading
- Triple cropping of paddy in the entire area; productivity increase of paddy through intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,483 | | | 1,483 | 100% | 5.5 | 8,157 | | |
| Season II (dry I) | 1,483 | | | 1,483 | 100% | 5.5 | 8,157 | | |
| Season III (dry II) | 1,483 | | | 1,483 | 100% | 5.0 | 7,415 | | |
| Total/Annual | 4,449 | 0 | 0 | 4,449 | 300% | 5.3 | 23,728 | 0 | 0 |
| Annual Increment | 1,371 | 0 | 0 | 1,371 | 0% | 0.5 | 8,851 | -1,371 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 6 | b. Established; | 6 | c. Not yet; | 0 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 6 | c. Not yet; | 0 | Not yet registered | | 6 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low collection level of membership fee.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(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 : C Main Canal System : C Secondary Canal System : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 15 m
d. Design intake discharge : 3.1 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 1 nos.
g. Settling basin : provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

| Canal | Lined (m) | Unlined | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 10,000 | 0 | 10,000 | 34 | 10,000 | C |
| Secondary | 17,600 | 6,000 | 23,600 | 86 | 5,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Impassable of inspection road along canal
  - General O&M problems
  - Overage, lower strength of canal
  - Cracks or partial damage on lined canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- 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
  - Deterioration of canal, no or insufficient rehabilitation due to budget problem
  - Improper regular maintenance or long leave of repair, insufficient provision of budget
  - 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 additional ripraps or blocks after stilling basin of weir as required
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- 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 and reconstruction of canal
  - Replace and reconstruction, provision of special treatment at cross drain to prevent settlement
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 10,000 | 0 | 10,000 |
| | Secondary | 0 | 23,600 | 0 | 23,600 |
| Structure (nos) | Main | 0 | 34 | 3 | 37 |
| | Secondary | 0 | 86 | 17 | 103 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 1,026 | d. Non-potential paddy field | 0 |
| b. Potential non-irrigated paddy field | 457 | e. Non-potenttial non-paddy field | 0 |
| c. Potential non-paddy field | 0 | Total | 1,483 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 1,856 | 38,666 | 3,867 | 3,274 | 1,260 | 48,923 | 33.0 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 11.3%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | - | Agricultural Productivity | 20.0 | - | 0.0 |
| | Urgency | 25.0 | - | Social Problem | 15.0 | - | |
| | Sustainability | 15.0 | - | Economic Impact | 15.0 | - | |

**VI.3 Priority Group** Group VI: Development by other category (High rehabilitation cost)

**VI.4 Priority Ranking in the Province** -

| Scheme | Kemaron Jambe | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Technical | 1,026 ha | Year of Construction | 1991 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir and Intake

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require removal of sediment in front of weir and intake, require scouring sluice

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream View

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require provision of scouring sluice

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream View

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require provision of stilling basin

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

| Scheme | Kemaron Jambe | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,026 ha | Year of Construction | 1991 |

*Category*
Irrigation (Secondary Canal)

*Structure*
Drop

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require inspection road

*Category*
Irrigation (Secondary Canal)

*Structure*
Bifurcation

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of measuring facility

*Category*
Irrigation (Paddy Field)

*Structure*
Paddy Field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require farm road

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 | : 33001150-52 | (7) | Number of Farmers | : 34,236 |
| (2) | Name of Irrigation Scheme | : Jengkelok | (8) | Water Resource River | : |
| (3) | District (Kabupaten) | : Brebes | (9) | Catchment Area ($km^2$) | : |
| (4) | Sub-district (Kecamatan) | : Losari | (10) | Completion / Last Rehabilitation Year | : 1990 |
| (5) | Registered Area (ha) | : 6,505 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 6,173 | 6,173 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 6,173 | 6,173 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 5,112 | | | 5,112 | 83% | 5.0 | 25,560 | | |
| Season II (dry I) | | 3,958 | 436 | 4,394 | 71% | | | 11,874 | 28,340 |
| Season III (dry II) | | 2,035 | | 2,035 | 33% | | | 2,442 | |
| Total/Annual | 5,112 | 5,993 | 436 | 11,541 | 187% | 5.0 | 25,560 | 14,316 | 28,340 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- Irrigation water supply at on-farm level limited in dry season; water shortage in dry season reported
- Single cropping of paddy prevailing; paddy yield levels high; palawija cropped area larger then that of paddy

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

| | | | |
|---|---|---|---|
| - Irrigation & Drainage: | Water shortage at on-farm level in dry season | - Palawija Marketing: | Unstable marketing prices |
| - Agronomic Issues: | Damage caused by rat | - Farmers Organizations: | Most members are not active |
| - Paddy Marketing | Unstable marketing prices | - Extension Services: | Shortage of operation funds of PPLs |

**III.2 Development Plan**

(1) Development Approaches

- Expansion of irrigated area & ensuring year round irrigation water supply at on-farm level through rehabilitation
- Introduction of double cropping of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 6,173 | | | 6,173 | 100% | 5.5 | 33,952 | | |
| Season II (dry I) | 2,469 | 1,854 | 436 | 4,759 | 77% | 5.5 | 13,580 | 9,270 | 28,340 |
| Season III (dry II) | 617 | 1,235 | | 1,852 | 30% | 5.0 | 3,085 | 1,729 | |
| Total/Annual | 9,259 | 3,089 | 436 | 12,784 | 207% | 5.5 | 50,616 | 10,999 | 28,340 |
| Annual Increment | 4,147 | -2,904 | 0 | 1,243 | 20% | 0.5 | 25,056 | -3,317 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 38 | b. Established; | 38 | c. Not yet; | 0 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 21 | c. Not yet; | 17 | Not yet registered | | 38 |

(2) Problems and Constraints

Operation Maintenance Management

(3) Causes of Problems and Constraints

- Low collection level of membership fee.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(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 : C Main Canal System : C Secondary Canal System : D On-farm : D

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 40 m
d. Design intake discharge : 8.6 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 2 nos.
g. Settling basin : provided
h. Inspection bridge : not provided
i. Condition : C
(A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation)
(no info.: no information)

(3) Irrigation Canal and Inspection Road

| Canal | Lined (m) | Unlined (m) | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 3,100 | 2,100 | 5,200 | 10 | 5,200 | C |
| Secondary | 12,800 | 32,227 | 45,027 | 171 | 3,800 | D |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Problem on management for flood/scouring sluice gate(s) operation
  - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Impassable of inspection road along canal
  - General O&M problems
  - Lower function of regulating structure on canal

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
- Irrigation Canal and Related Structure
  - 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
  - Improper routine O&M works due to no or narrow wide of road, slope erosion by rainfall then in flow into canal
  - No kilo and hectometer post, no structure plate or mark on structures and no identification for repair/maintenance
  - Deterioration of regulating structure on canal, especially gate and metal works

**V.2 Development Plan**

(1) Proposed Countermeasures for Major Problems

- Water Resources Facility
  - Provision of additional ripraps or blocks after stilling basin of weir as required
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
  - 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 of inspection road both main and secondary canal with pavement
  - Provision of kilo, hect-m posts, marking to each structure with structure name
  - Replacement and reconstruction of regulating structure on canal

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 5,200 | 0 | 5,200 |
| | Secondary | 0 | 45,027 | 0 | 45,027 |
| Structure (nos) | Main | 0 | 10 | 1 | 11 |
| | Secondary | 0 | 171 | 34 | 205 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 6,173 | 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 | 6,173 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 2,600 | 81,291 | 8,129 | 12,655 | 2,590 | 107,265 | 17.4 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 14.0%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 15.0 | 67.9 |
| | Urgency | 25.0 | 21.6 | Social Problem | 15.0 | 10.5 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 9.0 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 1

Central Java Province
32. Jengkelok Scheme
(3/4)

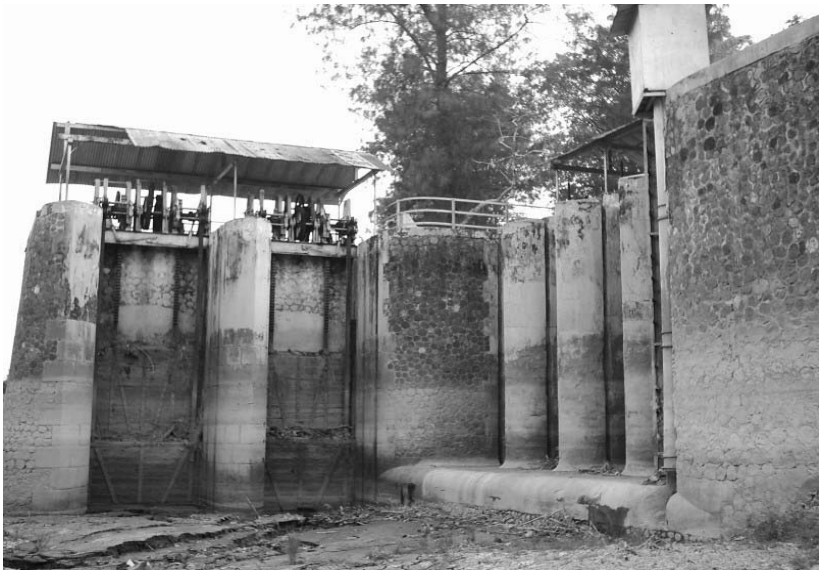
| Scheme | Jengkelok | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 6,505 ha | Year of Construction | 1990 |

Irrigation (Headworks)

*Structure*
Fixed Weir, Downstream View

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require replacement of scoring sluice and intake gates, wooden to steel

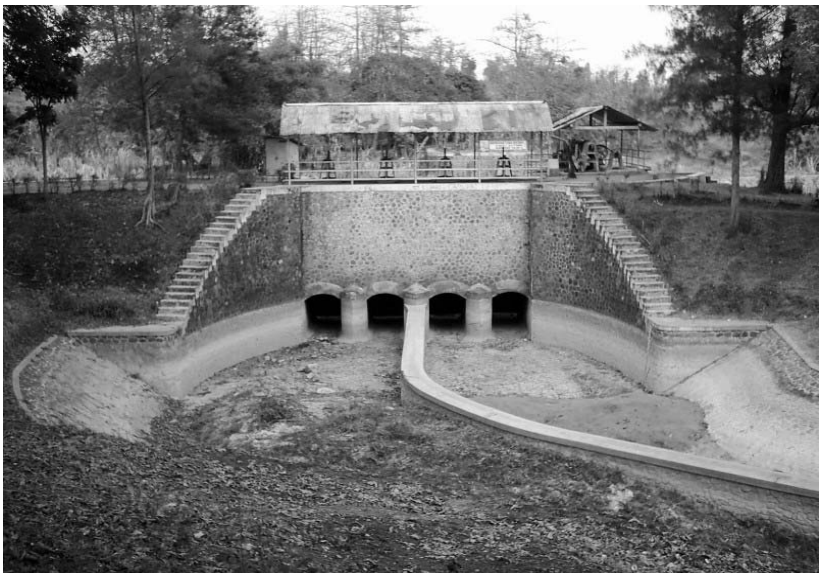


*Category*
Irrigation (Headworks)

*Structure*
Scouring Sluice and Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require replacement of gates, wooden to steel



*Category*
Irrigation (Headworks)

*Structure*
Intake, Rear View

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment and provision of inspection road along main canal

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

| Scheme | Jengkelok | District | Brebes | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 6,505 ha | Year of Construction | 1990 |

*Category*
Irrigation (Main Canal)

*Structure*
Settling Basin and Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediment and provision of inspection road

*Category*
Irrigation (Paddy field)

*Structure*
Paddy field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require farm road and ditch

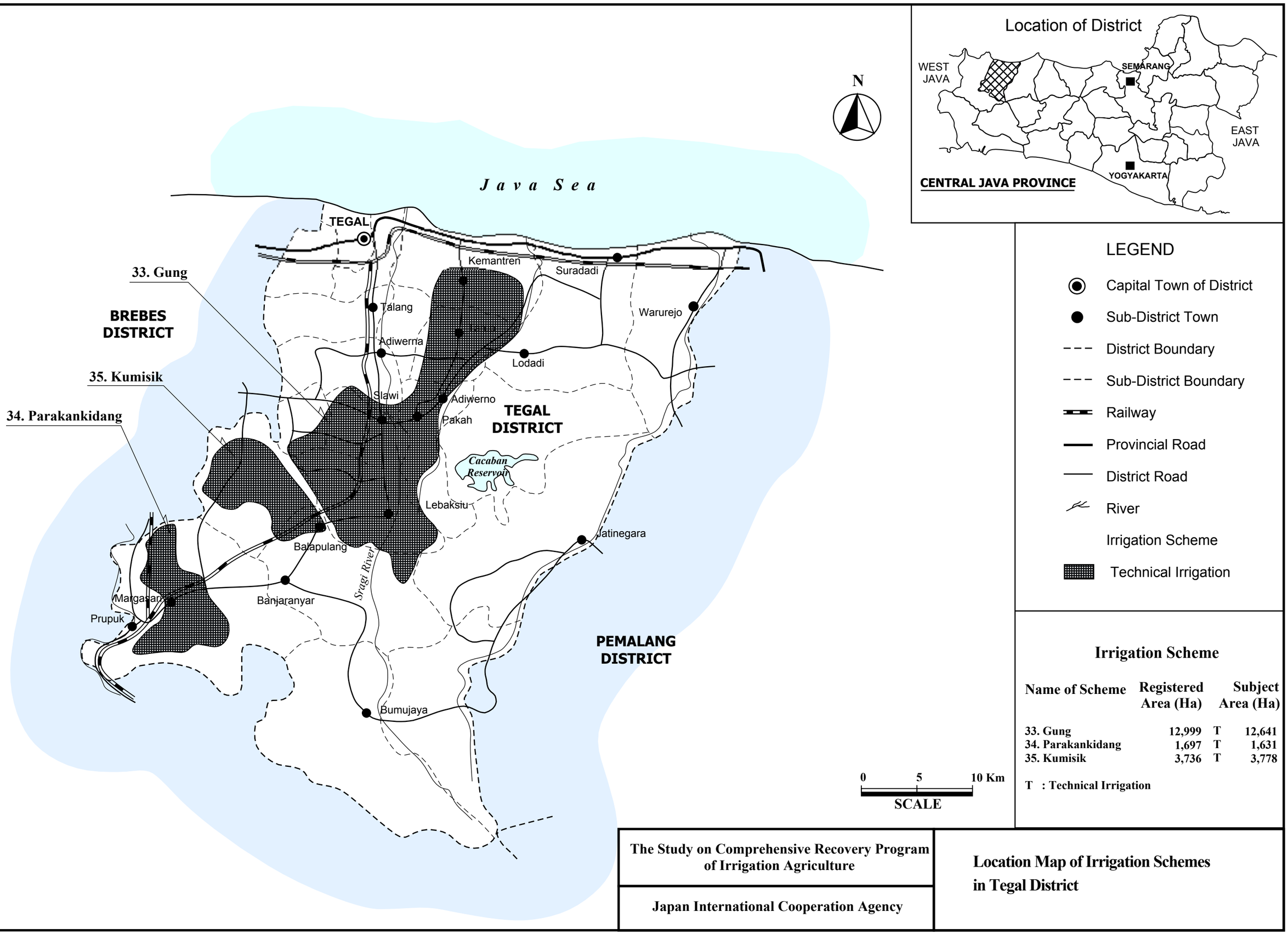
*Category*
Irrigation (Paddy field)

*Structure*
Paddy field

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require farm road and ditch

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




## Irrigation Scheme

| Name of Scheme | Registered Area (Ha) | | Subject Area (Ha) |
|---|---|---|---|
| 33. Gung | 12,999 | T | 12,641 |
| 34. Parakankidang | 1,697 | T | 1,631 |
| 35. Kumisik | 3,736 | T | 3,778 |

T : Technical Irrigation

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

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

## I. PROJECT FUNDAMENTALS

**I.1 General**

| | | | | | |
|---|---|---|---|---|---|
| (1) | Code Number | : 33003044-64 | (7) | Number of Farmers | : 63,390 |
| (2) | Name of Irrigation Scheme | : D.I. Gung | (8) | Water Resource River | : Kali Gung |
| (3) | District (Kabupaten) | : Tegal & Kodia Tegal | (9) | Catchment Area ($km^2$) | : 155.60 |
| (4) | Sub-district (Kecamatan) | : Lebaksui | (10) | Completion / Last Rehabilitation Year | : 1991/1998 |
| (5) | Registered Area (ha) | : 12,999 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 12,641 | 12,641 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 12,641 | 12,641 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 9,734 | 1,517 | 1,390 | 12,641 | 100% | 5.0 | 48,670 | 4,551 | 90,350 |
| Season II (dry I) | 4,579 | 5,077 | 1,563 | 11,219 | 89% | 5.0 | 22,895 | 15,231 | 101,595 |
| Season III (dry II) | 406 | 9,572 | | 9,978 | 79% | 4.5 | 1,827 | 11,486 | |
| Total/Annual | 14,719 | 16,166 | 2,953 | 33,838 | 268% | 5.0 | 73,392 | 31,268 | 191,945 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Single cropping of paddy prevailing; paddy yield levels high; palawija cropped area larger then that of paddy

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

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

**III.2 Development Plan**

(1) Development Approaches

- Expansion of irrigated area of paddy & ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropping of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 11,251 | | 1,390 | 12,641 | 100% | 5.5 | 61,881 | | 90,350 |
| Season II (dry I) | 6,321 | 3,367 | 1,563 | 11,251 | 89% | 5.5 | 34,766 | 16,835 | 101,595 |
| Season III (dry II) | | 10,113 | | 10,113 | 80% | | | 14,158 | |
| Total/Annual | 17,572 | 13,480 | 2,953 | 34,005 | 269% | 5.5 | 96,646 | 30,993 | 191,945 |
| Annual Increment | 2,853 | -2,686 | 0 | 167 | 1% | 0.5 | 23,254 | -275 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 131 | b. Established; | 129 | c. Not yet; | 2 | Registered | | 7 |
| Performance | a. Developed; | 2 | b. Under developing; | 74 | c. Not yet; | 53 | Not yet registered | | 122 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Low collection level of membership fee.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Calling attention of WUA members to their obligation.

(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 : C Main Canal System : C Secondary Canal System : C On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 65 m
d. Design intake discharge : 19.0 m3/s
e. Scouring sluice gate : 2 nos.
f. Intake gate : 2 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | Total (m) | Structure (nos) | Inspection road (m) | Condition |
|---|---|---|---|---|---|---|
| Main | 13,500 | 0 | 13,500 | 27 | 8,576 | C |
| Secondary | 20,000 | 17,000 | 37,000 | 165 | 37,000 | C |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
  - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope 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
  - Provision of additional ripraps or blocks after stilling basin of weir as required
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
  - 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
  - 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 : large rehabilitation
Settling basin : large rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 2,700 | 10,800 | 0 | 13,500 |
| | Secondary | 4,000 | 33,000 | 0 | 37,000 |
| Structure (nos) | Main | 3 | 24 | 3 | 30 |
| | Secondary | 32 | 133 | 33 | 198 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 12,641 | 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 | 12,641 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 5,870 | 54,147 | 5,415 | 25,914 | 3,600 | 94,946 | 7.5 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 16.1%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 13.0 | 61.3 |
| | Urgency | 25.0 | 20.0 | Social Problem | 15.0 | 6.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 10.5 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 11

| Scheme | D.I Gung | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 12,999 ha | Year of Construction | 1991/1998 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Bar-screen Type

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require total repair of weir body

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Bar-screen Type

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require total repair of weir body

*Category*
Irrigation (Headworks)

*Structure*
Settling Basin

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of inspection road

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

| Scheme | D.I Gung | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 12,999 ha | Year of Construction | 1991/1998 |

*Category*
Irrigation (Main Canal)

*Structure*
Main Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediments at inside of canal

*Category*
Irrigation (Secondary Canal)

*Structure*
Concrete Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require repair of lining

*Category*
Irrigation (Tertiary Canal)

*Structure*
Tertiary Canal

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require tertiary development and provision of farm road

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 | : 33003036 | (7) | Number of Farmers | : 8,250 |
| (2) | Name of Irrigation Scheme | : Parakankidang | (8) | Water Resource River | : Kali Gintung |
| (3) | District (Kabupaten) | : Tegal & Kodia Tegal | (9) | Catchment Area ($km^2$) | : |
| (4) | Sub-district (Kecamatan) | : Margasari | (10) | Completion / Last Rehabilitation Year | : 1994 |
| (5) | Registered Area (ha) | : 1,697 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 1,631 | 1,631 | 0 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 1,631 | 1,631 | 0 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,523 | | 98 | 1,621 | 99% | 5.0 | 7,615 | | 6,370 |
| Season II (dry I) | 354 | 1,156 | 14 | 1,524 | 93% | 5.0 | 1,770 | 3,468 | 910 |
| Season III (dry II) | | 1,213 | | 1,213 | 74% | | | 1,456 | |
| Total/Annual | 1,877 | 2,369 | 112 | 4,358 | 267% | 5.0 | 9,385 | 4,924 | 7,280 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Single cropping of paddy prevailing; paddy yield levels high; palawija cropped area larger then that of paddy

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

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

**III.2 Development Plan**

(1) Development Approaches

- Expansion of irrigated area of paddy & ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropping of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 1,533 | | 98 | 1,631 | 100% | 5.5 | 8,432 | | 6,370 |
| Season II (dry I) | 816 | 703 | 14 | 1,533 | 94% | 5.5 | 4,488 | 3,515 | 910 |
| Season III (dry II) | | 1,468 | | 1,468 | 90% | | | 2,055 | |
| Total/Annual | 2,349 | 2,171 | 112 | 4,632 | 284% | 5.5 | 12,920 | 5,570 | 7,280 |
| Annual Increment | 472 | -198 | 0 | 274 | 17% | 0.5 | 3,535 | 646 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 8 | b. Established; | 8 | c. Not yet; | 0 | Registered | | 0 |
| Performance | a. Developed; | 0 | b. Under developing; | 8 | c. Not yet; | 0 | Not yet registered | | 8 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Insufficient internal coordination in WUA

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Improvement of WUA management system

(2) Development Plan

- WUA management training

## V. IRRIGATION FACILITY

**V.1 Existing Condition**

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

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 23 m
d. Design intake discharge : 3.6 m3/s
e. Scouring sluice gate : no info.
f. Intake gate : no info.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 1,200 | 510 | 1,710 | 5 | 1,710 | B |
| Secondary | 4,400 | 10,290 | 14,690 | 65 | 14,690 | B |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Insufficient diversion water due to sedimentation in front of intake
  - Difficulty on O&M
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Sedimentation in front of intake
  - No provision of inspection/access road, no provision of inspection bridge/deck
- Irrigation Canal and Related Structure
  - Improper regular maintenance of canal, settlement of canal then insufficient freeboard and overtopping
  - Improper maintenance; insufficient nos. of cross drain, berm width, or catch drain; and/or steep slope 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
  - Provision of additional ripraps or blocks after stilling basin of weir as required
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
  - Provision of inspection/access road, inspection bridge/deck
- Irrigation Canal and Related Structure
  - 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
  - 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 : large rehabilitation Intake, civil : large rehabilitation Intake, mechanical : large rehabilitation
Settling basin : large rehabilitation

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 240 | 1,470 | 0 | 1,710 |
| | Secondary | 880 | 13,810 | 0 | 14,690 |
| Structure (nos) | Main | 0 | 5 | 1 | 6 |
| | Secondary | 9 | 56 | 13 | 78 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 1,631 | 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 | 1,631 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 1,856 | 12,805 | 1,280 | 3,344 | 1,260 | 20,545 | 12.6 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 15.1%

**VI.2 Prioritization Scoring**

| Evaluation Index | | Full Score | Score | Evaluation Index | Full Score | Score | Total Score |
|---|---|---|---|---|---|---|---|
| Irrigation System | Utilization of Irrigation Potential | 10.0 | 5.0 | Agricultural Productivity | 20.0 | 13.0 | 58.9 |
| | Urgency | 25.0 | 17.6 | Social Problem | 15.0 | 6.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 10.5 | |

**VI.3 Priority Group** Group II: Second priority group **VI.4 Priority Ranking in the Province** 20

| Scheme | Parakankidang | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,697 ha | Year of Construction | 1994 |

*Category*
Irrigation (Headworks)

*Structure*
Intake and Scouring Sluice

*Condition*
☐ A ☑ B ☐ C ☐ D

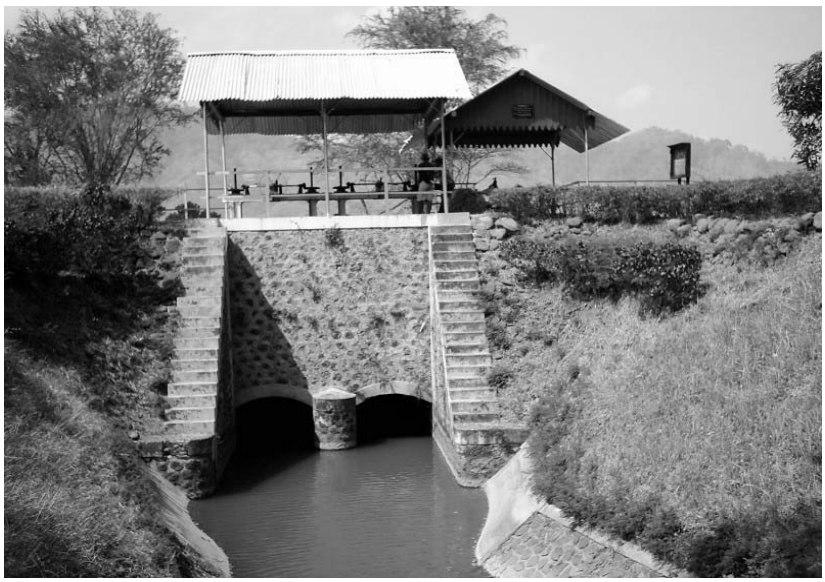
*Problems*
Require minor repair for civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Fixed Wir, Rear View

*Condition*
☐ A ☑ B ☐ C ☐ D

*Problems*
Require minor repair for civil and gate works



*Category*
Irrigation (Headworks)

*Structure*
Intake

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of settling basin

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

| Scheme | Parakankidang | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 1,697 ha | Year of Construction | 1994 |

*Category*
Irrigation (Secondary Canal)

*Structure*
Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require total rehabilitation

*Category*
Irrigation (Secondary Canal)

*Structure*
Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Under repairing of canal lining

*Category*
Irrigation (Secondary Canal)

*Structure*
Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require removal of sediments and provision of inspection road

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 | : 33003088-91 | (7) | Number of Farmers | : 15,112 |
| (2) | Name of Irrigation Scheme | : Kumisik | (8) | Water Resource River | : Kali Kumisik |
| (3) | District (Kabupaten) | : Tegal & Kodia Tegal | (9) | Catchment Area ($km^2$) | : - |
| (4) | Sub-district (Kecamatan) | : Balapulang | (10) | Completion / Last Rehabilitation Year | : 1997/1998 |
| (5) | Registered Area (ha) | : 3,736 | | | |
| (6) | Technical Level | : Technical | | | |

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

| a. Design Reports of Existing System(Full set) | b. Irrigation diagram | c. As-built drawings | d. Structure lists & diagram |
|---|---|---|---|
| A | A | A | A |
| e. Rehabilitation plan & its references | f. Crops and yield data | g. Cropping Calender | h. WUAs data |
| C | A | A | 1 |

## II. SUBJECT AREA FOR REHABILITATION PLAN

**II.1 Present and Planned Land Use**

| Category | Present (ha) | Plan (ha) | Increment (ha) |
|---|---|---|---|
| a. Irrigated paddy field | 3,778 | 3,788 | 10 |
| b. Rainfed paddy field | 0 | 0 | 0 |
| c. Upland field | 0 | 0 | 0 |
| d. Uncultivated land | 0 | 0 | 0 |
| e. Non-irrigable land | 0 | 0 | 0 |
| Total | 3,778 | 3,788 | 10 |

## III. AGRICULTURE

**III.1 Present/Before Project Condition**

(1) Irrigation Performance and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 3,533 | | 224 | 3,757 | 99% | 5.0 | 17,665 | | 14,560 |
| Season II (dry I) | 1,225 | 2,042 | 225 | 3,492 | 92% | 5.0 | 6,125 | 6,126 | 14,625 |
| Season III (dry II) | | 1,921 | | 1,921 | 51% | | | 2,305 | |
| Total/Annual | 4,758 | 3,963 | 449 | 9,170 | 243% | 5.0 | 23,790 | 8,431 | 29,185 |

(2) Problems and Constraints

*A. Irrigation & Agriculture Performances*

- High irrigation performances achieved; however, intensity of paddy is limited & water shortage in dry season reported
- Single cropping of paddy prevailing; paddy yield levels high; palawija cropped area extensive

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

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

**III.2 Development Plan**

(1) Development Approaches

- Expansion of irrigated area of paddy & ensuring year round irrigation water supply at on-farm level through rehabilitation
- Expansion of double cropping of paddy; productivity increase through further intensification
- Extension activities toward improvement of post-harvest & marketing; empowerment of farmer groups (KTs) to establish agri-business oriented KTs

(2) Planned Irrigation Performances and Crop Production

| Season | Cropped Area in Irrigated Paddy Field (ha) | | | | Annual | Irrigated Paddy Yield (GKG | Crop Production (ton) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Paddy | Palawija | Sugarcane | Total | Intensity | ton/ha) | Paddy | Palawija | Others |
| Season I (wet) | 3,554 | | 224 | 3,778 | 100% | 5.5 | 19,547 | | 14,560 |
| Season II (dry I) | 3,329 | | 225 | 3,554 | 94% | 5.5 | 18,310 | | 14,625 |
| Season III (dry II) | | 2,645 | | 2,645 | 70% | | | 3,703 | |
| Total/Annual | 6,883 | 2,645 | 449 | 9,977 | 264% | 5.5 | 37,857 | 3,703 | 29,185 |
| Annual Increment | 2,125 | -1,318 | 0 | 807 | 21% | 0.5 | 14,067 | -4,728 | 0 |

## IV. WUAs

**IV.1 Existing Condition**

(1)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Number | a. Target; | 31 | b. Established; | 28 | c. Not yet; | 3 | Registered | | 0 |
| Performance | a. Developed; | 1 | b. Under developing; | 27 | c. Not yet; | 0 | Not yet registered | | 28 |

(2) Problems and Constraints

☐ Operation ☐ Maintenance ☑ Management

(3) Causes of Problems and Constraints

- Not so active members
- Low collection level of membership fee.

**IV.2 Development Plan**

(1) Proposed Countermeasures

- Encouragement of members to involve positively in O&M works.
- Calling attention of WUA members to their obligation.

(2) Development Plan

- WUA O&M training and 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 : C Main Canal System : C Secondary Canal System : D On-farm : C

(2) Water Resources Facilty

a. Type of facility : Headworks
b. Type of weir : Fixed weir
c. Length of weir : 24 m
d. Design intake discharge : 5.4 m3/s
e. Scouring sluice gate : 1 nos.
f. Intake gate : 3 nos.
g. Settling basin : provided
h. Inspection bridge : no info.
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 | 4,500 | 10,700 | 15,200 | 51 | 15,200 | C |
| Secondary | 5,200 | 12,077 | 17,277 | 31 | 17,277 | D |

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

(4) Major Problems and Constrains

- Water Resources Facility
  - Washed away of ripraps or blocks after stilling basin
  - Problem on management for flood/scouring sluice gate(s) operation
  - Insufficient diversion water due to sedimentation in front of intake
- Irrigation Canal and Related Structure
  - Leakage from canal
  - Collapse of canal
  - Lower function of regulating structure on canal
  - Difficulty on O&M

(5) Causes of Major Problems and Constraints

- Water Resources Facility
  - Insufficient weight of ripraps or blocks for stilling basin, insufficient length of protection work after stilling basin
  - Improper maintenance of flood or scouring sluice gate(s) of headworks (no greasing and anti-rust painting)
  - Sedimentation in front of intake
- Irrigation Canal and Related Structure
  - 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
  - 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 additional ripraps or blocks after stilling basin of weir as required
  - Replacement of control system or damaged equipment of flood/scouring sluice gate(s) of headworks
  - Dredging or flushing of sediment, proper gate operation of headworks and intake
- Irrigation Canal and Related Structure
  - 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
  - Replacement and reconstruction of regulating structure on canal
  - Provision or repair of inspection road with all weather type/pavement

(2) Water Resources Facility

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

(3) Irrigation Canal and Related Structure

| Works | | No rehabilitaion | Rehabilitation | New construction | Total |
|---|---|---|---|---|---|
| Canal (m) | Main | 0 | 15,200 | 0 | 15,200 |
| | Secondary | 0 | 17,277 | 0 | 17,277 |
| Structure (nos) | Main | 0 | 51 | 5 | 56 |
| | Secondary | 0 | 31 | 6 | 37 |

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

| | | | |
|---|---|---|---|
| a. Potential Irrigated paddy field | 3,778 | 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 | 3,778 |

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

| W.R.F | Irrigation | Drainage | On-Farm Develop. | Project Facility | Total | Cost per ha |
|---|---|---|---|---|---|---|
| 2,595 | 41,115 | 4,112 | 7,745 | 1,570 | 57,137 | 15.1 |

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

## VI. PROJECT EVALUATION

**VI.1 EIRR** 13.5%

**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 | 60.8 |
| | Urgency | 25.0 | 21.0 | Social Problem | 15.0 | 6.0 | |
| | Sustainability | 15.0 | 6.8 | Economic Impact | 15.0 | 9.0 | |

**VI.3 Priority Group** Group I: First priority group **VI.4 Priority Ranking in the Province** 12

| Scheme | Kumisik | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 3,736 ha | Year of Construction | 1997/1998 |

*Category*
Irrigation (Headworks)

*Structure*
Fixed Weir, Bar-screen Type

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require total repair or replacement

*Category*
Irrigation (Headworks)

*Structure*
Intake Gate, Rear View

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require major repair of civil and gate works

*Category*
Irrigation (Headworks)

*Structure*
Masonry Lined Canal and Settling Basin

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of inspection road

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

| Scheme | Kumisik | District | Tegal & Kodia Tegal | | |
|---|---|---|---|---|---|
| Technical Level | Technical | Registered Area | 3,736 ha | Year of Construction | 1997/1998 |

*Category*
Irrigation (Main Canal)

*Structure*
Masonry Lined Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require canal lining and provision of inspection road

*Category*
Irrigation (Tertiary Canal)

*Structure*
Canal

*Condition*
☐ A ☐ B ☑ C ☐ D

*Problems*
Require provision of gates and farm road

*Category*
Irrigation (Paddy Field)

*Structure*
Tertiary Canal and Paddy Field

*Condition*
☐ A ☐ B ☐ C ☑ D

*Problems*
Require tertiary development

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