No.

Japan International Cooperation Agency (JICA)

Ministry of Settlement and Regional Infrastructure (MOSRI)
The Republic of Indonesia

THE STUDY
ON
COMPREHENSIVE RECOVERY PROGRAM
OF
IRRIGATION AGRICULTURE

VOLUME-7

ANNEX-III (2/3)

Development Plan
(Central Java Province)

February 2004

Nippon Koei Co., Ltd.

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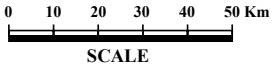
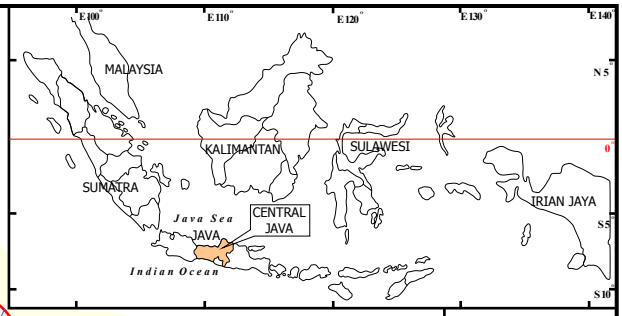
Study Area: Central Java Province





Irrigation Scheme

Name of Scheme	Registered Area(Ha)		Subject Area (Ha)
1. Cijalu	1,377	T	1,377
2. Mangganti	18,895	T	22,644
3. Serayu	15,869	T	20,795
4. Banjarcahyana	4,859	T	5,001
5. Kaligending	2,981	T	2,923
6. Pesucen	1,666	T	1,659
7. Bedegolan	8,430	T	8,401
8. Kedung Putri	4,341	T	4,451
9. Sudagaran	3,665	T	3,665
10. Rebug	1,202	T	1,202
11. Kalimeneng	1,262	T	1,262
12. Kedung GW	1,129	T	1,129
13. Waduk Cengklik	1,579	T	2,120
14. Ploso Wareng	1,100	T	1,100
15. Jaban	1,191	T	1,191
16. Colo Kanan	18,108	T	22,982
17. Bonggo	1,811	T	1,406
18. Pangkalan	1,765	T	654
19. Sentul	1,759	T	1,739
20. Widodaren	3,652	T	2,616
21. Klambu Kanan	10,391	T	6,216
22. Jragung	4,597	T	4,416
23. Guntur	2,020	T	1,543
24. Klambu Kiri	21,419	T	20,738
25. Kedungdowo Kramat	1,250	T	1,250
26. Sungapan Kanan	1,851	T	1,851
27. Mejagong	1,997	T	2,049
28. Sungapan Kiri	5,229	T	5,570
29. Kabuyutan	4,182	T	3,876
30. Babakan	2,181	T	2,528
31. Kemaron Jambe	1,026	T	1,483
32. Jengkelok	6,505	T	6,173
33. Gung	12,999	T	12,641
34. Parakankidang	1,697	T	1,631
35. Kumisik	3,736	T	3,778
36. Pesantren Kletak	4,263	T	3,636
37. Sragi	3,540	T	3,539
38. Sudikampir	1,564	T	1,550
39. Padurekso	2,764	T	2,764
40. Kedung Asem	3,726	T	2,845
41. Bodri	8,538	T	7,710
42. Trompo	1,263	T	1,229
43. Kedung Pengilon	3,134	T	2,686
44. Pasekan	1,078	T	988
45. Kosar	1,617	T	3,243
46. Notog	27,682	T	25,540
47. Sidorejo	14,622	T	5,717
48. Glapan	18,696	T	18,784
49. Klambu Kanan	6,841	T	11,078
50. Kaliwadas	7,520	T	7,722

T : Technical Irrigation

LEGEND

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

S 7°
S 8°
E 109°
E 110°
E 111°

REMBANG DISTRICT
BLORA DISTRICT
PATI DISTRICT
KUDUS DISTRICT
JEPARA DISTRICT
DEMAK DISTRICT
PURWODADI DISTRICT
SEMARANG DISTRICT
SEMARANG
KENDAL DISTRICT
TEMANGGUNG DISTRICT
BATANG DISTRICT
PEKALONGAN DISTRICT
PEMALANG DISTRICT
TEGAL DISTRICT
BREBES DISTRICT
KARANGANYAR DISTRICT
SRAGEN DISTRICT
BOYOLALI DISTRICT
SUKOHARJO DISTRICT
KLATEN DISTRICT
MAGELANG DISTRICT
WONOSOBO DISTRICT
BANJARNEGARA DISTRICT
PURBALINGGA DISTRICT
BANYUMAS DISTRICT
CILACAP DISTRICT
PURWOREJO DISTRICT
KEBUMEN DISTRICT
WONOGIRI DISTRICT
YOGYAKARTA
YOGYAKARTA PROVINCE
EAST JAVA
WEST JAVA
Java Sea
Indian Ocean
Rembang
Blora
Pati
Purwodadi
Kudus
Jepara
Demak
Ungaran
Kendal
Temanggung
Magelang
Batang
Pekalongan
Pemalang
Tegal
Brebes
Purwokerto
Purbalingga
Banjarnegara
Wonosobo
Purworejo
Kebumen
Cilacap
Sragen
Karanganyar
Wonogiri
Sukoharjo
Klaten
Boyolali
Gajah Mungkur Reservoir
Kedungombo Reservoir
Rawapening Reservoir
Wadaslintang Reservoir
Cacaban Reservoir
Mahalaya Reservoir

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Location Map of Irrigation Schemes in Central Java Province

THE STUDY
ON
COMPREHENSIVE RECOVERY PROGRAM
OF
IRRIGATION AGRICULTURE
IN
THE REPUBLIC OF INDONESIA

Volume-7

ANNEX-III (2/3)
DEVELOPMENT PLAN
(Central Java Province)

Table of Contents

PART I PRE-FEASIBILITY STUDY FOR PRIORITIZATION OF IRRIGATION SCHEMES

List of Tables

List of Figures

PART II FEASIBILITY STUDY FOR SELECTED MODEL SCHEME

Page

List of Tables

List of Figures

Drawings

PART I

PRE-FEASIBILITY STUDY FOR PRIORITIZATION OF IRRIGATION SCHEMES

CHAPTER 1 STUDY AREA

1.1 General

Central Java Province with a land area of 32,544 km^2 is administratively composed of 29 districts, 6 municipalities, 553 sub-districts and 8,550 villages. There are 19 major districts covered by the target irrigation schemes (the project districts). Some administrative, demographic and socio-economic features of the province and project districts are presented in Table A-1.1.1 and shown in the following table.

Administrative, Demographic and Socio-economic Features in 2001

Division	Land Area (km^2)	No. of Districts	No. of Sub-districts	Population (1,000)	Household (1,000)
Province	32,544	29	553	31,064	7,986
Project Districts	20,196	19	329	19,097	4,876

Source: Statistic data of BPS, Central Java

The main economic activity of the province and the project districts is the agriculture sector accounting for 31 % and 32 % of the total GRDP, respectively. In the agriculture sector, food crops agriculture is a leading sub-sector accounting for 70 % of the sector GRDP followed by the livestock sub-sector in province. The provincial per capita GRDP in 2001 is estimated at Rp. 3.5 million.

1.2 Condition of Paddy Fields and Irrigation Systems

The table below shows the area and percentage of irrigated and rainfed paddy fields in relation to the total paddy fields of Central Java Province in comparison with those of the whole country:

Classification of Paddy Fields

Condition of Paddy Fields	Central Java Province		Whole Country	
	Area (ha)	Ratio (%)	Area (ha)	Ratio (%)
Irrigated Paddy Fields	719,300	72.0	4,868,800	62.5
Rainfed Paddy Fields	279,800	28.0	2,918,600	37.5
Total	999,100	100.0	7,787,400	100.0

Source: Statistic data of BPS (2002), Central Java Province.
In the case of the whole country, the areas of Maluku and Irian Jaya are excluded from those of the respective type of field.

It is seen from the above table that the percentage of irrigated paddy fields in Central Java Province is 72.0, while that of the whole country is 62.5. These facts indicate that the percentage of irrigated paddy fields in Central Java Province is much higher than that of the whole country.

The table below shows the area and percentage of the respective categories of Central Java Province in comparison with those of the whole country based on the Indonesian standards for irrigation system design classification:

Classification of Categories of Irrigation Systems depending on Technical Level

Technical Level	Central Java Province		Whole Country	
	Area (ha)	Ratio (%)	Area (ha)	Ratio (%)
Technical Systems	384,400	53.5	2,214,300	45.5
Semi-technical Systems	123,300	17.1	979,200	20.1
Simple Systems	211,600	29.4	1,675,300	34.4
Total	719,300	100.0	4,868,800	100.0

Source: Statistic data of BPS (2002), Central Java Province.
In the case of the whole country, the areas of Maluku and Irian Jaya are excluded from those of the respective type of field.

It is seen from the above table that the percentage of technical systems in Central Java Province is 53.5, while that of the whole country is 45.5. On the other hand, the percentage of simple systems in Central Java Province is 29.4, while that of the whole country is 34.4. These facts indicate that the technical level of irrigation systems in Central Java Province is much higher than the average of the whole country.

1.3 Technical Level of Irrigation System

In Central Java, a total of 721,675 ha of paddy fields is irrigated by the existing 4,997 government developed irrigation schemes and, furthermore, 336,855 ha is provided with irrigation water by numerous village irrigation schemes as shown in Table A-1.3.1. About 75% of the former irrigated areas are served by 702 technical irrigation schemes, while 8% are covered by 746 semi-technical irrigation schemes and 17% by 3,549 simple irrigation schemes.

On a district basis, the government developed irrigation schemes are classified into 87 large scale schemes with a potential irrigation area of more than 1,000 ha, 109 middle scale schemes of 500 ha to 1,000 ha and 4,791 small scale schemes of less than 500 ha. Potential irrigation areas of the three classes are 371,707 ha, 75,804 ha and 274,164 ha respectively as shown in Table A-1.3.2.

1.4 Agricultural and Agro-economic Situations

The agricultural and agro-economic situations in the province and project districts is presented in Table A-1.4.1 and summarized as follows.

1.4.1 Agro-demography and Land Holding & Tenure

The agro-demographic features of the province and project districts are estimated based on the Agriculture Census 1993 as presented in Table A-1.4.1 and as summarized in the following table:

Agro-demographic Features of Province in 1993

Agro-demographic Indicators	Range among Project Districts (%)	Province (%)
Proportion of Farm Households to Total Households	34-75	54
Proportion of Farm Households Having Activity in:		
- Food Crops Farming	70-95	89
- Horticulture Crops Farming	8-40	22
- Estate Crops Production	6-37	20
- Livestock	6-37	25

On the basis of the census results, the number of farm households in the province in 2001 is estimated at some 4,319,000 and accounts for about 54% of the total households of about 7,986,000. The primary farming activity of the farm households in the province is food crops production followed by livestock activity. Food crops farmers are some 89% of the total farmers.

The current land holding status in the province and project districts has been roughly estimated based on the number of farm households and the present agricultural land use as shown in Table A-1.4.1 and summarized below:

Roughly Estimated Land Holding Status in Province

Indicators	Range among Project Districts	Province
Average Farm Land Holding Size/Farm Household	0.43～0.67 ha	0.54 ha
Average Holding Size of Paddy Field/Farm Household	0.11～0.36 ha	0.23 ha
Distribution of Farm Household by Holding Size		
- < 0.5 ha	62～83 %	69 %
- ≧0.5 ha	17～38 %	31 %

Source: Agricultural Census, 1993, BPS

1.4.2 Agricultural Land Use

The present agricultural land use of the province and project districts has been studied based on the statistical data of the BPS province as shown in Table A-1.4.2. The largest farm land category in the province and the project districts is paddy fields occupying about 41 or 45% of the total farm land, followed by dry land/gardens (*tegal/kebun*) accounting for 31 or 27% as summarized below:

Present Agricultural Land Use in the Province in 2001

Land Use Category	Province		Project Districts	
	Area (ha) *1	Ratio (%)	Area (ha) *1	Ratio (%)
Paddy Fields	999,100	41	717,800	45
Home Gardens	581,500	24	374,300	23
Dry Land/Gardens	760,200	31	441,400	27
Upland Fields	5,800	0	5,700	0
Estate Crops Land *2	86,900	4	74,800	5
Total Farm Land	2,433,500	100	1,614,000	100

Note: *1. Rounded figures, *2. Estate operated by public or private firms
Source: Statistic Data of BPS, Central Java

1.4.3 Food Crops Agriculture

Paddy production is by far the most important farming activity in the food crops agriculture sub-sector, both in the province and the project districts, representing 60% or 68% of the total harvested area with food crops (not including vegetables) in 2001, as shown in Table A-1.4.3 and summarized below:

Harvested Area of Food Crops by Proportion in 2001 in Province & Project Districts

Province	Paddy (%)	Maize (%)	Beans *1 (%)	Tubers *2 (%)	Total (%)
Province	60	19	12	9	100
Project Districts	68	15	11	6	100

Note: *1. Includes soybeans, mungbeans & groundnut, *2. Includes cassava & sweat potatoes
Source: Statistic Data of BPS, Central Java

The second most important food crop in terms of harvested area in the province and project districts is maize accounting for 19% and 15% respectively of the total harvested area, followed by beans. The productions of food crops in 2001 in the province and project districts is shown in Table A-1.4.3 and summarized below:

Production of Food Crops in 2001 in Province & Project Districts (unit: 1,000t)

Province	Paddy	Maize	Beans *1	Tubers *2
Province	8,284	1,506	349	3,098
Project Districts	6,120	785	207	1,440

Note: *1 Includes soybeans, mungbeans & groundnut, *2 Includes cassava & sweat potatoes
Source: Statistic Data of BPS, Central Java

1.4.4 Agricultural Institutions and Extension

(1) Agricultural Institutions

The government agricultural support institutions in the province include Food & Horticulture Crops Agriculture Services Office, Estate Crops Services Office, Livestock Services Office and Food Security Mass Guidance Agency. The Agriculture Services Office is composed of four sub-services and Technical Implementation Units (*Unit Pelaksana Teknis Daerah*/UPTD) as shown in Figure A-1.4.1. The agricultural institutions in the province and project districts are shown in Table A-1.4.4.

The government agricultural support institutional arrangements at district level are not consistent with the provincial arrangements and there are differences among the districts concerned as is the case in North Sumatra.

The major farmers organization in agricultural activities is the Farmers' Group (*Kelompok Tani*/KT). The number of KTs formed in the province and their development status assessed by district agricultural agencies are shown by sub-district in Table A-1.4.4. In the province, 22% of KTs are classified as

primary level (*pemula*), 38% as secondary level (*lanjut*), 28% as middle level (*madya*) and 11% as advanced level (*maju*).

There are 588 Village Unit Cooperatives (*Koperasi Unit Desa*/KUD) in the province with varying activities from dormant status to actively operated status. General problems encountered by KUD are similar to those discussed in Section 1.1.

(2) Agricultural Extension

The numbers of Rural Extension Centers (*Balai Penyuluhan Pertanian*/BPP) and Field Extension Workers (*Penyuluhan Pertanian Lapangan*/PPL) deployed in the province and the project districts in 2002 are shown in Table A-1.4.4. No information on the number of BPPs and PPLs in the province was accessible.

1.4.5 Farm Machinery and Post-harvest Facilities

The numbers of farm machinery including tractor, water pump, thresher, paddy dryer etc. and rice mills possessed in the project districts are shown in Table A-1.4.5. The availability of hand tractors are quite in shortage when land preparation works of all the paddy fields in the districts are to be carried out by machinery. The results of the Inventory Survey indicate sufficiency of rice mills in most of the target schemes.

1.4.6 Non-food Crops Agriculture

The primary non-food crops agriculture in the province is the livestock sub-sector followed by the estate crops sub-sector operated both by public and private estates and smallholders. Statistical figures of the non-food crops agriculture are shown in Table A-1.4.6.

1.5 Institution

In Central Java, the Water Resources Management Services (PWRS) unit was appointed by the Governor as the prime agency to implement water resources management services based on *Perda Propinsi Jawa Tenga*h No. 7/2001. One of its main tasks is to handle technical aspects of water resources management as well as operation and maintenance of inter-District irrigation schemes. The organization of PWRS in Central Java consists of Head, Administration Division, Sub-service for Program, Sub-service for Construction, Sub-service for Operation and Maintenance, Sub-service for Cooperation and License, and field technical units (*Balai* PSDA).

A total of 6,356 WUA have been established in 5,499 irrigation schemes, including some village irrigation schemes, with a total working area of 961,578 ha. The performance of these WUA has been regularly monitored and evaluated by PWRS by scoring six indicators and 19 sub-indicators. This system was developed through the implementation of "Turnover of Small Irrigation Systems (PIK)" and indicates work progress by three levels, i.e. developed, under development and not yet developed. According to the evaluation results in 2002, 527 WUA are judged as developed and 4,762 WUA as under development, while the remaining 1,067 WUA are ranked at the level of not yet developed as shown in Table A-1.5.1.

As for legitimate status, each WUA has to get official approval of *Bupati* and then apply for its legal registration to the local court of justice. At present, 2,725 WUA have already been officially approved by *Bupati* for their establishment. However, they are facing difficulties in getting approval of their registration due to the limited capacity of the local courts of justice. As a result, only 159 WUA have been legitimized so far as shown in Table A-1.5.1.

1.6 Financial Condition of District/Municipal Governments

In Table A-1.6.1, financial condition of the respective District and Municipal Governments in Central Java is summarized by using such indicators as per capita income and revenue for 2001 as well as actual receipts and expenditures for 2000. As for the latter indicator, some of financial reports for 2001 are still under internal auditing by officials concerned so that data for 2000 are referred to. In the course of transition period for synchronizing fiscal year with calendar year by the Government, the actual receipts and expenditures for 2000 were born during the 9-month period from April 1 to December 31, 2000.

The consolidated per capita provincial revenue for 2001 comprised Rp.41,036 for own fiscal capacity consisting of own source revenue, non-tax from natural resources and share taxes and Rp.266,040 for general allocation fund (DAU) plus contingency. Among 29 Districts and 6 Municipalities, the own fiscal capacity on per capita basis of 1 District and 5 Municipalities is over the consolidated provincial level, while the per capita general allocation fund of 9 Districts and 5 Municipalities exceeds over the consolidated provincial level.

CHAPTER 2 SELECTION OF IRRIGATION SCHEMES

2.1 Database of Irrigation Schemes prepared by MOSRI

2.1.1 Verification of MOSRI's Database (WRDC)

The Ministry of Settlement and Regional Infrastructure prepared a database for water resources and irrigation systems called "WRDC", which consists of the following components:

(a) Database for irrigation schemes, crop yield and water users' associations,
(b) Location map of irrigation schemes, and
(c) Irrigation diagrams for irrigation schemes.

The WRDC was established in the year 2001. However, the autonomy, accountability and responsibility for operation and maintenance are still unclear according to information from the Directorate of Technical Guidance, MOSRI.

The status of the WRDC is as follows:

(a) System operation commenced in 2001.
(b) The number of columns (information to be filled out) is 306 in total.
(c) The WRDC is composed of administrative division such as Province, District and Sub-district.

(d) The WRDC is still under preparation and the only information available is the area registered (potential area and non-potential area). Other information such as i) kind of water resources structure/intake, ii) length of canal, and iii) kind and number of related structures have not been input yet.

As a result, it is necessary to collect most of the data from province and from field investigations, which have been executed on a sub-contract basis.

2.1.2 Contents of the List of Irrigation Schemes

The following basic information is shown in the list, which is provided by the central office of MOSRI and provincial offices:

(a) Registration Code Number
(b) Name of irrigation scheme
(c) Location of irrigation scheme (province, district, sub-district)
(d) Technical level of irrigation scheme
(e) Area (potential and non-potential area)

2.2 Criteria for Selection of Irrigation Schemes

The Inception Meetings were held between the Water Resources Management Services Office (Dinas PSDA) of Central Java province and the Study Team in the initial stage of field investigation. In the meeting, the irrigation schemes to be studied were examined and determined based on the following criteria:

(a) The Study area shall be determined based on the original list presented in the Scope of Work (S/W),

(b) The irrigation schemes with the conditions stated below shall be excluded from the original list:
- The schemes which have been recently completed and are functioning appropriately,
- The schemes for which implementation has been pledged by the Government and/or international donors,
- The schemes for which potential is too low (less than 1,000 ha), even though they are included in the original list.

(c) The irrigation schemes that need urgent rehabilitation, have been added to the list in addition to the original schemes presented in the Scope Work (S/W).

2.3 Definitions

2.3.1 Definition of Land Use and Irrigation Area

The Irrigation Area for the Study is determined by the following formula:

Irrigation Area = (potential area for irrigation + non-potential area for irrigation) - (other land use in potential area + other land use in non-potential area)

2.3.2 Definition of Technical Level of Irrigation System

According to the Indonesian standards for irrigation system design, the irrigation area is classified into three categories, depending on their technical levels, namely technical systems, semi-technical systems, and non-technical systems, as explained below:

Standard of Irrigation System

Items	Irrigation system		
	Technical system (T)	Semi-technical system (ST)	Non-technical system (NT)
Main intake	Permanent structure	Permanent structure and semi-permanent structure	Temporary structure
Diversion structure with measuring devices	Good	Fair	Poor
Canal system	Complete independent canal systems for irrigation and drainage	Not complete independent canal systems for irrigation and drainage	Dual function of irrigation and drainage
Tertiary canal system	Well developed	Developed to some extent	Not developed yet
Irrigation efficiency	50 - 60%	40 - 50%	Less than 40%
Size of irrigation area	No limitation	Up to 2,000 ha	Less than 500 ha

2.3.3 Definition of Rehabilitation

The term of rehabilitation is classified into two, "so-called rehabilitation" and "upgrading" according to the definition stated in the table below. Such classification will be applied for all the irrigation schemes to be studied, and for the selection of irrigation schemes for preliminary investigation.

Definition of Rehabilitation

Classification of rehabilitation	Definition of Rehabilitation
1. Rehabilitation	1) Rehabilitation is not accompanied by an increase of irrigation area. 2) Rehabilitation aims at recovering the system designed irrigation capacity (recovering as designed) from the reservoir/intake facilities to the terminal system. 3) Rehabilitation will increase cropping intensity of dry season crops by 0.2 for Java and 0.3 for outer Java. 4) Rehabilitation aims at repairing reservoir/intake facilities, canals and related structures, which are damaged, defective and deteriorated. 5) The grade to be applied to the irrigation system should be technical level.
2. Upgrading	1) It is possible to expand the irrigation area by upgrading existing irrigation facilities. 2) Extension of the irrigation area by means of upgrading can be made within rainfed paddy fields. More than one cropping can be increased. 3) Rehabilitation of the existing facilities is considered to be the same as 2.1) above. However, as rehabilitation aims at upgrading the quality of structures, deterioration can be decreased (life span can be approx. 50 years). 4) Effectiveness of implementation of upgrading works is expected to be high if the extension area is large. 5) The grade to be applied to the irrigation system should be technical level.

Classification of rehabilitation has been carried out based on the collected information from province and determined as indicated in Table A-2.3.1, and summarized as shown in the following table:

Type and Number of Rehabilitation Works

No. of Schemes	Classification of Irrigation Scheme	
	Rehabilitation	Upgrading
50	50	0

2.4 Selected Irrigation Schemes

The original list of irrigation schemes attached to the Inception Report shows that 85 schemes with a total area of 373,710 ha were to be studied in Central Java Province.

According to the inventory survey conducted by Dinas PSDA in Central Java Province in 2000, 35 irrigation schemes with a total area of 88,209 ha have to be excluded from the list for the following reasons:

(a) Technically and economically viable rehabilitation of 12 unimproved irrigation systems with areas of 38,344 ha was completed under IBRD Loan-3762, 'Java Irrigation Improvement and Water Management Project (JIWMP)'. Restoration of the capacity and function of 1 irrigation system (Sedadi) with an area of 14,399 ha was conducted under JBIC Loan IP-476, 'Project Type Sector Loan in Water Resources Development (PTSL)'. Another irrigation scheme (Logung) with an area of 2,821 ha was completed by APBN (state budget). There is 1 good functional irrigation scheme (Senjoyo) with an area of 2,294 ha, that does not need rehabilitation. Since there are 15 irrigation systems with areas of 57,858 ha which were recently completed and are in good condition, they are excluded from the original list.

(b) There are 2 irrigation schemes which are expected to be implemented in the near future. One (Kali Lanang) with an area of 1,818 ha is listed in the JBIC Loan IP-505, 'Project Type Sector Loan for Water Resources Development (II)', which aims at contribution to the self-sufficiency of rice in Indonesia. The other (Kedungsamak) with an area of 6,678 ha is expected to be implemented by APBN. Therefore, 2 irrigation schemes with a total area of 8,496 ha are screened out from the original list.

(c) There are 18 irrigation schemes, in which the irrigation potential is too low (less than 1,000 ha) and/or land use has been changed to other purposes.

Accordingly, it was decided to study 50 irrigation schemes with a total area of 285,501 ha in Central Java Province as shown in Table A-2.3.1 and a Location Map attached at the top of this report.

As a result of discussion, number and area of irrigation schemes finally selected for the Study are summarized in comparison with those of the Inception Stage as shown below:

Irrigation Schemes selected for the Study

Inception Stage		Selected Scheme	
Number of Schemes	Scheme Area (ha)	Number of Schemes	Scheme Area (ha)
98	391,412	50	285,501

CHAPTER 3 PRELIMINARY INVESTIGATION

3.1 General Description

3.1.1 Purposes

The purposes of the preliminary investigation for quantification of rehabilitation are as follows:

(a) Confirmation of the related agencies for the investigation and availability of information and holders (agencies),
(b) Analysis of the cause of malfunctioning of the irrigation system,
(c) Collection of basic data necessary for the preparation of evaluation indicators for prioritization of rehabilitation,
(d) Finalization of technical specification for inventory survey work, and
(e) Collection and examination of evaluation standards consisting of standard rehabilitation methods, standard unit prices and information on cost estimates.

The purposes of the preliminary investigation for the irrigation systems are (i) finalization of the specifications for the implementation of the quantification of rehabilitation to be entrusted by analyzing the cause of malfunctioning of the irrigation systems, and (ii) confirmation of the related agencies for the investigation and availability of information and holders (agencies).

In preparation of evaluation indicators for prioritization of rehabilitation in an irrigation network, the past study report, "Technical Guideline, Rehabilitation and Upgrading of Irrigation Network (JICA, 1999, Original is written in Indonesian) were reviewed in order to summarize the problems with irrigation facilities.

Evaluation indicators for prioritization of rehabilitation in an irrigation network were prepared respectively for (i) headworks, (ii) free intakes, (iii) canals and related structures, (iv) terminal facilities and on-farm, and (v) inspection roads.

Standard rehabilitation methods were prepared on the basis of, in principle, the "Irrigation Design Standards" prepared by the Directorate General of Water Resources Development, Ministry of Public Works in 1986. In addition, whenever necessary, recent design standards prepared by the Ministry of Agriculture, Fisheries and Forestry in Japan, and United States Development of the Interior, Bureau of Reclamation (USBR). The standard unit prices were determined referring to the recent similar rehabilitation works and bid prices.

3.1.2 Selection of Irrigation Schemes for preliminary investigation

The criteria for the selection of schemes for preliminary investigation were as follows:

(a) Schemes to be selected to represent the types of rehabilitation, i.e., (i) rehabilitation, (ii) upgrading.
(b) The beneficiary areas to be the average of all schemes, i.e., 2,000 to 3,000 ha.
(c) WUAs in the schemes must have been established and be functioning.

Sample areas for the preliminary investigation were further discussed and selected as shown in the table below. The Study Team made the investigations at the beginning of March 2003 in collaboration with engineers of Dinas PSDA.

Irrigation Schemes selected for Preliminary Investigation

Item	Schemes	
Irrigation Scheme	Jragang	Sungapan Kiri
District	Demak	Pemalang
Sub-district	Guntur	Pemalang
Registered area (ha)	4,597	5,229
Technical level	Technical	Technical
Completion year of system	1988	2000
Water resources river	Jragang	Kali Waluh
Type of water resources facility	Headworks	Headworks
Settling basin	Provided	Provided
Max. intake discharge (m^3/s)	8.0	8.5
Length of main canal (km)	7.3	7.9
Length of secondary canal (km)	27.8	35.5
Number of WUAs (Target/Established)	38/19	40/40
Number of farmers	10,638	27,850

3.2 Main Issues Identified and Study Agenda

3.2.1 Analysis of Causes of Incompleteness and Defectiveness of Facilities

By means of preliminary investigation and reference to past documents, analysis of the causes of problems with each irrigation scheme was carried out in terms of incompleteness, structural and functional defectiveness and necessity for rehabilitation. The causes thus analyzed were classified into five (5) classes according to the kind of structures. In all cases, the study was carried out for the following:

(a) Appropriateness of planning and design (including availability of necessary data and information),
(b) Construction technique and accuracy (including possibility of corner-cutting in the construction works), and
(c) Operational condition of structures.

A table was prepared listing the structural items, problems with the structures and their causes as shown below:

Problems and their Causes on Irrigation Facilities found through Preliminary Investigation

Structure	Problems	Causes
Headworks	1) The design discharge cannot be taken because of sediment in front of intake. 2) The river water level cannot be maintained as designed. 3) Intake of river water cannot be appropriately made. 4) Operation of gates is difficult due to damage of gates. 5) Intake discharge cannot be measured accurately.	1) Sediment exists in front of intake and/or scouring sluice and settling basin is not provided or it is malfunctioning. 2) Civil works (intake weir, etc.) are damaged or defective. 3) Steel gates or other metal structures are damaged or deteriorated. 4) No proper maintenance and repair is being executed. 5) No measuring devices (even gauging) are provided.
Free Intake	1) The design discharge cannot be taken because of i) lowering of river water level and ii) sedimentation in front of intake.	1) No fundamental measures, such as provision of weir, are undertaken against lowering of riverbed. 2) No removal of sedimentation located at or in front of intake is undertaken.
Canal and related structures	1) Irrigation water cannot be conveyed to the tail of the canal. 2) Contour canal located in the upstream section of a system is choked with sediment. 3) Structures with a service life of more than 30 years are malfunctioning in some irrigation systems. 4) Irrigation water is not equitably distributed due to insufficient water supply. 5) Less activity on O&M works.	1) This is due to seepage loss, obstruction of flow by sediment, collapse of canal, etc. 2) Sediment is flowing into canal from Headworks/intake due to improper operation of scouring sluice gate/settling basin or no provision of settling basin. 3) Structures are older than service life and no rehabilitation/ replacement has been done. 4) Due to inadequacy of diversion structure, no proper water management could be done. 5) Low density of inspection roads, crossing facility such as bridge, culvert not in working condition.
Terminal facility and on-farm	1) Irrigation water is not used efficiently due to shortage of provision of canals. 2) Drainage is not appropriately practiced due to shortage of provision of tertiary and quaternary drains. 3) Transportation of farming input and output is poor.	1) This is due to insufficient density of tertiary and quaternary (feeder) canals. 2) This is due to insufficient density of tertiary and quaternary drains. 3) Provision of appropriate length of farm road is necessary.

Inspection road	1) O&M are difficult due to poor condition of inspection road along main and secondary canals. 2) Transportation of farming input and output is poor due to lack of farm road connecting village with inspection road.	1) Inadequate proper maintenance has been done and related facilities are in a damaged state. 2) Low density or no provision of roads.

3.2.2 Evaluation Indicators for Rehabilitation Priority

Rehabilitation for the irrigation facilities was to be evaluated by verifying their condition with respect to (i) type, size and condition of headworks/intake, (ii) functional status of canals and their related structures, (iii) condition of terminal facility and on-farm, and (iv) condition of inspection roads.

Evaluation indicators for the rehabilitation that are to be applied for the investigation for all schemes were prepared based on the findings through the preliminary investigation. Evaluation indicators were further examined and finalized mainly referring to the "Technical Guideline, Rehabilitation and Upgrading of Irrigation Network (JICA 1999)".

The following are the principal evaluation indicators for the preparation of prioritization for the rehabilitation.

Evaluation Indicators

Facility	Indicators
1. Headworks (Concrete Weir)	1) Crack/damage on crest 2) Erosion and seepage in stilling basin 3) Leakage from foundation 4) Gate/Leakage from gate 5) Sedimentation/mud in front of gate 6) Flushing of sedimentation/mud 7) Settling basin 8) Measuring device
2. Free Intake	1) Lowering of river water level or degradation of riverbed 2) Intake gate/scouring gate 3) Leakage from gate 4) Sedimentation/mud in front of gate 5) Flushing of sedimentation/mud 6) Settling basin

3. Canals and Related Structures	
3.1 Canals	1) Lined or unlined canal 2) Lining of canal, broken or cracked 3) Sedimentation 4) Seepage loss 5) Collapse of canal bank
3.2 Regulating, Conveyance, Crossing, Protection Structure	1) Gate 2) Leakage on gate 3) Crack on concrete/stone masonry 4) Scouring on structures 5) Settlement 6) Measuring devices
4. Terminal Facilities and On-Farm	1) Leakage on canal 2) Sedimentation/mud on canal 3) Density of canal, road
5. Inspection Roads	1) Condition 2) Density

The method of evaluation of the existing facilities against respective indicators is discussed in Chapter 6.

3.2.3 Technical Specifications for Inventory Survey Work

Draft technical specifications for inventory survey work were prepared in initiation stage and finalized based on the findings of preliminary investigation. The composition and contents of the technical specifications are as follows:

Part-I: Inventory of Irrigation Schemes

1.1 General
1.2 Structure of Water Source
1.3 Irrigation Canals
1.4 Terminal Facility and On-farm
1.5 Socio-economy and Agriculture
1.6 Present Condition of WUAs
1.7 Rehabilitation Plan

Part-II: Survey for Estimate of Rehabilitation Works

2.1 General Layout
2.2 Irrigation Diagram
2.3 Schematic Layout of Related Structures
2.4 Survey Sheets
2.5 Quantity Estimate
2.6 Photographs

3.2.4 Standards for Design and Construction

For the Evaluation of existing condition and preparation of measures for rehabilitation, the following criteria for the design and construction of rehabilitation is provisionally shown in the below table:

Standards for Design and Construction

Facilities	Condition of structures	Measures for recovery of function
Dam	Leakage from foundation	1) Cement grouting
	Sliding of embankment/ insufficient stability of slope	1) Re-construction 2) Extra embankment
	Damaged/defective spillway/ structure	1) Repair by concrete works
	Insufficient capacity of spillway for flood discharge	1) Extend crest length of spillway
	Damages/inadequate function of gate, valve, metal works	1) Repair/replace
Headworks	Damages due to settlement, broken, washed away, deterioration	1) Reconstruction/renovation
	Insufficient intake capacity	1) Widening of gate 2) Heightening of weir crest
	Influx sediment load	1) Provision of settling basin 2) Increase of basin barrel 3) Proper operation of scouring sluice gates
	Damages/inadequate function of gate and metal works	1) Repair/replace
Irrigation canal	Retarded design capacity	1) Dredging, removal of foreign materials 2) Provision of concrete lining
	Collapsed embankment/lining	1) Re-embankment 2) Provision of concrete lining
	Earth canal	1) Provision of concrete lining with n = 0.017
Related structure	Decrepit more than 50 years after construction	1) Replace/reconstruct
	Deflection, settlement and no function for gate operation	1) Replace/reconstruct
	Broken/damaged	1) Repair/replace
	Insufficient load capacity for traffic (bridge, culvert)	1) Replace with required design load (T = 10, 14, 20)
	Clogging	1) Remove foreign materials 2) Provision of screen 3) Widening of barrel section

3.2.5 Estimation of Work Quantities and Costs

The work quantities for rehabilitation are estimated by means of site survey works and summarized in each work item. The unit prices of each work item are collected through the actual expenditures and/or average of tender and contracted prices of similar works.

CHAPTER 4 FIELD INVESTIGATION

4.1 Execution of Field Investigation

4.1.1 Works by Indonesian Consultant

The inventory survey work was carried out by an Indonesian Consultant on a sub-contract basis (PPA Consultants), who was selected through competitive bidding. The work was commenced on April 11, 2003 and completed in the middle of June 2003.

4.1.2 Procedures

Major assignments entrusted to the sub-contractor were as follows:

(1) Preparatory work
   (a) Coordination meeting with Dinas and Balai PSDA for the orientation of the investigation methods, and
   (b) Collection of data and information, which were required for field investigation, from said offices.

(2) Field work
   (a) Collection of basic information regarding water resource facilities to the on-farm level of each irrigation and drainage system, agriculture and agro-economy, and status of WUAs,
   (b) Field investigation of the existing condition of irrigation facilities, evaluation of their functions and analysis of the cause of problems, and
   (c) Preparation of the latest irrigation diagram and the schematic structure diagram of each scheme.

(3) Outcomes
   (a) Preparation of investigation report, and
   (b) Estimation of work quantities for rehabilitation work on major irrigation works.

4.2 Results and Findings

4.2.1 Irrigation Systems

As discussed in Chapter 3, field investigations were carried out for the collection of information regarding the condition of the following facilities in order to evaluate the functional status of each irrigation system;

   (a) Particular information (constructed and rehabilitated year, name of the river and catchment area at the location of the water resource

facilities),

(b) Water resource facility (dam, headworks, free intake, pumping station),

(c) Irrigation canals with related structures (main and secondary canals),

(d) Drainage canals and related structures, and

(e) Terminal facilities and on-farm

On the basis of the results of the investigation, the irrigation facilities were classified, by the scale of required rehabilitation, into the following four (4) groups:

A: Facilities are functioning well, and no rehabilitation is needed,

B: Facilities are partially damaged/deteriorated, and minor rehabilitation is needed,

C: Facilities are not functioning well, i.e., operation of the system is difficult, and large-scale rehabilitation is needed, and

D: Facilities are seriously damaged operationally, and replacement or reconstruction is needed.

In order to identify the particular causes of problems and constraints of the existing facilities, detailed evaluation of the facilities was made based on the investigation results as summarized hereinafter.

(1) Water Resource Facilities of Each Scheme

1) Existing conditions

The type of water resource facilities and their existing condition are detailed in Table A-4.2.1, and summarized as shown below:

Condition of Water Resource Facilities

Type of Water Resource Facilities	Number	Condition of Facilities			
		A	B	C	D
Dam	1	1	-	-	-
Headworks	49*	1	12	33	3
Total	50	2	12	33	3

Note: * Number of settling basins provided is 39.

In the above table, the condition of facilities that are classified into C is mainly due to their age of more than 30 years and the physical operation problems are caused by sedimentation at and around the intake. In addition, the scouring sluice gates were found to be in serious condition due to damage of steel members (gate leaf, stem, guide frame) and sedimentation in front of the gates.

2) Analysis of causes of problems and constraints

The causes of problems and constraints were analyzed for all the irrigation schemes as detailed in Table A-4.2.2, and summarized as shown below:

(a) Physical operation problem due to damage and deterioration of structure, especially stilling basin and riprap protection

(b) Inflow of bed loads into canal due to sedimentation upstream of weir resulting in inadequate function of scouring sluice,

(c) No provision of settling basin or inadequate function due to sedimentation and inadequate O&M, and

(d) Operation and management problems with scouring sluice gates and intake gates and introduction of bed loads and soils into canals.

Sidorejo Headworks

In Good Condition

(2) Irrigation Canals and Related Structures

1) Existing conditions

Features of irrigation canals and related structures are detailed in Table A-4.2.3 to A-4.2.6 and summarized as shown below:

Canal Type, Length and Condition

Canals	Length (km)			Condition (Scheme)			
	Lined	Earth	Total	A	B	C	D
Main Canal	338 (55.8%)	268 (44.2%)	606	0	4	42	2
Secondary Canal	1,213 (56.3%)	943 (43.8%)	2,156	0	1	41	10
Total	1,551 (56.2%)	1,211 (43.8%)	2,762	-	-	-	-

Note: 2 schemes are not provided main canal

Condition of Related Structures

Canals	Total Number of Structures	Condition of Canals (%)			
		A	B	C	D
Main Canal	2,777	5	33	37	25
Secondary Canal	7,117	6	34	37	23

2) Analysis of causes of problems and constraints

Analysis of causes of problems and constraints for all the schemes is detailed as shown in Table A-4.2.7, and summarized as shown below:

(a) Sedimentation in canals, especially upstream portion of main canal and earth canal portion,

(b) Damage and deterioration of canal lining and structures, mainly found at steel gates of control facilities, bridges, culverts,

(c) Leakage from unlined canals at embankment construction portion, crossing portion of cross drains and defective lined canals,

(d) Difficulty in maintenance of canals due to no provision and/or non-trafficable condition of inspection roads,
(e) Difficulty in O&M due to poor/malfunctioning structures,
(f) Physical operation problem with regulating structures in water distribution due to deteriorated and/or damaged steel gates, and
(g) Entering of eroded soil in the excavated canal portion during rainfall due to no provision of drainage canal and facilities along the canal.

Jenegkelok Scheme **Sidorejo Scheme**

Main Canal, Sediment and Collapse at Canal Bank

In Good Condition

(3) Inspection Road along Canal

1) Existing conditions

The existing condition of inspection roads is detailed as shown in Table A-4.2.3and A-4.2.6, and summarized as follows:

Ratio of Inspection Road to Canal

Inspection Road	Total length of canals (km)	Inspection roads (km)	Ratio (%)
Along Main Canal	606	465	77
Along Secondary Canal	2,156	1,142	53
Total	2,762	1,607	58

Condition of Inspection Roads

Inspection Roads	Number of Schemes providing Inspection Roads	Condition of Roads (nos.)			
		A	B	C	D
Along Main Canal	48	0	6	37	6
Along Secondary Canal	48	0	1	39	8

2) Analysis of causes of problems and constraints

A ratio of inspection roads along irrigation canals is about 58 % both main and secondary canals. However, almost all of the inspection roads are

non-paved or lack maintenance over a long time. The existing condition of inspection roads affects not only the activities of agriculture but also the operation and maintenance works on irrigation systems of the scheme. A summary of problems and constraints of each scheme are shown in Table A-4.2.7.

(4) Terminal Facilities and On-farm

The existing condition of terminal facilities and on-farm are detailed as shown in Table A-4.2.7, and summarized as follows:

Existing Condition of Terminal Facilities and On-farm

Terminal Facilities and On-farm	Condition of terminal facilities and on-farm (%)			
Average of 50 Schemes	A	B	C	D
	0	0	96	4

In recent times, many farmers have introduced and are using hand tractors (10 HP class) for paddling, harvesting and transportation. However, problems and constraints in the activities of farm practice and marketing are found due to the low density of farm roads at the on-farm level and the rough condition of inspection roads, etc.

4.2.2 Agriculture and Agro-economy

The agriculture and agro-economic investigations were primarily carried out through the Inventory Survey. However, some basic data and information such as crop yields, crop budget and farm economy were separately collected from statistic data and secondary data from agriculture services offices. The present agricultural conditions of the target irrigation schemes thus identified are presented in Table A-4.2.8 and summarized in the following sections.

(1) Present Land Use

The scheme-wise present land uses of the subject area for development are shown in Table A-4.2.8. The overall provincial features are summarized as follows:

Overall Present Land Uses of Target Schemes

Land Use Category			Area (ha)	Ratio (%)
1.	Potential Area for Irrigation	Irrigated Paddy Fields	281,600	99
		Rainfed Paddy Fields	1,491	1
2.	Target Area for Development		283,091	100
3.	Non-target Area for Development *1		1,604	-
4.	Total (3 + 4)		284,695	-

Note: *1 Including other land use (*alih fungsi*)

As shown in the table, almost all the target irrigation schemes in the province are at the completion stage and there are no non-potential areas for irrigation.

Further, nearly 100% of all the potential areas for irrigation have been developed into irrigated paddy fields. In the overall target schemes, the potential area accounts for 100% of the target area for the development study and the irrigated paddy fields represent 99% of the same. The extent of rainfed paddy fields is extremely limited to 1,491 ha or 1% of the target area. The target area for development under the Study accounts for 99% of the registered area.

(2) Cropping Seasons and Patterns

The cropping seasons in the target schemes and in the province are composed of three (3) seasons of wet season, dry season I and dry season II. Although there are some area specific variations due to irrigation water supply schedule or availability, rainfall distribution, drainage/flooding etc., the principal cropping calendars are identified as follows:

Wet Season: October/November - January/February
Dry Season I: March/April - June/July
Dry Season II: July/August - September/October

The current cropping patterns introduced in the irrigated paddy fields in the target irrigation schemes are shown in Table A-4.2.8. As shown in the table, the prevailing cropping patterns in the irrigated fields are double cropping of paddy (paddy - paddy) and paddy - paddy - paddy or palawija. Cultivation of palawija in irrigated fields is common and cultivation of sugarcane is also commonly practiced in the target schemes. Common palawija in the target schemes and province are maize, soybeans and mungbeans. The prevailing patterns in the target schemes are as summarized below:

<u>Most Common</u>
Wet - Dry I - Dry II: paddy - paddy - palawija or palawija/fallow
<u>Second Common</u>
Wet - Dry I - Dry II: paddy - paddy - fallow
Wet - Dry I - Dry II: paddy - paddy - paddy or paddy/fallow

(3) Cropped Area and Cropping Intensity

The irrigation performances in the target schemes expressed by cropped area and cropping intensity to the irrigated area have been examined based on the monitoring data from provincial and district irrigation agencies obtained through the Inventory Survey. The results are shown in Table A-4.2.8. The overall cropped areas and cropping intensities of paddy and palawija in wet and dry season in irrigated paddy fields are:

Overall Cropped Area & Cropping Intensity in Irrigated Fields in Target Schemes

Season	Paddy		Palawija		Sugarcane		Overall	
	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)
Wet Season	245,878	87	20,952	7	9,270	3	276,100	97
Dry Season I	228,798	81	30,356	11	4,828	2	263,982	94
Dry Season II	39,095	14	100,266	36	-	-	139,361	50
Annual	513,771	182	151,574	54	14,098	5	679,443	241

As indicated in the table, the overall cropped area and annual intensity is estimated respectively at 679,400 ha and 241% of the total irrigated paddy fields of 281,600 ha. There are substantially higher cropping intensities in irrigated fields compared with what the other provinces have attained in the target schemes in Central Java. The overall cropped area and cropping intensity in the target area for development are shown in Table A-4.2.8.

Naturally, the annual cropping intensities vary largely depending on irrigation schemes due mainly to availability of irrigation water in dry season. The target irrigation schemes (50 schemes) are classified based on annual cropping intensities of irrigated paddy in irrigated paddy fields as follows:

Irrigation Schemes by Annual Cropping Intensity of Paddy

Cropping Intensity of Paddy *1	No. of Schemes	Proportion (%)
180 %	26	52
150 ～ < 180 %	15	30
120 ～ < 150 %	3	6
100 ～ < 120 %	3	6
< 100 %	3	6

Note: *1 Cropping intensity in irrigated paddy fields

(4) Crop Yields and Crop Production

The current paddy yield levels of the individual target schemes are estimated by analyzing yield data obtained through the Inventory Survey, BPS crop cutting survey results by sub-district, BPS statistic information on sub-district reported in *Kabupaten dalam Angka*, and statistical information on paddy yield by district reported by the Provincial Agriculture Services Office. The estimated paddy yields adopted in the present Study are shown in Table A-4.2.9 together with yield data used for the estimates. The estimated paddy yields are summarized as follows:

Estimated Current Irrigated Paddy Yields

Cropping Season	Yield Range (t/ha)	Average (t/ha)	Cropping Season	Yield Range (t/ha)	Average (t/ha)	Annual (t/ha)
Wet Season	4.5 - 5.5	5.0	Dry Season	4.0 - 5.5	4.8	4.9

The yield levels of palawija are assumed based on the findings of the Inventory Survey and statistical information as follows:

Maize (composite): 3.0t/ha

Beans (average of soybeans & mungbeans): 1.2t/ha

The current crop productions in the individual target schemes is estimated from the estimated cropped areas and crop yields as shown in Table A-4.2.8. The overall features are presented in the following table:

Overall Crop Production

Commodity	Wet Season (ton)	Dry Season I (ton)	Dry Season II (ton)	Annual (ton)
Paddy	1,232,000	1,118,000	173,000	2,523,000
Palawija	62,900	91,100	120,300	274,300
Sugarcane	603,000	314,000	-	917,000

(5) Crop Budget

Crop budgets for different yield levels of irrigated paddy, palawija (maize, soybeans & mungbeans) and sugarcane and are estimated as shown in Table A-4.2.10 and as summarized below:

Financial Net Return per ha Assumed

Commodity	Yield (t/ha)	Net Return/ha (Rp.000)	Commodity	Yield (t/ha)	Net Return/ha (Rp.000)
Irrigated Paddy	4.5	2,970	Maize	3.0	1,130
	5.0	3,420	Beans	1.2	1,710
	5.5	3,800	Sugarcane	65.0	2,760

(6) Farm Economy

In accordance with the procedure applied in the case of North Sumatra, the present farm economic analysis has been made on 1 ha of irrigated paddy field by estimating net farm income from the field. The results of the farm economic analyses thus made is presented in Table A-4.2.11 and summarized below:

Estimated Net Farm Income from 1ha of Field

Land Use Category	Net Farm Income from Paddy Field (Rp.000)	
	Range	Average
Irrigated Paddy Field	4,008 - 9,810	6,678

(7) Agricultural Support Services and Marketing

The present statuses of agricultural institutions, support services and food crops marketing in the individual schemes identified through the Inventory Survey is presented in Table A-4.2.12 and the major or prevailing issues are as follows;

(a) Accessibilities to farm credits depend on irrigation schemes, however, prevailing responses are "no difficulty to receive" or "some difficulty to receive farm credit, but can get" to "almost no access to credits".
(b) No difficulties for procurement of farm inputs and quality seeds are reported in most of the target schemes.
(c) The most prevailing marketing practice for paddy is "sold after harvest at field" followed by "sold paddy after drying".
(d) The most prevailing marketing channel for paddy is "paddy to collector or middlemen" followed by "paddy to rice mill".
(e) The most prevailing marketing channel for palawija is "sold to collector or middlemen" followed by ""sold at local market".
(f) In most schemes, sufficient availability of rice mills is reported under the current marketing practices for paddy.

(8) Development Constraints

The agricultural development constraints in the individual schemes identified through the Inventory Survey are presented in Table A-4.2.12. The major or prevailing issues in the target schemes are enumerated as follows:

Engineering Issues

"Water shortage in dry season" is the primary constraint reported in most schemes.

Agronomic Issues

"Farmers not following recommended farming practices" and "rat attack" are agronomic constraints prevailing in the target schemes.

Paddy and Palawija Marketing Issues

"Low marketing prices" is the most prevailing constraint in paddy marketing followed by "unstable marketing prices".

Farmer Organization (KT) Issues

"Most members are not active", "economic activities are limited" and "managerial capability of KTs are limited" are the main constraints reported.

Extension Services Issues

The prevailing one is "implementation of extension programs is limited", followed by "shortage of operational funds of PPLs".

4.2.3 Water Users' Associations (WUAs)

The WUA establishment target set up by PWRS Central Java is 2,598 in 50 irrigation schemes. The average working area of one WUA is 109 ha with a range from 33 ha at the minimum to 247 ha at the maximum with exceptional case of 696 ha in Colo Kanan irrigation scheme.

Up to now, 2,184 WUA have been established in 50 irrigation schemes so that the target realization is 84%. At present, the WUA establishment target ratio is 100% in 22 irrigation schemes, 50% to less than 100% in 23 irrigation schemes and less than 50% in 5 irrigation schemes.

Regarding performance of WUA, PWRS Central Java has annually prepared monitoring and evaluation (M&E) report taking into account organization, water allocation and distribution, irrigation maintenance, financing, physical condition of irrigation and related facilities, and Government program on WUA promotion and development. According to the latest M&E report, 250 WUA are classified into "Developed", while 1,670 are "Under developing" and 264 are "Not yet developed". Due to slow progress of legal arrangement, however, only 17 WUA have been legitimized in the local court of justice.

The present condition of WUA as mentioned above is shown in Table A-4.2.13 and summarized as shown below.

Present Condition of WUA in Central Java

WUA Establishment Target Realization Ratio	No. of Scheme	No. of Existing WUA	Performance and Legal Status of Existing WUA					
			Developed		Under Developing		Not Yet Developed	
			L	N	L	N	L	N
75% and more	37	1,862	0	201	16	1,433	0	212
50% to 74%	8	289	1	46	0	199	0	43
25% to 49%	4	29	0	2	0	18	0	9
Less than 25%	1	4	0	0	0	4	0	0
Total	50	2,184	1	249	16	1,654	0	264

Note : L ; Legitimated in local court
N ; Not yet legitimated in local court

4.3 Database for Existing Condition of Irrigation Scheme

Existing conditions of irrigation schemes of Central Java provinces (50 schemes) are prepared and presented in ANNEX-II (2/3). (Title: Priority List of Irrigation Schemes for Rehabilitation)

CHAPTER 5 REHABILITATION PLAN

5.1 Basic Concepts

5.1.1 Rehabilitation Plan

For the proper management of irrigation schemes, it is necessary to carry out improvement of irrigation infrastructures, to operate and maintain the systems appropriately, and to upgrade the organization of management of water resources and water supply, farming technology, etc. as well as to recognize the significance of irrigated agriculture. For this, important items to be considered are (i) preparation of a rehabilitation plan in due consideration of both aspects of agriculture and organization, (ii) improvement of crop productivity which can be capable of paying the irrigation management fee, and (iii) strengthening of water users' associations.

The basic concepts for the formulation of rehabilitation of facilities to recover the irrigation system are itemized as follows:

(a) Provision of appropriate irrigation infrastructures with sufficient sustainability, which does not require heavy rehabilitation works during the service life of the systems as far as routine O&M are practiced,
(b) Securing of design discharge throughout the irrigation system and equitable distribution of canals in order to remove constraints of O&M,
(c) Provision of user-friendly and easy-operation and maintenance canal structures with sufficient water level at each outlet to irrigate farmlands,
(d) Proper arrangement of measuring devices and outlets (diversion structure/turnout), considering water distribution methods and easy O&M,
(e) Provision of inspection roads along main and secondary canals for O&M and farm machinery,
(f) Provision of farm roads in on-farm level connecting with inspection roads and villages, and
(g) Provision or renewal of irrigation offices and gate-keeper houses at water resource facilities and canals with transportation equipment.

5.1.2 Agriculture Plan

The basic concepts applied for the formulation of the agriculture plans for the present Study are as enumerated below.

(a) The formulation of agriculture plans placing emphasis on paddy

production envisaging contribution to food security in Indonesia and setting a double cropping of paddy as a basic cropping pattern,

(b) The irrigation agriculture performances and experiences in the advanced schemes among the target schemes of the Study in each province have been to be fully taken into consideration in the formulation of agriculture plans,

(c) The plans envisage improvement of crop productivity and realization of an increase of cropping intensity through the efficient use of irrigation water,

(d) The current agricultural status including crop selection, cropping schedule, cropping pattern and cropping intensity in the target schemes should dully be assessed and taken into planning so that the formulated plans will be sustainable in accordance with beneficiaries intentions and capabilities,

(e) The rational utilization of irrigation water resources is to be emphasized. In this regard, the increase of cropping intensity with the available water in the 3rd cropping season (cropping season following or between the double crops of paddy) to a possible extent is envisaged. The consensus of beneficiaries should be sought at the project detail design stage for this, and

(f) It is assumed that there will be no constraints on farm labor availability as almost all the target areas for development are existing paddy fields.

5.1.3 Institutional Aspects

(1) New Irrigation Management Policy

In line with the irrigation substance of the draft Law of Water Resources, all irrigation management activities of main and secondary systems of irrigation schemes are under the full responsibility of the Government and/or Regional Governments. Based on the participatory irrigation management policy that is a new concept in the draft Law of Water Resources, farmers can participate in any activities related to the above systems as long as they have established WUA and their willingness, capacity and capability are sufficient to do.

Operation and maintenance works of tertiary irrigation systems including fund arrangement are the full responsibility of WUA. Although the Government in its Bill of Law on Water Resources proposed the House of Representatives (DPR) that tertiary irrigation system development cost shall be shouldered by WUA, DPR has made several counter proposals to share fully or partly the said cost by the Government. This issue is under deliberation in DPR at moment.

(2) Regional Government Capacity Building on Irrigation Management

In Central Java, Balai PSDA as branch offices of PWRS is responsible for water resources management and technical assistance to district/municipal government which is principally responsible for irrigation water usage management. At present, the respective district/municipal governments almost fulfill staff allocated to manage 4,997 public irrigation schemes throughout the province. Considering this situation, therefore, the concept of district/municipal government capacity building in this study is to upgrade the existing staff capability based on the new irrigation management policy..

(3) WUA Establishment Acceleration

In the participatory irrigation management policy, WUA is considered the fundamental body of irrigation water users. In connection with this, the target of WUA establishment set up by PWRS Central Java should be fully realized in parallel with recovery of function of irrigation system. At moment, 414 WUA in 28 irrigation schemes have not been established yet. In institutional planning to accelerate WUA establishment, therefore, primary attention is to be paid to these irrigation schemes.

(4) WUA Strengthening

Out of 2,184 WUA already established in 50 irrigation schemes, the current performance of 1,326 WUA is evaluated as "Under developing" and 239 as "Not yet developed". This monitoring and evaluation record clearly reveals that these WUA still need to improve their capacity to manage organization, capability to collect and expense member's fee, and activities to conduct operation and maintenance of tertiary irrigation system. The focal point in formulating institutional plan, therefore, is to be technical assistance to "Under developing" and "Not yet developed" WUA to overcome its weakness.

(5) Setting-up of WUA Federation

Since the Government Regulation No. 77/2001 on Irrigation was enacted, it was promoted to organize higher-level institutional bodies of irrigation water users, i.e. federation of WUA (FWUA) on secondary canal basis and main federation of WUA (MWUA) on apex scheme-level basis. Although the core of these higher-level bodies should be WUA and irrigation water users themselves should act as the main player in organizing such bodies, actual promotion activities for FWUA/MWUA establishment in Central Java seem to depend on top-down procedure through the channel from the Ministry of Home Affairs to district/municipal governments following the above regulation and the previous

Irrigation Management Policy Reform (PKPI) backed up by the World Bank. Such top-down activities result in that there has been less opportunity of consulting with WUA representatives about FWUA/MWUA establishment.

In institutional planning under this study, therefore, the basic concept is to be set up in such way that the role of FWUA/MWUA is to coordinate member WUA concerning common rule of reasonable water allocation to each WUA as well as to collect ideas and data from WUA as input materials to district/municipal governments.

(6) WUA Activity in Operation and Maintenance Stage

After completion of rehabilitation work, WUA is responsible for operation and maintenance of tertiary system of irrigation scheme. In this regard, WUA's members should master necessary skills required for optimum operation and maintenance of related irrigation facilities to practice irrigation water allocation plan.

In formulating WUA activity plan to meet such requirements, attention is paid to provide WUA's members with on-the-job training on operation and maintenance of tertiary irrigation system once irrigation water can be distributed to the concerned tertiary block. Further activity is considered to be guidance on collection and expenses of WUA member's fee in more transparent manner as well as preparation of annual financial report.

5.2 Irrigation Facility

5.2.1 Criteria for Rehabilitation

(1) Classification of rehabilitation in estimating cost

Classification of rehabilitation is based on the degree of defectiveness and deterioration as follows:

(a) Class A: Facilities are functioning well: In this case, no rehabilitation cost is incurred.
(b) Class B: Facilities are partially damaged/deteriorated, and minor rehabilitation is needed. In this case, rehabilitation cost is estimated to be 30% of the new construction cost.
(c) Class C: Facilities are not functioning well, i.e., operation of the system is difficult and large-scale rehabilitation is needed. In this case, the rehabilitation cost is estimated to be 50% of the new construction cost.
(d) Class D: Facilities are seriously damaged with respect to operation. In

this case, the rehabilitation cost is estimated to be equivalent to the replacement and new reconstruction cost.

(2) Headworks

1) Design criteria for rehabilitation of civil works

(a) More than 50 years: Class D is applied,
(b) From 30 to 50 years: Class C is applied,
(c) From 20 to 30 years: Classes B to D are applied depending on the condition, and
(d) Less than 20 years: Classes B to D are applied depending on the condition.

2) Design criteria for rehabilitation of steel gates and other metal works

(a) More than 20 years: Class D is applied, and
(b) Less than 20 years: Class C to D are applied depending on the condition.

3) Other design criteria

(a) Provision of a settling basin with a sand flush function
(b) Provision of a device for measuring discharge,
(c) Provision of an operation bridge, and
(d) Provision of a water level gauging staff.

(3) Canals and related structures

1) Proposed ratio of canals and structures

The proposed ratio of the canal length and number of related structures to the original design is determined as shown in the following table:

Proposed Ratio of Canals and Structures

Canal works	Classification of canal	Technical	Semi-technical	Non-technical
Canal length	Main canal	1	1.1	1.2
	Secondary canal	1	1.2	1.5
No. of structures	Main canal	1.1	1.2	1.3
	Secondary canal	1.2	1.35	1.5

2) Standardization of canals based on discharge in m^3/sec (refer to the Irrigation Design Standard prepared by DGWRD in 1986)

Construction costs for lining canals have been estimated based on the following classified standards:

Standardization of Canals by Discharge (Unit: m^3/sec)

0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0	2 - 4	4 - 6	6 - 8
8 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	more than 35

Notes: Canal; lined with concrete, side slope; 1:1.25, longitudinal slope; 1/5,000, n = 0.017

3) Design criteria for inspection roads

It is proposed to provide inspection roads with gravel metaling along the main and secondary canals. The total width of the inspection road is 5.0 m and the effective width is 3.0 m both main and secondary canals. The thickness of gravel metalling is 0.20 m.

4) Standard canal section

For the standard canal section including inspection road, refer to the Irrigation Design Standard prepared by DGWRD in 1986. Typical canal sections for cost estimation are as follows:

(a) Type A: New construction,
(b) Type B: Main canal without existing inspection road,
(c) Type C: Main canal with existing inspection road,
(d) Type D: Main and secondary canals along existing provincial road,
(e) Type E: Secondary canal without inspection road, and
(f) Type F: Secondary canal with existing inspection road.

5) Design criteria for rehabilitation of canals

Cost estimation for rehabilitation of canals is based on the typical canal section and the degree of defectiveness and deterioration as follows:

(a) Based on the above type of canal section, cost is estimated at the assumption of concrete lining reinforced with PVC fiber mesh,
(b) More than 20 years: Class D is applied,
(c) From 10 to 20 years: Class C is applied, and
(d) Less than 10 years: Classes B to D are applied depending on the condition.

6) Related canal structures

Cost estimates for rehabilitation of related structures have been based on the same standards as headworks, both for civil and metal works.

7) Other design criteria

(a) Provision of a watercourse section to prevent inflow from outside of the canal during rainfall,
(b) Provision of discharge measuring devices for appropriate water management,
(c) Replacement or renewal of bridges or crossing structures with required design loads (T-10 to T-20 class),
(d) Provision of hectometer, kilometer posts and name plates for structures

for operation and maintenance, and

(f) Provision of safety facilities for traffic and humans (safety rope, handrail, etc.).

(4) Terminal facilities and on-farm

A design criterion for terminal facility and on-farm is as follows:

(a) Provision of tertiary and quaternary (feeder) canals and related structures with appropriate density,
(b) Provision of farm roads with appropriate density, and
(c) Provision of field drains with appropriate density.

(5) Project facilities

It is proposed that gate-keeper houses at major diversion structures with an area of 50 m^2 be provided.

(a) From 1,000 ha to 2,000 ha: 2 gate-keeper houses,
(b) From 2,000 ha to 5,000 ha: 4 gate-keeper houses,
(c) From 5,000 ha to 10,000 ha: 8 gate-keeper houses, and
(d) More than 10,000 ha: 10 gate-keeper houses.

(6) Office equipment

It is proposed that field cars (4WD, 3,000cc class), motor cycles (125cc class), and computers, copy machines and consumables as office equipment be provided.

For field cars,

(a) From 1,000 ha to 5,000ha: 2 field cars,
(b) From 5,000 ha to 10,000 ha: 5 field cars, and
(c) More than 10,000 ha: 7 field cars.

For motor cycles

(a) From 1,000 ha to 2,000 ha: 10 motor cycles,
(b) From 2,000 ha to 5,000 ha: 20 motor cycles,
(c) From 5,000 ha to 10,000 ha: 30 motor cycles, and
(d) More than 10,000 ha: 40 motor cycles.

For computer, copy machine and consumables

(a) From 1,000 ha to 2,000 ha: Rp. 100 million,
(b) From 2,000 ha to 5,000 ha: Rp. 150 million,
(c) From 5,000 ha to 10,000 ha: Rp. 250 million, and
(d) More than 10,000 ha: Rp. 400 million.

5.2.2 Availability of Water Resources

It is a common practice in the planning stage to determine the irrigation area in the wet and dry season by means of a water balance study between the water demand of the proposed cropping pattern and the availability of water resources. As such information is not available, it is not possible to review the cropping intensity through previous study reports.

The Ministry of Settlement and Regional Infrastructure has been preparing the database for water resources and irrigation systems called "WRDC". The WRDC was established in the year 2001. However, the autonomy, accountability and responsibility are still unclear. It is also understood that discharge measurement of river runoff is not being done systematically in this country. As a result the database on water resources has not been prepared by WRDC, and consequently it was not possible to collect information necessary for carrying out a water balance study.

Consequently, information on water resources and irrigable area of the schemes furnished by the Dinas PSDA/project offices have been adopted for the determination of the possibility for water supply for the schemes in Pre-F/S stage.

5.2.3 Development Plan

(1) Countermeasures for recovery of function

The existing condition of irrigation systems from the water resource facilities to the terminal facilities and on-farm has been examined and analyzed for the establishment of a rehabilitation plan. Problems and constraints are detailed in Section 4.2.1 and its countermeasures for the recovery of function of the facilities are proposed as summarized below:

Countermeasures for Recovery of Function

Causes of Problems and Constraints	Countermeasures for Recovery
Water resource facility	
1. Weir, flood way, scouring sluices: civil works	
- Crack or damage on weir crest	Repair by chemical/cement grouting or filling concrete
- Leakage from foundation, settlement of weir	Grouting or adding concrete on weir crest
- Inclination, settlement and deflection of pier	Reconstruction
- Settlement and washed away apron and/or stilling basin	Reconstruction
- Fallen down, inclined, or washed away retaining wall	Reconstruction
- Washed away riprap, concrete block	Provision of additional protection works
- Physical O&M problems due to deterioration	Replacement and reconstruction
2. Weir, flood way, scouring sluices: gate and metal works	
- Leakage from guide frame	Repair or replacement of guide frames seal rubber and other members
- Lower strength against design requirement	Replace or strengthen with additional steel members
- Physical operation problem due to deflection, breakage, deterioration	Replacement of parts, replacement of all, paint, oil to hoist gear
3. Intake, free intake: civil works	
- Insufficient diversion water due to sedimentation at and around intake	Removal of sediments through proper maintenance and operation of scouring sluices and intake gates during flood
- Physical operation problems due to breakage of structure	Repair or replace with new construction
- Inflow of bed loads into canal	Proper operation of scouring sluice, provision of settling basin
4. Intake: gate and metal works	
- Leakage from gates and guide frames	Repair or replace guide frames and other members
- Physical operation problems due to breakage or deterioration	Replace or strengthen with additional steel members
5. Others	
- Difficulty in water distribution/water management	Provision of measuring devices, water level gauging staff, and proper operation of intake gate
- Difficulty in O&M	Provision of access road, operation house, inspection bridge and necessary facilities/equipment for O&M
Irrigation Canal and Related Structure	
1. General	
- Sedimentation and/or obstruction of flow	Removal of sediment/water plants by periodical maintenance
- Leakage	Replacement of embankment material by impervious material

(to be continued)

- Collapse	Provision of drainage ditch along canal, provision of cross drain, redesign of canal slope
- General O&M problems	Provision of inspection roads, kilometer and hectometer posts, name plate of respective structures
2. Canal Works	
- Leakage, cracks, collapse	Replace with concrete canal lining with provision of under and side drains
- Physical O&M problems due to deterioration, unlined	Provision of concrete lining, inspection roads
3. Related Structures	
- Poor function of discharge control facilities (diversion structure, off-take) due to deterioration of structure both civil and gate works	Repair or reconstruct structure with water management facilities such as measuring devices, staff, gauge
- Poor function of water conveyance facilities (siphon, aqueduct, drop) due to deterioration, breakage, leakage	Repair, replace, provide protection facilities, maintenance facilities (blow-off for siphon)
- Poor function of canal crossing structures (bridge, culvert, cross drain) due to deterioration, clogging by foreign materials, narrow width for traffic	Reconstruct bridge based on actual traffic load, remove clogged materials/sediments, reconstruct cross drain based on actual site condition
4. O&M Matters	
- Difficulty in O&M due to no or less density of inspection roads	Provision of inspection roads with all weather type design, execution of periodical maintenance of canal and roads
- Difficulty in water distribution and management	Review of irrigation area, irrigation diagram and field water requirement and redesign of canal, if required
- Physical operation problems due to breakage of structure	Repair or replace with new construction
Drainage Canal	
Natural River/Drainage Canal	
- Inundation of paddy fields during rainy season due to drainage problem	Provision of drainage canals and sluices
- Physical drainage problem due to sediments, water plants and obstructive materials inside drainage canal	Periodical maintenance
- Physical operation problems due to insufficient number of related structures	Provision of sluices, bridges, culverts, protection works, etc.
Terminal Facilities and On-farm	
Facilities/Water Management	
- Physical operation problems due to low density of irrigation and drainage canals in a tertiary block	Provision of sufficient irrigation and drainage canals with related structures
- Physical operation problems during planting and harvesting	Provision of farm roads for operation of farm machinery, conveyance of harvested paddy
- Physical operation problems of water management due to poor land leveling	Execution of land leveling and re-layout of irrigation and drainage canals

(2) Rehabilitation plan

1) Basic Concept for Rehabilitation Plan

Rehabilitation plans are to be designed for all the schemes in accordance with the rehabilitation criteria discussed in Section 5.2.1. For the rehabilitation plans the following measures were considered and applied.

Water Resource Facilities

(a) Provision of settling basin to all the headworks

As analyzed in the previous section, the major problems of operation and maintenance of irrigation canals is caused by sediments that flow into the canal from the river not only during the flood time but also under the normal flow condition of the river. To prevent sediment loads flowing into the irrigation canal, it is proposed to provide settling basin structures for all the headworks except where the intake method is direct from the dam reservoir. (10 schemes)

(b) Replacement of steel gates for scouring sluice and intake

One of the major causes of sedimentation in front of the intake and of inflow into the irrigation canal is judged to be the physical operation problems of both steel gates due to damage and deterioration. To remove this major cause, replacement and/or large scale repair of gates is to be executed.

(c) Provision of inspection bridge and measuring devices

The following facilities are to be provided with appropriate operation and maintenance as well as discharge control structures:

- Inspection bridge having effective wide not less than 3.5 m.
- Measuring devices such as gauging staff, measuring devices with instruments.

Canals and Related Structures

(a) Provision of concrete lining

In order to make provision for proper water management and to decrease O&M costs, including repairing works, it is proposed to provide concrete lining for both the main and secondary canals for rehabilitation of non-lined canals.

(b) Provision of inspection road

In order to carry out proper O&M and to contribute to the agricultural activities and distribution of products, the inspection roads along the canals

are to be rehabilitated or newly provided. The road design should be all-weather type with pavement (effective width: 3.5m in minimum).

(c) Rehabilitation and provision of related structures

In order to execute proper water management and O&M, the related structures are to be rehabilitated and/or newly provided. Steel gates associated with the control structures (diversion and off-take structures) are to be replaced by new ones in cases where they have deteriorated (over the age of their service design) and/or physically damaged/not functioning.

Terminal Facility and On-Farm

In order to support proper water management and post harvest activities, the terminal facilities including canals, farm roads and related structures are to be rehabilitated or provided new.

2) Features of rehabilitation plan

Based on the basic rehabilitation plan mentioned above in 1), rehabilitation designs at the pre-feasibility study level were made for the irrigation systems from the water resource facilities to terminal facilities including on farm development. The features of the rehabilitation plan for each scheme are shown in Tables A-5.2.1 and Figure A-5.2.1, respectively.

5.2.4 Cost Estimates

Cost estimates for the rehabilitation works have been made for the following five items:

(1) Direct construction cost for rehabilitation

(a) Water resource facilities
(b) Irrigation canals and related facilities
(c) Drainage canals and related facilities
(d) Terminal facilities and on-farm
(e) Project facilities (Field office and office equipment)

(2) Work quantities

Work quantities for the rehabilitation including reconstruction and/or new construction have been estimated based on the field investigation and the rehabilitation design described in Section 5.2.1.

(3) Unit prices

Material costs, labor wages, and unit prices of respective construction items have been collected through the field investigation. In addition to the survey results, the actual engineer's cost estimates were collected from similar projects under

MOSRI. After examination of the costs, all the costs were found to be the same or similar. Therefore, the same unit prices have been applied for the cost estimates.

(4) Cost estimates

Costs for the rehabilitation works for 50 schemes have been estimated and the results are shown in Tables A-4.2.2. Figures shown in the table below indicate the rehabilitation cost per hectare at a maximum of 5,107 US$/ha (or 42.3 million Rp./ha) and a minimum of 907 US$/ha (or 7.5 million Rp./ha).

Rehabilitation Cost per Hectare (US$/ha)

Number of Schemes	Unit	Minimum	Maximum	Average
50	US$/ha	907	5,107	2,359
	million Rp./ha	7.5	42.3	19.5

Note: Conversion rate US$ 1.00 = Rp. 8,279 as of May 2003.

5.3 Agriculture Plans

5.3.1 Agriculture Land Use Plans

Almost all the target irrigation schemes in Central Java are at the completion stage and only three schemes have rainfed paddy fields yet to be irrigated. The agricultural land use plans of the subject areas in the individual target schemes are shown in Table A-5.3.1. The overall features by province are as follows:

Overall Land Use Plans of Subject Areas (ha)

Land Use Category	Present/Before Project		Future Plan	
	Area (ha)	Ratio (%)	Area (ha)	Ratio (%)
Irrigated Paddy Fields	281,600	99.5	283,091	100
Rainfed Paddy Fields	1,491	0.5	0	-
Total	283,091	100	283,091	100

As shown in the table, the increase of irrigated paddy fields of some 1,500 ha is planned as a whole under the Study.

5.3.2 Planned Cropping Patterns

The approaches applied for the formulation of the planned cropping patterns are as follows:

(a) Selection of crops to be introduced in the planned cropping patterns has been made basically by observing the current cropping patterns prevailing in the subject area, which represent farmers intention and capabilities to a certain extent. In this regard, cropped areas of sugarcane have been kept unchanged from the present level.

(b) Priority is given to paddy in all schemes as a result of the farmers

preferences for a crop and the volume of market demands.

(c) Expansion of hybrid maize cultivation is envisaged, as it appears to be the most promising crop among palawija from the national economic viewpoint.

(d) Major cropping patterns planned are;

Wet - Dry I - Dry II: paddy - paddy - palawija
Wet - Dry I - Dry II: paddy – paddy/palawija - palawija
Wet - Dry I - Dry II: paddy - paddy – paddy/palawija

(e) The planned cropping patterns are presented in Table A-5.3.2

5.3.3 Planned Cropped Area and Cropping Intensity

In accordance with the planned cropping patterns, the target cropped areas and cropping intensities in the target schemes under the present Study have been planned in accordance with the following:

(a) Target cropped areas and cropping intensities have been determined on the basis of current and past cropped areas and cropping intensities in individual schemes.

(b) The basic target for a cropping intensity of paddy is 200% or higher. However, an annual paddy intensity of 150% is taken as a minimum target in a few schemes based on the current and past records on intensities of paddy,

(c) An increase of 20% of annual intensity from the present levels is also set as a general target under the Study, and

(d) In accordance with the points discussed above, the target cropping intensities for individual schemes have been determined as presented in Table A-5.3.3

In accordance with the planned cropping pattern & the selected crops discussed earlier and the target cropping intensity, the cropped area have been planned as presented in Table A-5.3.2 and summarized in the following table:

Overall Features of Cropped Area & Cropping Intensity

Crop	Cropped Area (ha)				Cropping Intensity (%)	
	Wet	Dry I	Dry II	Annual	Range	Overall
Paddy	264,436	247,679	45,533	557,648	137 - 300	197
Palawija	9,402	18,985	134,695	163,082	0 - 150	58
Sugarcane	9,253	4,828	0	14,081	0 - 27	5
Total	283,091	271,492	180,228	734,811	160 - 240	260

5.3.4 Target Crop Yields and Crop Production Plans

In principle, target yields of paddy have been assumed for individual schemes by setting an increase of 0.5 t/ha of paddy yield from the present levels as a target under the present Study as shown in Table A-5.3.2 and summarized below:

Target Yields under the Study

Cropping Season/Crops	Target Yield		Crop	Target Yield
	Range	Overall Avg		
Wet Season Paddy	5.0 - 6.0 ton/ha	5.5 ton/ha	Maize (hybrid)	5.0 ton/ha
Dry Season I Paddy	4.5 - 6.0 ton/ha	5.4 ton/ha	Beans *1	1.4 ton/ha
Dry Season II Paddy	4.5 - 5.5 ton/ha	5.0 ton/ha	Sugarcane	65 ton/ha

Note: *1. Average of soybeans & mungbeans

The overall average target yield level of 5.4 t/ha is an increase of 0.5 t/ha from the present overall average yield of 4.9 t/ha.

On the basis of the target crops yields and the planned cropping pattern, the with-project crop production plans have been formulated for individual target schemes as shown in Table A-5.3.2. As shown in the table, the production increase of 510,000 tons of paddy as a whole is estimated under the with-project condition.

5.3.5 Crop Budgets

The planned crop budgets estimated based on the planned farming practices of paddy and palawija are detailed in Table A-5.3.3 For groundnut, both intensive practice with-tillage and practice without tillage have been planned. The planned crop budgets for paddy and palawija are summarized in the following table.

Planned Crop Budget per Ha (unit: Rp.000)

Crops		Return		Crops	Return	
		Gross	Net		Gross	Net
Paddy	- Yield 6.0 t/ha	7,200	4,250	Maize (hybrid)	4,800	2,120
	- Yield 5.5 t/ha	6,600	3,800	Beans *1	3,735	2,105
	- Yield 5.0 t/ha	6,000	3,420	Sugarcane	9,364	2,760
	- Yield 4.5 t/ha	5,400	2,970			

Note: *1 Average of soybeans & mungbeans

5.3.6 Farm Economy

The farm economic analyses under the present Study has been analyzed on the basis of 1 ha of irrigated paddy field by estimating net farm income from paddy fields as applied for North Sumatra and as discussed earlier in Section 4.2.2.

The results of the farm economic analysis made on the individual schemes are presented in Table A-5.3.4 and summarized below.

Estimated Net Farm Income from 1ha of Field (unit: Rp.000)

Land Use Category	Net Farm Income			Incremental Net Income Average
	With-Project		Present	
	Range	Average	Average	
Irrigated Paddy Field	6,566 - 11,020	8,450	6,678	1,772

5.4 Institutional Capacity Building

(1) District/Municipal Government Capacity Building Plan

The focal point of capacity building of district/municipal district government staff in charge of irrigation management is to make staff understand fully the new participatory irrigation management policy and also the difference from the previous irrigation management policy reform based on hand-over of authority to water users. For this purpose, technical guidance seminar will be held in each capital town/city by facilitators consisting of PWRS task force team, consultant and if necessary staff of central line ministries. Materials to be distributed to all attendants are outline papers of new Law on Water resources, Amendment of Government Regulation on Irrigation (Regulation No.77/2001 to be modified) and relevant ministerial decrees (also to be modified) of Ministry of Settlement and Regional Infrastructure, Ministry of Home Affairs and Ministry of Finance.

Following this technical guidance seminar, workshop is to be held to review and modify decrees of Regent/Mayor related to water resources and irrigation as well as job descriptions of officials concerned of district/municipal government about irrigation management in line with the spirit of new Law on Water Resources.

Such seminar and workshop for the technical guidance need to be held in all districts and municipalities in the province. To ensure effective and efficient dissemination of the new irrigation management policy, however, the technical guidance should be carried out with more compact scale. Considering the availability of capable facilitators for technical guidance, therefore, the technical guidance is to be started from the following districts and municipalities where the selected 141 irrigation schemes are located:

Kebumen, Purworejo, Boyolali, Klaten, Sragen, Pati, Demak, Batang, Pemalang, Brebes, Tegal, Kendal, Magelang, Grobogan and Kudus Districts and Tegal, Pekalongan, Semarang and Magelang Municipalities as 38 candidate irrigation schemes are located in these districts and municipalities.

(2) WUA Strengthening Plan

The main objective of WUA strengthening is to make all member farmers be aware of role of WUA and responsibility of its membership in the concerned

irrigation scheme. In this connection, the basic concept of WUA strengthening plan is to identify weak points of WUA activities by members themselves on the participatory basis by recapturing monitoring and evaluation record of WUA performance focusing on administrative, financial and operational aspects.

The main targets of WUA strengthening plan are WUA's board of directors and member farmers. The plan consists of WUA awareness raising workshop and technical assistance to WUA concerning capacity to manage organization, capability to collect and expense member's fee, and activities to conduct operation and maintenance of tertiary irrigation system. As for technical assistance, class room training, on-the-job training and mass guidance will be combined in one package program to meet technical assistant requirements of the respective WUA.

Although the target of this plan is 1,670 "Under developing" WUA and 264 "Not yet developed" WUA, the above package program should be implemented for 1,342 "Under developing" WUA and 239 "Not yet developed" WUA in 38 candidate irrigation schemes.

(3) WUA Federation Setting-up Plan

In the irrigation scheme where WUA federation has been organized, its role and function are to be confirmed through review of its article from the viewpoint of new participatory irrigation management policy. Also hearing is to be made to representatives of the federation focusing on who took an initiative to establish the federation and whether or not the establishment of federation was backed up by the general will of WUA in the concerned irrigation scheme. If the article is based on Government Regulation No. 77/2001 on Irrigation and relevant ministerial decrees as well as less connection and coordination with member WUA are found, it is confirmed whether the representatives of federation need technical support from Regional (provincial/district) Government for modification of its article and resetting-up of FWUA/MWUA.

For the case of new establishment of FWUA/MWUA, socialization workshop is to be held by the Provincial task force team aiming in order to make WUA and its members understand fully the necessity as well as the role and function of FWUA/MWUA in line with the irrigation substance of new Law on Water Resources. To support WUA for smooth establishment and initial setting-up of FWUA/MWUA, the Provincial task force team is to act as a facilitator.

Although WUA federation setting-up plan needs cover 50 irrigation schemes, the first priority should be given over 38 candidate schemes.

(4) WUA Establishment Acceleration Plan

The main target of WUA establishment acceleration plan is farmers' group in each tertiary block where no WUA has been established although irrigation water can be distributed to the concerned block. For this purpose, Provincial task force team is to invite representatives and members of Farmers' Group to socialization meeting and workshop aiming at confirmation of their awareness to establishment of and participation to WUA as well as their needs for general guidance about procedure and practice of WUA establishment.

Although this plan has to cover 414 WUA not yet established in 28 irrigation schemes, its implementation should be commenced from 19 candidate schemes in which there remain 317 WUA not yet established.

(5) On-the-job O&M Training and Management Guidance

As O&M of tertiary irrigation system is the responsibility of WUA, training programs are to be implemented during the implementation period of rehabilitation works in the respective irrigation schemes in order to enable WUA member farmers to carry out physical activities smoothly and non-physical activities properly. The main menu is on-the-job training program on O&M of irrigation facilities at tertiary level and management guidance program on collection and expense of WUA member's fee.

(6) Strengthening of Extension Services

To strengthen extension services based on the area specific concept in order to accommodate farmer's needs, promote farmer/farmers' group participation and to take initiatives in the execution of extension services in the irrigation scheme, the main activities are to include farmer/farmers' group empowerment, staff empowerment, field demonstration, technical development/trial, class room training, field school, study tour, workshop and mass guidance.

(7) Cost Estimate for Institutional Capacity Building

The unit cost of each institutional capacity building plan is estimated at preliminary level as follows:

District/municipal government capacity building plan	Rp.10,000,000/time
WUA strengthening plan	Rp.40,000/ha
WUA Federation Setting-up Plan	Rp.20,000/ha
WUA Establishment Acceleration Plan	Rp.20,000/ha
On-the-job O&M Training	Rp.100,000/ha
WUA Management Guidance	Rp.20,000/ha
Strengthening of Extension Services	1% of rehabilitation cost

Taking into account the above unit cost, target and established numbers of WUA, and subject area of irrigation scheme, institutional capacity building cost has been estimated and the result is as shown in Table A-5.4.1.

5.5 Economic Evaluation

5.5.1 General

The economic evaluation of the present Study has been made to assess the economic viability by comparing the project costs and the incremental project benefits between the present/before project conditions and the with-project conditions as the reliable prediction or estimation of the without-project conditions was not possible and impractical. The approaches or assumptions applied for the economic evaluation are as follows;

(a) Economic evaluation has been made by estimating project benefits between the present/before project and the with-project conditions,
(b) For economic evaluation, economic internal rate of return (EIRR), financial gross return per ha have been examined,
(c) Project benefits are estimated based on crop production benefits and indirect or intangible benefits have not been counted,
(d) The useful life of the Project was taken as 30 years from project implementation,
(e) Exchange rate of Indonesian Rupiah (Rp.) to US. Dollar (US$) was taken to be Rp. 8,279 equivalent to US$ 1.00 (as of May 2003);
(f) Constant prices at 2003 level were used in the economic evaluation, and

5.5.2 Project Costs

The project costs of the individual rehabilitation plans consist of initial investment costs, replacement costs and O&M costs. The economic project costs were calculated from the financial project costs by applying standard conversion factor of 0.90, as shown in Table A-5.5.1.

5.5.3 Project Benefits

(1) Economic Prices of Farm Inputs and Outputs

Economic prices of farm inputs and outputs were estimated in order to evaluate the expected project benefits. Economic prices of trade goods such as rice, maize, soybeans, groundnuts and fertilizers were estimated on the basis of the projected world market prices of these commodities forecast by the World Bank. Non-trade goods were valued at financial prices which were estimated on the basis of current

market or farm gate prices. Farm labor was valued at the shadow wage rate of 0.80. The economic prices of farm inputs and outputs applied for the economic evaluation are presented in Table B-6.2.2 and B-6.2.3.

(2) Project Benefits

Only the crop production benefits are assessed as the project benefits as stated earlier. The net project benefits are defined as the difference in net return from crop production between the with-project and the present/before project conditions. The economic crop budgets applied for the estimation of the net return under the Study are as presented in Table A-5.5.2. The project benefits expressed as the incremental net return form crop production in the individual schemes are estimated as shown in Table A-5.5.3.

5.5.4 Results of Economic Evaluation

The results of the economic evaluation (EIRR, B/C, B - C & incremental gross return per ha) are presented in Table A-5.5.4 and as summarized below.

Economic Internal Rate of Return (EIRR)

EIRR	No. of Schemes	Ratio (%)
≧ 20%	0	-
15 - 19%	4	8
10 - 14%	8	16
< 10%	38	76

EIRRs of the schemes in Central Java province are in the range of -1.2% to 17.1% and 12 schemes (24%) out of 50 schemes have EIRR higher than10%.

B/C ratios at a discount rate of 10% are summarized in the following table.

B/C at Discount Rate of 10%

B/C	No. of Schemes	Ratio (%)
≧ 1.0	12	24
< 1.0	38	76

The incremental gross returns per ha of the subject area under the with-project conditions are shown in Table A-5.5.4 and summarized in the following table.

Incremental Gross Return per ha (Financial Value)

Incremental Return/ha (million Rp.)	No. of Schemes	Ratio (%)
≧ 6.0	1	2
3.0 - < 6.0	18	36
< 3.0	31	62

Overall average gross returns per ha and incremental gross returns per ha in each province are estimated as shown in the following table.

Average Incremental Gross Return per ha of Subject Area

Gross Return per ha (Rp.000)		
Before Project	With-project	Increment
12,879	15,579	2,700

The overall average incremental gross returns per ha of the subject area under the with-project conditions are estimated at Rp. 2,700,000 respectively as shown above.

5.6 Database for Rehabilitation Plan

The databases for the rehabilitation plan of 50 irrigation schemes are shown in Volume 5, ANNEX-II (2/3).

CHAPTER 6 PRIORITIZATION FOR IMPLEMENTATION OF REHABILITATION

6.1 Flow of Criteria for Prioritization

6.1.1 Flow of Prioritization

The general flow for prioritization of Rehabilitation Projects is shown in Figure A-6.1.1.

The procedure for the prioritization is described as below:

First Screening

Step-1

1.1 Collection of data on existing irrigation schemes with a registered area of more than 1,000 ha.

1.2 If the area of both the registered area and the estimated area were more than 1,000 ha proceeded to Step-2. If an estimated area was less than 1,000 ha, such scheme has been categorized into Group-VI.

Step-2

2.1 Evaluation of capacities of WUA of each irrigation schemes and related district governments.

2.2 If more than 50% against target number of WUAs has been already established as well as the post of head of water resources and irrigation service office has been fulfilled by the third or higher rank officer, proceeded to Step-3 (1). On the other hand, if more than 50% against target number of WUAs has not been established or the said post has been vacant or fulfilled by the fourth rank officer, the scheme has been categorized into Group-V.

Step-3

3.1 Information on water resources and irrigable area of the scheme furnished by the Dinas PSDA/project office has been adopted for the determination of the possibility for water supply for the scheme.

3.2 If the water resources was considered to be sufficient for the scheme according to such information, an inventory survey and pre-F/S have been carried out.

3.3 If the water resources were considered to be insufficient for the scheme according to the information, proceeded to Step-3 (2).

3.4 In case that there was a possibility of reformulation of water resources development plan, the scheme has been categorized into Group-IV. On the

other hand, if there was no possibility of reformulation of water resources development plan, the scheme has been categorized into Group-VI.

Second Screening

Step-4

4.1 If there are such problems as low technical sustainability (high construction cost and low economic feasibility) and less contribution to the society, such scheme shall be categorized into Group-VI.

Step-5

5.1 Evaluation indicators for prioritization consist of issues of: (a) irrigation, (b) agricultural productivity, (c) society, and (d) economic and financial impacts.

5.2 Based on the comprehensive examination of the above evaluation indicators in pre-F/S, priority of the schemes to be rehabilitated shall be determined and listed.

Priority

Based on the priority list thus prepared, recommendation of implementation procedure is made as follows:

Group-I: Recommended as the first priority
Group-II: Recommended as the second priority
Group-III: Recommended as the third priority
Group-IV: Recommended to reformulate water resources development plan
Group-V: Recommended to accelerate WUA establishment and to empower district government officials concerned
Group-VI: Recommended to formulate development method by other categories

6.1.2 Criteria for Prioritization

Prioritization of rehabilitation works has been based on following four (4) major evaluation indicators:

(a) Rehabilitation of irrigation system impact
(b) Agriculture productivity impact
(c) Social impact
(d) Economic and financial impacts

It should be noted that the status of water users' association has not been included in the evaluation indicators due to the reasons stated in the box in the next stage.

(1) Rehabilitation of irrigation system impact

Rehabilitation of irrigation system impact consists of following three items:

(a) Utilization of resources potential
(b) Urgency of rehabilitation
(c) Sustainability

"Utilization of resources potential" means that actual intake of water vs. designed capacity of intake structure. It is necessary to evaluate increment of intake of water by improving or repairing intake structure, and as a result how much irrigation area can be increased.

"Urgency of rehabilitation" means recovery of function of irrigation scheme, which was not functioning due to disorders of the facilities, by means of rehabilitation. For instance, intake structure or main canal is heavily damaged by some reasons, all the system may not function at all. In such case, evaluation should be made in such a manner that how much function of the system recovers with limited investments.

"Sustainability" does not necessarily depend on structure stability, but it is one of the most important indicators of the effect of rehabilitation. Evaluation of sustainability should be based on the extension of project life.

(2) Agriculture productivity impact

Agriculture productivity impact consists of following three items:

(a) Increase of irrigation area
(b) Cropping intensity
(c) Crop yield

Evaluation of agriculture productivity impact shall be made in terms of increments of irrigation area, crop yield and cropping area.

(3) Social impact

Social impact consists of following two items:

(a) Increase of beneficiaries
(b) Improvement of rural infrastructures

Evaluation of social impact shall be made both aspects of alleviation of poverty and improvement and newly provision of rural infrastructures.

(4) Economic and financial impacts

Evaluation of economic feasibility shall be carried out based on Economic Internal Rate of Return (EIRR) and evaluation of financial viability shall be based on analysis of agriculture gross return.

6.2 Weights of Evaluation Indicators

Distribution of weighted score for four respective indicators is determined as below and details are shown in Table A-6.2.1.

Evaluation Indicators for Prioritization of Rehabilitation Work

Evaluation Indicator		Weighted Score
1.	**Issue of Irrigation Indicator**	**50**
1.1	Utilization of irrigation potential	(10)
1.2	Urgency of rehabilitation	(25)
1.3	Sustainability	(15)
2.	**Issue of Agriculture Productivity**	**20**
2.1	Current cropping intensity	(10)
2.2	Current unit yield of paddy	(10)
3.	**Issue of Society**	**15**
3.1	Number of beneficiaries	(7.5)
3.2	Provision of social infrastructure	(7.5)
4.	**Issue of Economic and Financial Impact**	**15**
4.1	Feasibility (EIRR)	(7.5)
4.2	Agriculture gross return per hectare	(7.5)

6.3 Evaluation Results

The evaluation was made for 50 schemes and the evaluation results are finally classified into Group I, II, III, IV, V and VI as shown in Table A-6.2.2 and summarized below, and high priority is given in the schemes classified into from Groups I to III.

Summary of Prioritization

Priority Group						
I	II	III	IV	V	VI	Total
16	10	12	0	4	8	50

The database for the prioritization in each scheme is presented in Volume 5, ANNEX-II (2/3).

6.4 Selection of Model Scheme for the Feasibility Study

Selection of model scheme to be taken up for the feasibility study has been comprehensively made considering not only the evaluation results of prioritization but also the following factors:

(a) The scheme of which irrigation area is more or less the same as the average area of the 50 schemes,

(b) The scheme of which condition of topography, situation of agriculture and agro-economy, type of irrigation system/facilities, etc. represents the subject schemes,
(c) The scheme of which rehabilitation brings about immediate effects on the recovery of the system (such as damages on the primary canal)
(d) The scheme of which rehabilitation gives rise to a great impact on a regional community/economy (schemes located suburbs of a city or at large market)

A few proposed irrigation schemes were selected by the Team in due consideration of the above factors. This proposal was further examined in the meetings with the counterpart personnel and the representatives of Dinas PSDA. Finally, Gung Irrigation Scheme was selected and determined to be taken up fro the model schemes. The general features of Gung Irrigation Scheme are as follows:

Features of Selected Areas

Irrigation Scheme	Gung
District	Tegal & Kodia
Sub-district	Lebaksui
Existing Condition	
Registered area (ha)	12,999
Technical level	Technical
Completion year of system	1998
Water resources river	Kali Gung
Type of water resources facility	Headworks
Settling basin	Provided
Max. intake discharge (m^3/s)	5.4
Length of main canal (km)	13.5
Length of secondary canal (km)	37.0
Number of WUAs (Target/Established)	131/129
Number of farmers	63,390
Development Plan	
Subject area (ha)	12,641
Water resources facility	Headworks (Rehabilitation)
Settling basin	Rehabilitation
Length of main canal (km)	13.5
Length of secondary canal (km)	17.0
Rehabilitation cost: Total (Mil. Rp.)	94,946
Rehabilitation cost: Per hectare (million Rp.)	7.5 (US$907/ha)
Economic internal rate of return (%)	16.1

CHAPTER 7 PREPARATION OF ACTION PLAN

7.1 Action Plan

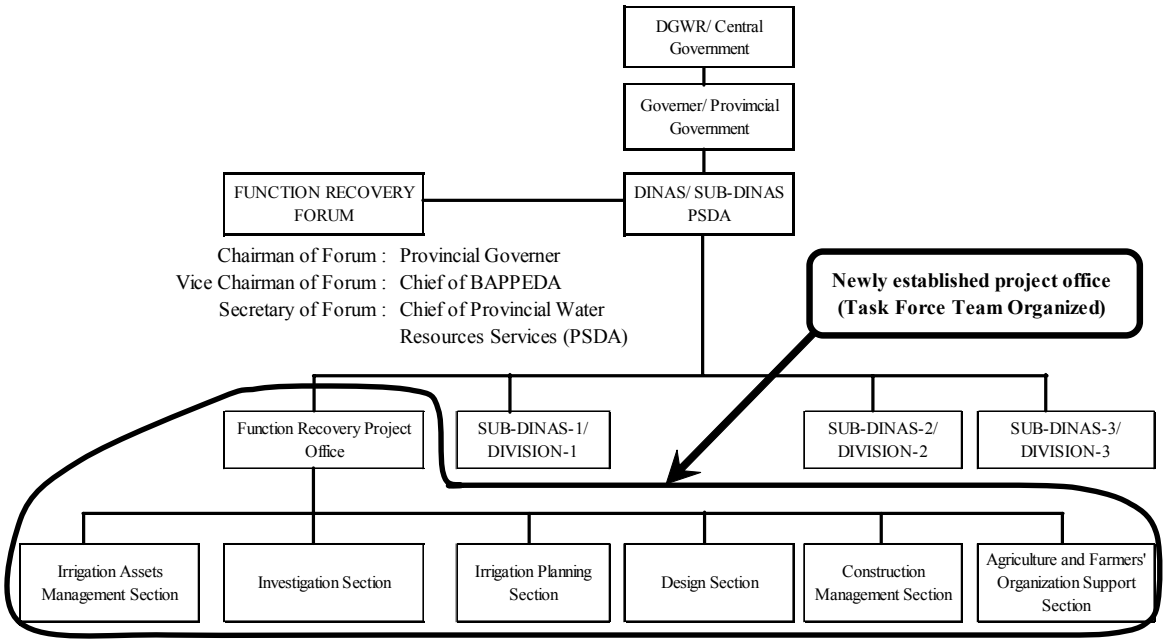
The priority ranking has been made for each irrigation scheme in the preliminary feasibility study. The action plan for rehabilitation work after the prioritization should be prepared with following contents:

(a) Organization plan,
(b) Action plan for recovering function of irrigation facilities,
(c) Action plan for institutional strengthening,
(d) Action plan for extension services strengthening, and
(e) Action plan for budgeting.

7.2 Organization Plan

(1) Precondition

The organization for the recovery program is proposed as illustrated below:



Proposed Organization for Recover Program of Irrigation Agriculture

The organization is to be formed of "Forum" as a decision making body and "Project Office" as an implementation body. These bodies are to be newly

established at provincial level, which are responsible for implementing the comprehensive recovery program of irrigation agriculture from the initiation phase to the final phase on the basis of participatory irrigation management concept.

The Project Office is attached to provincial water resources service as one of functional units and under the control of the chief in charge of water resources management and utilization.

(2) Function Recovery Forum

The Forum is to play facilitator's role in collecting ideas and inputs to the function recovery program at the respective Phases from water users and other stakeholders. The Forum is also responsible for getting final approval from the Governor about its decisions on implementation of the program including budgeting and budget implementation plans. The Forum will be composed of the following members:

Chairman of Forum:	Provincial governor
Vice chairman of Forum:	Chief of BAPPEDA
Secretary of Forum:	Chief of Provincial Water Resources Services (PSDA)
Member of Forum:	District Regent, Municipal Mayor, Chief of District BAPPEDA, Chief of District Water Resources Services, Chief of Agriculture Services at provincial and district level, Chief of relevant services at provincial and district level, Representative of Water Users' Association, University and NGO

(3) Function Recovery Project Office

As discussed in the precondition, "Function Recovery Project Office (tentative name)" will be established under PSDA or Public Services (PU) and take full responsibility of implementation and management of all activities in each phase of the recovery program. The Project Office will be composed of about six (6) Sections such as (a) Irrigation Assets Management Section, (b) Investigation Section, (c) Irrigation Planning Section, (d) Design Section, (e) Construction Section, and (f) Agriculture and Farmers' Organization Support Section.

The Project Office has to (i) maintain close relationship with the stakeholders of water user side, (ii) clarify, utilize and manage their ideas and inputs, and (iii) has a right of influence on their demands for the successful completion of the project. The Project Office will organize various task force teams to carry out specific activities under the direction of the Forum.

In implementing and managing the recovery program, the project manager is a leader of the working group, and his leadership has to be displayed in any activity of the program. He is expected to have skills as communicator, negotiator and problem solver.

Major activities of the respective sections stated above are as follows:

Project Manager	1. The person in charge of implementation of the project. 2. Responsible for negotiation with related agencies, and obtaining consensus. 3. Responsible for implementation schedule. 4. Responsible for drawing up and expending budget for the implementation of the project.
Irrigation assets management section	1. Responsible for managing/safekeeping and updating of irrigation facilities account book. 2. Collection and assessment of information of irrigation facilities from the subordinate agencies (Kabupaten).
Investigation section	1. Confirmation of consistency of the account book and the existing status of irrigation facilities. 2. Supervision of observation and collection/classification of meteorological and hydrological (river runoff) data. 3. Periodical investigation on the status of irrigation facilities and preparation of report. 4. Conducting inventory survey of the existing facilities, which are necessary for formulating the rehabilitation program.
Irrigation planning section	1. Analysis of data on meteorology and hydrology (river runoff). 2. Formulation of rehabilitation plan based on the investigation results. 3. Prioritization of irrigation schemes based on the rehabilitation plan and the construction cost. 4. Preparation of manual of water management and O&M, and guidance of the manual 5. Conducting investigation on environmental impact assessment, and obtaining permits for implementation of the project.
Design section	1. Preparation of design report and bill of quantities, and tender documents including drawings. 2. Conducting design modification during the construction of irrigation facilities.
Construction section	1. Selection of contractors (from tendering to contract signing). 2. Supervision of construction works. 3. Inspecting completion of work, and supervising the project works during the guarantee period.
Agriculture and farmers' organization support section	1. Collection and classification of information on the WUA and related organizations. 2. Collection and classification of information on agriculture and agro-economy required for formulating rehabilitation program. 3. Establishment and support of the program on agriculture and agro-economy. 4. Establishment and support of the program on the empowerment of institutional organization.

The activities stated above will change in accordance with the implementation progress of activities in each phase of the program. It will become necessary to

employ specialized and qualified consultants (Indonesian and/or international) as required.

7.3 Action Plan for Recovering Function of Irrigation Facilities

7.3.1 Action Plan based on the Priority Group

Recommendations based on the evaluation results for the six (6) groups from Groups I to VI are as follows

Group I: High priority schemes (Recommended making F/S)
Group II: Second high priority schemes (Recommended making F/S)
Group III: Third high priority schemes (Recommended making F/S)
Group IV: Schemes that require reexamination of availability of water resources before making F/S
Group V: Schemes that require empowerment of WUA or district government before making F/S
Group VI: Schemes that require reexamination of development methodology before making F/S

Of the above classification, action plan for Groups I to III is more or less the same, though timing of initiation of implementation is different, whereas action plan for Groups IV to VI is not the same due to different constraints. Action plan for each group is as follows:

Groups I to III:

- Procurement of consultants for making F/S,
- Execution of F/S,
- Preparation of implementation program for each scheme,
- Appropriation of funds for the rehabilitation,
- Procurement of consultants for detailed design and construction supervision,
- Field investigation and topographic survey, etc., for detailed design, and preparation of detailed design,
- Preparation of tender documents including drawings,
- Selection of contractor(s),
- Supervision of construction, and
- Final inspection for completion delivery and O/M of the system.

Group IV:

- Procurement of consultants for field survey and study on development plan,

- Preparation of alternative development plan,
- Execution of F/S based on the alternative plan, and
- Activities to be followed are the same as Groups I to III stated above.

Group V:

- Promotion of the organization of WUA to the required level,
- Promotion of the organization of district government to the required level,
- Classification of schemes to Groups I to III or Group VI, and
- Activities to be followed are the same as Groups I to III stated above.

Group VI:

- Procurement of consultants for field survey and study on development plan,
- Preparation of alternative development plan (If the registered area is less too small, integration of plural schemes or exclusion from the list are to be considered.),
- Execution of F/S based on the alternative plan, and
- Activities to be followed are the same as Groups I to III stated above.

7.3.2 Evaluation of Each Scheme and Confirmation of Development Plan

Evaluation of each scheme in terms of issues/problems and their countermeasures are summarized as follows:

Priority of Rehabilitation of the Schemes, Issues/ Problems and Countermeasures

Group	Priority of Rehabilitation	Issues and Problems	Countermeasures
I	High priority (Recommend F/S)	- Poor function of basic structures - No problem in water resources facilities	- Recovery of function by R/U of basic structures.
II	Second priority (Recommend F/S)	- Poor function of the system due to deterioration - Malfunction of terminal system - No problem in water resources facilities	- 30-50% of facilities needs R/U. - Replacement or repairing of gates is necessary. - New construction or rehabilitation of inspection road is necessary.
III	Third priority (Recommend F/S)	- Malfunction of the system due to deterioration - No function of terminal system - No problems in water resources facilities	- More than 50% of facilities need R/U. - Rehabilitation of terminal system is urgent.
IV	Re-examination	- Water is not distributed to the terminal system due to shortage of river runoff. - Paddy field is converted to upland field or orchard due	- Development of new water resources - Integration of schemes - Conversion of crops to be cultivated to meet irrigable

		to shortage of water.	area.
V	Re-examination	- Poor functions and activities of WUA or district government (on the condition that there is no problem in water supply).	- Establishment and empowerment of WUA or empowerment of district government is urgent (on the condition that there is no problem in water supply).
VI	Re-examination	- Registered area with less than 1,000 ha (recommended by JICA Study Team) - Absolute shortage of water resources - Low effect on investment - Low motivation of farmers in practicing farming	- Development of new water resources - Conversion of crops to meet irrigation area

7.3.3 Packaging of Field Survey and Construction Works

(1) Field Investigation for F/S

In order to maintain the uniformity of field survey results, number of package of F/S is one (1) regardless of the scale of the schemes. The study period ranges from 6-18 months depending on size of the schemes.

(2) Construction Works

Packaging of the construction works is made on the basis of monetary terms that are the decisive factors. The approximate construction cost is Rp. 50,000 million (approximately J¥ 700 million) per package. The construction period of one scheme is determined to be 2 years in principle, however, that of large area is 3 years.

7.3.4 Implementation Schedule

The irrigation schemes in the province are classified based on the evaluation of rehabilitation priority as shown below:

Number of Schemes classified based on Priority of Rehabilitation

Group	I	II	III	IV	V	VI	Total
Number	16	10	12	0	4	8	50

Based on the priority group and major features of the schemes stated in the above table, the implementation schedule together with the said information are summarized in Table A-7.3.1 and Figure A-7.3.1. It should be noted that the implementation schedules of the F/S and construction works of the schemes

classified into Groups IV, V and VI are not presented in the report because various kinds of survey and study are required before commencing F/S.

7.3.5 Status of Basic Information on the Irrigation Schemes

In commencing the Study on the Comprehensive Recovery Program of Irrigated Agriculture, basic information such as irrigation area, irrigation diagram, dimension of canals and related structures, intake water record, meteorological and hydrological data. Needless to say, the Study largely depends on the availability of such basic data and their accuracy.

One of the most important tasks of the Study is to collect the basic information. However, many schemes are equipped with neither basic information nor detailed information. To cope with this situation, it was necessary to visit the branch offices of the Provincial Water Resources Management Services Office (Dinas PSDA), nonetheless plenty of documents have been scattered and lost.

The comprehensive recovery project is expected to be certain that the function of facilities can be easily recovered, as most of the existing schemes.

In order to complete successfully the project, the "processing of basic information and preparation of the updated book" is prerequisite condition. For the implementation of the project, necessary information can be collected through such updated book, and if further information is required, additional field survey would be necessary, which is to be added to the book.

It is recommended that the Dinas PSDA should supervise such activities and be responsible for keeping book. In other words, it is urgently necessary for Dinas PSDA to update the information regarding meteorology, hydrology, conditions of irrigation facilities, irrigated area, crop production, etc., which can be furnished for the formulation of rehabilitation plan.

7.4 Action Plan for Institutional Strengthening

7.4.1 Type of Plan

Action plan for institutional strengthening consists of the following two (2) program groups:

- The one is to be conducted in either initial or midterm phase prior to the implementation of rehabilitation works of irrigation system. Action plan for this group includes institutional capacity building and staff capability improvement program, WUA strengthening program, FWUA and MWUA initial setting-up program, and WUA

establishment acceleration program; and

- The other is to be carried out in final stage as one of the project components in parallel with rehabilitation works of irrigation system. Action plan for this group covers training program on operation and maintenance of tertiary irrigation system, and guidance program for collection and expense of irrigation water service charge.

The overall implementation schedule of action plan for institutional strengthening is included in Figure A-7.3.1.

7.4.2 Formulation of Task Force Team for Institutional Strengthening

For conducting the action plan of the first group, a Task Force Team will be established by the Provincial Government. In principle, this Task Force Team is responsible for providing initial ideas/needs and making decision to take necessary arrangement for the program implementation. This Task Force Team is therefore formed of the following members:

- Chief is to be appointed from Provincial Water Resources Service Office;
- Secretary is to be appointed from Provincial Water Resources Service Office; and
- Members are to be appointed from Provincial and District/Municipal Water Resources Service Offices as well as representatives of WUAs, FWUA/MWUA if already organized and Farmers' Group in non-WUA.

For carrying out the action plan of the second group, a working group will be organized under the control of the rehabilitation project manager and led by a senior project staff in charge. As members of this working group, experts are also invited from NGO and universities in addition to representatives of WUAs and FWUA/MWUA if available. This working group is responsible for providing necessary inputs and making decision and necessary arrangement for the program implementation.

7.4.3 Elements of Action Plans for Institutional Strengthening

(1) Institutional Capacity Building and Staff Capability Improvement Program

This program contains two (2) components. One is to enable irrigation officials at regional level to understand and practice the new irrigation management policy. The other is to improve the capacity of organization units of district/municipality government involved in irrigation management and those staff capability in line with the new irrigation management policy.

The first component will be done through undertaking a series of seminar and workshop to be facilitated by the central government after the legal framework of water resources and irrigation management is completed. Its program formulation and budget arrangement will be also made by the central government.

The second component should reflect to the above nationwide dissemination of the new irrigation policy by the central government. This component will be done by the Task Force Team at provincial level and consultants as follows:

- To evaluate the capacity of district/municipal government authorities and the capability of those staff, both involved in irrigation management activities;
- To identify needs for improving institutional capacity and staff capability to cope with the new irrigation management policy as well as supporting requirements for fulfillment of such needs through technical assistance by central/provincial government; and
- To formulate implementation programs on institutional capacity building and staff capability improvement for the respective district/municipal government authorities involved in irrigation management.

Regarding the budget arrangement for these implementation programs, the main source is district/municipal government budget to cover the cost for institutional capacity building and staff capability improvement, while the supplemental source is provincial government budget to cover the cost for implementation of the supporting menus.

In implementing the institutional capacity building and staff capability improvement program, a group of trainers will be organized by inviting well experienced specialists from consultant, NGO and universities. Monitoring and supervision of the program implementation should be carried out continuously by relevant organization units at provincial level throughout the program implementation stage with periodical reporting on performance and impact of the program implementation.

(2) WUA Strengthening Program

The background of this program is the existence of many irrigation schemes where majority of WUAs have yet shown good performance in terms of organization management and financing aspects other than physical aspects like irrigation facility condition and water allocation utilization. From the initial stage of irrigation system rehabilitation, farmers' participation is prerequisite so

that the capability of WUA is one of important key factors for successful implementation of the comprehensive recovery program of irrigation agriculture.

The Task Force Team should be responsible for making necessary arrangement to formulate and implement WUA strengthening program by recruiting consultant as technical assistant. The Task Force Team and its consultants shall:

- hold WUAs' awareness raising workshop to reconfirm weak points elaborated from recapitulated the latest monitoring and evaluation (M & E) record on WUA's performance;
- confirm establishment of WUA Federation (FWUA) at secondary level and federations group at primary level (MWUA) as well as non-WUA tertiary system within the irrigation scheme;
- carry out interview survey to WUAs' representatives of all WUAs in the irrigation scheme if the latest M & E record shows the condition of more than three years ago, and update M & E record;
- identify technical assistant requirements for improving WUA's capacity to manage organization, capability to conduct operation and maintenance of tertiary irrigation system, and/or activities to collect and expense WUA members' fee;
- formulate a technical assistant menu list and make a package program of technical assistance menus according to WUA's needs to improve its capacity, capability and/or activities; and
- estimate unit cost of each technical assistant menu and total cost of package program.

Budget for implementing package program for strengthening WUA is to be arranged by Regional Government according to its jurisdiction.

In implementing the WUA strengthening program before starting rehabilitation works, the Task Force Team shall make necessary arrangement to recruit consultant, NGO and/or universities as facilitators and implementers in the irrigation scheme area.

(3) FWUA and MWUA Initial Setting-up Program

The background of this program is the current change in the operation and maintenance responsibility of primary and secondary irrigation system in line with the draft of new Law on Water Resources. These two groups will represent those member WUAs so that they should build up transparent channel and good cooperation among WUAs, FWUAs and MWUA in implementing irrigation management activities. In order to secure appropriate role and function of

WUAs' groups in conformity with the participatory irrigation management policy, therefore, it is necessitated to support initial setting-up of FWUA and MFUA.

The same Task Force Team and its consultant shall:

- collect list of FWUA/MWUA, list of member WUAs, legal documents;
- review and confirm role and function of FWUA/MWUA compared with the participatory irrigation management policy;
- socialize the necessity of setting up representative groups to WUA to cope with the participatory irrigation management policy if FWUA/MWUA has not been established;
- formulate a guidance menu list and make a package program of guidance menus to support initial setting-up of FWUA/MWUA according to the current situation in the irrigation scheme; and
- estimate unit cost of each guidance menu and total cost of package program.

Budget for implementing package program for initial setting-up of FWUA and MWUA is to be arranged by Regional Government according to its jurisdiction.

In implementing the initial setting-up of FWUA and MWUA program before starting rehabilitation works, the Task Force Team shall make necessary arrangement to recruit consultant, NGO and/or universities as facilitators and supporters in the irrigation scheme area.

(4) WUA Establishment Acceleration Program

The background of this program is the existence of tertiary blocks where no WUA has yet established within one irrigation system resulting in that the realization of full-scale management of irrigation system is still impossible. In such case, any irrigation scheme with WUA establishment target realization ration of less than 50% is to be dropped from Master List according to the criteria. Further, there are candidate irrigation schemes which have tertiary blocks without WUA. As long as irrigation water is distributed to the concerned tertiary block, WUA should be established as a terminal body of water users. Therefore, it is indispensable for accelerating WUA establishment up to the target level in each irrigation scheme in order to ensure participatory irrigation management in the whole tertiary blocks of one irrigation system in an integrated manner.

The same Task Force Team and its consultant shall:

- hold socialization meeting and workshop to invite representatives and members of farmers' groups which are available in non-WUA tertiary blocks provided with irrigation water, for the purpose of accelerating

WUA establishment and promoting participatory irrigation management;

- confirm farmers' awareness to establishment of and participation to WUA as well as their needs for guidance about procedure and practice of WUA establishment;
- formulate a guidance menu list and make a package program of guidance menus to accelerate WUA establishment in non-WUA tertiary blocks to which irrigation water is distributed; and
- estimate unit cost of each guidance menu and total cost of package program.

Budget for implementing package program for WUA establishment acceleration is to be arranged by Regional Government according to its jurisdiction.

In implementing the WUA establishment acceleration program before starting rehabilitation works, the Task Force Team shall make necessary arrangement to recruit consultant, NGO and/or universities as facilitators and supporters in the irrigation scheme area.

(5) Training Program on Operation and Maintenance of Tertiary Irrigation System

This training program will be done after completing the rehabilitation works of irrigation system. For this purpose, however, preparation of training manual and program should be done in parallel with the final stage of rehabilitation works. Also the concept of training program should synchronize irrigation water allocation plan to tertiary blocks as well as cropping pattern and planting schedule in the irrigation scheme.

As this training will be done as one of rehabilitation project components, consultant under the project manager is responsible for preparing training manuals, formulating training program estimating training cost and implementing training program. To ensure effective and efficient implementation of training on operation and maintenance of tertiary irrigation system, NGO and other volunteers will be encouraged to involve in training activities at field level in addition to the project staff, Regional Government officials and consultant.

Budget arrangement based on consultant's cost estimate is the responsibility of the project manager.

(6) Guidance Program for Collection and Expense of Irrigation Water Service Charge

The background of this program is the reconfirmation of WUA's obligation to operate and maintain tertiary irrigation system in the draft of new Law on Water Resources. Since 1984, farmers have been responsible for paying irrigation service fee to cover the cost for operation and maintenance of tertiary irrigation system as well as management cost of WUA. Due to uncertain realization of irrigation water allocation plan to each tertiary block of the irrigation system, however, many WUA members put lower priority over their irrigation service fees among annual expenses from their income. As irrigation water supply can be guaranteed as planned after the rehabilitation works completed, therefore, it is needed for reluctant farmers to remind their obligation and to encourage them to fulfill their obligation.

In parallel with preparation of training manual on operation and maintenance of tertiary irrigation system, the project consultant shall:

- identify issues on book keeping system, fee determination method, payment form, fee collection system and payment schedule;
- identify issues fee allocation system to cover administration, operation, maintenance and other miscellaneous cost;
- identify incentives to members;
- formulate a guidance menu list and a package program of guidance menus for collection and expenses of irrigation water service fee; and
- estimate unit cost of each guidance menu and total cost of package program.

Budget arrangement based on consultant's cost estimate is the responsibility of the project manager

In formulating and implementing the guidance program for collection and expense of irrigation water service charge, the project manager should pay his due attention to recruit a consultant with specific experiences matching with the above terms.

7.5 Action Plan for Extension Services Strengthening

7.5.1 Formulation of Action Plan

The goal of strengthening extension services is to mitigate individual or plural constraints to agricultural development based on farmer-to-farmer approaches. To reach the goal, it is prerequisite to formulate a strategic action plan tailored to

area specific needs. Therefore, the action plan has to include a series of program menus aiming at farmer/farmers' group and staff empowerment. Formulation of the action plan for strengthening extension services also has to be well synchronized with the implementation schedule of rehabilitation works of the irrigation scheme. Key program menus are field demonstration, technical trial, classroom and field school training, study tour, workshop, mass guidance, and so on.

7.5.2 Formulation of Task Force Team for Extension Services Strengthening

For implementing the action plan, a Regional Task Force Team for strengthening extension services will be established by Regional Government. This Task Force Team is formed of the following members:

Chief	Regional agriculture services agencies
Secretary	Regional agriculture services agencies
Member	Irrigation services agencies
	Water users' association (farmers)
Technical guidance team	Agriculture & irrigation agencies of higher jurisdiction; BPTP

7.5.3 Formulation of Implementation Program

An implementation program of the action plan for strengthening extension services will be formulated stepwise as below:

Constraints for development will be identified by the following means:

- Investigation on the present agriculture conditions and identification of constraints to be mitigated for the attainment of the targets set in the agriculture plan; and
- Field confirmation of the constraints by the research-extension dialog team.

Approaches and countermeasures or technologies will be introduced by establishment of:

- Approaches for the mitigation of the constraints identified;
- Countermeasures for the mitigation of the constraints identified; and
- Agriculture technologies for the mitigation of the constraints identified.

Based on the extension system employed in a district, the modified system accommodating area specific conditions and needs should better be worked out by emphasizing promotion of farmer/farmers' group's participation and initiatives in the execution of extension services in the irrigation scheme.

Element extension programs will be formulated for the mitigation of individual or plural development constraints by emphasizing farmer-to-farmer approaches. Element extension programs should be area specific ones tailored to area specific needs and will include farmer/farmers' group empowerment program, staffs empowerment program, field demonstration program, technical development or trial program, training program in class and in field (field school), study tour, workshop, mass guidance and so on.

For implementing extension services strengthening program, a certain period from 3 to 5 years will be required as shown in Figure A-7.3.1, based on the time series for implementation schedule of element programs, budget requirement and availability as well as staff availability and capability.

7.5.4 Implementation of Extension Services Strengthening Program

The extension services strengthening program will be implemented as follows:

- Formulation of annual work program for the strengthening of extension services in individual irrigation schemes based on the action plan for strengthening of extension services and through participatory approach;
- Budget arrangement on the basis of the annual work program formulated above;
- Preparation of detail agreed plan of operation for the implementation of strengthening programs accommodated in the budgets through participatory approaches of stakeholders involved in the implementation of the programs;
- Extension materials or materials required for the implementation of the programs accommodated in APO should be prepared in time for the execution of the programs;
- Based on the establishment or development of agriculture technologies to be introduced, simple extension materials to be distributed to farmer/farmers' group should be prepared;
- Implementation of the programs for the strengthening of extension services should better be carried out by a working Team organized for the implementation of the programs in individual irrigation schemes. The Working Team should be composed of: staffs of district agriculture services office, field agriculture & irrigation staffs, representatives of WUAs and representatives of participants of the programs;
- Monitoring & supervision of the program implementation by the Task Force Team should be carried out continuously throughout the program implementation stage; and

- Monitoring of the program implementation and impacts should be made by the Working Team under the supervision of the Task Force Team. Periodical reporting of the results and findings of such monitoring activities should be institutionalized.

7.6 Action Plan for Budgeting and Budget Implementation

In discussing the preparation of budget proposals and implementing of budget to be allocated to the function recovery program, special attention has to be paid to the following key issues related to the modified irrigation management policy in line with the draft of new Law on Water Resources:

- Arrangement of irrigation management responsibility between irrigation water suppliers and water users;
- Arrangement of irrigation management responsibility among government authorities;
- Funding criteria; and
- Mechanism of budget arrangement and utilization

Among irrigation management activities, the responsibility of planning and design works for development, rehabilitation and upgrading purposes is arranged to governments at central and provincial level to assure quality of outputs from these works. Regarding implementation of physical works, it can be considered that the budget availability, staff capability and contractor capacity are crucial factors at district/municipal level. Therefore, it can be considered rational that irrigation schemes commanding more than 1,000 ha are to be handled by provincial governments in a sense of participatory irrigation management.

Although irrigation schemes covering 500 to 1,000 ha are to be dropped from the function recovery program, rehabilitation and upgrading works of such schemes needs to be implemented by district/municipal government with financial support by the Special Allocation Fund to district/municipal government (*DAK*) and technical assistance from provincial government, if necessary.

Budgeting for activities in the initiation and midterm phase of the function recovery program for the irrigation scheme with the scale of more than 1,000 ha is recommended to be made at central level. For allocating APBN of Ministry of Settlement and Regional Infrastructure, therefore, it is required to make a package of the initiation phase activities on provincial basis. It is also recommended that, after budget is allocated, provincial government is to execute initiation phase package plans through assistant task.

In the midterm phase of the function recovery program, it is recommended that Ministry of Settlement and Regional Infrastructure takes an initiative for budgeting after scrutinizing provincial governments' proposals for undertaking F/S and packaging priority schemes. Similar procedures of budgeting and budget implementation are also recommended.

Budgeting for implementing rehabilitation works of irrigation schemes will be basically made according to the jurisdiction of irrigation management stipulated in the daft of new Law on Water Resources if internal budget source is considered. If external funding sources are targeted, it is recommended to consider the scale of proposed project matching with the financing standard of the donor agencies. In other words, central government is to prepare an implementation program (I/P) by packaging irrigation schemes proposed by Regional Governments.

Tables

Table A-1.1.1 Administrative, Demographic and Socio-economic Features by Project District and Province in 2002: Central Java

I. Administrative & Demographic Features

Province/District	Land Area		No. of Administrative Units		Population & Households										
					Population				Density (per km2)	Urban Population		Rural Population		Households	
	(km^2)	(%)	Sub-district	Village	Male	Female	Total	Growth Rate		(No.)	(%)	(No.)	(%)	Households No.	Family Size
301 Cilacap	2,139	7	23	282	809,048	804,916	1,613,964	0.81 %	755	455,624	28	1,158,340	72	410,656	3.9
302 Banjarnegara	1,070	3	18	278	426,860	412,102	838,962	0.80 %	784	151,542	18	687,420	82	207,488	4.0
303 Kebumen	1,283	4	26	460	582,342	584,262	1,166,604	0.40 %	909	291,090	25	875,514	75	288,160	4.0
304 Purworejo	1,035	3	16	494	363,641	340,422	704,063	0.06 %	680	185,464	26	518,599	74	191,055	3.7
305 Magelang	1,086	3	21	370	544,126	558,233	1,102,359	0.83 %	1,015	275,406	25	826,953	75	284,896	3.9
306 Boyolali	1,015	3	19	267	445,581	451,626	897,207	0.63 %	884	235,456	26	661,751	74	238,987	3.8
307 Klaten	656	2	26	401	540,575	568,911	1,109,486	0.23 %	1,691	712,766	64	396,720	36	305,504	3.6
308 Sukoharjo	467	1	12	167	394,147	386,802	780,949	1.48 %	1,672	549,822	70	231,127	30	207,488	3.8
309 Sragen	946	3	20	207	422,520	422,800	845,320	0.24 %	894	233,510	28	611,810	72	227,392	3.7
310 Grobogan	1,976	6	19	280	624,120	647,380	1,271,500	1.03 %	643	182,393	14	1,089,107	86	354,752	3.6
311 Pati	1,491	5	21	405	559,772	594,734	1,154,506	0.79 %	774	349,967	30	804,539	70	320,736	3.6
312 Kudus	425	1	9	131	339,924	369,981	709,905	1.13 %	1,670	481,705	68	228,200	32	178,528	4.0
313 Demak	897	3	14	247	494,120	490,621	984,741	1.76 %	1,098	270,011	27	714,730	73	253,754	3.9
314 Kendal	1,002	3	17	285	418,912	432,592	851,504	0.64 %	850	357,253	42	494,251	58	223,392	3.8
315 Batang	789	2	12	244	328,051	337,375	665,426	1.16 %	843	219,512	33	445,914	67	161,504	4.1
316 Pekalongan	836	3	19	282	399,966	407,085	807,051	1.37 %	965	359,832	45	447,219	55	184,880	4.4
317 Pemalang	1,012	3	14	222	644,841	626,563	1,271,404	1.29 %	1,256	619,544	49	651,860	51	291,040	4.4
318 Tegal	880	3	18	287	698,059	693,125	1,391,184	1.14 %	1,581	760,433	55	630,751	45	327,584	4.2
319 Brebes	1,658	5	17	297	849,608	861,756	1,711,364	1.13 %	1,032	555,993	32	1,155,371	68	425,504	4.0
320 Others	11,881	37	212	2,944	5,559,187	5,627,132	11,186,319	n.a.	942	809,576	50	805,992	50	2,903,143	3.9
Province Total	32,544	100	553	8,550	15,445,400	15,618,418	31,063,818	0.84 %	955	12,484,207	40	18,579,611	60	7,986,443	3.9
Indonesia 2/	1,890,754		4,918	70,460	106,332,251	105,670,749	212,003,000	1.49 %	112	85,380,627	42	115,861,372	58	55,041,000	3.9

II. Socio-economic Features

Province/District	Working Population & Occupation							GRDP in 2001 5/				Farm Economy (in 1996)					Population under Poverty Line ('00) (%)
												Estimated Annual Family		Annual Per Capita Expenditure			
	Working Population 3/		Working Population per Family	Proportion of Working Population by Sector (%) 4/				Agriculture Sector (Rp. million)	Non-agriculture Sector (Rp. million)	Per District (Rp. million)	Per Capita (Rp.000)	Income (Rp.000)	Expenditure (Rp.000)	Food (Rp.000)	Non-food (Rp.000)	Total (Rp.000)	
	(No.)	(%)		Agriculture	Industry	Others	Total										
301 Cilacap	1,042,117	64.6	2.5	60	6	34	100	2,623,085	4,704,662	7,327,747	12,014	No data available	4,787	838	380	1,218	29.7
302 Banjarnegara	564,723	67.3	2.7	64	6	30	100	975,491	1,359,859	2,335,350	2,706		4,577	765	367	1,132	52.4
303 Kebumen	750,570	64.3	2.6	52	6	41	100	1,067,631	1,317,974	2,385,605	2,028		5,231	897	395	1,292	27.8
304 Purworejo	478,344	67.9	2.5	63	4	33	100	936,236	1,181,946	2,118,182	2,766		4,850	817	499	1,316	33.7
305 Magelang	753,565	68.4	2.6	57	7	36	100	1,069,828	1,946,322	3,016,150	2,721		4,995	829	462	1,291	30.2
306 Boyolali	622,101	69.3	2.6	58	7	35	100	1,215,376	1,757,477	2,972,853	3,213		5,034	865	476	1,341	36.9
307 Klaten	798,203	71.9	2.6	31	12	57	100	789,303	2,562,942	3,352,245	3,013		5,644	988	566	1,554	23.6
308 Sukoharjo	555,458	71.1	2.7	23	14	63	100	780,807	2,097,903	2,878,710	3,644		6,165	1,001	637	1,638	13.4
309 Sragen	593,215	70.2	2.6	60	5	35	100	787,142	1,128,614	1,915,756	2,259		4,922	856	468	1,324	38.7
310 Grobogan	853,570	67.1	2.4	76	2	23	100	857,665	1,069,673	1,927,338	1,448		4,333	859	350	1,209	37.2
311 Pati	808,952	70.1	2.5	57	7	36	100	1,367,122	1,477,296	2,844,418	2,415		5,101	987	430	1,417	21.4
312 Kudus	488,212	68.8	2.7	26	32	42	100	367,943	9,006,020	9,373,963	13,186		6,088	888	643	1,531	14.6
313 Demak	659,758	67.0	2.6	54	9	37	100	1,011,028	1,112,392	2,123,420	2,143		5,580	927	511	1,438	22.2
314 Kendal	562,253	66.0	2.5	55	8	37	100	1,149,934	3,118,245	4,268,179	4,845		5,542	927	527	1,454	17.3
315 Batang	438,667	65.9	2.7	48	11	41	100	588,391	1,420,853	2,009,244	3,019		5,010	842	374	1,216	32.7
316 Pekalongan	531,923	65.9	2.9	33	17	50	100	523,499	2,284,629	2,808,128	3,480		6,670	1,046	482	1,528	24.6
317 Pemalang	830,621	65.3	2.9	46	5	49	100	1,023,447	1,710,309	2,733,756	2,153		6,212	906	516	1,422	33.9
318 Tegal	906,641	65.2	2.8	33	9	58	100	568,590	1,817,667	2,386,257	1,717		5,691	891	449	1,340	29.3
319 Brebes	1,105,000	64.6	2.6	57	2	41	100	2,011,298	1,748,137	3,759,435	2,201		5,442	907	446	1,353	36.0
320 Others	7,782,463	69.6	2.7	45	11	44	100	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.
Province Total	21,126,356	68.0	2.6	49	9	42	100	33,326,727	74,705,030	108,031,757	3,478		5,687	934	528	1,462	28.5
Indonesia 2/	135,426,402	63.9	2.5	47	8	45	100	246,298,200	1,203,099,900	1,449,398,100	6,837		9,537	1,448	1,028	2,476	18.2

1/:Figures in 2002, if not stated otherwise 2/: Figures in 2001 based on Statistik Indonesia 2002, BPS Indonesia 3/: Estimated based on: population of age group 15 - 64 x 1.0 + age group ≧65 x 0.5

4/: Proportion of working population of aged 10 years and over by working sector during the previous week; Survei Sosial Ekonomi Nasional, 2001 5/: Pendapatan Regional Jawa Tengah Menurut Kabupaten/Kota 2001, BPS Jawa Tengah

Source: Jawa Tengah (2002) Dalam Angka, BPS Jawa Tengah & Karakteristik Penduduk Jawa Tengah, Hasil Sensus Penduduk 2000, BPS Jawa Tengah

Table A-1.3.1 Number and Area of Irrigation Schemes in Central Java

	District / Municipal	Irrigation Scheme and Potential Area									
		Technical Irrigation Scheme		Semi-technical Irrigation Scheme		Simple Irrigation Scheme		Government Scheme Sub-total		Village Irrigation Scheme	Total
		No. of Scheme	Area (ha)	No. of Scheme	Area (ha)	No. of Scheme	Area (ha)	No. of Scheme	Area (ha)	Area (ha)	Area (ha)
1	Cilacap	14	41,721	4	1,461	89	3,092	107	46,274	11,029	57,303
2	Banyumas	19	14,995	9	670	201	6,860	229	22,525	13,207	35,732
3	Purbalingga	19	12,617	8	1,477	52	2,094	79	16,188	12,160	28,348
4	Banjarnegara	11	9,634	3	382	135	6,131	149	16,147	7,263	23,410
5	Kebumen	14	28,218	3	358	66	2,784	83	31,360	6,872	38,232
6	Purworejo	19	22,681	8	3,113	61	1,395	88	27,189	5,024	32,213
7	Wonosobo	12	2,376	28	2,387	388	8,022	428	12,785	11,600	24,385
8	Magelang	35	12,562	17	3,089	395	10,962	447	26,613	15,465	42,078
9	Boyolali	20	6,390	60	4,036	62	1,610	142	12,036	15,090	27,126
10	Klaten	116	18,620	230	8,847	63	1,723	409	29,190	16,326	45,516
11	Sukoharjo	23	14,673	34	3,162	5	515	62	18,350	6,811	25,161
12	Wonogiri	32	9,920	62	5,354	231	9,754	325	25,028	16,372	41,400
13	Karanganyar	29	8,896	32	2,763	114	4,356	175	16,015	17,740	33,755
14	Sragen	22	22,496	6	1,552	14	439	42	24,487	6,595	31,082
15	Grobogan	12	38,341	2	412	20	1,384	34	40,137	8,381	48,518
16	Blora	21	6,161	8	382	9	701	38	7,244	7,083	14,327
17	Rembang	31	6,451	26	2,960	16	1,889	73	11,300	7,066	18,366
18	Pati	51	30,426	55	5,888	121	4,060	227	40,374	15,701	56,075
19	Kudus	10	11,938	3	71	99	2,385	112	14,394	7,137	21,531
20	Jepara	15	5,938	3	270	333	9,264	351	15,472	14,590	30,062
21	Demak	11	54,280	0	0	0	0	11	54,280	2,239	56,519
22	Semarang	24	6,934	9	1,065	202	4,740	235	12,739	18,341	31,080
23	Temanggung	21	4,850	102	5,298	104	2,799	227	12,947	13,847	26,794
24	Kendal	11	17,741	3	507	142	3,100	156	21,348	17,119	38,467
25	Batang	21	9,122	7	1,325	217	7,604	245	18,051	15,079	33,130
26	Pekalongan	15	18,100	0	0	80	3,558	95	21,658	13,916	35,574
27	Pemalang	13	26,717	3	217	66	1,940	82	28,874	8,791	37,665
28	Tegal	14	33,017	1	434	68	3,597	83	37,048	9,778	46,826
29	Brebes	26	46,314	20	2,993	175	4,474	221	53,781	16,233	70,014
30	Kota Magelang	1	280	0	0	0	0	1	280	0	280
31	Kota Surakarta	0	0	0	0	0	0	0	0	0	0
32	Kota Salatiga	4	3,293	0	0	3	52	7	3,345	0	3,345
33	Kota Semarang	12	1,351	0	0	18	426	30	1,777	0	1,777
34	Kota Pekalongan	3	1,978	0	0	0	0	3	1,978	0	1,978
35	Kota Tegal	1	461	0	0	0	0	1	461	0	461
	Total	702	549,492	746	60,473	3,549	111,710	4,997	721,675	336,855	1,058,530

Source: Daftar Perincian Luas Baku Sawah Tiap Unit Daerah Pengairan, Dinas Pengairan Jawa Tengah

Table A-1.3.2 Classification of Government Irrigation Schemes by Size in Central Java

	District / Municipal	Class of Size														
		0 - 500 ha					500 - 1,000 ha					More than 1,000 ha				
		T (No.)	ST (No.)	SD (No.)	Total (No.)	Area (ha)	T (No.)	ST (No.)	SD (No.)	Total (No.)	Area (ha)	T (No.)	ST (No.)	SD (No.)	Total (No.)	Area (ha)
1	Cilacap	6	3	89	98	5,262	4	1	0	5	3,485	4	0	0	4	37,527
2	Banyumas	11	9	201	221	10,996	5	0	0	5	3,397	3	0	0	3	8,132
3	Purbalingga	14	8	52	74	8,239	2	0	0	2	1,422	3	0	0	3	6,527
4	Banjarnegara	7	3	135	145	6,272	2	0	0	2	1,487	2	0	0	2	8,388
5	Kebumen	7	3	66	76	4,221	2	0	0	2	1,543	5	0	0	5	25,596
6	Purworejo	7	8	61	76	3,962	4	0	0	4	2,840	8	0	0	8	20,387
7	Wonosobo	11	28	388	427	12,231	1	0	0	1	554	0	0	0	0	0
8	Magelang	28	17	395	440	19,162	5	0	0	5	3,152	2	0	0	2	4,299
9	Boyolali	16	60	62	138	8,113	3	0	0	3	2,344	1	0	0	1	1,579
10	Klaten	106	230	63	399	21,189	8	0	0	8	5,710	2	0	0	2	2,291
11	Sukoharjo	18	34	5	57	5,780	3	0	0	3	2,130	2	0	0	2	10,440
12	Wonogiri	28	62	231	321	22,346	4	0	0	4	2,682	0	0	0	0	0
13	Karanganyar	24	31	114	169	10,413	3	1	0	4	2,621	2	0	0	2	2,981
14	Sragen	12	5	14	31	4,483	7	1	0	8	5,662	3	0	0	3	14,342
15	Grobogan	2	2	20	24	1,467	4	0	0	4	2,909	6	0	0	6	35,761
16	Blora	18	8	9	35	4,905	2	0	0	2	1,258	1	0	0	1	1,081
17	Rembang	27	25	16	68	7,452	3	1	0	4	2,258	1	0	0	1	1,590
18	Pati	37	52	121	210	12,505	7	3	0	10	6,064	7	0	0	7	21,805
19	Kudus	6	3	99	108	3,817	1	0	0	1	574	3	0	0	3	10,003
20	Jepara	10	3	332	345	10,279	5	0	0	5	3,814	0	0	1	1	1,379
21	Demak	1	0	0	1	366	1	0	0	1	986	9	0	0	9	52,928
22	Semarang	18	9	202	229	8,289	6	0	0	6	4,450	0	0	0	0	0
23	Temanggung	19	102	104	225	11,420	2	0	0	2	1,527	0	0	0	0	0
24	Kendal	5	3	142	150	4,405	0	0	0	0	0	6	0	0	6	16,943
25	Batang	15	6	217	238	11,319	4	1	0	5	4,288	2	0	0	2	2,444
26	Pekalongan	8	0	80	88	5,250	1	0	0	1	555	6	0	0	6	15,853
27	Pemalang	5	3	66	74	4,531	1	0	0	1	989	7	0	0	7	23,354
28	Tegal	4	1	68	73	4,536	4	0	0	4	2,623	6	0	0	6	29,889
29	Brebes	19	20	175	214	37,970	3	0	0	3	1,917	4	0	0	4	13,894
30	Kota Magelang	1	0	0	1	280	0	0	0	0	0	0	0	0	0	0
31	Kota Surakarta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32	Kota Salatiga	2	0	3	5	466	1	0	0	1	585	1	0	0	1	2,294
33	Kota Semarang	12	0	18	30	1,777	0	0	0	0	0	0	0	0	0	0
34	Kota Pekalongan	0	0	0	0	0	3	0	0	3	1,978	0	0	0	0	0
35	Kota Tegal	1	0	0	1	461	0	0	0	0	0	0	0	0	0	0
	Total	505	738	3,548	4,791	274,164	101	8	0	109	75,804	96	0	1	97	371,707

Source: Daftar Perincian Luas Baku Sawah Tiap Unit Daerah Pengairan, Dinas Pengairan Jawa Tengah

Remarks : T; Technical irrigation scheme, ST; Semi-technical irrigation scheme, SD; Simple irrigation scheme

Table A-1.4.1 Agro-demographic Conditions by Project District and Province: Central Java

(Unit: ha & %)

Province/District	Conditions in 1993 (based on 1993 Agriculture Census)															Estimated Current Conditions in 2001					
	Total Household	Farm Household		Farm Household Use Land	Farm Household Having Activities in					Farm Household by Land Control Size 1/		Land Tenure Status of Cultivated Land (ha)				Total Household	Estimated Farm Household	Total Farm Land	Total Paddy Field	Per Farm Household	
		No.	%		Paddy/ Palawija	Horti-culture	Estate Crops	Livestock	Farm Labor	< 0.5 ha	≧ 0.5 ha	Own Land	Rented-out	Rented-in	Total					Farm Land	Paddy Field
																(No.)	(No.) 2/	(ha) 3/	(ha) 3/	(ha) 4/	(ha) 4/
201 Cilacap No.	351,518	209,780	*60*	204,976	194,288	29,285	31,831	18,417	152,428	139,149	65,827	78,418	7,258	20,795	99,213	410,656	245,073	141,638	63,097	0.58	0.26
% to Total F. H. 5/		*100*		*98*	*93*	*14*	*15*	*9*	*73*	*68*	*32*	*79*		*21*	*100*						
202 Banjarnegara No.	180,130	129,359	*72*	*128,495*	108,203	45,270	29,850	21,799	57,188	74,846	53,649	60,718	4,988	11,882	72,600	207,488	149,006	82,692	16,704	0.55	0.11
% to Total F. H. 5/		*100*		*99*	*84*	*35*	*23*	*17*	*44*	*58*	*42*	*84*		*16*	*100*						
203 Kebumen No.	247,434	173,951	*70*	172,995	165,103	24,916	30,738	31,415	83,775	135,967	37,028	51,144	3,269	10,019	61,163	288,160	202,582	106,468	39,699	0.53	0.20
% to Total F. H. 5/		*100*		*99*	*95*	*14*	*18*	*18*	*48*	*79*	*21*	*84*		*16*	*100*						
204 Purworejo No.	168,524	124,481	*74*	124,295	117,798	25,511	33,306	15,265	56,825	87,421	36,874	43,588	5,391	13,958	57,546	191,055	141,124	92,229	30,151	0.65	0.21
% to Total F. H. 5/		*100*		*100*	*95*	*20*	*27*	*12*	*46*	*70*	*30*	*76*		*24*	*100*						
205 Magelang No.	239,038	158,350	*66*	158,178	146,071	56,297	49,396	40,611	71,181	125,803	32,375	42,374	5,405	12,647	55,021	284,896	188,728	93,957	37,932	0.50	0.20
% to Total F. H. 5/		*100*		*100*	*92*	*36*	*31*	*26*	*45*	*80*	*20*	*77*		*23*	*100*						
206 Boyolali No.	201,357	150,552	*75*	150,184	142,251	53,772	37,803	67,519	56,017	110,963	39,221	46,629	3,249	10,974	57,603	238,987	178,687	78,528	22,656	0.44	0.13
% to Total F. H. 5/		*100*		*100*	*94*	*36*	*25*	*45*	*37*	*74*	*26*	*81*		*19*	*100*						
207 Klaten No.	260,671	117,718	*45*	117,270	95,982	21,780	31,118	43,972	55,237	96,950	20,320	23,793	4,394	13,505	37,298	305,504	137,964	59,822	33,659	0.43	0.24
% to Total F. H. 5/		*100*		*100*	*82*	*19*	*26*	*37*	*47*	*83*	*17*	*64*		*36*	*100*						
208 Sukoharjo No.	154,821	61,336	*40*	61,261	55,299	4,677	1,715	20,648	26,507	46,018	15,243	16,868	2,323	6,832	23,700	207,488	82,201	42,318	21,298	0.51	0.26
% to Total F. H. 5/		*100*		*100*	*90*	*8*	*3*	*34*	*43*	*75*	*25*	*71*		*29*	*100*						
209 Sragen No.	199,093	131,692	*66*	131,566	122,041	18,298	7,631	43,492	88,364	94,169	37,397	42,776	7,459	15,543	58,319	227,392	150,411	82,343	39,688	0.55	0.26
% to Total F. H. 5/		*100*		*100*	*93*	*14*	*6*	*33*	*67*	*72*	*28*	*73*		*27*	*100*						
210 Grobogan No.	293,507	216,818	*74*	213,856	205,967	29,101	42,277	65,442	93,403	145,226	68,630	66,623	8,022	30,621	97,244	354,752	262,061	120,860	60,349	0.46	0.23
% to Total F. H. 5/		*100*		*99*	*95*	*13*	*19*	*30*	*43*	*68*	*32*	*69*		*31*	*100*						
211 Pati No.	286,333	155,546	*54*	146,390	121,393	19,170	16,980	50,065	104,404	90,988	55,402	62,056	8,549	27,137	89,193	320,736	174,235	116,121	58,314	0.67	0.33
% to Total F. H. 5/		*100*		*94*	*78*	*12*	*11*	*32*	*67*	*62*	*38*	*70*		*30*	*100*						
212 Kudus No.	144,102	49,308	*34*	49,003	34,510	9,815	11,930	8,789	30,835	37,836	11,167	13,665	1,915	8,468	22,133	178,528	61,088	37,793	21,545	0.62	0.35
% to Total F. H. 5/		*100*		*99*	*70*	*20*	*24*	*18*	*63*	*77*	*23*	*62*		*38*	*100*						
213 Demak No.	196,325	113,262	*58*	108,799	102,854	17,496	20,988	6,409	75,798	67,718	41,081	32,995	8,348	27,021	60,016	253,754	146,393	78,846	50,087	0.54	0.34
% to Total F. H. 5/		*100*		*96*	*91*	*15*	*19*	*6*	*67*	*62*	*38*	*55*		*45*	*100*						
214 Kendal No.	184,257	93,539	*51*	88,193	74,326	26,604	34,810	16,006	73,026	61,433	26,760	30,865	3,869	12,591	43,456	223,392	113,406	64,287	27,412	0.57	0.24
% to Total F. H. 5/		*100*		*94*	*79*	*28*	*37*	*17*	*78*	*70*	*30*	*71*		*29*	*100*						
215 Batang No.	136,660	81,046	*59*	78,233	69,325	32,128	16,852	16,937	58,671	55,773	22,460	29,393	2,446	6,414	35,807	161,504	95,780	54,328	22,501	0.57	0.23
% to Total F. H. 5/		*100*		*97*	*86*	*40*	*21*	*21*	*72*	*71*	*29*	*82*		*18*	*100*						
216 Pekalongan No.	145,745	68,085	*47*	66,429	61,354	8,461	10,731	10,184	50,798	47,899	18,530	23,324	2,188	6,977	30,301	184,880	86,367	50,782	26,214	0.59	0.30
% to Total F. H. 5/		*100*		*98*	*90*	*12*	*16*	*15*	*75*	*72*	*28*	*77*		*23*	*100*						
217 Pemalang No.	249,267	106,575	*43*	102,140	90,900	21,764	29,187	15,101	97,018	73,726	28,414	37,367	3,023	8,719	46,086	291,040	124,435	71,305	40,218	0.57	0.32
% to Total F. H. 5/		*100*		*96*	*85*	*20*	*27*	*14*	*91*	*72*	*28*	*81*		*19*	*100*						
218 Tegal No.	265,740	93,083	*35*	89,578	76,671	14,730	9,107	17,762	79,555	66,702	22,876	28,070	4,455	10,573	38,643	327,584	114,746	65,690	40,922	0.57	0.36
% to Total F. H. 5/		*100*		*96*	*82*	*16*	*10*	*19*	*85*	*74*	*26*	*73*		*27*	*100*						
219 Brebes No.	337,405	165,300	*49*	160,315	134,800	55,543	14,242	27,366	142,073	123,117	37,198	46,813	7,264	18,894	65,707	425,504	208,461	99,228	65,375	0.48	0.31
% to Total F. H. 5/		*100*		*97*	*82*	*34*	*9*	*17*	*86*	*77*	*23*	*71*		*29*	*100*						
220 Others No.	2,426,395	1,206,083	*50*	1,195,527	1,086,871	281,845	273,159	368,457	542,903	767,753	427,774	501,113	41,475	111,003	612,116	2,903,143	1,443,059	807,341	281,315	0.56	0.19
% to Total F. H. 5/		*100*		*99*	*90*	*23*	*23*	*31*	*45*	*64*	*36*	*80*		*18*	*100*						
Province Total No.	6,668,322	3,605,864	*54*	3,547,683	3,206,007	796,463	733,651	905,656	1,996,006	2,449,457	1,098,226	1,278,592	135,290	384,573	1,663,165	7,986,443	4,318,632	2,346,576	999,136	0.54	0.23
% to Total F. H. 5/		*100*		*98*	*89*	*22*	*20*	*25*	*55*	*69*	*31*	*77*		*23*	*100*						

1/: No. of farmer households by size of farmlands under control (luas lahan yang dikuasai)

2/: Estimated --- proportion (%) of farm households to total households in 1993 x total households in 2001

3/: Total farm land or paddy field in province or project districts (source: Table 3.1.16 Agricultural Land Use)

4/: Total farm land /No. of farm households estimated or total paddy field /No. of farm households estimated

5/: Proportion (%) to total farm households

Source: Sensus Pertanian 1993, BPS,Propinsi Jawa Tengah

Table A-1.4.2 Agricultural Land Use by Project District and Province in 2000: Central Java

(Unit: ha & %)

Province/District		Paddy Field										Non-paddy Farm Land			
		Irrigated Paddy Field					Non-irrigated Paddy Field				Total	Paddy Field	Home Garden 1/	Dry Land/ Garden 2/	Upland Field 3/	Total Farm Land
		Technical	Semi-technical	Non-technical	Village Irrigation	Sub-total	Rainfed Field	Tidal Irrigation	Others	Sub-total						
201 Cilacap	ha	35,572	2,930	1,962	3,590	44,054	17,850	0	1,193	19,043	63,097	63,097	43,238	34,484	819	141,638
	%	*56*	*5*	*3*	*6*	*70*	*28*	*0*	*2*	*30*	*100*	*45*	*31*	*24*	*1*	*100*
202 Banjarnegara	ha	6,690	509	3,023	1,859	12,081	3,942	0	681	4,623	16,704	16,704	15,771	50,217	0	82,692
	%	*40*	*3*	*18*	*11*	*72*	*24*	*0*	*4*	*28*	*100*	*20*	*19*	*61*	*0*	*100*
203 Kebumen	ha	19,137	3,573	2,155	994	25,859	13,825	0	15	13,840	39,699	39,699	35,543	31,226	0	106,468
	%	*48*	*9*	*5*	*3*	*65*	*35*	*0*	*0*	*35*	*100*	*37*	*33*	*29*	*0*	*100*
204 Purworejo	ha	17,557	5,240	2,512	688	25,997	3,638	0	516	4,154	30,151	30,151	14,579	43,241	4,258	92,229
	%	*58*	*17*	*8*	*2*	*86*	*12*	*0*	*2*	*14*	*100*	*33*	*16*	*47*	*5*	*100*
205 Magelang	ha	6,996	4,652	10,590	7,426	29,664	8,268	0	0	8,268	37,932	37,932	18,403	37,622	0	93,957
	%	*18*	*12*	*28*	*20*	*78*	*22*	*0*	*0*	*22*	*100*	*40*	*20*	*40*	*0*	*100*
206 Boyolali	ha	5,437	4,086	2,281	1,297	13,101	9,555	0	0	9,555	22,656	22,656	25,250	30,554	68	78,528
	%	*24*	*18*	*10*	*6*	*58*	*42*	*0*	*0*	*42*	*100*	*29*	*32*	*39*	*0*	*100*
207 Klaten	ha	18,034	11,978	2,391	0	32,403	1,256	0	0	1,256	33,659	33,659	19,840	6,323	0	59,822
	%	*54*	*36*	*7*	*0*	*96*	*4*	*0*	*0*	*4*	*100*	*56*	*33*	*11*	*0*	*100*
208 Sukoharjo	ha	14,729	2,375	1,857	0	18,961	2,337	0	0	2,337	21,298	21,298	14,881	6,139	0	42,318
	%	*69*	*11*	*9*	*0*	*89*	*11*	*0*	*0*	*11*	*100*	*50*	*35*	*15*	*0*	*100*
209 Sragen	ha	18,417	3,835	1,440	1,742	25,434	14,003	0	251	14,254	39,688	39,688	23,094	19,526	35	82,343
	%	*46*	*10*	*4*	*4*	*64*	*35*	*0*	*1*	*36*	*100*	*48*	*28*	*24*	*0*	*100*
210 Grobogan	ha	18,717	2,209	2,981	5,326	29,233	31,116	0	0	31,116	60,349	60,349	30,857	29,654	0	120,860
	%	*31*	*4*	*5*	*9*	*48*	*52*	*0*	*0*	*52*	*100*	*50*	*26*	*25*	*0*	*100*
211 Pati	ha	18,482	9,887	8,183	4,152	40,704	17,610	0	0	17,610	58,314	58,314	27,834	29,971	2	116,121
	%	*32*	*17*	*14*	*7*	*70*	*30*	*0*	*0*	*30*	*100*	*50*	*24*	*26*	*0*	*100*
212 Kudus	ha	4,203	5,756	4,231	459	14,649	6,896	0	0	6,896	21,545	21,545	9,983	6,100	165	37,793
	%	*20*	*27*	*20*	*2*	*68*	*32*	*0*	*0*	*32*	*100*	*57*	*26*	*16*	*0*	*100*
213 Demak	ha	15,680	7,770	3,327	1,793	28,570	21,517	0	0	21,517	50,087	50,087	13,192	15,567	0	78,846
	%	*31*	*16*	*7*	*4*	*57*	*43*	*0*	*0*	*43*	*100*	*64*	*17*	*20*	*0*	*100*
214 Kendal	ha	16,577	1,788	2,522	5,525	26,412	1,000	0	0	1,000	27,412	27,412	14,506	22,369	0	64,287
	%	*60*	*7*	*9*	*20*	*96*	*4*	*0*	*0*	*4*	*100*	*43*	*23*	*35*	*0*	*100*
215 Batang	ha	7,495	2,435	9,739	1,104	20,773	1,728	0	0	1,728	22,501	22,501	12,120	19,447	260	54,328
	%	*33*	*11*	*43*	*5*	*92*	*8*	*0*	*0*	*8*	*100*	*41*	*22*	*36*	*0*	*100*
216 Pekalongan	ha	14,614	1,627	3,447	2,026	21,714	4,500	0	0	4,500	26,214	26,214	12,002	12,516	50	50,782
	%	*56*	*6*	*13*	*8*	*83*	*17*	*0*	*0*	*17*	*100*	*52*	*24*	*25*	*0*	*100*
217 Pemalang	ha	26,531	2,003	817	3,261	32,612	7,606	0	0	7,606	40,218	40,218	13,045	18,002	40	71,305
	%	*66*	*5*	*2*	*8*	*81*	*19*	*0*	*0*	*19*	*100*	*56*	*18*	*25*	*0*	*100*
218 Tegal	ha	28,633	1,502	2,751	1,264	34,150	6,772	0	0	6,772	40,922	40,922	13,960	10,808	0	65,690
	%	*70*	*4*	*7*	*3*	*83*	*17*	*0*	*0*	*17*	*100*	*62*	*21*	*16*	*0*	*100*
219 Brebes	ha	30,383	11,509	5,579	2,690	50,161	14,427	0	787	15,214	65,375	65,375	16,250	17,603	0	99,228
	%	*46*	*18*	*9*	*4*	*77*	*22*	*0*	*1*	*23*	*100*	*66*	*16*	*18*	*0*	*100*
220 Others	ha	60,541	37,674	56,756	37,835	192,806	88,251	238	20	88,509	281,315	281,315	207,143	318,811	72	807,341
	%	*22*	*13*	*20*	*13*	*69*	*31*	*0*	*0*	*31*	*100*	*35*	*26*	*39*	*0*	*100*
Province Total	ha	384,425	123,338	128,544	83,031	719,338	276,097	238	3,463	279,798	999,136	999,136	581,491	760,180	5,769	2,346,576
	%	*38*	*12*	*13*	*8*	*72*	*28*	*0.0*	*0.3*	*28*	*100*	*43*	*25*	*32*	*0*	*100*

1/: Bangunan/pekarangan; 2/: Tegal/kebun; 3/: Ladang/huma; Source: Jawa Tengah (2002) Dalam Angka, BPS Central Java

Table A-1.4.3 Harvested Area and Production of Food Crops in 2002 by Project District and Province: Central Java

Province/District	Paddy		Maize		Soybeans		Mungbeans		Groundnut		Cassava		Total
	Harvested Area (ha)	Production (GKG t)	Harvested Area (ha)	Production (ton)	Harvested Area (ha)	Production (ton)	Harvested Area (ha)	Production (ton)	Harvested Area (ha)	Production (ton)	Harvested Area (ha)	Production (ton)	Harvested Area (ha)
201 Cilacap	118,670	646,649	3,718	10,932	3,891	4,957	1,546	1,421	4,420	3,923	8,006	111,971	140,251
202 Banjarnegara	22,679	116,299	25,373	76,052	112	133	88	80	4,854	5,497	16,798	238,847	69,904
203 Kebumen	64,975	348,173	3,023	8,657	3,657	4,446	4,071	4,315	10,006	9,392	11,464	161,373	97,196
204 Purworejo	52,632	264,316	1,396	4,418	1,788	2,494	84	68	1,562	1,730	6,114	86,270	63,576
205 Magelang	53,670	274,739	18,253	58,327	54	66	-	-	1,264	1,372	3,106	42,859	76,347
206 Boyolali	39,243	209,084	23,329	75,970	3,628	4,604	13	14	5,687	6,499	9,339	133,685	81,239
207 Klaten	58,634	325,101	10,144	33,395	4,175	5,640	99	105	2,685	3,068	984	14,358	76,721
208 Sukoharjo	48,586	261,429	4,282	13,127	3,972	5,217	67	73	7,590	8,934	4,794	63,822	69,291
209 Sragen	82,952	453,959	4,949	15,753	1,538	2,140	2,605	3,038	14,463	15,288	6,399	88,957	112,906
210 Grobogan	103,605	556,869	71,508	236,686	10,649	14,892	20,821	17,840	753	841	2,921	40,017	210,257
211 Pati	95,829	471,201	11,491	33,790	2,619	3,197	9,289	9,153	4,669	5,194	15,171	213,953	139,068
212 Kudus	24,244	121,422	2,124	5,715	141	180	2,400	2,217	803	894	1,468	21,250	31,180
213 Demak	87,823	457,116	10,658	32,130	7,339	10,621	23,551	25,455	402	467	910	13,148	130,683
214 Kendal	35,633	183,396	12,677	39,387	154	226	1,167	1,191	4,187	4,622	2,425	35,246	56,243
215 Batang	38,310	195,315	4,975	16,530	8	10	18	16	1,426	1,533	3,363	47,252	48,100
216 Pekalongan	43,002	214,000	7,662	21,976	111	151	572	476	423	489	916	12,507	52,686
217 Pemalang	62,689	315,067	12,412	38,640	70	81	300	320	442	482	3,027	41,706	78,940
218 Tegal	52,931	268,215	11,497	35,962	238	303	324	339	543	626	1,458	21,092	66,991
219 Brebes	83,472	437,848	10,128	27,499	4,925	7,235	2,166	2,359	539	607	3,650	51,806	104,880
220 Others	411,813	2,163,626	245,625	720,760	39,987	50,475	14,793	12,713	74,819	79,069	125,292	1,657,658	912,329
Province Total	1,581,392	8,283,824	495,224	1,505,706	89,056	117,068	83,974	81,193	141,537	150,527	227,605	3,097,777	2,618,788
%	60		19		3		3		5		9		100

Source: Statistik Tanaman Padi dan Palawija 2002 Jawa Tengah, BPS Central Java

Table A-1.4.4 Inventory on Agriculture Support Institutions and Farmers Organizations by Project District and Province: Central Java

Province/District	Food Crops Agriculture Agencies	Food Crops Extension Agencies	Extension			Food Crops Research Institute	Plant Protection Center	Seed Production & Supply				Farmer Organizations					
			No. of	No. of PPLs				Seed Farm			BPSB	KUD	Kelompok Tani (KT)				
			BPPs	Mantan	PPLs	BPTP	BPTPH	BBI	BBU	BBP		(No.)	Primary	Secondary	Middle	Advanced	Total
201 Cilacap	District agriculture services office Food security office	Dinas	No data obtained	22	No data obtained							24	122	381	1,677	170	2,350
202 Banjarnegara	District agriculture services office Food security office	Dinas		18					1 (palawija)			19	54	82	83	340	559
203 Kebumen	District agriculture services office Food security office	Dinas		22					1 (palawija)			23	688	1,051	178	15	1,932
204 Purworejo	District agriculture services office Food security office	Dinas		16								18	214	665	210	30	1,119
205 Magelang	District agriculture services office Food security office	Dinas		21				1 (horticult.)	1 (horticult.)			24	546	950	292	38	1,826
206 Boyolali	District agriculture services office Food security office	Dinas		19					1 (paddy)			21	355	400	396	225	1,376
207 Klaten	District agriculture services office Food security office	Dinas		26								34	0	60	605	343	1,008
208 Sukoharjo	District agriculture services office Food security office	Dinas		12				1 (paddy)		2 (paddy)	○	13	6	81	326	225	638
209 Sragen	District agriculture services office Food security office	Dinas		20						1 (paddy)		29	643	727	273	51	1,694
210 Grobogan	District agriculture services office Food security office	Dinas		19						1 (paddy)		24	79	348	708	463	1,598
211 Pati	District agriculture services office Food security office	Dinas		51					1 (paddy)	1 (paddy)		24	407	479	173	19	1,078
212 Kudus	District agriculture services office Food security office	Dinas		9								9	7	71	80	55	213
213 Demak	District agriculture services office Food security office	Dinas		13						2 (pad./hort.)		17	77	481	432	100	1,090
214 Kendal	District agriculture services office Food security office	Dinas		17						1 (paddy)		19	141	334	212	31	718
215 Batang	District agriculture services office Food security office	Dinas		12						2 (pad./hort.)		15	78	349	274	94	795
216 Pekalongan	District agriculture services office Food security office	Dinas		4					1 (horticult.)			17	9	611	294	17	931
217 Pemalang	District agriculture services office Food security office	Dinas		13					1 (paddy)			22	551	233	52	28	864
218 Tegal	District agriculture services office Food security office	Dinas		18				1 (palawija)		1 (paddy)		23	56	246	716	350	1,368
219 Brebes	District agriculture services office Food security office	Dinas		17								26	110	1,281	324	61	1,776
220 Others	District agriculture services office Food security office	Dinas		185		(Semarang D.)	(Semarang D.)			5		187	3,660	4,698	2,683	1,276	12,317
Province/Province Total	Provincial Food & Horticulture Crops Agriculture Services Office Food Security Mass Guidance Agency	Dinas		534				4	13	21		588	7,803	13,528	9,988	3,931	35,250

Source: Dinas Pertanian Tanaman Pangan dan Hortikultura, Jawa Tengah

Table A-1.4.5 Inventory on Farm Machinery by District in 2000: Central Java

Unit: Number

District	Hand Tractor	4 Wheel Tractor	Transplanter	Water Pump	Sprayer		Thresher		Paddy Dryer	Paddy Cleaner	Paddy Husker	Large Rice Mill	Small Rice Mill	RMU
					Hand	Motor	Pedal	Power						
1. Cilacap	2,026	0	2	539	8,424	0	96	100	1	64	242	73	362	288
2. Purbalingga	371	4	4	81	2,563	0	121	163	0	0	22	1	41	134
3. Banjarnegara	299	7	0	1,117	2,743	3	52	27	2	0	55	0	69	122
4. Kebumen	1,180	44	0	498	2,733	5	34	67	2	17	167	93	183	276
5. Purworejo	558	0	0	843	4,782	2	4,795	13	0	0	0	0	52	342
6. Wonosobo	38	0	1	2,173	7,228	940	18	8	0	1	20	6	28	106
7. Magelang	144	5	0	104	16,893	12	41	24	0	9	85	0	68	294
8. Boyolali	258	12	0	1,328	2,828	0	5,935	441	6	8	126	25	70	335
9. Klaten	813	0	0	996	5,494	77	1,507	333	0	0	116	62	41	263
10. Sukoharjo	749	1	0	1,058	4,385	304	8,566	134	0	52	115	1	185	220
11. Wonogiri	560	12	1,760	1,011	4,977	1	13,959	65	6	13	104	12	16	405
12. Karanganyar	445	0	0	596	5,797	0	6,919	21	4	2	122	17	59	345
13. Sragen	1,016	8	0	7,342	10,116	167	14,664	23	0	2	61	0	112	292
14. Grobogan	324	6	0	354	10,544	0	10,472	81	0	34	115	27	85	186
15. Blora	939	0	0	3,283	7,880	1	17,129	38	2	3	67	14	11	418
16. Rembang	167	0	0	328	2,716	0	5,087	26	0	0	0	0	55	156
17. Pati	895	36	0	2,409	8,461	519	12,653	39	0	0	65	41	0	405
18. Kudus	290	0	0	440	2,067	0	1,443	14	3	12	25	9	74	30
19. Jepara	112	2	0	270	2,030	0	1,389	3	2	0	27	0	241	34
20. Demak	660	26	0	677	9,454	2	10,721	79	2	2	167	85	71	170
21. Semarang	122	4	0	27	11,752	2	188	33	6	2	0	1	59	334
22. Temanggung	138	4	0	14	9,629	6	22	16	3	2	44	0	62	123
23. Kendal	269	0	0	190	6,815	3	1,312	32	13	1	26	43	49	167
24. Batang	297	2	2	39	2,111	404	682	73	0	24	0	0	212	15
25. Pekalongan	420	0	0	87	2,476	0	945	11	0	1	0	7	124	142
26. Pemalang	594	14	0	965	5,199	1	1,591	39	3	2	181	57	97	201
27. Tegal	685	0	22	2,551	14,544	2	247	31	0	10	160	14	204	102
28. Brebes	416	0	40	2,873	40,765	31	57	27	3	92	171	48	101	285
29. Kota Semarang	0	0	0	0	132	0	0	0	0	0	0	0	3	9
30. Others	4,882	60	114	2,838	22,867	690	507	490	7	87	523	194	984	930
Province Total	15,791	192	1,939	32,796	221,942	3,164	120,849	2,094	60	359	2,320	663	3,063	6,309
Indonesia	97,033	4,013	24,038	188,860	1,757,280	21,253	348,436	40,173	6,238	35,063	17,982	6,716	28,778	45,402

Source: Alat-alat Pertanian Menurut Propinsi dan Kabupaten di Indonesia, 2000, BPS

Table A-1.4.6 Production Features of Vegetables, Fruits, Estate Crops and Livestock in 2001: Central Java

Vegetables								
Commodity	Chilly	Carrot	French Beans	Tomato	Long Beans	Garlic	Cucumber	Shallot
Harvested Area (ha)	22,660	2,400	3,330	2,140	8,650	4,890	2,220	29,750
Production (ton)	1,212,100	261,000	221,200	138,400	326,900	383,700	172,400	2,297,200
Fruits								
Commodity	Mango	Rambutan	Salak	Durian	Citrus	Banana	Papaya	Pineapple
Harvested Area (ha)	55,800	17,700	8,200	6,200	4,400	15,300	1,700	1,300
Production (ton)	217,000	94,000	264,000	38,000	57,000	404,000	58,000	21,000
Estate Crops by Smallholders								
Commodity	Tea	Cashew Nut	Coffee	Tobacco	Kapok	Sugarcane	Clove	Coconut
Planted Area (ha)	6,540	31,700	36,090	66,790	74,510	51,210	46,980	313,380
Estate Crops by Public & Private Estate								
Commodity	Rubber	Tea	Cocoa	Coffee	Clove	Kapok	Coconut	Rambutan
Planted Area (ha)	28,810	4,150	3,830	3,730	1,470	1,450	730	390
Production (ton)	22,950	7,570	1,710	2,810	260	400	910	1,000
Livestock								
kind	Cow	Milking Cow	Buffalo	Goat	Sheep	Broiler	Egg Layer	Domestic Hen
Population	1,331,100	114,900	170,000	2,974,900	1,874,700	53,879,300	7,112,200	32,880,200

Note: Rounded figures

Source: Jawa Tengah Dalam Angka, 2001

Table A-1.5.1 WUA Establishment and Performance in Central Java

	District / Municipal	Irrigation Scheme (No.)	Irrigation Scheme and Potential Area: Established WUA and Working Area (No.)	(ha)	Approval by Bupati SSK	BSK	Registration to Local Court SBH	BBH	Performance of WUA B	SB	BB
1	Cilacap	55	220	51,569	60	160	2	218	12	180	28
2	Banyumas	191	216	19,072	117	99	2	214	21	150	45
3	Purbalingga	118	119	17,023	47	72	11	108	0	93	26
4	Banjarnegara	143	144	10,984	49	95	0	144	23	102	19
5	Kebumen	330	330	136,611	319	11	7	323	42	268	20
6	Purworejo	385	395	146,386	159	236	4	391	35	311	49
7	Wonosobo	102	102	5,701	18	84	14	88	0	82	20
8	Magelang	367	368	22,179	44	324	36	332	6	319	43
9	Boyolali	98	107	10,778	83	24	0	107	2	100	5
10	Klaten	249	250	25,445	125	125	8	242	10	181	59
11	Sukoharjo	168	166	20,258	9	157	0	166	8	116	42
12	Wonogiri	209	206	19,532	30	176	0	206	18	141	47
13	Karanganyar	394	251	22,152	125	126	0	251	1	220	30
14	Sragen	327	141	51,474	83	58	0	141	67	17	57
15	Grobogan	46	266	27,875	59	207	1	265	26	196	44
16	Blora	80	113	12,168	34	79	0	113	0	92	21
17	Rembang	74	88	9,802	20	68	0	88	0	81	7
18	Pati	324	358	36,977	75	283	0	358	23	243	92
19	Kudus	89	189	13,885	43	146	1	188	47	114	28
20	Jepara	94	118	10,496	20	98	0	118	8	93	17
21	Demak	45	236	31,672	20	216	0	236	17	190	29
22	Semarang	95	117	7,587	52	65	14	103	4	105	9
23	Temanggung	123	130	9,289	4	126	1	129	4	117	9
24	Kendal	176	176	19,708	168	8	14	162	7	110	59
25	Batang	161	161	79,472	74	87	2	159	2	93	66
26	Pekalongan	127	278	22,478	261	17	12	266	15	211	52
27	Pemalang	130	307	34,167	109	198	0	307	10	289	8
28	Tegal	339	339	37,839	172	167	9	330	56	216	66
29	Brebes	460	465	48,999	346	119	21	444	63	332	70
30	Kota Magelang	-	-	-	-	-	-	-	-	-	-
31	Kota Surakarta	-	-	-	-	-	-	-	-	-	-
32	Kota Salatiga	-	-	-	-	-	-	-	-	-	-
33	Kota Semarang	-	-	-	-	-	-	-	-	-	-
34	Kota Pekalongan	-	-	-	-	-	-	-	-	-	-
35	Kota Tegal	-	-	-	-	-	-	-	-	-	-
	Total	5,499	6,356	961,578	2,725	3,631	159	6,197	527	4,762	1,067

Source: Data pokok Pengairan 2000, January 2001, Dinas Pekerjaan Umum Pengairan Java Tengah

Remarks : SSK ; Already approved by Bupati BSK ; Not yet approved by Bupati

SBH ; Already legitimated in local courts of justice BBH ; Not yet registered to local courts of justice

B ; Developed SB ; Under developping BB ; Not yet developed

Note: Figures of Kota Magelang, Kota Surakarta, Kota Salatiga, Kota Semarang, Kota Pekalongan and Kota Tegal are included in the concerned Districts.

Table A-1.6.1 Financial Condition of District/Municipal Governments in Central Java - 1/2

	District/Municipality	Per Capita Income and Revenues in Rupiah for 2001						Actual Receipts and Expenditures in million Rupiah for 2000				
		GRDP	Own Fiscal Capacity				DAU + Contin-Gency	Total Receipt	Expenditures			Expenses for Water Resources & Irrigation Sector
			Own Source Revenue	Non-tax from Natural Resources	Share Taxes	Total			Total	Current	Develop-ment	
1	Cilacap	11,208,816	16,017	1,015	8,279	25,311	193,773	164,445	155,838	113,524	42,314	185
2	Banyumas	1,565,888	15,308	826	6,892	23,026	202,168	152,240	145,009	116,448	28,561	1,655
3	Purbalingga	1,685,539	8,678	1,229	6,804	16,711	283,197	81,968	80,414	64,149	16,265	0
4	Banjarnegara	2,194,974	7,828	1,246	6,667	15,741	251,767	89,124	89,124	72,938	16,186	130
5	Kebumen	1,693,165	8,986	859	5,551	15,396	231,984	116,454	105,555	87,059	18,496	47
6	Purworejo	2,401,363	17,108	1,692	8,057	26,857	293,760	101,780	97,982	78,342	19,640	315
7	Wonosobo	1,587,072	11,757	1,612	7,556	20,925	279,732	76,139	70,069	55,104	14,965	205
8	Magelang	2,156,507	14,540	888	5,995	21,423	225,624	112,343	103,136	83,601	19,535	299
9	Boyolali	2,532,250	15,254	1,136	7,126	23,516	234,239	103,703	98,814	78,109	20,705	87
10	Klaten	2,434,919	7,940	863	6,285	15,088	259,534	126,579	121,245	103,912	17,333	746
11	Sukoharjo	2,923,038	9,836	1,236	9,873	20,945	200,516	84,602	80,268	62,025	18,243	30
12	Wonogiri	1,928,713	16,555	1,009	5,788	23,352	244,076	113,779	105,102	85,163	19,939	666
13	Karanganyar	3,056,016	16,083	1,264	8,717	26,064	274,362	83,832	79,497	64,544	14,953	15
14	Sragen	1,943,559	11,589	1,135	7,436	20,160	251,794	96,921	91,317	75,567	15,750	10
15	Grobogan	1,150,780	8,470	1,284	6,747	16,501	191,978	109,519	98,558	81,852	16,706	113
16	Blora	1,875,459	11,013	3,981	10,318	25,312	352,208	95,643	90,798	72,095	18,703	137
17	Rembang	2,175,406	15,343	2,521	10,134	27,998	287,821	69,559	65,068	50,522	14,546	25
18	Pati	1,967,908	14,799	929	7,115	22,843	210,456	111,829	103,819	84,716	19,103	35
19	Kudus	10,415,229	28,796	1,517	9,652	39,965	258,856	77,975	72,855	58,306	14,549	144

Source: Actual Receipts and Expenditures of District/Municipality Government 1999/00 - 2000 by BPS and Decentralizing Indonesia by WB

Note: Due to the trasition period of changing fiscal year, the term of fiscal year 2000 is 9 months starting from April 1 and ending at December 31, 2000.

Table A-1.6.1 Financial Condition of District/Municipal Governments in Central Java - 2/2

District/Municipality	Per Capita Income and Revenues in Rupiah for 2001						Actual Receipts and Expenditures in million Rupiah for 2000				
	GRDP	Own Fiscal Capacity				DAU + Contin-Gency	Total Receipt	Expenditures			Expenses for Water Resources & Irrigation Sector
		Own Source Revenue	Non-tax from Natural Resources	Share Taxes	Total			Total	Current	Develop-ment	
20 Jepara	2,474,516	13,733	996	6,870	21,599	238,997	89,717	86,863	66,122	20,741	0
21 Demak	1,730,603	6,002	984	7,161	14,147	160,422	79,837	73,616	61,457	12,159	0
22 Semarang	2,988,231	78,332	1,230	10,457	90,019	230,748	93,091	83,604	65,583	18,021	833
23 Temanggung	2,235,882	10,442	1,484	7,969	19,895	274,561	74,085	69,186	53,795	15,391	0
24 Kendal	4,067,990	17,347	1,393	9,845	28,585	338,489	90,554	84,673	65,352	19,321	89
25 Batang	2,372,807	11,510	1,502	8,539	21,551	320,649	65,754	62,163	49,039	13,124	145
26 Pekalongan	2,673,060	14,614	1,273	6,589	22,476	256,973	76,628	71,571	58,610	12,961	15
27 Pemalang	1,652,377	7,264	1,474	5,664	14,402	172,732	95,971	93,491	73,807	19,684	47
28 Tegal	1,344,628	9,704	1,327	5,968	16,999	203,152	127,086	120,201	77,433	42,768	609
29 Brebes	1,576,315	8,263	1,453	5,362	15,078	160,946	122,456	119,476	94,145	25,331	76
30 Kota Magelang	5,752,876	78,917	8,232	29,787	116,936	888,017	36,066	32,866	24,959	7,907	40
31 Kota Surakarta	5,206,625	59,788	1,954	24,381	86,123	288,094	111,753	101,316	63,361	37,955	0
32 Kota Salatiga	3,371,991	48,132	6,342	25,275	79,749	512,090	36,767	29,716	22,078	7,638	15
33 Kota Semarang	8,319,093	48,893	710	31,835	81,438	189,032	222,958	203,986	140,989	62,997	0
34 Kota Pekalongan	4,223,537	17,481	3,652	16,058	37,191	315,296	41,826	39,905	23,953	15,952	0
35 Kota Tegal	2,969,404	38,179	4,042	21,360	63,581	754,550	40,506	38,432	28,498	9,934	0
Consolidated Provincial Revenue/Total	3,772,282	27,440	1,522	12,074	41,036	266,040	3,373,489	3,165,533	2,457,157	708,376	6,713

Source: Actual Receipts and Expenditures of District/Municipality Government 1999/00 - 2000 by BPS and Decentralizing Indonesia by WB

Note: Due to the trasition period of changing fiscal year, the term of fiscal year 2000 is 9 months starting from April 1 and ending at December 31, 2000.

Table A-2.3.1 Selected Irrigation Schemes : Central Java

No.	Irrigation Scheme	District	Technical Level (*1)	Registered Area (ha)	Classification of Rehabilitation (*2)
1.	Cijalu	Cilacap	T	1,377	REH
2.	Mangganti	Cilacap	T	18,895	REH
3.	Serayu	Cilacap	T	15,869	REH
4.	Banjarcahyana	Banjarnegara	T	4,859	REH
5.	Kaligending	Kebumen	T	2,981	REH
6.	Pesucen	Kebumen	T	1,666	REH
7.	Bedegolan	Kebumen	T	8,430	REH
8.	Kedung Putri	Purworejo	T	4,341	REH
9.	Sudagaran	Purworejo	T	3,665	REH
10.	Rebug	Purworejo	T	1,202	REH
11.	Kalimeneng	Purworejo	T	1,262	REH
12.	Kedung GW	Purworejo	T	1,129	REH
13.	Waduk Cengklik	Boyolali	T	1,579	REH
14.	Ploso Wareng	Klaten	T	1,100	REH
15.	Jaban	Klaten	T	1,191	REH
16.	Colo Kanan	Sragen	T	18,108	REH
17.	Bonggo	Sragen	T	1,811	REH
18.	Pangkalan	Pati	T	1,765	REH
19.	Sentul	Pati	T	1,759	REH
20.	Widodaren	Pati	T	3,652	REH
21.	Klambu Kanan	Pati	T	10,391	REH
22.	Jragung	Demak	T	4,597	REH
23.	Guntur	Demak	T	2,020	REH
24.	Klambu Kiri	Demak	T	21,419	REH
25.	Kedungdowo Kramat	Batang	T	1,250	REH
26.	Sungapan Kanan	Pemalang	T	1,851	REH
27.	Mejagong	Pemalang	T	1,997	REH
28.	Sungapan Kiri	Pemalang	T	5,229	REH
29.	Kabuyutan	Brebes	T	4,182	REH
30.	Babakan	Brebes	T	2,181	REH
31.	Kemaron Jambe	Brebes	T	1,026	REH
32.	Jengkelok	Brebes	T	6,505	REH
33.	Gung	Tegal & Kodia Tegal	T	12,999	REH
34.	Parakankidang	Tegal & Kodia Tegal	T	1,697	REH
35.	Kumisik	Tegal & Kodia Tegal	T	3,736	REH
36.	Pesantren Kletak	Pekalongan & Kodia P.	T	4,263	REH
37.	Sragi	Pekalongan & Kodia P.	T	3,540	REH
38.	Sudikampir	Pekalongan & Kodia P.	T	1,564	REH
39.	Padurekso	Pekalongan & Kodia P.	T	2,764	REH
40.	Kedung Asem	Kendal & Kodia Semarang	T	3,726	REH
41.	Bodri	Kendal & Kodia Semarang	T	8,538	REH
42.	Trompo	Kendal & Kodia Semarang	T	1,263	REH
43.	Kedung Pengilon	Kendal & Kodia Semarang	T	3,134	REH
44.	Pasekan	Magelang dan Kodia Mag.	T	1,078	REH
45.	Kosar	Batang / Pekalongan	T	1,617	REH
46.	Notog	Brebes / Tegal	T	27,682	REH
47.	Sidorejo	Grobogan / Boyolali	T	14,622	REH
48.	Glapan	Grobogan / Demak	T	18,696	REH
49.	Klambu Kanan	Grobogan / Kudus / Pati	T	6,841	REH
50.	Kaliwadas	Pekalogan / Pemalang	T	7,520	REH
	Total			**284,569**	**REH: 50**

Remarks:

*1. T : Technical
ST : Semi Technical
NT : Non Technical

*2. UPG: Upgrading
REH: Rehabilitation

Table A-4.2.1 Existing Condition of Water Resource Facility: Central Java

No.	Irrigation Scheme	District	Technical Level [1)]	Registered Area (ha)	Age of the Facilities (years)	Catchment Area (km^2)	Type of Facility	Type of Weir	Length of Weir (m)	Design Intake Discharge (m^3/s)	No. of Scouring Sluice Gate	No. of Intake Gate	Provision of Settling Basin	Provision of Inspection Bridge	Condition
1.	Cijalu	Cilacap	T	1,377	16	70	Headworks	Fixed weir	68	2.7	2	2	not provided	unknown	C
2.	Mangganti	Cilacap	T	18,895	6	2,546	Headworks	Movable weir	76	56.3	-	6	provided	provided	B
3.	Serayu	Cilacap	T	15,869	9	3,719	Headworks	Movable weir	12	32.0	-	4	provided	provided	B
4.	Banjarcahyana	Banjarnegara	T	4,859	17	1,022	Dam	-	-	11.0	-	N/A	-	-	A
5.	Kaligending	Kebumen	T	2,981	4	281	Headworks	Fixed weir	88	3.5	2	N/A	provided	not provided	B
6.	Pesucen	Kebumen	T	1,666	1	81	Headworks	Fixed weir	40	3.0	5	N/A	provided	not provided	A
7.	Bedegolan	Kebumen	T	8,430	5	211	Headworks	Fixed weir	58	13.5	2	4	provided	not provided	B
8.	Kedung Putri	Purworejo	T	4,341	15	364	Headworks	Fixed weir	53	5.5	2	3	provided	not provided	C
9.	Sudagaran	Purworejo	T	3,665	13	500	Headworks	Fixed weir	43	7.0	N/A	N/A	not provided	unknown	C
10.	Rebug	Purworejo	T	1,202	15	88	Headworks	Fixed weir	45	0.0	1	N/A	provided	provided	C
11.	Kalimeneng	Purworejo	T	1,262	19	12	Headworks	Fixed weir	36	2.0	2	2	provided	provided	C
12.	Kedung GW	Purworejo	T	1,129	64	11	Headworks	Fixed weir	68	2.0	2	2	not provided	provided	D
13.	Waduk Cengklik	Boyolali	T	1,579	3	-	Headworks	Fixed weir	40	4.7	3	2	provided	not provided	C
14.	Ploso Wareng	Klaten	T	1,100	11	-	Headworks	Fixed weir	20	1.6	1	2	provided	not provided	C
15.	Jaban	Klaten	T	1,191	11	-	Headworks	Fixed weir	13	2.7	1	1	not provided	not provided	C
16.	Colo Kanan	Sragen	T	18,108	18	2,743	Headworks	Fixed weir	112	31.6	2	5	provided	provided	C
17.	Bonggo	Sragen	T	1,811	18	66	Headworks	Fixed weir	50	1.5	1	2	provided	not provided	D
18.	Pangkalan	Pati	T	1,765	10	23	Headworks	Fixed weir	31	2.5	1	2	not provided	unknown	C
19.	Sentul	Pati	T	1,759	11	-	Headworks	Fixed weir	30	2.0	1	2	provided	unknown	C
20.	Widodaren	Pati	T	3,652	13	-	Headworks	Fixed weir	22	2.0	N/A	2	provided	unknown	B
21.	Klambu Kanan	Pati	T	10,391	11	2,854	Headworks	Fixed weir	33	9.0	N/A	N/A	provided	unknown	C
22.	Jragung	Demak	T	4,597	14	-	Headworks	Fixed weir	33	8.0	1	1	provided	provided	C
23.	Guntur	Demak	T	2,020	24	-	Headworks	Movable weir	30	3.5	-	3	provided	provided	C
24.	Klambu Kiri	Demak	T	21,419	11	2,101	Headworks	Fixed weir	100	21.0	6	4	provided	unknown	B
25.	Kedungdowo Kramat	Batang	T	1,250	27	95	Headworks	Fixed weir	50	2.1	2	1	not provided	provided	C
26.	Sungapan Kanan	Pemalang	T	1,851	3	160	Headworks	Fixed weir	72	4.0	3	4	provided	unknown	B
27.	Mejagong	Pemalang	T	1,997	11	-	Headworks	Fixed weir	50	8.0	2	2	provided	unknown	C
28.	Sungapan Kiri	Pemalang	T	5,229	3	-	Headworks	Fixed weir	72	8.5	3	4	provided	unknown	B
29.	Kabuyutan	Brebes	T	4,182	17	127	Headworks	Fixed weir	67	8.5	2	3	provided	not provided	C
30.	Babakan	Brebes	T	2,181	11	-	Headworks	Fixed weir	68	3.7	2	2	provided	not provided	C
31.	Kemaron Jambe	Brebes	T	1,026	12	145	Headworks	Fixed weir	15	3.1	1	1	provided	not provided	C
32.	Jengkelok	Brebes	T	6,505	13	206	Headworks	Fixed weir	40	8.6	1	2	provided	not provided	C
33.	Gung	Tegal & Kodia Tegal	T	12,999	5	156	Headworks	Fixed weir	65	5.4	2	2	provided	unknown	C
34.	Parakankidang	Tegal & Kodia Tegal	T	1,697	9	45	Headworks	Fixed weir	23	3.6	N/A	N/A	provided	unknown	C
35.	Kumisik	Tegal & Kodia Tegal	T	3,736	11	23	Headworks	Fixed weir	24	5.4	1	3	provided	unknown	C
36.	Pesantren Kletak	Pekalongan & Kodia P.	T	4,263	8	289	Headworks	Fixed weir	123	6.0	3	3	provided	not provided	B
37.	Sragi	Pekalongan & Kodia P.	T	3,540	29	-	Headworks	Movable weir	25	N/A	-	N/A	unknown	provided	C
38.	Sudikampir	Pekalongan & Kodia P.	T	1,564	28	289	Headworks	Fixed weir	37	1.2	1	3	provided	not provided	C
39.	Padurekso	Pekalongan & Kodia P.	T	2,764	88	106	Headworks	Fixed weir	64	6.5	2	3	provided	not provided	C
40.	Kedung Asem	Kendal & Kodia Semarang	T	3,726	13	200	Headworks	Fixed weir	45	4.9	1	1	provided	unknown	C
41.	Bodri	Kendal & Kodia Semarang	T	8,538	13	320	Headworks	Fixed weir	60	11.3	2	2	provided	provided	C
42.	Trompo	Kendal & Kodia Semarang	T	1,263	13	26	Headworks	Movable weir	15	3.5	-	2	not provided	provided	D
43.	Kedung Pengilon	Kendal & Kodia Semarang	T	3,134	13	150	Headworks	Fixed weir	25	4.0	2	2	not provided	unknown	C
44.	Pasekan	Magelang dan Kodia Mag.	T	1,078	12	73	Headworks	Fixed weir	35	1.1	2	2	provided	not provided	C
45.	Kosar	Batang / Pekalongan	T	1,617	28	199	Headworks	Fixed weir	37	6.7	1	3	provided	not provided	C
46.	Notog	Brebes / Tegal	T	27,682	31	-	Headworks	Fixed weir	85	27.0	4	7	provided	not provided	C
47.	Sidorejo	Grobogan / Boyolali	T	14,622	13	63	Headworks	Fixed weir	80	11.0	2	2	provided	provided	B
48.	Glapan	Grobogan / Demak	T	18,696	26	-	Headworks	Fixed weir	100	14.0	1	2	provided	not provided	C
49.	Klambu Kanan	Grobogan / Kudus / Pati	T	6,841	13	-	Headworks	#N/A	N/A	N/A	N/A	N/A	unknown	unknown	B
50.	Kaliwadas	Pekalogan / Pemalang	T	7,520	29	765	Headworks	Fixed weir	85	10.0	3	3	provided	provided	B
	Total			**284,569**											
	Average			5,691	16	403			51						
	Itemized Total		T : 50 ST : 0 NT : 0				dam: 1 headworks: 49 free intake: 0	fixed weir: 43 movable weir: 5 gabion weir: 0					provided: 39 not provided: 8	provided: 14 not provided: 19	A : 2 B : 12 C : 33 D : 3

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical
N/A : no information was available
Condition: A: Functioning well, B: Partially deteriorated, C: Not functioning well, D: Serious condition for operation

Source: Inventory Survey Works for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Table A-4.2.2 Problems and Constraints of Irrigation Scheme : 1. Water Resources Facility: Central Java

No.	Irrigation Scheme	District	Existing Technical Level	Registered Area (ha)			Type of Facility	Provision of Settling Basin	Year Constructed	Weir, Flood Way and Scouring Sluice										Intake for Headworks or Free Intake									O & M		Condition/Problem				Problems and Constraints: Summary		
										Civil Works							Gate and Metal Works					Civil Works				Gate and Metal Works												
				Total	Potensial Area	Non-Potential Area				W-16 Crack or damage on weir crest	W-17 Leakage from foundation and/or settlement of weir body	W-18 Incline, settlement or deflection of pier of weir	W-19 Settlement or breakage of apron	W-20 Settlement or washed away of stilling basin	W-21 Fallen down, incline or washed away of retaining wall of weir	W-22 Washed away of ripraps or blocks at downstream of stilling basin	W-23 Physical O&M problem due to overage facility	W-24 Leakage from gate leaf or guide frame	W-25 Insufficient strength against design load due to rust, decay of steel materials	W-26 Physical operational problem due to deflection	W-27 Problem on management due to lack of periodically maintenance	W-28 Insufficient diversion water due to river bed degradation	W-29 Insufficient diversion water due to sedimentation in front of intake	W-30 Incline, settlement or deflection of intake structure	W-31 Inflow of bed loads into canal and decrease canal flow capacity	W-32 Leakage from intake gate(s) or guide frame	W-33 Insufficient strength against design load due to rust, decay of steel materials	W-34 Physical operational problem due to deflection/ trouble	W-35 Problem on management due to lack of periodically maintenance	W-36 Overage, Lower strength of intake gate(s)	W-37 Difficulty on O & M due to facility problem	W-38 Difficulty on proper water distribution/discharge measurement	A Fully functioning	B Partly deteriorated, but functioning in a satisfactory range	C Not functioning well and/or affecting the downstream flow	D Serious condition for operation, replace and reconstruction is needed			
1.	Cijalu	Cilacap	T	1,377	1,377	0	Headworks	Not provided	1987	B	B	B	B	C	C	C	B	C	C	C	C	A	C	B	C	C	C	C	C	C	C	1	6	16	0	26	28	34
2.	Mangganti	Cilacap	T	18,895	18,895	0	Headworks	Provided	1997	B	B	B	B	B	B	B	B	C	C	C	C	A	B	B	B	B	B	B	C	B	B	B	1	17	5	0	27	35	
3.	Serayu	Cilacap	T	15,869	15,869	0	Headworks	Provided	1994	A	A	A	A	A	A	A	A	B	B	B	B	A	A	A	A	B	B	B	B	B	B	B	11	12	0	0	29		
4.	Banjarcahyana	Banjarnegara	T	4,859	4,859	0	Dam	-	1986	N.A. (Dam)																							A	A	6	5	0	0	Function well		
5.	Kaligending	Kebumen	T	2,981	2,981	0	Headworks	Provided	1986/99	A	A	A	A	B	B	B	A	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	6	17	0	0	27	28	
6.	Pesucen	Kebumen	T	1,666	1,666	0	Headworks	Provided	1998/02	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	21	2	0	0	Function well		
7.	Bedegolan	Kebumen	T	8,430	8,430	0	Headworks	Provided	1998	A	A	A	A	A	A	A	A	B	B	B	B	A	B	B	A	B	B	B	B	B	B	B	10	13	0	0	29	35	
8.	Kedung Putri	Purworejo	T	4,341	4,341	0	Headworks	Provided	1937/88	B	B	B	B	B	B	B	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	8	14	0	27	29	38
9.	Sudagaran	Purworejo	T	3,665	3,665	0	Headworks	Not provided		B	B	B	B	B	C	C	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	27	31	38
10.	Rebug	Purworejo	T	1,202	1,202	0	Headworks	Provided	1977/88	B	B	B	B	B	C	C	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	21	29	38
11.	Kalimeneng	Purworejo	T	1,262	1,262	0	Headworks	Provided	1940/84	B	B	B	B	B	B	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	24	29	35
12.	Kedung GW	Purworejo	T	1,129	1,129	0	Headworks	Not provided	1939	C	C	C	C	C	C	C	C	D	D	D	D	A	C	C	C	D	D	D	D	D	C	C	1	0	13	9	27	31	33
13.	Waduk Cengklik	Boyolali	T	1,579	1,579	0	Headworks	Provided	2000	B	B	B	B	B	B	B	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	8	14	0	27	29	35
14.	Ploso Wareng	Klaten	T	1,100	1,100	0	Headworks	Provided	1992	B	B	B	B	B	B	B	B	C	C	C	C	A	B	B	B	C	C	C	C	C	C	C	1	11	11	0	27	33	38
15.	Jaban	Klaten	T	1,191	1,191	0	Headworks	Not provided	1992	B	B	B	B	B	B	B	B	C	C	C	C	A	B	B	B	C	C	C	C	C	C	C	1	11	11	0	27	31	38
16.	Colo Kanan	Sragen	T	18,108	18,108	0	Headworks	Provided	1985	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	22	27	37
17.	Bonggo	Sragen	T	1,811	1,811	0	Headworks	Provided	1836/85	C	C	C	C	D	D	D	D	D	D	D	D	A	D	C	C	D	D	D	D	D	D	D	1	0	6	16	22	29	37
18.	Pangkalan	Pati	T	1,765	1,765	0	Headworks	Not provided	1993	B	B	B	B	B	B	B	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	8	14	0	27	29	37
19.	Sentul	Pati	T	1,759	1,759	0	Headworks	Provided	1992	B	B	B	B	B	B	B	B	C	C	C	C	A	C	B	B	C	C	C	C	C	C	C	1	10	12	0	27	29	37
20.	Widodaren	Pati	T	3,652	3,652	0	Headworks	Provided	1990	A	A	A	A	B	B	B	A	C	C	C	C	A	C	B	B	C	C	C	C	C	B	C	6	6	11	0	27	29	35
21.	Klambu Kanan	Pati	T	10,391	10,391	0	Headworks	Provided	1992	C	C	C	C	C	C	C	C	C	C	C	C	A	B	B	C	C	C	C	C	C	B	C	1	3	19	0	22	31	38
22.	Jragung	Demak	T	4,597	4,597	0	Headworks	Provided	1989	C	C	C	C	C	C	C	C	C	C	C	D	A	C	B	C	C	C	C	C	C	C	C	1	1	20	1	27	29	37
23.	Guntur	Demak	T	2,020	2,020	0	Headworks	Provided	1979	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	22	27	29
24.	Klambu Kiri	Demak	T	21,419	21,419	0	Headworks	Provided	1992	A	A	A	A	A	A	B	A	B	B	B	B	A	C	A	A	B	B	B	B	B	B	B	10	12	1	0	29	0	0
25.	Kedungdowo Kramat	Batang	T	1,250	1,250	0	Headworks	Not provided	1976	C	C	C	C	C	C	C	C	C	C	C	D	A	C	B	B	C	C	C	C	C	C	C	1	2	19	1	27	29	37
26.	Sungapan Kanan	Pemalang	T	1,851	1,851	0	Headworks	Provided	2000	A	A	A	A	A	A	A	A	B	B	B	B	A	C	B	B	B	B	B	B	B	B	B	9	13	1	0	29	0	0
27.	Mejagong	Pemalang	T	1,997	1,997	0	Headworks	Provided	1974/92	B	B	B	B	B	C	C	B	C	C	C	C	A	C	B	C	C	C	C	C	C	C	C	1	6	16	0	22	27	29
28.	Sungapan Kiri	Pemalang	T	5,229	5,229	0	Headworks	Provided	2000	B	B	B	B	B	B	B	B	C	C	C	C	A	B	B	C	C	C	C	C	C	C	C	1	10	12	0	27	31	0
29.	Kabuyutan	Brebes	T	4,182	4,182	0	Headworks	Provided	1986	B	B	B	B	B	B	B	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	8	14	0	27	29	36
30.	Babakan	Brebes	T	2,181	2,181	0	Headworks	Provided	1936/92	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	25	29	37
31.	Kemaron Jambe	Brebes	T	1,026	1,026	0	Headworks	Provided	1991	B	B	B	B	B	C	C	B	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	22	29	37
32.	Jengkelok	Brebes	T	6,505	6,505	0	Headworks	Provided	1990	B	B	B	B	B	B	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	22	27	29
33.	Gung	Tegal & Kodia Tegal	T	12,999	12,999	0	Headworks	Provided	1991/98	B	B	B	B	B	B	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	6	16	0	22	29	37
34.	Parakankidang	Tegal & Kodia Tegal	T	1,697	1,697	0	Headworks	Provided	1994	B	B	B	B	B	B	C	C	C	C	C	C	A	C	B	B	B	B	B	B	B	B	C	1	14	8	0	22	29	37
35.	Kumisik	Tegal & Kodia Tegal	T	3,736	3,736	0	Headworks	Provided	1973/92	B	B	B	B	B	B	C	C	C	C	C	D	A	C	C	C	C	C	C	C	C	C	C	1	6	15	1	22	27	29
36.	Pesantren Kletak	Pekalongan & Kodia P.	T	4,263	4,263	0	Headworks	Provided	1918/95	A	A	A	A	A	A	B	B	B	B	B	B	A	C	B	B	B	B	B	B	B	B	B	7	15	1	0	29	0	0
37.	Sragi	Pekalongan & Kodia P.	T	3,540	3,540	0	Headworks	Unknown	1974	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	22	27	29
38.	Sudikampir	Pekalongan & Kodia P.	T	1,564	1,564	0	Headworks	Provided	1931/75	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	26	29	37
39.	Padurekso	Pekalongan & Kodia P.	T	2,764	2,764	0	Headworks	Provided	1915	C	C	C	C	C	D	D	D	D	D	D	D	A	C	C	C	C	D	D	D	D	D	D	1	0	9	13	23	27	37
40.	Kedung Asem	Kendal & Kodia Semarang	T	3,726	3,726	0	Headworks	Provided	1990	B	B	B	B	B	B	C	C	C	C	C	C	A	C	B	B	C	C	C	C	C	C	C	1	8	14	0	27	29	36
41.	Bodri	Kendal & Kodia Semarang	T	8,538	8,538	0	Headworks	Provided		C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	22	29	37
42.	Trompo	Kendal & Kodia Semarang	T	1,263	1,263	0	Headworks	Not provided	1990	C	C	C	C	C	C	C	C	D	D	D	D	A	D	D	D	D	D	D	D	D	D	D	1	0	8	14	27	29	37
43.	Kedung Pengilon	Kendal & Kodia Semarang	T	3,134	3,134	0	Headworks	Not provided		C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	27	29	37
44.	Pasekan	Magelang dan Kodia Mag.	T	1,078	1,078	0	Headworks	Provided	1991	B	B	B	B	C	B	C	C	C	C	C	C	A	C	B	B	C	C	C	C	C	C	C	1	7	15	0	27	29	37
45.	Kosar	Batang / Pekalongan	T	1,617	1,617	0	Headworks	Provided	1975	C	C	C	C	C	C	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	0	22	0	23	29	37
46.	Notog	Brebes / Tegal	T	27,682	27,682	0	Headworks	Provided	1972	C	C	C	C	C	C	C	C	C	D	D	D	A	C	B	B	C	C	C	C	C	C	C	1	2	17	3	27	29	37
47.	Sidorejo	Grobogan / Boyolali	T	14,622	14,622	0	Headworks	Provided	1990	N.A. (Headworks : PLN)																							A	B	B	B	B	B	B	B	-	-	-
48.	Glapan	Grobogan / Demak	T	18,696	18,696	0	Headworks	Provided	1977	C	C	C	C	C	B	C	C	C	C	C	C	A	C	C	C	C	C	C	C	C	C	C	1	1	21	0	25	29	37
49.	Klambu Kanan	Grobogan / Kudus / Pati	T	6,841	6,841	0	Headworks	Unknown	1990	B	B	B	B	B	B	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	1	22	0	0	-	-	-
50.	Kaliwadas	Pekalogan / Pemalang	T	7,520	7,520	0	Headworks	Provided	1920/74	B	B	B	B	B	B	B	B	B	B	B	B	A	B	B	B	B	B	B	B	B	B	B	1	22	0	0	-	-	-
	Total			**284,569**	**284,569**	**0**																											**127**	**332**	**609**	**58**			

Remarks:
T : Technical
ST : Semi Technical
NT : Non Technical

Condition of Facility:
A : Function well/no rehabilitation is needed.
B : Partially deteriorated, minor rehabilitation is needed.
C : Not functioning well and affecting the operation, large scale of rehabilitation is needed.
D : Serious condition for operation, replace and reconstruction is needed.

Table A-4.2.3 Existing Condition of Irrigation Scheme : 2-1. Canals and Related Structures, Canals Works: Central Java

No.	Irrigation Scheme	District	Condition of Facility																					
			Main Canal											Secondary Canal										
			Canal								Inspection road			Canal								Inspection road		
			Length (m)			Lined			Earth	Total D	Length (m)	Condition	Evaluation of Condition	Length (m)			Lined			Earth	Total D	Length (m)	Condition	Evaluation of Condition
			Lined	Earth	Total	A	B	C	D					Lined	Earth	Total	A	B	C	D					
1.	Cijalu	Cilacap	2,000	3,331	5,331	100	600	800	500	3,331	3,831	2,026	C	C	5,300	16,142	21,442	265	1,590	2,120	1,325	16,142	17,467	15,009	D	C
2.	Manganti	Cilacap	69,687	0	69,687	13,937	27,875	20,906	6,969	0	6,969	39,722	C	C	170,000	20,500	190,500	34,000	68,000	51,000	17,000	20,500	37,500	99,060	C	C
3.	Serayu	Cilacap	4,108	91,839	95,947	822	1,643	1,232	411	91,839	92,250	49,892	D	D	4,567	111,285	115,852	913	1,827	1,370	457	111,285	111,742	52,133	D	D
4.	Banjarcahyana	Banjarnegara	24,540	16,360	40,900	0	4,908	9,816	9,816	16,360	26,176	40,900	C	C	8,730	5,820	14,550	0	1,746	3,492	3,492	5,820	9,312	9,312	C	C
5.	Kaligending	Kebumen	12,000	0	12,000	2,400	4,800	3,600	1,200	0	1,200	12,000	C	C	6,000	9,000	0	1,200	2,400	1,800	600	9,000	9,600	0	C	C
6.	Pesucen	Kebumen	224	0	224	45	90	67	22	0	22	224	B	B	9,000	8,000	17,000	1,800	3,600	2,700	900	8,000	8,900	8,500	C	C
7.	Bedegolan	Kebumen	3,500	2,730	6,230	700	1,400	1,050	350	2,730	3,080	6,230	B	B	40,500	40,760	81,260	8,100	16,200	12,150	4,050	40,760	44,810	17,065	C	C
8.	Kedung Putri	Purworejo	6,644	2,656	9,300	332	1,993	2,658	1,661	2,656	4,317	9,300	C	C	3,527	1,328	4,855	176	1,058	1,411	882	1,328	2,210	2,476	C	C
9.	Sudagaran	Purworejo	1,000	3,100	4,100	50	300	400	250	3,100	3,350	2,009	C	C	16,000	25,700	41,700	800	4,800	6,400	4,000	25,700	29,700	15,012	C	C
10.	Rebug	Purworejo	0	0	0	0	0	0	0	0	0	0	-	-	6,000	13,000	19,000	0	1,200	2,400	2,400	13,000	15,400	7,980	C	D
11.	Kalimeneng	Purworejo	906	180	1,086	0	181	362	363	180	543	1,086	C	C	9,941	5,200	15,141	0	1,988	3,976	3,977	5,200	9,177	8,025	C	C
12.	Kedung GW	Purworejo	748	435	1,183	0	150	299	299	435	734	201	D	C	13,000	2,929	15,929	0	2,600	5,200	5,200	2,929	8,129	10,035	C	C
13.	Waduk Cengklik	Boyolali	1,891	2,765	4,656	378	756	567	190	2,765	2,955	4,656	C	C	11,003	17,246	28,249	2,200	4,401	3,301	1,101	17,246	18,347	28,249	C	C
14.	Ploso Wareng	Klaten	250	0	250	12	75	100	63	0	63	250	C	C	6,205	4,075	10,280	310	1,861	2,482	1,552	4,075	5,627	10,280	C	C
15.	Jaban	Klaten	3,627	400	4,027	181	1,088	1,451	907	400	1,307	4,027	C	C	9,275	3,970	13,245	463	2,783	2,783	3,246	3,970	7,216	13,245	C	C
16.	Colo Kanan	Sragen	17,816	46,684	64,500	0	3,563	7,126	7,127	46,684	53,811	64,500	C	D	110,378	9,800	120,178	0	22,076	44,151	44,151	9,800	53,951	120,178	C	C
17.	Bonggo	Sragen	600	1,200	1,800	0	120	240	240	1,200	1,440	1,800	C	C	6,508	9,570	16,078	0	1,301	2,603	2,604	9,570	12,174	16,078	C	C
18.	Pangkalan	Pati	700	0	700	140	280	210	70	0	70	700	C	C	5,650	1,152	6,802	1,130	2,260	1,695	565	1,152	1,717	2,993	C	C
19.	Sentul	Pati	1,357	1,408	2,765	271	543	407	136	1,408	1,544	1,880	C	C	5,456	8,348	13,804	1,091	2,182	1,637	546	8,348	8,894	5,107	C	C
20.	Widodaren	Pati	0	5,778	5,778	0	0	0	0	5,778	5,778	5,778	C	D	5,500	15,640	21,140	275	1,650	2,200	1,375	15,640	17,015	6,976	C	D
21.	Klambu Kanan	Pati	37,270	0	37,270	1,863	11,181	14,908	9,318	0	9,318	37,270	C	C	50,200	5,900	56,100	2,510	15,060	20,080	12,550	5,900	18,450	31,416	C	C
22.	Jragung	Demak	7,325	0	7,325	366	2,198	2,930	1,831	0	1,831	2,417	C	C	17,504	10,300	27,804	875	5,251	7,002	4,376	10,300	14,676	8,619	C	C
23.	Guntur	Demak	500	0	500	0	100	200	200	0	200	0	D	C	3,000	12,303	15,303	0	600	1,200	1,200	12,303	13,503	3,061	D	C
24.	Klambu Kiri	Demak	34,130	0	34,130	1,707	10,239	13,652	8,532	0	8,532	32,082	C	C	105,689	0	105,689	5,284	31,707	42,276	26,422	0	26,422	31,707	D	C
25.	Kedungdowo Kramat	Batang	700	2,140	2,840	0	140	280	280	2,140	2,420	937	C	C	1,200	4,330	5,530	0	240	480	480	4,330	4,810	1,991	D	D
26.	Sungapan Kanan	Pemalang	2,004	4,676	6,680	400	802	601	201	4,676	4,877	6,680	B	B	4,828	3,219	8,047	966	1,931	1,448	483	3,219	3,702	5,391	C	C
27.	Mejagong	Pemalang	218	0	218	11	65	87	55	0	55	218	C	C	1,663	16,202	17,865	83	499	665	416	16,202	16,618	9,290	C	D
28.	Sungapan Kiri	Pemalang	4,396	3,529	7,925	879	1,758	1,319	440	3,529	3,969	7,925	C	C	19,539	15,988	35,527	3,908	7,816	5,861	1,954	15,988	17,942	18,119	C	C
29.	Kabuyutan	Brebes	3,100	340	3,440	0	620	1,240	1,240	340	1,580	1,617	C	C	30,707	12,440	43,147	0	6,141	12,283	12,283	12,440	24,723	19,848	C	C
30.	Babakan	Brebes	2,547	0	2,547	127	764	1,019	637	0	637	1,197	C	C	7,360	17,140	24,500	368	2,208	2,944	1,840	17,140	18,980	4,900	C	D
31.	Kemaron Jambe	Brebes	10,000	0	10,000	500	3,000	4,000	2,500	0	2,500	10,000	C	C	17,600	6,000	23,600	880	5,280	7,040	4,400	6,000	10,400	4,956	D	C
32.	Jengkelok	Brebes	3,100	2,100	5,200	155	930	1,240	775	2,100	2,875	5,200	C	C	12,800	32,227	45,027	640	3,740	5,120	3,300	32,227	35,527	3,602	D	D
33.	Gung	Tegal & Kodia Tegal	13,500	0	13,500	2,700	5,400	4,050	1,350	0	1,350	8,640	B	C	20,000	17,000	37,000	4,000	8,000	6,000	2,000	17,000	19,000	37,000	C	C
34.	Parakan Kidang	Tegal & Kodia Tegal	1,200	510	1,710	240	480	360	120	510	630	1,710	B	B	4,400	10,290	14,690	880	1,760	1,320	440	10,290	10,730	14,690	B	B
35.	Kumisik	Tegal & Kodia Tegal	4,500	10,700	15,200	225	1,350	1,800	1,125	10,700	11,825	15,200	B	C	5,200	12,077	17,277	260	1,560	2,080	1,300	12,077	13,377	17,277	C	D
36.	Pesantren Kletak	Pekalongan & Kodia P.	1,300	12,747	14,047	260	520	390	130	12,747	12,877	9,692	C	C	14,139	24,016	38,155	2,827	5,656	4,242	1,414	24,016	25,430	19,841	C	C
37.	Sragi	Pekalongan & Kodia P.	3,626	2,967	6,593	0	725	1,450	1,451	2,967	4,418	1,516	C	C	5,703	25,303	31,006	0	1,141	2,281	2,281	25,303	27,584	4,961	C	C
38.	Sudikampir	Pekalongan & Kodia P.	2,595	7,777	10,372	0	519	1,038	1,038	7,777	8,815	3,008	C	C	4,582	7,774	12,356	0	916	1,833	1,833	7,774	9,607	10,255	C	D
39.	Padurekso	Pekalongan & Kodia P.	550	3,000	3,550	0	110	220	220	3,000	3,220	3,550	D	D	4,857	14,571	19,428	0	971	1,942	1,944	14,571	16,515	7,577	D	D
40.	Kedung Asem	Kendal & Kodia Semarang	2,500	0	2,500	125	750	1,000	625	0	625	2,250	C	C	28,854	0	28,854	1,443	8,656	11,542	7,213	0	7,213	9,233	C	C
41.	Bodri	Kendal & Kodia Semarang	3,429	0	3,429	171	1,029	1,372	857	0	857	2,195	C	C	60,499	0	60,499	3,025	18,150	24,200	15,124	0	15,124	30,250	C	C
42.	Trompo	Kendal & Kodia Semarang	1,200	0	1,200	60	360	480	300	0	300	0	D	C	10,690	0	10,690	534	3,207	4,276	2,673	0	2,673	2,031	C	C
43.	Kedung Pengilon	Kendal & Kodia Semarang	655	0	655	33	197	262	163	0	163	655	C	C	32,620	0	32,620	1,631	9,786	13,048	8,155	0	8,155	7,829	C	C
44.	Pasekan	Magelang dan Kodia Mag.	0	0	0	0	0	0	0	0	0	0	-	-	8,350	1,754	10,104	418	2,505	3,340	2,087	1,754	3,841	0	C	C
45.	Kosar	Batang / Pekalongan	1,246	4,854	6,100	0	249	498	499	4,854	5,353	2,684	C	C	9,895	34,145	44,040	0	1,979	3,958	3,958	34,145	38,103	33,911	C	C
46.	Notog	Brebes / Tegal	3,750	13,350	17,100	0	750	1,500	1,500	13,350	14,850	17,100	C	C	159,563	239,345	398,908	0	31,913	63,825	63,825	239,345	303,170	251,312	C	C
47.	Sidorejo	Grobogan / Boyolali	13,500	0	13,500	675	4,050	5,400	3,375	0	3,375	13,500	C	C	20,000	17,000	37,000	1,000	6,000	8,000	5,000	17,000	22,000	37,000	C	C
48.	Glapan	Grobogan / Demak	7,100	10,880	17,980	0	1,420	2,840	2,840	10,880	13,720	17,980	C	C	14,931	36,619	51,550	0	2,956	5,972	6,003	36,619	42,622	15,981	C	C
49.	Klambu Kanan	Grobogan / Kudus / Pati	12,619	0	12,619	631	3,786	5,048	3,154	0	3,154	11,988	C	C	45,057	5,533	50,590	2,253	13,517	18,023	11,264	5,533	16,797	29,848	C	C
50.	Kaliwadas	Pekalogan / Pemalang	7,737	9,457	17,194	0	1,547	3,095	3,095	9,457	12,552	860	D	C	38,976	31,890	70,866	0	7,795	15,590	15,591	31,890	47,481	22,677	C	C
	Total		337,895	267,893	605,788	30,496	105,404	123,570	78,425	267,893	346,318	465,253			1,212,946	942,831	2,155,777	86,508	352,464	452,742	321,232	942,831	1,264,063	1,142,285		

Remarks:
T : Technical
ST : Semi Technical
NT : Non Technical

Condition of Facility:
A : Function well/no rehabilitation is needed.
B : Partially deteriorated, minor rehabilitation is needed.
C : Not functioning well and affecting the operation, large scale of rehabilitation is needed.
D : Serious condition for operation, replace and reconstruction is needed.

A: 0
B: 4
C: 42
D: 2

A: 0
B: 1
C:41
D:10

Table A-4.2.4 Existing Condition of Irrigation Scheme : 2-2. Canals and Related Structures, Related Structures (1/2): Central Java

• Main Canal

No.	Irrigation Scheme	District	MC Q (m3/s)	Condition of Facility																																Total
				Diversion (Main body only) (Bangunan Bagi)				Off-take (Bagi Sadap)				Box Culvert (Gorong-Gorong)				Drop/Chute (Terjunan)				Bridge (Jembatan)				Spillway (Pelimpah)				Cross Drain (Gorong^2 Silang)				Others (Lain-lain)				Breakdown of Condition				
				A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
1.	Cijalu	Cilacap	1	0	1	1	1	0	12	14	8	0	2	3	1	0	14	16	11	0	0	0	0	0	0	0	0	0	0	0	0	0	4	4	2	0	33	38	23	94
2.	Mangganti	Cilacap	15	2	4	3	1	6	12	9	3	4	8	6	2	4	8	6	2	3	6	4	2	16	32	24	8	2	4	3	1	3	6	4	2	40	80	59	21	200
3.	Serayu	Cilacap	15	12	24	18	11	22	44	33	12	9	18	14	5	3	6	4	2	24	48	36	13	1	2	1	1	3	6	4	1	8	16	12	4	82	164	122	49	417
4.	Banjarcahyana	Banjarnegara	5	0	3	7	7	0	12	24	25	0	11	21	21	0	17	34	34	0	13	25	25	0	1	2	3	0	0	1	0	0	6	12	12	0	63	126	127	316
5.	Kaligending	Kebumen	3	0	1	0	0	5	10	8	2	0	0	0	0	0	2	1	0	8	17	13	5	1	3	2	1	1	2	1	1	2	3	2	1	17	38	27	10	92
6.	Pesucen	Kebumen	1.5	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0	0	4
7.	Bedegolan	Kebumen	8	1	1	1	0	1	2	2	1	0	1	1	0	0	1	1	0	1	2	2	2	0	1	0	0	1	2	2	1	0	2	0	0	4	12	9	4	29
8.	Kedung Putri	Purworejo	4	0	7	8	6	0	0	0	0	0	0	0	0	0	4	4	3	0	9	9	9	0	1	0	0	0	0	0	0	1	2	2	1	1	23	23	19	66
9.	Sudagaran	Purworejo	4	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3
10.	Rebug	Purworejo	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11.	Kalimeneng	Purworejo	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	0	0	0	0	0	0	0	0	0	2	0	0	2	5	3	10
12.	Kedung GW	Purworejo	1.2	0	0	2	1	0	0	1	1	0	0	0	0	0	0	1	0	0	1	2	2	0	0	0	0	0	0	0	0	0	0	2	0	0	1	8	4	13
13.	Waduk Cengklik	Boyolali	1.5	2	5	4	1	2	4	3	1	0	0	0	0	0	1	0	0	2	4	3	1	0	2	0	0	0	2	0	0	1	2	2	0	7	20	12	3	42
14.	Ploso Wareng	Klaten	1.2	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	3
15.	Jaban	Klaten	1.2	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0	2
16.	Colo Kanan	Sragen	25	0	8	17	17	0	6	12	13	0	4	8	8	0	9	19	18	0	22	43	43	0	7	15	15	0	29	58	58	0	6	12	12	0	91	184	184	459
17.	Bonggo	Sragen	1.5	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	4	1	5
18.	Pangkalan	Pati	0.8	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	4
19.	Sentul	Pati	2	2	4	2	1	0	1	1	1	0	0	0	0	0	0	0	0	1	3	2	1	0	0	0	0	0	1	0	0	1	2	2	1	4	11	7	4	26
20.	Widodaren	Pati	1.5	0	5	6	4	0	2	2	2	0	0	0	0	0	1	2	1	0	2	3	2	0	0	0	0	0	0	0	0	0	2	2	2	0	12	15	11	38
21.	Klambu Kanan	Pati	8	0	4	5	3	0	7	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	1	2	1	0	12	15	10	37
22.	Jragung	Demak	5	0	1	0	0	0	3	4	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	5	5	3	13
23.	Guntur	Demak	2	0	1	2	2	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	1	1	0	1	6	4	11
24.	Klambu Kiri	Demak	25	0	5	5	3	0	10	11	7	0	4	4	3	0	1	1	1	0	37	43	27	0	1	1	1	0	0	1	0	0	6	7	4	0	64	73	46	183
25.	Kedungdowo Kramat	Batang	1	0	1	3	2	0	0	2	1	0	0	0	0	0	1	3	2	0	1	2	2	0	0	1	0	0	0	1	1	0	0	1	1	0	3	13	9	25
26.	Sungapan Kanan	Pemalang	2.5	0	1	1	0	1	2	2	1	1	2	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	1	1	0	2	8	7	1	18
27.	Mejagong	Pemalang	2.5	0	1	2	1	0	2	3	2	0	4	5	2	0	1	1	1	0	0	0	0	0	0	0	0	0	2	3	3	0	1	2	1	0	11	16	10	37
28.	Sungapan Kiri	Pemalang	6	1	2	1	0	1	2	1	0	1	1	1	0	0	1	1	0	2	4	3	2	0	1	0	0	0	0	0	0	0	2	1	0	5	13	8	2	28
29.	Kabuyutan	Brebes	5	0	4	8	7	0	1	2	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	1	0	0	0	0	0	1	1	1	0	6	13	10	29
30.	Babakan	Brebes	3	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	3	1	5
31.	Kemaron Jambe	Brebes	2	0	1	2	1	0	2	2	2	0	3	3	2	0	3	4	2	0	1	1	1	0	1	0	0	0	0	0	0	0	1	1	1	0	12	13	9	34
32.	Jengkelok	Brebes	8	0	1	2	1	0	0	1	0	0	0	1	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1	0	0	3	6	1	10
33.	Gung	Tegal & Kodia Tegal	15	1	2	1	0	1	2	1	0	0	0	0	0	2	4	3	2	0	3	4	2	0	0	0	0	0	0	0	0	0	2	1	0	4	13	10	4	31
34.	Parakankidang	Tegal & Kodia Tegal	2	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	5	0	0	5
35.	Kumisik	Tegal & Kodia Tegal	4	0	1	0	0	0	6	7	4	0	2	3	2	0	5	5	3	0	2	3	1	0	1	1	0	0	0	0	0	0	2	2	1	0	19	21	11	51
36.	Pesantren Kletak	Pekalongan & Kodia P.	4	1	1	1	0	1	2	2	1	1	2	1	0	0	1	1	0	3	6	5	2	0	0	0	0	0	0	0	0	0	2	1	0	6	14	11	3	34
37.	Sragi	Pekalongan & Kodia P.	4	0	1	2	2	0	1	3	2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	1	1	0	0	0	0	0	0	1	1	0	2	9	7	18
38.	Sudikampir	Pekalongan & Kodia P.	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39.	Padurekso	Pekalongan & Kodia P.	3.5	0	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	2	0	0	1	0	0	2	5	3	10
40.	Kedung Asem	Kendal & Kodia Semarang	3.5	0	2	3	1	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	5	2	10
41.	Bodri	Kendal & Kodia Semarang	6	0	1	2	1	0	2	3	2	0	3	3	2	0	2	2	1	0	5	8	5	0	0	0	0	0	0	0	0	0	1	2	1	0	14	20	12	46
42.	Trompo	Kendal & Kodia Semarang	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	3
43.	Kedung Pengilon	Kendal & Kodia Semarang	2	0	2	2	1	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	5	8	3	16
44.	Pasekan	Magelang dan Kodia Mag.	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45.	Kosar	Batang / Pekalongan	4	0	1	1	1	0	1	3	3	0	0	0	0	0	0	1	1	0	1	1	1	0	0	1	1	0	0	0	0	0	0	2	0	0	3	9	7	19
46.	Notog	Brebes / Tegal	30	0	0	1	1	0	0	1	1	0	0	0	0	0	0	1	0	0	0	1	0	0	1	2	1	0	0	0	0	0	0	1	0	0	1	7	3	11
47.	Sidorejo	Grobogan / Boyolali	6	0	7	8	6	0	4	5	3	0	5	7	4	0	1	1	0	0	10	14	11	0	3	4	2	0	3	3	2	0	10	12	8	0	43	54	36	133
48.	Glapan	Grobogan / Demak	12	0	3	2	0	0	6	4	0	0	1	1	0	0	2	0	0	0	29	0	0	0	2	2	0	0	4	1	0	0	0	5	0	0	47	15	0	62
49.	Klambu Kanan	Grobogan / Kudus / Pati	6	0	6	0	0	0	2	0	0	0	0	0	0	0	1	0	0	0	15	0	0	0	1	0	0	0	0	0	0	0	1	2	0	0	26	2	0	28
50.	Kaliwadas	Pekalogan / Pemalang	10	0	6	5	0	0	5	9	0	0	0	0	0	0	0	0	0	0	10	8	0	0	0	0	0	0	0	0	0	0	1	2	1	0	22	24	1	47
	Total			**22**	**127**	**134**	**87**	**40**	**170**	**187**	**109**	**16**	**71**	**87**	**52**	**9**	**88**	**113**	**85**	**44**	**256**	**243**	**163**	**18**	**62**	**62**	**36**	**7**	**57**	**81**	**70**	**16**	**89**	**117**	**59**	**172**	**920**	**1,024**	**661**	**2,777**

Remarks:
T : Technical
ST : Semi Technical
NT : Non Technical

Condition of Facility:
A : Function well/no rehabilitation is needed.
B : Partially deteriorated, minor rehabilitation is needed.
C : Not functioning well and affecting the operation, large scale of rehabilitation is needed.
D : Serious condition for operation, replace and reconstruction is needed.

Table A-4.2.5 Existing Condition of Irrigation Scheme : 2-2. Canals and Related Structures, Related Structures (2/2): Central Java

• Secondary Canal

No.	Irrigation Scheme	District	SC Q (m3/s)	Condition of Facility																																Total
				Diversion (Main body only) (Bangunan Bagi)				Off-take (Bagi Sadap)				Box Culvert (Gorong-Gorong)				Drop/Chute (Terjunan)				Bridge (Jembatan)				Spillway (Pelimpah)				Cross Drain (Gorong^2 Silang)				Others (Lain-lain)				Breakdown of Condition				
				A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D	
1.	Cijalu	Cilacap	0.5	0	1	1	0	0	18	20	12	0	7	8	5	0	28	32	20	0	7	8	5	0	4	4	2	0	4	4	2	0	8	8	4	0	77	85	50	212
2.	Mangganti	Cilacap	3	1	2	1	1	9	18	14	4	6	12	9	3	4	8	6	2	6	12	9	3	4	8	6	2	2	4	3	1	3	6	4	2	35	70	52	18	175
3.	Serayu	Cilacap	3	10	20	15	6	37	74	55	18	22	44	33	7	0	0	0	0	13	26	19	7	0	0	0	0	16	32	24	20	6	12	9	3	104	208	155	61	528
4.	Banjarcahyana	Banjarnegara	2	2	3	2	2	8	15	12	3	0	2	1	0	6	12	10	6	2	4	3	2	0	1	0	0	1	3	2	1	2	4	3	1	21	44	33	15	113
5.	Kaligending	Kebumen	1	0	1	2	0	0	0	0	0	0	3	6	9	0	0	1	1	0	9	18	18	0	0	1	0	0	0	0	0	0	1	3	3	0	14	31	31	76
6.	Pesucen	Kebumen	1	8	16	12	3	0	0	0	0	0	0	0	0	2	4	3	1	5	9	8	2	0	1	1	0	0	0	0	0	15	30	22	8	30	60	46	14	150
7.	Bedegolan	Kebumen	2	4	7	5	2	25	50	38	12	0	6	12	11	3	7	5	2	14	27	20	7	0	1	1	0	2	4	3	1	5	10	8	2	53	112	92	37	294
8.	Kedung Putri	Purworejo	1.5	8	16	11	4	14	27	21	7	0	0	0	0	15	30	22	8	16	32	24	8	1	2	1	0	0	0	0	0	5	10	8	2	59	117	87	29	292
9.	Sudagaran	Purworejo	1.5	0	4	5	2	0	12	14	9	0	2	2	0	0	0	0	0	0	9	10	6	0	1	2	1	0	0	0	0	0	3	3	2	0	31	36	20	87
10.	Rebug	Purworejo	0.5	0	1	1	1	0	6	7	5	0	0	0	0	0	1	1	0	0	3	4	2	0	1	1	0	0	1	1	0	0	1	2	1	0	14	17	9	40
11.	Kalimeneng	Purworejo	0.5	0	1	2	1	0	4	8	9	0	3	6	6	0	0	1	1	0	15	30	31	0	1	2	1	0	1	2	1	0	2	6	5	0	27	57	55	139
12.	Kedung GW	Purworejo	0.5	0	5	10	11	0	5	11	11	0	0	1	1	0	0	1	1	0	11	22	22	0	0	0	0	0	0	0	0	0	2	5	5	0	23	50	51	124
13.	Waduk Cengklik	Boyolali	0.5	0	6	12	11	0	7	15	14	0	0	0	0	0	0	0	1	0	18	37	37	0	0	0	0	0	3	4	6	0	4	8	8	0	38	76	77	191
14.	Ploso Wareng	Klaten	0.5	1	2	2	1	8	15	11	3	0	5	10	10	0	4	2	0	2	4	3	2	0	1	0	0	0	0	0	0	2	4	3	1	13	35	31	17	96
15.	Jaban	Klaten	0.5	0	2	3	2	0	15	17	11	0	3	4	2	0	9	10	6	0	15	17	11	0	0	1	0	0	0	0	0	0	5	6	3	0	49	58	35	142
16.	Colo Kanan	Sragen	4	0	2	3	3	0	14	16	10	0	11	12	7	0	7	8	5	0	0	0	0	0	0	0	0	0	11	12	7	0	14	16	10	0	59	67	42	168
17.	Bonggo	Sragen	0.5	0	3	7	7	0	14	16	8	0	9	18	17	0	4	8	9	0	4	7	7	0	1	3	3	0	0	0	0	0	3	6	6	0	38	65	57	160
18.	Pangkalan	Pati	0.5	0	3	7	6	0	1	0	0	0	3	6	6	0	0	3	2	0	1	3	1	0	1	3	2	0	0	2	2	0	1	3	2	0	10	27	21	58
19.	Sentul	Pati	0.5	3	6	4	3	2	4	3	3	0	1	1	1	1	2	1	1	3	7	5	2	0	0	0	0	0	0	0	0	1	2	2	1	10	22	16	11	59
20.	Widodaren	Pati	0.5	0	0	0	0	0	7	8	5	0	1	2	1	0	5	6	4	0	7	8	5	0	0	0	0	0	2	3	1	0	2	3	2	0	24	30	18	72
21.	Klambu Kanan	Pati	2	0	4	5	3	0	24	27	17	0	0	0	0	0	0	0	0	0	26	30	18	0	0	0	0	0	0	0	0	0	6	6	4	0	60	68	42	170
22.	Jragung	Demak	2	0	2	2	2	0	9	10	6	0	9	11	7	0	6	6	4	0	0	0	0	0	0	1	1	0	1	2	1	0	3	4	3	0	30	36	24	90
23.	Guntur	Demak	0.5	0	5	10	9	0	3	6	5	0	0	1	0	0	0	0	0	0	3	5	5	0	0	0	0	0	0	0	0	0	1	2	2	0	12	24	21	57
24.	Klambu Kiri	Demak	4	0	5	6	3	0	46	52	32	0	8	9	6	0	0	1	1	0	51	58	37	0	0	0	0	0	0	0	0	0	10	12	8	0	120	138	87	345
25.	Kedungdowo Kramat	Batang	0.5	0	1	3	2	0	2	4	5	0	0	1	0	0	0	0	0	0	1	3	3	0	0	0	0	0	1	2	2	0	0	2	1	0	5	15	13	33
26.	Sungapan Kanan	Pemalang	1	0	1	1	0	1	2	1	1	1	2	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	2	1	0	0	2	1	0	2	10	5	2	19
27.	Mejagong	Pemalang	1	0	1	2	1	0	10	11	17	0	0	0	0	0	3	4	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	1	0	16	19	21	56
28.	Sungapan Kiri	Pemalang	2	1	2	2	1	7	13	10	3	0	1	1	0	0	0	0	0	11	23	17	6	0	0	0	0	0	0	0	0	2	4	3	1	21	43	33	11	108
29.	Kabuyutan	Brebes	1.5	0	11	22	21	0	10	20	20	0	0	0	0	0	0	1	0	0	4	7	7	0	1	1	1	0	0	0	0	0	3	5	5	0	29	56	54	139
30.	Babakan	Brebes	1	0	1	1	0	0	10	11	7	0	0	0	0	0	2	2	1	0	4	5	3	0	1	1	0	0	0	0	0	0	2	2	1	0	20	22	12	54
31.	Kemaron Jambe	Brebes	0.5	0	9	11	7	0	0	0	0	0	0	0	0	0	12	14	9	0	2	3	2	0	3	4	2	0	0	0	0	0	3	3	2	0	29	35	22	86
32.	Jengkelok	Brebes	2	0	14	16	9	0	13	15	10	0	1	1	0	0	6	7	4	0	17	19	12	0	0	0	0	0	3	5	3	0	6	6	4	0	60	69	42	171
33.	Gung	Tegal & Kodia Tegal	3	2	4	3	2	12	24	18	6	8	17	13	5	2	4	4	1	4	8	6	2	0	1	0	0	0	0	0	0	3	6	5	1	31	64	49	17	161
34.	Parakankidang	Tegal & Kodia Tegal	0.5	0	1	0	0	1	3	2	1	0	4	5	3	7	15	11	4	0	0	0	0	0	1	1	0	0	0	0	0	1	2	2	1	9	26	21	9	65
35.	Kumisik	Tegal & Kodia Tegal	1	0	2	2	2	0	5	5	3	0	0	0	0	0	0	0	0	0	3	4	2	0	0	0	0	0	0	0	0	0	1	1	1	0	11	12	8	31
36.	Pesantren Kletak	Pekalongan & Kodia P.	1	0	1	1	0	6	12	9	4	2	3	2	1	0	1	1	0	0	25	28	18	0	0	0	0	0	0	0	0	1	5	4	2	9	47	45	25	126
37.	Sragi	Pekalongan & Kodia P.	1	0	0	2	1	0	3	6	5	0	0	2	1	0	1	3	3	0	1	3	3	0	0	0	0	0	0	0	0	0	1	2	1	0	6	18	14	38
38.	Sudikampir	Pekalongan & Kodia P.	0.5	0	0	1	0	0	2	3	3	0	2	4	4	0	0	1	1	0	2	5	5	0	0	1	1	0	0	0	0	0	1	2	1	0	7	17	15	39
39.	Padurekso	Pekalongan & Kodia P.	1	0	2	3	3	0	3	6	5	0	0	0	0	0	3	6	5	0	2	5	4	0	0	0	0	0	9	19	19	0	2	4	4	0	21	43	40	104
40.	Kedung Asem	Kendal & Kodia Semarang	1	0	2	3	2	0	18	20	13	0	0	0	0	0	5	6	4	0	18	20	14	0	1	1	0	0	3	4	3	0	5	6	3	0	52	60	39	151
41.	Bodri	Kendal & Kodia Semarang	2	0	1	2	1	0	20	23	14	0	1	2	1	0	5	6	3	0	20	22	14	0	0	0	0	0	0	0	0	0	5	6	3	0	52	61	36	149
42.	Trompo	Kendal & Kodia Semarang	0.5	0	0	0	0	0	4	5	3	0	0	1	0	0	0	0	0	0	9	10	6	0	0	0	0	0	0	0	0	0	1	2	1	0	14	18	10	42
43.	Kedung Pengilon	Kendal & Kodia Semarang	0.5	0	0	0	0	0	25	29	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	2	0	27	32	20	79
44.	Pasekan	Magelang dan Kodia Mag.	0.5	0	1	2	1	0	26	30	19	0	2	2	1	0	22	25	18	0	7	8	5	0	2	2	1	0	0	0	0	0	6	7	4	0	66	76	49	191
45.	Kosar	Batang / Pekalongan	1	0	2	3	2	0	12	13	8	0	3	7	6	0	1	2	2	0	17	34	33	0	0	2	1	0	0	0	0	0	3	6	7	0	38	67	59	164
46.	Notog	Brebes / Tegal	6	0	5	11	10	0	33	67	66	0	0	0	0	0	13	26	26	0	23	46	46	0	17	34	32	0	0	0	0	0	9	19	19	0	100	203	199	502
47.	Sidorejo	Grobogan / Boyolali	2	0	21	24	16	0	20	41	41	0	15	17	10	0	6	7	5	0	15	18	11	0	0	0	0	0	7	8	5	0	10	12	7	0	94	127	95	316
48.	Glapan	Grobogan / Demak	2.5	0	32	2	0	0	30	25	0	0	0	1	0	0	2	1	0	0	74	0	0	0	2	1	0	0	1	6	0	0	6	7	5	0	147	43	5	195
49.	Klambu Kanan	Grobogan / Kudus / Pati	2	0	6	0	0	0	29	29	0	0	0	0	0	0	0	0	0	0	27	27	0	0	2	0	0	0	0	0	0	0	4	5	3	0	68	61	3	132
50.	Kaliwadas	Pekalogan / Pemalang	2.5	0	4	2	0	0	34	30	0	0	4	2	0	0	0	0	0	0	20	15	0	0	3	2	0	0	0	0	0	0	2	5	5	0	67	56	5	128
	Total			**40**	**241**	**247**	**164**	**130**	**751**	**814**	**476**	**39**	**184**	**214**	**132**	**40**	**228**	**254**	**163**	**76**	**622**	**653**	**434**	**5**	**58**	**77**	**50**	**21**	**92**	**107**	**75**	**46**	**237**	**274**	**173**	**397**	**2,413**	**2,640**	**1,667**	**7,117**

Remarks:
T : Technical
ST : Semi Technical
NT : Non Technical

Condition of Facility:
A : Function well/no rehabilitation is needed.
B : Partially deteriorated, minor rehabilitation is needed.
C : Not functioning well and affecting the operation, large scale of rehabilitation is needed.
D : Serious condition for operation, replace and reconstruction is needed.

Table A-4.2.6 Irrigation Facility Provision Ratio of Present Irrigation System: Central Java

No.	Irrigation Scheme	District	Technical Level [1]	Subject Area (ha)	Age of the Facilities (years)	Density of Canal (m/ha)			Lined Canal Provision Ratio			Inspection Road Provision Ratio			Structure Provision Ratio (m/nos)		
						MC	SC	Total	MC	SC	Total	MC	SC	Total	MC	SC	Total
1.	Cijalu	Cilacap	T	1,377	16	3.9	12.1	16.0	38%	3%	11%	38%	90%	77%	57	79	72
2.	Mangganti	Cilacap	T	18,895	6	3.1	8.4	11.5	100%	89%	92%	57%	52%	54%	410	929	694
3.	Serayu	Cilacap	T	15,869	9	4.6	5.6	10.2	4%	4%	4%	52%	43%	47%	314	181	224
4.	Banjarcahyana	Banjarnegara	T	4,859	17	8.2	2.9	11.1	60%	60%	60%	100%	64%	91%	129	129	129
5.	Kaligending	Kebumen	T	2,981	4	4.1	5.1	9.2	100%	40%	67%	100%	100%	100%	130	197	161
6.	Pesucen	Kebumen	T	1,666	1	0.1	10.2	10.4	100%	53%	54%	100%	50%	51%	56	113	112
7.	Bedegolan	Kebumen	T	8,430	5	0.7	9.7	10.4	56%	50%	50%	100%	21%	27%	215	276	271
8.	Kedung Putri	Purworejo	T	4,341	15	2.1	1.1	3.2	71%	73%	72%	100%	51%	83%	141	17	40
9.	Sudagaran	Purworejo	T	3,665	13	1.1	11.4	12.5	24%	38%	37%	49%	36%	37%	1,367	479	509
10.	Rebug	Purworejo	T	1,202	15	0.0	15.8	15.8	No Canal	32%	32%	No Canal	42%	42%	No Canal	475	475
11.	Kalimeneng	Purworejo	T	1,262	19	0.9	12.0	12.9	83%	66%	67%	100%	53%	57%	109	109	109
12.	Kedung GW	Purworejo	T	1,129	64	1.0	14.1	15.2	63%	82%	80%	17%	63%	60%	91	128	125
13.	Waduk Cengklik	Boyolali	T	1,579	3	2.2	13.3	15.5	41%	39%	39%	100%	100%	100%	111	148	141
14.	Ploso Wareng	Klaten	T	1,100	11	0.2	9.3	9.6	100%	60%	61%	100%	100%	100%	83	107	106
15.	Jaban	Klaten	T	1,191	11	3.4	11.1	14.5	90%	70%	75%	100%	100%	100%	2,014	93	120
16.	Colo Kanan	Sragen	T	18,108	18	2.8	5.2	8.0	28%	92%	69%	100%	100%	100%	151	604	295
17.	Bonggo	Sragen	T	1,811	18	1.3	11.4	12.7	33%	40%	40%	100%	100%	100%	360	100	108
18.	Pangkalan	Pati	T	1,765	10	1.1	10.4	11.5	100%	83%	85%	100%	44%	49%	175	117	121
19.	Sentul	Pati	T	1,759	11	1.6	7.9	9.5	49%	40%	41%	68%	24%	31%	106	234	195
20.	Widodaren	Pati	T	3,652	13	2.2	8.1	10.3	0%	26%	20%	100%	33%	47%	152	294	245
21.	Klambu Kanan	Pati	T	10,391	11	6.0	9.0	15.0	100%	89%	94%	100%	56%	74%	1,007	330	451
22.	Jragung	Demak	T	4,597	14	1.7	6.3	8.0	100%	63%	71%	33%	31%	31%	563	309	341
23.	Guntur	Demak	T	2,020	24	0.3	9.9	10.2	100%	20%	22%	0%	20%	19%	45	268	232
24.	Klambu Kiri	Demak	T	21,419	11	1.6	5.1	6.7	100%	100%	100%	94%	30%	46%	220	283	265
25.	Kedungdowo Kramat	Batang	T	1,250	27	2.3	4.4	6.7	25%	22%	23%	33%	36%	35%	114	168	144
26.	Sungapan Kanan	Pemalang	T	1,851	3	3.6	4.3	8.0	30%	60%	46%	100%	67%	82%	371	424	398
27.	Mejagong	Pemalang	T	1,997	11	0.1	8.7	8.8	100%	9%	10%	100%	52%	52%	6	388	218
28.	Sungapan Kiri	Pemalang	T	5,229	3	1.4	6.4	7.8	55%	55%	55%	100%	51%	60%	283	329	320
29.	Kabuyutan	Brebes	T	4,182	17	0.9	11.1	12.0	90%	71%	73%	47%	46%	46%	119	310	277
30.	Babakan	Brebes	T	2,181	11	1.0	9.7	10.7	100%	30%	37%	47%	20%	23%	509	454	458
31.	Kemaron Jambe	Brebes	T	1,026	12	6.7	15.9	22.7	100%	75%	82%	100%	21%	45%	294	274	280
32.	Jengkelok	Brebes	T	6,505	13	0.8	7.3	8.1	60%	28%	32%	100%	8%	18%	520	263	277
33.	Gung	Tegal & Kodia Tegal	T	12,999	5	1.1	2.9	4.0	100%	54%	66%	64%	100%	90%	500	224	263
34.	Parakankidang	Tegal & Kodia Tegal	T	1,697	9	1.0	9.0	10.1	70%	30%	34%	100%	100%	100%	342	226	234
35.	Kumisik	Tegal & Kodia Tegal	T	3,736	11	4.0	4.6	8.6	30%	30%	30%	100%	100%	100%	298	557	396
36.	Pesantren Kletak	Pekalongan & Kodia P.	T	4,263	8	3.9	10.5	14.4	9%	37%	30%	69%	52%	57%	413	303	326
37.	Sragi	Pekalongan & Kodia P.	T	3,540	29	1.9	8.8	10.6	55%	18%	25%	23%	16%	17%	366	816	671
38.	Sudikampir	Pekalongan & Kodia P.	T	1,564	28	6.7	8.0	14.7	25%	37%	32%	29%	83%	58%	No Structure	317	583
39.	Padurekso	Pekalongan & Kodia P.	T	2,764	88	1.3	7.0	8.3	15%	25%	24%	100%	39%	48%	355	187	202
40.	Kedung Asem	Kendal & Kodia Semarang	T	3,726	13	0.9	10.1	11.0	100%	100%	100%	90%	32%	37%	250	191	195
41.	Bodri	Kendal & Kodia Semarang	T	8,538	13	0.4	7.8	8.3	100%	100%	100%	64%	50%	50%	75	406	328
42.	Trompo	Kendal & Kodia Semarang	T	1,263	13	1.0	8.7	9.7	100%	100%	100%	0%	19%	17%	400	255	264
43.	Kedung Pengilon	Kendal & Kodia Semarang	T	3,134	13	0.2	12.1	12.4	100%	100%	100%	100%	24%	25%	41	413	350
44.	Pasekan	Magelang dan Kodia Mag.	T	1,078	12	0.0	10.2	10.2	No Canal	83%	83%	No Canal	0%	0%	No Canal	53	53
45.	Kosar	Batang / Pekalongan	T	1,617	28	1.9	13.6	15.5	20%	22%	22%	44%	77%	73%	321	269	274
46.	Notog	Brebes / Tegal	T	27,682	31	0.7	15.6	16.3	22%	40%	39%	181%	63%	68%	1,900	791	811
47.	Sidorejo	Grobogan / Boyolali	T	14,622	13	2.4	6.5	8.8	100%	54%	66%	100%	100%	100%	102	117	112
48.	Glapan	Grobogan / Demak	T	18,696	26	1.0	2.7	3.7	39%	29%	32%	100%	31%	49%	346	251	271
49.	Klambu Kanan	Grobogan / Kudus / Pati	T	6,841	13	1.1	4.6	5.7	100%	89%	91%	95%	59%	66%	451	383	395
50.	Kaliwadas	Pekalogan / Pemalang	T	7,520	29	2.2	9.2	11.4	45%	55%	53%	5%	32%	27%	366	554	503
	Total			**284,569**													
	Average of the province			5,691	16	2.1	7.6	9.7	56%	56%	56%	79%	54%	59%	237	294	279
	Itemized Total		T : 50														
			ST : 0														
			NT : 0														

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical
MC: Main Canal, SC: Secondary Canal

Source: Inventory Survey Works for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Table A-4.2.7 Problems and Constraints of Irrigation Scheme : 2. Canals and Related Structures & 3. Terminal Facility and On Farm: Central Java

No.	Irrigation Scheme	District	Canal and Related Structure																								Condition/Problem					Problems and Constraints: Summary					Overall Condition of Canal System	Terminal Facility and On Farm
			General					Lined and Earth Canal					Related regulating structure				Related conveyance structure					Related crossing structure			Protection structure	O & M												
			C-1 Sedimentation or obstruction of water flow	C-2 Leakage from canal	C-3 Collapse of canal	C-4 Inspection road along canal	C-5 General O&M problems	C-6 Overage, Lower strength of lined canal	C-7 Cracks of partial damage on lined canal	C-8 Leakage from lined canal	C-9 Deflection of lining toward inside of canal	C-10 Difficulty on maintenance of earth canal	C-11 Lower function of regulating structure on canal	C-12 Settlement or damage (breakdown) of regulating structure on canal	C-13 Physical operation problem on regulating structure on canal	C-14 No function of discharge measuring	C-15 Settlement/deflection on foundation of aqueduct	C-16 Damage/breakout on superstructure of aqueduct	C-17 Leakage from barrel of siphon	C-18 Insufficient covering for siphon under below river bed	C-19 Clogging of barrel of siphon	C-20 Clogging of road crossing (box,pipe culvert)	C-21 Settlement of foundation of bridge	C-22 Damage/breakout of superstructure of brigde	C-23 Clogging of barrel of cross drain	C-24 Difficulty on O & M due to facility problem	C-25 Difficulty on proper water distribution/discharge measurement	A Fully functioning	B Partly deteriorated, but functioning in a satisfactory range	C Nort functioning well and/or affecting the downstream flow	D Serious condition for operation, replace and reconstruction is needed	N.A. Not Applicable							
1.	Cijalu	Cilacap	D	D	D	B	B	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	D	C	0	3	14	8	0	1	11	24			C	C
2.	Mangganti	Cilacap	C	B	B	C	C	B	B	B	B	B	C	B	B	C	B	B	B	B	C	C	B	B	C	C	C	0	15	10	0	0	4	11	24			C	C
3.	Serayu	Cilacap	C	D	D	C	C	B	B	B	B	D	C	B	B	C	B	B	B	B	C	C	B	B	C	C	D	0	12	9	4	0	2	4	25			D	C
4.	Banjarcahyana	Banjarnegara	B	C	C	B	B	C	C	C	C	C	C	B	C	C	B	B	C	B	C	C	B	B	C	B	C	0	10	15	0	0	3	11	24			C	C
5.	Kaligending	Kebumen	C	C	C	B	B	A	A	A	A	C	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	3	13	3	0	1	3	11	24	25	C	C
6.	Pesucen	Kebumen	C	D	D	C	C	A	A	A	A	D	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	1	12	6	0	2	3	11	13	24	C	C
7.	Bedegolan	Kebumen	C	C	C	D	D	A	A	A	A	C	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	1	13	5	0	2	4	11	24		C	C
8.	Kedung Putri	Purworejo	C	C	C	B	B	C	C	C	C	C	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	8	17	0	0	2	3	11	24		C	C
9.	Sudagaran	Purworejo	D	D	D	D	D	C	C	C	C	D	C	B	C	C	B	B	C	B	C	C	B	B	C	D	C	0	6	12	7	0	1	2	3	24		C	C
10.	Rebug	Purworejo	C	D	D	C	C	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	D	0	1	17	7	0	2	11	24	25		D	D
11.	Kalimeneng	Purworejo	C	C	C	C	C	C	C	C	C	C	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	1	21	3	0	2	3	11	24	25	C	C
12.	Kedung GW	Purworejo	D	B	B	C	C	D	D	D	D	B	D	C	D	D	C	C	D	B	C	C	C	C	D	D	C	0	4	10	11	0	1	4	6	11	24	C	C
13.	Waduk Cengklik	Boyolali	C	D	D	B	B	A	A	A	A	D	C	B	A	C	B	B	A	B	C	C	B	B	C	C	C	6	8	8	3	0	2	11	24	25		C	C
14.	Ploso Wareng	Klaten	C	C	C	B	B	C	C	C	C	C	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	3	19	3	0	2	3	11	24		C	C
15.	Jaban	Klaten	D	C	C	B	B	C	C	C	C	C	D	C	C	D	C	C	C	B	C	C	C	C	D	D	C	0	3	17	5	0	1	2	11	24		C	C
16.	Colo Kanan	Sragen	C	C	C	B	B	C	C	C	C	C	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	8	17	0	0	1	2	11	24		C	C
17.	Bonggo	Sragen	C	D	D	B	B	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	3	16	6	0	2	3	11	24		C	C
18.	Pangkalan	Pati	D	B	B	C	C	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	D	C	0	4	16	5	0	1	4	11	24		C	C
19.	Sentul	Pati	C	D	D	D	D	C	C	C	C	D	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	6	14	5	0	2	3	4	5	24	C	C
20.	Widodaren	Pati	C	D	D	C	C	C	C	C	C	D	C	B	C	C	B	B	C	B	C	C	B	B	C	C	D	0	6	15	4	0	2	3	10	24		D	C
21.	Klambu Kanan	Pati	C	B	B	B	B	C	C	C	C	B	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	11	14	0	0	1	6	8	24		C	C
22.	Jragung	Demak	C	C	C	D	D	C	C	C	C	C	D	C	C	D	C	C	B	C	C	C	C	C	D	C	C	0	1	19	5	0	4	5	11	24		C	C
23.	Guntur	Demak	C	D	D	D	D	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	C	C	0	1	10	14	0	2	3	6	7	24	C	C
24.	Klambu Kiri	Demak	C	B	B	C	C	C	C	C	C	B	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	9	16	0	0	1	6	7	12	24	C	C
25.	Kedungdowo Kramat	Batang	D	D	D	D	D	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	D	C	0	1	8	16	0	1	2	6	11	24	C	C
26.	Sungapan Kanan	Pemalang	C	D	D	B	B	A	A	A	A	D	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	3	10	6	0	2	3	11	12	24	C	C
27.	Mejagong	Pemalang	C	D	D	C	C	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	1	18	6	0	2	3	11	24		C	C
28.	Sungapan Kiri	Pemalang	C	C	C	C	C	A	A	A	A	C	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	1	15	3	0	2	3	11	24		C	C
29.	Kabuyutan	Brebes	C	C	C	C	C	C	C	C	C	C	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	6	19	0	0	2	3	6	11	24	C	C
30.	Babakan	Brebes	C	D	D	D	D	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	1	16	8	0	2	3	4	11	24	C	C
31.	Kemaron Jambe	Brebes	C	B	B	C	C	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	4	18	3	0	4	5	6	7	24	C	C
32.	Jengkelok	Brebes	C	D	D	D	D	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	1	16	8	0	2	3	4	5	11	C	D
33.	Gung	Tegal & Kodia Tegal	C	C	C	B	B	A	A	A	A	C	D	C	A	D	C	C	A	B	C	C	C	C	D	C	C	6	3	13	3	0	2	3	11	24		C	C
34.	Parakankidang	Tegal & Kodia Tegal	C	D	D	B	B	B	B	B	B	D	D	C	B	D	C	C	B	B	C	C	C	C	D	C	B	0	10	9	6	0	2	3	11	24		B	C
35.	Kumisik	Tegal & Kodia Tegal	C	D	D	B	B	C	C	C	C	D	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	3	16	6	0	2	3	11	24		C	C
36.	Pesantren Kletak	Pekalongan & Kodia P.	C	D	D	C	C	B	B	B	B	D	D	C	B	D	C	C	B	B	C	C	C	C	D	C	C	0	7	12	6	0	2	3	11	24		C	C
37.	Sragi	Pekalongan & Kodia P.	D	D	D	D	D	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	D	C	0	1	8	16	0	2	3	4	5	11	C	C
38.	Sudikampir	Pekalongan & Kodia P.	C	D	D	C	C	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	C	C	0	1	12	12	0	2	3	6	7	11	C	C
39.	Padurekso	Pekalongan & Kodia P.	C	D	D	C	C	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	C	D	0	1	11	13	0	2	3	6	7	24	D	C
40.	Kedung Asem	Kendal & Kodia Semarang	C	B	B	D	D	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	4	16	5	0	4	5	11	24		C	C
41.	Bodri	Kendal & Kodia Semarang	C	B	B	D	D	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	4	16	5	0	4	5	11	24		C	C
42.	Trompo	Kendal & Kodia Semarang	D	B	B	D	D	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	D	C	0	4	14	7	0	1	4	5	11	24	C	C
43.	Kedung Pengilon	Kendal & Kodia Semarang	D	B	B	D	D	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	D	C	0	4	14	7	0	4	5	11	24		C	C
44.	Pasekan	Magelang dan Kodia Mag.	C	B	B	D	D	C	C	C	C	B	D	C	C	D	C	C	C	B	C	C	C	C	D	C	C	0	4	16	5	0	4	5	11	24		C	C
45.	Kosar	Batang / Pekalongan	C	D	D	B	B	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	C	C	0	3	10	12	0	2	3	6	7	11	C	C
46.	Notog	Brebes / Tegal	C	D	D	B	B	D	D	D	D	D	D	C	D	D	C	C	D	B	C	C	C	C	D	C	C	0	3	10	12	0	2	3	6	7	11	C	C
47.	Sidorejo	Grobogan / Boyolali	B	C	C	B	B	C	C	C	C	C	C	B	C	C	B	B	C	B	C	C	B	B	C	B	C	0	10	15	0	0	2	3	11	24		C	C
48.	Glapan	Grobogan / Demak	C	D	D	C	C	D	D	D	D	D	C	B	D	C	B	B	D	B	C	C	B	B	C	C	C	0	6	10	9	0	2	3	6	7	24	C	C
49.	Klambu Kanan	Grobogan / Kudus / Pati	C	B	B	B	B	C	C	C	C	B	C	B	C	C	B	B	C	B	C	C	B	B	C	C	C	0	11	14	0	0	1	6	7	24		C	C
50.	Kaliwadas	Pekalogan / Pemalang	C	C	C	B	B	D	D	D	D	C	C	B	D	C	B	B	D	B	C	C	B	B	C	C	C	0	8	11	6	0	6	7	24			C	C
	Total																										**42**	**233**	**691**	**284**	**0**							

Remarks:
T : Technical
ST : Semi Technical
NT : Non Technical

Condition of Facility
A : Function well/no rehabilitation is needed
B : Partially deteriorated, minor rehabilitation is needed
C : Not functioning well and affecting the operation, large scale of rehabilitation is needed
D : Serious condition for operation, replace and reconstruction is needed

A : 0	**A : 0**
B : 1	**B : 0**
C : 45	**C : 48**
D : 4	**D : 2**

Table A-4.2.8 Present Agriculture Conditions of Target Irrigation Schemes : Central Java -1/3

District		Cilacap			Banjar.	Kebumen			Purworejo					Boyola.	Klaten		Sragen	
Irrigation Scheme		Cijalu	Manggenti	Serayu	Banjarcahyana	Kaligending	Pesucen	Bedegolan	Kedung Putri	Sudagaran	Rebug	Kalimeneng	Kedung GW	Waduk Cengklik	Ploso Wareng	Jaban	Colo Kanan	Bonggo
No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Technical Level		T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
1. Land Use																		
1.1 Potential Area																		
- Irrigated Paddy Field	ha	1,377	22,644	20,100	5,001	2,923	1,659	8,401	4,341	3,665	1,202	1,262	1,129	2,120	1,100	1,191	22,982	1,406
- Rainfed Paddy Field	ha	0	0	695	0	0	0	0	110	0	0	0	0	0	0	0	0	0
Total	ha	1,377	22,644	20,795	5,001	2,923	1,659	8,401	4,451	3,665	1,202	1,262	1,129	2,120	1,100	1,191	22,982	1,406
1.2 Non-potential Area	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3 Target Area (1.1 + 1.2)	ha	1,377	22,644	20,795	5,001	2,923	1,659	8,401	4,451	3,665	1,202	1,262	1,129	2,120	1,100	1,191	22,982	1,406
1.4 Converted Land 1/	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	419
1.5 Registered Area	ha	1,377	22,644	20,795	5,001	2,923	1,659	8,401	4,451	3,665	1,202	1,262	1,129	2,120	1,100	1,191	22,982	1,825
2. Cropping Pattern in Irrigated Area 2/		A	E	D	A	B	E	B	A	A	A	D	A	D	C	C	C	D
3. Cropped Area/Cropping Intensity																		
3.1 Cropped Area																		
1) Wet Season																		
- Irrigated Paddy	ha	1,281	22,644	20,100	5,001	2,923	1,659	8,401	4,334	3,372	1,200	1,244	1,129	957	1,100	1,191	22,982	1,350
- Palawija	ha													42				
- Sugarcane	ha													42				
- Rainfed Palawija	ha			695					110									
Total	ha	1,281	22,644	20,795	5,001	2,923	1,659	8,401	4,444	3,372	1,200	1,244	1,129	1,041	1,100	1,191	22,982	1,350
2) Dry Season I																		
- Irrigated Paddy	ha	1,033	18,147	20,100	4,001	2,842	960	8,167	3,328	2,615	806	795	1,129	1,030	1,100	1,191	22,524	1,336
- Palawija	ha		4,492				699	95	162					41			160	
- Sugarcane	ha																298	
-	ha																	
Total		1,033	22,639	20,100	4,001	2,842	1,659	8,262	3,490	2,615	806	795	1,129	1,071	1,100	1,191	22,982	1,336
3) Dry Season II																		
- Irrigated Paddy	ha			1,582								644		716	451	562	21,250	232
- Palawija	ha		5,317			657		200						39	649	629	1,434	
-	ha																	
Total	ha	0	5,317	1,582	0	657	0	200	0	0	0	644	0	755	1,100	1,191	22,684	232
4) Annual																		
- Irrigated Paddy	ha	2,314	40,791	41,782	9,002	5,765	2,619	16,568	7,662	5,987	2,006	2,683	2,258	2,703	2,651	2,944	66,756	2,918
- Palawija	ha	0	9,809	0	0	657	699	295	162	0	0	0	0	122	649	629	1,594	0
- Sugarcane	ha	0	0	0	0	0	0	0	0	0	0	0	0	42	0	0	298	0
- Rainfed Palawija	ha	0	0	695	0	0	0	0	110	0	0	0	0	0	0	0	0	0
Total	ha	2,314	50,600	42,477	9,002	6,422	3,318	16,863	7,934	5,987	2,006	2,683	2,258	2,867	3,300	3,573	68,648	2,918
3.2 Intensity in Irrigated Field 3/																		
1) Wet Season	%	93	100	100	100	100	100	100	100	92	100	99	100	49	100	100	100	96
2) Dry Season I	%	75	100	100	80	97	100	98	80	71	67	63	100	51	100	100	100	95
3) Dry Season II	%	0	23	8	0	22	0	2	0	0	0	51	0	36	100	100	99	17
4) Annual	%																	
- Irrigated Paddy	%	168	180	208	180	197	158	197	177	163	167	213	200	128	241	247	290	208
- Palawija	%	0	43	0	0	22	42	4	4	0	0	0	0	6	59	53	7	0
- Sugarcane	%	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	1	0
-	%																	
Total	%	168	223	208	180	220	200	201	180	163	167	213	200	135	300	300	299	208
3.3 Intensity in Rainfed Field 4/				100					100									
3.4 Overall Intensity 5/		168	223	204	180	220	200	201	178	163	167	213	200	135	300	300	299	208
4. Crop Yield & Production																		
4.1 Crop Yield																		
1) Wet Season																		
- Irrigated Paddy	t/ha	5.0	5.0	5.0	5.5	5.0	4.5	5.5	5.0	5.0	5.0	5.0	5.0	4.5	5.0	5.0	5.0	5.0
- Palawija	t/ha													3.0				
- Rainfed Palawija	t/ha			3.0					3.0									
2 Dry Season I																		
- Irrigated Paddy	t/ha	4.5	4.5	5.0	5.5	4.5	4.5	5.0	5.0	4.5	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0
- Palawija	t/ha		3.0				3.0	3.0	3.0					3.0			3.0	
3 Dry Season I																		
- Irrigated Paddy	t/ha			4.5								4.0		4.0	5.0	4.0	4.5	4.5
- Palawija	t/ha		1.2			1.2		1.2						1.2	1.2	1.2	1.2	
4 Sugarcane	t/ha													65.0			65.0	
5) Avg. Paddy Yield 6/	t/ha	4.8	4.8	5.0	5.5	4.8	4.5	5.3	5.0	4.8	4.8	4.6	4.8	4.4	5.0	4.8	4.8	5.0
4.2 Annual Crop Production																		
1 Irrigated Paddy	ton	11,054	194,882	208,119	49,511	27,404	11,786	87,041	38,310	28,628	9,627	12,374	10,726	11,806	13,255	14,158	323,155	14,474
2 Palawija	ton	0	19,856	0	0	788	2,097	525	486	0	0	0	0	296	779	755	2,201	0
3 Sugarcane	ton	0	0	0	0	0	0	0	0	0	0	0	0	2,730	0	0	19,370	0
4 Rainfed Palawija	ton	0	0	2,085	0	0	0	0	330	0	0	0	0	0	0	0	0	0
			assumed															
No. of Beneficiaries	No.	5,296	87,092	77,308	45,464	14,615	8,295	42,005	14,836	14,660	6,868	5,048	5,645	24,600	4,700	6,000	29,807	3,315
Irrigated Field/Beneficiary	ha	0.26	0.26	0.26	0.11	0.20	0.20	0.20	0.29	0.25	0.18	0.25	0.20	0.09	0.23	0.20	0.77	0.42

1/: Area converted to other land uses (alih fungsi) 3/: Cropping intensity in irrigated field 4/: Cropping intensity in rainfed field
5/: Cropping intensity in the target area 6/: Weighted annual average yield of irrigated & rainfed paddy
2/: Patter: A = paddy - paddy - fallow; B = paddy - paddy - palawija or palawija/fallow;
C = paddy - paddy - paddy/palawija or paddy/palawija/fallow; D = paddy - paddy - paddy or paddy/fallow; E = other patterns

Table A-4.2.8 Present Agriculture Conditions of Target Irrigation Schemes : Central Java -2/3

District	Pati				Demak			Batang	Pemalang			Brebes				Tegal & Kodia Tegal		
Irrigation Scheme	Pangkalan	Sentul	Widodaren	Klambu Kanan	Jragung	Guntur	Klambu Kiri	Kedungdowo Kramat	Sungapan Kanan	Mejagong	Sungapan Kiri	Kabuyutan	Babakan	Kemaron Jambe	Jengkelok	Gung	Parakankidang	Kumisik
No.	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Technical Level	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
1. Land Use																		
1.1 Potential Area																		
- Irrigated Paddy Field ha	654	1,739	2,616	6,216	4,416	1,543	20,738	1,250	1,851	2,049	5,541	3,876	2,528	1,026	6,173	12,641	1,631	3,778
- Rainfed Paddy Field ha	0	0	0	0	0	0	0	0	0	0	29	0	0	457	0	0	0	0
Total ha	654	1,739	2,616	6,216	4,416	1,543	20,738	1,250	1,851	2,049	5,570	3,876	2,528	1,483	6,173	12,641	1,631	3,778
1.2 Non-potential Area ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1.3 Target Area (1.1 + 1.2) ha	654	1,739	2,616	6,216	4,416	1,543	20,738	1,250	1,851	2,049	5,570	3,876	2,528	1,483	6,173	12,641	1,631	3,778
1.4 Converted Land 1/ ha	466	0	0	0	0	0	719	0	0	0	0	0	0	0	0	0	0	0
1.5 Registered Area ha	1,120	1,739	2,616	6,216	4,416	1,543	21,457	1,250	1,851	2,049	5,570	3,876	2,528	1,483	6,173	12,641	1,631	3,778
2. Cropping Pattern in Irrigated Area 2/	E	E	E	C	E	A	B	B	B	D	B	E	E	D	E	E	E	E
3. Cropped Area/Cropping Intensity																		
3.1 Cropped Area																		
1) Wet Season																		
- Irrigated Paddy ha	654	1,551	1,911	5,946	2,333	1,543	20,738	1,079	1,487	2,049	4,654	2,735	2,295	1,026	5,112	9,734	1,523	3,553
- Palawija ha		188	705		2,083			68				565	35			1,517		
- Sugarcane ha				270								576	198			1,390	98	224
- Rainfed Palawija ha											29			457				
Total ha	654	1,739	2,616	6,216	4,416	1,543	20,738	1,147	1,487	2,049	4,683	3,876	2,528	1,483	5,112	12,641	1,621	3,777
2) Dry Season I																		
- Irrigated Paddy ha	336	1,412	572	5,946	1,400	1,543	20,738	1,069	1,299	2,045	4,356	1,105	1,406	1,026		4,579	354	1,225
- Palawija ha	318	327	2,044		3,016			76		4		1,554	658		3,958	5,077	1,156	2,042
- Sugarcane ha									491		1,185	369	247		436	1,563	14	225
- ha																		
Total	654	1,739	2,616	5,946	4,416	1,543	20,738	1,145	1,790	2,049	5,541	3,028	2,311	1,026	4,394	11,219	1,524	3,492
3) Dry Season II																		
- Irrigated Paddy ha				1,533				10		2,041		947	475	1,026		406		
- Palawija ha				1,669	4,416		12,028	1,063	361		817	1,638	1,276		2,035	9,572	1,213	1,921
- ha																		
Total ha	0	0	0	3,202	4,416	0	12,028	1,073	361	2,041	817	2,585	1,751	1,026	2,035	9,978	1,213	1,921
4) Annual																		
- Irrigated Paddy ha	990	2,963	2,483	13,425	3,733	3,086	41,476	2,158	2,786	6,135	9,010	4,787	4,176	3,078	5,112	14,719	1,877	4,778
- Palawija ha	318	515	2,749	1,669	9,515	0	12,028	1,207	361	4	817	3,757	1,969	0	5,993	16,166	2,369	3,963
- Sugarcane ha	0	0	0	270	0	0	0	0	491	0	1,185	945	445	0	436	2,953	112	449
- Rainfed Palawija ha	0	0	0	0	0	0	0	0	0	0	29	0	0	457	0	0	0	0
Total ha	1,308	3,478	5,232	15,364	13,248	3,086	53,504	3,365	3,638	6,139	11,041	9,489	6,590	3,535	11,541	33,838	4,358	9,190
3.2 Intensity in Irrigated Field 3/																		
1) Wet Season %	100	100	100	100	100	100	100	92	80	100	84	100	100	100	83	100	99	100
2) Dry Season I %	100	100	100	96	100	100	100	92	97	100	100	78	91	100	71	89	93	92
3) Dry Season II %	0	0	0	52	100	0	58	86	20	100	15	67	69	100	33	79	74	51
4) Annual %																		
- Irrigated Paddy %	151	170	95	216	85	200	200	173	151	299	163	124	165	300	83	116	115	126
- Palawija %	49	30	105	27	215	0	58	97	20	0	15	97	78	0	97	128	145	105
- Sugarcane %	0	0	0	4	0	0	0	0	27	0	21	24	18	0	7	23	7	12
- %																		
Total %	200	200	200	247	300	200	258	269	197	300	199	245	261	300	187	268	267	243
3.3 Intensity in Rainfed Field 4/											100			100				
3.4 Overall Intensity 5/	200	200	200	247	300	200	258	269	197	300	198	245	261	238	187	268	267	243
4. Crop Yield & Production																		
4.1 Crop Yield																		
1) Wet Season																		
- Irrigated Paddy t/ha	4.5	4.5	4.5	4.5	4.5	4.5	5.0	4.5	4.5	5.0	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
- Palawija t/ha		3.0	3.0		3.0			3.0				3.0	3.0			3.0		
- Rainfed Palawija t/ha											3.0			3.0				
2) Dry Season I																		
- Irrigated Paddy t/ha	4.5	4.5	4.5	4.5	4.5	4.5	5.0	4.5	4.5	4.5	5.5	5.5	5.0	5.0		5.0	5.0	5.0
- Palawija t/ha	3.0	3.0	3.0		3.0			3.0		1.2		3.0	3.0		3.0	3.0	3.0	3.0
3) Dry Season I																		
- Irrigated Paddy t/ha				4.5				4.0		4.5		5.0	4.5	4.5		4.5		
- Palawija t/ha				1.2	1.2		1.2	1.2	1.2		1.2	1.2	1.2		1.2	1.2	1.2	1.2
4) Sugarcane t/ha				65.0					65.0		65.0	65.0	65.0		65.0	65.0	65.0	65.0
5) Avg. Paddy Yield 6/ t/ha	4.5	4.5	4.5	4.5	4.5	4.5	5.0	4.5	4.5	4.7	5.5	5.4	4.9	4.8	5.0	5.0	5.0	5.0
4.2 Annual Crop Production																		
1) Irrigated Paddy ton	4,455	13,334	11,174	60,413	16,799	13,887	207,380	9,706	12,537	28,632	49,555	25,855	20,643	14,877	25,560	73,392	9,385	23,890
2) Palawija ton	954	1,545	8,247	2,003	20,596	0	14,434	1,708	433	5	980	8,323	3,610	0	14,316	31,268	4,924	8,431
3) Sugarcane ton	0	0	0	17,550	0	0	0	0	31,915	0	77,025	61,425	28,925	0	28,340	191,945	7,280	29,185
4) Rainfed Palawija ton	0	0	0	0	0	0	0	0	0	0	87	0	0	1,371	0	0	0	0
							assumed											
No. of Beneficiaries No.	1,292	2,240	5,730	30,208	10,638	6,565	60,994	5,435	5,784	10,250	27,850	20,400	13,305	20,520	34,236	63,390	8,250	15,112
Irrigated Field/Beneficiary ha	0.51	0.78	0.46	0.21	0.42	0.24	0.34	0.23	0.32	0.20	0.20	0.19	0.19	0.05	0.18	0.20	0.20	0.25

1/: Area converted to other land uses (alih fungsi) 3/: Cropping intensity in irrigated field 4/: Cropping intensity in rainfed field
5/: Cropping intensity in the target area 6/: Weighted annual average yield of irrigated & rainfed paddy
2/: Patter: A = paddy - paddy - fallow; B = paddy - paddy - palawija or palawija/fallow;
C = paddy - paddy - paddy/palawija or paddy/palawija/fallow; D = paddy - paddy - paddy or paddy/fallow; E = other patterns

Table A-4.2.8 Present Agriculture Conditions of Target Irrigation Schemes : Central Java -3/3

District		Pekalongan & Kodia P.				Kendal & Kodia Semar.				Mage.	Inter-district							
Irrigation Scheme		Pesantren Kletak	Stagi	Sudikampir	Padurekso	Kedung Asem	Bodri	Trompo	Kedung Pengilon	Pasekan	Kosar	Notog	Sidorejo	Glapan	Klambu Kanan	Kaliwadas		
No.		36	37	38	39	40	41	42	43	44	45	46	47	48	49	50		
Technical Level		T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	Overall Province	
1. Land Use																		
1.1 Potential Area																		
- Irrigated Paddy Field	ha	3,636	3,539	1,550	2,764	2,645	7,710	1,229	2,686	988	3,243	25,540	5,717	18,784	11,078	7,722	**281,600**	99%
- Rainfed Paddy Field	ha	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	**1,491**	1%
Total	ha	3,636	3,539	1,550	2,764	2,845	7,710	1,229	2,686	988	3,243	25,540	5,717	18,784	11,078	7,722	**283,091**	100%
1.2 Non-potential Area	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**	0%
1.3 Target Area (1.1 + 1.2)	ha	3,636	3,539	1,550	2,764	2,845	7,710	1,229	2,686	988	3,243	25,540	5,717	18,784	11,078	7,722	**283,091**	100%
1.4 Converted Land 1/	ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1,604**	-
1.5 Registered Area	ha	3,636	3,539	1,550	2,764	2,845	7,710	1,229	2,686	988	3,243	25,540	5,717	18,784	11,078	7,722	**284,695**	-
2. Cropping Pattern in Irrigated Area 2/		B	B	B	B	A	A	A	E	D	C	E	B	B	C	B		
3. Cropped Area/Cropping Intensity																		
3.1 Cropped Area																		
1) Wet Season																		
- Irrigated Paddy	ha	3,264	2,996	1,380	2,454	2,645	7,313	1,167	2,686	839	3,215	6,910	5,717	18,784	9,373	6,344	**245,878**	89%
- Palawija	ha						397	62			28	15,262					**20,952**	8%
- Sugarcane	ha	371	543	170	310							3,368			332	1,378	**9,270**	3%
- Rainfed Palawija	ha					200											**1,491**	1%
Total	ha	3,635	3,539	1,550	2,764	2,845	7,710	1,229	2,686	839	3,243	25,540	5,717	18,784	9,705	7,722	**277,591**	100%
2) Dry Season I																		
- Irrigated Paddy	ha	3,264	2,996	1,380	2,454	2,645	7,313	1,167	2,036	604	3,208	18,625	5,717	18,784	10,746	6,344	**228,798**	87%
- Palawija	ha							62	650		35	3,730					**30,356**	11%
- Sugarcane	ha																**4,828**	2%
-	ha																**0**	0%
Total		3,264	2,996	1,380	2,454	2,645	7,313	1,229	2,686	604	3,243	22,355	5,717	18,784	10,746	6,344	**263,982**	100%
3) Dry Season II																		
- Irrigated Paddy	ha				65					520	2,339	131			4,165		**39,095**	28%
- Palawija	ha	2,547	1,921	873	1,259				700		904	18,457	5,400	13,405	4,386	3,480	**100,266**	72%
-	ha																**0**	0%
Total	ha	2,547	1,921	873	1,324	0	0	0	700	520	3,243	18,588	5,400	13,405	8,551	3,480	**139,361**	100%
4) Annual																		
- Irrigated Paddy	ha	6,528	5,992	2,760	4,973	5,290	14,626	2,334	4,722	1,963	8,762	25,666	11,434	37,568	24,284	12,688	**513,771**	75%
- Palawija	ha	2,547	1,921	873	1,259	0	397	124	1,350	0	967	37,449	5,400	13,405	4,386	3,480	**151,574**	22%
- Sugarcane	ha	371	543	170	310	0	0	0	0	0	0	3,368	0	0	332	1,378	**14,098**	2%
- Rainfed Palawija	ha	0	0	0	0	200	0	0	0	0	0	0	0	0	0	0	**1,491**	0%
Total	ha	9,446	8,456	3,803	6,542	5,490	15,023	2,458	6,072	1,963	9,729	66,483	16,834	50,973	29,002	17,546	**680,934**	100%
3.2 Intensity in Irrigated Field 3/																		
1) Wet Season	%	100	100	100	100	100	100	100	100	85	100	100	100	100	88	100	**98**	
2) Dry Season I	%	90	85	89	89	100	95	100	100	61	100	88	100	100	97	82	**94**	
3) Dry Season II	%	70	54	56	48	0	0	0	26	53	100	73	94	71	77	45	**49**	
4) Annual	%																	
- Irrigated Paddy	%	180	169	178	180	200	190	190	176	199	270	100	200	200	219	164	**182**	
- Palawija	%	70	54	56	46	0	5	10	50	0	30	147	94	71	40	45	**54**	
- Sugarcane	%	10	15	11	11	0	0	0	0	0	0	13	0	0	3	18	**5**	
-	%																	
Total	%	260	239	245	237	200	195	200	226	199	300	260	294	271	262	227	**241**	
3.3 Intensity in Rainfed Field 4/						100											**100**	
3.4 Overall Intensity 5/		260	239	245	237	193	195	200	226	199	300	260	294	271	262	227	**241**	
4. Crop Yield & Production																		
4.1 Crop Yield																		
1) Wet Season																		
- Irrigated Paddy	t/ha	4.5	4.5	4.5	4.5	5.0	5.0	5.0	5.0	4.5	4.5	5.0	5.5	5.5	5.0	4.5	-	
- Palawija	t/ha						3.0	3.0			3.0	3.0					-	
- Rainfed Palawija	t/ha					3.0											-	
2) Dry Season I																	-	
- Irrigated Paddy	t/ha	4.5	4.5	4.0	4.5	5.0	5.0	5.0	5.0	4.5	4.5	5.0	5.5	5.0	5.0	4.5	-	
- Palawija	t/ha							3.0	3.0		3.0	3.0					-	
3) Dry Season I																	-	
- Irrigated Paddy	t/ha				4.0					4.0	4.0	5.0			4.5	4.0	-	
- Palawija	t/ha	1.2	1.2	1.2	1.2				1.2		1.2	1.2	1.2	1.2	1.2	1.2	-	
4) Sugarcane	t/ha	65.0	65.0	65.0	65.0							65.0			65.0	65.0	-	
5) Avg. Paddy Yield 6/	t/ha	4.5	4.5	4.3	4.5	5.0	5.0	5.0	5.0	4.4	4.4	5.0	5.5	5.3	4.9	4.5	**4.9**	
4.2 Annual Crop Production																		
1) Irrigated Paddy	ton	29,376	26,964	11,730	22,346	26,450	73,130	11,670	23,610	8,574	38,260	128,330	62,887	197,232	119,338	57,096	**2,524,769**	
2) Palawija	ton	3,056	2,305	1,048	1,511	0	1,191	372	2,790	0	1,274	79,124	6,480	16,086	5,263	4,176	**274,236**	
3) Sugarcane	ton	24,115	35,295	11,050	20,150	0	0	0	0	0	0	218,920	0	0	21,580	89,570	**916,370**	
4) Rainfed Palawija	ton	0	0	0	0	600	0	0	0	0	0	0	0	0	0	0	**4,473**	
		assumed						assumed										
No. of Beneficiaries	No.	18,180	11,797	7,850	13,820	5,426	21,000	5,426	11,192	9,980	12,972	271,700	8,074	67,080	18,260	38,650	**1,259,159**	
Irrigated Field/Beneficiary	ha	0.20	0.30	0.20	0.20	0.49	0.37	0.23	0.24	0.10	0.25	0.09	0.71	0.28	0.61	0.20	**0.22**	

1/: Area converted to other land uses (alih fungsi) 3/: Cropping intensity in irrigated field 4/: Cropping intensity in rainfed field
5/: Cropping intensity in the target area 6/: Weighted annual average yield of irrigated & rainfed paddy
2/: Patter: A = paddy - paddy - fallow; B = paddy - paddy - palawija or palawija/fallow;
C = paddy - paddy - paddy/palawija or paddy/palawija/fallow; D = paddy - paddy - paddy or paddy/fallow; E = other patterns

Table A-4.2.9 Estimation of Irrigated Paddy Yield : Central Java - 1/2

District/Irrigation Scheme	Irrigated Paddy Field	Major Sub-district	Source: Statistic Data, BPS 1/												Crop Cutting Syrvey by BPS 2/ Average						PSDA 3/ Average			Inventory Survey 4/							Estimated Yield							
			1999/2000			2000/2001			2001/2002			Average			Wet		Dry I		Dry II					Avg. of 00/01 - 02/03				Wet	Dry I	Dry II	Present			Target		
			10-1	2-5	6-9	10-1	2-5	6-9	10-1	2-5	6-9	10-1	2-5	6-9	No.	Avg.	No.	Avg.	No.	Avg.	10-1	2-5	6-9	Source	Wet	Dry I	Dry II				Wet	Dry I	Dry II	Wet	Dry I	Dry II
Cilacap		District	5.4	5.2	5.2	5.0	5.0	5.5	5.5	5.4	5.5	5.3	5.2	5.4																						
1 Cijalu	1,377	Majenang		5.6			5.7			5.5			5.6		4	7.1					*4.5*	*4.8*	*4.2*					5.2	4.8	4.0	5.0	4.5		5.5	5.0	
2 Mangganti	18,895	Kawunganten		5.8			5.7			5.4			5.6		6	5.1	8	5.2	3	4.5					4.8	4.6					5.0	4.5		5.5	5.0	
		Kedungreja		5.6			5.6			5.6			5.6		16	6.2			2	3.9																
		Patimuan		5.5			5.5			5.6			5.5																						
Cilacap/Banyumas		District/Ba	5.5	5.1	5.1	5.5	5.3	4.4	5.5	5.3	5.4	5.5	5.2	5.0																						
3 Serayu	15,869	Maos		5.7			5.7			5.2			5.5		18	5.6	2	5.2	6	5.4				P3A	4.8	4.3	4.0				5.0	5.0	4.5	5.5	5.5	5.0
		Nusawungu		5.4			5.5			5.3			5.4		6	6.3	1	7.7	2	6.3																
		Kesugihan		5.5			5.6			5.4			5.5		31	6.5	7	5.7																		
		Bimangun		5.7			5.7			5.2			5.5																						
Banjarnegara/Purbalingga		District/Ba	5.2	5.0	5.0	4.9	4.9	5.3	5.2	5.1	5.2	5.1	5.0	5.2																						
4 Banjarcahyana	4,859	Rakit		4.9			5.5			5.4			5.3		6	6.7	4	6.4	10	6.5		*7.7*		BPS	5.4	4.9					5.5	5.5		6.0	6.0	
		Mandiraja		5.9			6.1			5.5			5.8		6	4.7	10	6.8																		
Kebumen		District	5.6	5.1	4.8	5.4	5.0	5.5	5.5	5.1	5.4	5.5	5.1	5.2																						
5 Kaligending	2,981	Kebumen		4.5			5.9			5.5			5.3												4.2	3.1					5.0	4.5		5.5	5.0	
		Bulu Pesantren		4.6			5.4			5.2			5.1				4	6.2																		
6 Pesucen	1,666	Bulu Pesantren		4.6			5.4			5.2			5.1				4	6.2							5.2			5.0	4.3		4.5	4.5		5.0	5.0	
7 Bedegolan	8,430	Mirit		5.3			5.3			5.5			5.4		5	7.3	5	7.3	7	3.7	*5.2*	*4.7*			5.2						5.5	5.0		6.0	5.5	
		Ambal		5.1			5.5			5.4			5.3		8	6.1			9	3.9																
Purworejo		District	5.3	5	4.9	5.0	4.9	5.2	5.0	4.9	5.2	5.1	4.9	5.1																						
8 Kedung Putri	4,341	Banyu Urip		5.0			5.3			5.3			5.2		26	5.8					*5.0*	*5.0*			5.5	4.8		5.0			5.0	5.0		5.5	5.5	
		Bayan		5.0			5.4			5.3			5.2		9	6.1			1	5.4																
9 Sudagaran	3,665	Grabag		4.9			5.6			5.3			5.3				5	4.3			*5.3*	*4.7*		DIPERTA	5.2	4.3		5.2	4.8		5.0	4.5		5.5	5.0	
		Kutarjo		4.6			5.0			5.3			5.0																						
10 Rebug	1,202	Butuh		5.1			5.4			5.2			5.2		10	5.9								DIPERTA	5.2	4.3					5.0	4.5		5.5	5.0	
11 Kalimeneng	1,262	Mirit													5	7.3	5	7.3	7	3.7	*6.2*	*5.2*									5.0	4.5	4.0	5.5	5.0	4.5
12 Kedung GW	1,129	Pituruh		4.5			4.8			5.2			4.8		36	6.1	6	6.3			*7.0*	*5.6*			5.2	4.3		6.1	4.8		5.0	4.5		5.5	5.0	
Boyolali		District	5.2	4.9	5.9	5.2	5.0	4.8	5.5	5.2	5.4	5.3	5.0	5.4																						
13 Waduk Cengklik	1,579	Ngemplak		6.0			5.2			5.4			5.5								*5.8*	*5.6*	*6.7*					5.8	5.5		4.5	4.5	4.0	5.0	5.0	4.5
Klaten		District	5.7	5.4	5.9	5.7	5.4	5.5	5.6	5.4	5.7	5.7	5.4	5.7																						
14 Ploso Wareng	1,100	Polanharjo		5.6			5.9			5.5			5.7		10	5.7	7	6.8						DIPERTA	5.3	5.3	5.4				5.0	5.0	5.0	5.5	5.5	5.5
15 Jaban	1,191	Wonosari		5.6			6.0			5.4			5.7				7	5.5	5	4.9	*3.5*	*3.5*						3.5			5.0	5.0	4.0	5.5	5.5	4.5
Sragen / Sukoharjo / Karangayar		District/Sra	4.8	5	5.2	5.1	5.0	5.3	5.6	5.4	5.4	5.2	5.1	5.3																						
16 Colo Kanan	18,108	Sragen		5.6			5.8			5.6			5.7		5	6.1								BPS	5.8	5.3	4.7				5.0	5.0	4.5	5.5	5.5	5.0
		Gondang		5.5			5.6			5.4			5.5		11	5.8	8	5.7	3	6.1																
		Ngampal		5.5			5.6			5.5			5.5		7	5.8	1	4.3	2	5.2																
		Tangen		4.1			4.3			4.2			4.2																						
Sragen		District	4.8	5	5.2	5.1	5.0	5.3	5.6	5.4	5.4	5.2	5.1	5.3																						
17 Bonggo	1,811	Karangmalang		5.5			5.7			5.6			5.6		19	5.7	2	4.7						DIPERTA	4.5						5.0	5.0	4.5	5.5	5.5	5.0
Pati		District	5	4.9	5.0	5.0	4.9	4.7	5.0	4.8	4.9	5.0	4.9	4.9																						
18 Pangkalan	1,765	Margoyoso		5.0			5.2			5.3			5.2		5	5.8	3	5.2													4.5	4.5		5.0	5.0	
		Juana		4.8			5.0			5.0			4.9																						
19 Sentul	1,759	Jakenan		5.0			4.9			5.0			5.0		4	5.1	9	5.6										4.8			4.5	4.5		5.0	5.0	
		Juana		4.8			5.0			5.0			4.9																						
20 Widodaren	3,652	Batangan		4.8			5.0			4.9			4.9																		4.5	4.5	4.0	5.0	5.0	4.5
		Jiken		5.0			5.0			5.0			5.0																						
21 Klambu Kanan	10,391	Sukolilo		5.0			5.2			5.2			5.1		39	5.2	28	5.0	5	3.7		*4.3*						4.3	4.3		4.5	4.5	4.0	5.0	5.0	4.5
		Kayen		5.0			5.2			5.2			5.1		14	5.0																				
Demak		District	5.2	4.9		5.1	5.0	4.9	5.3	5.1	5.2	5.2	5.0	5.1																						
22 Jragung	4,597	Karangawen		4.9			5.8			4.6			5.1		3	4.9						*5.4*		DIPERTA	5.2	5.2					4.5	4.5	4.5	5.0	5.0	5.0
		Mranggen		4.9			5.8			4.6			5.1		1	5.4	6	5.4																		
		Guntur		5.1			5.7			5.2			5.3																						
23 Guntur	2,020	Karang Tengah		4.8			5.4			5.1			5.1											DIPERTA	5.1	4.3					4.5	4.5		5.0	5.0	
		Guntur		5.1			5.7			5.2			5.3																						
24 Klambu Kiri	21,419	Wedung		4.9			5.3			5.5			5.2								*3.9*	*3.8*		Kec	6.9	6.3					5.0	5.0		5.5	5.5	5.0
		Karanganyar		6.2			6.0			5.6			5.9		44	5.6	31	6.1																		
		Dempet		5.7			5.7			5.2			5.5		81	5.9	26	3.9																		
		Wonosalam		5.6			6.0			5.3			5.6		29	5.9	16	5.0																		
Batang		District	4.8	4.8	5.1	4.6	4.8	5.0	5.2	4.9	5.2	4.9	4.8	5.1																						
25 Kedungdowo Kramat	1,250	Tulis		5.2			4.9			5.0			5.0		4	4.3					*5.4*	*5.6*	*5.9*								4.5	4.5		5.0	5.0	
		Batang		5.4			5.2			5.4			5.3																						
Pemalang		District	5.1	5.3	4.9	5.0	5.3	4.6	5.1	4.9	5.1	5.1	5.2	4.9																						
26 Sungapan Kanan	1,851	Ampelgading		5.3			5.2			5.2			5.2				6	4.6	2	4.7					4.6	4.9					4.5	4.5		5.0	5.0	4.5
27 Mejagong	1,997	Randudongkal		5.5			5.4			5.3			5.4		47	5.9	8	5.7	3	5.2	*3.5*	*4.5*		BPS	5.3	5.3	5.2	3.5	4.8		5.0	4.5	4.5	5.5	5.0	5.0
28 Sungapan Kiri	5,229	Pemalang		5.4			5.5			5.2			5.4		22	6.6	17	6.9	1	4.1					4.6	4.9					5.5	5.5		6.0	6.0	
		Taman		5.6			5.5			5.2			5.4												5.4	5.7										

Table A-4.2.9 Estimation of Irrigated Paddy Yield : Central Java - 2/2

District/Irrigation Scheme	Irrigated Paddy Field	Major Sub-district	Source: Statistic Data, BPS 1/												Crop Cutting Syrvey by BPS 2/ Average						PSDA 3/			Inventory Survey 4/							Estimated Yield							
			1999/2000			2000/2001			2001/2002			Average			Wet		Dry I		Dry II		Average			Avg. of 00/01 - 02/03							Present			Target		
			10-1	2-5	6-9	10-1	2-5	6-9	10-1	2-5	6-9	10-1	2-5	6-9	No.	Avg.	No.	Avg.	No.	Avg.	10-1	2-5	6-9	Source	Wet	Dry I	Dry II	Wet	Dry I	Dry II	Wet	Dry I	Dry II	Wet	Dry I	Dry II
Brebes		District	5.5	5.3	5.0	5.2	5.1	5.5	5.3	5.2	5.3	5.3	5.2	5.3																						
29 Kabuyutan	4,182	Banjarharjo		5.6			6.0			6.0			5.9		9	6.0	7	6.4			*2.6*	*3.9*						5.6	6.1		5.5	5.5	5.0	6.0	6.0	5.5
		Kersana		6.0			6.0			6.0			6.0				13	5.4	8	5.6																	
		Tanjung		5.9			6.0			6.0			6.0																								
30 Babakan	2,181	Ketanggungan		5.9			6.0			6.0			6.0		2	6.7	4	6.7	15	5.6	*3.6*	*4.8*			3.6			4.8			5.0	5.0	4.5	5.5	5.5	5.0
		Tanjung		5.9			6.0			6.0			6.0																								
31 Kemaron Jambe	1,026	Paguyangan		6.0			6.0			6.0			6.0								*4.1*	*3.8*						5.2	5.2		5.0	5.0	4.5	5.5	5.5	5.0
32 Jengkelok	6,505	Losari		5.9			6.0			6.0			6.0									*4.0*			6.4			5.4			5.0	5.0	4.5	5.5	5.5	5.0
		Tanjung		5.9			6.0			6.0			6.0																								
Tegal & Kodia Tegal		District	5.5	5.2	5.1	5.3	5.2	5.3	5.1	5.0	5.1	5.3	5.1	5.2																						
33 Gung	12,999	Lebaksui		5.7			5.6			5.3			5.5		100	5.2	4	5.2	1	4.4																	
		Dukuhwaru		5.5			5.8			5.8			5.7		7	4.5																					
		Kramat		5.7			5.4			5.5			5.5		6	4.0	2	6.4	3	3.3																	
34 Parakankidang	1,697	Margasari		6.0			5.6			5.7			5.8		4	4.8	2	5.0			*4.0*	*5.0*									5.0	5.0	4.5	5.5	5.5	5.0
35 Kumisik	3,736	Balapulang		5.7			5.7			5.9			5.8		5	5.0															5.0	5.0	4.5	5.5	5.5	5.0
Pekalongan & Kodia P		District	4.9	5.1	5.1	5.0	4.9	4.7	5.1	4.8	5.1	5.0	4.9	5.0																						
36 Pesantren Kletak	4,263	Sragi		5.0			5.3			5.2			5.2		6	5.1	2	6.2			*6.2*	*5.8*	*4.5*		4.6	4.9		4.8	5.6	3.9	4.5	4.5	4.0	5.0	5.0	4.5
		Wiradesa		4.9			5.0			5.1			5.0																								
37 Sragi	3,540	Kesesi		5.0			5.2			5.1			5.1		36	3.9	4	3.2	4	4.2	*4.8*	*5.2*	*3.9*		4.6	4.6					4.5	4.5	4.0	5.0	5.0	4.5
		Sragi		5.0			5.3			5.2			5.2		6	5.1	2	6.2																			
38 Sudikampir	1,564	Bojong		4.8			5.2			4.7			4.9		2	4.4	1	3.9													4.5	4.0		5.0	4.5	
39 Padurekso	2,764	Karangganyar		4.1			4.6			4.5			4.4		11	4.9	14	5.1			*5.4*	*5.7*	*4.5*					4.8	4.8		4.5	4.5	4.0	5.0	5.0	4.5
		Kajen		5.0			5.1			5.2			5.1																								
Kendal & Kodia Semar.		District/Ke	4.9	5.0	5.2	4.6	4.9	5.5	5.2	5.1	5.2	4.9	5.0	5.3																						
40 Kedung Asem	3,726	Weleni/Ke		5.6			4.8			5.4			5.3								*5.8*	*5.8*			5.6	5.8		5.7	5.8		5.0	5.0		5.5	5.5	
		Grinsing/Bat		5.6			5.5			5.5			5.5												5.6	5.8										
41 Bodri	8,538	Cepiring/Ke		5.6			4.8			5.4			5.3		7	4.0			6	5.4	*5.8*	*6.4*	*6.0*	DIPERTA	5.5	5.7		5.2	6.1		5.0	5.0		5.5	5.5	
		Pegandon/Ke		5.6			4.8			5.3			5.2		21	4.8												5.9	6.5							
42 Trompo	1,263	Kendal/Ke		5.5			4.7			5.2			5.1		4	5.6								DIPERTA	5.6	5.8					5.0	5.0		5.5	5.5	
43 Kedung Pengilor	3,134	Pegandon/Ke		5.6			4.8			5.3			5.2								*6.9*	*5.1*			5.6	5.5					5.0	5.0		5.5	5.5	
		Kaliungu/Ke		5.5			4.7			5.3			5.2		2	4.8	1	3.3																			
Magelang dan Kodia Mag			5.4	5.0	5.0	5.1	5.0	4.8	5.2	5.0	5.2	5.2	5.0	5.0																						
44 Pasekan	1,078	Mungkid		5.5			5.5			5.5			5.5		4	4.3					*5.6*	*5.3*	*4.8*	Mantri PU	4.3	3.9	3.9				4.5	4.5	4.0	5.0	5.0	4.5
		Sawangan		5.3			5.3			5.4			5.33																								
Batang / Pekalongan		District/B	4.8	4.8	5.1	4.6	4.8	5.0	5.2	4.9	5.2	4.9	4.8	5.1																						
45 Kosar	1,617	Grinsing/Bat		5.4			5.2			5.4			5.3		14	5.3	8	5.8	6	5.7				DIPERTA	4.2	4.3	4.3				4.5	4.5	4.0	5.0	5.0	4.5
Brebes / Tegal		District/B	5.5	5.3	5.0	5.2	5.1	5.5	5.3	5.2	5.3	5.3	5.2	5.3																						
46 Notog	27,682	Bumiayu/B		6.0			6.0			6.0			6.0						3	6.4								5.8	5.4		5.5	5.0	5.0	6.0	5.5	5.5
		Bulukumba/B		5.9			6.0			6.0			6.0		16	6.7																					
		Larangan/B		5.9			6.0			6.0			6.0		16	6.3	1	5.8	5	5.4																	
Grobogan			5.1	4.9	4.9	5.4	5.1	5.0	5.5	5.2	5.4	5.3	5.1	5.1							*8.2*	*6.9*	*2.4*														
47 Sidorejo	14,622	Purwodadi/GO		4.8			6.2			5.2			5.4		22	6.9	22	6.6			*6.9*	*6.9*	*2.6*	DIPERTA	7.8	6.5		6.9	6.9	6.9	5.5	5.5	5.0	6.0	6.0	5.5
		Toroh/GO		4.8			6.2			5.2			5.4		6	6.2	11	5.2																			
Grobogan / Demak																																				
48 Glapan	18,696	Gubug/GO		4.9			6.3			5.2			5.5		167	6.6	15	5.9			*5.5*	*5.5*		DIPERTA	5.6	5.2		7.0			5.5	5.5	5.0	6.0	6.0	5.5
		Tegewanu/GO		4.7			6.1			5.1			5.3		1	6.1	16	4.9			*6.9*	*6.7*	*5.6*														
		Godong/GO		5.0			6.4			5.2			5.5		32	5.8	34	5.7																			
		Klambu/Go		4.9			6.3			5.2			5.5		25	6.6	7	5.3																			
		Guntur/DEM		5.1			5.1			5.7			5.3																								
		Dempet/DEM		5.7			5.7			5.7			5.7																								
		Wonosalam/DEM		5.6			5.6			6.0			5.7																								
Grobogan / Kudus / Pati																																				
49 Klambu Kanan	6,841	Undaan/KUD		5.4			5.4			5.1			5.3		16	4.9	18	4.8			*4.3*	*4.3*	*3.9*		6.1	5.6	5.2	4.3	4.3	3.9	5.0	5.0	4.5	5.5	5.5	5.0
		Klambu/GO		4.9			6.3			5.2			5.5		25	6.6	7	5.3																			
Pekalogan / Pemalang		District/Pem	5.1	5.3	4.9	5.0	5.3	4.6	5.1	4.9	5.1	5.1	5.2	4.9																						
50. Kaliwadas	7,520	Ulujami/PEM		5.2			5.3			5.1			5.2		25	5.2	2	2.9	1	2.9					4.6	4.9		6.2			4.5	4.5	4.0	5.0	5.0	4.5
		Bodeh/PEM		4.7			5.4			5.1			5.1		1	5.4	1	4.0																			
		Comal/PEM		5.3			5.5			5.2			5.3		3	5.7																					

1/: Statistik Tanaman Padi dan Palawija 1986-2001and 2002 Jawa Tengah, BPS Central Java
Statistik Pertanian Tanaman Pangan, Dinas Pertanian Tanaman Pangan dan Hortikutrua, Jawa Tengah
10-3 --- harvested period Jan. - Apr.; 4-9A --- harvested period May - Aug.; 4-9B --- harvested period Sep. - Dec.
Kabupaten dalam Angka, project districts

2/: Results of BPS crop cutting surveys

3/: Laporan Monitoring & Evaluasi Kinerja Daerah Irigasi Se Jawa Tengah, 2002 and Laporan Monitoring & Evaluasi Kinerja D.I. Lintas Kabupaten Se Jawa Tengah, 2002

4/: Results of the Inventory Survey by the Study Team

Table A-4.2.10 Financial Crop Budget per Ha: Central Java - 1/2 --- Paddy

Items	Unit	Unit Price (Rp000)	Irrigated Paddy											
			Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)
1. Gross Return														
Unit Yield	(t/ha)		4.0		4.5		5.0		5.5		6.0		6.5	
Unit Price	(Rp.000/t)			1,200		1,200		1,200		1,200		1,200		1,200
Gross Return	(Rp.000)			**4,800**		**5,400**		**6,000**		**6,600**		**7,200**		**7,800**
2. Production cost				**2,248**		**2,431**		**2,576**		**2,803**		**2,954**		**3,123**
2-1. Farm Inputs				*545*		*663*		*743*		*903*		*975*		*1,079*
Seed 1/	(kg)		30	60	30	60	30	90	30	90	30	90	30	90
Fertilizers				392		510		561		720		767		871
- Urea	(kg)	1.25	150	188	180	225	200	250	230	288	250	313	275	344
- SP36	(kg)	1.70	50	85	75	128	90	153	110	187	110	187	125	213
- KCl	(kg)	1.90	30	57	50	95	50	95	70	133	75	143	100	190
- ZA	(kg)	1.25	50	63	50	63	50	63	90	113	100	125	100	125
Agro chemicals				93		93		93		93		118		118
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.5	75	1.5	75	2.0	100	2.0	100
- Insecticide (powder)	(kg)	30												
- Rodenticide	(kg)	35	0.5	18	0.5	18	0.5	18	0.5	18	0.5	18	0.5	18
- Herbicide	(kg)	30												
2-2. Labour Costs				*1,200*		*1,245*		*1,290*		*1,335*		*1,395*		*1,440*
Contracted Works														
- Planting/Transplanting 2/	(unit)		1	300	1	300	1	300	1	300	1	300	1	300
- Harvesting	(unit)													
Labour Requirements 4/														
- Hired Labor	(man-day)	15	60	900	63	945	66	990	69	1,035	73	1,095	76	1,140
- Family Labor	(man-day)		22		22		23		24		24		25	
Total	(man-day)		82		85		89		93		97		101	
2-3. Land Preparation				*300*		*300*		*300*		*300*		*300*		*300*
- Machinery	(unit)		1	300	1	300	1	300	1	300	1	300	1	300
- Draft Animal	(unit)													
2-4. Field Transportation	(L.S.)		2 %	*96*	2 %	*108*	2 %	*120*	2 %	*132*	2 %	*144*	2 %	*156*
2-5. Misceraneous Expenses	(L.S.)		5 %	*107*	5 %	*116*	5 %	*123*	5 %	*133*	5 %	*141*	5 %	*149*
				4.0		4.5		5.0		5.5		6.0		6.5
3. Net Return	Rp.000			**2,552**		**2,969**		**3,424**		**3,797**		**4,246**		**4,677**
	%			***53***		***55***		***57***		***58***		***59***		***60***
	Rounded			*2,550*		*2,970*		*3,420*		*3,800*		*4,250*		*4,680*

1/: Seed price: yield level < 5.0 Rp. 2,000; yield level ≧5.0 Rp. 3,000 2/: Contract work for transplanting assumed --- Rp. 300,000/ha at financial price

3/: Hired Labour Requirements --- assumed to be 80% of total labour requirements

Table A-4.2.10 Financial Crop Budget per Ha: Central Java - 2/2 --- Palawija & Others

Items	Unit	Unit Price (Rp000)	Maize				Soybeans				Mungbeans				Sugarcane		Vegetable (shallot)	
			Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)
1. Gross Return			Composite		Hybrid		No-tillage		No-tillage		No-tillage		No-tillage					
Unit Yield	(t/ha)		3.0		5.0		1.3		1.5		1.0		1.2		65.0		12.0	
Unit Price	(Rp.000/t)			960		960		2,500		2,500		3,100		3,100				4,000
Gross Return	(Rp.000)			**2,880**		**4,800**		**3,250**		**3,750**		**3,100**		**3,720**		**9,364**		**48,000**
2. Production cost				**1,754**		**2,680**		**1,573**		**1,683**		**1,361**		**1,576**		**6,608**		**38,400**
2-1. Farm Inputs				*563*		*1,056*		*548*		*583*		*370*		*503*				
Seed 1/	(kg)		30	111	20	400	40	160	45	180	30	150	25	125				
Fertilizers				402		504		313		328		220		328				
- Urea	(kg)	1.25	150	188	175	219	50	63	50	63	50	63	50	63				
- SP36	(kg)	1.70	70	119	75	128	80	136	100	170	70	119	100	170				
- KCl	(kg)	1.90	50	95	50	95	60	114	50	95	20	38	50	95				
- ZA	(kg)	1.25			50	63												
- PPC	(lit)	40																
Agro chemicals				50		153		75		75		0		50				
- Insecticide (liquid)	(lit)	50	1.0	50	1.5	75	1.5	75	1.5	75	0.0	0	1.0	50				
- Insecticide (powder)	(kg)																	
- Rodenticide	(kg)	35			0.5	18								0				
- Herbicide	(lit)	30			2.0	60												
2-2. Labour Costs				*840*		*1,050*		*795*		*840*		*795*		*840*				
Contracted Works																		
- Planting/Transplanting	(unit)																	
- Harvesting	(unit)																	
Labour Requirements 2/																		
- Hired Labor	(man-day)	15	56	840	70	1,050	53	795	56	840	53	795	56	840				
- Family Labor	(man-day)		24		30		22		24		22		24					
Total	(man-day)		80		100		75		80		75		80					
2-3. Land Preparation				*0*		*0*		*0*		*0*		*0*		*0*				
- Machinery	(unit)																	
- Draft Animal	(unit)																	
2-4. Field Transportation	(L.S.)		2 %	*58*	2 %	*96*	2 %	*65*	2 %	*75*	2 %	*62*	2 %	*74*				
2-5. Shelling	(L.S.)	70/t		*210*		*350*		*91*		*105*		*70*		*84*				
2-6. Misceraneous Expenses	(L.S.)		5 %	*84*	5 %	*128*	5 %	*75*	5 %	*80*	5 %	*65*	5 %	*75*				
				3.0		5.0												
3. Net Return	Rp.000			**1,126**		**2,120**		**1,677**		**2,067**		**1,739**		**2,144**		**2,756**		**9,600**
	%			**39**		**44**		**52**		**55**		**56**		**58**		**29**		**20**
	Rounded	Rp.000		***1,130***		***2,120***		***1,680***		***2,070***		***1,740***		***2,140***		***2,760***		***9,600***

1/: Seed price: Maize --- composite Rp. 3,700/kg; hybrid Rp. 20,000/ka; soybeans --- RP. 4,000; mungbeans --- Rp. 5,000/kg

2/: Hired Labour Requirements --- assumed to be 70% of total labour requirements

Table A-4.2.11 Estimated Net Farm Income per Ha: Central Java - 1/2

Irrigation Scheme	Crop	Cropping Intensity & Cropped Area						Net Return per Ha (Rp. million)			Net Return per Ha of Farm (Rp. 000)
		Wet Season		Dry Season I		Dry Season II					
		Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Wet Season	Dry Season	Dry Season	
1. Cijalu	Irrigated Paddy	93	0.93	75	0.75		0.00	3.42	2.97		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,408
2. Mangganti	Irrigated Paddy	100	1.00	80	0.80		0.00	3.42	2.97		
	Palawija		0.00	20	0.20	23	0.23		1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,415
3. Serayu	Irrigated Paddy	100	1.00	100	1.00	8	0.08	3.42	3.42	2.97	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,078
4. Banjarcahyana	Irrigated Paddy	100	1.00	80	0.80		0.00	3.80	3.80		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,840
5. Kaligending	Irrigated Paddy	100	1.00	97	0.97		0.00	3.42	2.97		
	Palawija		0.00		0.00	22	0.22			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,677
6. Pesucen	Irrigated Paddy	100	1.00	58	0.58		0.00	2.97	2.97		
	Palawija		0.00	42	0.42		0.00		1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,167
7. Bedegolan	Irrigated Paddy	100	1.00	97	0.97		0.00	3.80	3.42		
	Palawija		0.00	1	0.01	2	0.02		1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,163
8. Kedung Putri	Irrigated Paddy	100	1.00	77	0.77		0.00	3.42	3.42		
	Palawija		0.00	4	0.04		0.00		1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,099
9. Sudagaran	Irrigated Paddy	92	0.92	71	0.71		0.00	3.42	2.97		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,255
10. Rebug	Irrigated Paddy	100	1.00	67	0.67		0.00	3.42	2.97		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,410
11. Kalimeneng	Irrigated Paddy	99	0.99	63	0.63	51	0.51	3.42	2.97	2.55	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,557
12. Kedung GW	Irrigated Paddy	100	1.00	100	1.00		0.00	3.42	2.97		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,390
13. Waduk Cengklik	Irrigated Paddy	45	0.45	49	0.49	34	0.34	3.42	3.42	2.97	
	Palawija	2	0.02	2	0.02	2	0.02	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane	2	0.02		0.00		0.00	2.76			4,359
14. Ploso Wareng	Irrigated Paddy	100	1.00	100	1.00	41	0.41	3.42	3.42	3.42	
	Palawija		0.00		0.00	59	0.59			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,251
15. Jaban	Irrigated Paddy	100	1.00	100	1.00	47	0.47	3.42	3.42	2.55	
	Palawija		0.00		0.00	53	0.53			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,945
16. Colo Kanan	Irrigated Paddy	100	1.00	98	0.98	92	0.92	3.42	3.42	2.97	
	Palawija		0.00	1	0.01	6	0.06		1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00	1	0.01		0.00	2.76			9,646
17. Bonggo	Irrigated Paddy	96	0.96	95	0.95	17	0.17	3.42	3.42	2.97	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,037
18. Pangkalan	Irrigated Paddy	100	1.00	51	0.51		0.00	2.97	2.97		
	Palawija		0.00	49	0.49		0.00		1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,038
19. Sentul	Irrigated Paddy	89	0.89	81	0.81		0.00	2.97	2.97		
	Palawija	11	0.11	19	0.19		0.00	1.13	1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,388
20. Widodaren	Irrigated Paddy	73	0.73	22	0.22		0.00	2.97	2.97		
	Palawija	27	0.27	78	0.78		0.00	1.13	1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				4,008
21. Klambu Kanan	Irrigated Paddy	96	0.96	96	0.96	25	0.25	2.97	2.97	2.55	
	Palawija		0.00		0.00	27	0.27			1.71	
Irrigated Field 1 ha	Sugarcane	4	0.04		0.00		0.00	2.76			6,912
22. Jragung	Irrigated Paddy	53	0.53	32	0.32		0.00	2.97	2.97		
	Palawija	47	0.47	68	0.68	100	1.00	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,534
23. Guntur	Irrigated Paddy	100	1.00	100	1.00		0.00	2.97	2.97		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,940
24. Klambu Kiri	Irrigated Paddy	100	1.00	100	1.00		0.00	3.42	3.42		
	Palawija		0.00		0.00	58	0.58			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,832
25. Kedungdowo Kramat	Irrigated Paddy	86	0.86	86	0.86		0.00	2.97	2.97	2.55	
	Palawija	5	0.05	6	0.06	85	0.85	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,686
26. Sungapan Kanan	Irrigated Paddy	80	0.80	70	0.70		0.00	2.97	2.97		
	Palawija		0.00		0.00	20	0.20			1.17	
Irrigated Field 1 ha	Sugarcane		0.00	27	0.27		0.00	2.76			5,434

Table A-4.2.11 Estimated Net Farm Income per Ha: Central Java - 2/2

Irrigation Scheme	Crop	Cropping Intensity & Cropped Area						Net Return per Ha (Rp. million)			Net Return per Ha of Farm (Rp. 000)
		Wet Season		Dry Season I		Dry Season II					
		Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Wet Season	Dry Season	Dry Season	
27. Mejagong	Irrigated Paddy	100	1.00	100	1.00	100	1.00	3.42	2.97	2.97	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,360
28. Sungapan Kiri	Irrigated Paddy	84	0.84	79	0.79		0.00	3.80	3.80		
	Palawija		0.00		0.00	15	0.15			1.71	
Irrigated Field 1 ha	Sugarcane		0.00	21	0.21		0.00	2.76			7,030
29. Kabuyutan	Irrigated Paddy	71	0.71	29	0.29	24	0.24	3.80	3.80	3.42	
	Palawija	15	0.15	40	0.40	42	0.42	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane	14	0.14	10	0.10		0.00	2.76			6,623
30. Babakan	Irrigated Paddy	91	0.91	56	0.56	19	0.19	3.42	3.42	2.97	
	Palawija	1	0.01	26	0.26	50	0.50	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane	8	0.08	10	0.10		0.00	2.76			7,249
31. Kemaron Jambe	Irrigated Paddy	100	1.00	100	1.00	100	1.00	3.42	3.42	2.97	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,810
32. Jengkelok	Irrigated Paddy	83	0.83		0.00		0.00	3.42			
	Palawija		0.00	64	0.64	33	0.33		1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00	7	0.07		0.00	2.76			4,319
33. Gung	Irrigated Paddy	77	0.77	36	0.36	3	0.03	3.42	3.42	2.97	
	Palawija	12	0.12	40	0.40	76	0.76	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane	11	0.11	12	0.12		0.00	2.76			6,476
34. Parakankidang	Irrigated Paddy	93	0.93	22	0.22		0.00	3.42	3.42		
	Palawija		0.00	71	0.71	74	0.74		1.13	1.71	
Irrigated Field 1 ha	Sugarcane	6	0.06	1	0.01		0.00	2.76			6,194
35. Kumisik	Irrigated Paddy	94	0.94	32	0.32		0.00	3.42	3.42		
	Palawija		0.00	54	0.54	51	0.51		1.13	1.71	
Irrigated Field 1 ha	Sugarcane	6	0.06	6	0.06		0.00	2.76			6,123
36. Pesantren Kletak	Irrigated Paddy	90	0.90	90	0.90		0.00	2.97	2.97		
	Palawija		0.00		0.00	70	0.70			1.71	
Irrigated Field 1 ha	Sugarcane	10	0.10		0.00		0.00	2.76			6,819
37. Sragi	Irrigated Paddy	85	0.85	85	0.85		0.00	2.97	2.97		
	Palawija		0.00		0.00	54	0.54			1.71	
Irrigated Field 1 ha	Sugarcane	15	0.15		0.00		0.00	2.76			6,386
38. Sudikampir	Irrigated Paddy	89	0.89	89	0.89		0.00	2.97	2.55		
	Palawija		0.00		0.00	56	0.56			1.71	
Irrigated Field 1 ha	Sugarcane	11	0.11		0.00		0.00	2.76			6,174
39. Padurekso	Irrigated Paddy	89	0.89	89	0.89	2	0.02	2.97	2.97	2.55	
	Palawija		0.00		0.00	46	0.46			1.71	
Irrigated Field 1 ha	Sugarcane	11	0.11		0.00		0.00	2.76			6,428
40. Kedung Asem	Irrigated Paddy	100	1.00	100	1.00		0.00	3.42	3.42		
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,840
41. Bodri	Irrigated Paddy	95	0.95	95	0.95		0.00	3.42	3.42		
	Palawija	5	0.05		0.00		0.00	1.13			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,555
42. Trompo	Irrigated Paddy	95	0.95	95	0.95		0.00	3.42	3.42		
	Palawija	5	0.05	5	0.05		0.00	1.13	1.13		
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,611
43. Kedung Pengilon	Irrigated Paddy	100	1.00	76	0.76		0.00	3.42	3.42		
	Palawija		0.00	24	0.24	26	0.26		1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,735
44. Pasekan	Irrigated Paddy	85	0.85	61	0.61	53	0.53	2.97	2.97	2.55	
	Palawija		0.00		0.00		0.00				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				5,688
45. Kosar	Irrigated Paddy	99	0.99	99	0.99	72	0.72	2.97	2.97	2.55	
	Palawija	1	0.01	1	0.01	28	0.28	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,218
46. Notog	Irrigated Paddy	27	0.27	73	0.73	1	0.01	3.42	3.42	3.42	
	Palawija	60	0.60	15	0.15	72	0.72	1.13	1.13	1.71	
Irrigated Field 1 ha	Sugarcane	13	0.13		0.00		0.00	2.76			5,892
47. Sidorejo	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80		
	Palawija		0.00		0.00	94	0.94			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,207
48. Glapan	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.42		
	Palawija		0.00		0.00	71	0.71			1.71	
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,434
49. Klambu Kanan	Irrigated Paddy	85	0.85	97	0.97	38	0.38	3.42	3.42	2.97	
	Palawija		0.00		0.00	40	0.40			1.71	
Irrigated Field 1 ha	Sugarcane	3	0.03		0.00		0.00	2.76			8,120
50. Kaliwadas	Irrigated Paddy	82	0.82	82	0.82		0.00	2.97	2.97	2.55	
	Palawija		0.00		0.00	45	0.45			1.71	
Irrigated Field 1 ha	Sugarcane	18	0.18		0.00		0.00	2.76			6,137
Overall										Average	**6,678**
										Maximum	**9,810**
										Minimum	**4,008**

Table A-4.2.12 Summary Sheet for Results of Inventory Survey on Agriculture Support Services and Agricultural Constraints : Central Java - 1/2

Irrigation Scheme	Technical Level	Current Irrigated Area (ha)	1. Agriculture Extension & Institutions											2. Marketing								3. Constraints *****									
			1.1	1.2	1.3	1.4	1.5		1.6	1.7	1.8			Paddy 2.1		2.2		Palawija 2.3		2.4		3.1		3.2		3.3		3.4		3.5		3.6	
			PPLs	BPPs	KUD	KUD Mandiri	Farm Credit		Farm Inputs	Seed Procurement	Farmers Organizations			Practices		Channel		Channel		Rice Mills	Storage Facilities	Engineering		Agronomic		Paddy Marketing		Palawija / Vegetable Marketing		KT		Extension	
							1.5.1	1.5.2			KT	UPJA	KOPTAN	1st	2nd	1st	2nd	1st	2nd			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
1. Cijalu	T	1,377		1	4	1	b	c	a	a				b	a	a	c	a	b	b	a	a	b	a	b	a	c	a	e	a	c	a	c
2. Mangganti	T	22,644		1	1	1	b	b	a	a				a	b	a	c	b	a	b	a	a	b	b	a	a	b	c	f	c	a	d	a
3. Serayu	T	20,100		2	2	0	a	c	a	a			35	b	d	a	b			b	a	d	e	a	b	b	a			c	b	a	b
4. Banjarcahyana	T	5,001	12	0	4	0	a							b	c	a	c	a	b	b	a	a	d	a	c	a	b	a	b	a	c	a	
5. Kaligending	T	2,923		1	2	0	a	b	a	a				a	c	c	d	b	a	b	b	a	b	a	b	a	b	a	e	a	b	d	a
6. Pesucen	T	1,659		1			a	b	a	a				a	b	a	d	a	b	b	b	a	c	b	a	a	b	b	d	a	b	a	c
7. Bedegolan	T	8,401		1	4	1	a	b	a	a				b	d	a	c	a	c	b	b	b	a	a	b	a	d	a	e	a	c	c	a
8. Kedung Putri	T	4,341		1	4	0	d	d	b	c				a	b	a	e	a	b	b	a	a	c	b	a	b	a	a	b	a	c	b	a
9. Sudagaran	T	3,665		1	4	0	b	b	b	c	27			a	c	a		a	b	b	a	a	c	b	c	b	d	a	d	a	b	a	b
10. Rebug	T	1,202	6	1	2	0	b	c	a	a	27			b	d	a	d	a	b	b	a	a	c	a	b	b	d	b	d	a	b	a	
11. Kalimeneng	T	1,262	5	1	3	0	c	c	b	b				a	b	a		a		b	a	a	e	b		b	a	a	b	a	b	a	b
12. Kedung GW	T	1,129	6	1	3	0	c	c	b	b				b	a	a		a		b	a	a	c	b		b	a	a	b	a	b	a	b
13. Waduk Cengklik	T	2,120	10		3	1	d	d	a	a	34	5	17	a	c	a	d	a	c	b	a	a		a	c	a	b	a	b	a	d	a	b
14. Ploso Wareng	T	1,100		0	3	3	a	c	a	a	116	3	116	a	b	a	c	a		a		a	d	a	b	a	b	a	b	a	d		
15. Jaban	T	1,191	3		1	0	b	b	b	a			7	c	a	c	a	a	b	b		a	d	a	b	a	b			a	c	b	a
16. Colo Kanan	T	22,982		14	14	14	b		a	b				a	c	a	c	a	b	b	b	a	d	a	b	a	b	a	b	a	c	a	b
17. Bonggo	T	1,406		2	2	2	b	b	a	a				c	a	d	a	a	b	b	a	a		a		a	b	a	b	a	b	a	c
18. Pangkalan	T	654	3		1	0	b	b	b	a			7	c	a	c	a	a	b	b		a	d	a	b	a	b			a	c	b	a
19. Sentul	T	1,739	4	1	2	0	b	b	a	a				a	c	a	d			b	a	a		a	c	a	b	a	b	d	a	a	b
20. Widodaren	T	2,616	5		2	0	a	b	a	a				c	a	c	a	b	a	b	a	a		a	b	b	d	b	d	a	c	b	a
21. Klambu Kanan	T	6,216	8		3	0			a	a	125		5	c	a	c	a	a	e	b	a	d	c	a	c	b	a	b	f	a	c	b	a
22. Jragung	T	4,416		2	3	1	b	b	a	b				a	b	a	c	a	b	a	b	a	c	a	b	a	b			a	c	a	c
23. Guntur	T	1,543		0	1	0	b	b	a	a				a	b	a	c	a	b	b		a	d	b	c	a	b	a	b	a	b	a	b
24. Klambu Kiri	T	20,738		1	4	0			a	a				a	c	a	c	a	c	b	b	a	c	a	b								
25. Kedungdowo Kramat	T	1,250			1	0	a	a	a	b			2	a		a		a	b	b	c	b	a	b	a	a	b	b		c	a	a	b

Inquiries and Coises for Answers Employed in the Inventory Survey

1. Agriculture Extension & Institutions

1.1 No. of PPLs working in the DI or deployed in sub-districts located in DI
1.2 No. of BPPs providing extension services in the DI
1.3 No. of KUDs in and around the DI
1.4 No. of KUD Mandiri among KUDs in and around the DI
1.5 Accessibility to farm credits in the DI
  1.5.1 Accessibility to farm credit by farmers in the DI
    a. No difficulty to receive farm credit
    b. Some difficulty to receive farm credit, but can get
    c. Very difficult to receive farm credit
    d. Almost no access to farm credit
  1.5.2 Coverage of farm credit in the DI
    a. Over 70 % of farmers supported by credit c. 20 - 40 % supported
    b. 40 - 70 % of farmers supported by credit d. less than 20% supporte
1.6 Procurement of farm inputs (fertilizer/chemical)
  a. No difficulty to procure b. Some difficul c. Very difficult
1.7 Procurement of quality seeds
  a. No difficulty to procure b. Some difficul c. Very difficult
1.8 Farmers Organizations
  No. of Kelompok Tani formed in the DI
  No. of UPJA formed in the DI
  No. of KOPTAN formed in the DI

2. Marketing

2.1 Prevailing Practices for Marketing of paddy
  a. Sold just after harvest at field
  b. Sold paddy after drying
  c. Sold after milling
  d. Sold after storing
  e. Other
2.2 Prevailing marketing channel of paddy in DI
  a. Paddy (gabah) to collector/middlemen
  b. Paddy (gabah) to KUD
  c. Paddy (gabah) to rice mill
  d. Rice (beras) to collector/middlemen
  e. Other
2.3 Prevailing marketing channel of palawija in DI
  a. Sold to collector/middlemen
  b. Sold at local market
  c. Sold to KUD
  e. Other
2.4 Availability of Post-harvest Facilities
  Rice Mills a. Surplus b. Enough c. Not enough
  Storage Facilities a. Enough b. Not enough c. Not existing

3. Constraints ***** 1st = primary constraint 2nd = secondary constraint

3.1 Engineering (Irrigation & Drainage)
  a. Water shortage at on-farm level in dry season
  b. Poor drainage
  c. Flooding
  d. Poor O&M at main & 2ry canals
  e. Poor O&M at tertiary level and below
  f. Other
3.2 Agronomic
  a. Farmers not following recommended practices
  b. Rat
  c. Pest & diseases
  d. Other
3.3 Paddy Marketing
  a. Low marketing prices
  b. Unstable marketing prices
  c. Limited market outlet
  d. Limited bargaining power of farmers
  e. Poor quality of products
  f. Other
3.4 Palawija & Vegetable Marketing
  a. Low marketing prices
  b. Unstable marketing prices
  c. Limited market outlet
  d. Limited bargaining power of farmers
  e. Poor quality of products
  f. Low competitiveness with other producing areas
  g. Other
3.5 Farmer Organizations (*kelompok tani/KT*)
  a. Most members are not active
  b. Economic activities are limited
  c. Managerial capacity of KTs are limited
  d. No collaboration among KTs
  e. Other
3.6 Extension
  a. Implementation of extension programs is limited
  b. Shortage of operation funds of PPLs
  c. Extension activities of PPLs are limited
  d. Capability & experiences of PPLs are limited
  e. Other

Table A-4.2.12 Summary Sheet for Results of Inventory Survey on Agriculture Support Services and Agricultural Constraints : Central Java - 2/2

Irrigation Scheme	Technical Level	Current Irrigated Area (ha)	1. Agriculture Extension & Institutions											2. Marketing								3. Constraints *****									
			1.1	1.2	1.3	1.4	1.5		1.6	1.7	1.8			Paddy				Palawija		2.4		3.1		3.2		3.3		3.4		3.5		3.6	
			PPLs	BPPs	KUD	KUD Mandiri	Farm Credit		Farm Inputs	Seed Procurement	Farmers Organizations			2.1 Practices		2.2 Channel		2.3 Channel		Rice Mills	Storage Facilities	Engineering		Agronomic		Paddy Marketing		Palawija / Vegetable Marketing		KT		Extension	
							1.5.1	1.5.2			KT	UPJA	KOPTAN	1st	2nd	1st	2nd	1st	2nd			1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd	1st	2nd
26. Sungapan Kanan	T	1,851		1	1	1	a	a	a	a				a	c	c	a	a	b	b	b	a		b	c	a	b	b	a	a	b	a	b
27. Mejagong	T	2,049	5	1	1	1	a	a	a	a				a	b	c	a	a	b	b	b	b	e	c	a	a	b	b	a	a	b	a	b
28. Sungapan Kiri	T	5,541		2	11	11	a	a	a	a				a	c	c	a	a	b	b	b	a		b	c	a	b	b	a	a	c	a	b
29. Kabuyutan	T	3,876			6	0	d	b	a	a	120	6	2	b		a		a			a	a	e	c	b	a	b	a	b	b		a	c
30. Babakan	T	2,528			3	3	d	b	a	a				b	d	a	c	a	c	b	a	a	d	c	a	b	d	a	b	a	d	a	c
31. Kemaron Jambe	T	1,026			2	2	b	b	b	a			36	b		b	c	c	b	b	a			b	c	a	b	b	a	c	b	a	
32. Jengkelok	T	6,173		1	3	2	a	d	a	a	120		2	b	d	a		a	b	b	a	a	c	b	a	b	a	b	d	a	b	b	a
33. Gung	T	12,641		1	8	1	b	b	a	a				a	b	a	b	a	b	b	b	a		a		a	b	a	b	a	b	a	c
34. Parakankidang	T	1,631		1	1	1	b	b	d	a				b		b		b		b	b	a		a		b		b		a	b	a	c
35. Kumisik	T	3,778		1	1	1	b	b	a	a				b		b		b		b	b	a		a		a	b	a	b	a	b	a	c
36. Pesantren Kletak	T	3,636	14	2	10	2	a	a	a	a			7	a	c	a	c	a	b	b	c	c	a	b	c	a		a	f	b	c	a	b
37. Sragi	T	3,539	2	0	1	1	a	a	a	a			3	a	b	a	b	a	b	b	b	c	a	b	c	a	b	a	c	b	c	a	b
38. Sudikampir	T	1,550	2	1	1	1	a	a	a	a			5	a	b	a	c	a	b	b	c	a	b	a	b	a	b	f		c	a	a	b
39. Padurekso	T	2,764	8	1	4	4	a	a	a	a			6	a	c	a	c	a	c	b	c	a	c	a	b	a		f		c	a	a	b
40. Kedung Asem	T	2,645	2	3	3	2	b/a	b/c	a	a		2	2	a	b	a	c	a	b	a	a	a	d/b	a	c	a	b	a	b	a	c	a	c/b
41. Bodri	T	7,710	3	8	7	6	b	b	a	a		10	4	a	b	a	c	a	b	a	a	a	b	a	b	a	e	a	b	a	c	a	b
42. Trompo	T	1,229	1	2	2	2	b	b	a	a		2	4	a	b	a	c	a	b	a	a	a	d	a	b	a	e	a	b	a	c	a	b
43. Kedung Pengilon	T	2,686	1	4	4	1	b	b	a	a				a	b	a	c	a	b	a	a	a	d	a	c	b		a	b	a	c	a	
44. Pasekan	T	988		2	3	0	b	b	a	a	41	0	50	a	c	a	c	a	b	b	b	a	b	b	c	a	b	a	b	a	c	a	b
45. Kosar	T	3,243	4	1	2	1	b	b	a	a	27		4	a		a	c	a	b	b	a	a	b	b	c	a				a	c	a	b
46. Notog	T	25,540	44	5	20	20	b	b	b	a			144	b	d	b	c	b		b	a	a	d	b	c	b		b	a	c	b	a	
47. Sidorejo	T	5,717	6	1	2	2	b	b	a	a			1	a	e	a	e	a	b	b	b	a	e	b	c	a	e	b	a	a	b	a	b
48. Glapan	T	18,784	8	4	7	2	a	b	a	a				a	b	a	c	a	b	a	b	a	d	c/a	d/b	a	b	a	b	a	c	a	d/b
49. Klambu Kanan	T	11,078	8	4	3	0			a	a	125		5	c	a	c	a	a	e	b	a	d	c	a	c	b	a	b	f	a	c	b	a
50. Kaliwadas	T	7,722	8		4	4	a	a	a	a			4	a	c	a	c	a	b	b	b	c	a	b	c	a	b	a	c			a	c

Inquiries and Coises for Answers Employed in the Inventory Survey

1. Agriculture Extension & Institutions

1.1 No. of PPLs working in the DI or deployed in sub-districts located in DI
1.2 No. of BPPs providing extension services in the DI
1.3 No. of KUDs in and around the DI
1.4 No. of KUD Mandiri among KUDs in and around the DI
1.5 Accessibility to farm credits in the DI
1.5.1 Accessibility to farm credit by farmers in the DI
a. No difficulty to receive farm credit
b. Some difficulty to receive farm credit, but can get
c. Very difficult to receive farm credit
d. Almost no access to farm credit
1.5.2 Coverage of farm credit in the DI
a. Over 70 % of farmers supported by credit c. 20 - 40 % supported
b. 40 - 70 % of farmers supported by credit d. less than 20% supported
1.6 Procurement of farm inputs (fertilizer/chemical)
a. No difficulty to procure b. Some difficul c. Very difficult
1.7 Procurement of quality seeds
a. No difficulty to procure b. Some difficul c. Very difficult
1.8 Farmers Organizations
No. of Kelompok Tani formed in the DI
No. of UPJA formed in the DI
No. of KOPTAN formed in the DI

2. Marketing

2.1 Prevailing Practices for Marketing of paddy
a. Sold just after harvest at field
b. Sold paddy after drying
c. Sold after milling
d. Sold after storing
e. Other
2.2 Prevailing marketing channel of paddy in DI
a. Paddy (gabah) to collector/middlemen
b. Paddy (gabah) to KUD
c. Paddy (gabah) to rice mill
d. Rice (beras) to collector/middlemen
e. Other
2.3 Prevailing marketing channel of palawija in DI
a. Sold to collector/middlemen
b. Sold at local market
c. Sold to KUD
e. Other
2.4 Availability of Post-harvest Facilities
Rice Mills a. Surplus b. Enough c. Not enough
Storage Facilities a. Enough b. Not enough c. Not existing

3. Constraints ***** 1st = primary constraint 2nd = secondary constraint

3.1 Engineering (Irrigation & Drainage)
a. Water shortage at on-farm level in dry season
b. Poor drainage
c. Flooding
d. Poor O&M at main & 2ry canals
e. Poor O&M at tertiary level and below
f. Other
3.2 Agronomic
a. Farmers not following recommended practices
b. Rat
c. Pest & diseases
d. Other
3.3 Paddy Marketing
a. Low marketing prices
b. Unstable marketing prices
c. Limited market outlet
d. Limited bargaining power of farmers
e. Poor quality of products
f. Other
3.4 Palawija & Vegetable Marketing
a. Low marketing prices
b. Unstable marketing prices
c. Limited market outlet
d. Limited bargaining power of farmers
e. Poor quality of products
f. Low competitiveness with other producing areas
g. Other
3.5 Farmer Organizations (*kelompok tani/KT*)
a. Most members are not active
b. Economic activities are limited
c. Managerial capacity of KTs are limited
d. No collaboration among KTs
e. Other
3.6 Extension
a. Implementation of extension programs is limited
b. Shortage of operation funds of PPLs
c. Extension activities of PPLs are limited
d. Capability & experiences of PPLs are limited
e. Other

Table A-4.2.13 Current Condition of WUA in Study Area of Central Java

	District	Irrigation Scheme in Study Area	WUA Establishment			WUA Performance and Status					
			Target	Estab-lished	Realized Ratio (%)	Developed		Under Developing		Not Yet Developed	
						BBH	SBH	BBH	SBH	BBH	SBH
1	Kebumen	Cijalu*	14	11	79	0	0	11	0	0	0
2		Mangganti*	189	152	80	0	0	152	0	0	0
3		Serayu*	159	128	81	0	0	128	0	0	0
4		Babjarcahyana*	49	40	82	0	0	40	0	0	0
5		Kaligending	26	26	100	7	0	19	0	0	0
6		Pesucen	30	30	100	3	0	27	0	0	0
7		Bedegolan	74	74	100	3	0	51	0	20	0
8	Purworejo	Kedung Putri	61	61	100	0	0	41	0	20	0
9		Sudagaran	50	38	76	0	0	34	1	3	0
10		Rebug	18	9	50	0	0	9	0	0	0
11		Kalimeneng	14	14	100	13	0	1	0	0	0
12		Kedung GW	20	20	100	10	0	10	0	0	0
13	Boyolali	Waduk Cengklik	14	12	86	2	0	9	0	1	0
14	Klaten	Ploso Wareng	16	16	100	1	0	11	0	4	0
15		Jaban	10	10	100	1	0	9	0	0	0
16	Sragen	Colo Kanan	33	33	100	25	0	8	0	0	0
17		Bonggo	8	8	100	6	0	2	0	0	0
18	Pati	Pangkalan	20	4	20	0	0	4	0	0	0
19		Sentul	14	8	57	0	0	8	0	0	0
20		Widodaren	19	6	32	0	0	1	0	5	0
21		Klambu Kanan (I)	112	112	100	9	0	88	1	14	0
22	Demak	Jragung	38	19	50	0	0	16	0	3	0
23		Guntur	26	7	27	0	0	7	0	0	0
24		Klambu Kiri	107	67	63	0	0	53	0	14	0
25	Batang	Kedungdowo Kramat	11	6	55	0	0	5	0	1	0
26	Pemalang	Sungapan Kanan	26	26	100	15	0	10	1	0	0
27		Mejagong	19	9	47	1	0	8	0	0	0
28		Sungapan Kiri	40	40	100	5	0	35	0	0	0
29	Brebes	Kabuyutan	35	31	89	0	0	30	0	1	0
30		Babakan	38	38	100	0	0	21	0	17	0
31		Kemaron Jambe	6	6	100	0	0	6	0	0	0
32		Jengkelok	38	38	100	0	0	38	0	0	0
33	Tegal / Kodia Tegal	Gung	131	129	98	2	0	67	7	53	0
34		Parakankidang	8	8	100	0	0	8	0	0	0
35		Kumisik	31	28	90	1	0	27	0	0	0
36	Pekalongan /	Pesantren Kletak	49	40	82	4	0	31	0	5	0
37	Kodia Pekalongan	Sragi	39	38	97	0	0	38	0	0	0
38		Sadikampir	19	19	100	0	0	19	0	0	0
39		Padurekso	28	28	100	0	0	20	0	8	0
40	Kendal /	Kedung Asem	28	14	50	0	0	2	0	12	0
41	Kodia Semarang	Bodri	110	110	100	3	0	69	0	38	0
42		Trompo	20	20	100	0	0	20	0	0	0
43		Kedung Pengilon	44	44	100	0	0	44	0	0	0
44	Magelang / Kodia Magelang	Pasekan*	11	9	82	0	0	9	0	0	0
45	Batang / Pekalongan	Kosar	20	7	35	1	0	2	0	4	0
46	Brebes / Tegal	Notong	288	276	96	33	0	221	6	16	0
47	Grobogan / Boyolali	Sadorejo	102	67	66	12	1	45	0	9	0
48	Grobogan / Demak	Glapan	162	99	61	34	0	61	0	4	0
49	Grobogan / Kudus	Klambu Kanan (II)	109	85	78	55	0	30	0	0	0
50	Pekalogan / Pemalang	Kaliwadas	65	64	98	3	0	49	0	12	0
		Total	2,598	2,184	84	249	1	1,654	16	264	0

Remarks SBH : Already registered in local court of justice BBH : Not yet registered in local court of justice

Table A-5.2.1 Summary: Existing Condition and Development Plan: Central Java

No.	Irrigation Scheme	District	Existing Condition												Development Plan									
			Technical Level [1]	Registered Area (ha)	Age of Facility as of year 2003 (years)	Water Resources Facility			Canal and Related Facility					Terminal Facility and On Farm	Subject Area (ha)	Water Resources Facility		Canal and Related Facility					Terminal Facility and On Farm	
						Facility	Settling Basin	Condition	MC length (km)	SC length (km)	Nos. of Related Structures (nos.)	Condition		Condition		Grade of Rehabilitation	Settling Basin	Grade of Rehabilitation		MC length (km)	SC length (km)	Nos. of Related Structures (nos.)	On-farm Development (ha)	
												MC	SC					MC	SC				Potential Area	Non-Potential Area
1	Cijalu	Cilacap	T	1,377	16	Headworks	not provided	C	5.331	16.672	306	C	C	C	1,377	RG3	new construction	RG3 & RG4	RG3 & RG4	5.331	21.442	358	1,377	-
2	Mangganti	Cilacap	T	18,895	6	Headworks	provided	B	69.687	190.500	375	C	C	C	22,644	RG2	minor rehabili.	RG3 & RG4	RG3 & RG4	69.687	190.500	433	22,644	-
3	Serayu	Cilacap	T	15,869	9	Headworks	provided	B	95.947	115.852	945	D	D	C	20,795	RG2	minor rehabili.	RG4	RG4	95.947	115.852	1,103	20,795	-
4	Banjarcahyana	Banjarnegara	T	4,859	17	Dam	-	A	40.900	14.550	429	C	C	C	5,001	RG1	not required	RG3 & RG4	RG3 & RG4	40.900	14.550	483	5,001	-
5	Kaligending	Kebumen	T	2,981	4	Headworks	provided	B	12.000	15.000	168	C	C	C	2,923	RG2	large rehabili.	RG3 & RG4	RG3 & RG4	12.000	15.000	192	2,923	-
6	Pesucen	Kebumen	T	1,666	1	Headworks	provided	A	0.224	17.000	154	B	C	C	1,659	RG1	no rehabili.	RG2	RG3 & RG4	0.224	17.000	184	1,659	-
7	Bedegolan	Kebumen	T	8,430	5	Headworks	provided	B	6.230	81.260	323	B	C	C	8,401	RG2	replacement	RG2	RG3 & RG4	6.230	81.260	385	8,401	-
8	Kedung Putri	Purworejo	T	4,341	15	Headworks	provided	C	9.300	4.855	358	C	C	C	4,451	RG3	replacement	RG3 & RG4	RG3 & RG4	9.300	27.804	423	4,451	-
9	Sudagaran	Purworejo	T	3,665	13	Headworks	not provided	C	4.100	41.700	90	C	C	C	3,665	RG3	new construction	RG3 & RG4	RG3 & RG4	4.100	41.700	108	3,665	-
10	Rebug	Purworejo	T	1,202	15	Headworks	provided	C	0.000	19.000	40	D	D	D	1,202	RG3	large rehabili.	RG4	RG4	-	19.000	48	1,202	-
11	Kalimeneng	Purworejo	T	1,262	19	Headworks	provided	C	1.086	15.141	149	C	C	C	1,262	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	1.086	15.141	178	1,262	-
12	Kedung GW	Purworejo	T	1,129	64	Headworks	not provided	D	1.183	15.929	137	C	C	C	1,129	RG4	new construction	RG4	RG4	1.183	15.929	163	1,129	-
13	Waduk Cengklik	Boyolali	T	1,579	3	Headworks	provided	C	4.656	28.249	233	C	C	C	2,120	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	4.656	28.249	275	2,120	-
14	Ploso Wareng	Klaten	T	1,100	11	Headworks	provided	C	0.250	10.280	99	C	C	C	1,100	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	0.250	10.280	119	1,100	-
15	Jaban	Klaten	T	1,191	11	Headworks	not provided	C	4.027	13.245	144	C	C	C	1,191	RG3	new construction	RG3 & RG4	RG3 & RG4	4.027	13.245	217	1,191	-
16	Colo Kanan	Sragen	T	18,108	18	Headworks	provided	C	64.500	120.178	627	D	C	C	22,982	RG3	replacement	RG4	RG3 & RG4	64.500	120.178	710	22,982	-
17	Bonggo	Sragen	T	1,811	18	Headworks	provided	D	1.800	16.078	165	C	C	C	1,406	RG4	replacement	RG3 & RG4	RG3 & RG4	1.800	16.078	198	1,406	-
18	Pangkalan	Pati	T	1,765	10	Headworks	not provided	C	0.700	6.802	62	C	C	C	654	RG3	new construction	RG3 & RG4	RG3 & RG4	0.700	6.802	74	654	-
19	Sentul	Pati	T	1,759	11	Headworks	provided	C	2.765	13.804	85	C	C	C	1,739	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	2.765	13.804	99	1,739	-
20	Widodaren	Pati	T	3,652	13	Headworks	provided	B	5.778	21.140	110	D	D	C	2,616	RG2	minor rehabili.	RG4	RG4	5.778	21.140	128	2,616	-
21	Klambu Kanan	Pati	T	10,391	11	Headworks	provided	C	37.270	56.100	207	C	C	C	6,216	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	37.270	56.100	245	6,216	-
22	Jragung	Demak	T	4,597	14	Headworks	provided	C	7.325	27.804	103	C	C	C	4,416	RG3	replacement	RG3 & RG4	RG3 & RG4	7.325	27.804	122	4,416	-
23	Guntur	Demak	T	2,020	24	Headworks	provided	C	0.500	15.303	68	C	C	C	1,543	RG3	replacement	RG4	RG4	0.500	15.303	81	1,543	-
24	Klambu Kiri	Demak	T	21,419	11	Headworks	provided	B	34.130	105.689	528	C	C	C	20,738	RG2	minor rehabili.	RG3 & RG4	RG3 & RG4	34.130	105.689	618	20,738	-
25	Kedungdowo Kramat	Batang	T	1,250	27	Headworks	not provided	C	2.840	5.530	58	C	D	C	1,250	RG3	new construction	RG4	RG4	2.840	5.530	67	1,250	-
26	Sungapan Kanan	Pemalang	T	1,851	3	Headworks	provided	B	6.680	8.047	37	B	C	C	1,851	RG2	minor rehabili.	RG2	RG3 & RG4	6.680	8.047	43	1,851	-
27	Mejagong	Pemalang	T	1,997	11	Headworks	provided	C	0.218	17.865	83	C	D	C	2,049	RG3	large rehabili.	RG3 & RG4	RG4	0.218	17.865	96	2,049	-
28	Sungapan Kiri	Pemalang	T	5,229	3	Headworks	provided	B	7.925	35.527	136	C	C	C	5,570	RG2	minor rehabili.	RG3 & RG4	RG3 & RG4	7.925	35.527	160	5,570	-
29	Kabuyutan	Brebes	T	4,182	17	Headworks	provided	C	3.440	43.147	168	C	C	C	3,876	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	3.440	43.147	199	3,876	-
30	Babakan	Brebes	T	2,181	11	Headworks	provided	C	2.547	24.500	59	C	D	C	2,528	RG3	large rehabili.	RG3 & RG4	RG4	2.547	24.500	70	2,528	-
31	Kemaron Jambe	Brebes	T	1,026	12	Headworks	provided	C	10.000	23.600	120	C	C	C	1,483	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	10.000	23.600	141	1,483	-
32	Jengkelok	Brebes	T	6,505	13	Headworks	provided	C	5.200	45.027	181	C	D	D	6,173	RG3	large rehabili.	RG3 & RG4	RG4	5.200	45.027	216	6,173	-
33	Gung	Tegal & Kodia Tegal	T	12,999	5	Headworks	provided	C	13.500	37.000	192	C	C	C	12,641	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	13.500	37.000	228	12,641	-
34	Parakankidang	Tegal & Kodia Tegal	T	1,697	9	Headworks	provided	C	1.710	14.690	70	B	B	C	1,631	RG3	large rehabili.	RG2	RG2	1.710	14.690	84	1,631	-
35	Kumisik	Tegal & Kodia Tegal	T	3,736	11	Headworks	provided	C	15.200	17.277	82	C	D	C	3,778	RG3	large rehabili.	RG3 & RG4	RG4	15.200	17.277	93	3,778	-
36	Pesantren Kletak	Pekalongan & Kodia P.	T	4,263	8	Headworks	provided	B	14.047	38.155	160	C	C	C	3,636	RG2	large rehabili.	RG3 & RG4	RG3 & RG4	14.047	38.155	189	3,636	-
37	Sragi	Pekalongan & Kodia P.	T	3,540	29	Headworks	unknown	C	6.593	31.006	56	C	C	C	3,539	RG3	new construction	RG4	RG4	6.593	31.006	65	3,539	-
38	Sudikampir	Pekalongan & Kodia P.	T	1,564	28	Headworks	provided	C	10.372	12.356	39	C	D	C	1,550	RG3	large rehabili.	RG4	RG4	10.372	12.356	84	1,550	-
39	Padurekso	Pekalongan & Kodia P.	T	2,764	88	Headworks	provided	C	3.550	19.428	114	D	D	C	2,764	RG4	replacement	RG4	RG4	3.550	19.428	136	2,764	-
40	Kedung Asem	Kendal & Kodia Semarang	T	3,726	13	Headworks	provided	C	2.500	28.854	161	C	C	C	2,845	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	2.500	28.854	192	2,845	-
41	Bodri	Kendal & Kodia Semarang	T	8,538	13	Headworks	provided	C	3.429	60.499	195	C	C	C	7,710	RG3	replacement	RG3 & RG4	RG3 & RG4	3.429	60.499	229	7,710	-
42	Trompo	Kendal & Kodia Semarang	T	1,263	13	Headworks	not provided	D	1.200	10.690	45	C	C	C	1,229	RG4	new construction	RG3 & RG4	RG3 & RG4	1.200	10.690	54	1,229	-
43	Kedung Pengilon	Kendal & Kodia Semarang	T	3,134	13	Headworks	not provided	C	0.655	32.620	95	C	C	C	2,686	RG3	new construction	RG3 & RG4	RG3 & RG4	0.655	32.620	112	2,686	-
44	Pasekan	Magelang dan Kodia Mag.	T	1,078	12	Headworks	provided	C	0.000	10.104	191	C	C	C	988	RG3	large rehabili.	RG3 & RG4	RG3 & RG4	-	10.104	229	988	-
45	Kosar	Batang / Pekalongan	T	1,617	28	Headworks	provided	C	6.100	44.040	183	C	C	C	3,243	RG3	large rehabili.	RG4	RG4	6.100	44.040	218	3,243	-
46	Notog	Brebes / Tegal	T	27,682	31	Headworks	provided	C	17.100	398.908	513	C	C	C	25,540	RG3	minor rehabili.	RG4	RG4	17.100	398.908	662	25,540	-
47	Sidorejo	Grobogan / Boyolali	T	14,622	13	Headworks	provided	B	13.500	37.000	449	C	C	C	5,717	RG2	not required	RG3 & RG4	RG3 & RG4	13.500	37.000	526	5,717	-
48	Glapan	Grobogan / Demak	T	18,696	26	Headworks	provided	C	17.980	51.550	257	C	C	C	18,784	RG3	large rehabili.	RG4	RG4	17.980	51.550	303	18,784	-
49	Klambu Kanan	Grobogan / Kudus / Pati	T	6,841	13	Headworks	unknown	B	12.619	50.590	160	C	C	C	11,078	RG2	new construction	RG3 & RG4	RG3 & RG4	12.619	50.590	189	11,078	-
50	Kaliwadas	Pekalogan / Pemalang	T	7,520	29	Headworks	provided	B	17.194	70.866	175	C	C	C	7,722	RG2	replacement	RG4	RG4	17.194	70.866	205	7,722	-

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical

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

Grade of rehabilitation: RG1: No rehabilitation, RG2: Minor rehabilitation, RG3: Large scale rehabilitation, RG4: Replacement or new construction

Table A-5.2.2 Irrigation System Rehabilitation Cost of the Schemes: Central Java

No.	Irrigation Scheme	District	Technical Level [1]	Present Irrigation Area (ha)	Subject Area (ha)	Area Increment (ha)	Age of the Facilities (years)	Irrigation System Rehabilitation Cost (million Rp.)										Rehabilitation Cost per ha (US$/ha)
								Water Resources Facility			Irrigation Works			Drainage Works	On-Farm Develop-ment	Project Facilities	Total	
								Dam/ Headworks	Settling Basin	Sub-total	Canals	Related Structures	Sub-total					
1.	Cijalu	Cilacap	T	1,377	1,377	0	16	814	2,876	3,691	22,417	15,541	37,958	3,796	2,823	1,260	49,527	4,344
2.	Mangganti	Cilacap	T	22,644	22,644	0	6	1,376	4,459	5,835	166,447	55,041	221,488	22,149	46,420	3,600	299,493	1,598
3.	Serayu	Cilacap	T	20,795	20,795	0	9	117	3,981	4,098	379,125	93,241	472,366	47,237	42,986	3,600	570,286	3,313
4.	Banjarcahyana	Banjarnegara	T	5,001	5,001	0	17	0	0	0	72,960	55,919	128,879	12,888	10,252	2,590	154,609	3,734
5.	Kaligending	Kebumen	T	2,923	2,923	0	4	1,260	1,277	2,537	15,693	13,249	28,943	2,894	5,992	1,570	41,936	1,733
6.	Pesucen	Kebumen	T	1,659	1,659	0	1	0	0	0	10,512	9,875	20,387	2,039	3,401	1,260	27,087	1,972
7.	Bedegolan	Kebumen	T	8,401	8,401	0	5	1,454	2,936	4,390	73,192	21,241	94,433	9,443	17,222	2,590	128,078	1,841
8.	Kedung Putri	Purworejo	T	4,451	4,451	0	15	863	3,063	3,926	39,025	28,527	67,551	6,755	9,181	1,570	88,983	2,415
9.	Sudagaran	Purworejo	T	3,665	3,665	0	13	999	2,554	3,553	45,091	7,357	52,448	5,245	7,513	1,570	70,329	2,318
10.	Rebug	Purworejo	T	1,202	1,202	0	15	1,183	807	1,990	18,655	3,101	21,756	2,176	2,464	1,260	29,645	2,979
11.	Kalimeneng	Purworejo	T	1,262	1,262	0	19	1,183	1,380	2,562	11,929	7,705	19,634	1,963	2,587	1,260	28,007	2,681
12.	Kedung GW	Purworejo	T	1,129	1,129	0	64	9,611	1,614	11,226	14,277	15,661	29,938	2,994	2,314	1,260	47,732	5,107
13.	Waduk Cengklik	Boyolali	T	2,120	2,120	0	3	2,365	1,732	4,097	19,800	15,532	35,332	3,533	4,346	1,570	48,878	2,785
14.	Ploso Wareng	Klaten	T	1,100	1,100	0	11	814	807	1,621	6,912	3,197	10,109	1,011	2,255	1,260	16,257	1,785
15.	Jaban	Klaten	T	1,191	1,191	0	11	635	1,614	2,249	12,652	13,881	26,533	2,653	2,442	1,260	35,137	3,564
16.	Colo Kanan	Sragen	T	22,982	22,982	0	18	1,726	13,269	14,995	280,537	158,585	439,122	43,912	47,113	3,600	548,742	2,884
17.	Bonggo	Sragen	T	1,406	1,406	0	18	7,272	2,084	9,356	13,120	9,849	22,970	2,297	2,882	1,260	38,766	3,330
18.	Pangkalan	Pati	T	654	654	0	10	1,144	1,380	2,523	5,078	4,906	9,984	998	1,341	1,260	16,106	2,975
19.	Sentul	Pati	T	1,739	1,739	0	11	1,183	1,042	2,225	13,856	5,173	19,029	1,903	3,565	1,260	27,982	1,944
20.	Widodaren	Pati	T	2,616	2,616	0	13	1,454	1,074	2,529	23,596	7,378	30,974	3,097	5,363	1,570	43,533	2,010
21.	Klambu Kanan	Pati	T	6,216	6,216	0	11	1,172	1,786	2,958	109,983	23,015	132,998	13,300	12,743	2,590	164,589	3,198
22.	Jragung	Demak	T	4,416	4,416	0	14	635	3,063	3,698	39,536	10,216	49,752	4,975	9,053	1,570	69,048	1,889
23.	Guntur	Demak	T	1,543	1,543	0	24	993	2,084	3,077	13,749	6,913	20,662	2,066	3,163	1,260	30,229	2,366
24.	Klambu Kiri	Demak	T	20,738	20,738	0	11	1,376	3,981	5,357	184,041	65,531	249,573	24,957	42,513	3,600	326,000	1,899
25.	Kedungdowo Kramat	Batang	T	1,250	1,250	0	27	1,628	2,759	4,387	8,376	4,498	12,874	1,287	2,563	1,260	22,371	2,162
26.	Sungapan Kanan	Pemalang	T	1,851	1,851	0	3	693	625	1,318	12,144	2,051	14,195	1,420	3,795	1,260	21,987	1,435
27.	Mejagong	Pemalang	T	2,049	2,049	0	11	814	1,042	1,856	16,325	6,831	23,155	2,316	4,200	1,570	33,097	1,951
28.	Sungapan Kiri	Pemalang	T	5,570	5,570	0	3	1,148	1,072	2,220	33,918	9,070	42,988	4,299	11,433	2,590	63,530	1,378
29.	Kabuyutan	Brebes	T	3,876	3,876	0	17	993	1,277	2,270	44,874	23,221	68,095	6,810	7,946	1,570	86,691	2,702
30.	Babakan	Brebes	T	2,528	2,528	0	11	814	1,042	1,856	25,799	3,969	29,768	2,977	5,182	1,570	41,354	1,976
31.	Kemaron Jambe	Brebes	T	1,483	1,483	0	12	814	1,042	1,856	27,760	10,906	38,666	3,867	3,274	1,260	48,923	3,985
32.	Jengkelok	Brebes	T	6,173	6,173	0	13	814	1,786	2,600	60,125	21,166	81,291	8,129	12,655	2,590	107,265	2,099
33.	Gung	Tegal & Kodia Tegal	T	12,641	12,641	0	5	1,628	4,242	5,870	39,293	14,854	54,147	5,415	25,914	3,600	94,946	907
34.	Parakankidang	Tegal & Kodia Tegal	T	1,631	1,631	0	9	814	1,042	1,856	9,969	2,836	12,805	1,280	3,344	1,260	20,545	1,521
35.	Kumisik	Tegal & Kodia Tegal	T	3,778	3,778	0	11	1,318	1,277	2,595	34,011	7,104	41,115	4,112	7,745	1,570	57,137	1,827
36.	Pesantren Kletak	Pekalongan & Kodia P.	T	3,636	3,636	0	8	1,260	1,277	2,537	47,370	10,158	57,528	5,753	7,454	1,570	74,841	2,486
37.	Sragi	Pekalongan & Kodia P.	T	3,539	3,539	0	29	1,183	2,554	3,737	41,824	5,754	47,578	4,758	7,255	1,570	64,897	2,215
38.	Sudikampir	Pekalongan & Kodia P.	T	1,550	1,550	0	28	1,318	1,042	2,361	26,022	7,894	33,915	3,392	3,178	1,260	44,105	3,437
39.	Padurekso	Pekalongan & Kodia P.	T	2,764	2,764	0	88	9,479	2,554	12,033	23,235	15,274	38,509	3,851	5,666	1,570	61,629	2,693
40.	Kedung Asem	Kendal & Kodia Semarang	T	2,845	2,845	0	13	814	2,084	2,898	25,201	11,714	36,915	3,692	5,935	1,570	51,010	2,166
41.	Bodri	Kendal & Kodia Semarang	T	7,710	7,710	0	13	912	5,617	6,529	59,590	18,473	78,063	7,806	15,806	2,590	110,793	1,736
42.	Trompo	Kendal & Kodia Semarang	T	1,229	1,229	0	13	1,172	2,759	3,932	8,758	1,848	10,606	1,061	2,519	1,260	19,378	1,904
43.	Kedung Pengilon	Kendal & Kodia Semarang	T	2,686	2,686	0	13	1,172	4,168	5,341	22,868	3,525	26,393	2,639	5,506	1,570	41,450	1,864
44.	Pasekan	Magelang dan Kodia Mag.	T	988	988	0	12	1,183	748	1,931	7,425	9,310	16,735	1,674	2,025	1,260	23,625	2,888
45.	Kosar	Batang / Pekalongan	T	3,243	3,243	0	28	993	1,277	2,270	48,709	16,099	64,808	6,481	6,648	1,570	81,777	3,046
46.	Notog	Brebes / Tegal	T	25,540	25,540	0	31	1,725	6,635	8,359	579,209	123,397	702,606	70,261	52,357	3,600	837,183	3,959
47.	Sidorejo	Grobogan / Boyolali	T	5,717	5,717	0	13	232	0	232	50,850	52,504	103,354	10,335	11,720	2,590	128,232	2,709
48.	Glapan	Grobogan / Demak	T	18,784	18,784	0	26	1,824	7,178	9,002	105,830	22,899	128,730	12,873	38,507	3,600	192,712	1,239
49.	Klambu Kanan	Grobogan / Kudus / Pati	T	11,078	11,078	0	13	1,454	2,545	3,999	62,520	10,488	73,008	7,301	22,710	3,600	110,618	1,206
50.	Kaliwadas	Pekalogan / Pemalang	T	7,722	7,722	0	29	1,454	1,761	3,216	133,287	17,210	150,497	15,050	15,830	2,590	187,182	2,928
	Total			**283,091**	**283,091**	**0**		**77,285**	**118,268**	**195,553**	**3,147,475**	**1,083,690**	**4,231,165**	**423,116**	**581,101**	**97,320**	**5,528,255**	**123,081**
	Average						16											2,359
	Rp. per ha							0.273	0.418	0.691	11.118	3.828	14.946	1.495	2.053	0.344	19.528	
	Itemized Total		T : 50 ST : 0 NT : 0															

Note: 1): T: Technical, ST: Semi-technical, NT: Non-technical

Source: JICA Study Team for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Table A-5.3.1 Agricultural Land Use Plan of the Subject Area: Central Java

Irrigation Scheme	Subject Area for Rehabilitation						Increment (Land Use Changes; II - I)		
	I. Present/Before-project Status (ha)			II. With-project Status (ha)					
	Irrigated Paddy Field	Rainfed Paddy Field	Total	Irrigated Paddy Field	Rainfed Paddy Field	Total	Irrigated Field	Rainfed Field	Total
1. Cijalu	1,377		1,377	1,377	0	1,377	0	0	0
2. Mangganti	22,644		22,644	22,644	0	22,644	0	0	0
3. Serayu	20,100	695	20,795	20,795	0	20,795	695	-695	0
4. Banjarcahyana	5,001		5,001	5,001	0	5,001	0	0	0
5. Kaligending	2,923		2,923	2,923	0	2,923	0	0	0
6. Pesucen	1,659		1,659	1,659	0	1,659	0	0	0
7. Bedegolan	8,401		8,401	8,401	0	8,401	0	0	0
8. Kedung Putri	4,341	110	4,451	4,451	0	4,451	110	-110	0
9. Sudagaran	3,665		3,665	3,665	0	3,665	0	0	0
10. Rebug	1,202		1,202	1,202	0	1,202	0	0	0
11. Kalimeneng	1,262		1,262	1,262	0	1,262	0	0	0
12. Kedung GW	1,129		1,129	1,129	0	1,129	0	0	0
13. Waduk Cengklik	2,120		2,120	2,120	0	2,120	0	0	0
14. Ploso Wareng	1,100		1,100	1,100	0	1,100	0	0	0
15. Jaban	1,191		1,191	1,191	0	1,191	0	0	0
16. Colo Kanan	22,982		22,982	22,982	0	22,982	0	0	0
17. Bonggo	1,406		1,406	1,406	0	1,406	0	0	0
18. Pangkalan	654		654	654	0	654	0	0	0
19. Sentul	1,739		1,739	1,739	0	1,739	0	0	0
20. Widodaren	2,616		2,616	2,616	0	2,616	0	0	0
21. Klambu Kanan	6,216		6,216	6,216	0	6,216	0	0	0
22. Jragung	4,416		4,416	4,416	0	4,416	0	0	0
23. Guntur	1,543		1,543	1,543	0	1,543	0	0	0
24. Klambu Kiri	20,738		20,738	20,738	0	20,738	0	0	0
25. Kedungdowo Kramat	1,250		1,250	1,250	0	1,250	0	0	0
26. Sungapan Kanan	1,851		1,851	1,851	0	1,851	0	0	0
27. Mejagong	2,049		2,049	2,049	0	2,049	0	0	0
28. Sungapan Kiri	5,541	29	5,570	5,570	0	5,570	29	-29	0
29. Kabuyutan	3,876		3,876	3,876	0	3,876	0	0	0
30. Babakan	2,528		2,528	2,528	0	2,528	0	0	0
31. Kemaron Jambe	1,026	457	1,483	1,483	0	1,483	457	-457	0
32. Jengkelok	6,173		6,173	6,173	0	6,173	0	0	0
33. Gung	12,641		12,641	12,641	0	12,641	0	0	0
34. Parakankidang	1,631		1,631	1,631	0	1,631	0	0	0
35. Kumisik	3,778		3,778	3,778	0	3,778	0	0	0
36. Pesantren Kletak	3,636		3,636	3,636	0	3,636	0	0	0
37. Sragi	3,539		3,539	3,539	0	3,539	0	0	0
38. Sudikampir	1,550		1,550	1,550	0	1,550	0	0	0
39. Padurekso	2,764		2,764	2,764	0	2,764	0	0	0
40. Kedung Asem	2,645	200	2,845	2,845	0	2,845	200	-200	0
41. Bodri	7,710		7,710	7,710	0	7,710	0	0	0
42. Trompo	1,229		1,229	1,229	0	1,229	0	0	0
43. Kedung Pengilon	2,686		2,686	2,686	0	2,686	0	0	0
44. Pasekan	988		988	988	0	988	0	0	0
45. Kosar	3,243		3,243	3,243	0	3,243	0	0	0
46. Notog	25,540		25,540	25,540	0	25,540	0	0	0
47. Sidorejo	5,717		5,717	5,717	0	5,717	0	0	0
48. Glapan	18,784		18,784	18,784	0	18,784	0	0	0
49. Klambu Kanan	11,078		11,078	11,078	0	11,078	0	0	0
50. Kaliwadas	7,722		7,722	7,722	0	7,722	0	0	0
Total	**281,600**	**1,491**	**283,091**	**283,091**	**0**	**283,091**	**1,491**	**-1,491**	**0**

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 1/7

District	Cilacap												Banjarnegara				Kebumen												Purworejo			
Irrigation Scheme	1. Cijalu				2. Mangganti				3. Serayu				4. Banjarcahyana				5. Kaligending				6. Pesucen				7. Bedegolan				8. Kedung Putri			
I. Present/Before Project																																
1. Land Use	Irri. Paddy Field 1,377 ha				Irri. Paddy Field 22,644 ha				Irri. Paddy Field 20,100 ha				Irri. Paddy Field 5,001 ha				Irri. Paddy Field 2,923 ha				Irri. Paddy Field 1,659 ha				Irri. Paddy Field 8,401 ha				Irri. Paddy Field 4,341 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 695 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 110 ha			
	Subject Area 1,377 ha				*Subject Area 22,644 ha*				*Subject Area 20,795 ha*				*Subject Area 5,001 ha*				*Subject Area 2,923 ha*				*Subject Area 1,659 ha*				*Subject Area 8,401 ha*				*Subject Area 4,451 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,281	1,033		2,314	22,644	18,147		40,791	20,100	20,100	1,582	41,782	5,001	4,001		9,002	2,923	2,842		5,765	1,659	960		2,619	8,401	8,167		16,568	4,334	3,328		7,662
- Palawija ha				0		4,492	5,317	9,809				0				0			657	657		699		699		95	200	295		162		162
- Sugarcane ha				0				0				0				0				0				0				0				0
- Palawija (rainfed) ha				0				0	695			695				0				0				0				0	110			110
Total ha	1,281	1,033	0	2,314	22,644	22,639	5,317	50,600	20,795	20,100	1,582	42,477	5,001	4,001	0	9,002	2,923	2,842	657	6,422	1,659	1,659	0	3,318	8,401	8,262	200	16,863	4,444	3,490	0	7,934
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	93	75	0	168	100	80	0	180	100	100	8	208	100	80	0	180	100	97	0	197	100	58	0	158	100	97	0	197	100	77	0	177
- Palawija %	0	0	0	0	0	20	23	43	0	0	0	0	0	0	0	0	0	0	22	22	0	42	0	42	0	1	2	4	0	4	0	4
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
In Irrigated Field %	*93*	*75*	*0*	*168*	*100*	*100*	*23*	*223*	*100*	*100*	*8*	*208*	*100*	*80*	*0*	*180*	*100*	*97*	*22*	*220*	*100*	*100*	*0*	*200*	*100*	*98*	*2*	*201*	*100*	*80*	*0*	*180*
- Palawija (rainfed) %									100	0	0	100																	100	0	0	100
Overall to Subject Area %	93	75	0	168	100	100	23	223	100	97	8	204	100	80	0	180	100	97	22	220	100	100	0	200	100	98	2	201	100	78	0	178
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	4.5		4.8	5.0	4.5		4.8	5.0	5.0	4.5	5.0	5.5	5.5		5.5	5.0	4.5		4.8	4.5	4.5		4.5	5.5	5.0		5.3	5.0	5.0		5.0
- Palawija t/ha				-		3.0	1.2	-				-				-			1.2	-		3.0		-		3.0	1.2	-		3.0		-
- Sugarcane t/ha				-				-				-				-				-				-				-				-
- Palawija (rainfed) t/ha				-				-	3.0			-				-				-				-				-	3.0			-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	6,405	4,649	0	11,054	113,220	81,662	0	194,882	100,500	100,500	7,119	208,119	27,506	22,006	0	49,511	14,615	12,789	0	27,404	7,466	4,320	0	11,786	46,206	40,835	0	87,041	21,670	16,640	0	38,310
- Palawija ton	0	0	0	0	0	13,476	6,380	19,856	0	0	0	0	0	0	0	0	0	0	788	788	0	2,097	0	2,097	0	285	240	525	0	486	0	486
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	2,085	0	0	2,085	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	330	0	0	330
	Palawija: maize (composite) & beans 1/								Palawija: maize (composite)								Palawija: beans 1/				Palawija: maize (composite)				Palawija: maize (composite) & beans 1/				Palawija: maize (composite)			
II. With Project																																
1. Land Use	Irri. Paddy Field 1,377 ha				Irri. Paddy Field 22,644 ha				Irri. Paddy Field 20,795 ha				Irri. Paddy Field 5,001 ha				Irri. Paddy Field 2,923 ha				Irri. Paddy Field 1,659 ha				Irri. Paddy Field 8,401 ha				Irri. Paddy Field 4,451 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel ha			
	Subject Area 1,377 ha				*Subject Area 22,644 ha*				*Subject Area 20,795 ha*				*Subject Area 5,001 ha*				*Subject Area 2,923 ha*				*Subject Area 1,659 ha*				*Subject Area 8,401 ha*				*Subject Area 4,451 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,377	1,377		2,754	22,644	18,115		40,759	20,795	20,795		41,590	5,001	5,001		10,002	2,923	2,923		5,846	1,659	1,327		2,986	8,401	8,401		16,802	4,451	4,451		8,902
- Palawija ha			411	411		4,529	9,058	13,587			8,318	8,318			1,500	1,500			1,169	1,169		332	498	830			2,520	2,520			1,335	1,335
- Sugarcane ha				0				0				0				0				0				0				0				0
- ha				0				0				0				0				0				0				0				0
Total ha	1,377	1,377	411	3,165	22,644	22,644	9,058	54,346	20,795	20,795	8,318	49,908	5,001	5,001	1,500	11,502	2,923	2,923	1,169	7,015	1,659	1,659	498	3,816	8,401	8,401	2,520	19,322	4,451	4,451	1,335	10,237
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	100	100	0	200	100	80	0	180	100	100	0	200	100	100	0	200	100	100	0	200	100	80	0	180	100	100	0	200	100	100	0	200
- Palawija %	0	0	30	30	0	20	40	60	0	0	40	40	0	0	30	30	0	0	40	40	0	20	30	50	0	0	30	30	0	0	30	30
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	100	100	30	230	100	100	40	240	100	100	40	240	100	100	30	230	100	100	40	240	100	100	30	230	100	100	30	230	100	100	30	230
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.5	5.0		5.3	5.5	5.0		5.3	5.5	5.5		5.5	6.0	6.0		6.0	5.5	5.0		5.3	5.0	5.0		5.0	6.0	5.5		5.8	5.5	5.5		5.5
- Palawija t/ha			1.4	-		5.0	1.4	-			1.4	-			1.4	-			1.4	-		5.0	1.4	-			1.4	-			1.4	-
- Sugarcane t/ha				-				-				-				-				-				-				-				-
5. Crop Production	We t	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	7,574	6,885	0	14,459	124,542	90,575	0	215,117	114,373	114,373	0	228,745	30,006	30,006	0	60,012	16,077	14,615	0	30,692	8,295	6,635	0	14,930	50,406	46,206	0	96,612	24,481	24,481	0	48,961
- Palawija ton	0	0	575	575	0	22,645	12,681	35,326	0	0	11,645	11,645	0	0	2,100	2,100	0	0	1,637	1,637	0	1,660	697	2,357	0	0	3,528	3,528	0	0	1,869	1,869
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palawija: beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: beans 2/			
Increment (With - Without)																																
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 695 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 110 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel -695 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel -110 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	96	344	0	440	0	-32	0	-32	695	695	-1,582	-192	0	1,000	0	1,000	0	81	0	81	0	367	0	367	0	234	0	234	117	1,123	0	1,240
- Palawija ha	0	0	411	411	0	37	3,741	3,778	0	0	8,318	8,318	0	0	1,500	1,500	0	0	512	512	0	-367	498	131	0	-95	2,320	2,225	0	-162	1,335	1,173
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	-695	0	0	-695	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-110	0	0	-110
Total ha	96	344	411	851	0	5	3,741	3,746	0	695	6,736	7,431	0	1,000	1,500	2,500	0	81	512	593	0	0	498	498	0	139	2,320	2,459	7	961	1,335	2,303
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	7	25	0	32	0	0	0	0	0	0	-8	-8	0	20	0	20	0	3	0	3	0	22	0	22	0	3	0	3	0	23	0	23
- Palawija	0	0	30	30	0	0	17	17	0	0	40	40	0	0	30	30	0	0	18	18	0	-22	30	8	0	-1	28	26	0	-4	30	26
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	-100	0	0	-100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	0	0	-100
Total %	7	25	30	62	0	0	17	17	0	3	32	36	0	20	30	50	0	3	18	20	0	0	30	30	0	2	28	29	0	22	30	52
4. Paddy Production ton	-	-	-	3,405	-	-	-	20,236	-	-	-	20,626	-	-	-	10,501	-	-	-	3,288	-	-	-	3,145	-	-	-	9,571	-	-	-	10,651
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 2/7

District	Purworejo																Boyolali				Klaten				Klaten - continued				Sragen			
Irrigation Scheme	9. Sudagaran				10. Rebug				11. Kalimeneng				12. Kedung GW				13. Waduk Cengklik				14. Ploso Wareng				15. Jaban				16. Colo Kanan			
I. Present/Before Project																																
1. Land Use	Irri. Paddy Field 3,665 ha				Irri. Paddy Field 1,202 ha				Irri. Paddy Field 1,262 ha				Irri. Paddy Field 1,129 ha				Irri. Paddy Field 2,120 ha				Irri. Paddy Field 1,100 ha				Irri. Paddy Field 1,191 ha				Irri. Paddy Field 22,982 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha			
	Subject Area 3,665 ha				*Subject Area 1,202 ha*				*Subject Area 1,262 ha*				*Subject Area 1,129 ha*				*Subject Area 2,120 ha*				*Subject Area 1,100 ha*				*Subject Area 1,191 ha*				*Subject Area 22,982 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	3,372	2,615		5,987	1,200	806		2,006	1,244	795	644	2,683	1,129	1,129		2,258	957	1,030	716	2,703	1,100	1,100	451	2,651	1,191	1,191	562	2,944	22,982	22,524	21,250	66,756
- Palawija ha				0				0				0				0	42	41	39	122			649	649			629	629		160	1,434	1,594
- Sugarcane ha				0				0				0				0	42			42				0				0		298		298
- Palawija (rainfed) ha				0				0				0				0				0				0				0				0
Total ha	3,372	2,615	0	5,987	1,200	806	0	2,006	1,244	795	644	2,683	1,129	1,129	0	2,258	1,041	1,071	755	2,867	1,100	1,100	1,100	3,300	1,191	1,191	1,191	3,573	22,982	22,982	22,684	68,648
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	92	71	0	163	100	67	0	167	99	63	51	213	100	100	0	200	45	49	34	128	100	100	41	241	100	100	47	247	100	98	92	290
- Palawija %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	2	6	0	0	59	59	0	0	53	53	0	1	6	7
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1
In Irrigated Field %	*92*	*71*	*0*	*163*	*100*	*67*	*0*	*167*	*99*	*63*	*51*	*213*	*100*	*100*	*0*	*200*	*49*	*51*	*36*	*135*	*100*	*100*	*100*	*300*	*100*	*100*	*100*	*300*	*100*	*100*	*99*	*299*
- Palawija (rainfed) %																																
Overall to Subject Area %	92	71	0	163	100	67	0	167	99	63	51	213	100	100	0	200	49	51	36	135	100	100	100	300	100	100	100	300	100	100	99	299
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	4.5		4.8	5.0	4.5		4.8	5.0	4.5	4.0	4.6	5.0	4.5		4.8	4.5	4.5	4.0	4.4	5.0	5.0	5.0	5.0	5.0	5.0	4.0	4.8	5.0	5.0	4.5	4.8
- Palawija t/ha				-				-				-				-	3.0	3.0	1.2	-			1.2	-			1.2	-		3.0	1.2	-
- Sugarcane t/ha				-				-				-				-	65.0			-				-				-		65.0		-
- Palawija (rainfed) t/ha				-				-				-				-				-				-				-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	16,860	11,768	0	28,628	6,000	3,627	0	9,627	6,220	3,578	2,576	12,374	5,645	5,081	0	10,726	4,307	4,635	2,864	11,806	5,500	5,500	2,255	13,255	5,955	5,955	2,248	14,158	114,910	112,620	95,625	323,155
- Palawija ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	126	123	47	296	0	0	779	779	0	0	755	755	0	480	1,721	2,201
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,730	0	0	2,730	0	0	0	0	0	0	0	0	0	19,370	0	19,370
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
																	Palawija: maize (composite) & beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: maize (composite) & beans 1/			
II. With Project																																
1. Land Use	Irri. Paddy Field 3,665 ha				Irri. Paddy Field 1,202 ha				Irri. Paddy Field 1,262 ha				Irri. Paddy Field 1,129 ha				Irri. Paddy Field 2,120 ha				Irri. Paddy Field 1,100 ha				Irri. Paddy Field 1,191 ha				Irri. Paddy Field 22,982 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 3,665 ha				*Subject Area 1,202 ha*				*Subject Area 1,262 ha*				*Subject Area 1,129 ha*				*Subject Area 2,120 ha*				*Subject Area 1,100 ha*				*Subject Area 1,191 ha*				*Subject Area 22,982 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	3,665	2,749		6,414	1,202	841		2,043	1,262	883	631	2,776	1,129	1,129		2,258	2,078	1,060	636	3,774	1,100	1,100	550	2,750	1,191	1,191	596	2,978	22,982	22,684	22,684	68,350
- Palawija ha		916	733	1,649		362	240	602		252	126	378			339	339		212	212	424			550	550			595	595				0
- Sugarcane ha				0				0				0				0	42			42				0				0		298		298
- ha				0				0				0				0				0				0				0				0
Total ha	3,665	3,665	733	8,063	1,202	1,203	240	2,645	1,262	1,135	757	3,154	1,129	1,129	339	2,597	2,120	1,272	848	4,240	1,100	1,100	1,100	3,300	1,191	1,191	1,191	3,573	22,982	22,982	22,684	68,648
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	100	75	0	175	100	70	0	170	100	70	50	220	100	100	0	200	98	50	30	178	100	100	50	250	100	100	50	250	100	99	99	297
- Palawija %	0	25	20	45	0	30	20	50	0	20	10	30	0	0	30	30	0	10	10	20	0	0	50	50	0	0	50	50	0	0	0	0
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1
Total %	100	100	20	220	100	100	20	220	100	90	60	250	100	100	30	230	100	60	40	200	100	100	100	300	100	100	100	300	100	100	99	299
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.5	5.0		5.3	5.5	5.0		5.3	5.5	5.0	4.5	5.1	5.5	5.0		5.3	5.0	5.0	5.0	5.0	5.5	5.5	5.5	5.5	5.5	5.5	4.5	5.3	5.5	5.5	5.0	5.3
- Palawija t/ha		5.0	1.4	-		5.0	1.4	-		5.0	1.4	-			1.4	-		5.0	1.4	-			1.4	-			1.4	-				-
- Sugarcane t/ha				-				-				-				-	65.0			-				-				-		65.0		-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	20,158	13,745	0	33,903	6,611	4,205	0	10,816	6,941	4,415	2,840	14,196	6,210	5,645	0	11,855	10,390	5,300	3,180	18,870	6,050	6,050	3,025	15,125	6,551	6,551	2,682	15,783	126,401	124,762	113,420	364,583
- Palawija ton	0	4,580	1,026	5,606	0	1,810	336	2,146	0	1,260	176	1,436	0	0	475	475	0	1,060	297	1,357	0	0	770	770	0	0	833	833	0	0	0	0
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2,730	0	0	2,730	0	0	0	0	0	0	0	0	0	19,370	0	19,370
	Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/							
Increment (With - Without)																																
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	293	134	0	427	2	35	0	37	18	88	-13	93	0	0	0	0	1,121	30	-80	1,071	0	0	99	99	0	0	34	34	0	160	1,434	1,594
- Palawija ha	0	916	733	1,649	0	362	240	602	0	252	126	378	0	0	339	339	-42	171	173	302	0	0	-99	-99	0	0	-34	-34	0	-160	-1,434	-1,594
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total ha	293	1,050	733	2,076	2	397	240	639	18	340	113	471	0	0	339	339	1,079	201	93	1,373	0	0	0	0	0	0	0	0	0	0	0	0
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	8	4	0	12	0	3	0	3	1	7	-1	7	0	0	0	0	53	1	-4	51	0	0	9	9	0	0	3	3	0	1	6	7
- Palawija	0	25	20	45	0	30	20	50	0	20	10	30	0	0	30	30	-2	8	8	14	0	0	-9	-9	0	0	-3	-3	0	-1	-6	-7
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	8	29	20	57	0	33	20	53	1	27	9	37	0	0	30	30	51	9	4	65	0	0	0	0	0	0	0	0	0	0	0	0
4. Paddy Production ton	-	-	-	5,275	-	-	-	1,189	-	-	-	1,822	-	-	-	1,129	-	-	-	7,065	-	-	-	1,870	-	-	-	1,625	-	-	-	41,428
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.6	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 3/7

District	Sragen - contimueed				Pati												Demak											
Irrigation Scheme	17. Bonggo				18. Pangkalan				19. Sentul				20. Widodaren				21. Klambu Kanan				22. Jragung				23. Guntur				24. Klambu Kiri			
I. Present/Before Project																												
1. Land Use	Irri. Paddy Field 1,406 ha				Irri. Paddy Field 654 ha				Irri. Paddy Field 1,739 ha				Irri. Paddy Field 2,616 ha				Irri. Paddy Field 6,216 ha				Irri. Paddy Field 4,416 ha				Irri. Paddy Field 1,543 ha				Irri. Paddy Field 20,738 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha			
	Subject Area 1,406 ha				*Subject Area 654 ha*				*Subject Area 1,739 ha*				*Subject Area 2,616 ha*				*Subject Area 6,216 ha*				*Subject Area 4,416 ha*				*Subject Area 1,543 ha*				*Subject Area 20,738 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,350	1,336	232	2,918	654	336		990	1,551	1,412		2,963	1,911	572		2,483	5,946	5,946	1,533	13,425	2,333	1,400		3,733	1,543	1,543		3,086	20,738	20,738		41,476
- Palawija ha				0		318		318	188	327		515	705	2,044		2,749			1,669	1,669	2,083	3,016	4,416	9,515				0			12,028	12,028
- Sugarcane ha				0				0				0				0	270			270				0				0				0
- Palawija (rainfed) ha				0				0				0				0				0				0				0				0
Total ha	1,350	1,336	232	2,918	654	654	0	1,308	1,739	1,739	0	3,478	2,616	2,616	0	5,232	6,216	5,946	3,202	15,364	4,416	4,416	4,416	13,248	1,543	1,543	0	3,086	20,738	20,738	12,028	53,504
3. Cropping Intensity	We t	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	96	95	17	208	100	51	0	151	89	81	0	170	73	22	0	95	96	96	25	216	53	32	0	85	100	100	0	200	100	100	0	200
- Palawija %	0	0	0	0	0	49	0	49	11	19	0	30	27	78	0	105	0	0	27	27	47	68	100	215	0	0	0	0	0	0	58	58
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
In Irrigated Field %	*96*	*95*	*17*	*208*	*100*	*100*	*0*	*200*	*100*	*100*	*0*	*200*	*100*	*100*	*0*	*200*	*100*	*96*	*52*	*247*	*100*	*100*	*100*	*300*	*100*	*100*	*0*	*200*	*100*	*100*	*58*	*258*
- Palawija (rainfed) %																																
Overall to Subject Area %	96	95	17	208	100	100	0	200	100	100	0	200	100	100	0	200	100	96	52	247	100	100	100	300	100	100	0	200	100	100	58	258
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	5.0	4.5	5.0	4.5	4.5		4.5	4.5	4.5		4.5	4.5	4.5		4.5	4.5	4.5	4.0	4.4	4.5	4.5		4.5	4.5	4.5		4.5	5.0	5.0		5.0
- Palawija t/ha				-		3.0		-	3.0	3.0		-	3.0	3.0		-			1.2	-	3.0	3.0	1.2	-				-			1.2	-
- Sugarcane t/ha				-				-				-				-	65.0			-				-				-				-
- Palawija (rainfed) t/ha				-				-				-				-				-				-				-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	6,750	6,680	1,044	14,474	2,943	1,512	0	4,455	6,980	6,354	0	13,334	8,600	2,574	0	11,174	26,757	26,757	6,132	59,646	10,499	6,300	0	16,799	6,944	6,944	0	13,887	103,690	103,690	0	207,380
- Palawija ton	0	0	0	0	0	954	0	954	564	981	0	1,545	2,115	6,132	0	8,247	0	0	2,003	2,003	6,249	9,048	5,299	20,596	0	0	0	0	0	0	14,434	14,434
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,550	0	0	17,550	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
					Palawija: maize (composite)1/				Palawija: maize (composite)1/				Palawija: maize (composite)1/				Palawija: beans 1/				Palawija: maize (composite) & beans 1/								Palawija: beans 1/			
II. With Project																												
1. Land Use	Irri. Paddy Field 1,406 ha				Irri. Paddy Field 654 ha				Irri. Paddy Field 1,739 ha				Irri. Paddy Field 2,616 ha				Irri. Paddy Field 6,216 ha				Irri. Paddy Field 4,416 ha				Irri. Paddy Field 1,543 ha				Irri. Paddy Field 20,738 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 1,406 ha				*Subject Area 654 ha*				*Subject Area 1,739 ha*				*Subject Area 2,616 ha*				*Subject Area 6,216 ha*				*Subject Area 4,416 ha*				*Subject Area 1,543 ha*				*Subject Area 20,738 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,406	1,406	281	3,093	654	392		1,046	1,739	1,391		3,130	2,616	1,308		3,924	5,946	5,946	1,554	13,446	4,416	2,208		6,624	1,543	1,543		3,086	20,738	20,738	4,148	45,624
- Palawija ha			281	281		262	131	393		348	348	696		1,308	785	2,093			2,486	2,486		2,208	4,416	6,624			463	463			12,443	12,443
- Sugarcane ha				0				0				0				0	270			270				0				0				0
- ha				0				0				0				0				0				0				0				0
Total ha	1,406	1,406	562	3,374	654	654	131	1,439	1,739	1,739	348	3,826	2,616	2,616	785	6,017	6,216	5,946	4,040	16,202	4,416	4,416	4,416	13,248	1,543	1,543	463	3,549	20,738	20,738	16,591	58,067
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	100	100	20	220	100	60	0	160	100	80	0	180	100	50	0	150	96	96	25	216	100	50	0	150	100	100	0	200	100	100	20	220
- Palawija %	0	0	20	20	0	40	20	60	0	20	20	40	0	50	30	80	0	0	40	40	0	50	100	150	0	0	30	30	0	0	60	60
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0
Total %	100	100	40	240	100	100	20	220	100	100	20	220	100	100	30	230	100	96	65	261	100	100	100	300	100	100	30	230	100	100	80	280
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.5	5.5	5.0	5.5	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	4.5	4.9	5.0	5.0		5.0	5.0	5.0		5.0	5.5	5.5	5.0	5.5
- Palawija t/ha			1.4	-		5.0	1.4	-		5.0	1.4	-		5.0	1.4	-			1.4	-		5.0	1.4	-			1.4	-			1.4	-
- Sugarcane t/ha				-				-				-				-	65.0			-				-				-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	7,733	7,733	1,405	16,871	3,270	1,960	0	5,230	8,695	6,955	0	15,650	13,080	6,540	0	19,620	29,730	29,730	6,993	66,453	22,080	11,040	0	33,120	7,715	7,715	0	15,430	114,059	114,059	20,740	248,858
- Palawija ton	0	0	393	393	0	1,310	183	1,493	0	1,740	487	2,227	0	6,540	1,099	7,639	0	0	3,480	3,480	0	11,040	6,182	17,222	0	0	648	648	0	0	17,420	17,420
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	17,550	0	0	17,550	0	0	0	0	0	0	0	0	0	0	0	0
	Palawija: beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: beans 2/			
Increment (With - Without)																												
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	56	70	49	175	0	56	0	56	188	-21	0	167	705	736	0	1,441	0	0	21	21	2,083	808	0	2,891	0	0	0	0	0	0	4,148	4,148
- Palawija ha	0	0	281	281	0	-56	131	75	-188	21	348	181	-705	-736	785	-656	0	0	817	817	-2,083	-808	0	-2,891	0	0	463	463	0	0	415	415
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total ha	56	70	330	456	0	0	131	131	0	0	348	348	0	0	785	785	0	0	838	838	0	0	0	0	0	0	463	463	0	0	4,563	4,563
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	4	5	3	12	0	9	0	9	11	-1	0	10	27	28	0	55	0	0	0	0	47	18	0	65	0	0	0	0	0	0	20	20
- Palawija	0	0	20	20	0	-9	20	11	-11	1	20	10	-27	-28	30	-25	0	0	13	13	-47	-18	0	-65	0	0	30	30	0	0	2	2
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	4	5	23	32	0	0	20	20	0	0	20	20	0	0	30	30	0	0	13	13	0	0	0	0	0	0	30	30	0	0	22	22
4. Paddy Production ton	-	-	-	2,397	-	-	-	775	-	-	-	2,317	-	-	-	8,447	-	-	-	6,807	-	-	-	16,322	-	-	-	1,543	-	-	-	41,478
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 4/7

District	Batang				Pemalang												Brebes											
Irrigation Scheme	25. Kedungdowo Kramat				26. Sungapan Kanan				27. Mejagong				28. Sungapan Kiri				29. Kabuyutan				30. Babakan				31. Kemaron Jambe				32. Jengkelok			
I. Present/Before Project																												
1. Land Use	Irri. Paddy Field 1,250 ha				Irri. Paddy Field 1,851 ha				Irri. Paddy Field 2,049 ha				Irri. Paddy Field 5,541 ha				Irri. Paddy Field 3,876 ha				Irri. Paddy Field 2,528 ha				Irri. Paddy Field 1,026 ha				Irri. Paddy Field 6,173 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 29 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 457 ha				Rainfed Paddy Field 0 ha			
	Subject Area 1,250 ha				*Subject Area 1,851 ha*				*Subject Area 2,049 ha*				*Subject Area 5,570 ha*				*Subject Area 3,876 ha*				*Subject Area 2,528 ha*				*Subject Area 1,483 ha*				*Subject Area 6,173 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,079	1,069	10	2,158	1,487	1,299		2,786	2,049	2,045	2,041	6,135	4,654	4,356		9,010	2,735	1,105	947	4,787	2,295	1,406	475	4,176	1,026	1,026	1,026	3,078	5,112			5,112
- Palawija ha	68	76	1,063	1,207			361	361		4		4			817	817	565	1,554	1,638	3,757	35	658	1,276	1,969				0		3,958	2,035	5,993
- Sugarcane ha				0		491		491				0		1,185		1,185	576	369		945	198	247		445				0		436		436
- Palawija (rainfed) ha				0				0				0	29			29				0				0	457			457				0
Total ha	1,147	1,145	1,073	3,365	1,487	1,790	361	3,638	2,049	2,049	2,041	6,139	4,683	5,541	817	11,041	3,876	3,028	2,585	9,489	2,528	2,311	1,751	6,590	1,483	1,026	1,026	3,535	5,112	4,394	2,035	11,541
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	86	86	1	173	80	70	0	151	100	100	100	299	84	79	0	163	71	29	24	124	91	56	19	165	100	100	100	300	83	0	0	83
- Palawija %	5	6	85	97	0	0	20	20	0	0	0	0	0	0	15	15	15	40	42	97	1	26	50	78	0	0	0	0	0	64	33	97
- Sugarcane %	0	0	0	0	0	27	0	27	0	0	0	0	0	21	0	21	15	10	0	24	8	10	0	18	0	0	0	0	0	7	0	7
In Irrigated Field %	*92*	*92*	*86*	*269*	*80*	*97*	*20*	*197*	*100*	*100*	*100*	*300*	*84*	*100*	*15*	*199*	*100*	*78*	*67*	*245*	*100*	*91*	*69*	*261*	*100*	*100*	*100*	*300*	*83*	*71*	*33*	*187*
- Palawija (rainfed) %													100	0	0	100									100	0	0	100				
Overall to Subject Area %	92	92	86	269	80	97	20	197	100	100	100	300	84	99	15	198	100	78	67	245	100	91	69	261	100	69	69	238	83	71	33	187
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	4.5	4.5	4.0	4.5	4.5	4.5		4.5	5.0	4.5	4.5	4.7	5.5	5.5		5.5	5.5	5.5	5.0	5.4	5.0	5.0	4.5	4.9	5.0	5.0	4.5	4.8	5.0			5.0
- Palawija t/ha	3.0	3.0	1.2	-			1.2	-		1.2		-			1.2	-	3.0	3.0	1.2	-	3.0	3.0	1.2	-				-		3.0	1.2	-
- Sugarcane t/ha				-		65.0		-				-		65.0		-	65.0	65.0		-	65.0	65.0		-				-		65.0		-
- Palawija (rainfed) t/ha				-				-				-	3.0			-				-				-	3.0			-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	4,856	4,811	40	9,706	6,692	5,846	0	12,537	10,245	9,203	9,185	28,632	25,597	23,958	0	49,555	15,043	6,078	4,735	25,855	11,475	7,030	2,138	20,643	5,130	5,130	4,617	14,877	25,560	0	0	25,560
- Palawija ton	204	228	1,276	1,708	0	0	433	433	0	5	0	5	0	0	980	980	1,695	4,662	1,966	8,323	105	1,974	1,531	3,610	0	0	0	0	0	11,874	2,442	14,316
- Sugarcane ton	0	0	0	0	0	31,915	0	31,915	0	0	0	0	0	77,025	0	77,025	37,440	23,985	0	61,425	12,870	16,055	0	28,925	0	0	0	0	0	28,340	0	28,340
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	0	0	0	0	87	0	0	87	0	0	0	0	0	0	0	0	1,371	0	0	1,371	0	0	0	0
	Palawija: maize (composite) & beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: maize (composite) & beans 1/				Palawija: maize (composite) & beans 1/				Palawija: maize (composite) 1/				Palawija: maize (composite) & beans 1/			
II. With Project																												
1. Land Use	Irri. Paddy Field 1,250 ha				Irri. Paddy Field 1,851 ha				Irri. Paddy Field 2,049 ha				Irri. Paddy Field 5,570 ha				Irri. Paddy Field 3,876 ha				Irri. Paddy Field 2,528 ha				Irri. Paddy Field 1,483 ha				Irri. Paddy Field 6,173 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 1,250 ha				*Subject Area 1,851 ha*				*Subject Area 2,049 ha*				*Subject Area 5,570 ha*				*Subject Area 3,876 ha*				*Subject Area 2,528 ha*				*Subject Area 1,483 ha*				*Subject Area 6,173 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,250	1,250		2,500	1,851	1,360	491	3,702	2,049	2,049	2,049	6,147	5,570	4,385		9,955	3,300	1,560	969	5,829	2,330	1,517	506	4,353	1,483	1,483	1,483	4,449	6,173	2,469	617	9,259
- Palawija ha			1,125	1,125			185	185				0			1,671	1,671		1,371	2,132	3,503		566	1,517	2,083				0		1,854	1,235	3,089
- Sugarcane ha				0		491		491				0		1,185		1,185	576	369		945	198	247		445				0		436		436
- ha				0				0				0				0				0				0				0				0
Total ha	1,250	1,250	1,125	3,625	1,851	1,851	676	4,378	2,049	2,049	2,049	6,147	5,570	5,570	1,671	12,811	3,876	3,300	3,101	10,277	2,528	2,330	2,023	6,881	1,483	1,483	1,483	4,449	6,173	4,759	1,852	12,784
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	100	100	0	200	100	73	27	200	100	100	100	300	100	79	0	179	85	40	25	150	92	60	20	172	100	100	100	300	100	40	10	150
- Palawija %	0	0	90	90	0	0	10	10	0	0	0	0	0	0	30	30	0	35	55	90	0	22	60	82	0	0	0	0	0	30	20	50
- Sugarcane %	0	0	0	0	0	27	0	27	0	0	0	0	0	21	0	21	15	10	0	24	8	10	0	18	0	0	0	0	0	7	0	7
Total %	100	100	90	290	100	100	37	237	100	100	100	300	100	100	30	230	100	85	80	265	100	92	80	272	100	100	100	300	100	77	30	207
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	5.0		5.0	5.0	5.0	4.5	4.9	5.5	5.0	5.0	5.2	6.0	6.0		6.0	6.0	6.0	5.5	5.9	5.5	5.5	5.0	5.4	5.5	5.5	5.0	5.3	5.5	5.5	5.0	5.5
- Palawija t/ha			1.4	-			1.4	-				-			1.4	-		5.0	1.4	-		5.0	1.4	-				-		5.0	1.4	-
- Sugarcane t/ha				-		65.0		-				-		65.0		-	65.0	65.0		-	65.0	65.0		-				-		65.0		-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	6,250	6,250	0	12,500	9,255	6,800	2,210	18,265	11,270	10,245	10,245	31,760	33,420	26,310	0	59,730	19,800	9,360	5,330	34,490	12,815	8,344	2,530	23,689	8,157	8,157	7,415	23,728	33,952	13,580	3,085	50,616
- Palawija ton	0	0	1,575	1,575	0	0	259	259	0	0	0	0	0	0	2,339	2,339	0	6,855	2,985	9,840	0	2,830	2,124	4,954	0	0	0	0	0	9,270	1,729	10,999
- Sugarcane ton	0	0	0	0	0	31,915	0	31,915	0	0	0	0	0	77,025	0	77,025	37,440	23,985	0	61,425	12,870	16,055	0	28,925	0	0	0	0	0	28,340	0	28,340
	Palawija: beans 2/				Palawija: beans 2/								Palawija: beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/								Palawija: maize (hybrid) & beans 2/			
Increment (With - Without)																												
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 29 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 457 ha				Irri. Paddy Field 0 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel -29 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel -457 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	171	181	-10	342	364	61	491	916	0	4	8	12	916	29	0	945	565	455	22	1,042	35	111	31	177	457	457	457	1,371	1,061	2,469	617	4,147
- Palawija ha	-68	-76	62	-82	0	0	-176	-176	0	-4	0	-4	0	0	854	854	-565	-183	494	-254	-35	-92	241	114	0	0	0	0	0	-2,104	-800	-2,904
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	0	0	0	0	-29	0	0	-29	0	0	0	0	0	0	0	0	-457	0	0	-457	0	0	0	0
Total ha	103	105	52	260	364	61	315	740	0	0	8	8	887	29	854	1,770	0	272	516	788	0	19	272	291	0	457	457	914	1,061	365	-183	1,243
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	14	14	-1	27	20	3	27	49	0	0	0	1	16	0	0	16	15	12	1	27	1	4	1	7	0	0	0	0	17	40	10	67
- Palawija	-5	-6	5	-7	0	0	-10	-10	0	0	0	0	0	0	15	15	-15	-5	13	-7	-1	-4	10	5	0	0	0	0	0	-34	-13	-47
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	0	0	0	0	-100	0	0	-100	0	0	0	0	0	0	0	0	-100	0	0	-100	0	0	0	0
Total %	8	8	4	21	20	3	17	40	0	0	0	0	16	1	15	32	0	7	13	20	0	1	11	12	0	31	31	62	17	6	-3	20
4. Paddy Production ton	-	-	-	2,794	-	-	-	5,728	-	-	-	3,128	-	-	-	10,175	-	-	-	8,635	-	-	-	3,046	-	-	-	8,851	-	-	-	25,056
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.4	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 5/7

District	Tegal & Kodia Tegal												Pekalongan & Kodia Pekalogan																Kendal & Kodia Semarang			
Irrigation Scheme	33. Gung				34. Parakankidang				35. Kumisik				36. Pesantren Kletak				37. Sragi				38. Sudikampir				39. Padurekso				40. Kedung Asem			
I. Present/Before Project																																
1. Land Use	Irri. Paddy Field 12,641 ha				Irri. Paddy Field 1,631 ha				Irri. Paddy Field 3,778 ha				Irri. Paddy Field 3,636 ha				Irri. Paddy Field 3,539 ha				Irri. Paddy Field 1,550 ha				Irri. Paddy Field 2,764 ha				Irri. Paddy Field 2,645 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Fie 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 200 ha			
	Subject Area 12,641 ha				*Subject Area 1,631 ha*				*Subject Area 3,778 ha*				*Subject Area 3,636 ha*				*Subject Area 3,539 ha*				*Subject Area 1,550 ha*				*Subject Area 2,764 ha*				*Subject Area 2,845 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	9,734	4,579	406	14,719	1,523	354		1,877	3,553	1,225		4,778	3,264	3,264		6,528	2,996	2,996		5,992	1,380	1,380		2,760	2,454	2,454	65	4,973	2,645	2,645		5,290
- Palawija ha	1,517	5,077	9,572	16,166		1,156	1,213	2,369		2,042	1,921	3,963			2,547	2,547			1,921	1,921			873	873			1,259	1,259				0
- Sugarcane ha	1,390	1,563		2,953	98	14		112	224	225		449	371			371	543			543	170			170	310			310				0
- Palawija (rainfed) ha				0				0				0				0				0				0				0	200			200
Total ha	12,641	11,219	9,978	33,838	1,621	1,524	1,213	4,358	3,777	3,492	1,921	9,190	3,635	3,264	2,547	9,446	3,539	2,996	1,921	8,456	1,550	1,380	873	3,803	2,764	2,454	1,324	6,542	2,845	2,645	0	5,490
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	77	36	3	116	93	22	0	115	94	32	0	126	90	90	0	180	85	85	0	169	89	89	0	178	89	89	2	180	100	100	0	200
- Palawija %	12	40	76	128	0	71	74	145	0	54	51	105	0	0	70	70	0	0	54	54	0	0	56	56	0	0	46	46	0	0	0	0
- Sugarcane %	11	12	0	23	6	1	0	7	6	6	0	12	10	0	0	10	15	0	0	15	11	0	0	11	11	0	0	11	0	0	0	0
In Irrigated Field %	*100*	*89*	*79*	*268*	*99*	*93*	*74*	*267*	*100*	*92*	*51*	*243*	*100*	*90*	*70*	*260*	*100*	*85*	*54*	*239*	*100*	*89*	*56*	*245*	*100*	*89*	*48*	*237*	*100*	*100*	*0*	*200*
- Palawija (rainfed) %																														100	0	100
Overall to Subject Area %	100	89	79	268	99	93	74	267	100	92	51	243	100	90	70	260	100	85	54	239	100	89	56	245	100	89	48	237	100	93	0	193
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	5.0	4.5	5.0	5.0	5.0		5.0	5.0	5.0	4.5	5.0	4.5	4.5		4.5	4.5	4.5		4.5	4.5	4.0		4.3	4.5	4.5	4.0	4.5	5.0	5.0		5.0
- Palawija t/ha	3.0	3.0	1.2	-		3.0	1.2	-		3.0	1.2	-			1.2	-			1.2	-			1.2	-			1.2	-				-
- Sugarcane t/ha	65.0	65.0		-	65.0	65.0		-	65.0	65.0		-	65.0			-	65.0			-	65.0			-	65.0			-				-
- Palawija (rainfed) t/ha				-				-				-				-				-				-				-	3.0			-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	48,670	22,895	1,827	73,392	7,615	1,770	0	9,385	17,765	6,125	0	23,890	14,688	14,688	0	29,376	13,482	13,482	0	26,964	6,210	5,520	0	11,730	11,043	11,043	260	22,346	13,225	13,225	0	26,450
- Palawija ton	4,551	15,231	11,486	31,268	0	3,468	1,456	4,924	0	6,126	2,305	8,431	0	0	3,056	3,056	0	0	2,305	2,305	0	0	1,048	1,048	0	0	1,511	1,511	0	0	0	0
- Sugarcane ton	90,350	101,595	0	191,945	6,370	910	0	7,280	14,560	14,625	0	29,185	24,115	0	0	24,115	35,295	0	0	35,295	11,050	0	0	11,050	20,150	0	0	20,150	0	0	0	0
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	600	0	0	600
	Palawija: maize (composite) & beans 1/				Palawija: maize (composite) & beans 1/				Palawija: maize (composite) & beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: beans 1/				Palawija: maize (composite) 1/			
II. With Project																																
1. Land Use	Irri. Paddy Field 12,641 ha				Irri. Paddy Field 1,631 ha				Irri. Paddy Field 3,778 ha				Irri. Paddy Field 3,636 ha				Irri. Paddy Field 3,539 ha				Irri. Paddy Field 1,550 ha				Irri. Paddy Field 2,764 ha				Irri. Paddy Field 2,845 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 12,641 ha				*Subject Area 1,631 ha*				*Subject Area 3,778 ha*				*Subject Area 3,636 ha*				*Subject Area 3,539 ha*				*Subject Area 1,550 ha*				*Subject Area 2,764 ha*				*Subject Area 2,845 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	11,251	6,321		17,572	1,533	816		2,349	3,554	3,329		6,883	3,265	3,265		6,530	2,996	2,996		5,992	1,380	1,380		2,760	2,454	2,454		4,908	2,845	2,845		5,690
- Palawija ha		3,367	10,113	13,480		703	1,468	2,171			2,645	2,645			2,909	2,909			2,477	2,477			1,085	1,085			1,658	1,658			1,423	1,423
- Sugarcane ha	1,390	1,563		2,953	98	14		112	224	225		449	371			371	543			543	170			170	310			310				0
- ha				0				0				0				0				0				0				0				0
Total ha	12,641	11,251	10,113	34,005	1,631	1,533	1,468	4,632	3,778	3,554	2,645	9,977	3,636	3,265	2,909	9,810	3,539	2,996	2,477	9,012	1,550	1,380	1,085	4,015	2,764	2,454	1,658	6,876	2,845	2,845	1,423	7,113
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	89	50	0	139	94	50	0	144	94	88	0	182	90	90	0	180	85	85	0	169	89	89	0	178	89	89	0	178	100	100	0	200
- Palawija %	0	27	80	107	0	43	90	133	0	0	70	70	0	0	80	80	0	0	70	70	0	0	70	70	0	0	60	60	0	0	50	50
- Sugarcane %	11	12	0	23	6	1	0	7	6	6	0	12	10	0	0	10	15	0	0	15	11	0	0	11	11	0	0	11	0	0	0	0
Total %	100	89	80	269	100	94	90	284	100	94	70	264	100	90	80	270	100	85	70	255	100	89	70	259	100	89	60	249	100	100	50	250
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.5	5.5	5.0	5.5	5.5	5.5		5.5	5.5	5.5		5.5	5.0	5.0		5.0	5.0	5.0		5.0	5.0	4.5		4.8	5.0	5.0		5.0	5.5	5.5		5.5
- Palawija t/ha		5.0	1.4	-		5.0	1.4	-			1.4	-			1.4	-			1.4	-			1.4	-			1.4	-			1.4	-
- Sugarcane t/ha	65.0	65.0		-	65.0	65.0		-	65.0	65.0		-	65.0			-	65.0			-	65.0			-	65.0			-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	61,881	34,766	0	96,646	8,432	4,488	0	12,920	19,547	18,310	0	37,857	16,325	16,325	0	32,650	14,980	14,980	0	29,960	6,900	6,210	0	13,110	12,270	12,270	0	24,540	15,648	15,648	0	31,295
- Palawija ton	0	16,835	14,158	30,993	0	3,515	2,055	5,570	0	0	3,703	3,703	0	0	4,073	4,073	0	0	3,468	3,468	0	0	1,519	1,519	0	0	2,321	2,321	0	0	1,992	1,992
- Sugarcane ton	90,350	101,595	0	191,945	6,370	910	0	7,280	14,560	14,625	0	29,185	24,115	0	0	24,115	35,295	0	0	35,295	11,050	0	0	11,050	20,150	0	0	20,150	0	0	0	0
	Palawija: maize (hybrid) & beans 2/				Palawija: maize (hybrid) & beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/			
Increment (With - Without)																																
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 200 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel -200 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	1,517	1,742	-406	2,853	10	462	0	472	1	2,104	0	2,105	1	1	0	2	0	0	0	0	0	0	0	0	0	0	-65	-65	200	200	0	400
- Palawija ha	-1,517	-1,710	541	-2,686	0	-453	255	-198	0	-2,042	724	-1,318	0	0	362	362	0	0	556	556	0	0	212	212	0	0	399	399	0	0	1,423	1,423
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-200	0	0	-200
Total ha	0	32	135	167	10	9	255	274	1	62	724	787	1	1	362	364	0	0	556	556	0	0	212	212	0	0	334	334	0	200	1,423	1,623
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	12	14	-3	23	1	28	0	29	0	56	0	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-2	-2	0	0	0	0
- Palawija	-12	-14	4	-21	0	-28	16	-12	0	-54	19	-35	0	0	10	10	0	0	16	16	0	0	14	14	0	0	14	14	0	0	50	50
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-100	0	0	-100
Total %	0	0	1	1	1	1	16	17	0	2	19	21	0	0	10	10	0	0	16	16	0	0	14	14	0	0	12	12	0	7	50	57
4. Paddy Production ton	-	-	-	23,254	-	-	-	3,535	-	-	-	13,967	-	-	-	3,274	-	-	-	2,996	-	-	-	1,380	-	-	-	2,194	-	-	-	4,845
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 6/7

District	Kendal & Kodia Semarang - continued												Magelang				Inter-district Scheme											
Irrigation Scheme	41. Bodri				42. Trompo				43. Kedung Pengilon				44. Pasekan				45. Kosar				46. Notog				47. Sidorejo				48. Glapan			
I. Present/Before Project																												
1. Land Use	Irri. Paddy Field 7,710 ha				Irri. Paddy Field 1,229 ha				Irri. Paddy Field 2,686 ha				Irri. Paddy Field 988 ha				Irri. Paddy Field 3,243 ha				Irri. Paddy Field 25,540 ha				Irri. Paddy Field 5,717 ha				Irri. Paddy Field 18,784 ha			
	Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha				Rainfed Paddy Field 0 ha			
	Subject Area 7,710 ha				*Subject Area 1,229 ha*				*Subject Area 2,686 ha*				*Subject Area 988 ha*				*Subject Area 3,243 ha*				*Subject Area 25,540 ha*				*Subject Area 5,717 ha*				*Subject Area 18,784 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	7,313	7,313		14,626	1,167	1,167		2,334	2,686	2,036		4,722	839	604	520	1,963	3,215	3,208	2,339	8,762	6,910	18,625	131	25,666	5,717	5,717		11,434	18,784	18,784		37,568
- Palawija ha	397			397	62	62		124		650	700	1,350				0	28	35	904	967	15,262	3,730	18,457	37,449			5,400	5,400			13,405	13,405
- Sugarcane ha				0				0				0				0				0	3,368			3,368				0				0
- Palawija (rainfed) ha				0				0				0				0				0				0				0				0
Total ha	7,710	7,313	0	15,023	1,229	1,229	0	2,458	2,686	2,686	700	6,072	839	604	520	1,963	3,243	3,243	3,243	9,729	25,540	22,355	18,588	66,483	5,717	5,717	5,400	16,834	18,784	18,784	13,405	50,973
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	95	95	0	190	95	95	0	190	100	76	0	176	85	61	53	199	99	99	72	270	27	73	1	100	100	100	0	200	100	100	0	200
- Palawija %	5	0	0	5	5	5	0	10	0	24	26	50	0	0	0	0	1	1	28	30	60	15	72	147	0	0	94	94	0	0	71	71
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	0
In Irrigated Field %	*100*	*95*	*0*	*195*	*100*	*100*	*0*	*200*	*100*	*100*	*26*	*226*	*85*	*61*	*53*	*199*	*100*	*100*	*100*	*300*	*100*	*88*	*73*	*260*	*100*	*100*	*94*	*294*	*100*	*100*	*71*	*271*
- Palawija (rainfed) %																																
Overall to Subject Area %	100	95	0	195	100	100	0	200	100	100	26	226	85	61	53	199	100	100	100	300	100	88	73	260	100	100	94	294	100	100	71	271
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0		5.0	4.5	4.5	4.0	4.4	4.5	4.5	4.0	4.4	5.0	5.0	5.0	5.0	5.5	5.5		5.5	5.5	5.0		5.3
- Palawija t/ha	3.0			-	3.0	3.0		-		3.0	1.2	-				-	3.0	3.0	1.2	-	3.0	3.0	1.2	-			1.2	-			1.2	-
- Sugarcane t/ha				-				-				-				-				-	65.0			-				-				-
- Palawija (rainfed) t/ha				-				-				-				-				-				-				-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	36,565	36,565	0	73,130	5,835	5,835	0	11,670	13,430	10,180	0	23,610	3,776	2,718	2,080	8,574	14,468	14,436	9,356	38,260	34,550	93,125	655	128,330	31,444	31,444	0	62,887	103,312	93,920	0	197,232
- Palawija ton	1,191	0	0	1,191	186	186	0	372	0	1,950	840	2,790	0	0	0	0	84	105	1,085	1,274	45,786	11,190	22,148	79,124	0	0	6,480	6,480	0	0	16,086	16,086
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	218,920	0	0	218,920	0	0	0	0	0	0	0	0
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Palawija: maize (composite) 1/				Palawija: maize (composite) 1/				Palawija: maize (composite) & beans 1/								Palawija: maize (composite) & beans 1/				Palawija: maize (composite) & beans 1/				Palawija: beans 1/				Palawija: beans 1/			
II. With Project																												
1. Land Use	Irri. Paddy Field 7,710 ha				Irri. Paddy Field 1,229 ha				Irri. Paddy Field 2,686 ha				Irri. Paddy Field 988 ha				Irri. Paddy Field 3,243 ha				Irri. Paddy Field 25,540 ha				Irri. Paddy Field 5,717 ha				Irri. Paddy Field 18,784 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 7,710 ha				*Subject Area 1,229 ha*				*Subject Area 2,686 ha*				*Subject Area 988 ha*				*Subject Area 3,243 ha*				*Subject Area 25,540 ha*				*Subject Area 5,717 ha*				*Subject Area 18,784 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	7,710	7,710		15,420	1,229	1,229		2,458	2,686	2,686		5,372	988	593	494	2,075	3,243	3,243	2,270	8,756	12,770	22,172		34,942	5,717	5,717	1,143	12,577	18,784	18,784		37,568
- Palawija ha			2,313	2,313			369	369			1,343	1,343		395		395			973	973	9,402		20,432	29,834			4,574	4,574			15,027	15,027
- Sugarcane ha				0				0				0				0				0	3,368			3,368				0				0
- ha				0				0				0				0				0				0				0				0
Total ha	7,710	7,710	2,313	17,733	1,229	1,229	369	2,827	2,686	2,686	1,343	6,715	988	988	494	2,470	3,243	3,243	3,243	9,729	25,540	22,172	20,432	68,144	5,717	5,717	5,717	17,151	18,784	18,784	15,027	52,595
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	100	100	0	200	100	100	0	200	100	100	0	200	100	60	50	210	100	100	70	270	50	87	0	137	100	100	20	220	100	100	0	200
- Palawija %	0	0	30	30	0	0	30	30	0	0	50	50	0	40	0	40	0	0	30	30	37	0	80	117	0	0	80	80	0	0	80	80
- Sugarcane %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	0	0	0
Total %	100	100	30	230	100	100	30	230	100	100	50	250	100	100	50	250	100	100	100	300	100	87	80	267	100	100	100	300	100	100	80	280
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy t/ha	5.5	5.5		5.5	5.5	5.5		5.5	5.5	5.5		5.5	5.0	5.0	4.5	4.9	5.0	5.0	4.5	4.9	6.0	5.5		5.7	6.0	6.0	5.5	6.0	6.0	6.0		6.0
- Palawija t/ha			1.4	-			1.4	-			1.4	-		5.0		-			1.4	-	5.0		1.4	-			1.4	-			1.4	-
- Sugarcane t/ha				-				-				-				-				-	65.0			-				-				-
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ton	42,405	42,405	0	84,810	6,760	6,760	0	13,519	14,773	14,773	0	29,546	4,940	2,965	2,223	10,128	16,215	16,215	10,215	42,645	76,620	121,946	0	198,566	34,302	34,302	6,287	74,891	112,704	112,704	0	225,408
- Palawija ton	0	0	3,238	3,238	0	0	517	517	0	0	1,880	1,880	0	1,975	0	1,975	0	0	1,362	1,362	47,010	0	28,605	75,615	0	0	6,404	6,404	0	0	21,038	21,038
- Sugarcane ton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	218,920	0	0	218,920	0	0	0	0	0	0	0	0
	Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: maize (hybrid) 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/				Palawija: beans 2/			
Increment (With - Without)																												
1. Land Use	Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha				Irri. Paddy Field 0 ha			
	Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha				Rainfed Paddy Fiel 0 ha			
	Subject Area 0 ha				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*				*Subject Area 0 ha*			
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy ha	397	397	0	794	62	62	0	124	0	650	0	650	149	-11	-26	112	28	35	-69	-6	5,860	3,547	-131	9,276	0	0	1,143	1,143	0	0	0	0
- Palawija ha	-397	0	2,313	1,916	-62	-62	369	245	0	-650	643	-7	0	395	0	395	-28	-35	69	6	-5,860	-3,730	1,975	-7,615	0	0	-826	-826	0	0	1,622	1,622
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total ha	0	397	2,313	2,710	0	0	369	369	0	0	643	643	149	384	-26	507	0	0	0	0	0	-183	1,844	1,661	0	0	317	317	0	0	1,622	1,622
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual
- Irrigated Paddy %	5	5	0	10	5	5	0	10	0	24	0	24	15	-1	-3	11	1	1	-2	0	23	14	-1	36	0	0	20	20	0	0	0	0
- Palawija	-5	0	30	25	-5	-5	30	20	0	-24	24	0	0	40	0	40	-1	-1	2	0	-23	-15	8	-30	0	0	-14	-14	0	0	9	9
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	5	30	35	0	0	30	30	0	0	24	24	15	39	-3	51	0	0	0	0	0	-1	7	7	0	0	6	6	0	0	9	9
4. Paddy Production ton	-	-	-	11,680	-	-	-	1,849	-	-	-	5,936	-	-	-	1,555	-	-	-	4,386	-	-	-	70,236	-	-	-	12,004	-	-	-	28,176
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.5	-	-	-	0.7	-	-	-	0.5	-	-	-	0.8

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans) 2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.2 Present Agriculture and Agriculture Plans of the Target Schemes: Central Java - 7/7

District	Inter-district Scheme - continued								Overall Province				
Irrigation Scheme	49. Klambu Kanan				50. Kaliwadas								
I. Present/Before Project													
1. Land Use	Irri. Paddy Field		11,078	ha	Irri. Paddy Field		7,722	ha	Irri. Paddy Field			**281,600**	ha 99%
	Rainfed Paddy Field		0	ha	Rainfed Paddy Field		0	ha	Rainfed Paddy Field			**1,491**	ha 1%
	Subject Area		*11,078*	*ha*	*Subject Area*		*7,722*	*ha*	*Subject Area*			***283,091***	*ha* 100%
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy ha	9,373	10,746	4,165	24,284	6,344	6,344		12,688	245,878	228,798	39,095	**513,771**	75%
- Palawija ha			4,386	4,386			3,480	3,480	20,952	30,356	100,266	**151,574**	22%
- Sugarcane ha	315			315	1,378			1,378	9,253	4,828	0	**14,081**	2%
- Palawija (rainfed) ha				0				0	1,491	0	0	**1,491**	0%
Total ha	9,688	10,746	8,551	28,985	7,722	6,344	3,480	17,546	277,574	263,982	139,361	**680,917**	100%
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy %	85	97	38	219	82	82	0	164	87	81	14	**182**	
- Palawija %	0	0	40	40	0	0	45	45	7	11	36	**54**	
- Sugarcane %	3	0	0	3	18	0	0	18	3	2	0	**5**	
In Irrigated Field %	*87*	*97*	*77*	*262*	*100*	*82*	*45*	*227*	98	94	49	**241**	
- Palawija (rainfed) %									100	0	0	**100**	
Overall to Subject Area %	87	97	77	262	100	82	45	227	98	93	49	**241**	
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy t/ha	5.0	5.0	4.5	4.9	4.5	4.5	4.0	4.5	5.0	4.9	4.4	**4.9**	
- Palawija t/ha			1.2	-			1.2	-	-	-	-	-	
- Sugarcane t/ha	65.0			-	65.0			-	-	-	-	-	
- Palawija (rainfed) t/ha				-				-	-	-	-	-	
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy ton	46,865	53,730	18,743	119,338	28,548	28,548	0	57,096	1,232,230	1,118,275	173,498	**2,524,003**	
- Palawija ton	0	0	5,263	5,263	0	0	4,176	4,176	62,856	91,061	120,319	**274,236**	
- Sugarcane ton	20,475	0	0	20,475	89,570	0	0	89,570	601,445	313,820	0	**915,265**	
- Palawija (rainfed) ton	0	0	0	0	0	0	0	0	4,473	0	0	**4,473**	
	Palawija: beans 1/				Palawija: beans 1/								
II. With Project													
1. Land Use	Irri. Paddy Field		11,078	ha	Irri. Paddy Field		7,722	ha	Irri. Paddy Field			**283,091**	ha 100%
	Rainfed Paddy Fiel		0	ha	Rainfed Paddy Fiel		0	ha	Rainfed Paddy Field			**0**	ha 0%
	Subject Area		*11,078*	*ha*	*Subject Area*		*7,722*	*ha*	*Subject Area*			***283,091***	*ha* 100%
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy ha	10,763	10,763	4,431	25,957	6,344	6,344		12,688	264,436	247,679	45,533	**557,648**	76%
- Palawija ha			4,431	4,431			4,633	4,633	9,402	18,985	134,695	**163,082**	22%
- Sugarcane ha	315			315	1,378			1,378	9,253	4,828	0	**14,081**	2%
- ha				0				0	0	0	0	**0**	0%
Total ha	11,078	10,763	8,862	30,703	7,722	6,344	4,633	18,699	283,091	271,492	180,228	**734,811**	100%
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy %	97	97	40	234	82	82	0	164	93	87	16	**197**	
- Palawija %	0	0	40	40	0	0	60	60	3	7	48	**58**	
- Sugarcane %	3	0	0	3	18	0	0	18	3	2	0	**5**	
Total %	100	97	80	277	100	82	60	242	100	96	64	**260**	
4. Crop Yield	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy t/ha	5.5	5.5	5.0	5.4	5.0	5.0		5.0	5.5	5.4	5.0	**5.4**	
- Palawija t/ha			1.4	-			1.4	-	-	-	-	-	
- Sugarcane t/ha	65.0			-	65.0			-	-	-	-	-	
5. Crop Production	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy ton	59,197	59,197	22,155	140,548	31,720	31,720	0	63,440	1,461,959	1,345,205	225,978	**3,033,142**	
- Palawija ton	0	0	6,203	6,203	0	0	6,486	6,486	47,010	94,925	188,573	**330,508**	
- Sugarcane ton	20,475	0	0	20,475	89,570	0	0	89,570	601,445	313,820	0	**915,265**	
	Palawija: beans 2/				Palawija: beans 2/								
Increment (With - Without)													
1. Land Use	Irri. Paddy Field		0	ha	Irri. Paddy Field		0	ha	Irri. Paddy Field			**1,491**	ha
	Rainfed Paddy Fiel		0	ha	Rainfed Paddy Fiel		0	ha	Rainfed Paddy Field			**-1,491**	ha
	Subject Area		*0*	*ha*	*Subject Area*		*0*	*ha*	*Subject Area*			***0***	*ha*
2. Cropped Area	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy ha	1,390	17	266	1,673	0	0	0	0	18,558	18,881	6,438	**43,877**	
- Palawija ha	0	0	45	45	0	0	1,153	1,153	-11,550	-11,371	34,429	**11,508**	
- Sugarcane ha	0	0	0	0	0	0	0	0	0	0	0	**0**	
- Palawija (rainfed) ha	0	0	0	0	0	0	0	0	-1,491	0	0	**-1,491**	
Total ha	1,390	17	311	1,718	0	0	1,153	1,153	5,517	7,510	40,867	**53,894**	
3. Cropping Intensity	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	Wet	Dry I	Dry II	Annual	
- Irrigated Paddy %	13	0	2	15	0	0	0	0	6	6	2	**15**	
- Palawija	0	0	0	0	0	0	15	15	-4	-4	12	**4**	
- Sugarcane	0	0	0	0	0	0	0	0	0	0	0	**0**	
- Palawija (rainfed) %	0	0	0	0	0	0	0	0	-100	0	0	**-100**	
Total %	13	0	3	16	0	0	15	15	2	3	14	**19**	
4. Paddy Production ton	-	-	-	21,211	-	-	-	6,344				**509,139**	
5. Av. Paddy Yield t/ha	-	-	-	0.5	-	-	-	0.5				**0.5**	

1/: Wet & dry I --- maize (compoiste); dry II --- beans (average of soybeans & mungbeans)

2/: Wet & dry I --- maize (hybrid); dry II --- beans (average of soybeans & mungbeans)

Table A-5.3.3 Determination of Target Cropping Intensity: Central Java - 1/4

Irrigation Scheme	Present Cropping Intensity % 1/					Planned Cropped Area & Intensity									Increment		Refference Data Used for Determination of Target Intensity								
						Crop	Wet		Dry I		Dry II		Annual		Annual		Past Highest Record (Cropping Intensity %) 2/			PSDA: 3/				
	Crop	Wet	Dry I	Dry II	Annual		ha	%	ha	%	ha	%	ha	%	%	ha	Wet	Dry I	Dry II	Crop	Wet	Dry I	Dry II	Annual
1. Cijalu	Paddy	93%	75%		168%	Paddy	1,377	100	1,377	100		0	2,754	200%	32%	440	100%	80%		Paddy	100	100		200
	Palawija				0%	Palawija					411	30	411	30%	30%	411				Palawija				
Irrigated area	Sugarcane				0%	Sugarcane							0	0%	0%									1262ha
1377 --> 1377 ha	Total	93%	75%	0%	168%	Total	*1,377*	100	*1,377*	100	*411*	30	*3,165*	230%	62%	851	100%	80%		Total	*100*	*100*	*100*	
2. Mangganti	Paddy	100%	80%		180%	Paddy	22,644	100	18,115	80		0	40,759	180%	0%	-32	100%	80%		Paddy	100	50		???
	Palawija		20%	23%	43%	Palawija		0	4,529	20	9,058	40	13,587	60%	17%	3,778		20%	23%	Palawija		25	100	???
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									20400ha
22644 --> 22644 ha	Total	100%	100%	23%	223%	Total	*22,644*	100	*22,644*	100	*9,058*	40	*54,346*	240%	17%	3,746	100%	100%	23%	Total	*100*	*100*	*100*	*250*
3. Serayu	Paddy	100%	100%	8%	208%	Paddy	20,795	100	20,795	100		0	41,590	200%	-8%	-192	100%	100%	11%					
	Palawija				0%	Palawija		0		0	8,318	40	8,318	40%	40%	8,318								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
20100 --> 20795 ha	Total	100%	100%	8%	208%	Total	*20,795*	100	*20,795*	100	*8,318*	40	*49,908*	240%	32%	8,126	100%	100%	11%					
4. Banjarcahyana	Paddy	100%	80%		180%	Paddy	5,001	100	5,001	100		0	10,002	200%	20%	1,000	100%	80%		Paddy	100	100	0	
	Palawija				0%	Palawija		0		0	1,500	30	1,500	30%	30%	1,500				Palawija				
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									6400ha
5001--> 5001 ha	Total	100%	80%	0%	180%	Total	*5,001*	100	*5,001*	100	*1,500*	30	*11,502*	230%	50%	2,500	100%	80%	0%	Total	*100*	*100*	*0*	*200*
5. Kaligending	Paddy	100%	97%		197%	Paddy	2,923	100	2,923	100		0	5,846	200%	3%	81	100%	100%		Paddy	100	80		
	Palawija			22%	22%	Palawija		0		0	1,169	40	1,169	40%	18%	512			53%	Palawija		25		
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									2982ha
2923 --> 2923 ha	Total	100%	97%	22%	219%	Total	*2,923*	100	*2,923*	100	*1,169*	40	*7,015*	240%	21%	593	100%	100%	53%	Total	*100*	*80*	*20*	*250*
6. Pesucen	Paddy	100%	58%		158%	Paddy	1,659	100	1,327	80			2,986	180%	22%	367	100%	58%		Paddy	100	81		
	Palawija		42%		42%	Palawija			332	20	498	30	830	50%	8%	131		42%		Palawija		29	22	
Irrigated area	Sugarcane				0%	Sugarcane							0		0%									6020ha
1659 --> 1659 ha	Total	100%	100%	0%	200%	Total	*1,659*	100	*1,659*	100	*498*	30	*3,816*	230%	30%	498	100%	100%	0%	Total	*100*	*50*	*90*	*211*
7. Bedegolan	Paddy	100%	97%		197%	Paddy	8,401	100	8,401	100		0	16,802	200%	3%	234	100%	99%		Paddy	100	81		
	Palawija		1%	2%	3%	Palawija		0		0	2,520	30	2,520	30%	27%	2,225		5%	9%	Palawija		29	22	
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									6020ha
8401--> 8401 ha	Total	100%	98%	2%	200%	Total	*8,401*	100	*8,401*	100	*2,520*	30	*19,322*	230%	30%	2,459	100%	104%	9%	Total	*100*	*50*	*10*	*211*
8. Kedung Putri	Paddy	100%	77%		177%	Paddy	4,451	100	4,451	100		0	8,902	200%	23%	1,240	100%	97%						
	Palawija		4%		4%	Palawija		0		0	1,335	30	1,335	30%	26%	1,173		19%						
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
4341--> 4451 ha	Total	100%	81%	0%	181%	Total	*4,451*	100	*4,451*	100	*1,335*	30	*10,237*	230%	49%	2,413	100%	116%	0%					
9. Sudagaran	Paddy	92%	71%		163%	Paddy	3,665	100	2,749	75		0	6,414	175%	12%	427	93%	76%		Paddy	100	83		
	Palawija				0%	Palawija		0	916	25	733	20	1,649	45%	45%	1,649				Palawija		17		
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%					Sugarcane				3634ha
3665 --> 3665 ha	Total	92%	71%	0%	163%	Total	*3,665*	100	*3,665*	100	*733*	20	*8,063*	220%	57%	2,076	93%	76%	0%	Total	*100*	*60*	*0*	*200*
10. Rebug	Paddy	100%	67%		167%	Paddy	1,202	100	841	70		0	2,043	170%	3%	37	100%	71%						
	Palawija				0%	Palawija		0	362	30	240	20	602	50%	50%	602								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1202 --> 1202 ha	Total	100%	67%	0%	167%	Total	*1,202*	100	*1,203*	100	*240*	20	*2,645*	220%	53%	639	100%	71%	0%					
11. Kalimeneng	Paddy	99%	63%	51%	213%	Paddy	1,262	100	883	70	631	50	2,776	220%	7%	93	100%	67%	53%					
	Palawija				0%	Palawija		0	252	20	126	10	378	30%	30%	378								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1262 --> 1262 ha	Total	99%	63%	51%	213%	Total	*1,262*	100	*1,135*	90	*757*	60	*3,154*	250%	37%	471	100%	67%	53%					
12. Kedung GW	Paddy	100%	100%		200%	Paddy	1,129	100	1,129	100		0	2,258	200%	0%	0	100%	100%		Paddy	100	70		
	Palawija				0%	Palawija		0		0	339	30	339	30%	30%	339				Palawija		30		
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%					Sugarcane				1136ha
1129 --> 1129 ha	Total	100%	100%	0%	200%	Total	*1,129*	100	*1,129*	100	*339*	30	*2,597*	230%	30%	339	100%	100%	0%	Total	*100*	*55*	*10*	*200*
13. Waduk Cengklik	Paddy	45%	49%	34%	128%	Paddy	2,078	98	1,060	50	636	30	3,774	178%	50%	1,071	54%	58%	53%					
	Palawija	2%	2%	2%	6%	Palawija		0	212	10	212	10	424	20%	14%	302	2%	2%	2%					
Irrigated area	Sugarcane	2%			2%	Sugarcane	42	2		0		0	42	2%	0%		2%							
2120 --> 2120 ha	Total	49%	51%	36%	136%	Total	*2,120*	100	*1,272*	60	*848*	40	*4,240*	200%	64%	1,373	58%	60%	55%					
14. Ploso Wareng	Paddy	100%	100%	41%	241%	Paddy	1,100	100	1,100	100	550	50	2,750	250%	9%	99	100%	100%	50%					
	Palawija			59%	59%	Palawija		0		0	550	50	550	50%	-9%	-99			65%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1100 --> 1100 ha	Total	100%	100%	100%	300%	Total	*1,100*	100	*1,100*	100	*1,100*	100	*3,300*	300%	0%	0	100%	100%	115%					

Table A-5.3.3 Determination of Target Cropping Intensity: Central Java - 2/4

Irrigation Scheme	Present Cropping Intensity % 1/					Planned Cropped Area & Intensity									Increment		Refference Data Used for Determination of Target Intensity									
						Crop	Wet		Dry I		Dry II		Annual		Annual		Past Highest Record (Cropping Intensity %) 2/			PSDA: 3/				
	Crop	Wet	Dry I	Dry II	Annual		ha	%	ha	%	ha	%	ha	%	%	ha	Wet	Dry I	Dry II	Crop	Wet	Dry I	Dry II	Annual
15. Jaban	Paddy	100%	100%	47%	247%	Paddy	1,191	100	1,191	100	596	50	2,978	250%	3%	34	100%	100%	50%					
	Palawija			53%	53%	Palawija		0		0	595	50	595	50%	-3%	-34			55%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1191--> 1191 ha	Total	100%	100%	100%	300%	Total	*1,191*	100	*1,191*	100	*1,191*	100	*3,573*	300%	0%	0	100%	100%	105%					
16. Colo Kanan	Paddy	100%	98%	92%	290%	Paddy	22,982	100	22,684	99	22,684	99	68,350	297%	7%	1,594	100%	99%	98%					
	Palawija		1%	6%	7%	Palawija		0		0		0	0	0%	-7%	-1,594		1%	15%					
Irrigated area	Sugarcane		1%		1%	Sugarcane		0	298	1		0	298	1%	0%			2%						
22982 --> 22982 ha	Total	100%	100%	98%	298%	Total	*22,982*	100	*22,982*	100	*22,684*	99	*68,648*	299%	1%	0	100%	102%	113%					
17. Bonggo	Paddy	96%	95%	17%	208%	Paddy	1,406	100	1,406	100	281	20	3,093	220%	12%	175	97%	95%	17%	Paddy	65	65	13	1862ha
	Palawija				0%	Palawija		0		0	281	20	281	20%	20%	281				Palawija			1	
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%					Sugarcan	35	35	35	
1406 --> 1406 ha	Total	96%	95%	17%	208%	Total	*1,406*	100	*1,406*	100	*562*	40	*3,374*	240%	32%	456	97%	95%	17%	Total	*100*	*75*	*10*	*300*
18. Pangkalan	Paddy	100%	51%		151%	Paddy	654	100	392	60		0	1,046	160%	9%	56	100%	60%						
	Palawija		49%		49%	Palawija		0	262	40	131	20	393	60%	11%	75		53%						
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
654 --> 654 ha	Total	100%	100%	0%	200%	Total	*654*	100	*654*	100	*131*	20	*1,439*	220%	20%	131	100%	113%	0%					
19. Sentul	Paddy	89%	81%		170%	Paddy	1,739	100	1,391	80		0	3,130	180%	10%	167	94%	82%						
	Palawija	11%	19%		30%	Palawija		0	348	20	348	20	696	40%	10%	181	14%	19%						
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1739 --> 1739 ha	Total	100%	100%	0%	200%	Total	*1,739*	100	*1,739*	100	*348*	20	*3,826*	220%	20%	348	108%	101%	0%					
20. Widodaren	Paddy	73%	22%		95%	Paddy	2,616	100	1,308	50		0	3,924	150%	55%	1,441	82%	23%						
	Palawija	27%	78%		105%	Palawija		0	1,308	50	785	30	2,093	80%	-25%	-656	32%	79%						
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
2616 --> 2616 ha	Total	100%	100%	0%	200%	Total	*2,616*	100	*2,616*	100	*785*	30	*6,017*	230%	30%	785	114%	102%	0%					
21. Klambu Kanan	Paddy	96%	96%	25%	217%	Paddy	5,946	96	5,946	96	1,554	25	13,446	216%	-1%	21	96%	97%	25%					
Klambu Wilalung	Palawija			27%	27%	Palawija		0		0	2,486	40	2,486	40%	13%	817			74%					
Irrigated area	Sugarcane	4%			4%	Sugarcane	270	4		0		0	270	4%	0%		4%							
6216 --> 6216 ha	Total	100%	96%	52%	248%	Total	*6,216*	100	*5,946*	96	*4,040*	65	*16,202*	261%	13%	838	100%	97%	99%					
22. Jragung	Paddy	53%	32%		85%	Paddy	4,416	100	2,208	50		0	6,624	150%	65%	2,891	68%	45%						
	Palawija	47%	68%	100%	215%	Palawija		0	2,208	50	4,416	100	6,624	150%	-65%	-2,891	55%	77%	100%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
4416 --> 4416 ha	Total	100%	100%	100%	300%	Total	*4,416*	100	*4,416*	100	*4,416*	100	*13,248*	300%	0%	0	123%	122%	100%					
23. Guntur	Paddy	100%	100%		200%	Paddy	1,543	100	1,543	100		0	3,086	200%	0%	0	100%	100%						
	Palawija				0%	Palawija		0		0	463	30	463	30%	30%	463								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1543 --> 1543 ha	Total	100%	100%	0%	200%	Total	*1,543*	100	*1,543*	100	*463*	30	*3,549*	230%	30%	463	100%	100%	0%					
24. Klambu Kiri	Paddy	100%	100%		200%	Paddy	20,738	100	20,738	100	4,148	20	45,624	220%	20%	4,148	100%	100%						
	Palawija			58%	58%	Palawija		0		0	12,443	60	12,443	60%	2%	415			60%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
20738 --> 20738 ha	Total	100%	100%	58%	258%	Total	*20,738*	100	*20,738*	100	*16,591*	80	*58,067*	280%	22%	4,563	100%	100%	60%					
25. Kedungdowo Kramat	Paddy	86%	86%	1%	173%	Paddy	1,250	100	1,250	100		0	2,500	200%	27%	342	92%	92%	3%					
	Palawija	5%	6%	85%	96%	Palawija		0		0	1,125	90	1,125	90%	-6%	-82	16%	18%	95%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1250 --> 1250 ha	Total	91%	92%	86%	269%	Total	*1,250*	100	*1,250*	100	*1,125*	90	*3,625*	290%	21%	260	108%	110%	98%					
26. Sungapan Kanan	Paddy	80%	70%		150%	Paddy	1,851	100	1,360	73	491	27	3,702	200%	50%	916	94%	87%						
	Palawija			19%	19%	Palawija		0		0	185	10	185	10%	-9%	-176			52%					
Irrigated area	Sugarcane			27%	27%	Sugarcane		0	491	27		0	491	27%	0%				32%					
1851 --> 1851 ha	Total	80%	70%	46%	196%	Total	*1,851*	100	*1,851*	100	*676*	37	*4,378*	237%	41%	740	94%	87%	84%					
27. Mejagong	Paddy	100%	100%	100%	300%	Paddy	2,049	100	2,049	100	2,049	100	6,147	300%	0%	12	100%	100%	100%					
	Palawija				0%	Palawija		0		0		0	0	0%	0%	-4								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
2049 --> 2049 ha	Total	100%	100%	100%	300%	Total	*2,049*	100	*2,049*	100	*2,049*	100	*6,147*	300%	0%	8	100%	100%	100%					
28. Sungapan Kiri	Paddy	84%	79%		163%	Paddy	5,570	100	4,385	79		0	9,955	179%	16%	945	90%	83%						
	Palawija			15%	15%	Palawija		0		0	1,671	30	1,671	30%	15%	854			18%					
Irrigated area	Sugarcane			21%	21%	Sugarcane		0	1,185	21		0	1,185	21%	0%				29%					
5541 --> 5570 ha	Total	84%	79%	36%	199%	Total	*5,570*	100	*5,570*	100	*1,671*	30	*12,811*	230%	31%	1,799	90%	83%	47%					

Table A-5.3.3 Determination of Target Cropping Intensity: Central Java - 3/4

Irrigation Scheme	Present Cropping Intensity % 1/					Planned Cropped Area & Intensity									Increment		Refference Data Used for Determination of Target Intensity								
						Crop	Wet		Dry I		Dry II		Annual		Annual		Past Highest Record (Cropping Intensity %) 2/			PSDA: 3/				
	Crop	Wet	Dry I	Dry II	Annual		ha	%	ha	%	ha	%	ha	%	%	ha	Wet	Dry I	Dry II	Crop	Wet	Dry I	Dry II	Annual
29. Kabuyutan	Paddy	71%	29%	24%	124%	Paddy	3,300	85	1,560	40	969	25	5,829	150%	26%	1,042	76%	36%	29%					
	Palawija	15%	40%	42%	97%	Palawija			1,371	35	2,132	55	3,503	90%	-7%	-254	40%	51%	52%					
Irrigated area	Sugarcane	15%	10%		25%	Sugarcane	576	15	369	10		0	945	24%	-1%		36%	60%	58%					
3876 --> 3876 ha	Total	101%	79%	66%	246%	Total	*3,876*	100	*3,300*	85	*3,101*	80	*10,277*	265%	19%	788	152%	147%	139%					
30. Babakan	Paddy	91%	56%	19%	166%	Paddy	2,330	92	1,517	60	506	20	4,353	172%	6%	177	94%	57%	20%	Paddy	58	49	6	
	Palawija	1%	26%	50%	77%	Palawija			566	22	1,517	60	2,083	82%	5%	114	2%	28%	64%	Palawija	20	15	58	
Irrigated area	Sugarcane	8%	10%		18%	Sugarcane	198	8	247	10		0	445	18%	0%		11%	21%	21%	Sugarcan	22	22	22	2336ha
2528 --> 2528 ha	Total	100%	92%	69%	261%	Total	*2,528*	100	*2,330*	92	*2,023*	80	*6,881*	272%	11%	291	107%	106%	105%	Total	*100*	*100*	*50*	*274*
31. Kemaron Jambe	Paddy	100%	100%	100%	300%	Paddy	1,483	100	1,483	100	1,483	100	4,449	300%	0%	1,371	100%	100%	100%					
	Palawija				0%	Palawija							0		0%	0								
Irrigated area	Sugarcane				0%	Sugarcane							0		0%									
1026 --> 1483 ha	Total	100%	100%	100%	300%	Total	*1,483*	100	*1,483*	100	*1,483*	100	*4,449*	300%	0%	1,371	100%	100%	100%					
32. Jengkelok	Paddy	83%	0%	0%	83%	Paddy	6,173	100	2,469	40	617	10	9,259	150%	67%	4,147	87%	9%	9%	Paddy	63	93	12	
	Palawija		64%	33%	97%	Palawija			1,854	30	1,235	20	3,089	50%	-47%	-2,904		65%	34%	Palawija	33		70	
Irrigated area	Sugarcane		7%		7%	Sugarcane			436				436	7%	0%			7%		Sugarcan	4	4	4	5658ha
6173 --> 6173 ha	Total	83%	71%	33%	187%	Total	*6,173*	100	*4,759*	77	*1,852*	30	*12,784*	207%	20%	1,243	87%	81%	43%	Total	*100*	*80*	*50*	*235*
33. Gung	Paddy	77%	36%	3%	116%	Paddy	11,251	89	6,321	50		0	17,572	139%	23%	2,853	82%	47%	8%					
	Palawija	12%	40%	76%	128%	Palawija		0	3,367	27	10,113	80	13,480	107%	-21%	-2,686	14%	53%	85%					
Irrigated area	Sugarcane		23%		23%	Sugarcane	1,390	11	1,563	12		0	2,953	23%	0%			35%						
12641--> 12641 ha	Total	89%	99%	79%	267%	Total	*12,641*	100	*11,251*	89	*10,113*	80	*34,005*	269%	2%	167	96%	135%	93%					
34. Parakankidang	Paddy	93%	22%		115%	Paddy	1,533	94	816	50		0	2,349	144%	29%	472	99%	46%						
	Palawija		71%	74%	145%	Palawija		0	703	43	1,468	90	2,171	133%	-12%	-198		85%	96%					
Irrigated area	Sugarcane		7%		7%	Sugarcane	98	6	14	1		0	112	7%	0%				9%					
1631 --> 1631 ha	Total	93%	100%	74%	267%	Total	*1,631*	100	*1,533*	94	*1,468*	90	*4,632*	284%	17%	274	99%	131%	105%					
35. Kumisik	Paddy	94%	32%		126%	Paddy	3,554	94	3,329	88		0	6,883	182%	56%	2,105	95%	91%						
	Palawija		54%	51%	105%	Palawija		0		0	2,645	70	2,645	70%	-35%	-1,318		80%	58%					
Irrigated area	Sugarcane		12%		12%	Sugarcane	224	6	225	6		0	449	12%	0%			32%						
3778 --> 3778 ha	Total	94%	98%	51%	243%	Total	*3,778*	100	*3,554*	94	*2,645*	70	*9,977*	264%	21%	787	95%	203%	58%					
36. Pesantren Kletak	Paddy	90%	90%		180%	Paddy	3,265	90	3,265	90		0	6,530	180%	0%	2	95%	95%						
	Palawija			70%	70%	Palawija		0		0	2,909	80	2,909	80%	10%	362			92%					
Irrigated area	Sugarcane	10%			10%	Sugarcane	371	10		0		0	371	10%	0%			13%						
3636 --> 3636 ha	Total	100%	90%	70%	260%	Total	*3,636*	100	*3,265*	90	*2,909*	80	*9,810*	270%	10%	364	95%	108%	92%					
37. Sragi	Paddy	85%	85%		170%	Paddy	2,996	85	2,996	85		0	5,992	169%	-1%	0	90%	90%		Paddy	70	70	40	Brondong
	Palawija			54%	54%	Palawija		0		0	2,477	70	2,477	70%	16%	556			55%	Palawija			30	
Irrigated area	Sugarcane	15%			15%	Sugarcane	543	15		0		0	543	15%	0%		29%			Sugarcan	30	30		3534ha
3539 --> 3539 ha	Total	100%	85%	54%	239%	Total	*3,539*	100	*2,996*	85	*2,477*	70	*9,012*	255%	16%	556	119%	90%	55%	Total	*100*	*100*	*80*	*300*
38. Sudikampir	Paddy	89%	89%		178%	Paddy	1,380	89	1,380	89		0	2,760	178%	0%	0	95%	95%						
	Palawija			56%	56%	Palawija		0		0	1,085	70	1,085	70%	14%	212			59%					
Irrigated area	Sugarcane	11%			11%	Sugarcane	170	11		0		0	170	11%	0%		15%							
1550 --> 1550 ha	Total	100%	89%	56%	245%	Total	*1,550*	100	*1,380*	89	*1,085*	70	*4,015*	259%	14%	212	110%	95%	59%					
39. Padurekso	Paddy	89%	89%	2%	180%	Paddy	2,454	89	2,454	89		0	4,908	178%	-2%	-65	95%	95%						
	Palawija			46%	46%	Palawija		0		0	1,658	60	1,658	60%	14%	399			48%					
Irrigated area	Sugarcane	11%			11%	Sugarcane	310	11		0		0	310	11%	0%		17%							
2764 --> 2764 ha	Total	100%	89%	48%	237%	Total	*2,764*	100	*2,454*	89	*1,658*	60	*6,876*	249%	12%	334	112%	95%	48%					
40. Kedung Asem Kiri	Paddy	100%	100%		200%	Paddy	1,475	100	1,475	100		0	2,950	200%	0%		100%	100%						
	Palawija				0%	Palawija		0		0	738	50	738	50%	50%									
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1275 --> 1475 ha	Total	100%	100%	0%	200%	Total	*1,475*	100	*1,475*	100	*738*	50	*3,688*	250%	50%	0	100%	100%	0%					
Kan	Paddy	100%	100%		200%	Paddy	1,370	100	1,370	100		0	2,740	200%	0%		100%	100%						
	Palawija				0%	Palawija		0		0	685	50	685	50%	50%									
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1370 --> 1370 ha	Total	100%	100%	0%	200%	Total	*1,370*	100	*1,370*	100	*685*	50	*3,425*	250%	50%	0	100%	100%	0%					
Total	Paddy	100%	100%		200%	Paddy	2,845	100	2,845	100		0	5,690	200%	0%	400	100%	100%						
	Palawija				0%	Palawija		0		0	1,423	50	1,423	50%	50%	1,423								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
2645 --> 2845 ha	Total	100%	100%	0%	200%	Total	*2,845*	100	*2,845*	100	*1,423*	50	*7,113*	250%	50%	1,823	100%	100%	0%					

Table A-5.3.3 Determination of Target Cropping Intensity: Central Java - 4/4

Irrigation Scheme	Present Cropping Intensity % 1/					Planned Cropped Area & Intensity									Increment		Refference Data Used for Determination of Target Intensity								
							Wet		Dry I		Dry II		Annual				Past Highest Record (Cropping Intensity %) 2/			PSDA: 3/				
	Crop	Wet	Dry I	Dry II	Annual	Crop	ha	%	ha	%	ha	%	ha	%	Annual %	Annual ha	Wet	Dry I	Dry II	Crop	Wet	Dry I	Dry II	Annual
41. Bodri Kiri	Paddy	93%	93%		186%	Paddy	4,323	100	4,323	100		0	8,646	200%	14%		93%	93%						
	Palawija	7%			7%	Palawija		0		0	1,297	30	1,297	30%	23%		7%							
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
4323 --> 4323 ha	Total	100%	93%	0%	193%	Total	*4,323*	100	*4,323*	100	*1,297*	30	*9,943*	230%	37%	0	100%	93%	0%					
Kan	Paddy	97%	97%		194%	Paddy	3,387	100	3,387	100		0	6,774	200%	6%		97%	97%						
	Palawija	3%			3%	Palawija		0		0	1,016	30	1,016	30%	27%		3%							
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
3387 --> 3387 ha	Total	100%	97%	0%	197%	Total	*3,387*	100	*3,387*	100	*1,016*	30	*7,790*	230%	33%	0	100%	97%	0%					
Total	Paddy	95%	95%		190%	Paddy	7,710	100	7,710	100		0	15,420	200%	10%	794	95%	95%						
	Palawija	5%			5%	Palawija		0		0	2,313	30	2,313	30%	25%	1,916	5%							
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
7710 --> 7710 ha	Total	100%	95%	0%	195%	Total	*7,710*	100	*7,710*	100	*2,313*	30	*17,733*	230%	35%	2,710	100%	95%	0%					
42. Trompo	Paddy	95%	95%		190%	Paddy	1,229	100	1,229	100		0	2,458	200%	10%	124	100%	100%						
	Palawija	5%	5%		10%	Palawija		0		0	369	30	369	30%	20%	245	5%	5%						
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
1229 --> 1229 ha	Total	100%	100%	0%	200%	Total	*1,229*	100	*1,229*	100	*369*	30	*2,827*	230%	30%	369	105%	105%	0%					
43. Kedung Pengilon	Paddy	100%	76%		176%	Paddy	2,686	100	2,686	100		0	5,372	200%	24%	650	100%	100%						
	Palawija		24%	26%	50%	Palawija		0		0	1,343	50	1,343	50%	0%	-7		24%	26%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
2686 --> 2686 ha	Total	100%	100%	26%	226%	Total	*2,686*	100	*2,686*	100	*1,343*	50	*6,715*	250%	24%	643	100%	124%	26%					
44. Pasekan	Paddy	85%	61%	53%	199%	Paddy	988	100	593	60	494	50	2,075	210%	11%	112	85%	61%	53%					
	Palawija				0%	Palawija		0	395	40		0	395	40%	40%	395								
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
988 --> 988 ha	Total	85%	61%	53%	199%	Total	*988*	100	*988*	100	*494*	50	*2,470*	250%	51%	507	85%	61%	53%					
45. Kosar	Paddy	99%	99%	72%	270%	Paddy	3,243	100	3,243	100	2,270	70	8,756	270%	0%	-6	99%	99%						
	Palawija	1%	1%	28%	30%	Palawija		0		0	973	30	973	30%	0%	6	1%	1%	32%					
Irrigated area	Sugarcane	0.5%			1%	Sugarcane		0		0		0	0	0%	-1%		1%							
3243 --> 3243 ha	Total	101%	100%	100%	301%	Total	*3,243*	100	*3,243*	100	*3,243*	100	*9,729*	300%	0%	0	101%	100%	32%					
46. Notog	Paddy	27%	73%	1%	101%	Paddy	12,770	50	22,172	87			34,942	137%	36%	9,276	32%	86%	2%					
	Palawija	60%	15%	72%	147%	Palawija	9,402	37			20,432	80	29,834	117%	-30%	-7,615	62%	37%	89%					
Irrigated area	Sugarcane	13%			13%	Sugarcane	3,368	13					3,368	13%	0%		17%	15%	17%					
25540 --> 25540 ha	Total	100%	88%	73%	261%	Total	*25,540*	100	*22,172*	87	*20,432*	80	*68,144*	267%	6%	1,661	111%	138%	108%					
47. Sidorejo	Paddy	100%	100%		200%	Paddy	5,717	100	5,717	100	1,143	20	12,577	220%	20%	1,143	100%	100%						
	Palawija			94%	94%	Palawija		0		0	4,574	80	4,574	80%	-14%	-826			100%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
5717 --> 5717 ha	Total	100%	100%	94%	294%	Total	*5,717*	100	*5,717*	100	*5,717*	100	*17,151*	300%	6%	317	100%	100%	100%					
48. Glapan Tim	Paddy	100%	100%		200%	Paddy	8,671	100	8,671	100		0	17,342	200%	0%		100%	100%						
	Palawija			38%	38%	Palawija		0		0	5,203	60	5,203	60%	22%				69%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
8671 --> 8671 ha	Total	100%	100%	38%	238%	Total	*8,671*	100	*8,671*	100	*5,203*	60	*22,545*	260%	22%	0	100%	100%	69%					
Bara	Paddy	100%	100%		200%	Paddy	10,113	100	10,113	100		0	20,226	200%	0%		100%	100%						
	Palawija			100%	100%	Palawija		0		0	10,113	100	10,113	100%	0%				100%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
10113 --> 10113 ha	Total	100%	100%	100%	300%	Total	*10,113*	100	*10,113*	100	*10,113*	100	*30,339*	300%	0%	0	100%	100%	100%					
Total	Paddy	100%	100%		200%	Paddy	18,784	100	18,784	100		0	37,568	200%	0%	0	100%	100%						
	Palawija			71%	71%	Palawija		0		0	15,027	80	15,027	80%	9%	1,622			100%					
Irrigated area	Sugarcane				0%	Sugarcane		0		0		0	0	0%	0%									
18784 --> 18784 ha	Total	100%	100%	71%	271%	Total	*18,784*	100	*18,784*	100	*15,027*	80	*52,595*	280%	9%	1,622	100%	100%	100%					
49. Klambu Kanan	Paddy	85%	97%	38%	220%	Paddy	10,763	97	10,763	97	4,431	40	25,957	234%	14%	1,673	86%	97%	42%					
	Palawija			40%	40%	Palawija		0		0	4,431	40	4,431	40%	0%	45			43%					
Irrigated area	Sugarcane	3%			3%	Sugarcane	315	3		0		0	315	3%	0%		3%							
11078 --> 11078 ha	Total	88%	97%	78%	263%	Total	*11,078*	100	*10,763*	97	*8,862*	80	*30,703*	277%	14%	1,718	89%	97%	85%					
50. Kaliwadas	Paddy	82%	82%		164%	Paddy	6,344	82	6,344	82		0	12,688	164%	0%	0	84%	84%		Paddy	70	70	30	
	Palawija			45%	45%	Palawija		0		0	4,633	60	4,633	60%	15%	1,153			50%	Palawija			30	
Irrigated area	Sugarcane	18%			18%	Sugarcane	1,378	18		0		0	1,378	18%	0%		20%			Sugarcan	30	30	30	7723ha
7722 --> 7722 ha	Total	100%	82%	45%	227%	Total	*7,722*	100	*6,344*	82	*4,633*	60	*18,699*	242%	15%	1,153	104%	84%	50%	Total	100%	100%	50%	300%

1/: Results of the Inventory Survey by the Study Team 2/: Past highest cropped area & intensity of irrigated paddy in a subject irrigation scheme; results of the Inventory Survey by the Study Team (not in the same year or season)

3/: Laporan Inventarisasi, Proyek Perencanaan Pemgembangan Sumber-sumber Air Jawa Tengah, Kanwil Propinsi Jawa Tengah, 1985

Table A-5.3.4 Estimated Net Farm Income per Ha under With-Project Condition: Central Java - 1/2

Irrigation Scheme	Crop	Cropping Intensity & Cropped Area						Net Return per Ha (Rp. million)			Net Return per Ha of Farm	Before Project Net Return per Ha	Incremental Net Return per Ha
		Wet Season		Dry Season I		Dry Season II							
		Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Wet Season	Dry Season	Dry Season	(Rp. 000)	(Rp. 000)	(Rp. 000)
1. Cijalu	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.42				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,853	5,408	2,445
2. Mangganti	Irrigated Paddy	100	1.00	80	0.80		0.00	3.80	3.42				
	Palawija		0.00	20	0.20	40	0.40		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,804	6,415	1,389
3. Serayu	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	40	0.40			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,444	7,078	1,366
4. Banjarcahyana	Irrigated Paddy	100	1.00	100	1.00		0.00	4.25	4.25				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,133	6,840	2,293
5. Kaligending	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.42				
	Palawija		0.00		0.00	40	0.40			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,064	6,677	1,387
6. Pesucen	Irrigated Paddy	100	1.00	80	0.80		0.00	3.42	3.42				
	Palawija		0.00	20	0.20	30	0.30		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,213	5,167	2,046
7. Bedegolan	Irrigated Paddy	100	1.00	100	1.00		0.00	4.25	3.80				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,683	7,163	1,520
8. Kedung Putri	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,233	6,099	2,134
9. Sudagaran	Irrigated Paddy	100	1.00	75	0.75		0.00	3.80	3.42				
	Palawija		0.00	25	0.25	20	0.20		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,317	5,255	2,062
10. Rebug	Irrigated Paddy	100	1.00	70	0.70		0.00	3.80	3.42				
	Palawija		0.00	30	0.30	20	0.20		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,252	5,410	1,842
11. Kalimeneng	Irrigated Paddy	100	1.00	70	0.70	50	0.50	3.80	3.42	2.97			
	Palawija		0.00	20	0.20	10	0.10		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,314	6,557	1,757
12. Kedung GW	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.42				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,853	6,390	1,463
13. Waduk Cengklik	Irrigated Paddy	98	0.98	50	0.50	30	0.30	3.42	3.42	3.42			
	Palawija		0.00	10	0.10	10	0.10		2.12	2.11			
Irrigated Field 1 ha	Sugarcane	2	0.02		0.00		0.00	2.76			6,566	4,359	2,207
14. Ploso Wareng	Irrigated Paddy	100	1.00	100	1.00	50	0.50	3.80	3.80	3.80			
	Palawija		0.00		0.00	50	0.50			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				10,555	9,251	1,304
15. Jaban	Irrigated Paddy	100	1.00	100	1.00	50	0.50	3.80	3.80	2.97			
	Palawija		0.00		0.00	50	0.50			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				10,140	8,945	1,195
16. Colo Kanan	Irrigated Paddy	100	1.00	99	0.99	99	0.99	3.80	3.80	3.42			
	Palawija		0.00		0.00		0.00						
Irrigated Field 1 ha	Sugarcane		0.00	1	0.01		0.00	2.76			10,975	9,646	1,330
17. Bonggo	Irrigated Paddy	100	1.00	100	1.00	20	0.20	3.80	3.80	3.42			
	Palawija		0.00		0.00	20	0.20			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,706	7,037	1,669
18. Pangkalan	Irrigated Paddy	100	1.00	60	0.60		0.00	3.42	3.42				
	Palawija		0.00	40	0.40	20	0.20		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,742	5,038	1,704
19. Sentul	Irrigated Paddy	100	1.00	80	0.80		0.00	3.42	3.42				
	Palawija		0.00	20	0.20	20	0.20		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,002	5,388	1,614
20. Widodaren	Irrigated Paddy	100	1.00	50	0.50		0.00	3.42	3.42				
	Palawija		0.00	50	0.50	30	0.30		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				6,823	4,008	2,815
21. Klambu Kanan	Irrigated Paddy	96	0.96	96	0.96	25	0.25	3.42	3.42	2.97			
	Palawija		0.00		0.00	40	0.40			2.11			
Irrigated Field 1 ha	Sugarcane	4	0.04		0.00		0.00	2.76			8,263	6,912	1,351
22. Jragung	Irrigated Paddy	100	1.00	50	0.50		0.00	3.42	3.42				
	Palawija		0.00	50	0.50	100	1.00		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,300	5,534	2,766
23. Guntur	Irrigated Paddy	100	1.00	100	1.00		0.00	3.42	3.42				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,473	5,940	1,533
24. Klambu Kiri	Irrigated Paddy	100	1.00	100	1.00	20	0.20	3.80	3.80	3.42			
	Palawija		0.00		0.00	60	0.60			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,550	7,832	1,718
25. Kedungdowo Kramat	Irrigated Paddy	100	1.00	100	1.00		0.00	3.42	3.42				
	Palawija		0.00		0.00	90	0.90			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,739	6,686	2,053
26. Sungapan Kanan	Irrigated Paddy	100	1.00	73	0.73	27	0.27	3.42	3.42	2.97			
	Palawija		0.00		0.00	10	0.10			2.11			
Irrigated Field 1 ha	Sugarcane		0.00	27	0.27		0.00	2.76			7,675	5,434	2,241

Table A-5.3.4 Estimated Net Farm Income per Ha under With-Project Condition: Central Java - 2/2

Irrigation Scheme	Crop	Cropping Intensity & Cropped Area						Net Return per Ha (Rp. million)			Net Return per Ha of Farm	Before Project Net Return per Ha	Incremental Net Return per Ha
		Wet Season		Dry Season I		Dry Season II							
		Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Intensity (%)	Cropped Area (ha)	Wet Season	Dry Season	Dry Season	(Rp. 000)	(Rp. 000)	(Rp. 000)
27. Mejagong	Irrigated Paddy	100	1.00	100	1.00	100	1.00	3.80	3.42	3.42			
	Palawija		0.00		0.00		0.00						
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				10,640	9,360	1,280
28. Sungapan Kiri	Irrigated Paddy	100	1.00	79	0.79		0.00	4.25	4.25				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00	21	0.21		0.00	2.76			8,820	7,030	1,790
29. Kabuyutan	Irrigated Paddy	85	0.85	40	0.40	25	0.25	4.25	4.25	3.80			
	Palawija		0.00	35	0.35	55	0.55		2.12	2.11			
Irrigated Field 1 ha	Sugarcane	15	0.15	10	0.10		0.00	2.76			8,855	6,623	2,232
30. Babakan	Irrigated Paddy	92	0.92	60	0.60	20	0.20	3.80	3.80	3.42			
	Palawija		0.00	22	0.22	60	0.60		2.12	2.11			
Irrigated Field 1 ha	Sugarcane	8	0.08	10	0.10		0.00	2.76			8,689	7,249	1,441
31. Kemaron Jambe	Irrigated Paddy	100	1.00	100	1.00	100	1.00	3.80	3.80	3.42			
	Palawija		0.00		0.00		0.00						
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				11,020	9,810	1,210
32. Jengkelok	Irrigated Paddy	100	1.00	40	0.40	10	0.10	3.80	3.80	3.42			
	Palawija		0.00	30	0.30	20	0.20		2.12	2.11			
Irrigated Field 1 ha	Sugarcane		0.00	7	0.07		0.00	2.76			6,913	4,319	2,594
33. Gung	Irrigated Paddy	89	0.89	50	0.50		0.00	3.80	3.80	3.42			
	Palawija		0.00	27	0.27	80	0.80		2.12	2.11			
Irrigated Field 1 ha	Sugarcane	11	0.11	12	0.12		0.00	2.76			8,177	6,476	1,702
34. Parakankidang	Irrigated Paddy	94	0.94	50	0.50		0.00	3.80	3.80				
	Palawija		0.00	43	0.43	90	0.90		2.12	2.11			
Irrigated Field 1 ha	Sugarcane	6	0.06	1	0.01		0.00	2.76			8,476	6,194	2,282
35. Kumisik	Irrigated Paddy	94	0.94	88	0.88		0.00	3.80	3.80				
	Palawija		0.00		0.00	70	0.70			2.11			
Irrigated Field 1 ha	Sugarcane	6	0.06	6	0.06		0.00	2.76			8,724	6,123	2,602
36. Pesantren Kletak	Irrigated Paddy	90	0.90	90	0.90		0.00	3.42	3.42				
	Palawija		0.00		0.00	80	0.80			2.11			
Irrigated Field 1 ha	Sugarcane	10	0.10		0.00		0.00	2.76			8,120	6,819	1,301
37. Sragi	Irrigated Paddy	85	0.85	85	0.85		0.00	3.42	3.42				
	Palawija		0.00		0.00	70	0.70			2.11			
Irrigated Field 1 ha	Sugarcane	15	0.15		0.00		0.00	2.76			7,705	6,386	1,319
38. Sudikampir	Irrigated Paddy	89	0.89	89	0.89		0.00	3.42	2.97				
	Palawija		0.00		0.00	70	0.70			2.11			
Irrigated Field 1 ha	Sugarcane	11	0.11		0.00		0.00	2.76			7,468	6,174	1,294
39. Padurekso	Irrigated Paddy	89	0.89	89	0.89		0.00	3.42	3.42				
	Palawija		0.00		0.00	60	0.60			2.11			
Irrigated Field 1 ha	Sugarcane	11	0.11		0.00		0.00	2.76			7,657	6,428	1,229
40. Kedung Asem	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	50	0.50			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,655	6,840	1,815
41. Bodri	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,233	6,555	1,679
42. Trompo	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,233	6,611	1,622
43. Kedung Pengilon	Irrigated Paddy	100	1.00	100	1.00		0.00	3.80	3.80				
	Palawija		0.00		0.00	50	0.50			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				8,655	6,735	1,920
44. Pasekan	Irrigated Paddy	100	1.00	60	0.60	50	0.50	3.42	3.42	2.97			
	Palawija		0.00	40	0.40		0.00		2.12				
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				7,805	5,688	2,117
45. Kosar	Irrigated Paddy	100	1.00	100	1.00	70	0.70	3.42	3.42	2.97			
	Palawija		0.00		0.00	30	0.30			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				9,552	8,218	1,334
46. Notog	Irrigated Paddy	50	0.50	87	0.87		0.00	4.25	3.80				
	Palawija	37	0.37		0.00	80	0.80	2.12		2.11			
Irrigated Field 1 ha	Sugarcane	13	0.13		0.00		0.00	2.76			8,262	5,892	2,371
47. Sidorejo	Irrigated Paddy	100	1.00	100	1.00	20	0.20	4.25	4.25	3.80			
	Palawija		0.00		0.00	80	0.80			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				10,948	9,207	1,741
48. Glapan	Irrigated Paddy	100	1.00	100	1.00		0.00	4.25	4.25				
	Palawija		0.00		0.00	80	0.80			2.11			
Irrigated Field 1 ha	Sugarcane		0.00		0.00		0.00				10,188	8,434	1,754
49. Klambu Kanan	Irrigated Paddy	97	0.97	97	0.97	40	0.40	3.80	3.80	3.42			
	Palawija		0.00		0.00	40	0.40			2.11			
Irrigated Field 1 ha	Sugarcane	3	0.03		0.00		0.00	2.76			9,667	8,120	1,547
50. Kaliwadas	Irrigated Paddy	82	0.82	82	0.82		0.00	3.42	3.42				
	Palawija		0.00		0.00	60	0.60			2.11			
Irrigated Field 1 ha	Sugarcane	18	0.18		0.00		0.00	2.76			7,372	6,137	1,235
Overall										Average	**8,450**	**6,678**	**1,772**
										Maximum	**11,020**	**9,810**	**2,815**
										Minimum	**6,566**	**4,008**	**1,195**

Table A-5.4.1 Institutional Capacity Building Cost : Central Java

(Unit : million Rp.)

	District	Irrigation Scheme in Study Area	Subject Area (ha)	Agri. Extension Strengthen	Institutional Capacity Building							Total Cost
					1	2	3	4	5	6	Sub-total	
1	Kebumen	Cijalu*	1,377	241	10	28	28	6	143	28	241	482
2		Mangganti*	22,644	3,963	0	453	453	89	2,515	453	3,963	7,925
3		Serayu*	20,795	3,639	0	416	416	81	2,311	416	3,639	7,278
4		Babjarcahyana*	5,001	875	0	100	100	18	556	100	875	1,750
5		Kaligending	2,923	512	0	43	58	0	352	58	512	1,024
6		Pesucen	1,659	291	0	30	33	0	194	33	290	581
7		Bedegolan	8,401	1,470	0	207	168	0	927	168	1,470	2,940
8	Purworejo	Kedung Putri	4,451	779	10	118	89	0	473	89	779	1,558
9		Sudagaran	3,665	641	0	79	73	18	398	73	641	1,282
10		Rebug	1,202	211	0	24	24	12	126	24	210	421
11		Kalimeneng	1,262	221	0	2	25	0	169	25	221	443
12		Kedung GW	1,129	198	0	11	23	0	141	23	197	395
13	Boyolali	Waduk Cengklik	2,120	371	10	39	42	6	231	42	371	742
14	Klaten	Ploso Wareng	1,100	193	10	26	22	0	113	22	193	386
15		Jaban	1,191	208	0	21	24	0	139	24	208	417
16	Sragen	Colo Kanan	22,982	4,022	10	111	460	0	2,981	460	4,022	8,044
17		Bonggo	1,406	246	0	7	28	0	183	28	246	492
18	Pati	Pangkalan	654	114	10	13	13	10	54	13	114	229
19		Sentul	1,739	304	0	35	35	15	185	35	304	609
20		Widodaren	2,616	458	0	96	52	36	222	52	458	916
21		Klambu Kanan (I)	6,216	1,088	0	129	124	0	711	124	1,088	2,176
22	Demak	Jragung	4,416	773	10	102	88	44	440	88	773	1,545
23		Guntur	1,543	270	0	31	31	23	155	31	270	540
24		Klambu Kiri	20,738	3,629	0	501	415	155	2,143	415	3,629	7,258
25	Batang	Kedungdowo Kramat	1,250	219	10	29	25	11	118	25	219	437
26	Pemalang	Sungapan Kanan	1,851	324	10	16	37	3	221	37	323	647
27		Mejagong	2,049	358	0	36	41	2	238	41	358	717
28		Sungapan Kiri	5,570	975	0	97	111	0	655	111	975	1,950
29	Brebes	Kabuyutan	3,876	678	10	80	78	9	425	78	679	1,357
30		Babakan	2,528	442	0	73	51	0	268	51	442	884
31		Kemaron Jambe	1,483	259	0	30	30	0	170	30	259	519
32		Jengkelok	6,173	1,080	0	123	123	0	709	123	1,080	2,160
33	Tegal / Kodia Tegal	Gung	12,641	2,212	20	353	253	4	1,330	253	2,212	4,425
34		Parakankidang	1,631	286	0	33	33	0	188	33	286	572
35		Kumisik	3,778	661	0	73	76	7	430	76	661	1,322
36	Pekalongan /	Pesantren Kletak	3,636	636	20	75	73	16	380	73	636	1,272
37	Kodia Pekalongan	Sragi	3,539	619	0	71	71	2	405	71	619	1,238
38		Sadikampir	1,550	271	0	31	31	0	178	31	271	542
39		Padurekso	2,764	484	0	71	55	0	302	55	484	968
40	Kendal /	Kedung Asem	2,845	498	20	106	57	28	230	57	497	995
41	Kodia Semarang	Bodri	7,710	1,349	0	203	154	0	838	154	1,350	2,699
42		Trompo	1,229	215	0	25	25	0	141	25	215	430
43		Kedung Pengilon	2,686	470	0	54	54	0	309	54	470	940
44	Magelang /											
	Kodia Magelang	Pasekan*	988	173	20	20	20	4	90	20	173	345
45	Batang / Pekalongan	Kosar	3,243	568	0	93	65	42	303	65	568	1,136
46	Brebes / Tegal	Notong	25,540	4,469	0	468	511	21	2,958	511	4,469	8,939
47	Grobogan / Boyolali	Sadorejo	5,717	1,001	10	108	114	39	615	114	1,000	2,001
48	Grobogan / Demak	Glapan	18,784	3,287	0	262	376	146	2,128	376	3,288	6,575
49	Grobogan / Kudus	Klambu Kanan (II)	11,078	1,939	10	78	222	49	1,359	222	1,939	3,878
50	Pekalogan / Pemalang	Kaliwadas	7,722	1,351	0	176	154	2	863	154	1,351	2,702
		Total	283,091	49,541	18	5,404	5,662	899	31,711	5,662	49,538	99,079

Remarks: 1; District/municipal government capacity building plan, 2; WUA strengthening plan, 3; WUA federation setting-up plan
4; WUA establishment acceleration plan, 5; On-the-job O&M training, 6; WUA management guidance

Table A-5.5.1 Economic Project Costs of Rehabilitation Plans : Central Java

(Unit: million Rp.)

	Irrigation Scheme	Subject Area (ha)	Initial Investment Cost (Economic Price)						Total Initial Investment Cost (Financial Price)	Running Cost	
			Irrigation System Rehabilitation	Institutional Capacity Building	Consulting Service	Admini-stration	Physical Contingency	Total		Incremental O&M Cost	Replacement (every 10 years)
1.	Cijalu	1,377	47,590	434	3,326	1,125	4,802	57,277	59,761	138	1,254
2.	Mangganti	22,644	287,627	7,133	20,443	6,917	29,476	351,596	367,364	2,264	3,570
3.	Serayu	20,795	547,589	6,550	38,408	12,995	55,414	660,956	690,190	2,080	3,570
4.	Banjarcahyana	5,001	148,504	1,575	10,398	3,518	15,008	179,003	186,849	500	2,566
5.	Kaligending	2,923	40,309	921	2,857	967	4,123	49,176	51,336	292	1,558
6.	Pesucen	1,659	26,048	523	1,840	623	2,657	31,690	33,063	166	1,254
7.	Bedegolan	8,401	123,034	2,646	8,713	2,948	12,568	149,909	156,567	840	2,566
8.	Kedung Putri	4,451	85,475	1,402	6,021	2,037	8,688	103,622	108,196	445	1,558
9.	Sudagaran	3,665	67,566	1,154	4,762	1,611	6,872	81,966	85,576	367	1,558
10.	Rebug	1,202	28,504	379	1,999	676	2,888	34,447	35,929	120	1,254
11.	Kalimeneng	1,262	26,931	398	1,892	640	2,733	32,593	33,996	126	1,254
12.	Kedung GW	1,129	45,867	356	3,200	1,083	4,622	55,128	57,512	113	1,254
13.	Waduk Cengklik	2,120	46,974	668	3,300	1,116	4,764	56,822	59,296	212	1,558
14.	Ploso Wareng	1,100	15,651	347	1,107	374	1,600	19,078	19,887	110	1,254
15.	Jaban	1,191	33,776	375	2,364	800	3,415	40,731	42,487	119	1,254
16.	Colo Kanan	22,982	526,906	7,239	37,026	12,528	53,415	637,114	665,359	2,298	3,570
17.	Bonggo	1,406	37,259	443	2,611	883	3,770	44,966	46,913	141	1,254
18.	Pangkalan	654	15,507	206	1,086	368	1,571	18,738	19,521	65	1,254
19.	Sentul	1,739	26,907	548	1,901	643	2,745	32,745	34,166	174	1,254
20.	Widodaren	2,616	41,842	824	2,956	1,000	4,267	50,889	53,116	262	1,558
21.	Klambu Kanan	6,216	158,085	1,958	11,090	3,752	16,004	190,890	199,284	622	2,566
22.	Jragung	4,416	66,336	1,391	4,694	1,588	6,773	80,783	84,359	442	1,558
23.	Guntur	1,543	29,064	486	2,046	692	2,955	35,244	36,769	154	1,254
24.	Klambu Kiri	20,738	313,074	6,532	22,162	7,498	31,961	381,227	398,244	2,074	3,570
25.	Kedungdowo Kramat	1,250	21,521	394	1,517	513	2,191	26,136	27,257	125	1,254
26.	Sungapan Kanan	1,851	21,152	583	1,505	509	2,174	25,923	27,049	185	1,254
27.	Mejagong	2,049	31,824	645	2,249	761	3,247	38,726	40,408	205	1,558
28.	Sungapan Kiri	5,570	61,068	1,755	4,354	1,473	6,282	74,933	78,248	557	2,566
29.	Kabuyutan	3,876	83,274	1,221	5,855	1,981	8,449	100,781	105,217	388	1,558
30.	Babakan	2,528	39,750	796	2,809	950	4,055	48,361	50,475	253	1,558
31.	Kemaron Jambe	1,483	47,011	467	3,288	1,112	4,748	56,626	59,083	148	1,254
32.	Jengkelok	6,173	103,054	1,944	7,277	2,462	10,500	125,237	130,764	617	2,566
33.	Gung	12,641	91,262	3,982	6,608	2,236	9,524	113,612	118,747	1,264	3,570
34.	Parakankidang	1,631	19,767	514	1,404	475	2,028	24,189	25,233	163	1,254
35.	Kumisik	3,778	54,902	1,190	3,888	1,315	5,609	66,904	69,859	378	1,558
36.	Pesantren Kletak	3,636	71,899	1,145	5,062	1,713	7,304	87,122	90,956	364	1,558
37.	Sragi	3,539	62,352	1,115	4,398	1,488	6,347	75,700	79,032	354	1,558
38.	Sudikampir	1,550	42,385	488	2,969	1,005	4,287	51,134	53,354	155	1,254
39.	Padurekso	2,764	59,214	871	4,163	1,408	6,009	71,665	74,802	276	1,558
40.	Kedung Asem	2,845	49,020	896	3,458	1,170	4,992	59,537	62,147	285	1,558
41.	Bodri	7,710	106,441	2,429	7,547	2,554	10,887	129,857	135,622	771	2,566
42.	Trompo	1,229	18,647	387	1,317	446	1,903	22,700	23,670	123	1,254
43.	Kedung Pengilon	2,686	39,843	846	2,819	954	4,069	48,530	50,656	269	1,558
44.	Pasekan	988	22,725	311	1,594	539	2,304	27,473	28,645	99	1,254
45.	Kosar	3,243	78,557	1,022	5,514	1,866	7,958	94,915	99,080	324	1,558
46.	Notog	25,540	803,810	8,045	56,267	19,038	81,185	968,345	1,011,116	2,554	3,570
47.	Sidorejo	5,717	123,182	1,801	8,660	2,930	12,498	149,072	155,628	572	2,566
48.	Glapan	18,784	185,117	5,917	13,253	4,484	19,103	227,874	238,147	1,878	3,570
49.	Klambu Kanan	11,078	106,308	3,490	7,614	2,576	10,980	130,967	136,822	1,108	3,570
50.	Kaliwadas	7,722	179,775	2,432	12,627	4,272	18,221	217,327	226,912	772	2,566
	Total	**283,091**	**5,310,286**	**89,174**	**374,218**	**126,615**	**539,946**	**6,440,238**	**6,724,668**	**28,309**	**96,588**

Source: JICA Study Team for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Table A-5.5.2 Economic Crop Budget per Ha: Central Java - 1/2 --- Paddy

Items	Unit	Unit Price (Rp000)	Irrigated Paddy											
			Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)
1. Gross Return														
Unit Yield	(t/ha)		4.0		4.5		5.0		5.5		6.0		6.5	
Unit Price	(Rp.000/t)			1,510		1,510		1,510		1,510		1,510		1,510
Gross Return	(Rp.000)			**6,040**		**6,795**		**7,550**		**8,305**		**9,060**		**9,815**
2. Production cost				**2,319**		**2,502**		**2,658**		**2,905**		**3,049**		**3,225**
2-1. Farm Inputs				*598*		*726*		*815*		*992*		*1,070*		*1,179*
Seed 1/	(kg)		30	60	30	60	30	90	30	90	30	90	30	90
Fertilizers				445		573		633		810		862		972
- Urea	(kg)	1.47	150	221	180	265	200	294	230	338	250	368	275	404
- SP36	(kg)	2.01	50	101	75	151	90	181	110	221	110	221	125	251
- KCl	(kg)	1.69	30	51	50	85	50	85	70	118	75	127	100	169
- ZA	(kg)	1.47	50	74	50	74	50	74	90	132	100	147	100	147
Agro chemicals				93		93		93		93		118		118
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.5	75	1.5	75	2.0	100	2.0	100
- Insecticide (powder)	(kg)	30												
- Rodenticide	(kg)	35	0.5	18	0.5	18	0.5	18	0.5	18	0.5	18	0.5	18
- Herbicide	(lit)	30												
2-2. Labour Costs				*1,224*		*1,260*		*1,308*		*1,356*		*1,404*		*1,452*
Contracted Works														
- Planting/Transplanting 2/	(unit)	x 0.8	1	240	1	240	1	240	1	240	1	240	1	240
- Harvesting 3/	(unit)													
Labour Requirements 3/														
- Hired Labor	(man-day)	12	60	720	63	756	66	792	69	828	73	876	76	912
- Family Labor	(man-day)	12	22	264	22	264	23	276	24	288	24	288	25	300
Total	(man-day)		82		85		89		93		97		101	
2-3. Land Preparation				*300*		*300*		*300*		*300*		*300*		*300*
- Machinery	(unit)		1	300	1	300	1	300	1	300	1	300	1	300
- Draft Animal														
2-4. Field Transportation	(L.S.)	x 0.9	2 %	*86*	2 %	*97*	2 %	*108*	2 %	*119*	2 %	*130*	2 %	*140*
2-5. Misceraneous Expenses	(L.S.)		5 %	*110*	5 %	*119*	5 %	*127*	5 %	*138*	5 %	*145*	5 %	*154*
				4.0		4.5		5.0		5.5		6.0		6.5
3. Net Return	Rp.000			**3,721**		**4,293**		**4,892**		**5,400**		**6,011**		**6,590**
	%			***62***		***63***		***65***		***65***		***66***		***67***
	Rounded			***3,720***		***4,290***		***4,890***		***5,400***		***6,010***		***6,590***

1/: Seed price: yield level < 5.0 Rp. 2,000; yield level ≧5.0 Rp. 3,000 2/: Contract work for transplanting assumed --- Rp. 300,000/ha at financial price

3/: Hired Labour Requirements --- assumed to be 80% of total labour requirements

Table A- 5.5.2 Economic Crop Budget per Ha : Central Java - 2/2 --- Palawija & Others

Items	Unit	Unit Price (Rp000)	Maize				Soybeans				Mungbeans				Sugarcane		Vegetable (shallot)	
			Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)	Q'ty	Value (Rp000)
1. Gross Return			Composite		Hybrid		No-tillage		No-tillage		No-tillage		No-tillage					
Unit Yield	(t/ha)		3.0		5.0		1.3		1.5		1.0		1.2		65.0		12.0	
Unit Price	(Rp.000/t)			1,300		1,300		2,340		2,340		3,100		3,100				4,000
Gross Return	(Rp.000)			**3,900**		**6,500**		**3,042**		**3,510**		**3,100**		**3,720**		**9,364**		**48,000**
2. Production cost				**1,910**		**2,872**		**1,692**		**1,824**		**1,493**		**1,727**		**6,608**		**38,400**
2-1. Farm Inputs				*613*		*1,125*		*578*		*623*		*404*		*543*				
Seed 1/	(kg)		30	111	20	400	40	160	45	180	30	150	25	125				
Fertilizers				452		573		343		368		254		368				
- Urea	(kg)	1.47	150	221	175	257	50	74	50	74	50	74	50	74				
- SP36	(kg)	2.10	70	147	75	158	80	168	100	210	70	147	100	210				
- KCl	(kg)	1.69	50	85	50	85	60	101	50	85	20	34	50	85				
- ZA	(kg)	1.47			50	74												
- PPC	(lit)	40																
Agro chemicals				50		153		75		75		0		50				
- Insecticide (liquid)	(lit)	50	1.0	50	1.5	75	1.5	75	1.5	75	0.0	0	1.0	50				
- Insecticide (powder)	(kg)																	
- Rodenticide	(kg)	35			0.5	18								0				
- Herbicide	(lit)	30			2.0	60												
2-2. Labour Costs				*960*		*1,200*		*900*		*960*		*900*		*960*				
Contracted Works																		
- Planting/Transplanting	(unit)																	
- Harvesting	(unit)																	
Labour Requirements 2/																		
- Hired Labor	(man-day)	12	56	672	70	840	53	636	56	672	53	636	56	672				
- Family Labor	(man-day)	12	24	288	30	360	22	264	24	288	22	264	24	288				
Total	(man-day)		80		100		75		80		75		80					
2-3. Land Preparation				*0*		*0*		*0*		*0*		*0*		*0*				
- Machinery	(unit)																	
- Draft Animal	(unit)																	
2-4. Field Transportation	(L.S.)	x 0.9	2 %	*78*	2 %	*130*	2 %	*61*	2 %	*70*	2 %	*62*	2 %	*74*				
2-5. Shelling	(L.S.)	x 0.8		*168*		*280*		*73*		*84*		*56*		*67*				
2-6. Misceraneous Expenses	(L.S.)		5 %	*91*	5 %	*137*	5 %	*81*	5 %	*87*	5 %	*71*	5 %	*82*				
				3.0		5.0												
3. Net Return	Rp.000			**1,990**		**3,628**		**1,350**		**1,686**		**1,607**		**1,993**		**2,756**		**9,600**
	%			**51**		**56**		**44**		**48**		**52**		**54**		**29**		**20**
	Rounded	Rp.000		***1,990***		***3,630***		***1,350***		***1,690***		***1,610***		***1,990***		***2,760***		***9,600***

1/: Seed price: Maize --- composite Rp. 3,700/kg; hybrid Rp. 20,000/ka; soybeans --- RP. 4,000; mungbeans --- Rp. 5,000/kg

2/: Hired Labour Requirements --- assumed to be 70% of total labour requirements

Table A-5.5.3 Estimated Project Benefits of Rehabilitation Plans : Central Java

(Unit: million Rp.)

Irrigation Scheme	Project Benefit			Gross Return per Ha of Subject Area		
	Before Project	With Project	Project Benefits	Before Project	With Project	Incremental Gross Return per Ha
	Net Return	Net Return	Incremental Net Return	Gross Return per Ha	Gross Return per Ha	
1. Cijalu	10,696	14,926	4,230	9,633	13,770	4,137
2. Mangganti	205,388	243,967	38,579	11,688	13,928	2,240
3. Serayu	204,748	239,891	35,143	12,106	14,768	2,662
4. Banjarcahyana	48,611	62,872	14,261	11,880	15,576	3,696
5. Kaligending	27,458	32,229	4,771	12,006	14,168	2,162
6. Pesucen	12,627	18,246	5,619	9,738	12,937	3,199
7. Bedegolan	85,787	100,492	14,705	12,545	14,976	2,431
8. Kedung Putri	38,008	50,527	12,519	10,504	14,376	3,872
9. Sudagaran	27,707	37,907	10,200	9,373	13,084	3,711
10. Rebug	9,326	12,359	3,033	9,611	13,026	3,415
11. Kalimeneng	11,889	14,986	3,097	11,766	14,848	3,082
12. Kedung GW	10,364	12,241	1,877	11,400	13,777	2,377
13. Waduk Cengklik	11,527	16,620	5,093	7,037	9,933	2,896
14. Ploso Wareng	13,924	15,862	1,938	16,442	18,460	2,018
15. Jaban	14,670	16,514	1,844	16,039	17,861	1,822
16. Colo Kanan	316,950	358,344	41,394	17,221	19,155	1,934
17. Bonggo	14,130	17,076	2,946	12,353	15,183	2,830
18. Pangkalan	4,880	6,307	1,427	9,575	12,304	2,729
19. Sentul	13,736	17,209	3,473	10,054	12,544	2,490
20. Widodaren	16,123	25,381	9,258	8,152	12,576	4,424
21. Klambu Kanan	59,935	70,138	10,203	12,812	14,792	1,980
22. Jragung	32,697	48,532	15,835	11,250	15,320	4,070
23. Guntur	13,239	15,942	2,703	10,800	13,176	2,376
24. Klambu Kiri	220,619	267,149	46,530	13,949	16,752	2,803
25. Kedungdowo Kra.	11,112	14,295	3,183	12,507	15,528	3,021
26. Sungapan Kanan	13,841	19,504	5,663	11,197	14,647	3,450
27. Mejagong	27,554	31,104	3,550	16,775	18,600	1,825
28. Sungapan Kiri	53,191	66,175	12,984	13,120	15,980	2,860
29. Kabuyutan	34,616	45,949	11,333	13,218	16,751	3,533
30. Babakan	24,631	29,322	4,691	13,886	16,273	2,387
31. Kemaron Jambe	15,345	23,268	7,923	12,926	19,200	6,274
32. Jengkelok	37,089	59,890	22,801	8,566	12,708	4,142
33. Gung	107,171	133,869	26,698	13,139	15,715	2,576
34. Parakankidang	13,583	18,247	4,664	12,070	15,728	3,658
35. Kumisik	31,510	43,274	11,764	11,935	15,850	3,915
36. Pesantren Kletak	32,799	38,308	5,509	12,977	14,840	1,863
37. Sragi	30,047	35,357	5,310	12,363	14,299	1,936
38. Sudikampir	12,815	15,134	2,319	11,972	13,892	1,920
39. Padurekso	24,016	27,906	3,890	12,253	14,026	1,773
40. Kedung Asem	26,266	33,344	7,078	11,359	15,161	3,802
41. Bodri	72,311	87,524	15,213	11,530	14,376	2,846
42. Trompo	11,660	13,952	2,292	11,685	14,377	2,692
43. Kedung Pengilon	25,420	31,480	6,060	12,121	15,160	3,039
44. Pasekan	8,125	11,284	3,159	10,413	14,220	3,807
45. Kosar	37,719	43,345	5,626	15,150	16,956	1,806
46. Notog	199,913	277,496	77,583	11,799	14,726	2,927
47. Sidorejo	69,736	83,307	13,571	16,374	18,856	2,482
48. Glapan	213,127	253,433	40,306	14,998	17,536	2,538
49. Klambu Kanan	123,657	146,930	23,273	14,530	17,051	2,521
50. Kaliwadas	63,385	74,372	10,987	12,011	13,834	1,823
Total	**2,745,678**	**3,373,786**	**628,108**	**Avg.**	**12,879**	**15,579**	**2,700**

Table A-5.5.4 Results of Economic Evaluation of Rehabiliation Plans: Central Java

	Irrigation Scheme	Subject Area (ha)	EIRR (%)	B/C [1/]	B - C [1/] (Rp. million)
1.	Cijalu	1,377	4.8%	0.59	-20,929
2.	Mangganti	22,644	7.5%	0.79	-70,178
3.	Serayu	20,795	1.7%	0.39	-360,535
4.	Banjarcahyana	5,001	5.2%	0.62	-61,508
5.	Kaligending	2,923	6.8%	0.75	-11,589
6.	Pesucen	1,659	14.2%	1.37	11,107
7.	Bedegolan	8,401	6.4%	0.71	-40,964
8.	Kedung Putri	4,451	9.1%	0.92	-7,352
9.	Sudagaran	3,665	9.4%	0.95	-3,958
10.	Rebug	1,202	6.1%	0.70	-9,648
11.	Kalimeneng	1,262	6.8%	0.75	-7,635
12.	Kedung GW	1,129	-1.2%	0.28	-35,929
13.	Waduk Cengklik	2,120	8.9%	0.90	-4,988
14.	Ploso Wareng	1,100	7.0%	0.77	-4,175
15.	Jaban	1,191	0.6%	0.36	-23,728
16.	Colo Kanan	22,982	3.2%	0.48	-299,425
17.	Bonggo	1,406	3.5%	0.52	-19,602
18.	Pangkalan	654	4.5%	0.59	-7,173
19.	Sentul	1,739	7.8%	0.82	-5,481
20.	Widodaren	2,616	13.9%	1.37	17,402
21.	Klambu Kanan	6,216	1.9%	0.41	-101,396
22.	Jragung	4,416	15.0%	1.48	35,833
23.	Guntur	1,543	4.7%	0.60	-13,058
24.	Klambu Kiri	20,738	8.7%	0.88	-40,884
25.	Kedungdowo Kramat	1,250	9.3%	0.94	-1,393
26.	Sungapan Kanan	1,851	17.1%	1.65	16,243
27.	Mejagong	2,049	6.2%	0.71	-10,572
28.	Sungapan Kiri	5,570	13.0%	1.27	19,284
29.	Kabuyutan	3,876	8.4%	0.86	-12,547
30.	Babakan	2,528	6.9%	0.75	-11,089
31.	Kemaron Jambe	1,483	11.3%	1.12	5,945
32.	Jengkelok	6,173	14.0%	1.38	43,863
33.	Gung	12,641	16.1%	1.59	66,259
34.	Parakankidang	1,631	15.1%	1.46	10,696
35.	Kumisik	3,778	13.5%	1.32	19,962
36.	Pesantren Kletak	3,636	3.0%	0.48	-41,263
37.	Sragi	3,539	3.8%	0.53	-32,657
38.	Sudikampir	1,550	0.6%	0.36	-29,648
39.	Padurekso	2,764	1.8%	0.42	-38,370
40.	Kedung Asem	2,845	8.8%	0.90	-5,779
41.	Bodri	7,710	8.1%	0.84	-19,515
42.	Trompo	1,229	7.1%	0.77	-4,866
43.	Kedung Pengilon	2,686	9.2%	0.93	-3,024
44.	Pasekan	988	8.8%	0.90	-2,479
45.	Kosar	3,243	2.5%	0.45	-47,538
46.	Notog	25,540	5.1%	0.60	-347,085
47.	Sidorejo	5,717	6.3%	0.70	-41,045
48.	Glapan	18,784	12.6%	1.24	52,384
49.	Klambu Kanan	11,078	12.5%	1.24	29,752
50.	Kaliwadas	7,722	1.2%	0.37	-123,708

1/: At discount rate of 10%

Source: JICA Study Team for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Table A-6.2.1 Prioritization for Rehabilitation by Weighted Scoring Method

Issue for Evaluation	Full Score	Evaluation Index	Weight	Weighted Score	Situation for High Priority
1 Issue of Irrigation System	**50.0**				
1.1 Rate of Utilization of Irrigation Potential (=present irrigation paddy area / irrigated paddy area with project x 100)	10.0	(1) Less than 50 %	1.0	10.0	Severe problem on irrigation program achievement.
		(2) 50 - 69 %	0.8	8.0	
		(3) 70 - 100 %	0.5	5.0	
1.2 Urgency of Rehabilitation	25.0				Severe problem on irrigation facilities
1.2.1 Function of Water Resources Facility	10.0	(1) Serious condition for operation (Evaluation: D)	1.0	10.0	
		(2) Not functioning well (Evaluation: C)	0.8	8.0	
		(3) Partially deteriorated (Evaluation: B)	0.6	6.0	
		(4) Functioning well (Evaluation: A)	0.4	4.0	
1.2.2 Function of Main Canal System	7.0	(1) Serious condition for operation (Evaluation: D)	1.0	7.0	
		(2) Not functioning well (Evaluation: C)	0.8	5.6	
		(3) Partially deteriorated (Evaluation: B)	0.6	4.2	
		(4) Functioning well (Evaluation: A)	0.4	2.8	
1.2.3 Function of Secondary Canal System	5.0	(1) Serious condition for operation (Evaluation: D)	1.0	5.0	
		(2) Not functioning well (Evaluation: C)	0.8	4.0	
		(3) Partially deteriorated (Evaluation: B)	0.6	3.0	
		(4) Functioning well (Evaluation: A)	0.4	2.0	
1.2.4 Function of On-farm System	3.0	(1) Serious condition for operation (Evaluation: D)	1.0	3.0	
		(2) Not functioning well (Evaluation: C)	0.8	2.4	
		(3) Partially deteriorated (Evaluation: B)	0.6	1.8	
		(4) Functioning well (Evaluation: A)	0.4	1.2	
1.3 Sustainability of Irrigation System	15.0				Severe problem on sustainability
1.3.1 Age of the Facility	7.5	(1) More than 50 years	1.0	7.5	
		(2) 30 - 49 years	0.8	6.0	
		(3) 15 - 29 years	0.6	4.5	
		(4) Less than 15 years	0.4	3.0	
1.3.2 Technical Level	7.5	(1) Non-technical level	1.0	7.5	
		(2) Semi-technical level	0.8	6.0	
		(3) Technical level	0.5	3.8	
2 Issue of Agricultural Productivity	**20.0**				
2.1 Current Cropping Intensity of Paddy (=annual cropped area of paddy / subject area x 100)	10.0	(1) Less than 100 %	1.0	10.0	Severe problem on agriculture (low productivity)
		(2) 100 - 149 %	0.8	8.0	
		(3) 150 - 199 %	0.6	6.0	
		(4) More than 200 %	0.4	4.0	
2.2 Current Unit Yield of Paddy (=weighted average unit yield of irrigated & rainfed paddy in the scheme)	10.0	(1) Less than 60 % of planned target yield	1.0	10.0	Severe problem on agriculture (low productivity)
		(2) 60 - 79 % of planned target yield	0.8	8.0	
		(3) 80 - 100 % of planned target yield	0.5	5.0	
3 Issue of Society	**15.0**				Severe social problem
3.1 Contribution to Regional Economy (Current Number of Beneficiaries)	7.5	(1) Less than 30 % of with project beneficiaries	1.0	7.5	
		(2) 30 - 59 % of with project beneficiaries	0.8	6.0	
		(3) 60 - 89 % of with project beneficiaries	0.6	4.5	
		(4) More than 90 % of with project beneficiaries	0.4	3.0	
3.2 Provision of Social Infrastructure (Current ratio of Inspcetion Road Provision)	7.5	(1) Less than 40 % of total canal length of main & secondary canal	1.0	7.5	
		(2) 40 - 59 % of total canal length of main & secondary canal	0.8	6.0	
		(3) 60 - 79 % of total canal length of main & secondary canal	0.6	4.5	
		(4) 80 - 100 % of total canal length of main & secondary canal	0.4	3.0	
4 Issue of Economic and Financial Impact	**15.0**				High economic and financial impact
4.1 Feasibility (EIRR)	7.5	(1) More than 20 %	1.0	7.5	
		(2) 15 - 19 %	0.8	6.0	
		(3) 10 - 14 %	0.6	4.5	
		(4) Less than 10 %	0.4	3.0	
4.2 Rate of Increase of Gross Agricultural Retern per ha (=planned annual gross retern per ha / current anuual gross retern per ha x 100)	7.5	(1) More than 200 %	1.0	7.5	
		(2) 150 - 199 %	0.8	6.0	
		(3) Less than 150 %	0.6	4.5	
TOTAL	**100.0**				

Table A-6.2.2 Priority Ranking for Rehabilitation : Central Java

	Irrigation Scheme	Utilization of Irrigation Potential	Function of Water Resources Facility	Function of Main Canal	Function of Secondary Canal	Function of On-farm	Factor of Deterioration by Year of Construction	Technical Level	Current Cropping Intentsity	Current Unit Yield of Paddy	Contibution to Regional Economy	Provision of social infrastructure	EIRR	Rate of Increase of Gross Agricultural Return	Total Score	Ranking	Classified Group
1	Cijalu	Group VI (High rehabilitation cost)															Group VI
2	Mangganti	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(2)	(4)	(3)	57.3	28	Group III
3	Serayu	(3)	(3)	(1)	(1)	(2)	(4)	(3)	(4)	(3)	(4)	(2)	(4)	(3)	57.7	26	Group II
4	Banjarcahyana	Group VI (High rehabilitation cost)															Group VI
5	Kaligending	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(4)	(4)	(3)	54.3	36	Group III
6	Pesucen	(3)	(4)	(3)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(2)	(3)	(3)	55.4	33	Group III
7	Bedegolan	(3)	(3)	(3)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	57.4	27	Group III
8	Kedung Putri	(3)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(3)	(4)	(4)	(4)	(3)	57.8	24	Group II
9	Sudagaran	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	60.8	12	Group I
10	Rebug	(3)	(2)	(1)	(1)	(1)	(3)	(3)	(3)	(3)	(4)	(2)	(4)	(3)	63.8	4	Group I
11	Kalimeneng	(3)	(2)	(2)	(2)	(2)	(3)	(3)	(4)	(3)	(4)	(2)	(4)	(3)	58.8	20	Group II
12	Kedung GW	Group VI (High rehabilitation cost)															Group VI
13	Waduk Cengklik	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(2)	(3)	(4)	(4)	(4)	(3)	58.3	23	Group II
14	Ploso Wareng	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(4)	(4)	(3)	54.3	36	Group III
15	Jaban	Group VI (High rehabilitation cost)															Group VI
16	Colo Kanan	(3)	(2)	(1)	(2)	(2)	(3)	(3)	(4)	(3)	(4)	(4)	(4)	(3)	57.2	30	Group III
17	Bonggo	(3)	(1)	(2)	(2)	(2)	(3)	(3)	(4)	(3)	(4)	(4)	(4)	(3)	57.8	24	Group II
18	Pangkalan	Group VI (Subject area is less than 1,000 ha)															Group VI
19	Sentul	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	60.8	12	Group I
20	Widodaren	Group V (Acceralation of WUAs establishment)															Group V
21	Klambu Kanan	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(3)	(4)	(3)	55.8	32	Group III
22	Jragung	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(1)	(3)	(4)	(1)	(2)	(3)	67.8	2	Group I
23	Guntur	Group V (Acceralation of WUAs establishment)															Group V
24	Klambu Kiri	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(2)	(4)	(3)	55.3	34	Group III
25	Kedungdowo Kramat	(3)	(2)	(2)	(1)	(2)	(3)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	63.3	5	Group I
26	Sungapan Kanan	(3)	(3)	(3)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(4)	(2)	(3)	55.9	31	Group III
27	Mejagong	Group V (Acceralation of WUAs establishment)															Group V
28	Sungapan Kiri	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(2)	(3)	(3)	58.8	20	Group II
29	Kabuyutan	(3)	(2)	(2)	(2)	(2)	(3)	(3)	(2)	(3)	(4)	(2)	(4)	(3)	62.8	6	Group I
30	Babakan	(3)	(2)	(2)	(1)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	61.8	9	Group I
31	Kemaron Jambe	Group VI (High rehabilitation cost)															Group VI
32	Jengkelok	(3)	(2)	(2)	(1)	(1)	(4)	(3)	(1)	(3)	(4)	(1)	(3)	(3)	67.9	1	Group I
33	Gung	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(2)	(3)	(4)	(4)	(2)	(3)	61.3	11	Group I
34	Parakankidang	(3)	(2)	(3)	(3)	(2)	(4)	(3)	(2)	(3)	(4)	(4)	(2)	(3)	58.9	19	Group II
35	Kumisik	(3)	(2)	(2)	(1)	(2)	(4)	(3)	(2)	(3)	(4)	(4)	(3)	(3)	60.8	12	Group I
36	Pesantren Kletak	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(2)	(4)	(3)	57.3	28	Group III
37	Sragi	(3)	(2)	(2)	(2)	(2)	(3)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	62.3	8	Group I
38	Sudikampir	(3)	(2)	(2)	(1)	(2)	(3)	(3)	(3)	(3)	(4)	(2)	(4)	(3)	61.8	9	Group I
39	Padurekso	(3)	(2)	(1)	(1)	(2)	(1)	(3)	(3)	(3)	(4)	(2)	(4)	(3)	66.2	3	Group I
40	Kedung Asem	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(1)	(4)	(3)	58.8	20	Group II
41	Bodri	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	60.8	12	Group I
42	Trompo	(3)	(1)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	62.8	6	Group I
43	Kedung Pengilon	(3)	(2)	(2)	(2)	(2)	(4)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	60.8	12	Group I
44	Pasekan	Group VI (Subject area is less than 1,000 ha)															Group VI
45	Kosar	Group V (Acceralation of WUAs establishment)															Group V
46	Notog	Group VI (High rehabilitation cost)															Group VI
47	Sidorejo	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(4)	(4)	(3)	52.3	38	Group III
48	Glapan	(3)	(2)	(2)	(2)	(2)	(3)	(3)	(4)	(3)	(4)	(2)	(3)	(3)	60.3	17	Group II
49	Klambu Kanan	(3)	(3)	(2)	(2)	(2)	(4)	(3)	(4)	(3)	(4)	(3)	(3)	(3)	55.3	34	Group III
50	Kaliwadas	(3)	(3)	(2)	(2)	(2)	(3)	(3)	(3)	(3)	(4)	(1)	(4)	(3)	60.3	17	Group II
	Average														59.5		
	Itemized Total	(1)	0	2	4	8	2	1	0	2	0	0	13	0	0	Group I :	16
		(2)	0	24	30	29	36	0	0	5	0	0	12	4	0	Group II :	10
		(3)	38	11	4	1	0	11	38	20	38	0	2	6	38	Group III :	12
		(4)	0	1	0	0	0	26	0	11	0	38	11	28	0	Group IV :	0
																Group V :	4
																Group VI :	8

Source: JICA Study Team for the Study on Comprehensive Recovery Program of Irrigation Agriculture

Group I: First priority group (Ranking 1 - 13)

Group II: Second priority group (Ranking 14 - 26)

Group III: Third priority group (Ranking 27 - 38)

Group IV: Reformulation of water resources development plan

Group V: Acceralation of WUAs establishment

Group VI: Development by other category or method

Table A-7.3.1 Breakdown of Area, Cost, Construction Package for Recovery Program on Action Plan : Central Java

Stage No.	Scheme No.	Irrigation Scheme	District	Subject Area (ha)	Const. Cost (Bil. Rp.)	Nos. of Contract		Construction Period (Year)
						F/S	Construction	
I	PI-1	Sudagaran	Purworejo	3,665	70	1	2	2
	PI-2	Rebug	Purworejo	1,202	30	1	1	2
	PI-3	Sentul	Pati	1,739	28	1	1	2
	PI-4	Jragung	Demak	4,416	69	1	2	2
	PI-5	Kedungdowo Kramat	Batang	1,250	22	1	1	2
	PI-6	Kabuyutan	Brebes	3,876	87	1	2	2
	PI-7	Babakan	Brebes	2,528	41	1	1	2
	PI-8	Jengkelok	Brebes	6,173	107	1	3	2
	PI-9	Gung	Tegal & Kodia Tegal	12,641	95	1	2	3
	PI-10	Kumisik	Tegal & Kodia Tegal	3,778	57	1	2	2
	PI-11	Sragi	Pekalongan & Kodia P.	3,539	65	1	2	2
	PI-12	Sudikampir	Pekalongan & Kodia P.	1,550	44	1	1	2
	PI-13	Padurekso	Pekalongan & Kodia P.	2,764	62	1	2	3
	PI-14	Bodri	Kendal & Kodia Semarang	7,710	111	1	3	2
	PI-15	Trompo	Kendal & Kodia Semarang	1,229	19	1	1	2
	PI-16	Kedung Pengilon	Kendal & Kodia Semarang	2,686	41	1	1	3
	Total I			60,746	948	16	27	
II	PII-1	Serayu	Cilacap	20,795	570	1	12	4
	PII-2	Kedung Putri	Purworejo	4,451	89	1	2	2
	PII-3	Kalimeneng	Purworejo	1,262	28	1	1	2
	PII-4	Waduk Cengklik	Boyolali	2,120	49	1	1	2
	PII-5	Bonggo	Sragen	1,406	39	1	1	2
	PII-6	Sungapan Kiri	Pemalang	5,570	64	1	2	2
	PII-7	Parakankidang	Tegal & Kodia Tegal	1,631	21	1	1	2
	PII-8	Kedung Asem	Kendal & Kodia Semarang	2,845	51	1	1	3
	PII-9	Glapan	Grobogan / Demak	18,784	193	1	4	4
	PII-10	Kaliwadas	Pekalogan / Pemalang	7,722	187	1	4	3
	Total II			66,586	1,291	10	29	
III	PIII-1	Mangganti	Cilacap	22,644	299	1	6	4
	PIII-2	Kaligending	Kebumen	2,923	42	1	1	2
	PIII-3	Pesucen	Kebumen	1,659	27	1	1	2
	PIII-4	Bedegolan	Kebumen	8,401	128	1	3	2
	PIII-5	Ploso Wareng	Klaten	1,100	16	1	1	2
	PIII-6	Colo Kanan	Sragen	22,982	549	1	11	4
	PIII-7	Klambu Kanan	Pati	6,216	165	1	3	3
	PIII-8	Klambu Kiri	Demak	20,738	326	1	7	4
	PIII-9	Sungapan Kanan	Pemalang	1,851	22	1	1	2
	PIII-10	Pesantren Kletak	Pekalongan & Kodia P.	3,636	75	1	2	2
	PIII-11	Sidorejo	Grobogan / Boyolali	5,717	128	1	3	2
	PIII-12	Klambu Kanan	Grobogan / Kudus / Pati	11,078	111	1	3	3
	Total III			108,945	1,888	12	42	
IV	Nil							
V	PV-1	Widodaren	Pati	2,616	44	1	N.A	
	PV-2	Guntur	Demak	1,543	30	1	N.A	
	PV-3	Mejagong	Pemalang	2,049	33	1	N.A	
	PV-4	Kosar	Batang / Pekalongan	3,243	82	1	N.A	
	Total V			9,451	189	4		
VI	PVI-1	Cijalu	Cilacap	1,377	50	1	N.A	
	PVI-2	Banjarcahyana	Banjarnegara	5,001	155	1	N.A	
	PVI-3	Kedung GW	Purworejo	1,129	48	1	N.A	
	PVI-4	Jaban	Klaten	1,191	35	1	N.A	
	PVI-5	Pangkalan	Pati	654	16	1	N.A	
	PVI-6	Kemaron Jambe	Brebes	1,483	49	1	N.A	
	PVI-7	Pasekan	Magelang dan Kodia Mag.	988	24	1	N.A	
	PVI-8	Notog	Brebes / Tegal	25,540	837	1	N.A	
	Total VI			37,363	1,214	8		
	Grand Total			283,091	5,530			

Figures

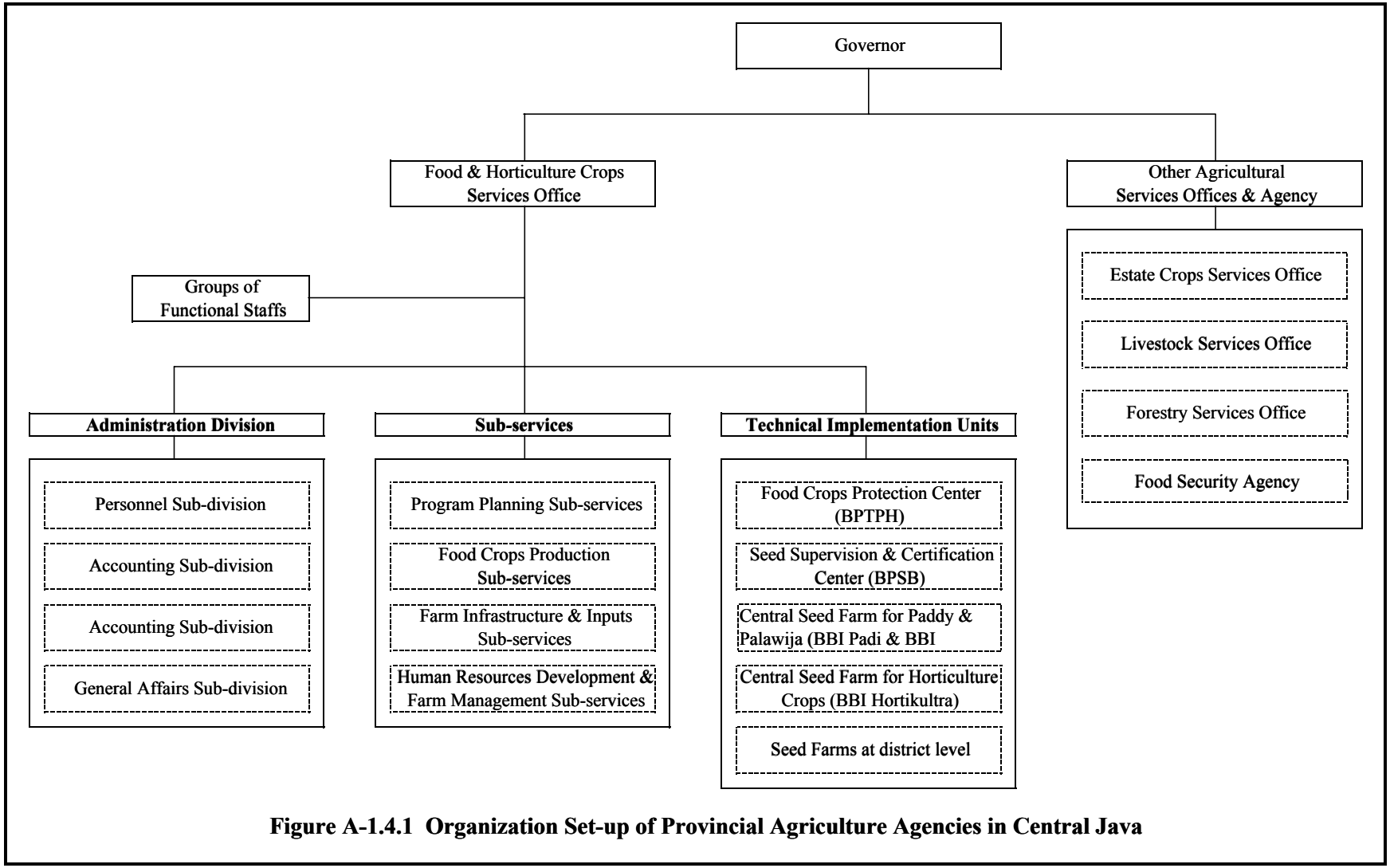
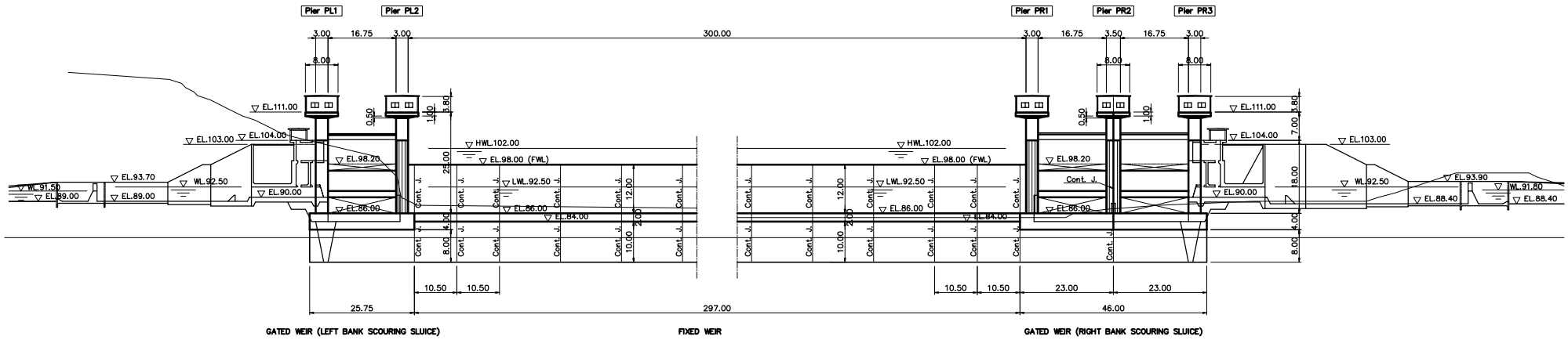
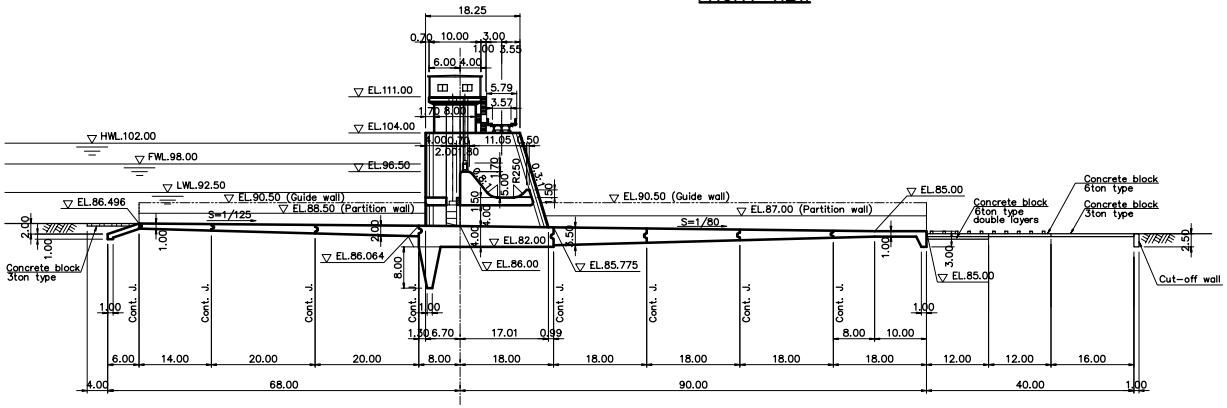


Figure A-1.4.1 Organization Set-up of Provincial Agriculture Agencies in Central Java

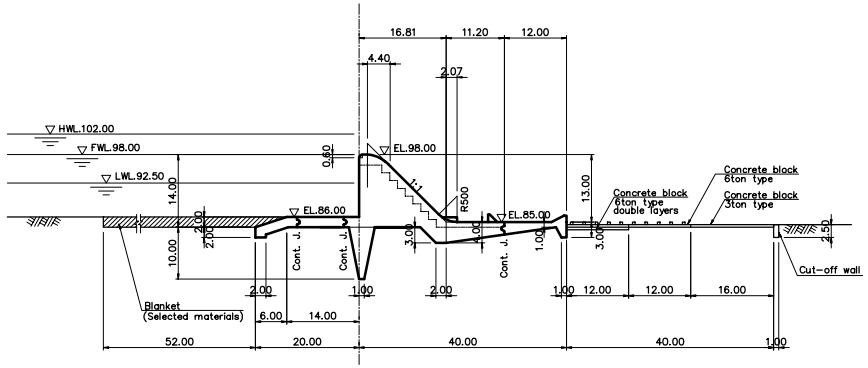
PLATE NO.



FRONT VIEW



SECTION OF RIGHT BANK SCOURING SLUICE



SECTION OF FIXED WEIR

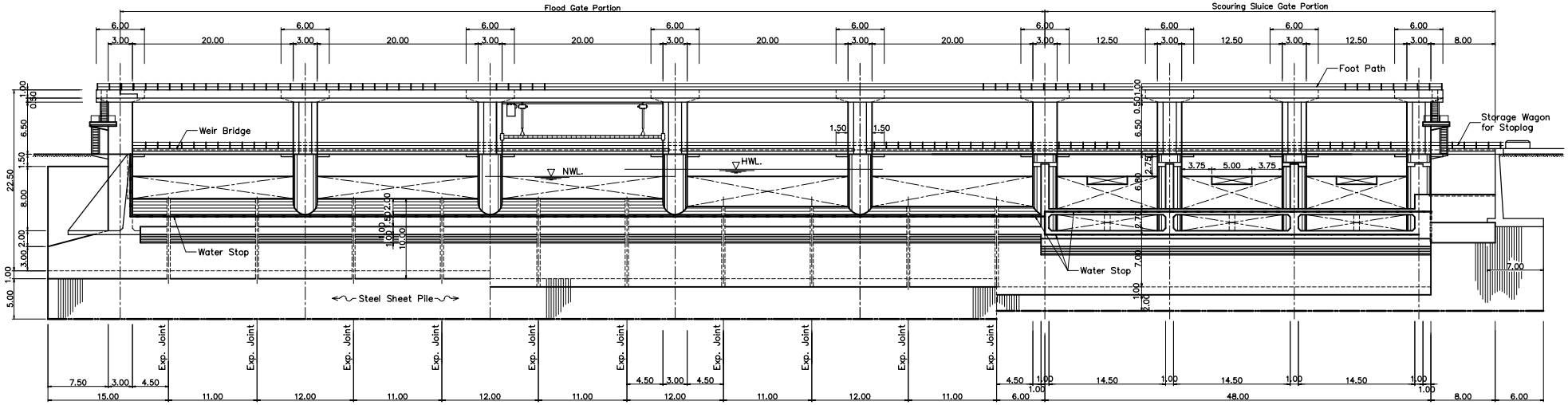
Note:
All dimensions are in meters unless specified.

SCALE 0 25.00 m 50.00 m

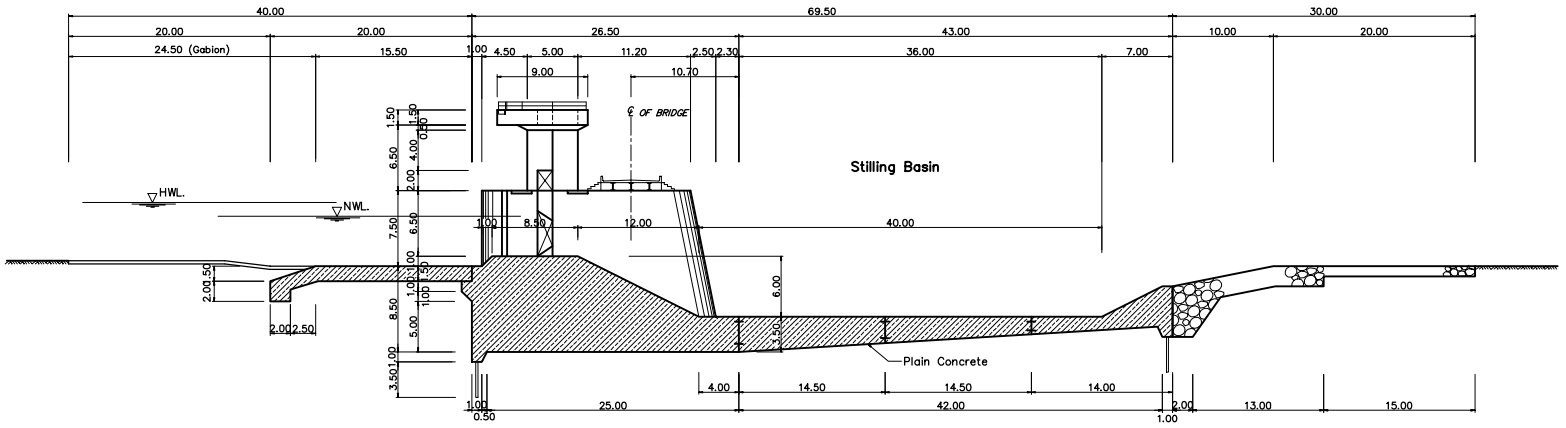
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (1/16) TYPICAL DRAWING HEADWORKS (Fixed Weir Type)
Japan International Cooperation Agency	

AF - 2

PLATE NO.



FRONT VIEW



SECTION

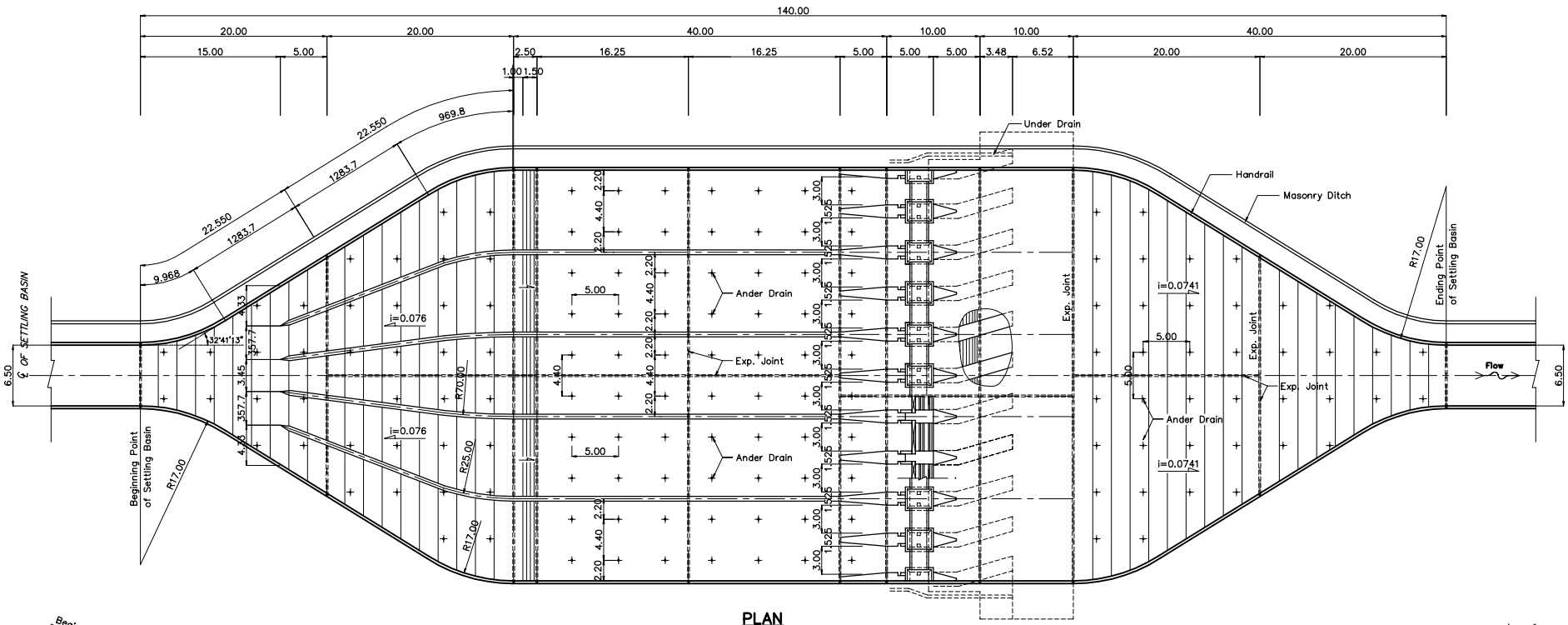
SCALE 0 12.50m 25.00m

Note:
All dimensions are in meters unless specified.

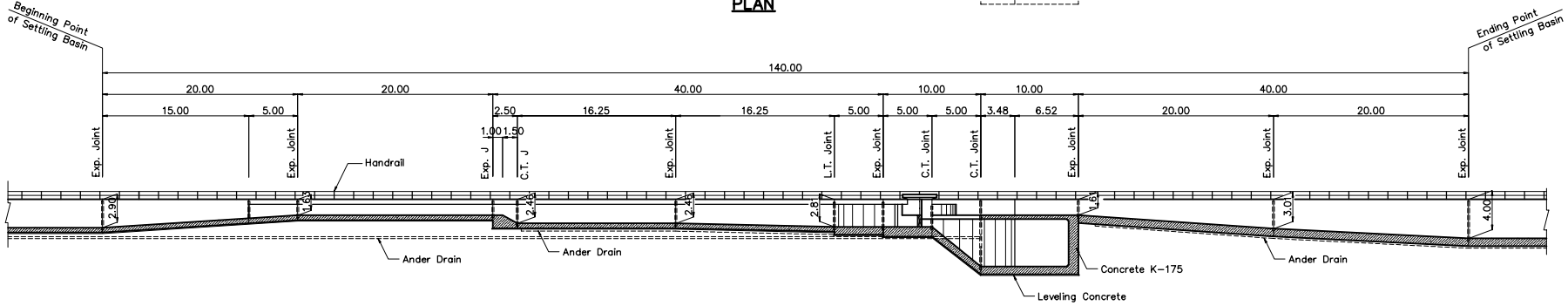
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (2/16) TYPICAL DRAWING HEADWORKS (Movable Weir Type)
Japan International Cooperation Agency	

AF - 3

PLATE NO.



PLAN



PROFILE OF SETTLING BASIN

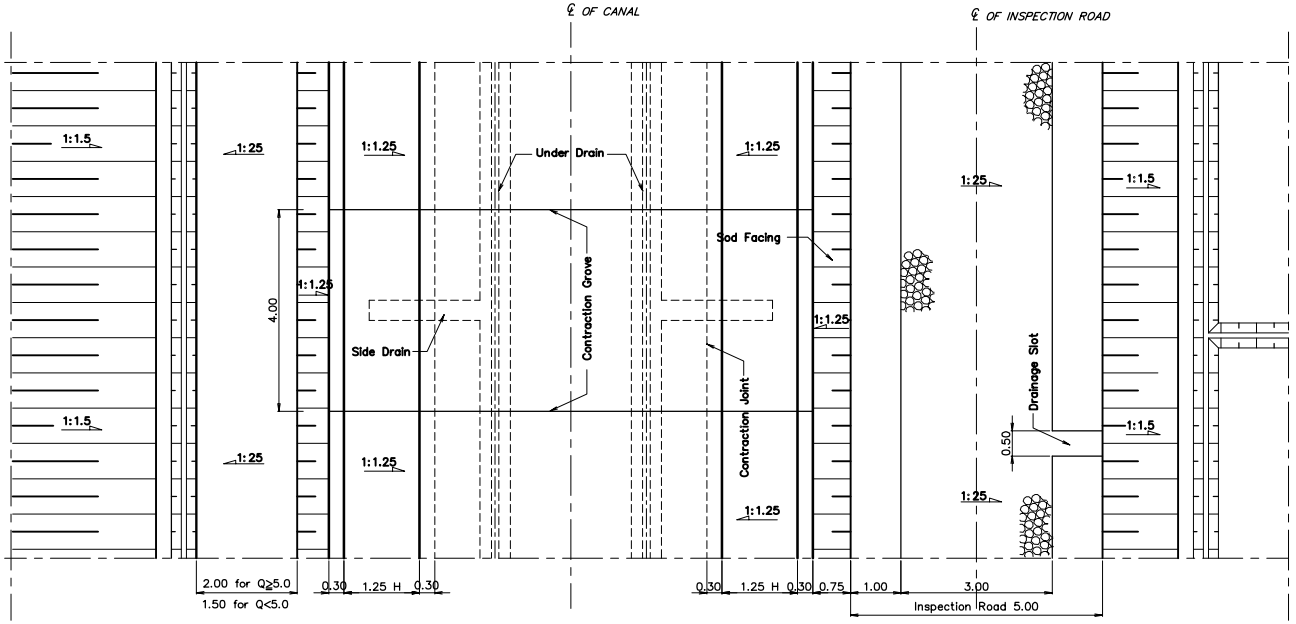
Note:
All dimensions are in meters unless specified.

SCALE 0 1.25m 25.00m

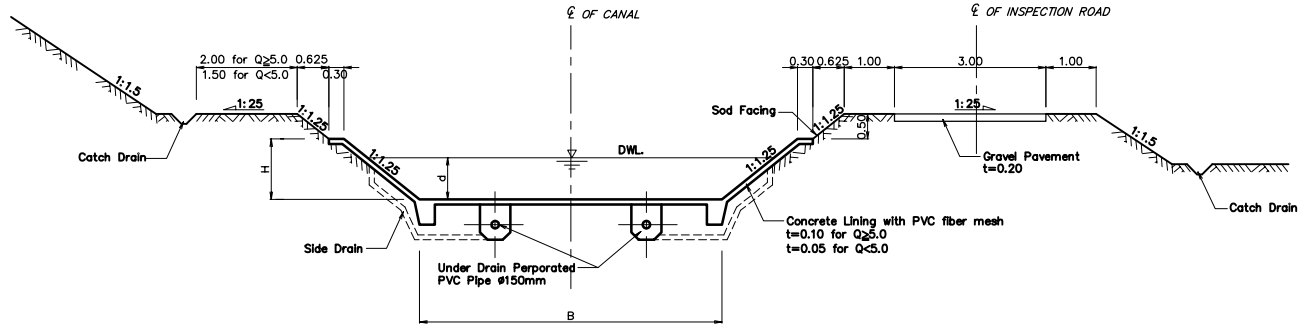
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (3/16) TYPICAL DRAWING SETTLING BASIN
Japan International Cooperation Agency	

AF - 4

PLATE NO.



PLAN



SECTION

DIMENSION TABLE

DESIGN DISCHARGE Q (m^3/s)	B (m)	H (m)	d (m)
0.0–0.5	1.00	1.50	0.90
0.5–1.0	1.00	1.75	1.15
10.–1.5	1.00	1.95	1.35
1.5–2.0	1.00	2.15	1.55
2.0–4.0	1.00	2.35	1.75
4.0–6.0	1.50	2.55	1.95
6.0–8.0	2.00	2.95	2.20
8.0–10.0	2.50	3.05	3.30
10.0–15.0	3.00	3.35	2.60
15.0–20.0	3.50	3.65	2.90
20.0–25.0	4.00	3.85	3.10
25.0–30.0	4.50	4.05	3.30
30.0–35.0	5.00	4.15	3.40

Note:
All dimensions are in meters unless specified.

SCALE 0 2.50m 5.00m

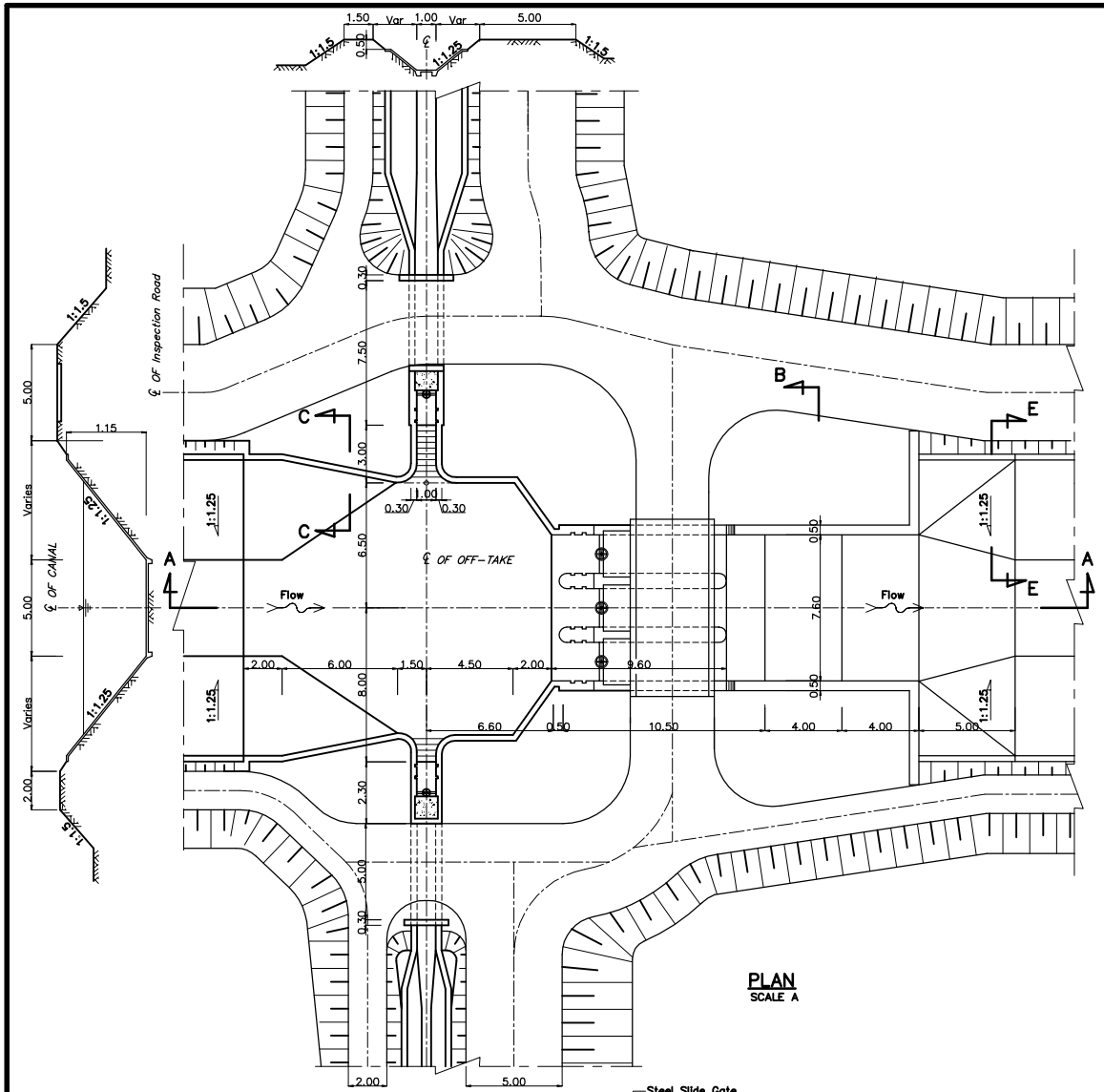
AF - 5

The Study on Comprehensive Recovery Program of Irrigation Agriculture

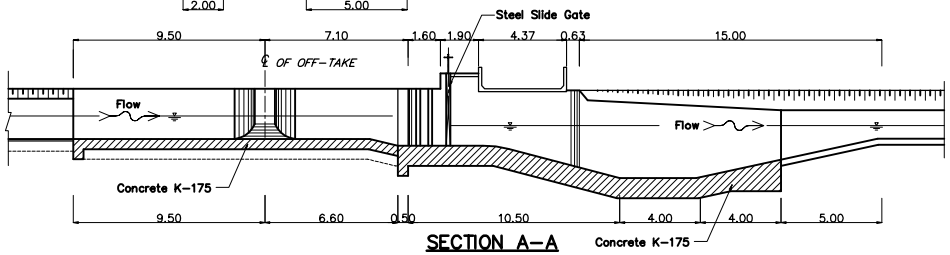
Japan International Cooperation Agency

Figure 5.2.1 (4/16)
TYPICAL CROSS SECTION OF IRRIGATION CANAL

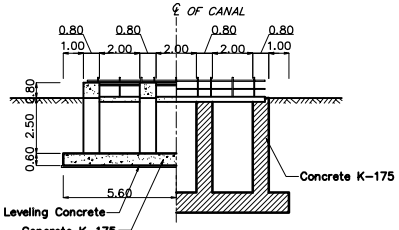
PLATE NO.



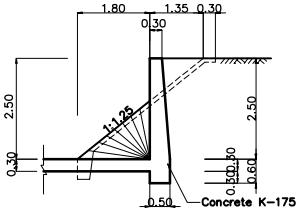
PLAN
SCALE A



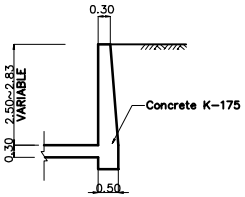
SECTION A-A
SCALE A



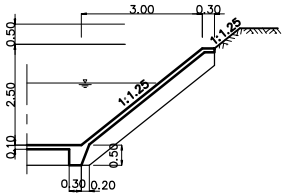
SECTION B-B
SCALE A



SECTION C-C
SCALE B



SECTION D-D
SCALE B



SECTION E-E
SCALE B

Note:
All dimensions are in meters unless specified.

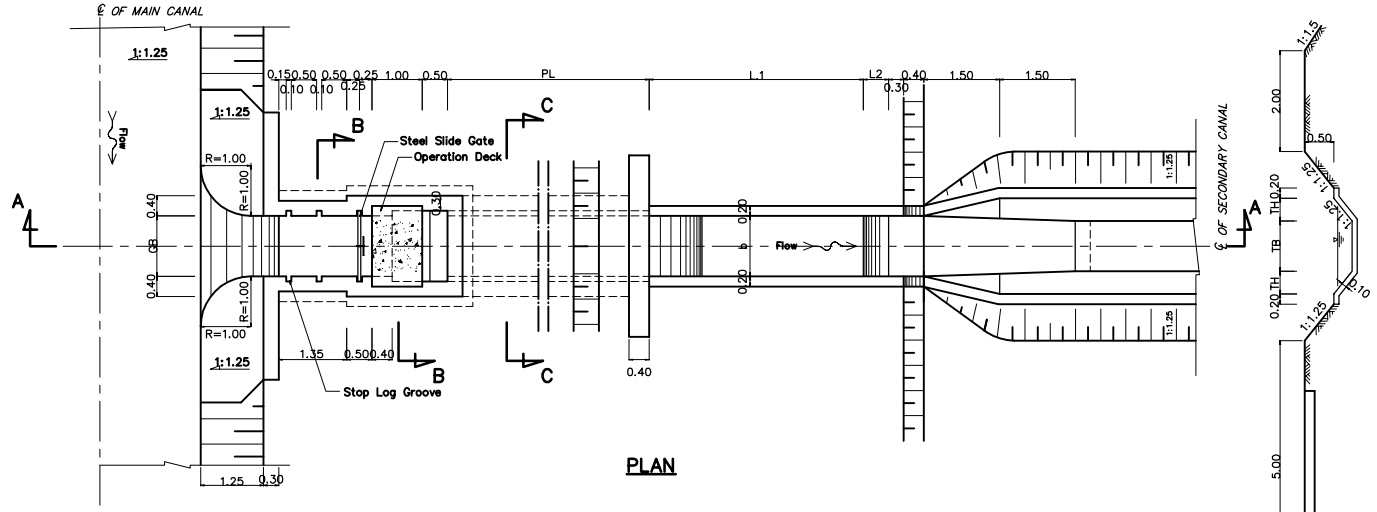
SCALE A 0 6.25m 12.50m

SCALE B 0 3.125m 6.25m

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (5/16) TYPICAL DRAWING DIVISION STRUCTURE
Japan International Cooperation Agency	

AF - 6

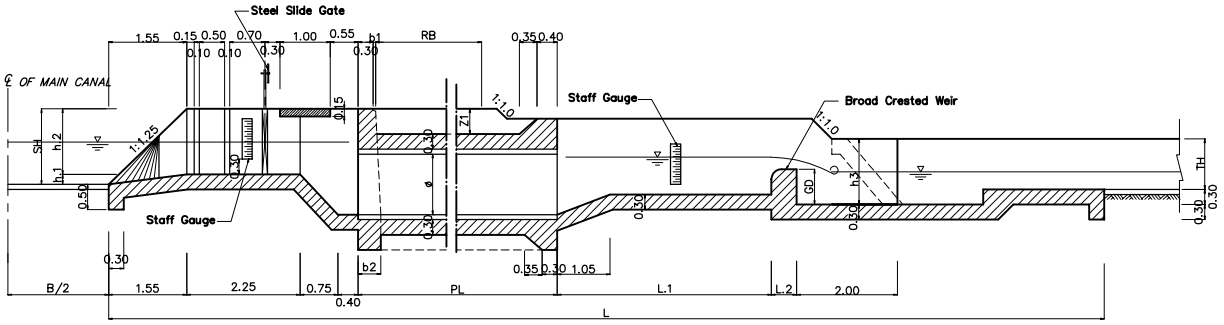
PLATE NO.



PLAN

SECTION B–B

SECTION C–C



SECTION A–A

Note:

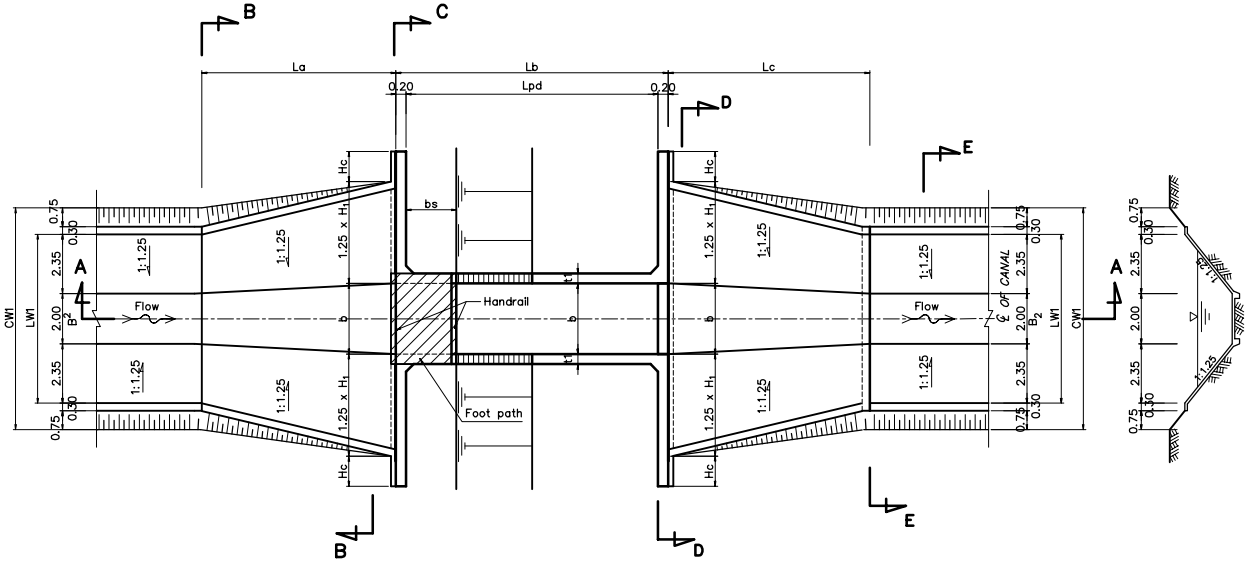
1. All dimensions are in meters unless specified.
1. Structure Shall be Reinforced Concrete

SCALE 0 2.50m 5.00m

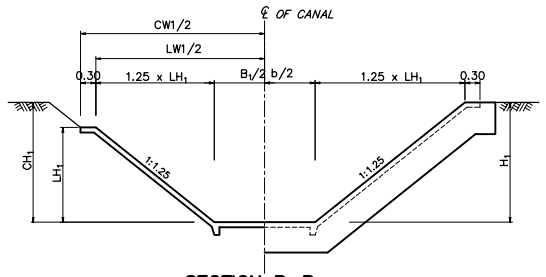
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (6/16) TYPICAL DRAWING TURNOUT
Japan International Cooperation Agency	

AF - 7

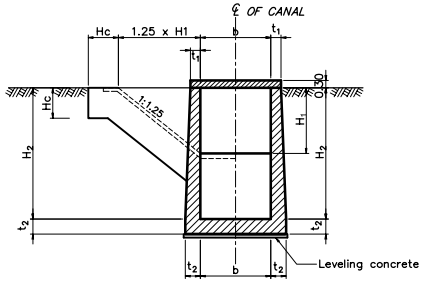
PLATE NO.



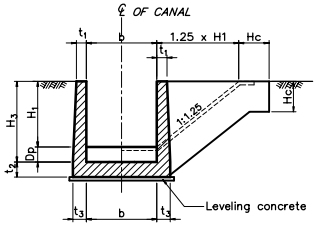
PLAN
SCALE A



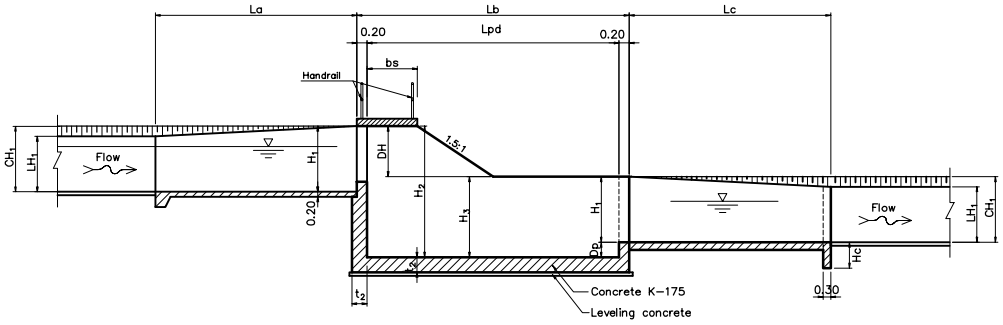
SECTION B–B
SCALE B



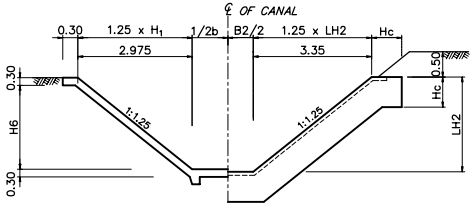
SECTION C–C
SCALE B



SECTION D–D
SCALE B



SECTION A–A
SCALE B



SECTION E–E
SCALE B

SCALE A 0 5.00 m 10.00 m

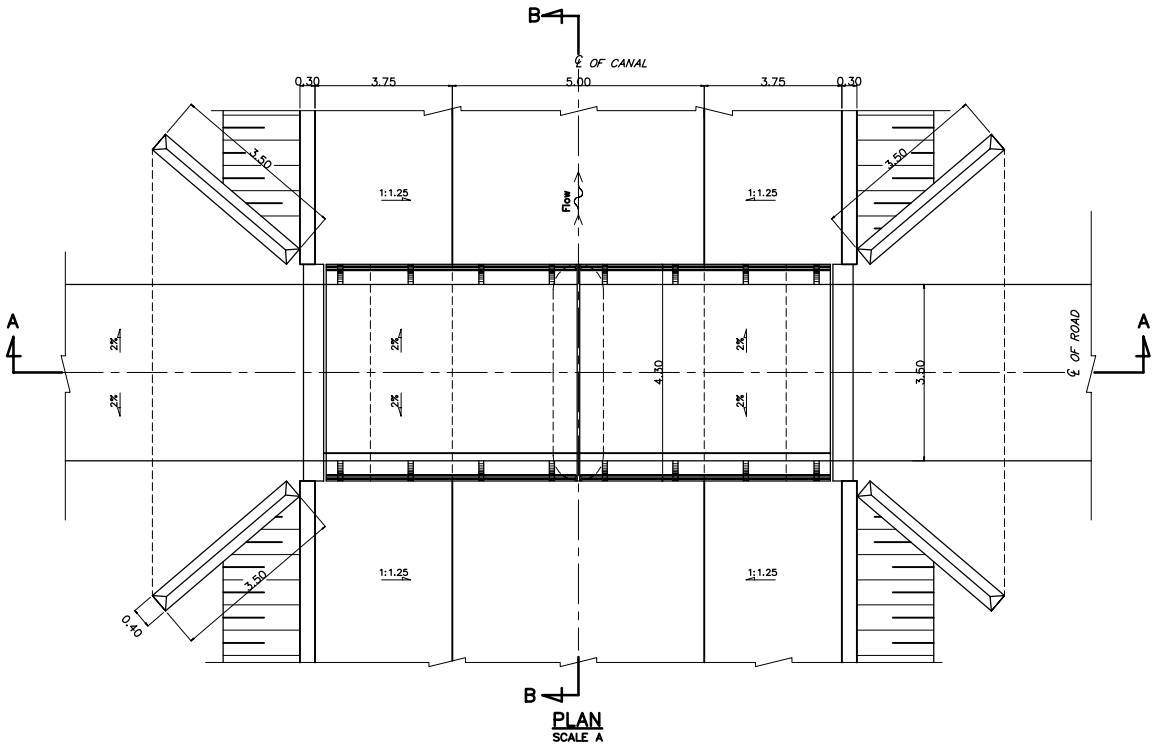
SCALE B 0 2.50 m 5.00 m

Note:
All dimensions are in meters unless specified.

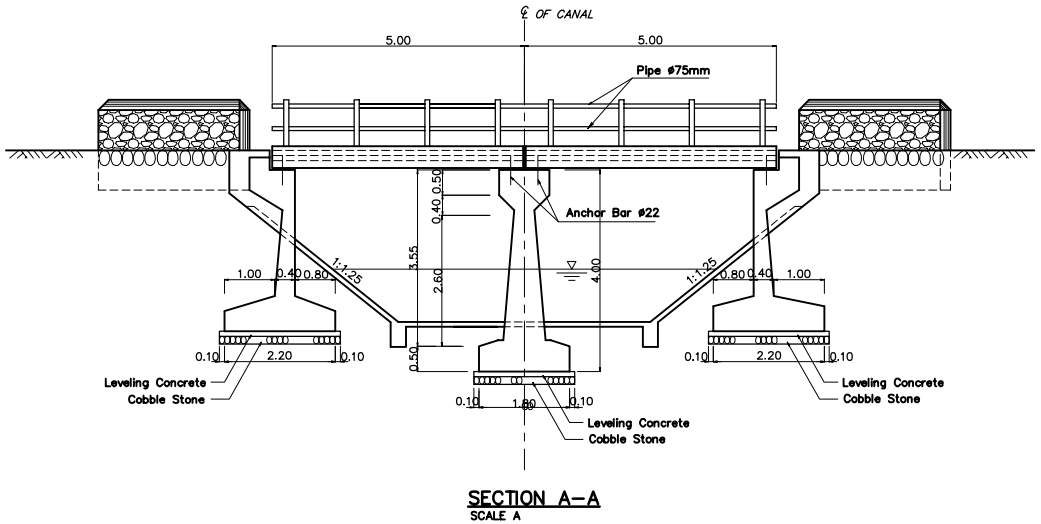
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (7/16) TYPICAL DRAWING DROP
Japan International Cooperation Agency	

AF - 8

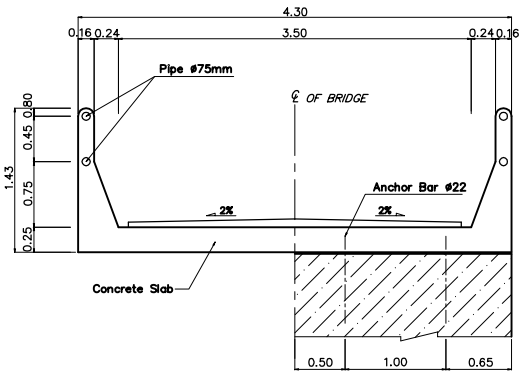
PLATE NO.



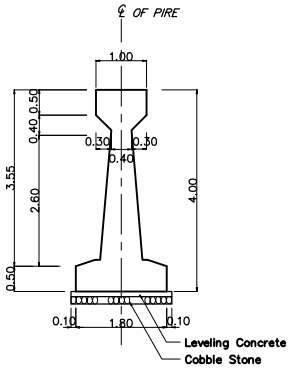
PLAN
SCALE A



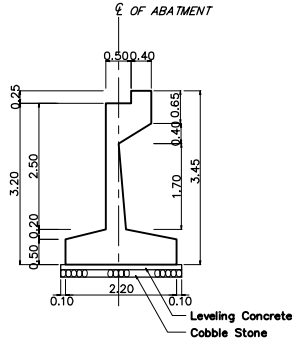
SECTION A–A
SCALE A



SECTION B–B
SCALE B



PIER
SCALE A



ABATMENT
SCALE A

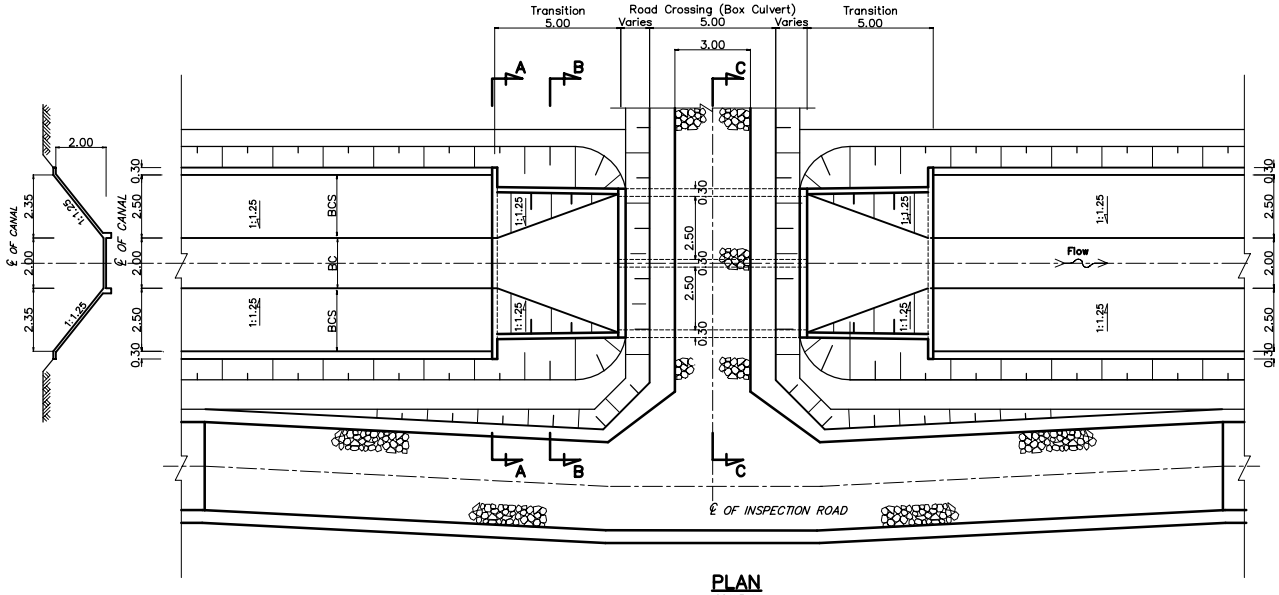
Note:
All dimensions are in meters unless specified.

SCALE A 0 2.50 m 5.00 m

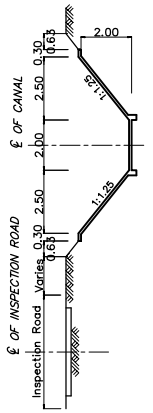
SCALE B 0 1.25 m 2.50 m

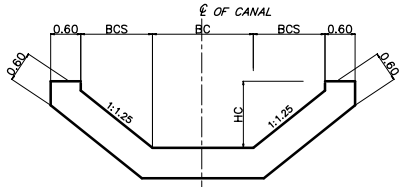
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (8/16) TYPICAL DRAWING SLAB BRIDGE
Japan International Cooperation Agency	

PLATE NO.

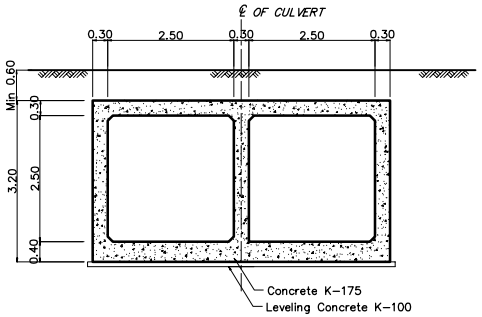


PLAN
SCALE A

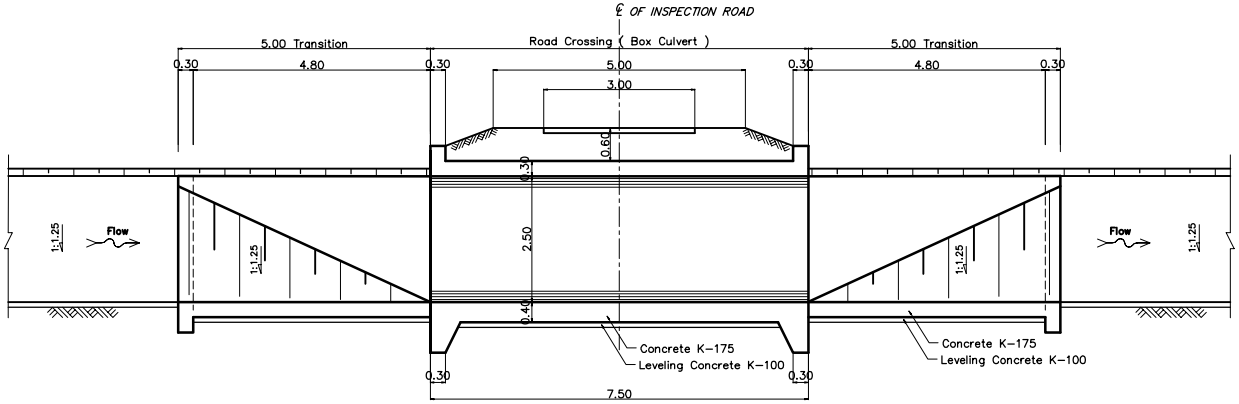




SECTION A – A
SCALE B



SECTION C – C
SCALE B



PROFILE
SCALE B

Note:
All dimensions are in meters unless specified.

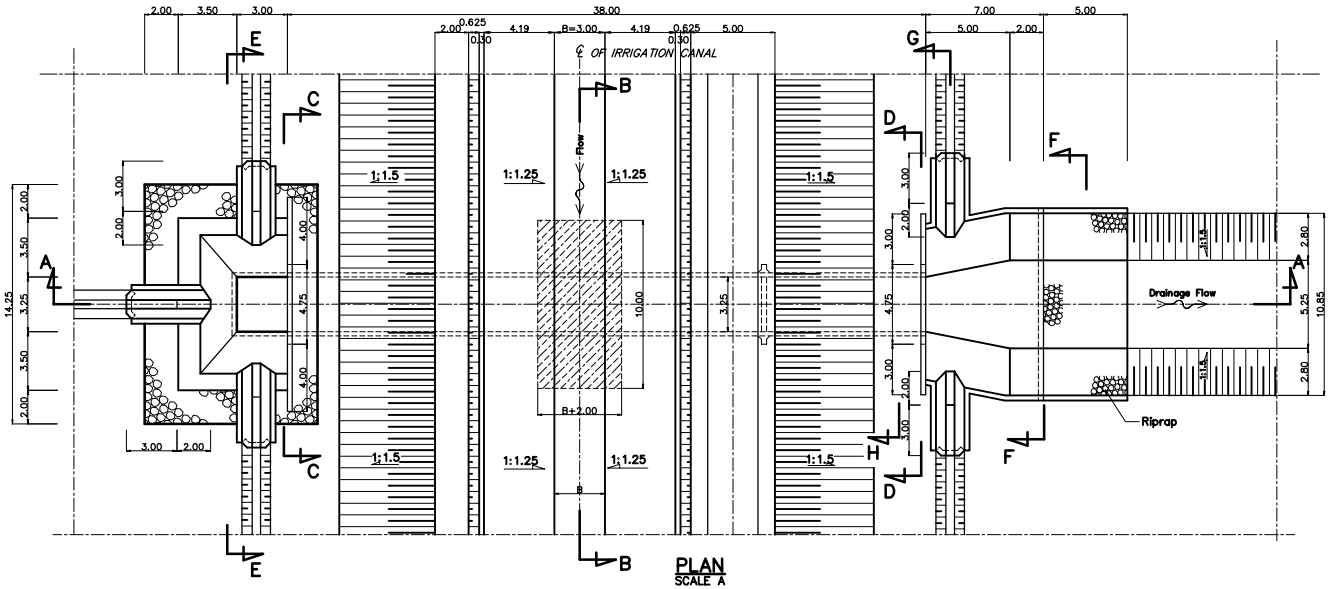
SCALE A 0 5.00m 10.00m

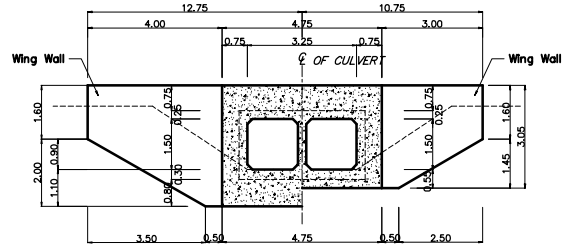
SCALE B 0 2.50m 5.00m

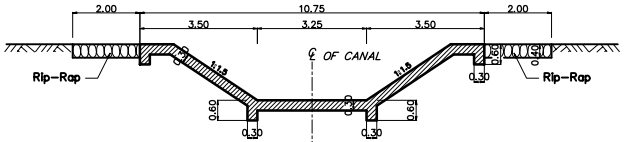
The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figuer 5.2.1 (9/16) TYPICAL DRAWING ROAD CROSSING (BOX CULVERT TYPE)
Japan International Cooperation Agency	

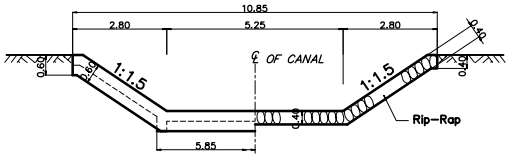
AF - 10

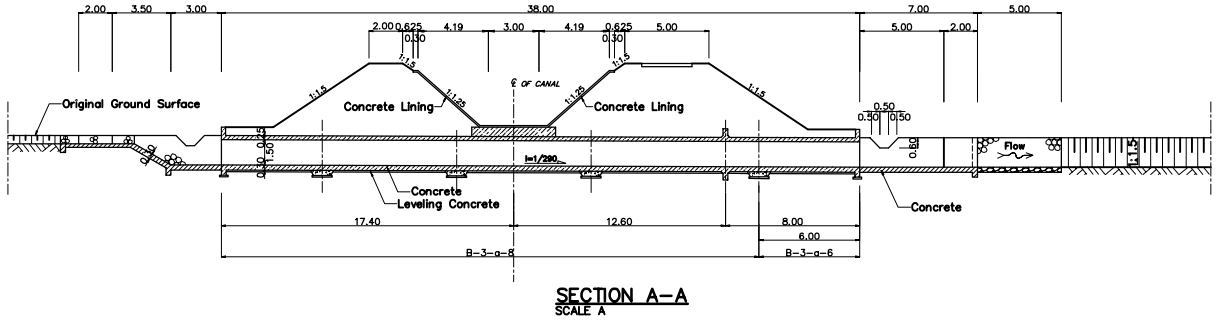
PLATE NO.

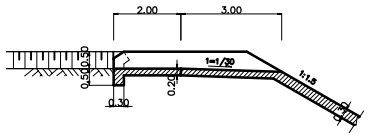


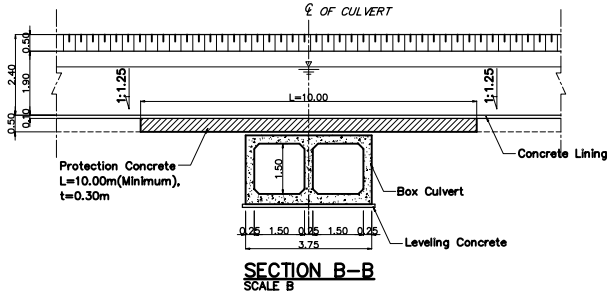












Note:
All dimensions are in meters unless specified.

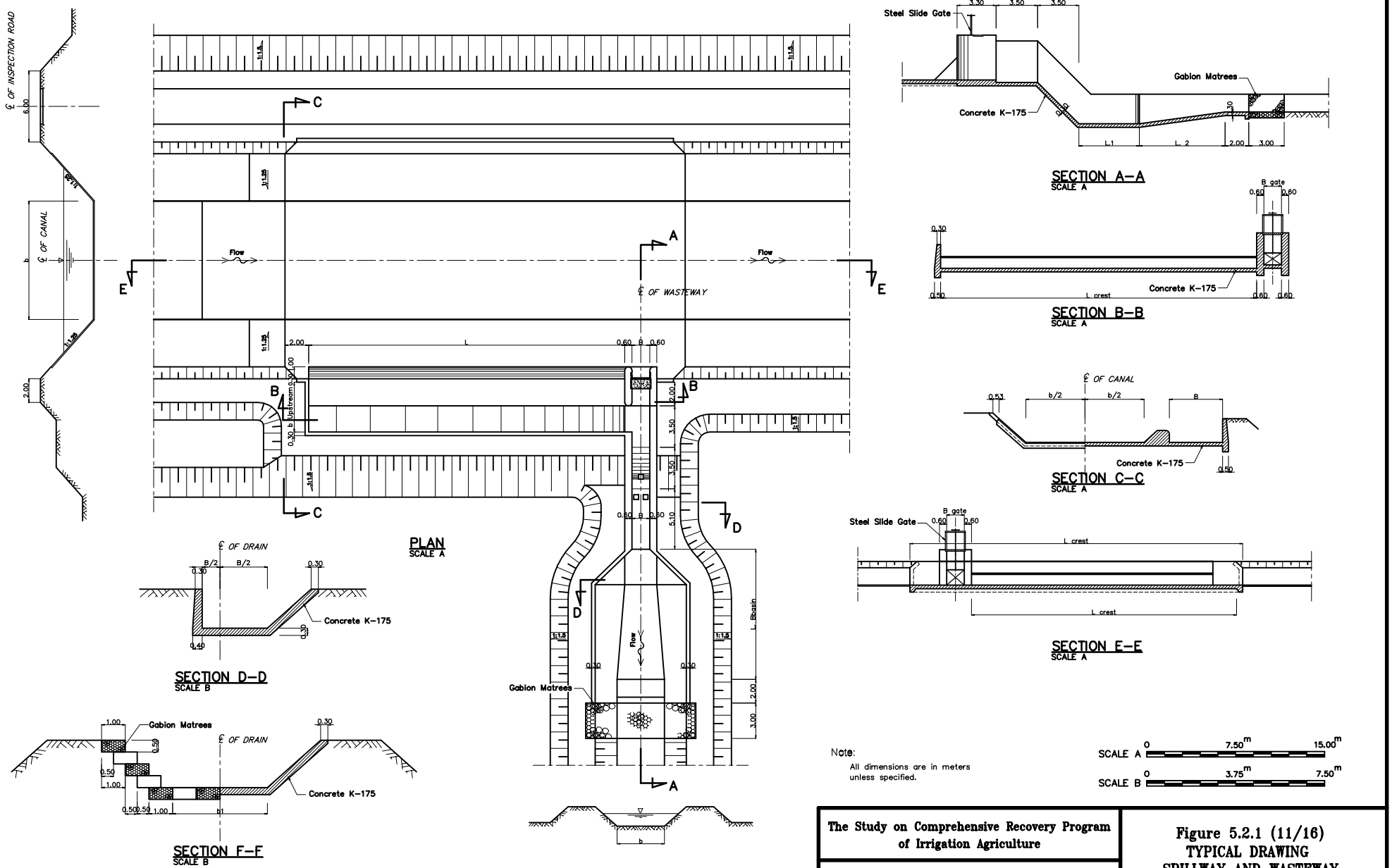
SCALE A 0 7.50m 15.00m

SCALE B 0 3.75m 7.50m

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (10/16) TYPICAL DRAWING DRAINAGE CROSSING
Japan International Cooperation Agency	

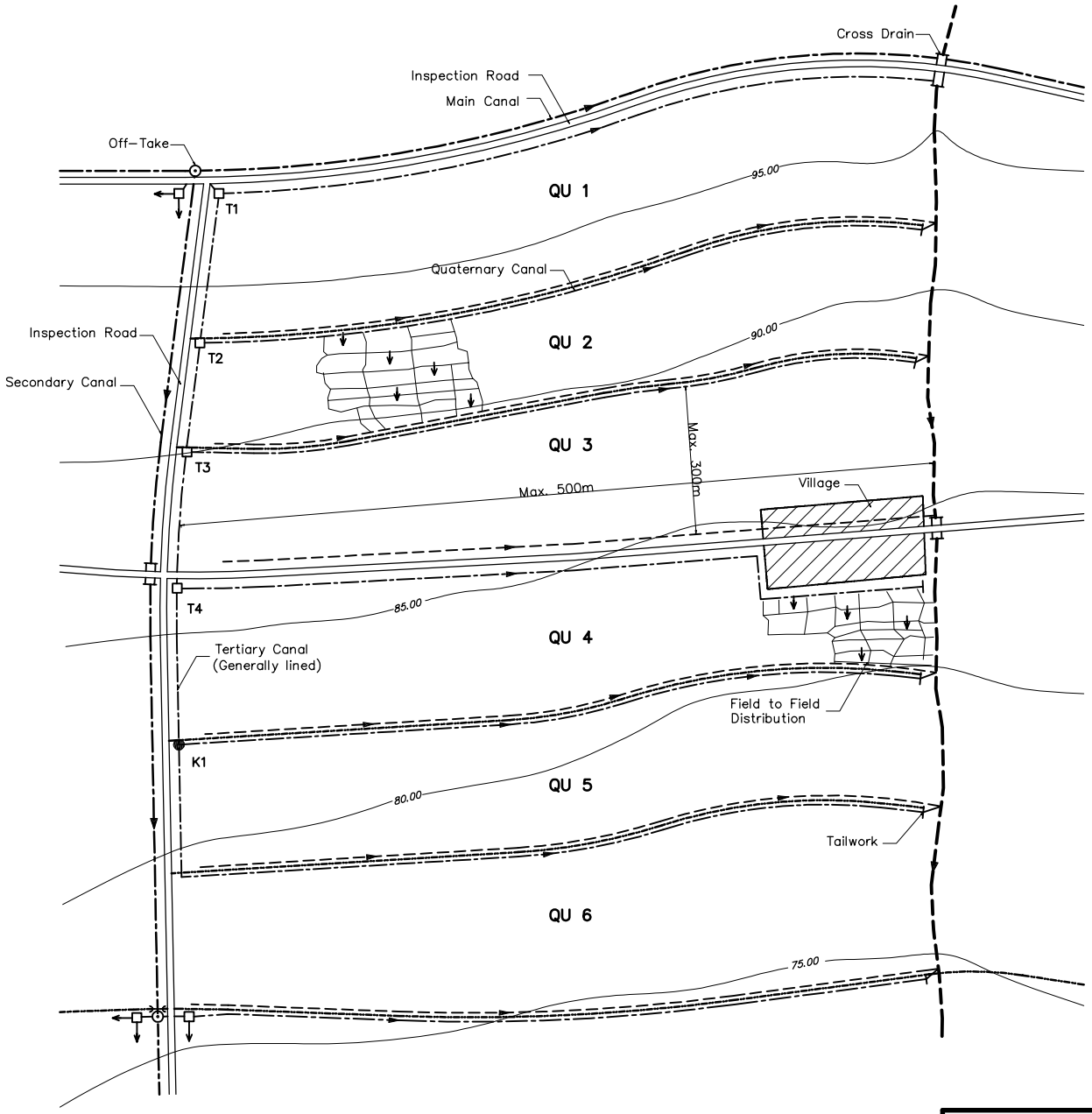
AF - 11

PLATE NO.



The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (11/16) TYPICAL DRAWING SPILLWAY AND WASTEWAY
Japan International Cooperation Agency	

PLATE NO.



General Criteria for Tertiary Unit Development
1, Size of Tertiary Unit 50–100 ha
2, Size of Quaternary Unit 8–15 ha
3, Length of Tertiary Canal <1500 m
4, Length of Quaternary Canal <500 m
5, Distance between Quaternary Canal and Drainage Canal <300 m

LEGEND

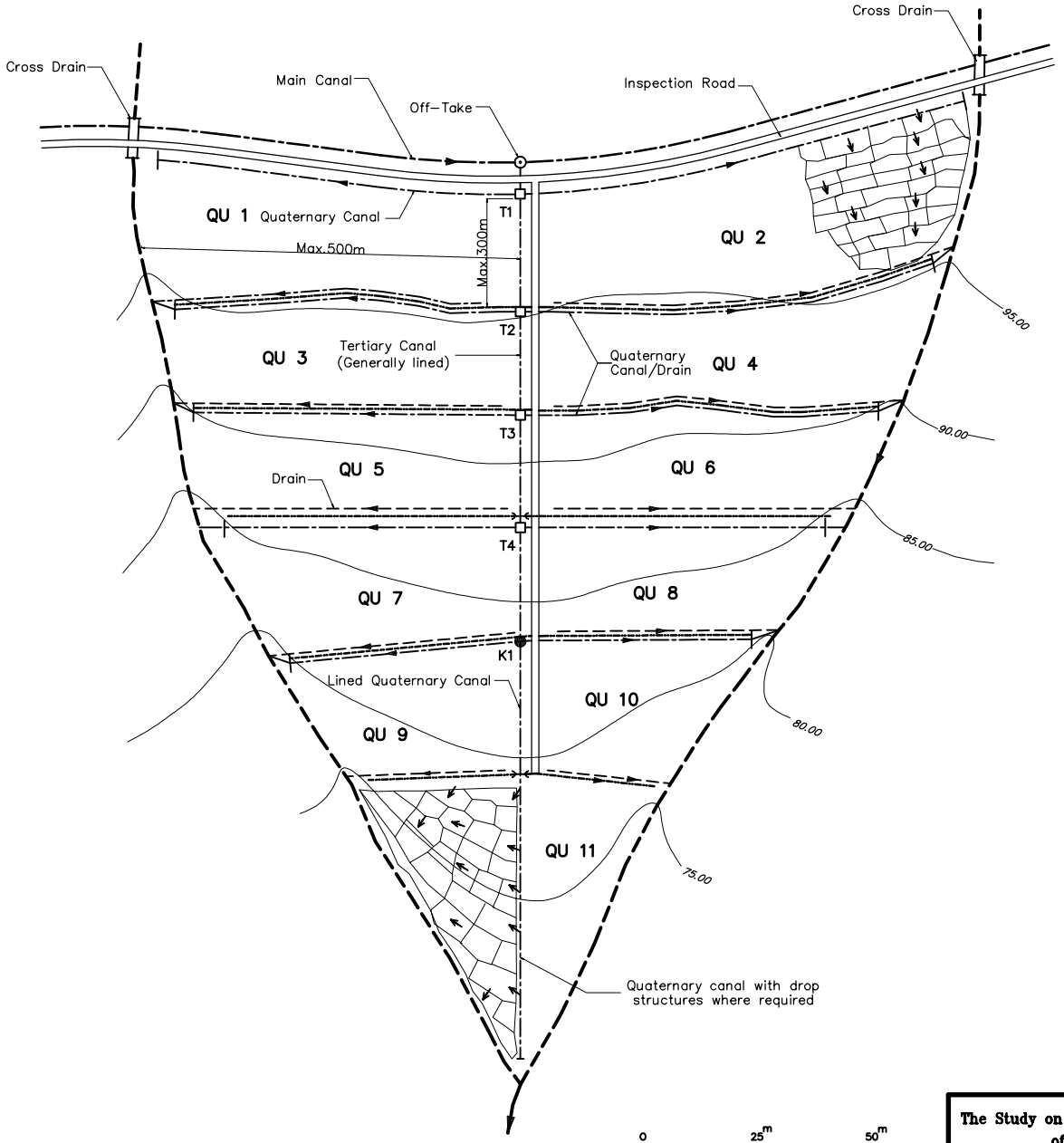
- 5m Contour line
- Inspection Road
- Village
- Paddy Fileld
- Culvert
- Off–Take
- Tertiary Division Box
- Quarternary Division Box
- Canal with Farm Road
- Drain
- Farm Road
- Flow
- Bridge

SCALE 0 25m 50m

The Study on Comprehensive Recovery Program of Irrigation Agriculture

Japan International Cooperation Agency

Figure 5.2.1 (12/16)
TYPICAL LAYOUT OF TERTIARY UNIT SLOPE LESS THAN 5%



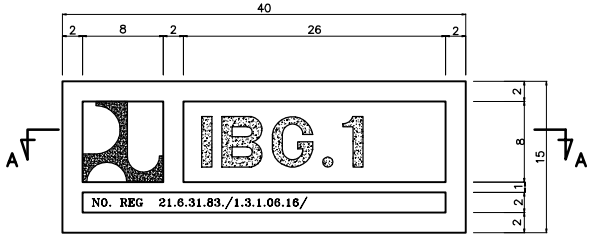
General Criteria for Tertiary Unit Development
1, Size of Tertiary Unit 50–100 ha
2, Size of Quaternary Unit 8–15 ha
3, Length of Tertiary Canal <1500 m
4, Length of Quaternary Canal <500 m
5, Distance between Quaternary Canal and Drainage Canal <300 m

LEGEND

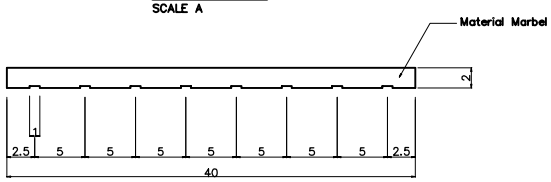
- 5m Contour line
- Inspection Road
- Village
- Paddy Fileld
- Culvert
- Off–Take
- Tertiary Division Box
- Quarternary Division Box
- Canal with Farm Road
- Drain
- Farm Road
- Flow
- Bridge

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figuer 5.2.1 (13/16) TYPICAL LAYOUT OF TERTIARY UNIT SLOPE MORE THAN 5%
Japan International Cooperation Agency	

PLATE NO.

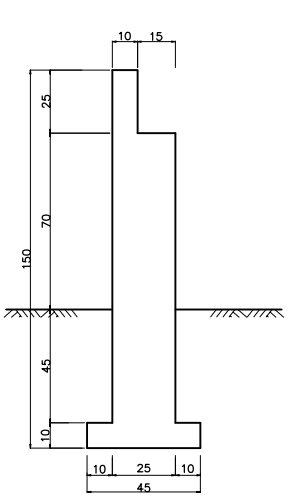


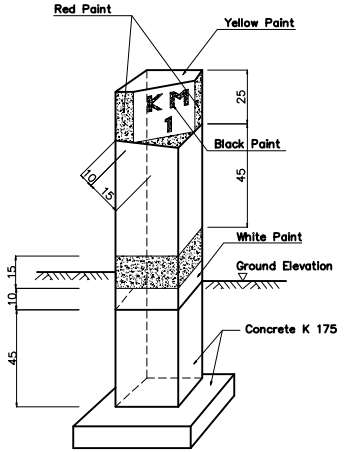
FRONT VIEW
SCALE A



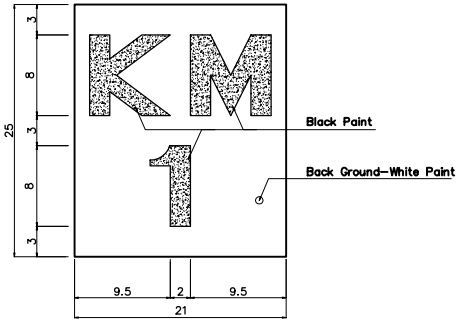
SECTION A–A
SCALE A

NAME PLATE OF STRUCTURE



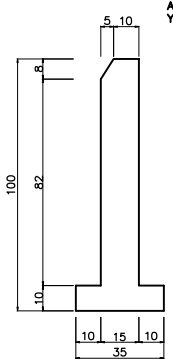


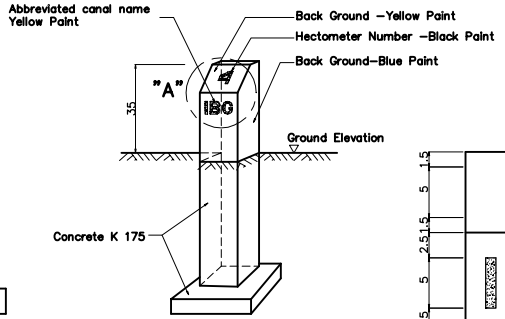
PERSPECTIVE
SCALE B



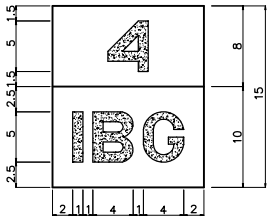
LETTERING DETAIL
SCALE A

KILOMETER POST





PERSPECTIVE
SCALE B



DETAIL "A"
SCALE A

HECTOMETER POST

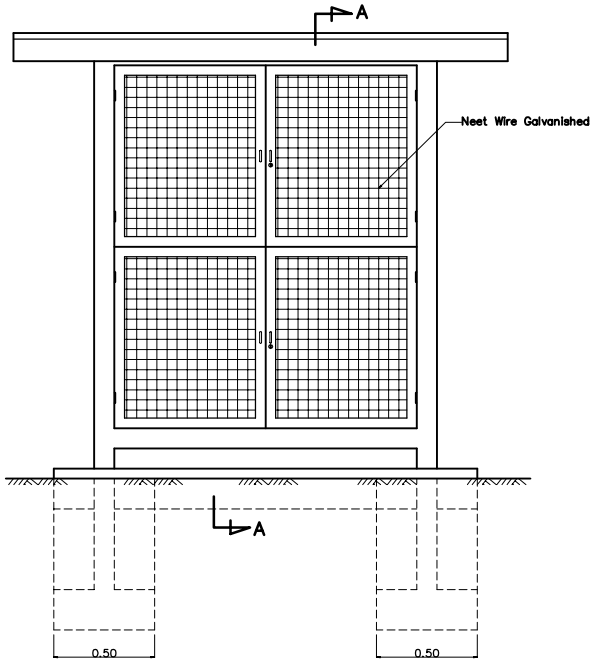
Note:
All dimensions are in centimeters unless specified.

SCALE A 0 12.50 cm 25.00 cm

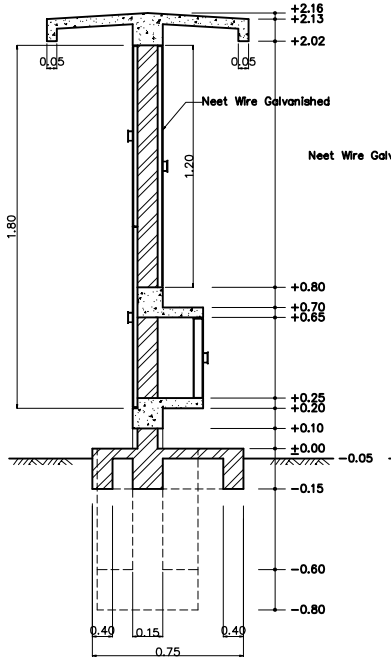
SCALE B 0 10.00 cm 20.00 cm

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (14/16) TYPICAL DRAWING NAME PLATE OF STRUCTURE, KILOMETER & HECTOMETER POST
Japan International Cooperation Agency	

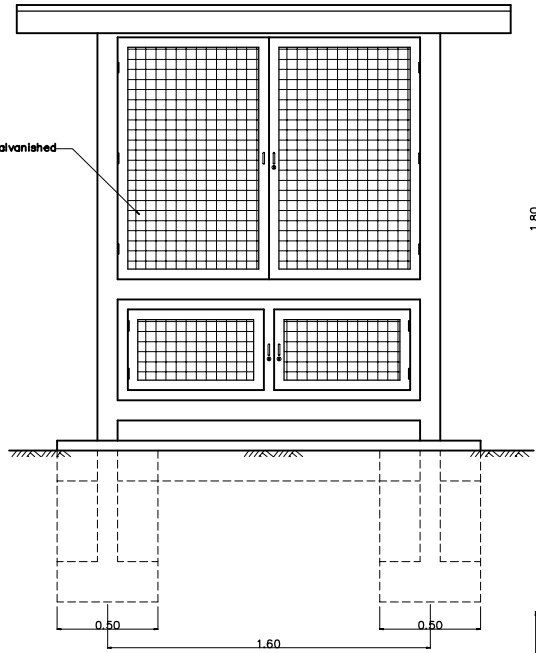
PLATE NO.



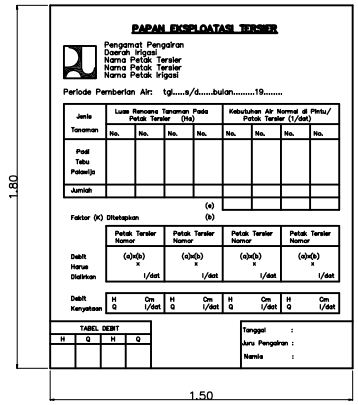
FRONT VIEW

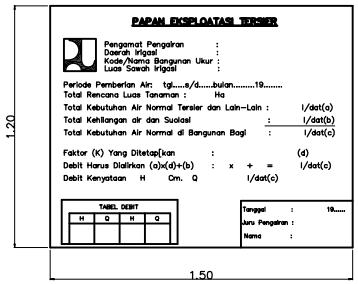


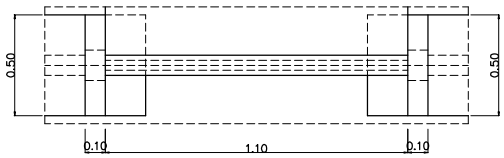
SECTION A–A



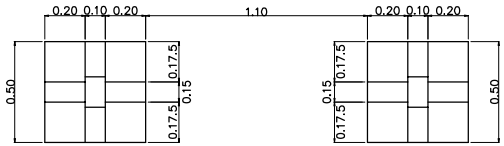
REAR VIEW



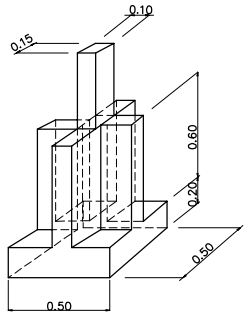




PLAN



FOUNDATION



FOUNDATION DETAIL

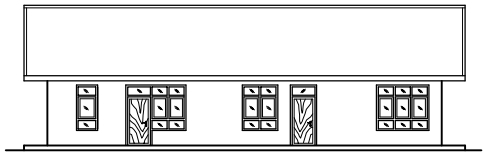
Note:
All dimensions are in centimeters unless specified.

SCALE 0 0.625 m 1.25 m

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (15/16) TYPICAL DRAWING DISPLAY BOARD
Japan International Cooperation Agency	

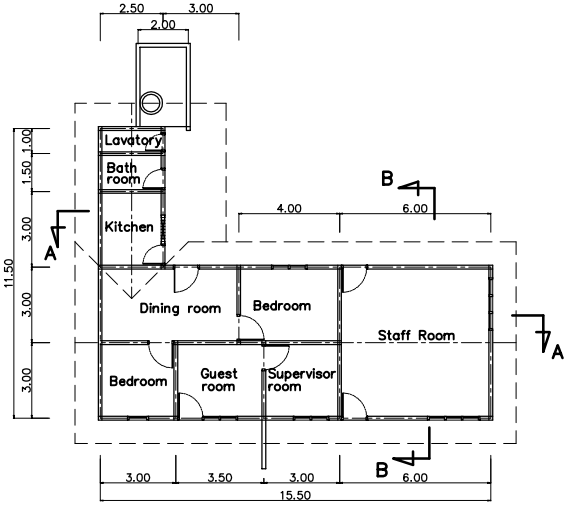
AF - 16

PLATE NO.

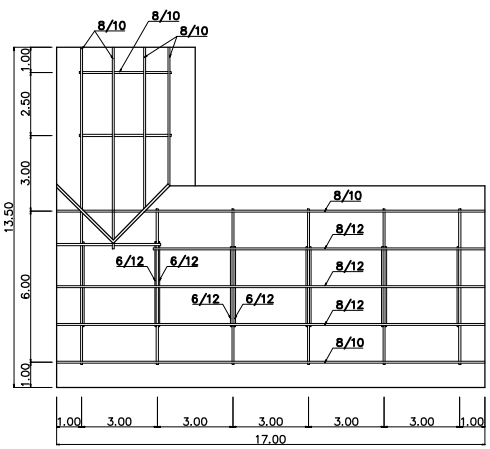


FRONT VIEW

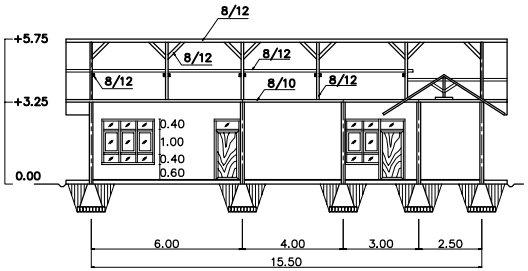
RIGHT SIDE VIEW



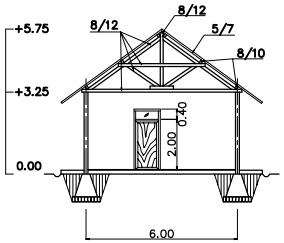
PLAN



ROOF PLAN

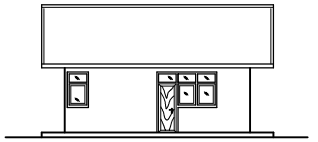


SECTION A–A

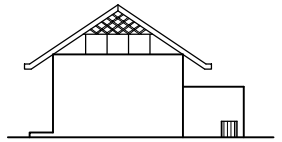


SECTION B–B

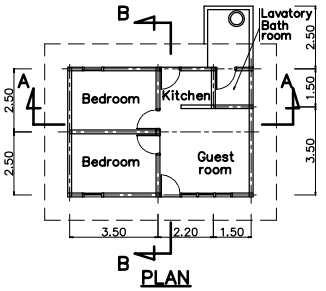
OPERATION OFFICE A= 120m²



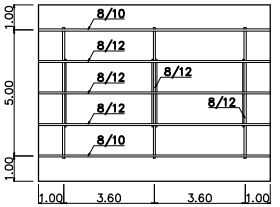
FRONT VIEW



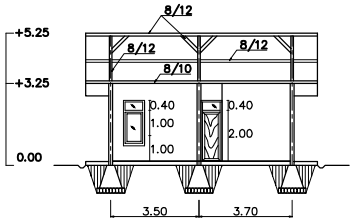
RIGHT SIDE VIEW



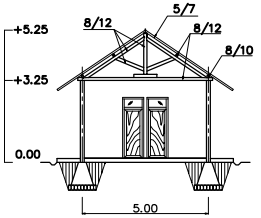
PLAN



ROOF PLAN



SECTION A–A



SECTION B–B

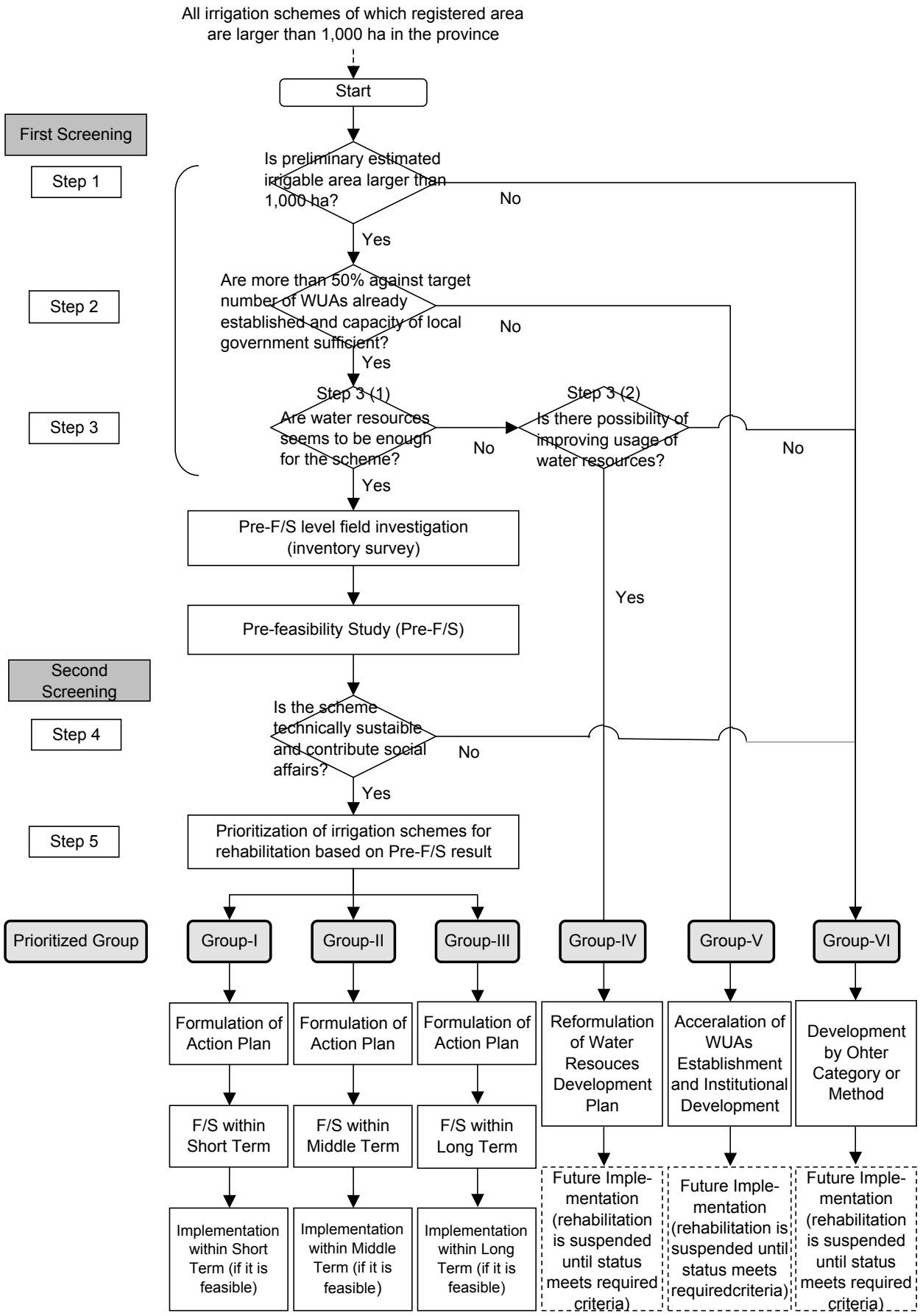
GATE KEEPER HOUSE A=36m²

Note:
All dimensions are in meters unless specified.

SCALE 0 5.00m 10.00m

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Figure 5.2.1 (16/16) TYPICAL DRAWING OPERATION OFFICE AND GATE KEEPER HOUSE
Japan International Cooperation Agency	

AF - 17



The Study on Comprehensive Recovery Program of Irrigation Agriculture

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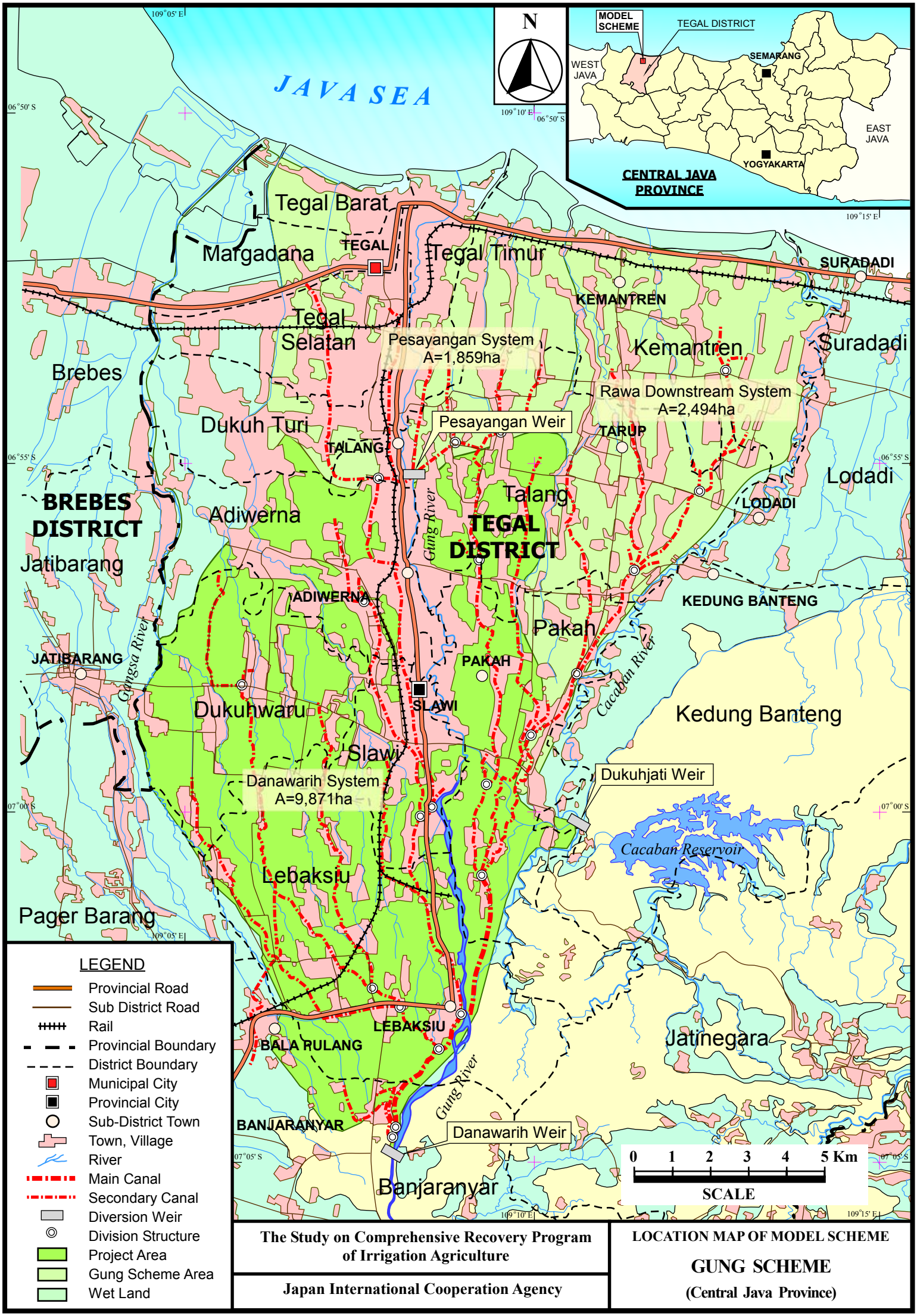
Figure A-6.1.1
Flow of Rehabilitation of Irrigation Schemes

Figure A-7.3.1 Action Plan of Recovery Program of Irrigation Agriculture : Central Java

Priority Group	Phase	Work Description	Pre-F/S		Year from commencement of Midterm Phase														
			1st	2nd	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	11th	12th	13th	14th	15th
-	**Initiation**	Pre-Feasibility - Preparation of Master List																	
		- Pre-F/S level Field Investigation																	
		- Second Screening by Water Resources Availability																	
		- Formulation of Pre-F/S level Development Plan																	
		- Prioritization																	
		- Preparation of Action Plan																	
I.	**Midterm**	Feasibility Study - Procurement of Consultant													**Group I**				
		- Preparation of F/S													Number of scheme: 16				
		- Financial Arrangement													Irrigation Area: 60,746 ha				
															Construction Lot: 27				
	Final	Implementation - Procurement of Consultant																	
		- Detailed Design																	
		- Tender																	
		- Construction																	
		- Guidance, training etc.																	
II.	**Midterm**	Feasibility Study - Procurement of Consultant																	
		- Preparation of F/S													**Group II**				
		- Financial Arrangement													Number of scheme: 10				
															Irrigation Area: 66,586 ha				
	Final	Implementation - Procurement of Consultant													Construction Lot: 29				
		- Detailed Design																	
		- Tender																	
		- Construction																	
		- Guidance, training etc.																	
III.	**Midterm**	Feasibility Study - Procurement of Consultant													**Group III**				
		- Preparation of F/S													Number of scheme: 12				
		- Financial Arrangement													Irrigation Area: 108,945 ha				
															Construction Lot: 42				
	Final	Implementation - Procurement of Consultant																	
		- Detailed Design																	
		- Tender																	
		- Construction																	
		- Guidance, training etc.																	
IV.	**Nil**											**Group IV: Nil**							
V.	**Midterm**	Institutional Capacity Building										**Group V**							
									(Continue to future step)			Number of scheme: 4							
												Irrigation Area: 9,451 ha							
VI.	**Midterm**	Review and Preparation of Development Plan											**Group VI**						
										(Continue to future step)			Number of scheme: 8						
													Irrigation Area: 37,363 ha						

PART II

FEASIBILITY STUDY FOR SELECTED MODEL SCHEME



The Study on Comprehensive Recovery Program of Irrigation Agriculture

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LOCATION MAP OF MODEL SCHEME

GUNG SCHEME

(Central Java Province)

CHAPTER 1 PRESENT CONDITION

1.1 Natural Conditions

(1) Location

The Gung Irrigation Scheme is located in the western part of Central Java Province, situated under Slamet Mountain (a volcano with an elevation of 3,428 m) on the south, and facing the Java Sea on the north. Administratively, the Scheme is located in Tegal District. The beneficiary area extends vastly in eight sub-districts of Lebaksiu, Slawi, Pangkah, Adwerna, Tarub, Talang, Kramat and Suradadi from its upper reaches. The capital of the district is Tegal, and the Scheme has an operation and maintenance office at Slawi situated 15 km south from Tegal.

Irrigation of the Scheme depends mostly on the water of the Gung River. The river has its source in Slamat Mountain, and is a rapidly flowing mountain river with a fall of 3,000 m in 54 km of flow length, and becomes gentle in slope at the estuary. The irrigation area extends about 5 km in the direction of east-west in its upstream basin, and about 10 km in the direction of east-west in its downstream basin, whereas it extends about 25 km in the direction of north-south. The catchment area of the river near the estuary is 156 km^2, and the design discharge is 514 m^3/s.

(2) Meteorology and Hydrology

The irrigation area ranges from latitude 6°S to 7°S, and lies in the typical monsoon zone. The annual rainfall in the area is about 1,500 mm, and it is concentrated in the dry season lasting from October to May, and the rainfall pattern exhibits a pattern of distinct wet and the dry seasons. The annual average temperature is about 27°C with very little seasonal variation throughout the year (Tegal Meteorological Station) (See Table B-1.1.1).

1.2 Socio-economy

Administratively, the Scheme is located almost entirely in Tegal District and to an extremely limited extent in Tegal Municipality[1]. The beneficiary area of the Scheme extends into 11 sub-districts (the project sub-districts) of the district. The administrative area of the project sub-districts is 404.3 km^2.

The population of the project sub-districts was some 893,000 in 2001. Number of households and the average family size in the sub-districts are some 205,300 and

[1] Extent of the scheme area in the Municipality is some 190 ha or 1.5% of the whole scheme area.

4.3 persons, respectively. Major socio-economic features of the project sub-districts are presented in the following table.

Socio-economic Features of Project Sub-districts in 2001

Indicators	Project Sub-districts
Area (km^2)	404.3
No. of *Desas*	186
Population	892,835
No. of Households	205,274
Average Family Size	4.3
Origin of Residents	Local
Labor Forces per Family	2.8 (Tegal District)

Source: Kabupaten Tegal Dalam Angka, 2001

The agriculture sector is the main economic activity in the project sub-districts. The main sub-sector is the food crops sub-sector followed by the estate crops sub-sector. The main food crop is paddy and the main estate crops are sugarcane and coconut. Estate crops production is mostly carried out by small holders. Other agricultural activities in the sub-districts are rather limited compared with these two.

1.3 Principal Features of the Project and the Conditions of the Irrigation Area

1.3.1 Present Conditions of the Irrigation Facilities

It is reported that the irrigated agriculture in the project area has a long history and has been highly developed since the Dutch colonial period. The irrigation area has been expanded from the coastal area to the hilly area, and from the flat land along the rivers to the hilly area as time passed. As a result, it is observed that the rather new irrigation infrastructures constructed in the hilly areas are maintained in a good condition, whereas the infrastructures that have a long history have deteriorated due to their age.

According to the expansion of the irrigation area as time passed, many water supply canals were constructed in order to supply water to the existing area from the new schemes that may have surplus water. The irrigation infrastructures of these systems have been added and rehabilitated several times as stated below:

1970 : Execution of rehabilitation and upgrading by PROSIDA
1988/89 : Execution of rehabilitation and upgrading by APBN
1991 : Transfer of the system to the central government
1991/92 : Execution of rehabilitation and upgrading by APBN
1997/98 : Execution of rehabilitation and upgrading by APBN

At present, according to the Central Java Provincial Water Resources Office (Dinas PSDA), the irrigation area of the Gung Irrigation Scheme is 14,222 ha, which is

based on the irrigation diagram prepared in 1991. The irrigation area is divided into three (3) sub-areas based on the water resources as shown in Figure B-1.3.1, and summarized as follows:

(a) The sub-area depending on the Gung river, A = 9,871 ha (includes an area of 1,255 ha of the Rawa Downstream System to be supplied from the Gung)
(b) The sub-area depending on the Cacaban reservoir, A = 3,749 ha (includes an area of 1,255 ha located in the Gung area)
(c) The sub-area depending on the former Pesayangan Weir (located in the coastal area), A = 1,857 ha

The supply discharge to the Gung sub-area from a) the Cacaban dam, and b) other water sources and/or river basins was investigated through an interview with the Central Java Provincial Water Resources Office. However, no definite response was obtained from the Office, except for the irrigation diagram showing the water supply to the sub-areas.

Cropping intensity of the Gung irrigation area is 77% in the wet season, 36% in the dry season I, and 3% in the dry season II. The cropping intensity of this project area is much lower than that of other areas on Java Island. This fact may be attributed to the absolute shortage of water (problems on availability of water resources) in the project area.

1.3.2 Basic Information on the Design Conditions of the Irrigation Facilities

According to the "Final Design Note", the canal system design is made on the basis of design discharge per ha as stated below. Cropping intensity on this condition is paddy (100%) - paddy (100%) - secondary crops (100%).

Main canal	: 0.91 liter/sec/ha
Secondary canal	: 0.82 liter/sec/ha
Tertiary canal	: 0.71 liter/sec/ha

Needless to say, it is hardly possible for the JICA Study Team to adopt such design discharge even for this project area where irrigation water management technology is much more advanced than other areas. In other words, the design discharges that seem to be 75% or less than the normal demands could not irrigate the entire project area (1,400 mm of annual rainfall only) for cropping of paddy with an intensity of 200% and second crops with *an* intensity of 100%.

Operation and maintenance of the project have been practiced for more than 10 years since it was completed in 1990. Notwithstanding the above, the cropping intensity given in the following table indicates that there are big differences

between the planned targets and the actual results (as of 2001), especially in cropping intensity of paddy:

Cropping Intensity in the Gung Area (%)

Crops	Wet Season	Dry Season I	Dry Season II	Annual
Irrigated Paddy	78	37	3	117
Palawija	7	40	76	123
Sugar Cane	15	0	0	15
Total	100	77	79	256

1.3.3 Reason of Selection of the Scheme as a Model Area in Pre-F/S Stage

Evaluation of the Gung Scheme was based on the field survey results. It was assumed that there would be no shortage in water resources for irrigating the scheme. However, such error in the survey led to the conclusion that the Scheme has been classified as 7th high priority in the Central Java Province, and selected as a Model Area.

In the course of the collection and analysis of the information regarding the Gung Scheme for the feasibility study, it has been found that there are some problems for the formulation of the development plan as stated in Sections 1.2.1 and 1.2.2. According to the criteria for the prioritization of the schemes as discussed in the Interim Report, the Gung Scheme that has constraints in water resources would have been classified into Group-IV or VI. Development plan of the schemes classified into such group would be formulated by decreasing the size of the scheme and/or developing additional water resources. In the case of the Gung Scheme, the fact was not fully understood due to the complicated historical background of the scheme such as expansion of irrigation area, construction of additional canals and development of new water resources (Danawarih headworks) to cope with the expansion. As a result, the Gung Scheme has been classified into Group-I (F/S is recommended to be carried out in the earliest stage).

However, it should be noted that there would exist other schemes under such circumstances in any districts and provinces. In this regard, a feasibility study of the Gung Scheme has been carried out as one of the model cases.

1.3.4 Inventory Survey of the Conditions of the Facilities

(1) Facilities for Investigation

Since land with an area of approximately 4,000 ha has been verified to be irrigated as a result of the water balance study as discussed in Section 2.3, the target area for the rehabilitation is determined to be 3,906 ha. It is understood, therefore, that execution of rehabilitation for the entire area does not make sense as far as the

available water resources would not be increased. In order to maximize the effect of rehabilitation, irrigation area located upstream has been selected for rehabilitation of facilities consisting of the headworks, the main canal and the Blue Secondary Canal, which is the representative secondary canal in the area. (The selection of this area was made for the purpose of the Study. This does not necessarily mean that the area has been selected for the rehabilitation purpose.)

Salient features of the target area are summarized as follows:

Features of Major Facilities

Facilities	Type	Scale	Related structures	Remarks
Headworks	Torrent intake type (provided with bar screen)	Length: 70m	Intake structure Gate: 2.5m(w) x 1.8m(h)	Surface damage to concrete crest portion O&M problems after flood
Main canal	Stone masonry (side walls only)	L = 8.9 km Width: 6~4 m Height: 2~0.8m	37 nos.	Most sections are steep slope canals (many chutes, drops) No lining on the bottom
Blue secondary canal	Stone masonry (side walls only)	L = 15.80 km Width: 6~2 m Height: 1~0.7 m	63 nos.	Most sections are steep slope canals (many chutes, drops)

(2) Facilities investigated

Inventory survey was carried out in October 2003, prior to the formulation of the rehabilitation plan. The facilities included in the inventory survey were as follows:

Headworks: 1 no. (Weir width: W = 70 m)
Main canal: 1 no. (Length: L = 8.9 km)
Secondary canal: 1 no. (Length: L = 15.8 km)

Following photographs show the conditions of the facilities in the project area:

1. Headworks (Bar Screen Compound Type Torrent Intake)

2. Intake Gate (Rear View)

3. Beginning Point of Main Canal (HM 0+00)

4. Chute Structure on Main Canal

5. Arch Type Aqueduct on Main Canal Crossing Gung River

6. Blue Secondary Canal near Residential Area

(3) Investigation results

Based on the investigation results, conditions of the facilities, the problems and their causes are shown in Table B-1.3.1 to B-1.3.3, and summarized below.

Summary Table of the Conditions of Facilities

Facilities	Problems	Causes
1. Headworks	- Deterioration of crest due to overtopping of water with sand and gravel	- Flow of a large amount of sand and gravel at high speed
	- High maintenance cost for removal of debris and cobbles in after bay	- Not sufficient flushing function of river water against deposited big stones (more than 1.5 m)
	- Lowering of downstream apron	- No provision of protection work
	- Damage of retaining wall foundation	- Scoring of the foundation by flood
2. Intake	- Obstruction of inflow of intake discharge due to velocity control	- No provision of connecting channel between intake gate and settling basin
	- Leakage from gates	- Poor installation of guides and material of gate leaf
3. Settling basin	- Too high velocity during requirement (less than 0.3 m/s)	- Not appropriate site
4. Main and secondary canals	- Direct inflow of rain water into canal at excavated section	- No provision of berm or drainage ditch/inlet
	- Damage of canal lining due to inflow of drains under lining concrete	- No provision of control structures for drains flowing into canal
	- Backwater from the paddy field to the canal	- No provision of berm or broken berm
	- Narrow flow area due to collapse of side slope of earth canal	- Poor maintenance and mainly no lining section
	- Illegal cultivation inside of canal	- No clear boundary between canal and farm road
	- Sedimentation in gentle gradient section and growing of grasses and trees	- Poor maintenance
5. Related structures	- Damage of foundation due to high velocity, and no provision of velocity control function	- Due to malfunction of drop, and poor design to maintain the appropriate gradient
	- Leakage from gate	- Poor maintenance
	- No provision or damage of safety facilities at the inlet of conduit, aqueduct	- Poor design to maintain the safety facilities

1.4 Agriculture

The basic agricultural features of the Scheme are presented in summarized form in Table B-1.4.1 and discussed in the following sections.

1.4.1 Agro-demography

The agro-demographic features of the project sub-districts are estimated based on the results of the Agriculture Census, 1993 (district) as presented in Table B-1.4.1 and summarized in the following table.

Agro-demographic Features of Project District in 1993 *1

Agro-demographic Indicators	Tegal District
Proportion of Farm Households to Total Households	35 %
Proportion of Farm Households Having Activity in	
- Food Crops Farming	82 %
- Horticulture Crops Farming	16 %
- Estate Crops Production	10 %
- Livestock	19 %
- Working as Farm Labor	85 %

Note *1: Results of the Census on the rural areas of the district

The average holding size of paddy field per beneficiary farm household in the Scheme is estimated at about 0.20 ha based on the paddy field of about 12,500 ha and the number of beneficiaries of about 63,400.

1.4.2 Land Use

The Scheme is a completion irrigation scheme and the entire potential area for irrigation was developed for irrigated paddy field. However, a limited area of the potential area was converted to housing or industrial purposes. The present irrigated area of the Scheme is estimated at 12,365 ha and the same of the target area (the project area) of the present rehabilitation plan is at 9,871 ha or 79% of the total as shown below.

Present Land Use of Gung Scheme & Project Area

Gung Scheme	- Irrigated Paddy Field	12,365 ha
	- Land Converted to Other Uses	98 ha
	- Original Potential Area for Irrigation	12,463 ha
Project Area	- Irrigated Paddy Field	9,871 ha

1.4.3 Cropping Schedule and Pattern

The prevailing cropping schedules and patterns in the project area are identified as shown below and in Table B-1.4.1.

Cropping Schedules

Paddy	Wet Season	Mid. Nov. - Mid. Dec. ~ Mid. Feb. - Mid. Mar.
	Dry Season I	Mid. Mar. - Early Apr. ~ Mid. June - Early July
	Dry Season II	Early July - Early Aug. ~ Early Oct. - Early Nov. (limited)
Maize	Wet Season	Mid. Nov. - Mid. Dec. ~ Mid. Feb. - Mid. Mar - Mid. Sep
	Dry Season I	Mid. Mar. - Early Apr. ~ Mid. June - Early July
Beans	Dry Season II	Early July - End July ~ End Sep. - Mid. Sep.
Sugarcane	Planting: May ~ July; Harvesting: July ~ Oct.	

Cropping Pattern:

Prevailing Pattern	Wet season - dry season I - dry season II: Paddy - paddy/palawija (maize) - palawija (beans)/fallow
Common Pattern	Wet season - dry season I - dry season II: Palawija - paddy/palawija (maize) - palawija (beans)/fallow
Common Pattern	Wet season - dry season I - dry season II: Sugarcane

1.4.4 Cropped Area and Cropping Intensity

The irrigation performances of the Scheme from 1998/99 to 2002/2003 expressed by cropped area and cropping intensity are shown in Table B-1.4.2. The current cropped area and cropping intensity assumed on the basis of the past records is shown in Table B-1.4.1 and in the following table.

Current Cropped Area and Cropping Intensity in Project Area (9,871 ha)

Crops	Wet Season		Dry Season I		Dry Season II		Annual	
	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)
Paddy	7,660	78	3,604	37	320	3	11,584	117
Maize	731	7	3,995	40	-	-	4,726	48
Beans	-	-	-	-	7,533	76	7,533	76
Sugarcane	1,480	15	-	-	-	-	1,480	15
Total	9,871	100	7,599	77	7,853	80	25,323	257

Note CI: Cropping intensity

As shown in the tables, the present annual cropping intensity of paddy in the project area stands at 117% and the overall annual cropping intensity is estimated at 257%. When areas occupied with sugarcane in each cropping season are counted in the calculation of the intensity, the overall intensity is estimated at 287%. The rather limited intensity of paddy is basically attributed to the shortage of irrigation water supply, even in the wet season.

1.4.5 Crop Yield and Production

The present yield levels of paddy in the project area are estimated on the basis of the findings of the Phase I Study (estimation of irrigated paddy yield), the field observation and information provided by the District Agriculture Services Office as follows;

Current Crop Yields in Project Area

Crops	Wet Season	Dry Season I	Dry Season II
Irrigated Paddy	5.0 t/ha	5.0 t/ha	4.5 t/ha
Maize	4.0 t/ha	4.0 t/ha	-
Beans	-	-	1.2 t/ha
Sugarcane	60.0 t/ha		

On the basis of the estimated yields and the cropped area, the present annual crop productions in the project area are estimated as shown in Table B-1.4.1 and summarized in the following table.

Present Crop Production in Project Area

Crops	Annual (ton)
Irrigated Paddy	57,760
Maize	18,900
Beans	9,040
Sugarcane	88,800

1.4.6 Farming Practices and Crop Budget

The current prevailing farming practices of paddy are as shown in Table B-1.4.3 and summarized below.

Variety	Improved variety: IR 64, Membramo (110-115 days)
Nursery	Seeding rate: 30 kg/ha; period 20 ~ 25 days
Land Preparation	By machinery (hand tractor)
Planting	Manual transplanting (regular)
Fertilization	NPK applied; volume depending
Harvesting	Manual; threshing by power/pedal thresher

Current crop budgets of major crops in the project area are studied based on the data collected through the Inventory Survey and crop budget analyses made by the District Agriculture Services Office, Tegal as shown in Table B-1.4.3 and summarized in the following table.

Financial Net Return per Ha

Commodity	Yield (t/ha)	Gross Return (Rp.000)	Production Cost (Rp.000)	Net Return (Rp.000)
Irrigated Paddy *1	5.0	6,000	2,590	3,410
Irrigated Paddy *2	4.5	5,400	2,470	2,930
Maize	4.0	3,840	1,900	1,940
Beans *3	1.2	3,100	1,380	1,720
Sugarcane *4	60.0	12,000	9,360	2,640

Note *1: Wet & dry season I
*2: Dry season II
*3: Average of soybeans & mungbeans
*4: Average of 1st & 2nd harvest

1.4.7 Marketing

The prevailing marketing practices of paddy in the Scheme is “selling paddy just after harvest at field” followed by “selling paddy after drying”. The prevailing marketing channel of paddy is “selling paddy to collector/middleman” followed by “selling paddy to KUD”.

1.4.8 Farm Economy

The primary objective of the farm economic analysis under the present Study is to examine capacity-to-pay or possible contribution of O&M costs by beneficiary farmers after the project. Further, the limited accessibility to reliable farm household income and expenditures prevent examining farm economic conditions. Accordingly, the present farm economic analysis has been made on 1 ha of irrigated paddy field or rainfed paddy field by estimating net farm income from the field. The results of the farm economic analyses thus made are presented as follows:

Estimated Net Farm Income from 1ha of Paddy Field

Cropping Pattern Assumed	Cropped Area (ha)	Net Farm Income (Rp. 000)
Wet Season: Paddy/Sugarcane	0.85/0.15	6,620
Dry Season I: Paddy/Maize	0.40/0.40	
Dry Season II: Beans	0.8	

1.4.9 Agricultural Support Institutions, Farmer Organizations and Extension

(1) Agricultural Support Institutions and Farmer Organizations

The main government agricultural support institutions providing technical and institutional support in and around the Scheme include three Rural Extension Service Centers (BPPs; Lebaksiu, Kramat, Pangkah), District Agriculture, Estate Crops and Forestry Services Office, BIMAS Food Security Office, and two seed farms as shown in Table B-1.4.1. The organization of the District Agriculture Services Office is illustrated in Figure B-1.4.1.

The district institutions are placed under the jurisdiction of the district governor, although the technical guidance and support linkages with the central and provincial agencies are still maintained. BPPs and Field Extension Workers (PPLs) are placed under the District Agriculture Services Office.

Major farmers' organizations involved in agricultural activities are formed in the project sub-districts. Among the same, the major ones are the Farmers' Group (*Kelompok Tani*/KT) and Water Users' Association (P3A). The number of KTs formed in the project sub-districts and their development status assessed by district agricultural agencies are shown in Table B-1.4.1. In the project sub-districts, 718 KTs are formed. Of 718 KTs, 8% are classified as primary level (*pemula*), 42% as secondary level (*lanjut*), 38% as middle level (*madya*) and 12% as advanced level (*maju*). The common constraint faced by these KTs is limitation in cooperation/collaboration in marketing activity (agribusiness activity) as a group.

There are 13 KUDs, 30 KOPTANs and 8 UPJAs in the project sub-districts. The memberships of the KUDs are very large, averaging some 5,200. General problems encountered by these farmers' organizations are reported to be: i) management capability still poor and ii) awareness of members on cooperative activities, member's rights & responsibilities and cooperative principles is still limited.

(2) Agricultural Extension

One of the main features of the decentralization policy in the agriculture sector is the devolution of agricultural extension activities to the district government. Therefore, the functions of the provincial extension agencies have faded away and their current main functions are to provide technical guidance and support to district agencies. The arrangements for institutions for the agricultural extension services are not uniform among districts.

The extension services to farmers in Indonesia are basically provided by PPLs of district agricultural agencies, who are to guide and serve farmers through farmers' groups in their working area. PPLs are deployed by sub-district basis to BPPs.

The number of PPLs assigned to BPPs in the project sub-districts is 92 in total. Among the same, 53 PPLs are deployed in the project sub-districts as shown in Table B-1.4.1. However, the activities of PPLs are rather limited due to limitations of transportation, extension materials & equipment and operational funds.

The weaknesses or problems involved in the current extension services are:

- Limitation of funds for implementation of extension activities, insufficient number of extension staff and; capabilities of extension staffs especially on post-harvest and marketing issues is still limited, and
- Coordination & collaboration of extension agencies and agriculture services offices is yet to be established to introduce holistic approaches for extension.

1.4.10 Agricultural Facilities and Machinery

The numbers of agricultural facilities and machinery including rice mills, tractors, threshers, paddy dryers, water pumps etc. possessed in the project sub-districts are shown in Table B-1.4.1. The availability of hand tractors in the sub-districts will be in shortage when land preparation works of all the paddy fields in the Scheme are carried out by machinery according to the prescribed cropping schedule of the Irrigation Committee, which may result in a prolonged planting season of paddy in the area. The capacity of rice mills in and around the Scheme is sufficient to meet milling requirements in the areas as such requirement is mostly for family consumption and most of the paddy is marketed without husking.

1.4.11 Agricultural Development Constraints

The major agricultural development constraints in the Scheme identified include:

- Shortage of irrigation water supply, especially in the dry season,
- Low marketing prices of paddy compared with farm inputs prices; instability of paddy marketing prices; with prices going down at major harvesting seasons,
- Insufficient extension services; capabilities of extension staff especially on post-harvest and marketing issues still limited, limitation of operation funds & transportation,
- Limited activities of KTs; especially in agri-business oriented activities,
- Shortage of hand tractors resulting in a prolonged planting season of paddy, and
- Low product quality of paddy due to high moisture content; especially of wet season crops; poor quality of rice due to poor functioning of rice mills.

1.5 Institution

(1) District Government Authorities

The Tegal District Government under the control of Regent (*Bupati*) is composed of one secretariat, 20 internal units and 13 external units, having 6,370 civil servants as a whole. These civil servants consist of one first rank officer, nine second rank, 90 third rank and 240 fourth rank officers as management staff and 6,030 rank-and-file staff. Educational background of civil servants is such situation that the majority (58%) have graduated from senior secondary school followed by diploma graduates (20%) and university graduates (10%).

Revenue of Tegal District Government was Rp.118,911 million in 1999/00 and Rp.127,086 million in 2000, while expenditure was Rp.113,111 million in 1999/00 and Rp.120,202 in 2000 as shown in Table B-1.5.1. Tegal Municipality Government's revenue was Rp.46 million in 1999/00 and Rp.41 million in 2000, while its expenditure was Rp.45 million in 1999/00 and Rp.38 million in 2000 as shown in Table B-1.5.2.

Out of the above expenditures, Rp. 31,282 million in 1999/00 and Rp. 42,768 million in 2000 were spent as development expenditure in Tegal District. Those include the amount allocated to water resources and irrigation sector of 167 million in 1999/00 and 608 million in 2000. In Tegal Municipality, the development expenditure was 12,026 million in 1999/00 and 9,934 million in 2000, but no budget allocation was made to water resources and irrigation sector.

(2) Water Resources and Irrigation Sector Authority

In Tegal District, the water resources and irrigation sector administration is under the jurisdiction of the Public Works Services (Dinas PU) as shown in Figure B-1.5.1. In the Water Resources Sub-Services (Sub Dinas), there are four sections and one bureau to handle administration activities with 33 staff in total. Under the Water Resources Sub-Services office, there are four branch offices with 168 staff in total. This Sub-Services unit is responsible for 83 public irrigation schemes including the Gung irrigation scheme. Among 83 irrigation schemes, there are 14 technical irrigation schemes commanding 33,017 ha, one semi-technical irrigation scheme covering 434 ha and 68 simple irrigation schemes of 3,597 ha. In order to lighten heavy burden of O&M staff in each branch, the unit is planning to increase number of waterman to its final target to appoint one waterman per 100 ha of irrigation area.

Budget allocated to the Water Resources Sub-Services of Tegal District has drastically increased between 1999/00 and 2002 as follows:

- In 1999/00, the source of budget was limited to APBD from the provincial government, amounting to Rp.1,511 million;
- In 2000, APBD from the provincial government increased to Rp.1,420 million;
- In 2001, Rp.2,950 million from APBD District was added to Rp.1,200 million from APBD province, amounting to Rp.4,150 million;
- In 2002, the budget allocated from APBD District increased to Rp.5,240 million and another Rp.1,325 million was allocated from APBN from the central government, amounting to Rp.6,565 million: and
- In 2003, the budget allocated from APBD District further increased to Rp.15,585 million and each Rp.1,000 million was allocated from APBN from the central government and APBD Province in 2003, amounting to Rp.17,585 million.

(3) Water Users' Association

It has been reported that the WUA establishment target in the Gung irrigation scheme command area is 131 and its achievement is 129. According to the latest monitoring and evaluation record as of 2000 made by the District Water Resources Sub-Services, two WUA are classified as "Developed", 74 WUA as "Under developing" and the remaining 53 WUA as "Not yet developed" and total WUA's mimbers ware 12,491 in the whole Gung irrigation scheme area.

Through the inventory under this F/S, it has been confirmed that there are 14 tertiary blocks directly commanded by the Gung main canal and 83 tertiary blocks covered by 15 secondary canals. The total command area is 9,871 ha. Out of these

tertiary blocks, WUA has been established in 78 tertiary blocks of which 12 are directly connected with the main canal and 66 are commanded by 12 secondary canals as listed up in Table B-1.5.3. Although the remaining 19 tertiary blocks have no WUA, these blocks are under the management of traditional water users' group so-called "*Ulu-ulu*".

The followings are major items identified and pointed out by face-to-face interview respondents consisting of 550 WUA member farmers and 20 non-members based on the rapid rural appraisal method:

- In general, WUA keeps close coordination with the branch of District Water Resources Sub-Services to ensure irrigation water supply to each tertiary block under three-day rotation system of irrigation water distribution which has been practiced to overcome insufficient water resources;
- In two "Developed" WUA represented by 20 respondents, board of director meeting and general meeting of WUA are regularly hold as stipulated in the article. Member farmers follow cropping pattern, planting schedule and water allocation plan. They also positively carry out O&M works of tertiary system and pay WUA membership fee and administration charge as irrigation management fee;
- With initiatives of "Developed" WUA, payment method of irrigation management fee is to be changed from "in kind" to "in cash" by modifying the article of WUA. Such modification can be legalized with approval of head of Sub-district Office as the branch of District Government;
- In 24 "Under developing" WUA represented by 240 respondents, member farmers follow cropping pattern, planting schedule and water allocation plan, although respondents in 16 WUA point out that tertiary irrigation system is not completely functioning. Irrigation management fee are collected by 23 WUA in the form of "in cash" and the amount of fee ranges from Rp. 60,000/ha to Rp. 120,000/ha according to the size of tertiary block and the number of members;
- In 24 "Not developed yet" WUA represented by 240 respondents, no regular board meeting has been held in two-third of WUA being still affected by the traditional water management custom of "*Ulu-Ulu*". These WUA are also featured by less coordination with waterman in implementing water allocation plan. In the remaining one-third, members do not intend to pay irrigation services fee because they grow sugar cane without irrigation water supply to their paddy field; and

- In two non-WUA tertiary blocks represented by 20 respondents, leaders of traditional water management group based on "*Ulu-Ulu*" custom have controlled their territories and don't intend to reform the legal document of "*Ulu-Ulu*" into the article of WUA.

CHAPTER 2 BASIC CONDITIONS OF THE FORMULATION OF REHABILITATION PLAN

2.1 Prerequisite Conditions for the Irrigation Area

The Gung Scheme, which consists of three sub-areas as mentioned in Section 1.3.1 has an area of 14,222 ha in total. The feasibility study this time has been carried out for the irrigation area covered by the Danawarih Headworks. The sub-area for the rehabilitation with A = 9,871 ha will be targeted, whereas other sub-areas, A = 4,351 ha, will be excluded from the feasibility study.

2.2 Process of the Determination of the Irrigation Area

The irrigation area covered by the Danawarih Headworks on the Gung river is 9,871 ha. However, irrigation of the said area is not guaranteed by the river runoff of the Gung. In this regard, it is necessary to carry out a water balance study between the river discharge (dependable discharge 4 out of 5 years or 80% probability) at the Danawarih Headworks site and the water demand based on the cropping patter and schedule determined for the agricultural development. The irrigation area that is estimated by the water balance study will be the target area for which a rehabilitation plan has been formulated.

For the area that cannot be irrigated as a result of the water balance study, it is necessary to consider countermeasures to supplement irrigation water and save water, such as development of new water resources, change of crops to be cultivated, etc. Some countermeasures are proposed in this chapter.

2.3 Water Balance Study

Through the field survey, it was reported that there is a severe water shortage in the Gung scheme. To evaluate water availability of the scheme, a water balance study was conducted.

(1) Review of original design

In the original design stage, a unit water requirement was estimated at 0.91 l/s/ha, which is very small compared with the average value in Indonesia. According to the irrigation service officers of the Gung scheme, it is because of the basic assumptions of original design. In the original design stage, it was assumed that not all of the area would be irrigated for paddy but that it would consist of a mix of irrigation area for paddy and non-irrigation area for sugarcane. Unfortunately, the

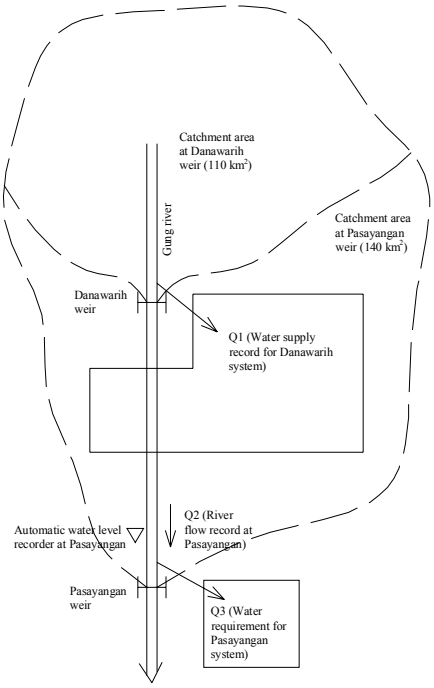
ratio of planned area of paddy and sugarcane in the original design stage was not available. It was preliminarily estimated by the JICA study team at paddy 60 % and sugarcane 40 %, based on the computed irrigation water requirements.

(2) Evaluation of present conditions

Present conditions of irrigation water supply of the Gung Scheme were analyzed by means of (a) a hydrological water balance model, (b) annual water supply schedule at Danawarih weir, and (c) interview with irrigation service officials.

(a) Hydrological water balance model

First, available water for the Danawarih system was estimated by using the hydrological model as shown to the right. Second, the irrigation water requirements for the Danawarih system with the present cropping pattern and cropping intensity was computed (Table B-2.3.1). Third, a balance calculation between both of them was made. The result of the calculation shows that irrigable area with 100 % water supply to crops and 80 % dependability is 3,906 ha (Table B-2.3.2).



Maximum available water for Danawarih system = Q1 + Q2 x 110 / 140 - Q

(b) Annual water supply schedule at Danawarih weir

An annual cropping pattern and water supply schedule for the Gung scheme is prepared and published by the Tegal district government. According to the schedule for the year 2002/2003, some water deficit was scheduled with 80 % dependability as shown below. This means that it was originally planned to supply less than 100 % of the water requirement to the area in year 2002/2003.

Water Supply Schedule for Danawarih System in year 2002/2003

Season	Planned paddy area (ha)	Ratio of available water	Irrigable area with 100% supply of water (ha)
Wet	9,249	46%	4,254
Dry I	3,635	100%	3,635
Dry II	0	-	0

(c) Interview with irrigation service office

Irrigation service officers of Gung scheme admitted that there is a severe water shortage in the Gung scheme. Because of the water shortage, they cannot supply 100 % of irrigation water requirements but only about 60 % from Danawarih weir.

Based on the identified facts described above, the JICA Study Team concluded that the irrigable area for the Danawarih system with 80 % dependability and 100 % supply of water requirement is 3,906 ha. However, there is another fact that actual cropped area of Danawarih system is 9,871 ha in the wet season (paddy 78 %, maize 7 % and sugarcane 15 %). This indicates that the Danawarih system is distributing less than 100 % of irrigation water requirements and dependability of the system is also less than 80 %. The testimony of irrigation service officers proved this situation. This water shortage might be due to too much expansion of paddy area from 60 % to 78 % of the area.

(3) Area for feasibility study planning and evaluation

Feasibility study planning and evaluation of the Gung Scheme have to be made according to the Indonesian design criteria and standards. It means that the project has to supply 100 % of irrigation requirement to crops and achieve 80 % dependability. Considering this matter, the JICA Study Team applied 3,906 ha of irrigation area for the feasibility study planning and evaluation, instead of 9,871 ha. Existing benefit in the remaining area of 9,871 ha was not counted in the evaluation, since it includes unreliable benefit of which dependability is less than 80 %. Such kind of benefit shall be treated as external benefit of the project.

2.4 Rehabilitation Plan of the Gung Area

As discussed in Section 2.3, the optimal irrigation area covered by the dependable runoff with a 80% probability at the Danawarih Headworks on the Gung river is estimated at 3,906 ha only. This is attributed to the fact that this land was mostly used for sugarcane cultivation in the past, and that the conversion of the land to paddy fields was commenced after 1980. The irrigation facilities in the Gung area are maintained fairly well (Regarding the actual supply of water, it is necessary to carry out further investigation.).

On the other hand, the result of the Study shows that the Gung area has been classified as the 7th highest priority in Central Java Province. Nonetheless, succeeding study result has indicated that the Gung irrigation area has to be decreased to 40% according to the water balance study.

To cope with this situation, the JICA Study Team had a meeting with the counterpart personnel of MOSRI to discuss the solution of this matter. As a result, both parties have come to the following conclusions:

Case 1: The feasibility study is to be carried out on the condition that the target area is 3,906 ha (output of the feasibility study).

Case 2: Issuance of supply of water to the Rawa Downstream System with an area of 1,255 ha from the Danawarih weir is to be stopped, instead it is proposed to examine the possibility of supplying water from the Cacaban dam (The countermeasure is to extend the Cacaban dam height.).

Case 3: It is proposed to develop new water resources upstream of the Danawarih weir (e.g. construction of Blembeng dam).

Case 4: It is proposed to adopt the cropping system to meet the availability of water (introduction of cash crops).

Case 5: It is proposed to estimate work quantities and costs for the rehabilitation of the facilities in the entire scheme with an area of 9,871 ha.

As discussed above, the Report does not deal with Cases 2, 3 and 4, however, recommendations have been made as seen above.

2.5 Agriculture

The agricultural plan has been formulated for the target area of 3,906 ha assuming that the present cropping pattern and cropped area in the area will be kept unchanged in the future with-project condition.

2.6 Institutional Strengthening Concept

As the current situation of WUA's performance in the scheme command area can be described as a mixed status of "WUA already established and under developing" and "WUA already established but not developed yet". The main reason is the present limited irrigation water supply condition and the existence of traditional irrigation management customs at terminal level. Therefore, non-physical efforts can be expected to contribute more to equitable use of the limited water resources at the moment. In this regard, the basic concept for strengthening the WUA's activities is to rationalize the water allocation plan of the whole irrigation system and WUA's management system. In case of the existing of "*Ulu-Ulu*", the basic concept is to encourage "*Ulu-Ulu*" leaders and members to unilize the merit of their

management system for modernizing their activities and reforming "*Ulu-Ulu*" to WUA.

Another concept for institutional strengthening is to enable irrigation officials in Tegal District to understand and practice the new irrigation management policy and also to improve the capacity of organization units involved in irrigation management and those staff capabilities in line with the new irrigation management policy.

In the target area of 3,906 ha, there are 29 tertiary blocks in which 28 WUA and one "*Ulu-Ulu*" exist.

CHAPTER 3 FORMULATION OF DEVELOPMENT PLAN

3.1 Formulation of Rehabilitation Plan

3.1.1 Design of Rehabilitation Works for F/S

Design for rehabilitation works has been carried out for the irrigation area of 3,906 ha. The design has been based on results of the survey of the existing conditions of the facilities. The design has been made in consideration of (a) judgment of the degree of deterioration of the facilities based on the photographs, (b) preparation of the design drawings of the facilities for rehabilitation, and (c) estimate of work quantities and construction costs. The basic drawings for rehabilitation of the major facilities are shown in DRAWINGS attached at the end of this report. Since the Scheme is rather new and the operation and maintenance have been conducted appropriately, the number of facilities to be rehabilitated is not so large compared to that of other schemes as shown in Table B-3.1.1 to B-3.1.3. Contents of the design of rehabilitation for each structure are as follows.

(1) Design Condition

Following basic conditions are applied for the design of irrigation facilities through the water balance study.

Development Area : 3,906 ha
Unit Design Water Requirement : q = 1.22 liters/s/ha
Design Intake Discharge : Q = 4.765 m^3/s

(2) Water Resources Facilities

(a) Measures to rectify wearing of concrete at water cushion behind the bar screen,
(b) Measures for removal of stone and cobbles remaining after flood (adoption of mechanical removal and providing a working area), and
(c) Repairing of retaining walls at both sides of the foundation.

(3) Canals and their related structures (main and secondary canals)

(a) Removal of sand and gravel deposits in the canals,
(b) Rehabilitation of the existing concrete lining,
(c) Execution of concrete lining for the unlined sections,
(d) Rehabilitation of the damaged structures,
(e) Repairing of gates, and
(f) Additional provision of bridges and canal crossing structures.

(4) Inspection Roads

(a) Rehabilitation of inspection roads along the main canal,
(b) Rehabilitation of inspection roads along the secondary canals and completion of the inspection roads which are uncompleted, and
(c) Expansion of farm road networks connecting to villages.

Based on the design drawings thus prepared, quantification of rehabilitation works has been made. Work quantities for the respective facilities are given in Table B-3.1.4. The work quantities for the secondary canals, of which an inventory survey was not conducted, have been estimated in proportion to the length of canals of which work quantities have been actually estimated based on the inventory survey.

3.1.2 Quantification of Rehabilitation Works in the Entire Area

The work quantity for the rehabilitation of the irrigation facilities has been estimated in Section 3.1.1 for the feasibility study for the area of 3,906 ha. Based on the inventory survey conducted at this time, quantification of rehabilitation works for the irrigation facilities and inspection roads for the entire area of 9,871 ha, was estimated at Rp. 82,958 million for reference as shown in Table B-3.1.5.

3.2 Agriculture

3.2.1 Agricultural Plan

The agricultural plan has been formulated for the target area of 3,906 ha assuming that the present cropping pattern and cropped area will be kept unchanged and assuming that crop yield levels will be increased with the improvement of irrigation supply under the rehabilitation plan.

(1) Land Use Plan

No alternation of agriculture land use is planned under the present Study as shown below.

Land Use Plan

Land Use Category	Present	With Project
Irrigated Paddy Field	3,906 ha	3,906 ha

(2) Planned Cropping Pattern, Copped Area and Cropping Intensity

The planned cropping pattern and schedule have been assumed to be kept unchanged from the present status as shown in Figure B-3.2.1 and summarized below.

Planned Cropping Pattern & Schedule

Season	Pattern (Crop & Intensity)
Wet Season	Paddy (78%); palawija (maize: 7%)
Dry Season I	Paddy (37%); palawija (maize: 40%)
Dry Season II	Paddy (3%); palawija (beans: 76%)
Year Round	Sugarcane (15%)
Annual	Paddy (117%); maize (48%), beans (76%); sugarcane (15%); total (257%)

In accordance with the planned cropping pattern, the with-project cropped areas and cropping intensities are planned as shown in Table B-3.2.1 and summarized below.

Planned Cropped Area & Cropping Intensity

Crop	Wet Season		Dry Season I		Dry Season II *3		Annual	
	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)
Paddy	3,032	78	1,426	37	126	3	4,584	117
Palawija *1	289	7	1,581	40	-	-	1,870	48
Palawija *2	-	-	-	-	2,981	76	2,981	76
Sugarcane	585	15	-	-	-	-	585	15
Total	3,906	100	3,007	77	3,107	80	10,020	257

Note CI: Cropping Intensity
*1: Palawija --- maize, *2: palawija --- beans (soybeans & mungbeans)
*3: Excluded from the water balance study

No changes in cropped area and cropping intensity between the present and with project conditions are planned as assumed earlier.

(3) Target Crop Yields and Crop Production Plan

Target yields of paddy and maize in the wet and dry season I are estimated by assuming the improvement of irrigation water supply under the with project condition and based on yield levels attained by advanced farmers in the scheme and information on potential yield levels provided by the District Agriculture Office. While, the yield levels of sugarcane and beans are assumed to be unchanged from the present levels as the improvement of irrigation water supply under the project can not be expected. The target yields under the with project are estimated as shown in Table B-3.2.1 and summarized below.

Target Yields under the Study

Cropping Season/Crops	Present Yield	Target Yield	Increase
Wet Season Irrigated Paddy	5.0 t/ha	5.5 t/ha	0.5 t/ha
Dry Season I Irrigated Paddy	5.0 t/ha	5.5 t/ha	0.5 t/ha
Dry Season II Irrigated Paddy	4.5 t/ha	4.5 t/ha	-
Palawija (maize)	4.0 t/ha	5.5 t/ha	1.5 t/ha
Palawija (beans) *1	1.2 t/ha	1.2 t/ha	-
Sugarcane	60.0 t/ha	60.0 t/ha	-

Note *1: Average of soybeans & mungbeans

As shown in the table, increases of paddy yield of 0.5 t/ha and maize yield of 1.5 t/ha in wet and dry season I from the present level are planned under the Study.

On the basis of the target crops yields and the planned cropping pattern, the with-project crop production plans are estimated as shown in Table B-3.2.1 and summarized in the following table.

Planned Crop Production

Crop	Present (ton)	With Project (ton)	Increment (ton)
Paddy	22,857	25,086	2,229
Palawija (maize)	7,480	10,285	2,805
Palawija (beans)	3,577	3,577	-
Sugarcane	35,100	35,100	-

As shown in the table, the production increases of some 2,229 tons of paddy, 2,805 tons of maize are estimated under the with-project condition.

(4) Crop Budgets

The planned crop budgets per ha for irrigated paddy, palawija and sugarcane are estimated as shown in Table B-3.2.2 and summarized in the following table.

Planned Crop Budget per ha

Crops	Yield (t/ha)	Gross Return (Rp. 000)	Production Cost (Rp. 000)	Net Return (Rp. 000)
Irrigated Paddy *1	5.5	6,600	2,820	3,780
Irrigated Paddy *2	4.5	5,400	2,470	2,930
Maize	5.5	5,500	2,770	2,730
Beans	1.2	3,180	1,460	1,720
Sugarcane *3	60.0	12,000	9,360	2,640

Note *1: Wet season & dry season I; *2: dry season II; *3: Average of 1st & 2nd harvest

3.2.2 Farm Economy

The farm economic analyses under the present Study have been made to examine capacity-to-pay or possible contribution of O&M costs by beneficiary farmers after the project and were made on 1 ha of irrigated paddy field or rainfed paddy field by estimating net farm income from the fields as discussed earlier in Section 1.4.8.

The results of the farm economic analyses thus made are summarized below:

Estimated Net Farm Income from 1ha of Field

Net Farm Income (Rp. 000)			Cropping Pattern Assumed
Present	With Project	Increment	
6,620	7,590	970	Paddy:1.25ha/maize:0.40ha/beans:0.80ha/sugarcane:0.15ha *1

Note *1: Paddy: wet season and dry season I: 0.85 & 0.40 ha

3.2.3 Agriculture Extension Services Strengthening Plan

(1) Constraints for Development

Major constraints for the further step or the attainment of the agriculture development targets stated in the previous sections are rather non-technical issues and include;

1) Farmers' Groups (KTs) yet to be empowered to a great extent, especially toward the introduction of agri-business oriented farming activities in collaboration among group members and groups (Constraints 1),
2) Insufficient capability of extension staffs especially in post-harvest & marketing aspects, limitation of operation funds & transportation means and coverage of extension services and activities of PPLs limited (Constraints 2), and
3) Improvement of product quality as a further step of the irrigated paddy farming in the Scheme should be targeted through the introduction of agri-business oriented farming activities of KTs and promotion of partnership between KTs and business sectors (Constraints 3).

(2) Agriculture Extension Services Strengthening (AESS)

The agriculture extension services strengthening programs formulated to meet the requirements discussed in the section above are presented in Table 3.3.3 and summarized as follows;

Institutional Strengthening Package Program (Constraint 2)
- Establishment Regional & Sub-regional Task Force Team for AESS
- Staff empowerment program (capacity building of regional & sub-regional & extension staffs)

Farmer Organizations Empowerment Package Program (Constraint 1 &3)
- Agribusiness Promotion Package Program
- Partnership Promotion Package Program

These programs should be implemented for the period of 5 years from the commencement of the construction works. The proposed implementation schedules for AESS are shown in Table B-3.2.1 and B-3.2.4 in detail. The overall program costs are estimated at Rp. 410 million as shown in Table B-3.2.4.

3.3 Institutional Strengthening Plan

The institutional strengthening plan for the target area of 3,907 ha in the scheme consists of four programs, i.e. institutional capacity building and staff capability improvement program, WUA strengthening program, FWUA and MWUA initial

setting-up program, and training program on operation and maintenance of tertiary irrigation systems.

(1) Institutional Capacity Building and Staff Capability Improvement Program

This program contains two components. One is to enable irrigation officials of the Tegal District to understand and practice the new irrigation management policy. The other is to improve the capacity of organization units of the Tegal District Government involved in irrigation management and those staff capabilities in line with the new irrigation management policy.

The first component will be done through undertaking a series of seminars and workshops to be facilitated by the central government after the legal framework of water resources and irrigation management is completed. Its program formulation and budget arrangements will be also made by the central government.

The second component should reflect to the above nationwide dissemination of the new irrigation policy by the central government. This component will be done as follows:

- To evaluate the capacity of district/municipal government authorities and the capability of those staff involved in irrigation management activities;
- To identify needs for improving institutional capacity and staff capability to cope with the new irrigation management policy as well as supporting requirements for fulfillment of such needs through technical assistance by the central/provincial governments; and
- To formulate implementation programs on institutional capacity building and staff capability improvement for the respective district/municipal government authorities involved in irrigation management.

Regarding budget arrangements for implementing these programs, the main source is the Tegal District Government budget to cover the cost for institutional capacity building and staff capability improvement, while the supplemental source is the provincial government budget to cover the cost for implementation of the supporting menus.

In implementing the institutional capacity building and staff capability improvement program, a group of trainers will be organized by inviting well experienced specialists from consultants, NGOs and universities. Monitoring and supervision of the program implementation should be carried out continuously by relevant organization units at the provincial level throughout the program implementation stage with periodical reporting on performance and impacts of the program implementation.

(2) WUA Strengthening Program

The WUA Strengthening Program will be conducted based on the following steps:

- hold WUAs' awareness raising workshops to address weak points elaborated from recapitulating data on the latest monitoring and evaluation (M & E) record on WUA's performance;
- identify technical assistant requirements for improving WUA's capacity to manage organization, capability to conduct operation and maintenance of tertiary irrigation systems, and/or activities to set and collect WUA member's fees;
- formulate a technical assistant menu list and make a package program of technical assistance menus according to WUA's needs to improve its capacity, capability and/or activities; and
- estimate unit cost of each technical assistant menu and total cost of the package program.

Budget for implementing the package program for strengthening WUA is to be covered by the project financing.

In implementing the WUA strengthening program before starting rehabilitation works, consultants, NGOs and/or universities are to be recruited as facilitators and implementers in the irrigation scheme area.

(3) FWUA and MWUA Initial Setting-up Program

The FWUA and MWUA initial setting-up program will be conducted based on the following steps:

- imbue the local society with the necessity of setting up representative groups of WUA to cope with the participatory irrigation management policy if FWUA/MWUA has not been established;
- formulate a guidance menu list, and make a package program of guidance menus to support initial setting-up of FWUA/MWUA according to the current situation in the scheme; and
- estimate unit cost of each guidance menu and total cost of the package program.

Budget for implementing the initial setting-up program of FWUA and MWUA is to be covered by the project financing.

In implementing the initial setting-up of the FWUA and MWUA program, consultants, NGOs and/or universities are to be recruited as facilitators and supporters in the irrigation scheme area.

(4) Training Program on Operation and Maintenance of Tertiary Irrigation Systems

This training program will be done after completing the rehabilitation works of the irrigation system. For this purpose, however, preparation of training manuals and programs should be done in parallel with the final stage of the rehabilitation works. Also the concept of training program should synchronize with the irrigation water allocation plan to tertiary blocks as well as the cropping pattern and planting schedule in the irrigation command area.

As this training will be done as one of the rehabilitation project components, a consultant under the project manager is responsible for preparing training manuals, formulating training programs, estimating training costs and implementing training programs. To ensure effective and efficient implementation of training on operation and maintenance of tertiary irrigation systems, NGOs and other volunteers will be encouraged to become involved in training activities at the field level in addition to the project staff, District Government officials and consultant.

Budget arrangements based on the consultant's cost estimate are the responsibility of the project manager.

(5) Cost Estimate for Institutional Strengthening Plan

The overall cost for the proposed institutional strengthening plan in the above is estimated at Rp. 249 million in total. The breakdown of estimated cost is as follows:

- Rp. 15 million for Institutional capacity building and staff capability improvement program for Water Resources Sub-service of Tegal District based on unit cost of Rp. 5 million and 3-time implementation;
- Rp. 78 million for WUA strengthening program to upgrade WUA based on unit cost of Rp. 20,000/ha considering the existing level and WUA's coverage area of 3,907 ha;
- Rp. 78 million for FWUA and MWUA initial setting-up program based on unit cost of Rp. 20,000/ha and the proposed recovery area of 3,907 ha; and
- Rp. 78 million for training program on operation and maintenance of tertiary irrigation systems based on unit cost of Rp. 20,000/ha and the proposed recovery area of 3,907 ha;

3.4 Environmental Aspect

Environmental assessment is now accepted as a key part of development planning and is as important as economic analysis in project evaluation. In this Study,

however, such assessment has not been conducted, as the objective of the Study is to recover the function of the existing infrastructures. Nonetheless, environmental assessment for rehabilitation projects is no less important than that of the new development project as far as environmental impact exists. In this regard, it is proposed to carry out an environmental assessment prior to the implementation of the project on the basis of the following law and regulation:

- Law No.23/1997 concerning environmental management, and
- Government Regulation No.27/1999 concerning environmental impact assessment

CHAPTER 4 COST ESTIMATE

4.1 Conditions of Project Cost Estimate

Project costs for the proposed project works including construction cost for rehabilitation, consulting services fee, administration cost (salary for the office staff and expenditures for office management), and costs for institutional and extension service strengthening are estimated on the basis of the following conditions:

(a) All the civil works of the project will be executed on a contract basis. Contractors will be selected through international competitive bidding.
(b) Physical contingency of each work is assumed to be 15%.
(c) Price contingency is not counted taking into account the short construction period.
(d) Costs for institutional strengthening and extension service strengthening are assumed to be 2% of the total costs of civil works construction.
(e) Cost for the consulting services is assumed to be 7% of the costs for civil works and works described in (d) above.
(f) Administration cost of the project office is assumed to be 2.5% of the costs for civil works and works described in (d).
(g) Exchange rate used for the estimate is US$1.00 = Yen 118.9 = Rp. 8,279 as of May 2003, and
(h) Currency for cost estimate is expressed in Indonesian Rupiah (Rp.)

4.2 Project Cost

(1) Direct Construction Cost

The direct construction cost is estimated based on the calculated work quantities of the proposed project works and unit prices of the works. The unit prices are based on those for similar works quoted in recent engineer's estimates of the Central Java Province such as Lodan Dam of PTSL-II Project.

The direct construction cost is estimated at Rp. 33,783 Million (equivalent to US$ 1,045 per ha or Rp. 8.7 million, A= 3,906 ha). The breakdown of direct construction costs is shown in Table-B.4.2.1 and summarized as follows:

Summary of Direct Construction Cost

Work Description	Amount (million. Rp.)
I. Headworks	5,581
II. Main Canal Works	963
III. Secondary Canal Works	16,146
IV. Drainage Works	1,711
V. On-Farm Development	7,812
VI. Project Facilities	1,570
Total	33,783

(2) Other Costs

Other costs are estimated as shown below:

- Costs for institutional and extension service strengthening: Rp. 659x 1,000
- Cost for the consulting services: Rp. 2,291x 1,000
- Administration cost of the project office: Rp. 775 x 1,000

(3) Project Costs

Project costs are estimated at Rp. 37.7 billion as shown in the following table:

Breakdown of Project Costs

Work Description	Costs (Rp. Million)
I. Civil works	33,783
II. Institutional and extension service strengthening	676
III. Consulting services	2,412
IV. Project administration cost	861
Total	37,732

CHAPTER 5 PROJECT IMPLEMENTATION

5.1 General

The implementation of rehabilitation work of the Gung Irrigation Scheme is urgently required for the recovery of function of the existing irrigation scheme to cope with progressing deterioration of the facilities. Implementation schedule of the rehabilitation work after the feasibility study is shown in Figure B-5.3.1 and briefed as follows:

(a) Preparation of Implementation Program (I/P) and budget arrangements,
(b) Establishment of project office,
(c) Preparation of detailed design with tender documents including field survey and investigation,
(d) Tender and selection of contractor(s),
(e) Execution of civil construction and taking over of completed irrigation scheme, and
(f) Execution of strengthening program such as institutional and extension services.

5.2 Implementation Schedule

5.2.1 Schedule on Initiation Stage and Construction Works

(1) Establishment of Project Office

The project office so-called "Function Recovery Project Office" is to be established at Dinas PSDA. Organization and staffing are to be restructured and transferred from other divisions. At the same time, "Function Recovery Forum" is also established. (Details are presented in Chapter 7 of Part 1 of this Report)

(2) Preparation of I/P and Budget Arrangements

Preparation of I/P is to be made by the Dinas PSDA for the submission to DGWR for its approval. DGWR has to make arrangement for budget by means of national fund and/or loan from the international lending agencies.

(3) Preparation of Detail Design

Immediately after completion of budget arrangement and office establishment, the detailed design including field survey and field investigation, and preparation of the tender documents are to be followed. Period for the detail design is estimated to be less than 12 months.

(4) Tender and Selection of Contractor(s)

Tender and its schedule are to be as follows:

- Number of contract: 2 contracts
- Tender call to contract signing: 6 months
- Construction period: 2 years

(5) Construction and Taking Over

Immediately after the contract signing, the construction is commenced. The construction management works including supervision work and quality control are to be carried out by the construction section of the project office. The completed scheme of the rehabilitation works is to be inspected, and after verification by the authority, the scheme is taken over by the provincial government for the commencement of operation.

5.2.2 Strengthening Program

The strengthening programs both institutional and extension service program are commenced with following elements and schedule.

(1) Institutional Strengthening Program

Elements of institutional strengthening program are as follows:

(a) Institutional capacity building and staff improvement program,
(b) WUA strengthening program,
(c) FWUA and MWUA initial setting-up program,
(d) WUA establishment acceleration program,
(e) Training for operation and maintenance of tertiary irrigation system program, and
(f) Guidance program for collection and expense of irrigation management fee.

(2) Extension Services Strengthening Program

Elements of extension services strengthening program are as follows:

(a) Formulation of strengthening program,
(b) Formulation of task force team,
(c) Formulation of implementation program, and
(d) Implementation of strengthening program.

(3) Budgeting and Budget Implementation

In discussing the preparation of budget proposals and implementing of budget to be allocated to the function recovery program, special attention has to be paid to the following key issues related to the modified irrigation management policy in line

with the draft of new Law on Water Resources:

(a) Arrangement of irrigation management responsibility between irrigation water suppliers and water users,
(b) Arrangement of irrigation management responsibility among government authorities,
(c) Funding criteria, and
(d) Mechanism of budget arrangement and utilization

Among irrigation management activities, the responsibility of planning and design works for development, rehabilitation and upgrading purposes is arranged to governments at central and provincial level to assure quality of outputs from these works. Regarding implementation of physical works, it can be considered that the budget availability, staff capability and contractor capacity are crucial factors at district/municipal level in a sense of participatory irrigation management.

CHAPTER 6 PROJECT EVALUATION

6.1 General

In accordance with Section 2.1, the target area based on the present condition was decided at 9,871 ha. However, the water balance study in Section 2.3 resulted in a maximum irrigable area covered by the dependable runoff with 80% probability is at 3,906 ha only. This means the present benefit for 9,871 ha includes an unreliable benefit with less than 80% probability.

In this regard, if the project is evaluated on the basis of 9,871ha as present area, it is not exactly reflecting the present condition. Then, for the project evaluation, the target area based on the present condition will be assumed at 3,906ha.

The economic evaluation of the present Study has been made to assess the financial and economic feasibility of the rehabilitation plan (the project). The approaches or assumptions applied for the project evaluation are as follows;

- Economic evaluation has been made by estimating project benefits between the without-project and the with-project conditions,
- For the project evaluation, economic internal rate of return (EIRR), financial return per ha, economic benefit-cost ratio (B/C) and economic benefit minus cost (B-C) have been examined,
- For the evaluation, project benefits have estimated based on crop production benefits and indirect or intangible benefits have not been counted,
- To assess the economic viability of the project to possible changes in project costs, project benefits and build-up period, a sensitivity analysis has been made,
- For financial evaluation of the project, the capacity to pay of beneficiary farmers have been analyzed,
- Without-project condition has been assumed to be the same as the present condition as the reliable prediction or estimation of the without-project conditions was not possible and impractical,
- The useful life of the Project was taken as 30 years from project implementation,
- Exchange rate of Indonesian Rupiah (Rp.) to US. Dollar (US$) was taken to be Rp. 8,279 equivalent to US$ 1.00 (as of May, 2003), and
- Constant prices at 2003 level were used in the economic evaluation.

6.2 Economic Evaluation

6.2.1 Project Costs

(1) Project Costs

The project costs for economic evaluation would consist of i) construction cost, ii) institutional & extension services strengthening costs, iii) consulting services cost, iv) administration cost, v) O&M costs, and vi) replacement cost. The economic project costs have been calculated from the financial project costs by applying the standard conversion factor with 0.90. The economic project costs estimated accordingly are shown in Table B-6.2.1.

6.2.2 Project Benefits

(1) Economic Prices of Farm Inputs and Outputs

Economic prices of farm inputs and outputs were estimated in order to evaluate the expected project benefits. Economic prices of trade goods such as rice, maize, soybeans, groundnuts and fertilizers were estimated on the basis of the projected world market prices of these commodities forecast by the World Bank. Non-trade goods were valued at financial prices which were estimated on the basis of current market or farm gate prices. Farm labor was valued at the shadow wage rate of 0.80. The economic prices of farm inputs and outputs applied for the economic evaluation are presented in Table B-6.2.2 and B-6.2.3.

(2) Project Benefits

Only the crop production benefits are assessed as the project benefits as stated earlier. The net project benefits are defined as the difference in net return from crop production between the with-project and the with-out project conditions. The without-project condition has been assumed to be the same as the present condition as stated earlier. The economic crop budgets applied for the estimation of the net return under the project are as presented in Table B-6.2.4 and B-6.2.5. The project benefits expressed as the incremental net production value from crop production are estimated as shown in Table B-6.2.6.

The annual economic project benefits at full development stage (the incremental net production value) have been estimated at Rp. 3.9 billion as shown in Table B-6.2.6 and summarized below.

Economic Project Benefits/Incremental Net Production Value *1

Net Production Value (Rp. million)		
Without Project	With Project	Increment
31,946	35,892	3,947

Note *1: At full development stage

The benefits would gradually increase up to the full benefit in the 5th year after the completion of construction works.

6.2.3 EIRR, B/C and B-C

The annual economic costs and benefits flows and the results of the economic evaluation (EIRR, B/C & B - C) are presented in Table B-6.2.7 and as summarized below.

Results of Economic Analysis

EIRR	B/C	B – C (million Rp.)
6.7 %	0.76	-7,430

B/C & B - C at 10% discount rate

6.2.4 Sensitivity Analysis

To examine the project economic viability to changes in project cost, project benefits and build-up period, the sensitivity analyses have been made on the four cases as follows.

Results of Sensitivity Analysis

Case		EIRR (%)
0. No Changes	-	6.7
1. Change in Project Costs	+ 10 %	5.8
2. Change in Project Benefits	- 10 %	5.6
3. Benefit Delay	1 year delay	5.9
4. 1 + 2 + 3	-	4.1

6.3 Financial Evaluation

The capacities to pay of beneficiary farmers have been assessed based on the farm budget analyses on 1 ha of paddy field under the with and without project condition, which have been made by applying the results of the farm economic analyses made in Section 1.4.8 and 3.3.6, as shown in Table B-6.3.1 and as summarized below:

Results of Farm Budget Analyses on 1 ha of Paddy Field

Land Use Category	Net Reserve on 1 ha of Paddy Field (Capacity to Pay: Rp.000))		
	Without Project	With Project	Increase
Irrigated Paddy Field	6,620	7,660	1,040

The capacity to pay of beneficiary farmers will increase from Rp. 6.6-7.7 million or the increase of Rp. 1.0 million under the future with project condition. The increases would enable the farmers to bear their contributions to O&M cost of irrigation system.

6.4 Indirect Benefits and Socio-economic Impacts

After implementation of the Project, various indirect benefits and socio-economic impacts are expected as mentioned below.

(1) Employment Opportunities

The Project would create a demand for farm labors due to the increased farming activity, more intensive use of land and higher agricultural production. In addition, the construction of the Project would increase employment opportunities in the area. During the construction stage, the majority of workers would be unskilled laborers, and most of whom would come from farmers and ordinary laborers in and around the Project area.

(2) Farmers' Income

After implementation of the Project, income of farmers is expected to increase considerably as a direct result of the increase in crop production. Such increase in income would contribute to improving farmers' living standards. Moreover, it is expected that farmers' purchasing power would increase along with improvement of their living standards, and this increased purchasing power would benefit the development of the regional economy.

(3) Marketing of Farm Inputs and Outputs

Future marketing in the project area is likely to expand as compared with the present condition. With anticipated higher agricultural production, more farm products could be marketed by the farmers and the proportion of sales would also increase relative to consumption. The merchants would have a larger turnover which could increase their incomes.

Marketing functions would not only be influenced by agricultural outputs. It is estimated that when agricultural production develops as a result of the Project, the Project area would be a good market for farm supplies. The farmers need to operate with farm supplies such as tools, equipment and bags. Both ends of marketing channels could, therefore, expect substantial beneficial impacts from the Project.

(4) Food Supply

The incremental production of paddy of some 2,200 tons under the with project condition will directly contribute to the supply-demand balance of rice and the food security in Indonesia.

(5) Other Effects

Implementation of the Project would certainly lead to changes in rural socio-economy in the area. By the construction of inspection roads along the canals,

the local transportation system would also be improved, which will contribute to the improvement of rural socio-economic activities.

Tables

Table B-1.1.1 Climate Conditions at Tegal

Name of the meteorological station	: Tegal
Province	: Central Java
District	: Tegal
Approximate distance of the station from the scheme	: Inside of the beneficiary area
Longitude : 6°52' S Latitude : 119°08' Altitude	: 1m

1. Monthly mean temperature (°C)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1998	28.1	27.6	27.7	28.1	28.4	27.6	27.3	27.6	27.5	27.9	27.5	27.4	27.7
1999	26.5	26.3	27.1	27.6	27.4	27.0	26.3	26.3	27.3	27.6	27.4	27.0	27.0
2000	26.3	26.3	26.6	27.4	27.4	26.5	26.7	26.7	27.8	27.9	27.2	27.7	27.0
2001	26.6	26.4	26.7	27.5	27.8	27.0	26.5	26.6	27.7	27.7	27.4	27.6	27.1
2002	26.8	26.2	27.4	27.8	27.7	27.2	26.7	26.4	27.1	28.3	28.5	27.6	27.3
Average	26.9	26.6	27.1	27.7	27.7	27.1	26.7	26.7	27.5	27.9	27.6	27.5	27.2

Source: Monthly data supplied by Meteorological and Geophysical Agency Jakarta, Department of Communication

2. Monthly mean relative humidity (%)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1998	81	85	85	84	81	83	83	78	77	81	81	81	82
1999	87	87	84	80	80	77	75	74	71	77	80	84	80
2000	87	88	85	83	83	81	79	76	76	77	84	80	82
2001	87	87	87	84	80	80	78	76	77	82	82	77	81
2002	87	90	85	83	79	76	76	70	68	70	75	79	78
Average	86	87	85	83	81	79	78	75	74	77	80	80	81

Source: Monthly data supplied by Meteorological and Geophysical Agency Jakarta, Department of Communication

3. Monthly mean sunshine duration (hours/day)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1993	3.9	5.0	6.0	5.2	6.1	6.9	7.3	-	7.5	-	4.6	4.5	5.7
1994	3.4	4.3	3.9	5.4	7.0	6.8	7.1	7.4	7.7	7.4	-	4.5	5.9
1996	3.8	3.4	6.4	6.7	7.2	5.9	-	-	6.8	5.3	5.1	5.0	5.6
1998	6.5	4.3	4.9	3.0	6.6	4.8	5.5	7.3	5.7	4.9	3.0	4.2	5.1
1999	3.9	3.3	5.1	5.5	6.5	6.8	6.7	7.1	7.5	5.8	3.4	-	5.6
Average	4.3	4.0	5.3	5.2	6.7	6.2	6.7	7.3	7.0	5.9	4.0	4.6	5.6

Source: Monthly data supplied by Meteorological and Geophysical Agency Jakarta, Department of Communication
Note: No data are available for year 1995, 1997, and after 2000.

4. Monthly mean wind velocity (knots)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
1994	3.0	3.0	3.0	2.0	3.0	4.0	4.0	5.0	4.0	4.0	-	4.0	3.5
1996	4.0	4.0	3.0	3.0	3.0	3.0	-	-	4.0	3.0	3.0	3.0	3.3
1998	4.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	4.0	5.0	3.8
1999	4.0	6.0	5.0	4.0	4.0	4.0	4.0	4.0	5.0	3.0	4.0	5.0	4.3
2000	7.0	8.0	7.0	5.0	4.0	4.0	5.0	6.0	5.0	4.0	4.0	5.0	5.3
Average	4.4	4.8	4.2	3.6	3.6	3.8	4.3	4.8	4.2	3.6	3.8	4.4	4.1

Source: Monthly data supplied by Meteorological and Geophysical Agency Jakarta, Department of Communication
Note: No data are available for year 1995, 1997, and after 2001.

Table B-1.3.1 Condition of Headworks

	Structure	Condition	Problems
1.	Weir, overflow crest	B	Damaged/eroded surface of crest
2.	Retaining wall, left bank site	B	Partially damaged/collapse
3.	Retaining wall, right bank site	B	Foundation was eroded
4.	Water cushion at downstream of bar screen	C	Eroded concrete and exposed re-bars
5.	Downstream apron	D	Completely washed away
6.	Settling basin	B	Functional, but velocity is found too high
7.	Settling basin	B	No working space along basin (removal of sediment)
8.	Settling basin	C	Damaged civil works at outlet cannel

Condition:

A: Functioning well, no rehabilitation is needed.

B: Partially damaged/deteriorated, minor rehabilitation is needed.

C: Not function well, large scale rehabilitation is needed.

D: Seriously damaged, replacement or reconstruction is needed.

Table B-1.3.2 Condition of Main Canal and Inspection Road

HM		Distance (m)	Condition of Canal (m)				Description of Condition				Inspection Road
			A	B	C	D					
0	5	500		500			1	2			B
5	10	500		500			1	2	3		B
10	15	500		500			1	3			B
15	20	500			500		1	3	5		B
20	25	500		500			1	3			B
25	30	500		500			1	3			C
30	35	500			500		1	3	5		B
35	40	500			500		1	5	7		C
40	45	500			500		1				B
45	50	500		500			1				C
50	55	500		500			1	2			B
55	60	500		500			1	2			C
60	65	500			500		1	2	4		C
65	70	500		500			1	3			C
70	75	500		500			1	3			C
75	80	500			500		1	3			C
80	85	500			500		1	3	5		B
85	88.63	363		363			1	3	5		B
Total		8,863	0	5,363	3,500	0					

Conditions:
1. No berm along canal at excavated section
2. Inflow of rainfall directly into canal
3. Damage of canal lining
4. Obstruction of water flow by sediment
5. Collapse of canal
6. Leakage from canal
7. Velocity more than allowable (2m/s)

Table B-1.3.3 Condition of Related Structures on Main Canal

HM	Distance (m)	Mark	Structure	Condition of Structures	
				Civil	Metal
2.22		B. GU1a	Measuring Device	B	B
7.68	546	B. GU1	Division Structure	B	B
13.87	619	B. GU2	Division structure & Chute	B	B
17.57	370	B.GU3a	Bridge	A	A
21.23	366	B.GU3	Division structure/bridge	B	B
21.83	60	B.GU4a	Chute	B	A
28.10	627	B.GU4b	Drop	B	-
35.00	690	B.GU4	Division structure	B	B
41.30	630	B.GU5	Division structure	C	B
43.30	200		Drain inlet	C	-
44.60	130	B.GU6a	Drop	B	-
44.90	30	B.GU6b	Drop	B	-
45.23	33	B.GU6	Diversion structure	C	B
47.83	260	B.GU7a	Aqueduct (l=192m)	C	C
50.11	228		Bridge	B	-
50.50	39	B.GU7b	Chute	A	-
52.70	220	B.GU7	Diversion structure	B	C
53.20	50		Drop	B	-
53.75	55		Drop	B	-
54.70	95		Drop	B	-
55.29	59		Drop	B	-
56.08	79		Drop	B	-
56.86	78		Drop	B	-
58.20	134		Drop	B	-
58.85	65		Drop	B	-
59.75	90		Drop	B	-
61.00	125		Drop	B	-
61.85	85		Drop	B	-
62.69	84		Drop	B	-
63.12	43	B.GU8a	Bridge	C	-
65.23	211		Drop	B	-
66.45	122		Drop	B	-
67.45	100		Drop	B	-
68.45	100		Drop	B	-
70.47	202		Drop	B	-
74.76	429		Drop	B	-
77.90	314	B.GU 8b	Bridge/Drop	C	-
78.50	60	B.GU8	Division structure	C	C
82.00	350		Drop	B	-
83.05	105		Drop	B	-
83.70	65		Village bridge	B	-
85.20	150		Drop	B	-
87.84	264	B.GU 9b	Measuring & drop	B	-
88.53	69	B.GU9	Division structure	B	B

Condition:

A: Functioning well, no rehabilitation is needed.
B: Partially damaged/deteriorated, minor rehabilitation is needed.
C: Not function well, large scale rehabilitation is needed.
D: Seriously damaged, replacement or reconstruction is needed.

Table B-1.4.1 Basic Agriculture Conditions of Gung Scheme

(1/2)

1. Agro-demographic Features of Project Sub-districts & Desas

1.1 Farm Households & Land Tenure Status in Tegal District (1993)

Proportion of Farm Households to Total Households: 35%
Proportion of Farm Households Having Activity in:
- Food Crops Production: 82 % - Horticulture Crops Production: 16 % - Estate Crops Production: 10 %
- Livestock: 19 % - Working as Farm Labor: 85 %

Source Sensus Pertanian, 1993, BPS

1.2 Estimated Average Land Holding Size in Gung Scheme

Paddy Field = 12,543 ha No. of Planned Beneficiary Farm Households: 63,000
Estimated Average Paddy Holding Size: 0.20 ha/farm household

Source Result of Inventory Survey in Phase I Study, JICA Study Team

2. Agriculture Conditions

2.1 Present Land Use of Gung Scheme & Project Area

Item	Potential Area for Irrigation / Irrigated Paddy Field	Paddy Field Converted to Housing & Industrial Yard	Original Potential Area for Irrigation
Gung Irrigation Scheme	12,543	98	12,641
	100	-	-
Project Area	9,871	-	-
	100	-	-

Source: Subdinas Pengairan, Dinas PU Tegal

2.2 Prevailing Cropping Schedule & Pattern in Gung Scheme

Paddy: Wet Season: Mid. Nov. - Mid. Dec. ~ Mid. Feb. - Mid. Mar;
Dry Season I: Mid. Mar. - Early Apr. ~ Mid. June - Early July;
Dry Season II: Early July - Early Aug. ~ Early Oct. - Early Nov. (area limited).
Maize: Wet Season: Mid. Nov. - Mid. Dec. ~ Mid. Feb. - Mid. Mar - Mid. Sep.;
Dry Season I: Mid. Mar. - Early Apr. ~ Mid. June - Early July.
Beans: Dry Season II: Early July - End July ~ End Sep. - Mid. Sep.
Sugarcane: Planting --- May ~ July; Harvesting --- July ~ Oct.

Cropping Pattern:
- Prevailing: Wet season - dry season I - dry season II: Paddy - paddy/palawija (maize) - palawija (beans)/fallow
- Common: Wet season - dry season I - dry season II: Palawija - paddy/palawija (maize) - palawija (beans)/fallow
- Common: Wet season - dry season I - dry season II: Sugarcane

2.3 Cropped Area & Intensity in the Project Area 1/

Crop Year/ Crops	Irrigated Paddy Field: 9,871 ha							
	Wet Season		Dry Season I		Dry Season II		Annual	
	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)	Area (ha)	CI (%)
Paddy	7,660	78	3,604	37	320	3	11,584	117
Palawija (maize) 2/	731	7	3,995	40			4,726	48
Palawija (beans) 2/					7,533	76	7,533	76
Sugarcane	1,480	15	-	-	-	-	1,480	15
Total	9,871	100	7,599	77	7,853	80	25,323	257

1/: Refer to Table B-1.4.2 CI: Crop intensity
Source: Subdinas Pengairan, Dinas Pekerjaan Umum (PU), Tegal

Table B-1.4.1 Basic Agriculture Conditions of Gung Scheme

2.4 Crop Yield & Production in the project area (Unit: t/ha & ton)

Cropping Season	Irrigated Paddy		Maize		Beans		Sugarcane 1/	
	Yield	Production	Yield	Production	Yield	Production	Yield	Production
Wet Season	5.0	38,300	4.0	2,924				
Dry Season I	5.0	18,020	4.0	15,980				
Dry Season II	4.5	1,440			1.2	9,040		
Annual	-	57,760	-	18,904	-	9,040	60	88,800

1/: Sugarcane yield = average of 1st harvest & 2nd harvest (ration)

Source: Findings of JICA Study Team; Statistic data of District Agriculture Services Office, Tegal

3. Agriculture Support Services

3.1 Extension Services

BPP	No. of PPLs Assigned to BPP	No. PPLs Deployed in Project Sub-districts					
		Sub-district	No.	Sub-district	No.	Sub-district	No.
BPP, Lebaksiu	42	Lebaksiu	6	Dukuhwaru	6	Balapulang	4
BPP, Kramat	26	Kramat	5	Adiwerna	5	Dukuhturi	4
BPP, Pangkah	24	Pangkah	7	Tarub	5	Kedungbanten	3
Total	92	Slawi	4	Talang	4	Total	53

3.2 Support Facilities

Facility	Name	Location
District Agriculture Services Office	District Agriculture, Estate Crops & Forestry Services Office, Tegal	Slawi, Tegal
Food Security Office	BIMAS Food Security Office, Tegal	Slawi, Tegal
Seed Farm	Balai Benih Hortikultur, Slawi	Slawi, Tegal
Seed Farm	Balai Benih Pembantu Padi, Kramat	Kec. Kramat, Tegal
Seed Supervision & Certification Office	BPSB, Lembang	Lembang, Kab. Semarang
	BPSB Branch Office, Tegal	Slawi, Tegal
Plant Protection Center	BPTPH, Lembang	Lembang, Kab. Semarang
Experimental Station	BPTPH, Lembang	Lembang, Kab. Semarang

3.3 Farmers Organizations (Kelompok Tani, 2002)

Project Sub-districts	Kelompok Tani (KT)								Total		
	Primary		Secondary		Intermediate		Advanced		KTs		Member
	No.	%	No.	%	No.	%	No.	%	No.	%	
11 Sub-districts	60	8	299	42	276	38	83	12	718	100	-

3.4 Farmer Organizations, Credit Institutions

Project Sub-districts	KUD			Koptan	UPJA	BRI Branch
	No.	Membership	Membership per KUD			
11 Sub-districts	13	67,662	5,205	30	8	n.a.

Source: Office file; District Agriculture Services Office, Tegal

4. Agriculture Facilities & Machinery

Project Sub-districts	Large Rice Mills	RMU	Small Rice Mills	Thresher		Huller
				Pedal	Power	
11 Sub-districts	5	152	63	21	21	138

Project Sub-districts	Hand Tractor	Polisher	Water Pump	Paddy Cleaner	Corn Sheller	KIOSK
11 Sub-districts	361	113	1,787	7	8	173

Source: Office file; District Agriculture Services Office, Tegal

Table B-1.4.2 Estimation of Cropped Area and Cropping Intensity in the Project Area

1. Gung Irrigation Scheme (12,543 ha)

Year	Irrigated Paddy Field (ha)	Crop	Planted Area (ha)				Cropping Intensity (%)				Major Palawija
			Wet Season	Dry I Season	Dry II Season	Annual	Wet Season	Dry I Season	Dry II Season	Annual	
1999/00	12,578	Paddy	9,735	4,721	986	15,442	77	38	8	123	Maize
		Sugarcane	1,096	3,271	3,046	7,413	9	26	24	59	Soybean
		Palawija	1,747	4,586	8,546	14,879	14	36	68	118	Mungbeans
		Total	12,578	12,578	12,578	37,734	100	100	100	300	
2000/01	12,576	Paddy	10,333	5,909	1,020	17,262	82	47	8	137	Maize
		Sugarcane	1,472	2,488	2,380	6,340	12	20	19	50	Soybean
		Palawija	771	4,179	9,176	14,126	6	33	73	112	Mungbeans
		Total	12,576	12,576	12,576	37,728	100	100	100	300	
2001/02	12,576	Paddy	9,301	5,330	20	14,651	74	42	0	116	Maize
		Sugarcane	1,355	2,177	1,757	5,289	11	17	14	42	Soybean
		Palawija	1,761	4,909	10,637	17,307	14	39	85	138	Mungbeans
		Total	12,417	12,416	12,414	37,247	99	99	99	296	
2002/03	12,543	Paddy	9,249	3,635		12,884	74	29	0	103	Maize
		Sugarcane	1,603	2,328	1,565	5,496	13	19	12	44	Soybean
		Palawija	1,789	6,678	10,033	18,500	14	53	80	147	Mungbeans
		Total	12,641	12,641	11,598	36,880	101	101	92	294	
Average of 2000/01 - 2002/03 (3 years)	12,565	Paddy	9,628	4,958	347	14,932	77	39	3	119	Maize
		Sugarcane	1,477	2,331	1,901	5,708	12	19	15	45	Soybean
		Palawija	1,440	5,255	9,949	16,644	11	42	79	132	Mungbeans
		Total	12,545	12,544	12,196	37,285	100	100	97	297	
Irrigated Field Adjusted	12,543	Paddy	9,611	4,949	346	14,906	77	39	3	119	
		Sugarcane	1,474	2,327	1,897	5,698	12	19	15	45	
		Palawija	1,438	5,246	9,931	16,615	11	42	79	132	
		Total	12,523	12,522	12,175	37,220	100	100	97	297	
Present Conditions Assumed 1/	12,543	Paddy	9,734	4,579	406	14,719	78	37	3	117	
		Sugarcane	1,880			1,880	15	0	0	15	
		Palawija	929	5,077	9,572	15,578	7	40	76	124	
		Total	12,543	9,656	9,978	32,177	100	77	80	257	

Source: Inventory Survey by the JICA Study Team 1/: Sugarcane planted area assumed to be 15% of the irrigated paddy throughout a year

2. Project Area (9,871 ha)

Item	Irrigated Paddy Field (ha)	Crop	Planted Area (ha)				Cropping Intensity (%)				Major Palawija
			Wet Season	Dry I Season	Dry II Season	Annual	Wet Season	Dry I Season	Dry II Season	Annual	
Present Conditions of Project Area Assumed	9,871	Paddy	7,660	3,604	320	11,584	78	37	3	117	
		Sugarcane	1,480	0	0	1,480	15	0	0	15	
		Palawija	731	3,995		4,726	7	40	0	48	Maize
		Palawija			7,533	7,533	0	0	76	76	Beans
		Total	9,871	7,599	7,853	25,323	100	77	80	257	

3. Project Area (3,906 ha)

Item	Irrigated Paddy Field (ha)	Crop	Planted Area (ha)				Cropping Intensity (%)				Major Palawija
			Wet Season	Dry I Season	Dry II Season	Annual	Wet Season	Dry I Season	Dry II Season	Annual	
Present Conditions of Project Area Assumed	3,906	Paddy	3,032	1,426	126	4,584	78	37	3	117	
		Sugarcane	585	0	0	585	15	0	0	15	
		Palawija	289	1,581		1,870	7	40	0	48	Maize
		Palawija			2,981	2,981	0	0	76	76	Beans
		Total	3,906	3,007	3,107	10,020	100	77	80	257	

Table B-1.4.3 Financial Crop Budget per Ha under Without Project

Items	Unit	Unit Price (Rp. 000)	Irrigated Paddy				Maize		Soybeans		Mungbeans		Sugarcane			
			Wet & Dry Season I		Dry Season II		Wet & Dry Season I		Dry Season II		Dry Season II		1st Harvest		2nd Harvest	
			Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)
1. Gross Return																
Unit Yield	(t/ha)		5.0		4.5		4.0		1.3		1.0		65		55	
Unit Price	(Rp. 000/t)			1,200		1,200		960		2,500		3,100		200		200
Gross Return	(Rp. 000)			**6,000**		**5,400**		**3,840**		**3,250**		**3,100**		**13,000**		**11,000**
2. Production cost				**2,585**		**2,474**		**1,904**		**1,557**		**1,346**		**10,703**		**8,008**
2-1. Farm Inputs				*722*		*644*		*548*		*537*		*360*		*2,680*		*1,180*
Seed 1/	(kg)		30	90	30	60	30	111	40	160	30	150		1,500		0
Fertilizers				539		491		387		302		210		1,180		1,180
- Urea	(kg)	1.2	200	240	180	216	150	180	50	60	50	60		0		0
- SP36	(kg)	1.6	90	144	75	120	70	112	80	128	70	112	200	320	200	320
- KCl	(kg)	1.9	50	95	50	95	50	95	60	114	20	38	200	380	200	380
- ZA	(kg)	1.2	50	60	50	60							400	480	400	480
Agro chemicals				93		93		50		75		0		0		0
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.0	50	1.5	75				0		0
- Insecticide (powder)	(kg)	30														
- Rodenticide	(kg)	35	0.5	18	0.5	18										0
- Herbicide	(kg)	30														
2-2. Labor Costs				*1,320*		*1,305*		*909*		*790*		*790*		*3,750*		*3,300*
Contracted Works																
- Planting/Transplanting 2/	(unit)		1	300	1	300										
- Harvesting 3/	(unit)		10%	600	10%	540	10%	384	10%	325	10%	310				
Labor Requirements 4/																
- Hired Labor	(man-day)	15	28	420	31	465	35	525	31	465	32	480	250	3,750	220	3,300
- Family Labor	(man-day)		16		16		20		20		20		50		50	
Total	(man-day)		44		47		55		51		52		300		270	
2-3. Land Preparation				*300*		*300*		*0*		*0*		*0*		*300*		*0*
- Machinery	(unit)		1	300	1	300							1	300		
- Draft Animal	(unit)															
2-4. Field Transportation	(L.S.)		2 %	*120*	2 %	*108*	2 %	*77*	2 %	*65*	2 %	*62*		*3,000*		*2,800*
2-5. Shelling		Rp.70/kg						*280*		*91*		*70*				
2-6. Miscellaneous Expenses	(L.S.)		5 %	*123*	5 %	*118*	5 %	*91*	5 %	*74*	5 %	*64*	10 %	*973*	10 %	*728*
3. Net Return	Rp. 000			**3,415**		**2,926**		**1,936**		**1,693**		**1,754**		**2,297**		**2,992**
	%			***57***		***54***		***50***		***52***		***57***		***18***		***27***
	Rounded			***3,410***		***2,930***		***1,940***		***1,690***		***1,750***		***2,300***		***2,990***
										Average	***1,720***				***Average***	***2,640***

1/: Seed price: paddy --- yield level < 5.0 Rp. 2,000; yield level ≧5.0 Rp. 3,000; maize composite Rp.3,700/kg; soybeans Rp.4,000/ka; mungbeans Rp. 5,000/kg

2/: Contract work for transplanting assumed --- Rp. 300,000/ha at financial price

3/: Share harvesting assumed --- 10% of products

4/: Hired Labor Requirements --- assumed to be 60~70% of total labor requirements except contracted works

Table B-1.5.1 Actual Receipts and Expenditures of Tegal District Government

Receipt/Expenditure	1999/00	2000
A. RECEIPTS	**118,910,774**	**127,085,745**
1. Previous Year Surplus	2,938,637	5,799,955
2. Local Gov. Original Receipt	10,074,757	10,039,245
2.1 Local Taxes Receipt	2,565,087	1,962,057
2.2 Retributions Receipt	6,368,670	7,605,384
2.2.1 Retributions of public service	5,595,747	6,587,945
2.2.2 Retributions of commercial service	631,888	891,246
2.2.3 Retributions of special permits	141,035	126,193
2.3 Local Gov. Corporate Profit	14,283	41,411
2.4 Other Receipt	1,126,717	430,393
3. Income from Higher Level Gov. and/or Authority	105,897,380	111,246,545
3.1 Tax Share	8,659,564	9,591,191
3.2 Non Tax Share	51,811	63,512
3.3 Subsidies to Local Government	68,777,489	64,054,304
3.4 Development Contribution	27,506,964	36,129,291
3.5 Other Receipt	901,552	1,408,247
4. Local Government Loan	0	0
B. CURRENT EXPENDITURES	**81,828,449**	**77,433,265**
1. Personnel Current Expenditure	67,563,294	63,442,910
2. Material Current Expenditure	7,510,085	6,925,553
3. Repair & Maintenance Current Expenditure	1,246,162	1,507,757
4. Official Travel Expenditure	284,968	241,213
5. Other Current Expenditure	2,506,153	2,234,045
6. Debt and Interest Repayment	630,655	1,139,842
7. Fund/Subsidy	1,173,347	1,149,845
8. Other Current Expenditure	778,920	425,331
9. Unpredicted Current Expenditure	134,865	366,769
C. DEVELOPMENT EXPENDITURES	**31,282,170**	**42,768,440**
1. Industry	700,255	325,816
2. Agriculture and Forestry	1,525,249	1,383,525
3. Natural Water Resources and Irrigations	167,209	608,873
4. Manpower	204,450	20,000
5. Trade, Unfolding Regional Initiative, Regional Financial and Cooperatives	1,957,828	1,409,858
6. Transportation	5,316,191	5,759,853
7. Mining and Energy	190,000	422,780
8. Tourism and Regional Communications	580,512	856,283
9. Regional Development and Resettlement	2,548,529	11,669,865
10. Environment and Lay Out	1,596,087	1,372,469
11. Education, National Culture, Credentials, Youth and Sport	6,820,775	5,898,866
12. Demography and Family Welfare	29,100	34,959
13. Health, Social Welfare, Women Participation, Child and Adolescent	5,354,907	6,530,873
14. Dwelling and Residence	168,812	1,335,069
15. Religion	366,925	379,300
16. Science and Technology	214,693	171,299
17. Law	122,704	105,806
18. Civil Servants and Control	2,659,819	4,317,930
19. Politics, Information, Communication and Mass Communication	485,125	75,016
20. Security and Public Order	273,000	90,000
21. Development Subsidies to Lower Level Gov.	0	0
D. TOTAL EXPENDITURES (B+C)	**113,110,619**	**120,201,705**

Table B-1.5.2 Actual Receipts and Expenditures of Tegal Municipal Government

Receipt/Expenditure	1999/00	2000
A. RECEIPTS	**46,429,117**	**40,506,064**
1. Previous Year Surplus	2,439,320	1,754,061
2. Local Gov. Original Receipt	8,042,959	6,765,212
2.1 Local Taxes Receipt	2,003,497	1,653,996
2.2 Retributions Receipt	5,779,224	4,863,508
2.2.1 Retributions of public service	5,248,361	4,280,195
2.2.2 Retributions of commercial service	412,835	454,488
2.2.3 Retributions of special permits	118,028	128,825
2.3 Local Gov. Corporate Profit	95,363	80,529
2.4 Other Receipt	164,875	167,179
3. Income from Higher Level Gov. and/or Authority	35,946,838	31,986,791
3.1 Tax Share	4,126,201	4,617,929
3.2 Non Tax Share	75,853	56,328
3.3 Subsidies to Local Government	20,202,983	17,961,882
3.4 Development Contribution	11,023,566	8,580,653
3.5 Other Receipt	518,235	769,999
4. Local Government Loan	0	0
B. CURRENT EXPENDITURES	**32,649,359**	**28,498,409**
1. Personnel Current Expenditure	19,936,333	19,055,574
2. Material Current Expenditure	5,763,243	4,752,788
3. Repair & Maintenance Current Expenditure	1,186,861	985,235
4. Official Travel Expenditure	273,742	128,973
5. Other Current Expenditure	3,005,752	2,389,114
6. Debt and Interest Repayment	1,086,530	738,788
7. Fund/Subsidy	74,128	86,975
8. Other Current Expenditure	584,288	349,962
9. Unpredicted Current Expenditure	738,482	11,000
C. DEVELOPMENT EXPENDITURES	**12,025,700**	**9,933,951**
1. Industry	396,430	8,075
2. Agriculture and Forestry	160,406	102,045
3. Natural Water Resources and Irrigations	0	0
4. Manpower	15,000	0
5. Trade, Unfolding Regional Initiative, Regional Financial and Cooperatives	339,309	516,585
6. Transportation	1,757,848	3,209,050
7. Mining and Energy	113,740	419,215
8. Tourism and Regional Communications	90,106	47,650
9. Regional Development and Resettlement	156,406	83,274
10. Environment and Lay Out	336,365	211,686
11. Education, National Culture, Credentials, Youth and Sport	2,103,608	1,320,697
12. Demography and Family Welfare	37,000	5,000
13. Health, Social Welfare, Women Participation, Child and Adolescent	186,727	483,924
14. Dwelling and Residence	4,061,118	1,070,594
15. Religion	64,216	79,125
16. Science and Technology	69,209	75,552
17. Law	59,835	49,788
18. Civil Servants and Control	1,501,752	2,117,751
19. Politics, Information, Communication and Mass Communication	183,413	63,872
20. Security and Public Order	93,829	44,835
21. Development Subsidies to Lower Level Gov.	299,383	25,233
D. TOTAL EXPENDITURES (B+C)	**44,675,059**	**38,432,360**

Table B-1.5.3 List of WUA in Gung Irrigation Scheme (1/4)

No.	Main & Secondary Canal	Tertiary Block	Service Area (ha)	Name of WUA	WUA Working Area (ha)	No. of WUA Member (person)	Name of Village	Name of Sub-District	Branch of Sub Water Resources	Approval by Bupati	
										Date	No.
1	*Induk Gung*	B.Gu.1.Ka	85.00					Balapulang	Balapulang		
2		B.Gu.2.Ki	35.00					Balapulang	Balapulang		
3		B.Gu.3.Ki.1	80.00	Dewi Sri	80.00	135	Timbangreja	Lebaksiu	Slawi	25/08/94	411.6/2846
4		B.Gu.3.Ki.2	84.00	Suka Makmur	84.00	142	Labaksiu Kidul	Lebaksiu	Slawi	27/10/97	411.6/3241
5		B.Gu.4.Ka	152.00	Sebaya	167.00	240	Labaksiu Lor	Lebaksiu	Slawi		
6		B.Gu.6.Ki.1	33.00	Harapan Jaya (1/2)	25.00	42	Kajen	Lebaksiu	Slawi		
7		B.Gu.6.Ki.2	3.00	Harapan Jaya (2/2)							
8		B.Gu.7.Ki	79.00	Fakim			Pener				
9		B.Gu.7.Ka	93.00	Rutin Lohjinawi			Kajen				
10		B.Gu.8.Ka.1	109.00	Sido Mulya			Pener				
11		B.Gu.8.Ka.2	51.00	Santosa			Karanganyar				
12		B.Gu.9.Ka.1	66.00	Sido Dadi							
13		B.Gu.9.Ka.2	56.00	Sido Makmur							
14	Djimat	B.Jm.1.Ka	69.00					Balapulang	Balapulang		
15		B.Jm.2.Ki	79.00					Balapulang	Balapulang		
16		B.Jm.3.Ka.1	122.00					Balapulang	Balapulang		
17		B.Jm.3.Ka.2	101.00								
18		B.Jm.4.Ki	41.00					Balapulang	Balapulang		
19		B.Jm.4.Ka	158.00					Balapulang	Balapulang		
20	Danawarih	B.Da.1.Ka.1	58.00	Sidareja	58.00	90	Timbangreja	Lebaksiu	Slawi	25/08/94	411.6/2845
21		B.Da.1.Ka.2	79.00	Marga Mulyo	77.00	130	Yamansari	Lebaksiu	Slawi	21/10/97	411.6/3238
22	Bulu	B.Bu.1.Ka	98.00	Sido Mukti	90.00	70	Yamansari	Lebaksiu	Slawi	17/02/98	411.6/0368
23		B.Bu.2.Ki	93.00	Subak Sari	94.00	72	Kesuben	Lebaksiu	Slawi		
24		B.Bu.3.Ka.1	92.00	Sumber Rejeki	76.00	216	Labakgowah	Lebaksiu	Slawi	17/02/98	411.6/0371
25		B.Bu.3.Ka.2	71.00	Sido Mulya	77.00	177	Labakgowah	Lebaksiu	Slawi		
26		B.Bu.4	88.00	Rejeki	89.00	230	Labakgowah	Lebaksiu	Slawi		
27		B.Bu.5.Ka.1	78.00	Sido Makmur	78.00	86	Kambangan	Lebaksiu	Slawi	25/08/94	411.6/2844
28		B.Bu.5.Ka.2	144.00	Sida Maju	148.00	178	Tegalandong	Lebaksiu	Slawi	30/08/99	411.6/0809
29		B.Bu.6.Ki.1	99.00	Jaya Dikara	93.00	200	Slarang Kidul	Lebaksiu	Slawi	17/02/98	411.6/0369

Table B-1.5.3 List of WUA in Gung Irrigation Scheme (2/4)

No.	Main & Secondary Canal	Tertiary Block	Service Area (ha)	Name of WUA	WUA Working Area (ha)	No. of WUA Member (person)	Name of Village	Name of Sub-District	Branch of Sub Water Resources	Approval by Bupati	
										Date	No.
30	Bulu	B.Bu.6.Ki.2	172.00	Suwuk	172.00	250	Slarang Kidul	Lebaksiu	Slawi	17/02/98	411.6/0370
31		B.Bu.7.Ki	175.00	Swanda Jaya	175.00	525	Dukuhwaru	Dukuhwaru	Slawi		
32		B.Bu.7.Ka	139.00	Rukun Tani	146.00	500	Dukuhdum	Dukuhwaru	Slawi	17/02/98	411.6/0372
33		B.Bu.8.Ka	121.00	Rukun Karya	113.00	560	Gumayun	Dukuhwaru	Slawi	17/11/97	411.6/1129
34		B.Bu.9.Ki.1	189.00	Sri Mulya	195.00	585	Bulakpancing	Dukuhwaru	Slawi	08/04/98	411.6/0918
35		B.Bu.9.Ki.2	203.00	Swanda Karya	194.00	582	Dukuhwaru	Dukuhwaru	Slawi	07/08/95	411.6/0397
36		B.Bu.10.Ki	100.00					Dukuhwaru	Slawi		
37		B.Bu.10.Ka	70.00	Lestari	66.00	265	Sindang	Dukuhwaru	Slawi	08/04/98	411.6/0916
38	Pendilwesi	B.Pw.1.Ki	124.00	Mulia	124.00	80	Balaradin	Lebaksiu	Slawi		
39		B.Pw.1.Ka	147.00	Tani Mulya	152.00	69	Balaradin	Lebaksiu	Slawi		
40		B.Pw.2.Ki	107.00	Makmur	107.00	75	Balaradin	Lebaksiu	Slawi		
41		B.Pw.2.Ka	133.00	Slatri	133.00	75	Kambangan	Lebaksiu	Slawi	25/08/94	411.6/2847
42		B.Pw.3.Ki	138.00	Ngudi Redjo	170.00		Slarang Lor	Dukuhwaru	Slawi	08/04/98	411.6/0922
43		B.Pw.3.Ka	119.00	Sandang Pangan	119.00	360	Slarang Lor	Dukuhwaru	Slawi	08/04/98	411.6/0923
44		B.Pw.4.Ki	194.00	Sumber Pangan	180.00	625	Slopura	Dukuhwaru	Slawi	08/04/98	411.6/0915
45		B.Pw.4.Ka	136.00	Lestari Mulya	134.00	310	Blubuk	Dukuhwaru	Slawi	08/04/98	411.6/0921
46	Begal	B.Be.1.Ki	163.00	Kedadi	163.00	272	Kambangan	Lebaksiu	Slawi	16/09/97	411.6/2746
47		B.Be.1.Ka.1	121.00	Sumber Hasir	120.00	221	Tegalandong	Lebaksiu	Slawi	26/05/99	411.6/0305
48		B.Be.1.Ka.2	110.00	Sido Makmur	110.00	99	Jatimulya	Lebaksiu	Slawi	29/08/96	411.6/2364
49		B.Be.2.Ka	167.00	Sugih Pari	169.00	151	Kalisapu	Slawi	Slawi	08/04/98	411.6/0925
50		B.Be.3	175.00	Harapan Makmur	175.00	121	Kabunan	Dukuhwaru	Slawi	08/04/98	411.6/0926
51		B.Be.4.Ki	145.00	Kali Pinang	145.00	120	Gumayun	Dukuhwaru	Slawi	08/04/98	411.6/0924
52		B.Be.4.Ka	114.00	Sugih Pari	114.00	92	Pedagangan	Dukuhwaru	Slawi	08/04/98	411.6/0927
53	Dukuh Waru	B.Dw.1.Ki.1	121.00		121.00				Adiwerna		
54		B.Dw.1.Ki.2	60.00	Bumi Mulya	61.00	245	Bulakpancing	Dukuhwaru	Adiwerna	08/04/98	411.6/0914
55		B.Dw.2.Ki	71.00		82.00				Adiwerna		
56		B.Dw.2.Ka	48.00		48.00				Adiwerna		
57	Wadas	B.Wa.1	19.00						Slawi		
58		B.Wa.2	72.00	Tani Maju	73.00	122	Dukuhlo	Lebaksiu	Slawi		

Table B-1.5.3 List of WUA in Gung Irrigation Scheme (3/4)

No.	Main & Secondary Canal	Tertiary Block	Service Area (ha)	Name of WUA	WUA Working Area (ha)	No. of WUA Member (person)	Name of Village	Name of Sub-District	Branch of Sub Water Resources	Approval by Bupati	
										Date	No.
59	Wadas	B.Wa.3.Ki	46.00	Pari Kesit	44.00	97	Pendawa	Lebaksiu	Slawi	29/08/96	411.6/2313
60		B.Wa.3.Ka	65.00	Setia Mulya	68.00	105	Pendawa	Lebaksiu	Slawi		
61		B.Wa.4	89.00	Suka Maju	94.00	160	Dukuhringin	Slawi Kulor	Slawi	29/08/96	411.6/2315
62		B.Wa.5	48.00	Lestari	49.00	71	Slawi Kulon	Slawi	Slawi	16/09/97	411.6/2797
63		B.Wa.7.Ki	126.00	Makmur	147.00				Adiwerna		
64		B.Wa.9.Ki	155.00	Gelombang	108.00				Adiwerna		
65		B.Wa.10.Ki	73.00	Makmur	55.00				Adiwerna		
66		B.Wa.11.Ki	26.00		52.00				Adiwerna		
67		B.Wa.12.Ki	58.00	Tani Maju	56.00				Adiwerna		
68		B.Wa.12.Ka	74.00	Karya Tani	105.00				Adiwerna		
69	Susukan	B.Su.1.Ki	59.00	Karya Harapan Maju	58.00	150	Dukuhringin	Slawi	Slawi	29/08/96	411.6/2312
70		B.Su.2.Ka	11.00	Karya Harapan Maju				Slawi	Slawi		
71		B.Su.3.Ki	40.00	Karya Harapan Maju				Slawi	Slawi		
72		B.Su.4.Ki	24.00	Karya Harapan Maju				Slawi	Slawi		
73	Jembangan	B.Jb.2.Ki	41.00		30.00				Slawi		
74		B.Jb.3.Ki	35.00		50.00				Slawi		
75		B.Jb.3.Ka	39.00		54.00				Slawi		
76		B.Jb.4.Ki	48.00								
77	Slawi	B.Sl.1.Ki	2.00						Slawi		
78		B.Sl.1.Ka	44.00						Slawi		
79	Adiwerna	B.Ad.1.Ki	43.00	Subur Makmur	39.00				Adiwerna		
80		B.Ad.1.Ka	62.00	Subur Makmur	77.00				Adiwerna		
81	Jarot	B.Jt.1.Ka	70.00	Sido Makmur	68.00				Bumijaya Pangkah		
82		B.Jt.2.Ki	108.00	Tani makmur	99.00				Bumijaya Pangkah		
83		B.Jt.4.Ki	59.00	Tani Jaya	59.00				Bumijaya Pangkah		
84		B.Jt.4.Ka	100.00	Barokah	100.00				Bumijaya Pangkah		
85		B.Jt.5.Ki	113.00	Mulyo Rejo	131.00				Bumijaya Pangkah		
86		B.Jt.5.Ka	72.00	Subur Makmar	69.00				Bumijaya Pangkah		
87		B.Jt.6.Ka	57.00	Sido Mulya	94.00				Adiwerna		

Table B-1.5.3 List of WUA in Gung Irrigation Scheme (4/4)

No.	Main & Secondary Canal	Tertiary Block	Service Area (ha)	Name of WUA	WUA Working Area (ha)	No. of WUA Member (person)	Name of Village	Name of Sub-District	Branch of Sub Water Resources	Approval by Bupati	
										Date	No.
88	Kabukan	B.Ka.1.Ki	55.00	Tani Maju	52.00				Adiwerna		
89		B.Ka.1.Ka	67.00	Tani Maju	68.00				Adiwerna		
90	Curung	B.Cu.1.Ki	125.00	Sida Mukmur	129.00				Bumijaya Pangkah		
91		B.Cu.1.Ka	82.00	Tani Maju	97.00				Bumijaya Pangkah		
92	Bawang	B.Bw.1.Ki	58.00	Tani Tauladan	86.00				Adiwerna		
93		B.Bw.1.Ka	70.00	Subur Makmur	69.00				Adiwerna		
94		B.Bw.2.Ki	58.00	Subur Makmur (1/2)	65.00				Adiwerna		
95		B.Bw.2.Ka	61.00	Subur Makmur					Adiwerna		
96		B.Bw.3.Ki	86.00	Subur Makmur (2/2)	86.00				Adiwerna		
97		B.Bw.3.Ka	115.00	Tani Jaya	115.00				Adiwerna		

Table B-2.3.1 Water Requirement for Gung Irrigation Scheme

Item			Jan			Feb			Mar			Apr			May			Jun			Jul			Aug			Sep			Oct			Nov			Dec		
			1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Basic Data	ETo	(mm/day)	4.03	4.03	4.03	3.89	3.89	3.89	4.34	4.34	4.34	4.16	4.16	4.16	4.29	4.29	4.29	3.94	3.94	3.94	4.20	4.20	4.20	4.90	4.90	4.90	5.29	5.29	5.29	4.96	4.96	4.96	4.21	4.21	4.21	4.40	4.40	4.40
	Percolation (P)	(mm/day)	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Reff Paddy	(mm/day)	41.30	21.00	20.09	38.15	25.20	0.35	33.88	31.57	10.50	10.50	4.97	5.60	0.35	2.10	-	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21	0.07	3.50	3.22	3.64	12.60	9.17
	Reff Palawija	(mm/day)	29.50	15.00	14.35	27.25	18.00	0.25	24.20	22.55	7.50	7.50	3.55	4.00	0.25	1.50	-	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-	0.15	0.05	2.50	2.30	2.60	9.00	6.55
	Eo = ETo * 1.1	(mm/day)	4.44	4.44	4.44	4.28	4.28	4.28	4.77	4.77	4.77	4.58	4.58	4.58	4.72	4.72	4.72	4.34	4.34	4.34	4.62	4.62	4.62	5.39	5.39	5.39	5.82	5.82	5.82	5.45	5.45	5.45	4.63	4.63	4.63	4.84	4.84	4.84
	M = Eo + P	(mm/day)	7.44	7.44	7.44	7.28	7.28	7.28	7.77	7.77	7.77	7.58	7.58	7.58	7.72	7.72	7.72	7.34	7.34	7.34	7.62	7.62	7.62	8.39	8.39	8.39	8.82	8.82	8.82	8.45	8.45	8.45	7.63	7.63	7.63	7.84	7.84	7.84
	T	(days)	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
	S	(mm)	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00
	K = M * T / S		0.59	0.59	0.59	0.58	0.58	0.58	0.62	0.62	0.62	0.61	0.61	0.61	0.62	0.62	0.62	0.59	0.59	0.59	0.61	0.61	0.61	0.67	0.67	0.67	0.71	0.71	0.71	0.68	0.68	0.68	0.61	0.61	0.61	0.63	0.63	0.63
	LP = M * e^k / (e^k -1)	(mm/day)	16.59	16.59	16.59	16.49	16.49	16.49	16.79	16.79	16.79	16.67	16.67	16.67	16.75	16.75	16.75	16.53	16.53	16.53	16.69	16.69	16.69	17.16	17.16	17.16	17.42	17.42	17.42	17.20	17.20	17.20	16.70	16.70	16.70	16.83	16.83	16.83
Cropping Pattern			Dry Season Paddy (50%)																																	Wet Season Paddy (85%)		
												Maize (35%)												No irrigation											Land Preparation		
																								Consumptive Use													
Land Preparation (LP) with Area Factor																																						
- Wet season paddy	schedule-1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.35	16.70	8.35	-	-	-
	schedule-2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.35	16.70	8.41	-	-
	schedule-3		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.35	16.83	8.41	-
	schedule-4		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8.41	16.83	8.41
	LP for the crop	(mm/day)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.09	6.26	8.35	8.41	6.31	2.10
- Dry season paddy	schedule-1		-	-	-	-	-	-	8.39	16.79	8.39	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-2		-	-	-	-	-	-	-	8.39	16.79	8.33	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	LP for the crop	(mm/day)	-	-	-	-	-	-	4.20	12.59	12.59	4.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crop Coefficient (Kc) with Area Factor																																						
- Wet season paddy	schedule-1		1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55	1.10	1.10	1.08
	schedule-2		1.08	1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55	1.10	1.10
	schedule-3		1.10	1.08	1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55	1.10
	schedule-4		1.10	1.10	1.08	1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.55
	Kc for the crop	(mm/day)	1.08	1.07	1.04	0.96	0.82	0.62	0.37	0.19	0.06	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14	0.41	0.69	0.96
- Dry season paddy	schedule-1		-	-	-	-	-	-	-	-	0.55	1.10	1.10	1.08	1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-2		-	-	-	-	-	-	-	-	-	0.55	1.10	1.10	1.08	1.05	1.05	1.00	0.73	0.50	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kc for the crop	(mm/day)	-	-	-	-	-	-	-	-	0.28	0.83	1.10	1.09	1.06	1.05	1.03	0.86	0.61	0.38	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize	schedule-1		-	-	-	-	-	-	-	-	0.38	0.53	0.58	0.87	0.99	1.04	1.03	0.99	0.96	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-2		-	-	-	-	-	-	-	-	-	0.38	0.53	0.58	0.87	0.99	1.04	1.03	0.99	0.96	0.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Kc for the crop	(mm/day)	-	-	-	-	-	-	-	-	0.19	0.45	0.56	0.72	0.93	1.02	1.03	1.01	0.98	0.60	0.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Consumtive Use (ETc)																																						
- Wet season paddy		(mm/day)	4.36	4.31	4.21	3.72	3.19	2.41	1.60	0.81	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.58	1.81	3.02	4.21
- Dry season paddy		(mm/day)	-	-	-	-	-	-	-	-	1.19	3.43	4.58	4.52	4.56	4.50	4.39	3.40	2.41	1.48	0.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize		(mm/day)	-	-	-	-	-	-	-	-	0.81	1.89	2.31	3.01	3.99	4.36	4.43	3.98	3.85	2.36	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Percolation (P) with Area Factor																																						
- Wet season paddy	schedule-1		3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	3.00	3.00	3.00
	schedule-2		3.00	3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	3.00	3.00
	schedule-3		3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50	3.00
	schedule-4		3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.50
	P for the crop	(mm/day)	3.00	3.00	3.00	3.00	3.00	2.50	1.50	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.50	1.50	2.50	3.00
- Dry season paddy	schedule-1		-	-	-	-	-	-	-	-	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-2		-	-	-	-	-	-	-	-	-	1.50	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	1.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	P for the crop	(mm/day)	-	-	-	-	-	-	-	-	0.75	2.25	3.00	3.00	3.00	3.00	3.00	3.00	3.00	2.25	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Water Layer Replacement (WLR) with Area Factor																																						
- Wet season paddy	schedule-1		2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.50
	schedule-2		2.50	2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-3		-	2.50	2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-4		-	-	2.50	2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WLR for the crop	(mm/day)	1.67	1.67	0.83	1.67	1.67	0.83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.83
- Dry season paddy	schedule-1		-	-	-	-	-	-	-	-	-	-	-	2.50	2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	schedule-2		-	-	-	-	-	-	-	-	-	-	-	-	2.50	2.50	-	-	2.50	2.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	WLR for the crop	(mm/day)	-	-	-	-	-	-	-	-	-	-	-	1.25	2.50	1.25	-	1.25	2.50	1.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Field Requirement																																						
- Wet season paddy		(mm/day)	-	-	-	-	-	6.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.02	2.76	6.21	8.09	-	0.97
- Dry season paddy		(mm/day)	-	-	-	-	-	-	-	-	4.31	0.17	3.71	3.01	8.27	6.45	8.42	7.19	6.03	4.10	1.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize		(mm/day)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Wet season paddy		(l/s/ha)	-	-	-	-	-	0.72	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.32	0.72	0.94	-	0.11
- Dry season paddy		(l/s/ha)	-	-	-	-	-	-	-	-	0.50	0.02	0.43	0.35	0.96	0.75	0.97	0.83	0.70	0.47	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize		(l/s/ha)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		(l/s/ha)	-	-	-	-	-	0.72	-	-	0.50	0.02	0.43	0.35	0.96	0.75	0.97	0.83	0.70	0.47	0.16	-	-	-	-	-	-	-	-	-	-	-	-	0.23	0.32	0.72	0.94	-	0.11
Diversion Water Requirement																																						
- Wet season paddy		(l/s/ha)	-	-	-	-	-	1.20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.39	0.53	1.20	1.56	-	0.19
- Dry season paddy		(l/s/ha)	-	-	-	-	-	-	-	-	0.83	0.03	0.71	0.58	1.59	1.24	1.62	1.39	1.16	0.79	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize		(l/s/ha)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		(l/s/ha)	-	-	-	-	-	1.20	-	-	0.83	0.03	0.71	0.58	1.59	1.24	1.62	1.39	1.16	0.79	0.27	-	-	-	-	-	-	-	-	-	-	-	-	0.39	0.53	1.20	1.56	-	0.19
Diversion Water Requirement with Cropping Intensity (CI																																						
- Wet season paddy	CI 78%	(l/s/ha)	-	-	-	-	-	0.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.30	0.42	0.93	1.22	-	0.15
- Dry season paddy	CI 37%	(l/s/ha)	-	-	-	-	-	-	-	-	0.31	0.01	0.26	0.21	0.59	0.46	0.60	0.51	0.43	0.29	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- Maize	CI 40%	(l/s/ha)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total		(l/s/ha)	-	-	-	-	-	0.94	-	-	0.31	0.01	0.26	0.21	0.59	0.46	0.60	0.51	0.43	0.29	0.10	-	-	-	-	-	-	-	-	-	-	-	-	0.30	0.42	0.93	1.22	-	0.15

Max. Diversion Requirement = 1.22 lit/sec/ha (Irrigation efficiency was estimated at 60%)

Table B-2.3.2 Hydrological Condition and Water Balance of Gung Scheme (Danawarih system)

1. Estimated available river flow at Danawarih weir (m^3/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
12.7	13.1	10.4	9.1	7.4	6.0	4.8	3.8	3.3	6.5	8.5	11.2	4.1

Note: Estimated based on the hydrological model prepared by the JICA Study Team

2. Monthly rainfall at Tegal (mm)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
284	263	177	138	93	35	33	14	12	68	178	142	1,436

Source: Monthly data supplied by Meteorological and Geophysical Agency Jakarta, Department of Communication.

3. Catchment area at weir site

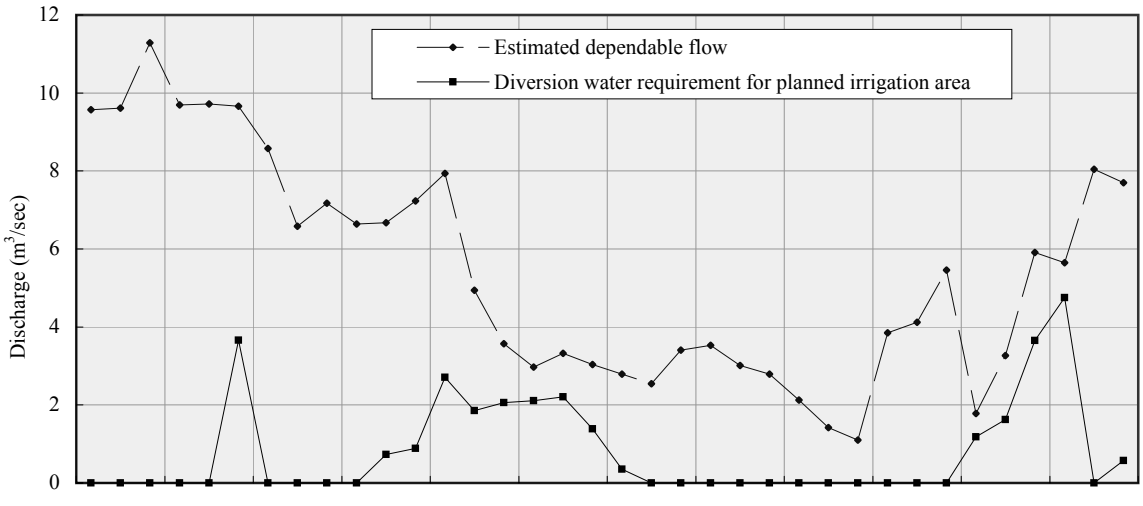
110 km^2

4. Estimated monthly dependable flow (m^3/s)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
10.2	9.7	7.4	6.8	5.5	3.1	2.9	3.1	1.5	4.5	3.7	7.1	5.5

5. 10-days basis water balance

Planned irrigation area (ha) 3,906 ha



Water Balance of Gung Scheme (Danawarih system)
(Difference between dependable flow and water requirement for Danawarih system shall be supplied to Pasayangan system)

Table B-3.1.1 Rehabilitation Plan of Headworks

	Structure	Condition	Problems
1.	Weir, overflow crest	RG2	Removal of large size of stones from upstream
2.	Retaining wall, left bank site	RG2	Repair by concrete
3.	Retaining wall, right bank site	RG2	Repair by concrete
4.	Water cushion at downstream of bar screen	RG3	Protected by steel plates (t = 12 mm)
5.	Downstream apron	RG4	Provided apron with 10 m x 70 m wide
6.	Settling basin	RG2	Consider re-design and to design the velocity less than 0.30 m in the basin
7.	Settling basin	RG2	Provision of road along basin with 6 m wide
8.	Settling basin	RG3	Repair of civil and gate works

Rehabilitation grade: RG 1: No rehabilitation
RG 2: Minor rehabilitation
RG 3: Large scale rehabilitation
RG 4: Replacement or new construction

Table B-3.1.2 Rehabilitation Plan of Main Canal and Inspection Road

HM		Distance (m)	Rehabilitation Grade of Canal (m)				Rehabilitation Grade of Insp. Road (m)	
			RG1	RG2	RG3	RG4	RG2	RG3
0	5	500		500			500	
5	10	500		500			500	
10	15	500		500			500	
15	20	500			500		500	
								500
20	25	500		500			500	
25	30	500		500				500
30	35	500			500		500	
	After HM 35: Out of area for F/S							
35	40	500			500			500
40	45	500			500		500	
45	50	500		500				500
50	55	500		500				500
55	60	500		500				500
60	65	500			500			500
65	70	500		500				500
70	75	500		500				500
75	80	500			500		500	
80	85	500			500		500	
85	88.63	363		363			363	
Total		8,863	0	5,363	3,500	0		

Rehabilitation grade: RG 1: No rehabilitation
RG 2: Minor rehabilitation
RG 3: Large scale rehabilitation
RG 4: Replacement or new construction

Table B-3.1.3 Rehabilitation Plan of Main Canal Related Structures

HM	Distance (m)	Mark	Structure	Grade of Rehabilitation	
				Civil	Metal
2.22	222	B. GU1a	Measuring Device	RG2	RG2
7.68	546	B. GU1	Division Structure	RG2	RG2
13.87	619	B. GU2	Division structure & Chute	RG2	RG2
17.57	370	B.GU3a	Bridge	RG1	RG1
21.23	366	B.GU3	Division structure/bridge	RG2	RG2
21.83	60	B.GU4a	Chute	RG2	RG2
28.10	627	B.GU4b	Drop	RG2	-
35.00	690	B.GU4	Division structure	RG2	RG2
		AFTER HM 35: Out of F/S Area			
41.30	630	B.GU5	Division structure	RG3	RG2
43.30	200		Drain inlet	RG3	-
44.60	130	B.GU6a	Drop	RG2	-
44.90	30	B.GU6b	Drop	RG2	-
45.23	33	B.GU6	Diversion structure	RG3	RG2
47.83	260	B.GU7a	Aqueduct (l=192m)	RG3	RG3
50.11	228		Bridge	RG2	-
50.50	39	B.GU7b	Chute	RG1	-
52.70	220	B.GU7	Diversion structure	RG2	RG3
53.20	50		Drop	RG2	-
53.75	55		Drop	RG2	-
54.70	95		Drop	RG2	-
55.29	59		Drop	RG2	-
56.08	79		Drop	RG2	-
56.86	78		Drop	RG2	-
58.20	134		Drop	RG2	-
58.85	65		Drop	RG2	-
59.75	90		Drop	RG2	-
61.00	125		Drop	RG2	-
61.85	85		Drop	RG2	-
62.69	84		Drop	RG2	-
63.12	43	B.GU8a	Bridge	RG3	-
65.23	211		Drop	RG2	-
66.45	122		Drop	RG2	-
67.45	100		Drop	RG2	-
68.45	100		Drop	RG2	-
70.47	202		Drop	RG2	-
74.76	429		Drop	RG2	-
77.90	314	B.GU 8b	Bridge/Drop	RG3	-
78.50	60	B.GU8	Division structure	RG3	RG3
82.00	350		Drop	RG2	-
83.05	105		Drop	RG2	-
83.70	65		Village bridge	RG2	-
85.20	150		Drop	RG2	-
87.84	264	B.GU 9b	Measuring & drop	RG2	-
88.53	69	B.GU9	Division structure	RG2	RG2

Rehabilitation grade:

RG 1: No rehabilitation
RG 2: Minor rehabilitation
RG 3: Large scale rehabilitation
RG 4: Replacement or new construction
D: Seriously damaged, replacement or reconstruction is needed.

Table B-3.1.4 Summary of Work Quantity for Rehabilitation (A=3,906ha)

	Work Description	Unit	Quantity
I. Diversion Weir			
1.1	Rehabilitation of Weir		
1.1.1	Excavation, rock	m3	1,800
1.1.2	Concrete works , K-23N	m3	900
1.1.3	Concrete works , K-18N	m3	4,000
1.1.4	Form works	m3	15,000
1.1.5	Metal works	m3	35
1.1.6	Masonry works	m3	300
1.1.7	Access road to weir	m3	500
1.1.8	Concrete works for intake	m3	50
1.1.9	Dewatering works	day	60
II.	**Main Canal Works (l = 3.5 km)**		
2.1	Main Canal, Canal Works		
2.1.1	Excavation	m3	15,000
2.1.2	Excavation, existing canal	m3	0
2.1.3	Embankment, dike	m3	0
2.1.4	Embankment, inside	m3	0
2.1.5	Lining concrete	m3	250
2.1.6	Sod facing	m2	0
2.2	Main Canal, Structure Works		
2.2.1	Excavation	m3	500
2.2.2	Embankment/backfill	m3	500
2.2.3	Concrete	m3	160
2.2.4	Form	m2	500
2.2.5	Reinforcement bars	ton	25
2.2.6	Gate	ton	4
2.2.7	Metal works	ton	2
2.3	Main Canal, Inspection Road		
2.3.1	Preparatory works	m2	10,000
2.3.2	Gravel pavement	m3	1,050
2.3.3	Related facilities (10% of above)	lot	1

	Work Description	Unit	Quantity
III.	**Secondary Canal (2 nos. of SC)**		
3.1	Secondary Canal, Canal Works		
3.1.1	Excavation	m3	106,800
3.1.2	Excavation, existing canal	m3	0
3.1.3	Embankment, dike	m3	0
3.1.4	Embankment, inside	m3	0
3.1.5	Lining concrete	m3	6,400
3.1.6	Sod facing	m2	0
3.2	Secondary Canal, Structure Works		
3.2.1	Excavation	m3	900
3.2.2	Embankment/backfill	m3	600
3.2.3	Concrete	m3	300
3.2.4	Form	m2	1,500
3.2.5	Reinforcement bars	ton	22
3.2.6	Gate	ton	14
3.3	Secondary Canal, Inspection Road		
3.3.1	Preparatory works	m2	100,000
3.3.2	Gravel pavement	m3	15,600
3.3.3	Related facilities (10 % of above)	lot	1
IV.	**Drainage Works** 10 % of (II+III)	L.S	1
V.	**On-Farm Development**		
5.1	Irrigated Paddy Field	ha	3,906
VI.	**Project Facility**		
6.1	Gate keepers house	house	4
6.2	Field cars	nos.	3
6.3	Motor cycle	nos.	20
6.4	Office equipment	L.S	1

Table B-3.1.5 Direct Construction Cost for Canal and Related Structures (Rehabilitation A=9,871ha)

	Work Description	Unit	Quantity	Unit Price (Rp.)	Amount (Rp.)
I. Diversion Weir					
1.1	Rehabilitation of Weir				
1.1.1	Excavation, rock	m3	1,800	60,000	108,000,000
1.1.2	Concrete works, K-23N	m3	900	400,000	360,000,000
1.1.3	Concrete works, K-18N	m3	4,000	350,000	1,400,000,000
1.1.4	Form works	m2	15,000	100,000	1,500,000,000
1.1.5	Metal works	ton	35	25,000,000	875,000,000
1.1.6	Masonry works	m3	300	200,000	60,000,000
1.1.7	Access road of weir	m3	500	150,000	75,000,000
1.1.8	Concrete works for intake	m3	50	500,000	25,000,000
1.1.9	Dewatering works	day	60	7,500,000	450,000,000
1.1.10	Physical contingency (15% of above)	L.S			727,950,000
	Total I				5,580,950,000
II.	**Main Canal Works (For l = 8.53 km)**				
2.1	Main Canal, Canal Works				
2.1.1	Excavation	m3	44,500	13,000	578,500,000
2.1.2	Lining concrete	m3	2,000	400,000	800,000,000
2.1.3	Physical contingency	L.S			206,775,000
	Sub-total				1,585,275,000
2.2	Main Canal, Structure Works				
2.2.1	Excavation	m3	1,000	13,000	13,000,000
2.2.2	Embankment/backfill	m3	1,000	30,000	30,000,000
2.2.3	Concrete	m3	1,000	400,000	400,000,000
2.2.4	Form	m2	3,000	100,000	300,000,000
2.2.5	Reinforcement bars	ton	50	6,000,000	300,000,000
2.2.6	Gate	ton	11	30,000,000	330,000,000
2.2.7	Metal works	ton	2	20,000,000	40,000,000
2.2.8	Physical contingency (15% of above)	L.S			211,950,000
	Sub-total				1,624,950,000
2.3	Main Canal, Inspection Road				
2.3.1	Preparatory works	m2	100,000	6,000	600,000,000
2.3.2	Gravel pavement	m3	3,800	500,000	1,900,000,000
2.3.3	Related facilities (10% of above)	lot	1		250,000,000
2.3.4	Physical contingency (15% of above)	L.S			412,500,000
	Sub-total				474,375,000
	Total II				3,684,600,000
III.	**Secondary Canal (2 nos. of SC for FS x 4 times)**				
3.1	Secondary Canal, Canal Works				
3.1.1	Excavation	m3	427,200	13,000	5,553,600,000
3.1.5	Lining concrete	m3	25,600	400,000	10,240,000,000
3.1.6	Physical contingency (15% of above)	L.S			2,369,040,000
	Sub-total				18,162,640,000
3.2	Secondary Canal, Structure Works				
3.2.1	Excavation	m3	3,600	13,000	46,800,000
3.2.2	Embankment/backfill	m3	2,400	30,000	72,000,000
3.2.3	Concrete	m3	1,200	400,000	480,000,000
3.2.4	Form	m2	6,000	100,000	600,000,000
3.2.5	Reinforcement bars	ton	88	6,000,000	528,000,000
3.2.6	Gate	ton	56	30,000,000	1,680,000,000
3.2.7	Physical contingency (15% of above)	L.S			511,020,000
	Sub-total				3,917,820,000
3.3	Secondary Canal, Inspection Road				
3.3.1	Preparatory works	m2	1,600,000	6,000	9,600,000,000
3.3.2	Gravel pavement	m3	62,400	500,000	31,200,000,000
3.3.3	Related facilities (10 % of above)	lot	4	672,000,000	4,080,000,000
3.3.4	Physical contingency (15% of above)	L.S			6,732,000,000
	Sub-total				51,612,000,000
	Total III				73,692,460,000
	Grand Total				82,958,010,000

Table B-3.2.1 Agriculture Plan

1. Land Use Plan

Land Use Category	Present/Without Project		With Project		Increment (With-Without)	
	Area (ha)	(%)	Area (ha)	(%)	Area (ha)	(%)
Project Area	3,906	100	3,906	100	0	-

2. Planned Cropped Area & Cropping Schedule 1/

Land Use Category/ Crops	Wet Season		Dry Season I		Dry Season II		Annual	
	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)	Area (ha)	Intensity (%)
Present/Without Project & With Project								
Irrigated Paddy Field (3,906 ha)								
- Irrigated Paddy	3,032	78	1,426	37	126	3	4,584	117
- Palawija (maize)	289	7	1,581	40		0	1,870	48
- Palawija (beans)					2,981	76	2,981	76
- Sugarcane	585	15	-	-	-	-	585	15
Total	3,906	100	3,007	77	3,107	80	10,020	257

1/: Assumed based on Table B-1.4.2

3. Planned Crop Yield

Unit: t/ha

Crop	Present/Without Project			With Project			Increment (t/ha)		
	Wet	Dry I	Dry II	Wet	Dry I	Dry II	Wet	Dry I	Dry II
Irrigated Paddy	5.0	5.0	4.5	5.5	5.5	4.5	0.5	0.5	-
Palawija (maize)	4.0	4.0		5.5	5.5		1.5	1.5	
Palawija (beans)			1.2			1.2			-
Sugarcane	60.0			60.0			-		

4. Planned Crop Production

Crop	Present/Without Project (t)			With Project (t)			Increment
	Wet Season	Dry Season	Annual	Wet Season	Dry Season	Annual	Annual (t)
Irrigated Paddy	15,160	7,697	22,857	16,676	8,410	25,086	2,229
Palawija (maize)	1,156	6,324	7,480	1,590	8,696	10,285	2,805
Palawija (beans)		3,577	3,577		3,577	3,577	0
Sugarcane	-	-	35,100	-	-	35,100	0

6. Extension Services Strengthening Plan

Major development constraints & extension services required for the earlier attainment of the project target.

Major Constraints for Agriculture Development:
- Farmers groups (KTs) yet to be empowered to a great extent,
- Insufficient extension services, especially in post-harvest & marketing aspects,
- Poor products quality,

Extension Services Required:
- Institutional Strengthening Package Program
- Farmer Organizations Empowerment Package Program

Implementation Plan of AESS (tentative)

Program	Implementation Schedule / Year				
	Construction Stage		Operation Stage		
	1st	2nd	3rd	4th	5th
Institutional Strengthening Package Program	.....	.....	.....	.....	.....
Farmer Organizations Empowerment P. Program		.....	.....	.....	.....

Table B-3.2.2 Financial Crop Budget per Ha under With Project

Items	Unit	Unit Price (Rp000)	Paddy				Maize (hybrid)		Soybeans		Mungbeans		Sugarcane			
			Wet/Dry Season I		Dry Season II		Dry Season I		Dry Season II		Dry Season II		1st Harvest		2nd Harvest	
			Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)
1. Gross Return							Minimum Tillage		Minimum Tillage		Minimum Tillage					
Unit Yield	(t/ha)		5.5		4.5		5.5		1.3		1.0		65		55	
Unit Price	(Rp.000/t)			1,200		1,200		1,000		2,500		3,100		200		200
Gross Return	(Rp.000)			**6,600**		**5,400**		**5,500**		**3,250**		**3,100**		**13,000**		**11,000**
2. Production cost				**2,822**		**2,474**		**2,769**		**1,557**		**1,346**		**10,703**		**8,008**
2-1. Farm Inputs				*876*		*644*		*1,038*		*537*		*360*		*2,680*		*1,180*
Seed 1/	(kg)		30	90	30	60	20	400	40	160	30	150	1 ha	1,500		
Fertilizers				693		491		485		302		210		1,180		1,180
- Urea	(kg)	1.2	230	276	180	216	175	210	50	60	50	60				
- SP36	(kg)	1.6	110	176	75	120	75	120	80	128	70	112	200	320	200	320
- KCl	(kg)	1.9	70	133	50	95	50	95	60	114	20	38	200	380	200	380
- ZA	(kg)	1.2	90	108	50	60	50	60					400	480	400	480
- PPC	(lit)	40														
Agro chemicals				93		93		153		75		0				
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.5	75	1.5	75		0				
- Insecticide (powder)	(kg)															
- Rodenticide	(kg)	35	0.5	18	0.5	18	0.5	18								
- Herbicide	(lit)	30					2.0	60								
2-2. Labor Costs				*1,380*		*1,305*		*1,105*		*790*		*790*		*3,750*		*3,300*
Contracted Works																
- Planting/Transplanting 2/	(unit)		1	300	1	300										
- Harvesting 3/	(unit)		10%	660	10%	540	10%	550	10%	325	10%	310				
Labor Requirements 4/																
- Hired Labor	(man-day)	15	28	420	31	465	37	555	31	465	32	480	250	3,750	220	3,300
- Family Labor	(man-day)		16		16		23		20		20		50		50	
Total	(man-day)		44		47		60		51		52		300		270	
2-3. Land Preparation				*300*		*300*		*0*		*0*		*0*		*300*		*0*
- Machinery	(unit)		1	300	1	300							1	300		
- Draft Animal	(unit)															
2-4. Field Transportation	(L.S.)		2 %	*132*	2 %	*108*	2 %	*110*	2 %	*65*	2 %	*62*		*3,000*		*2,800*
2-5. Shelling	(L.S.)	Rp.70/kg						*385*		*91*		*70*				
2-6. Miscellaneous Expenses	(L.S.)		5 %	*134*	5 %	*118*	5 %	*132*	5 %	*74*	5 %	*64*	10 %	*973*	10 %	*728*
3. Net Return	Rp. 000			**3,778**		**2,926**		**2,731**		**1,693**		**1,754**		**2,297**		**2,992**
	%			**57**		**54**		**50**		**52**		**57**		**18**		**27**
	Rounded	Rp.000		***3,780***		***2,930***		***2,730***		***1,690***		***1,750***		***2,300***		***2,990***
										Average	***1,720***				***Average***	***2,640***

1/: Seed price: p Maize --- composite Rp. 3,700/kg; hybrid Rp. 20,000/ka; soybeans --- RP. 4,000; mungbeans --- Rp. 5,000/kg

2/: Contract work for transplanting assumed --- Rp. 300,000/ha at financial price

3/: Share harvesting assumed --- 10% of products

4/: Hired Labor Requirements --- assumed to be 60~70% of total labor requirements except contracted works

Table B-3.2.3 (1/6): Program Description Sheet: Institutional Strengthening Package Program

1. Establishment of Task Force Team for Agriculture Extension Services Strengthening (AESS)

1-1. Regional (province or district) Task Force Team

1) Program Objectives and Description

The formation of "Task Force Team" at a regional level is proposed in order to ensure the establishment of a standing institution responsible for the planning, implementation and monitoring of AESS.

2) Task Force Team Members

Proposed members of Task Force Team are:

Chief:	Chief of Food Crops Agriculture Services Office
Secretary:	Food Crops Agriculture Services Office
Members:	Planning agencies (BAPPEDA etc.)
	Technical agencies (Food Crops, Irrigation etc.)
	Marketing agencies
	Adhoc members on need basis
	Technical guidance members (provincial technical agencies)

3) Job Description of Task Force Team

- Formulation of implementation program of AESS
- Preparation of annual work programs for AESS
- Preparation of budget proposal for the annual work program
- Monitoring & evaluation of AESS
- Guidance, support & supervision of Sub-regional Task Force Teams

4) Organizational Set-up and Authority

The Task Force Team should better be organized as a development institution directly responsible to regional governor. The Team should better be given the entire authority on AESS under the governor.

5) Estimated Program Cost

The costs for the program should better be accommodated in the regional administration budget.

1-2. Sub-regional (district or sub-district) Task Force Team

1) Program Objectives and Description

The formation of "Task Force Team" at a sub-regional level is planned in order to ensure the establishment of a standing institution responsible for the planning, implementation and monitoring of AESS.

2) Task Force Team Members

Proposed members of Task Force Team are:

Chief:	Chief of Food Crops Agriculture Services Sub-regional Office
Secretary:	Local government staff
Members:	Planning agencies
	Technical agencies (Food Crops, Irrigation etc.)
	Marketing agencies
	Adhoc members on need basis
	Technical guidance members (regional technical agencies)

3) Job Description of Task Force Team

- Preparation of proposal for an sub-regional annual work program for AESS through participatory approaches of beneficiaries.
- Monitoring & evaluation of AESS

4) Organizational Set-up and Authority

The Task Force Team should better be organized as an institution directly responsible to Regional Task Force Team . The Team should better be given the entire authority on AESS at sub-regional level.

5) Estimated Program Cost

The costs for the program should better be accommodated in the regional or sub-regional administration budget.

Table B-3.2.3 (2/6): Program Description Sheet: Institutional Strengthening Package Program

2. Staff Empowerment Program

2-1. Regional (province or district) Staff Empowerment Sub-program

1) Program Objectives

The program aims at empowerment of regional level staffs of agencies concerned with AESS through provision of periodical and specific staff empowerment programs.

2) Program Description and Subjects

The periodical empowerment program is for: 1) seasonal & annual planning and review of AESS at regional level participated by staffs concerned of province & district and representatives of sub-districts and 2) general empowerment program of district staffs concerned.

The special staff empowerment program is for: 1) empowerment of staffs on specific subjects such as marketing, partnership promotion, products processing, institutional strengthening etc. through training, workshop & seminar, 2) empowerment of Regional Task Force Teams members organized under AESS and 3) empowerment of staffs on specific subjects through field activities including OJT and study tour.

3) Target Groups

Periodical Empowerment Program:	- Province & district staffs concerned with AESS - Representatives of sub-districts
Special Empowerment Program:	- District staffs concerned with the selected subjects & Regional Task Force Teams members organized under AESS

4) Program Requirements and Timing

Periodical Empowerment Program:	2 programs per year (seasonal) in principle
Special Empowerment Program:	On need basis (intensive implementation required in the initial stage)

- Periodical program should be after the same in the sub-regional level

5) Estimated Program Cost

Periodical Empowerment Program:	Rp. 5,000,000/program
Special Empowerment Program:	Rp. 5,000,000/program & Rp. 10,000,000/program (field activities)

2-2. Agriculture & Extension Staff (Sub-regional Staff) Empowerment Sub-program

1) Program Objectives

The program aims at empowerment of sub-regional level staffs (district or sub-district) of agencies concerned with AESS through provision of periodical and specific staff empowerment programs.

2) Program Description and Subjects

The periodical empowerment program is for: 1) seasonal & annual planning and review of AESS at sub-regional level participated by staffs concerned of sub-regions and representatives of producers and 2) general empowerment program of sub-regional staffs concerned.

The special staff empowerment program is for: 1) empowerment of staffs on specific subjects through training, workshop & seminar, 2) empowerment of Sub-regional Task Force Teams members organized under AESS and 3) empowerment of staffs on specific subjects through field activities including OJT and study tour.

3) Target Groups

Periodical Empowerment Program:	- Sub-regional staffs concerned with AESS - Representatives of farmers/producers
Special Empowerment Program:	- Sub-regional staffs concerned with the selected subjects & Sub-regional Task Force Teams members organized under AESS.

4) Program Requirements and Timing

Periodical Empowerment Program:	2 programs per year (seasonal) in principle
Special Empowerment Program:	On need basis (intensive implementation required in the initial stage)

- Periodical program should be prior to the same in the regional level

5) Estimated Program Cost

Periodical Empowerment Program:	Rp. 5,000,000/program
Special Empowerment Program:	Rp. 5,000,000/program & Rp. 10,000,000/program (field activities)

Table B-3.2.3 (3/6): Program Description Sheet: Farmer Organization Empowerment Package Program

3. Agri-business Promotion Package Program

3-1. Program Background and Objectives

Agri-business development appears to be a key word selected as a direction or strategy for agriculture development in Indonesia. It should be area specific ones and promoted through a business minded manner based on cooperation and collaboration with private sectors. For the promotion of such a development strategy, collaborative studies of stakeholders on the subject will be essential.

The objective of the program is, therefore, to introduce the agri-business oriented agriculture development in the Area. Conceived activities required for the attainment of the objective are formulated as a package program.

3-2. Program Activities

The package programs will consist of: 1) the 1st phase program--- establishment of task force team, potential study, capacity building of staffs concerned and socialization programs for producers and interested groups (partner candidates) and 2) the 2nd phase program --- formation of agri-business groups, technical, managerial & institutional capacity building of producers groups, promotion of formation of partnership, pilot operation.

3-3. 1st Phase Program

3-3-1. Program Target

The 1st phase is the preparatory stage for the promotion of agri-business oriented agriculture.

3-3-2. Program descriptions

(1) Establishment of Task Force Team

Formation of Task Force Team

Task:	Responsible for agri-business promotion in a district
Chief:	Chief of Food Crops Agriculture Services Office
Member:	Food Crops Agriculture Services Office
	BAPPEDA
	Agricultural Information Center/Office (if any)
	Other agencies concerned (Cooperative Services Office etc.)
	Chief of sub-district agriculture services office
	Technical guidance members (provincial technical agencies)
Secretary:	Food Crops Agriculture Services Office

Empowerment of Task Force Team

- Induction training of members under Staff Empowerment Program
- Official establishment of Task Force Team by District Governor

1st Collaboration Workshop at District Level

- Workshop of stake holders chaired by Task Force Team
- Establishment of basic approaches for agri-business promotion by Task Force Team
  Establishing scope of the potential study
  Participants: Task force Team, sub-district agriculture services offices, farmer groups

(2) Potential Study

- Field survey & data collection
- Study tour
- Identification of constraints & potential
- 2nd Collaboration Workshop at district level
- Establishing approaches for partnership promotion (draft)

(3) District & Sub-district Staff Capacity Building

- Training program
- Study tour
- 3rd Collaboration Workshop at district level
- Establishing approaches for partnership promotion (final)

(4) Socialization Program

- 1st Workshop at Sub-district Level
- Continuous guidance by extension staffs & Task Force Team

(5) Performance Evaluation

Performance evaluation of 1st phase activities by Task Force Team and stakeholders.

Table B-3.3.3 (4/6): Program Description Sheet: Farmer Organization Empowerment Package Program

3-4. 2nd Phase Programs

3-4-1 Program Target

The 2nd phase is the pilot operation of the promotion of agri-business oriented agriculture.

3-4-2 Program descriptions

(1) Selection/Formation of Agri-business Farmers Groups

Selection or formation of farmer groups participating in the agri-business promotion program. Initially, advanced farmer groups in irrigated areas to be selected as target groups.

(2) Technical, Managerial & Institutional Capacity Building of Groups

- Training program
- Study tour/Field school
- Workshop on agri-business oriented foods crops production and determination on farming practices (from seed selection to post-harvest treatment) and marketing practices to be employed by the target farmers groups.

(3) Partnership Formation Promotion

In case of need, the partnership formation is to be introduced.

(4) Pilot Operation

Implementation of agri-business oriented food crops production by target groups in accordance with the practices agreed in the workshop.

(5) Performance Evaluation

Performance evaluation of 2nd phase activities, especially results of pilot operations by Task Force Team and stakeholders.

3-5. Program Requirements and Implementation

- In total of 3 packets in 3 years covering 15 KTs are tentatively proposed..
- The 1st and 2nd phase to be completed within a year.

3-6. Estimated Program Cost

Roughly estimated program costs are as follows;

Item	Estimated Cost (Rp. 000)		Remarks
1. 1st Phase Program			per 5 KTs
1) Establishment of Task Force Team		-	Administrative budget
Empowerment of Task Force Team	-		
1st Collaboration Workshop	-		
2) Potential Study		18,000	
Field survey	5,000		
Study tour	10,000		
2nd Collaboration Workshop	3,000		
3) District & Sub-district Staff Capacity Building		18,000	
Training program	5,000		
Study tour	10,000		
3rd Collaboration Workshop	3,000		
4) Socialization Program		1,000	
1st Workshop at Sub-district	1,000		
5) Administrative & miscellaneous cost		2,000	≒5 % of 2) to 4)
Sub-total		39,000	
2. 2nd Phase Program			per 5 KTs
1) Formation of Farmers Groups		1,000	
2) Capacity Building of Groups		16,000	
Training program	5,000		
Study tour/field school	10,000		
Workshop at sub-district	1,000		
3) Partnership Formation Promotion		1,000	
4) Administrative & miscellaneous cost		1,000	≒5 % of 1) to 3)
Sub-total		19,000	
Estimated Program Cost Total		58,000	

Table B-3.2.3 (5/6): Program Description Sheet: Farmer Organization Empowerment Package Program

4. Partnership Promotion Program

4-1. Program Background and Approaches

The embryonic operation of some partnership arrangements between farmers groups and private/state firms have been introduced in the province. The present program aims at the strengthening and expansion of partnership arrangements for the improvement in the accessibility to credit in food crops production and envisages to promote agri-business oriented food crops production in the project area.

The proposed approaches for the partnership promotion under the package program are the implementation of the program in two phases: 1) 1st phase: establishment of Task Force Team & potential study and 2) 2nd phase: implementation of partnership promotion program in a pilot scale directed to the potential areas or groups identified in the potential study.

4-2. 1st Phase Program: Establishment of Task Force Team & Study on Partnership Promotion Potential

4-2-1. Program Objectives

The objectives of the 1st phase program are: 1) establishment of Partnership Promotion Task Force Team (PP TFT), 2) identification of constraints and potential for the partnership promotion and 3) study on approaches for the same.

4-2-2. Program Descriptions

The descriptions of individual activities are as follows;

(1) Establishment of Task Force Team

Formation of Task Force Team

Task:	Responsible for the potential study & Partnership Promotion Program
Chief:	Chief of District Food Crops Agriculture Services Office
Member:	State firms, private firms, banks involved in agriculture activities
	District Food Crops Agriculture Services Office
	Other district agriculture services offices
	BAPPEDA
	Other agencies concerned (Cooperative Services Office etc.)
	Technical guidance members (provincial technical agencies)
Secretary:	District Food Crops Agriculture Services Office

Empowerment of Task Force Team

- Induction training of members under Staff Empowerment Program
- Official establishment of Task Force Team by District Governor

(2) 1st Collaboration Workshop

- Workshop of stake holders chaired by Task Force Team
- Preliminary identification of current partnership activities, constraints, needs, potential, opportunities, capabilities of farmer groups etc.
- Establishing scope of the potential study
- Participants: Task force Team, sub-district agriculture services offices, farmer groups

(3) Potential Study

- Field survey & data collection
- Study tour
- Identification of constraints & potential
- Establishing approaches for partnership promotion (draft)

(4) 2nd Collaboration Workshop

- Review of the findings & results of the potential study
- Discussing the draft approaches for partnership promotion prepared by Task Force Team
- Discussing target areas for pilot operation
- Participants: Task force Team, sub-district agriculture services offices, farmer groups

(5) Establishment of Approaches for the Partnership Promotion

- Finalization of the approaches for the partnership promotion
- Selection of target areas for pilot operation

Table B-3.2.3 (6/6): Program Description Sheet: Farmer Organization Empowerment Package Program

4-3. 2nd Phase Program: Partnership Promotion Program in Pilot Scale

4-3-1. Program Objectives and Basic Approaches

The program aims at the introduction of partnership of various types between farmers groups and private/state firms in a pilot scale. The partnership will cover farm inputs pre-financing, agri-business and even agro-industry partnerships.

The basic approaches proposed are: 1) socialization & selection of target farmer groups, 2) empowerment of target groups and 3) partnership promotion and pilot scale operation.

4-3-2. Program Descriptions

The descriptions of individual activities are as follows;

(1) Socialization & Selection of Target Farmer Groups

- 1st Workshop at target areas for socialization
- 2nd Workshop at target areas for selection of target farmer groups

(2) Training Program

- Training program on technical, marketing, managerial & institutional issues

(3) Study Tour

- Study tour to areas where partnership arrangements are successfully operated

(4) Workshop participated by target farmer groups and candidate partners

- Workshop participated by target farmer groups and candidate partners for formation of partnership

(5) Partnership Promotion and Formation

- Supporting activities for partnership formation
- Official formation of partnership between the target farmer groups and partners

(6) Pilot Operation

- Operation of the concluded partnership for a season

(7) Monitoring & evaluation

- Monitoring & evaluation of the results of Implementation of Farmer Group Integration Program & revising approaches based on lessons learned

4-3. Program Implementation

- The 1st phase program is to be implemented by district base and is to be completed in 1 year.
- The program is to be implemented by sub-district base following the 1st phase program.
- Two phases are to be completed in 1 year.

4-4. Estimated Program Cost

Roughly estimated program costs per district are as follows;

Item	Estimated Cost (Rp. 000)		Remarks
1st Phase Program			per district
1. Establishment of Task Force Team		-	Administrative budget
Empowerment of Task Force Team	-		
2. 1st Workshop at District Level		3,000	
3. Potential Study		15,000	
Field survey & data collection	5,000		
Study tour	10,000		
4. 2nd Collaboration Workshop		3,000	
5. Administrative & miscellaneous cost		1,000	≒5 % of 2 to 4
Total		22,000	
2nd Phase Program			per sub-district
1. Socialization & Selection of Farmer Groups		3,000	
1st Workshop	1,500		
2nd Workshop	1,500		
2. Training Program		4,000	
3. Study Tour		10,000	
4. Workshop at Target Areas		2,000	
5. Administrative & miscellaneous cost		1,000	≒5 % of 1 to 4
Total		20,000	

Table B-3.2.4 Proposed Implementation Schedule for Agriculture Extension Services Strengthening (AESS)

Activities/Programs	Item	Implementation Schedule / Year												Overall	Remarks
		Construction Stage						Operation Stage							
		1st			2nd			3rd			4th			5th			
Project Activates															
1. Formulation of Implementation Plan	Schedule		·····												Program cost to be accommodated in the regional administration budget.
2. Establishment of Extension System	Schedule			·····											
3. Formulation of Annual Work Program & Budget Arrangement	Schedule			·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	
4. Preparation of Extension Materials	Schedule			·····	·····	·····	·····	·····	·····	·····	·····	·····			
5. Monitoring & Evaluation	Schedule				·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	
Project Programs															
1. Institutional Strengthening Package Program	Schedule	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -		Program cost to be accommodated in the regional administration budget.
1.1 Establishment of Regional Task Force Team															
- Regional Task Force Team	Schedule	·····													
- Sub-regional Task Force Team	Schedule	·····													
1.2 Staff Empowerment Program															
- Regional Staff Empowerment Sub-program	Schedule		———	———	———	———	———	———	———	———	———	———			
	Packet		1		3			2			2				8 packets	With field activities: Rp. 10 M
	Cost Schedule		5		20			10			15				50 Rp. million	Without field activities: Rp. 5 M
- Agriculture & Extension Staffs Empowerment Sub-program	Schedule			———	———	———	———	———	———	———	———	———	———		-	
	Unit			1	3			2			3		1		10 packets	With field activities: Rp. 10 M
	Cost Schedule			5	20			10			20		5		60 Rp. million	Without field activities: Rp. 5 M
2. Farmer Organizations Empowerment Package Program	Schedule				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -		
2.1 Partnership Promotion Program	Schedule				- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -	- - -		
- 1st Phase Program	Schedule							———	———	———	———	———	———	———		Per District
	Packet							1			1			1	3 packets	
	Cost Schedule							22			22			22	66 Rp. million	
- 2nd Phase Program	Schedule							———	———	———	———	———	———	———		Per Sub-district
	Packet							1			1			1	3 packets	
	Cost Schedule							20			20			20	60 Rp. million	
2.2 Agri-business Promotion Package Program	Schedule				———	———	———	———	———	———	———	———	———			
	Packet				1			1			1				3 packets	1 packet/5 KTs
	Cost Schedule				58			58			58				174 Rp. million	15 KTs in 3 years
Overall Cost Schedule			10			98			120			135			47		410 Rp. million	
Ordinal Extension Programs	Schedule	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····	·····		-	

Programs not accommodated in the project costs ·····

Table B-4.2.1 Rehabilitation Cost of Main and Secondary System (Rehabilitation Area A=3,906ha)

	Work Description	Unit	Quantity	Unit Price (Rp.)	Amount (Rp.)
I. Diversion Weir					
1.1	Rehabilitation of Weir				
1.1.1	Excavation, rock	m3	1,800	60,000	108,000,000
1.1.2	Concrete works, K-23N	m3	900	400,000	360,000,000
1.1.3	Concrete works, K-18N	m3	4,000	350,000	1,400,000,000
1.1.4	Form works	m2	15,000	100,000	1,500,000,000
1.1.5	Metal works	ton	35	25,000,000	875,000,000
1.1.6	Masonry works	m3	300	200,000	60,000,000
1.1.7	Access road of weir	m3	500	150,000	75,000,000
1.1.8	Concrete works for intake	m3	50	500,000	25,000,000
1.1.9	Dewatering works	day	60	7,500,000	450,000,000
1.1.10	Physical contingency (15% of above)	L.S			727,950,000
	Total I				5,580,950,000
II.	**Main Canal Works**				
2.1	Main Canal, Canal Works				
2.1.1	Excavation	m3	15,000	13,000	195,000,000
2.1.2	Lining concrete	m3	250	400,000	100,000,000
2.1.3	Physical contingency (15% of above)	L.S			44,250,000
	Sub-total				339,250,000
2.2	Main Canal, Structure Works				
2.2.1	Excavation	m3	500	13,000	6,500,000
2.2.2	Embankment/backfill	m3	500	30,000	15,000,000
2.2.3	Concrete	m3	160	400,000	64,000,000
2.2.4	Form	m2	500	100,000	50,000,000
2.2.5	Reinforecement bars	ton	25	6,000,000	150,000,000
2.2.6	Gate	ton	4	30,000,000	120,000,000
2.2.7	Metal works	ton	2	20,000,000	40,000,000
2.2.8	Physical contingency (15% of above)	L.S			66,825,000
	Sub-total				512,325,000
2.3	Main Canal, Inspection Road				
2.3.1	Preparatory works	m2	10,000	6,000	60,000,000
2.3.2	Gravel pavement	m3	1,050	500,000	525,000,000
2.3.3	Related facilities (10% of above)	lot	1		58,500,000
2.3.4	Physical contingency (15% of above)	L.S			96,525,000
	Sub-total				111,003,750
	Total II				962,578,750
III.	**Secondary Canal (2 nos. of SC)**				
3.1	Secondary Canal, Canal Works				
3.1.1	Excavation	m3	106,800	13,000	1,388,400,000
3.1.5	Lining concrete	m3	6,400	400,000	2,560,000,000
3.1.6	Physical contingency (15% of above)	L.S			592,260,000
	Sub-total				4,540,660,000
3.2	Secondary Canal, Structure Works				
3.2.1	Excavation	m3	900	13,000	11,700,000
3.2.2	Embankment/backfill	m3	600	30,000	18,000,000
3.2.3	Concrete	m3	300	400,000	120,000,000
3.2.4	Form	m2	1,500	100,000	150,000,000
3.2.5	Reinforcement bars	ton	22	6,000,000	132,000,000
3.2.6	Gate	ton	14	30,000,000	420,000,000
3.2.7	Physical contingency (15% of above)	L.S			127,755,000
	Sub-total				979,455,000
3.3	Secondary Canal, Inspection Road				
3.3.1	Preparatory works	m2	100,000	6,000	600,000,000
3.3.2	Gravel pavement	m3	15,600	500,000	7,800,000,000
3.3.3	Related facilities (10 % of above)	lot	1	672,000,000	840,000,000
3.3.4	Physical contingency (15% of above)	L.S			1,386,000,000
	Sub-total				10,626,000,000
	Total III				16,146,115,000
IV.	**Drainage Works**	L.S	1	1,710,869,375	1,710,869,375
	10 % of (II+III)				
V.	**On-Farm Development**				
5.1	Irrigated Paddy Field	ha	3,906	2,000,000	7,812,000,000
	Total V				7,812,000,000
VI.	**Project Facility**				
6.1	Gate keepers house	house	4	30,000,000	120,000,000
6.2	Field cars	nos.	3	300,000,000	900,000,000
6.3	Motor cycle	nos.	20	20,000,000	400,000,000
6.4	Office equipment	L.S	1	150,000,000	150,000,000
	Total VI				1,570,000,000
	Grand Total				33,782,513,125

Table B-6.2.1 Economic Project Costs of Gung Scheme

(Unit: million Rp.)

Item	Cost		Remarks
Initial Investment Costs			
(1) Direct Construction Cost (Irrigation System Rehabilitation)	32,479		including physical contingency and project facilities
(2) Institutional & Extension Services Strengthening	659	*2.0% of (1)*	
(3) Consulting Service	2,291	*7.0% of (1)+(2)*	
(4) Administration	775	*2.5% of (1)+(2)*	
Total	36,205		
Running Costs			
(5) Incremental O&M cost	391		per year
(6) Replacement Cost	1,570		per 10 years
Total	1,961		

Table B-6.2.2 Estimation of Economic Prices

(1/2)

Item	Import Parity			Export Parity		
	Operation	US$/ton	Rp/kg	Operation	US$/ton	Rp/kg
Rice						
1. Thai 5% broken, 2005 (constant 1990 price) *1*3		226.9			226.9	
2. Adjusted to 2003 constant price	99.33%	225.4		99.33%	225.4	
3. Quality adjustment	90%	202.8		90%	202.8	
4. Freight and insurance (Bangkok-Indonesia)	+	40.0				
5. CIF Indonesia		242.8			202.8	
6. Conversion to Rupiah *2			2,010			1,679
7. Losses and port handling	5% +		101	5% -		84
8. Transportation (port to wholesaler)	+		40	-		40
9. Ex-wholesaler			2,151			1,555
10. Handling and transportation (wholesaler to mill)	-		80	-		80
11. Ex-mill			2,071			1,475
12. Conversion to paddy	68%		1,408	68%		1,003
13. By-products (rice bran: 20% of paddy x Rp100/kg)	+		100	+		100
14. Milling cost	-		100	-		100
15. Transportation (mill to farm)	-		20	-		20
16. Economic farm gate price			1,388			983
(Rounded)			1,390			980
17. Weighted average economic farm gate price (import 100%, export 0%						1,390
Maize						
1. Export price, 2005 (constant 1990 price) *1		111.0			111.0	
2. Adjusted to 2003 constant price	99.33%	110.3		99.33%	110.3	
3. Freight and insurance (gulf ports-Indonesia)	+	40.0				
4. CIF Indonesia		150.3			110.3	
5. Conversion to Rupiah *2			1,244			913
6. Losses and port handling	5% +		62	5% -		46
7. Transportation (port to wholesaler)	+		40	-		40
8. Ex-wholesaler			1,346			827
9. Handling and transportation (wholesaler to project area)	-		80	-		80
10. Ex-wholesaler price			1,266			747
11. Local transportation and handling losses	-		50	-		50
12. Economic farm gate price			1,216			697
(Rounded)			1,220			700
13. Weighted average economic farm gate price (import 100%, export 0%						1,220
Soybean						
1. Export price, 2005 (constant 1990 price) *1		226.9			226.9	
2. Adjusted to 2003 constant price	99.33%	225.4		99.33%	225.4	
3. Freight and insurance (gulf ports-Indonesia)	+	35.0				
4. CIF Indonesia		260.4			225.4	
5. Conversion to Rupiah *2			2,156			1,866
6. Losses and port handling	5% +		108	5% -		93
7. Transportation (port to wholesaler)	+		40	-		40
8. Ex-wholesaler			2,303			1,733
9. Handling and transportation (wholesaler to project area)	-		80	-		80
10. Local transportation and handling losses	-		50	-		50
11. Economic farm gate price			2,173			1,603
(Rounded)			2,170			1,600
12. Weighted average economic farm gate price (import 100%, export 0%						2,170

*1 Projected price in 2005 at constant 1990 price

*2 Exchange Rate as of May, 2003 (US$1.00=Rp. 8,279)

Source: World Bank, Global Economic Prospects 2003.

*3 Thai, white, milled, 5% broken, FOB Bangkok.

Table B-6.2.2 Estimation of Economic Prices

(2/2)

Item	Import Parity			Export Parity		
	Operation	US$/ton	Rp/kg	Operation	US$/ton	Rp/kg
Groundnut						
1. Export price, 2005 (constant 1990 price) *1		791.6			791.6	
2. Conversion to price of shelled groundnut	63%	498.7		63%	498.7	
3. Adjusted to 2003 constant price	99.33%	495.4		99.33%	495.4	
4. Freight and insurance (gulf ports-Indonesia)	+	35.0				
5. CIF Indonesia		530.4			495.4	
6. Conversion to Rupiah *2			4,391			4,101
7. Losses and port handling	5% +		220	5% -		205
8. Transportation (port to wholesaler)	+		40	-		40
9. Ex-wholesaler			4,650			3,856
10. Handling and transportation (wholesaler to project area)	-		80	-		80
11. Local transportation and handling losses	-		50	-		50
12. Economic farm gate price			4,520			3,726
(Rounded)			4,520			3,730
13. Weighted average economic farm gate price (import 50%, export 50%)						4,130
Urea						
1. Export price, Europe, bagged, 2005 (constant 1990 price) *1					122.3	
2. Adjusted to 2003 constant price				99.33%	121.5	
3. FOB Indonesia port					121.5	
4. Conversion to Rupiah *2						1,006
5. Transportation (port to wholesaler)				+		40
6. Port handling, storage, and losses				+		80
7. Handling and transportation cost to project site				+		120
8. Economic price of bagged urea at farm gate						1,246
(Rounded)						1,250
TSP						
1. Export price, Europe, bagged, 2005 (constant 1990 price) *1		144.8			144.8	
2. Adjusted to 2003 constant price	99.33%	143.8			143.8	
3. Freight and insurance	+	55.0				
4. CIF Indonesia port		198.8			143.8	
5. Conversion to Rupiah *2			1,646			1,191
6. Port handling, storage, and losses	+		120	+	120.0	120
7. Bagging cost	+		50	+	50.0	50
8. Handling and transportation cost to project site	+		120	+	120.0	120
9. Economic price of bagged TSP at farm gate			1,936		290.0	1,481
(Rounded)			1,940			1,480
10 Weight average economic farm gate price (import 80%, export 20%)						1,710
Potassium Chloride (KCl)						
1. Export price, Europe, bagged, 2005 (constant 1990 price) *1		119.7				
2. Adjusted to 2003 constant price	99.33%	118.9				
3. Freight and insurance	+	50.0				
4. CIF Indonesia port		168.9				
5. Conversion to Rupiah *2			1,398			
6. Port handling, storage, and losses	+		120			
7. Bagging cost	+		50			
8. Handling and transportation cost to project site	+		120			
9. Economic price of bagged urea at farm gate			1,688			
(Rounded)			1,690			

*1 Projected price in 2005 at constant 1990 price

*2 Exchange Rate as of May, 2003 (US$1.00=Rp. 8,279)

Source: World Bank, Global Economic Prospects 2003.

Table B-6.2.3 Economic Prices: Summary Table

Item	Unit	Financial Price (FP) *1	Economic Price *2
(1) Farm Products			
Paddy	(Rp/kg)	1,200	1,390
Maize	(Rp/kg)	1,000	1,220
Soybeans	(Rp/kg)	2,500	2,170
Mungbeans	(Rp/kg)	3,100	3,100
Sugarcane	(Rp/kg)	200	200
(2) Seeds			
Paddy	(Rp/kg)	2,000 & 3,000	2,000 & 3,000
Maize	(Rp/kg)	3,700	3,700
Maize (Hybrid)	(Rp/kg)	20,000	20,000
Soybeans	(Rp/kg)	4,000	4,000
Mungbeans	(Rp/kg)	5,000	5,000
Sugarcane Stock	(Rp/ha)	1,500,000	1,500,000
(3) Fertilizers			
Urea	(Rp/kg)	1,200	1,200
TSP	(Rp/kg)	1,600	1,600
KCl	(Rp/kg)	1,900	1,900
ZA *3	(Rp/kg)	1,200	1,200
(4) Agro-chemicals			
Insecticide (liquid type)	(Rp/lit)	50,000	50,000
Insecticide (powder type)	(Rp/kg)		
Herbicide	(Rp/lit)	30,000	30,000
Rodenticide	(Rp/kg)	35,000	35,000
(5) Hired Labor			
Labor	(Rp/man-day)	Financial prices x 0.8	
Contracted works			
- Planting/transplanting	(Rp)	Financial prices x 0.8	
- Harvesting	(Rp)	Financial prices x 0.8	
(6) Land Preparation Work (machinery)		Financial prices x 1.0	
(7) Shelling Cost		Financial prices x 0.8	
(8) Field Transportation Cost		Financial price x SCF (0.9)	

*1 As of 2003
*2 Projected Prices in 2005
*3 ZA is estimated as equivalent to Urea

Table B-6.2.4 Economic Crop Budget per Ha under Without Project

Items	Unit	Unit Price (Rp. 000)	Irrigated Paddy				Maize		Soybeans		Mungbeans		Sugarcane			
			Wet & Dry Season I		Dry Season II		Wet & Dry Season I		Dry Season II		Dry Season II		1st Harvest		2nd Harvest	
			Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)
1. Gross Return																
Unit Yield	(t/ha)		5.0		4.5		4.0		1.3		1.0		65		55	
Unit Price	(Rp.000/t)			1,390		1,390		1,220		2,170		3,100		200		200
Gross Return	(Rp.000)			**6,950**		**6,255**		**4,880**		**2,821**		**3,100**		**13,000**		**11,000**
2. Production cost				**2,509**		**2,400**		**1,903**		**1,617**		**1,418**		**10,208**		**7,634**
2-1. Farm Inputs				*733*		*653*		*553*		*536*		*366*		*2,680*		*1,180*
Seed 1/	(kg)		30	90	30	60	30	111	40	160	30	150		1,500		0
Fertilizers				551		500		392		301		216		1,180		1,180
- Urea	(kg)	1.25	200	250	180	225	150	188	50	63	50	63		0		0
- SP36	(kg)	1.71	90	154	75	128	70	120	80	137	70	120	200	342	200	342
- KCl	(kg)	1.69	50	85	50	85	50	85	60	101	20	34	200	338	200	338
- ZA	(kg)	1.25	50	63	50	63							400	500	400	500
Agro chemicals				93		93		50		75		0		0		0
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.0	50	1.5	75				0		0
- Insecticide (powder)	(kg)	30														
- Rodenticide	(kg)	35	0.5	18	0.5	18										0
- Herbicide	(kg)	30														
2-2. Labor Costs				*1,248*		*1,236*		*967*		*872*		*872*		*3,600*		*3,240*
Contracted Works																
- Planting/Transplanting 2/	(unit)	F x 0.8	1	240	1	240										
- Harvesting 3/	(unit)	F x 0.8		480		432		307		260		248				
Labor Requirements 4/																
- Hired Labor	(man-day)	12	28	336	31	372	35	420	31	372	32	384	250	3,000	220	2,640
- Family Labor	(man-day)	12	16	192	16	192	20	240	20	240	20	240	50	600	50	600
Total	(man-day)		44		47		55		51		52		300		270	
2-3. Land Preparation				*300*		*300*		*0*		*0*		*0*		*300*		*0*
- Machinery	(unit)		1	300	1	300							1	300		
- Draft Animal	(unit)															
2-4. Field Transportation 5/	(L.S.)	F x 0.9	2 %	*108*	2 %	*97*	2 %	*69*	2 %	*59*	2 %	*56*		*2,700*		*2,520*
2-5. Shelling		Rp.56/kg						*224*		*73*		*56*				
2-6. Miscellaneous Expenses	(L.S.)		5 %	*119*	5 %	*114*	5 %	*91*	5 %	*77*	5 %	*68*	10 %	*928*	10 %	*694*
3. Net Return	Rp.000			**4,441**		**3,855**		**2,977**		**1,204**		**1,683**		**2,792**		**3,366**
	%			***64***		***62***		***61***		***43***		***54***		***21***		***31***
	Rounded			***4,440***		***3,850***		***2,980***		***1,200***		***1,680***		***2,790***		***3,370***
									Average	***1,440***					***Average***	***3,080***

1/: Seed price: paddy --- yield level < 5.0 Rp. 2,000; yield level ≧5.0 Rp. 3,000; maize composite Rp.3,700/kg; soybeans Rp.4,000/ka; mungbeans Rp. 5,000/kg

2/: Contract work for transplanting assumed: Economic cost = financial cost x 0.8 3/: Share harvesting assumed: Economic cost = financial cost x 0.8

4/: Hired Labor Requirements --- assumed to be 60~70% of total labor requirements except contracted works 5/: Economic cost = financial cost x 0.9

Table B-6.2.5 Economic Crop Budget per Ha under With Project

Items	Unit	Unit Price (Rp. 000)	Paddy				Maize (hybrid)		Soybeans		Mungbeans		Sugarcane			
			Wet/Dry Season I		Dry Season II		Dry Season I		Dry Season II		Dry Season II		1st Harvest		2nd Harvest	
			Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)	Q'ty	Value (Rp. 000)
1. Gross Return							Minimum Tillage									
Unit Yield	(t/ha)		5.5		4.5		5.5		1.3		1.0		65		55	
Unit Price	(Rp.000/t)			1,390		1,390		1,220		2,170		3,100		200		200
Gross Return	(Rp.000)			**7,645**		**6,255**		**6,710**		**2,821**		**3,100**		**13,000**		**11,000**
2. Production cost				**2,734**		**2,400**		**2,744**		**1,617**		**1,418**		**10,208**		**7,634**
2-1. Farm Inputs				*889*		*653*		*1,047*		*536*		*366*		*2,680*		*1,180*
Seed 1/	(kg)		30	90	30	60	20	400	40	160	30	150		1,500		0
Fertilizers				706		500		494		301		216		1,180		1,180
- Urea	(kg)	1.25	230	288	180	225	175	219	50	63	50	63		0		0
- SP36	(kg)	1.71	110	188	75	128	75	128	80	137	70	120	200	342	200	342
- KCl	(kg)	1.69	70	118	50	85	50	85	60	101	20	34	200	338	200	338
- ZA	(kg)	1.25	90	113	50	63	50	63					400	500	400	500
- PPC	(lit)	40														
Agro chemicals				93		93		153		75		0		0		0
- Insecticide (liquid)	(lit)	50	1.5	75	1.5	75	1.5	75	1.5	75				0		0
- Insecticide (powder)	(kg)															
- Rodenticide	(kg)	35	0.5	18	0.5	18	0.5	18								0
- Herbicide	(lit)	30					2.0	60								
2-2. Labor Costs				*1,296*		*1,236*		*1,160*		*872*		*872*		*3,600*		*3,240*
Contracted Works																
- Planting/Transplanting 2/	(unit)	F x 0.8	1	240	1	240										
- Harvesting 3/	(unit)	F x 0.8		528		432		440		260		248				
Labor Requirements 4/																
- Hired Labor	(man-day)	12	28	336	31	372	37	444	31	372	32	384	250	3,000	220	2,640
- Family Labor	(man-day)	12	16	192	16	192	23	276	20	240	20	240	50	600	50	600
Total	(man-day)		44		47		60		51		52		300		270	
2-3. Land Preparation				*300*		*300*		*0*		*0*		*0*		*300*		*0*
- Machinery	(unit)		1	300	1	300							1	300		
- Draft Animal	(unit)															
2-4. Field Transportation	(L.S.)	F x 0.9	2 %	*119*	2 %	*97*	2 %	*99*	2 %	*59*	2 %	*56*		*2,700*		*2,520*
2-5. Shelling	(L.S.)	Rp.56/kg						*308*		*73*		*56*				
2-6. Miscellaneous Expenses	(L.S.)		5 %	*130*	5 %	*114*	5 %	*131*	5 %	*77*	5 %	*68*	10 %	*928*	10 %	*694*
3. Net Return	Rp.000			**4,911**		**3,855**		**3,966**		**1,204**		**1,683**		**2,792**		**3,366**
	%			**64**		***62***		**59**		***43***		***54***		***21***		***31***
	Rounded	Rp.000		***4,910***		***3,850***		***3,970***		***1,200***		***1,680***		***2,790***		***3,370***
										Average	***1,440***				***Average***	***3,080***

1/: Seed price: p Maize --- composite Rp. 3,700/kg; hybrid Rp. 20,000/ka; soybeans --- RP. 4,000; mungbeans --- Rp. 5,000/kg

2/: Contract work for transplanting assumed: Economic cost = financial cost x 0.8

3/: Share harvesting assumed: Economic cost = financial cost x 0.8

4/: Hired Labor Requirements --- assumed to be 60~70% of total labor requirements except contracted works

5/: Economic cost = financial cost x 0.9

Table B-6.2.6 Financial and Economic Net Production Values under With and Without Project

1. Financial Net Production Value

Crops/ Crop Season	Without Project			With Project			
	Area (ha)	Net Return (Rp. 000/ha)	Net Prod. Value (Rp. million)	Area (ha)	Net Return (Rp. 000)	Net Prod. Value (Rp. million)	Increment (Rp. million)
Irrigated Paddy							
Wet Season	3,032	3,410	10,339	3,032	3,780	11,461	1,122
Dry Season I	1,426	3,410	4,863	1,426	3,780	5,390	528
Dry Season II	126	2,930	369	126	2,930	369	0
Annual	4,584		15,571	4,584		17,220	1,649
Palawija (maize)							
Wet Season	289	1,940	561	289	2,730	789	228
Dry Season I	1,581	1,940	3,067	1,581	2,730	4,316	1,249
Annual	1,870		3,628	1,870		5,105	1,477
Palawija (beans)							
Dry Season II	2,981	1,720	5,127	2,981	1,720	5,127	0
Sugarcane	585	2,640	1,544	585	2,640	1,544	0
Total	10,020		25,870	10,020		28,997	3,127

2. Economic Net Production Value

Crops/ Crop Season	Without Project			With Project			
	Area (ha)	Net Return (Rp.000/ha)	Net Prod. Value (Rp. million)	Area (ha)	Net Return (Rp.000)	Net Prod. Value (Rp. million)	Increment (Rp. million)
Irrigated Paddy							
Wet Season	3,032	4,440	13,462	3,032	4,910	14,887	1,425
Dry Season I	1,426	4,440	6,331	1,426	4,910	7,002	670
Dry Season II	126	3,850	485	126	3,850	485	0
Annual	4,584		20,279	4,584		22,374	2,095
Palawija (maize)							
Wet Season	289	2,980	861	289	3,970	1,147	286
Dry Season I	1,581	2,980	4,711	1,581	3,970	6,277	1,565
Annual	1,870		5,573	1,870		7,424	1,851
Palawija (beans)							
Dry Season II	2,981	1,440	4,293	2,981	1,440	4,293	0
Sugarcane	585	3,080	1,802	585	3,080	1,802	0
Total	10,020		31,946	10,020		35,892	3,947

Table B-6.2.7 Annual Economic Costs and Benefit flow and the Results of Economic Evaluation (A=3,906 ha)

(Rp. Million)

Year	Economic Costs				Economic Benefit	Balance
	Initial Investment	O&M	Replacement	Total		
1	949	391		1,339		-1,339
2	949	391		1,339		-1,339
3	17,153	391		17,544		-17,544
4	17,153	391		17,544	1,184	-16,360
5		391		391	2,368	1,977
6		391		391	2,763	2,372
7		391		391	3,157	2,767
8		391		391	3,552	3,161
9		391		391	3,947	3,556
10		391		391	3,947	3,556
11		391	1,570	1,961	3,947	1,986
12		391		391	3,947	3,556
13		391		391	3,947	3,556
14		391		391	3,947	3,556
15		391		391	3,947	3,556
16		391		391	3,947	3,556
17		391		391	3,947	3,556
18		391		391	3,947	3,556
19		391		391	3,947	3,556
20		391		391	3,947	3,556
21		391	1,570	1,961	3,947	1,986
22		391		391	3,947	3,556
23		391		391	3,947	3,556
24		391		391	3,947	3,556
25		391		391	3,947	3,556
26		391		391	3,947	3,556
27		391		391	3,947	3,556
28		391		391	3,947	3,556
29		391		391	3,947	3,556
30		391		391	3,947	3,556

	B-C =	**-7,430**	**B/C =**	**0.76**	**EIRR =**	**6.7%**

Table B-6.3.1 Farm Budget Analysis on 1Ha of Paddy Field

Current Irrigated Paddy Field: Double Cropping of Paddy

Items/Crop	Without/Present Condition			Without/Present Condition			Incremental
	Cropped Area (ha)	Net Return per Ha (Rp. 000)	Net Return per Farm (Rp. 000)	Cropped Area (ha)	Net Return per Ha (Rp. 000)	Net Return per Farm (Rp. 000)	Net Return per Farm (Rp. 000)
1. Net Farm Income from 1 Ha of Paddy Field							
- Irrigated Paddy	1.25		4,071	1.25		4,725	655
Wet Season	0.85	3,410	2,899	0.85	3,780	3,213	315
Dry Season I	0.40	2,930	1,172	0.40	3,780	1,512	340
- Palawija (maize hybrid): Dry Season I	0.40	1,940	776	0.40	2,730	1,092	316
- Palawija (beans): Dry Season II	0.80	1,720	1,376	0.80	1,720	1,376	0
- Sugarcane	0.15	2,640	396	0.15	2,640	396	0
Total	2.60		6,619	2.60		7,589	971
		Rounded	***6,620***		Rounded	***7,590***	***970***
2. Incremental Family Expenditures 1/			-			380	380
3. Net Reserve			***6,620***			***7,211***	***591***
					Rounded	***7,210***	***590***

1/: Incremental family expenditure under with project condition assumed to be 5% of net return per ha; which to be covered by an income increase from paddy field

Figures

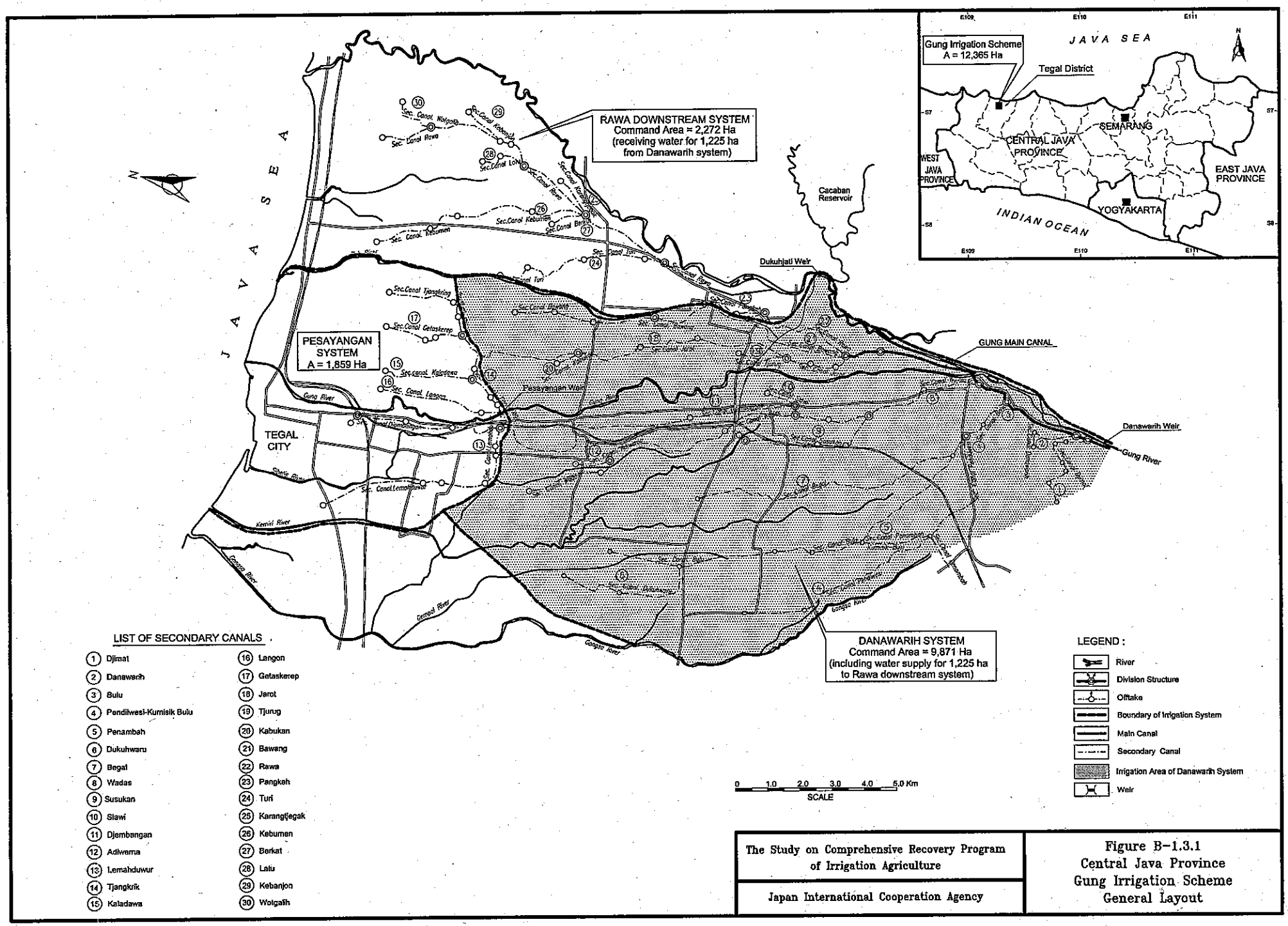


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Figure B-1.3.1
Central Java Province
Gung Irrigation Scheme
General Layout

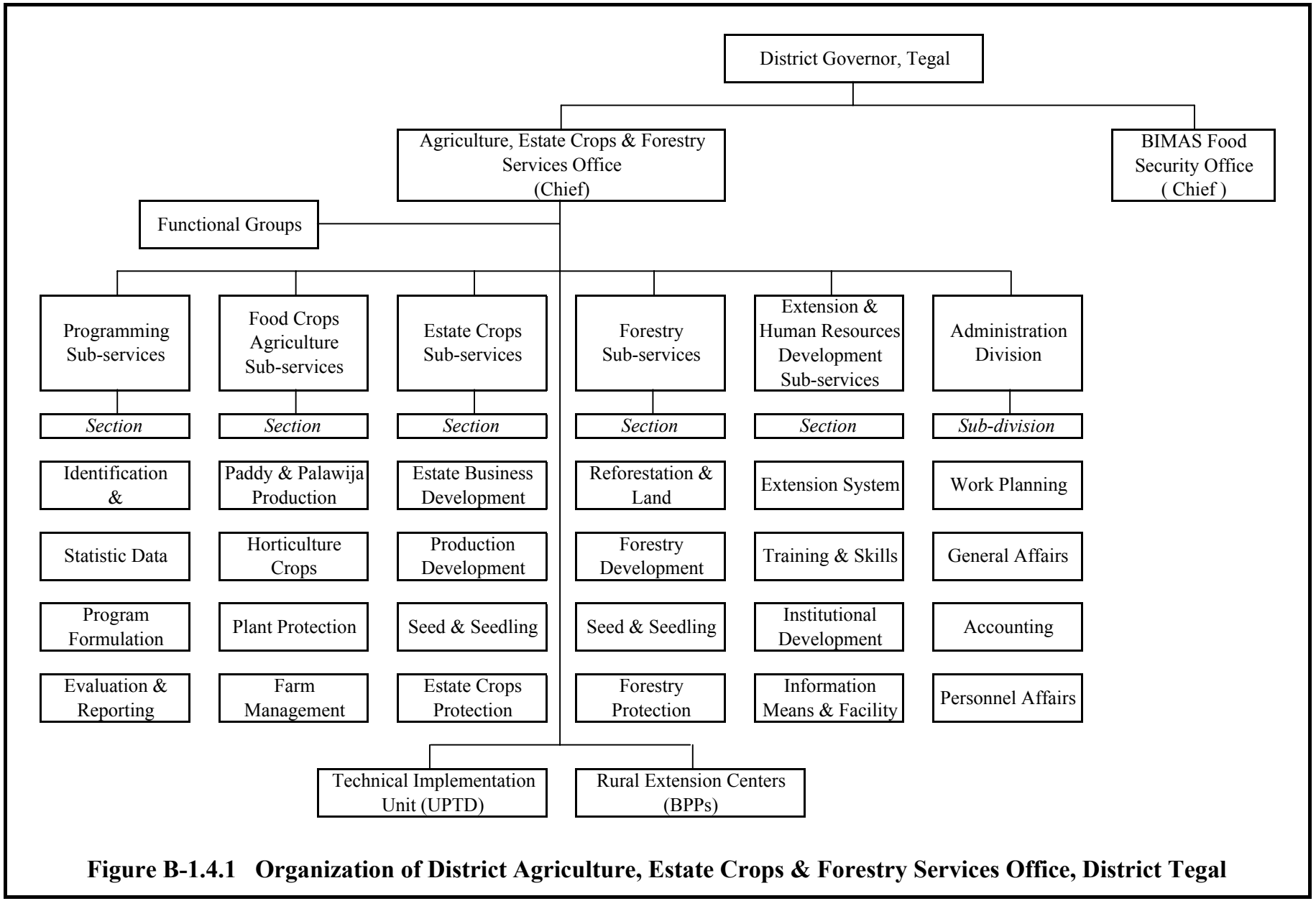


Figure B-1.4.1 Organization of District Agriculture, Estate Crops & Forestry Services Office, District Tegal

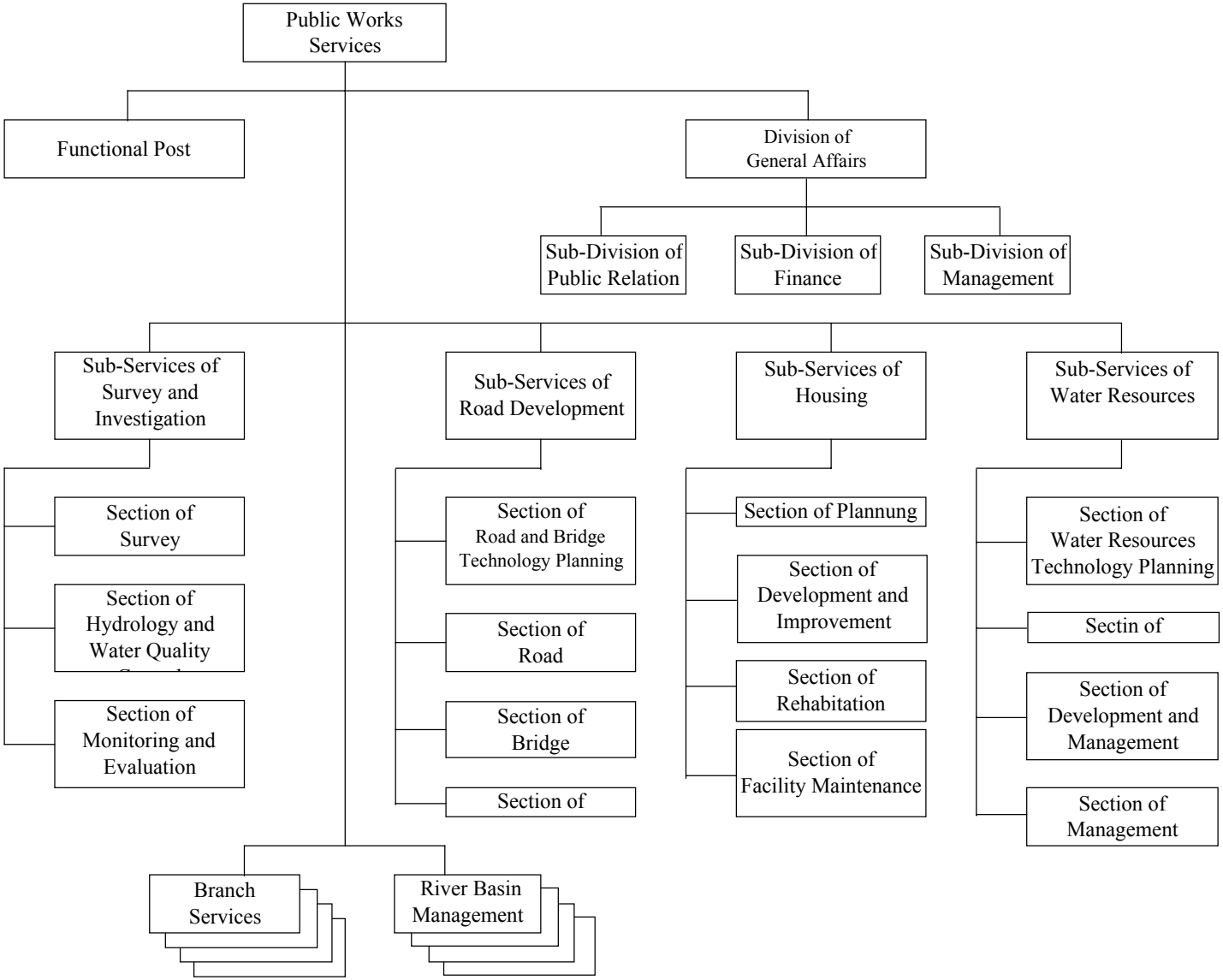
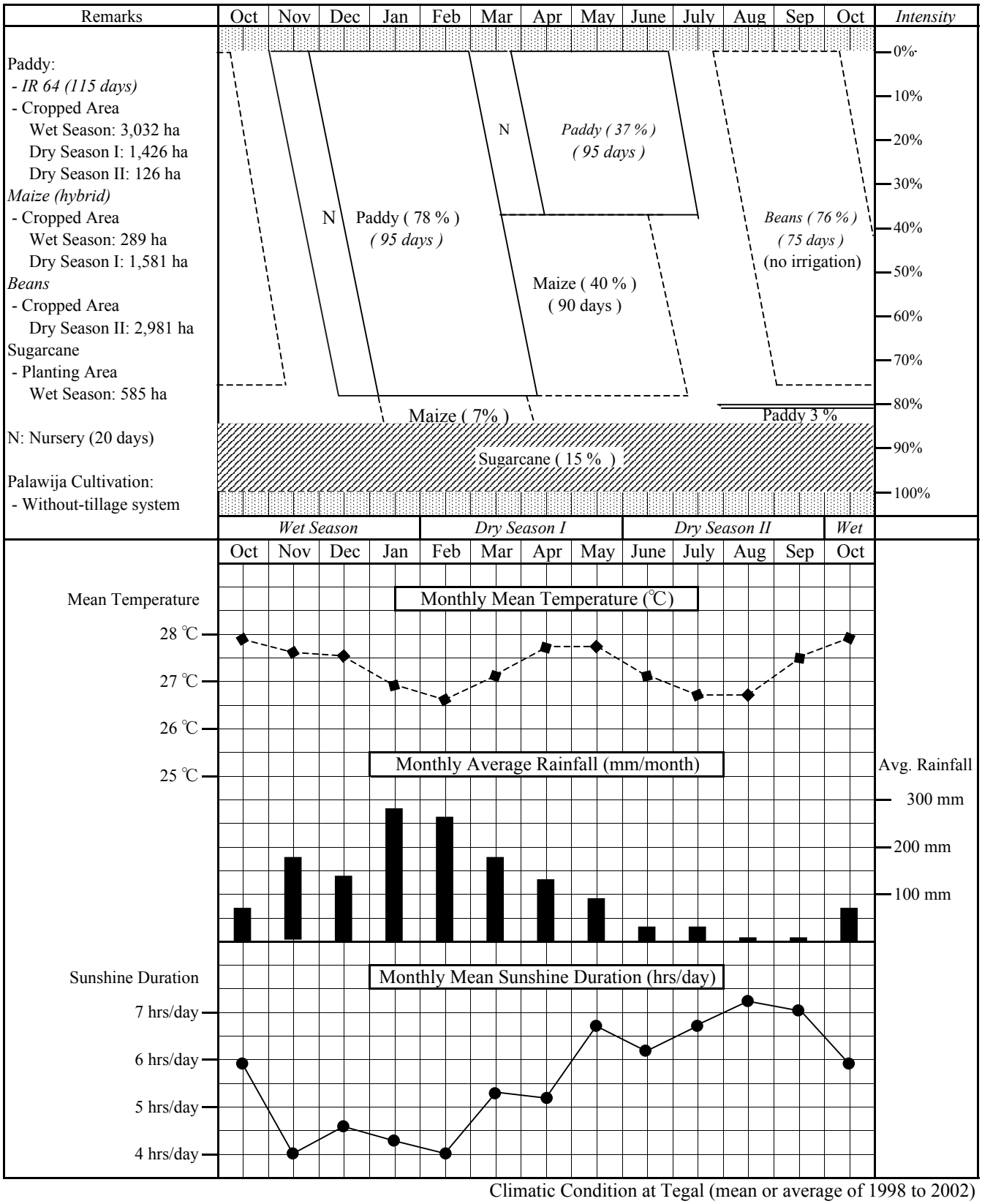


Figure B-1.5.1 Organization Chart of Public Works Services, Tegal

Figure B-3.3.1 Planned Cropping Pattern: Gung Irrigation Scheme



Climatic Condition at Tegal (mean or average of 1998 to 2002)

Figure B-5.3.1 Implementation Program of Rehabilitation Work for Gung Irrigation Scheme

Phase	Sector	Item of Implementation		Year from Commencement of Midterm Phase									
		Item	Works	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th
Midterm	1. Irrigation/ Civil Works	**Feasibility Study**	Procurement of consultant										
			Preparation of F/S										
			Preparation of Implementation Schedule										
	2.Institution	**Strengthening Program**	Government staff										
			Water Users Association										
			Initial setting-up of FWUA and MWUA										
	3.Project Budget		Budget arrangement										
Final	1. Irrigation/ Civil Works	**Implementation**	Procurement of consultant										
			Detailed design										
			Tender for procurement of contractor										
			Civil works for rehabilitation										
	2. Institution	**Training and Guidance**	O&M for tertiary and on-farm										
			Collection of irrigation service fee and accounting										
	3. Extension Service												
		Formulation of task force team											
		Formulation of strengthening program											
		Identification and confirmation of constraints											
		Countermeasures or technology to be introduced for mitigation of constraints											
		Preparation of detailed program for strengthening											
		Implementation of program											
		Preparation of annual program											
		Budget arrangement											
		Preparation of detailed agreed plan of operation											
		Preparation extension materials											
		Implementation of program, monitoring and evaluation											

Drawings

List of Drawings

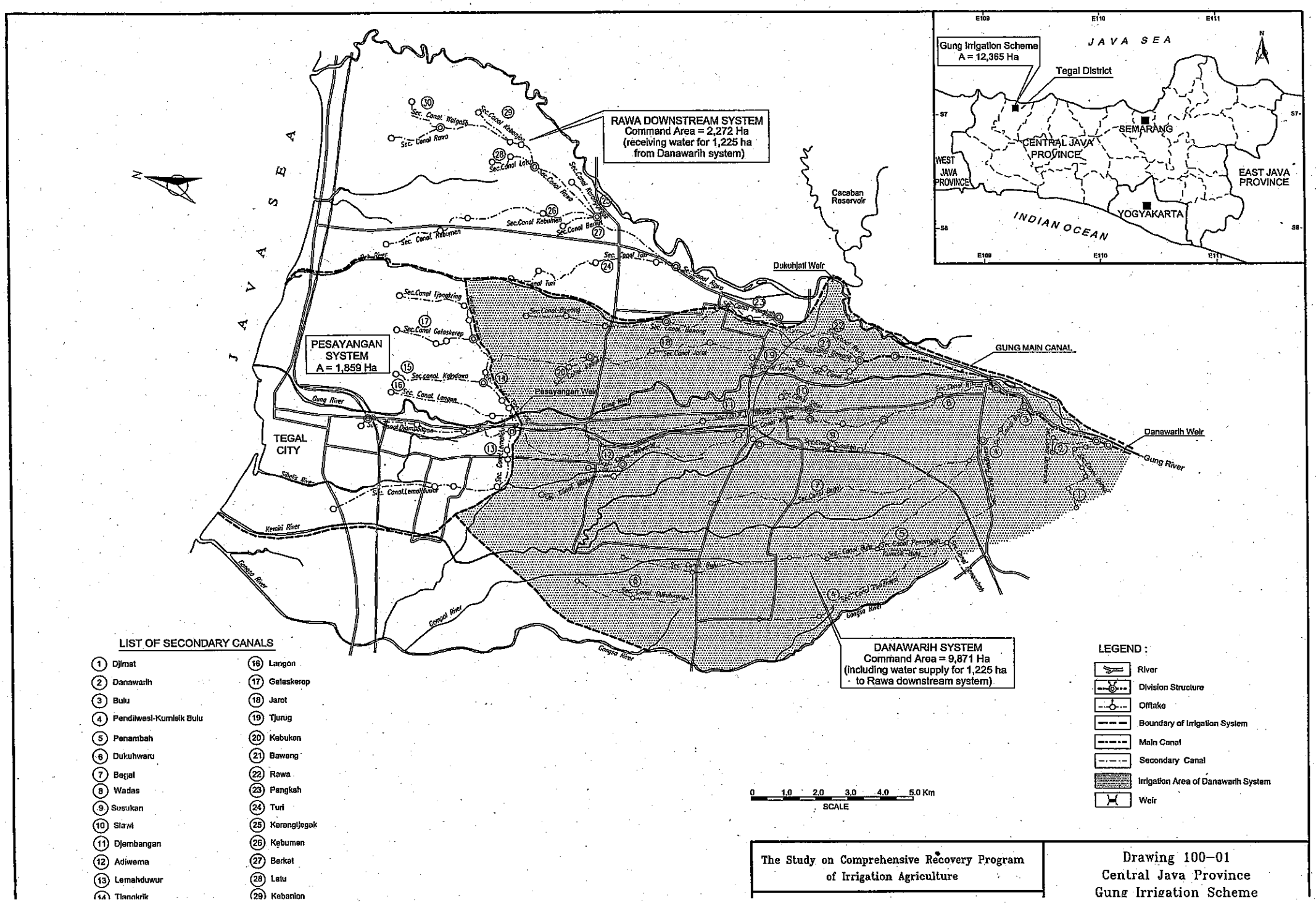
Drawing No.	Title
100	GENERAL
100-01	General Layout
100-02	Irrigation Diagram
200	WATER RESOURCES FACILITY
200-01	Rehabilitation Plan of Danawarih Headworks (1/2)
200-02	Rehabilitation Plan of Danawarih Headworks (2/2)
300	CANALS
300-01	Rehabilitation Plan of Main Canal and Inspection Road
300-02	Rehabilitation Plan of Main Canal Related Structures
300-03	Plan & Profile of Main Canal (1/9)
300-04	Plan & Profile of Main Canal (2/9)
300-05	Plan & Profile of Main Canal (3/9)
300-06	Plan & Profile of Main Canal (4/9)
300-07	Plan & Profile of Main Canal (5/9)
300-08	Plan & Profile of Main Canal (6/9)
300-09	Plan & Profile of Main Canal (7/9)
300-10	Plan & Profile of Main Canal (8/9)
300-11	Plan & Profile of Main Canal (9/9)
300-12	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (1/16)
300-13	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (2/16)
300-14	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (3/16)
300-15	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (4/16)
300-16	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (5/16)
300-17	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (6/16)
300-18	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (7/16)
300-19	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (8/16)
300-20	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (9/16)
300-21	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (10/16)
300-22	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (1/116)
300-23	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (12/16)
300-24	Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal)

(13/16)

300-25 Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (14/16)

300-26 Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (15/16)

300-27 Plan & Profile of Sample Secondary Canal (Bulu Secondary Canal) (16/16)



LIST OF SECONDARY CANALS

(1) Djimat	(16) Langon
(2) Danawarih	(17) Getaskerep
(3) Bulu	(18) Jarot
(4) Pendilwesi-Kumisik Bulu	(19) Tjurug
(5) Penambah	(20) Kebuken
(6) Dukuhwaru	(21) Baweng
(7) Begal	(22) Rawa
(8) Wadas	(23) Pangkah
(9) Susukan	(24) Turi
(10) Slarai	(25) Kerangjegak
(11) Djembangan	(26) Kebumen
(12) Adiwerna	(27) Berkat
(13) Lemahduwur	(28) Lalu
(14) Tlangkrik	(29) Kebanjon

LEGEND :

- River
- Division Structure
- Offtake
- Boundary of Irrigation System
- Main Canal
- Secondary Canal
- Irrigation Area of Danawarih System
- Weir

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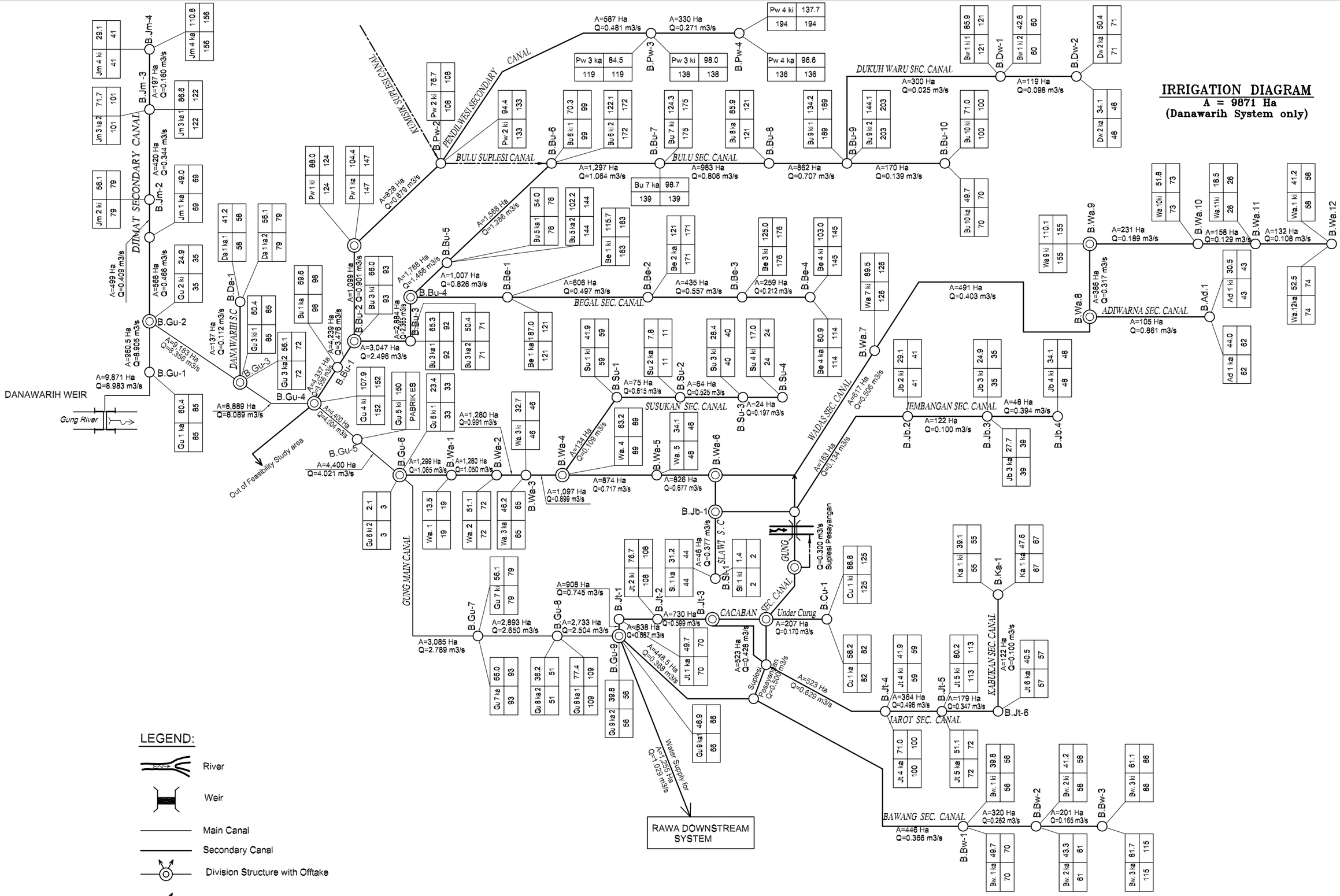
Drawing 100-01
Central Java Province
Gung Irrigation Scheme

IRRIGATION DIAGRAM

A = 9871 Ha

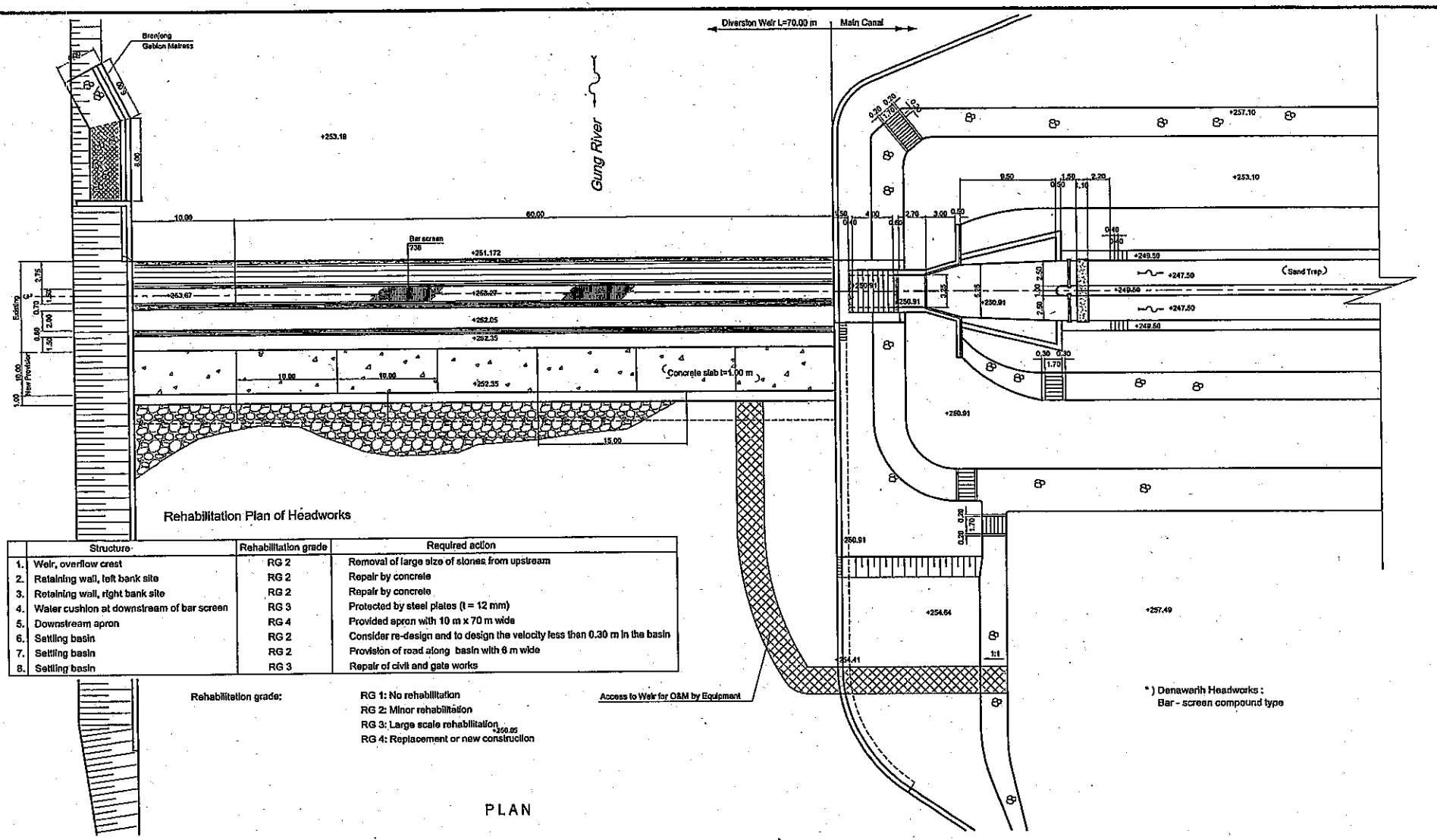
(Danawarih System only)



LEGEND:

- River
- Weir
- Main Canal
- Secondary Canal
- Division Structure with Offtake
- Offtake
- a. Name of Tertiary Unit
- b. Net Area

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Drawing 100-02 Gung Scheme Irrigation Diagram
Japan International Cooperation Agency	



Rehabilitation Plan of Headworks

	Structure	Rehabilitation grade	Required action
1.	Weir, overflow crest	RG 2	Removal of large size of stones from upstream
2.	Retaining wall, left bank site	RG 2	Repair by concrete
3.	Retaining wall, right bank site	RG 2	Repair by concrete
4.	Water cushion at downstream of bar screen	RG 3	Protected by steel plates (t = 12 mm)
5.	Downstream apron	RG 4	Provided apron with 10 m x 70 m wide
6.	Settling basin	RG 2	Consider re-design and to design the velocity less than 0.30 m in the basin
7.	Settling basin	RG 2	Provision of road along basin with 6 m wide
8.	Settling basin	RG 3	Repair of civil and gate works

Rehabilitation grade:

RG 1: No rehabilitation
RG 2: Minor rehabilitation
RG 3: Large scale rehabilitation
RG 4: Replacement or new construction

*) Denawarih Headworks :
Bar - screen compound type

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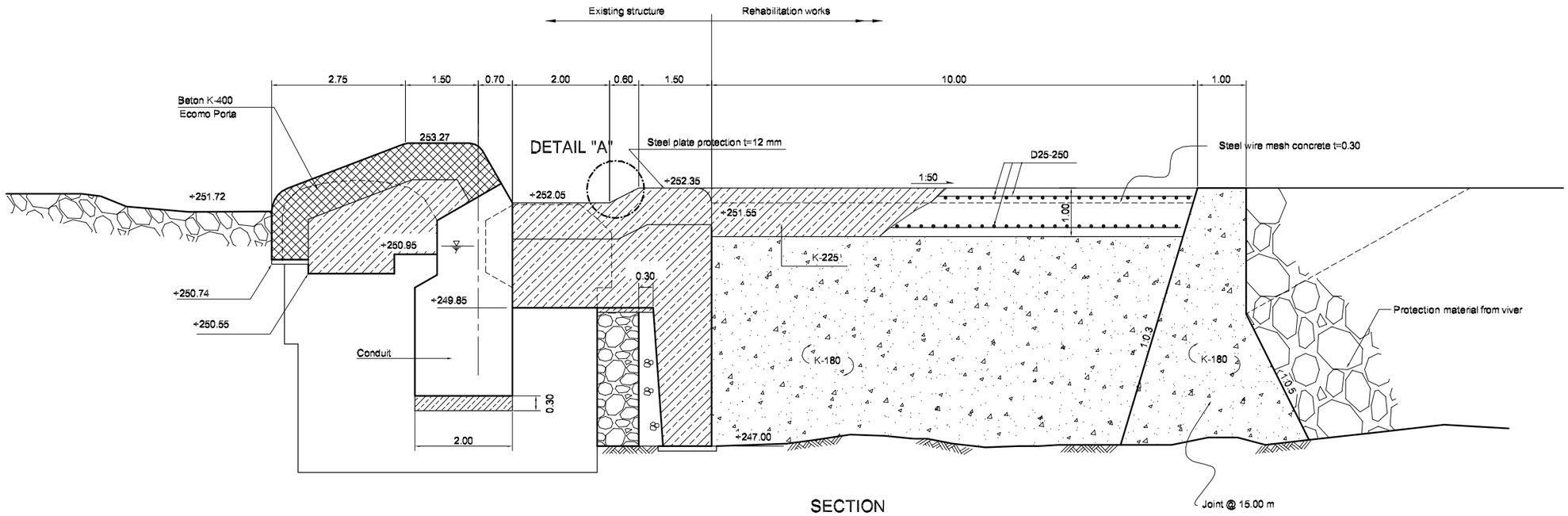
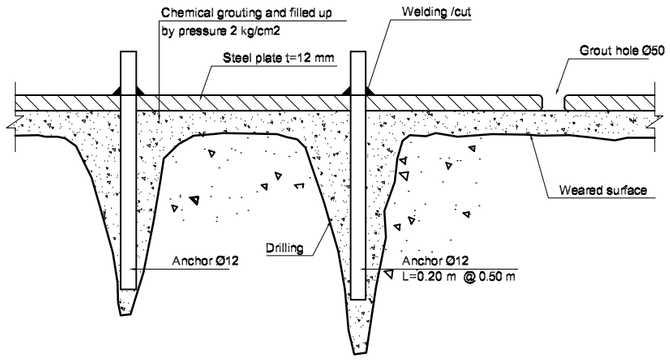
Drawing 200-01
Gung Scheme
Rehabilitation Plan of



SECTION



DETAIL "A"

Not to scale

Gung Headworks Rehabilitation Plan

1. Provision of steel plate at slab of water pool
2. Provision of grand sill at downtream of weir (h max=5m)
3. Provision of protection slab with t=1.00m for maintenance of water pool after flood (by equipment)
4. Provision of access for protection slab

0 1.0 2.0 3.0 4.0 5.0 m

Scale

The Study on Comprehensive Recovery Program of Irrigation Agriculture	Drawing 200-02 Gung Scheme Rehabilitation Plan of Danawarih Headworks (2/2)
Japan International Cooperation Agency	