

**EX-POST EVALUATION STUDY  
ON  
IRRIGATION ENGINEERING SERVICE  
CENTER PROJECT  
BEKASI**



**FINAL REPORT**

**MARCH 2005**



**PT. INDOKOEI INTERNATIONAL**  
*Engineering and Management Consultant*

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## Executive Summary

<b>I. Outline of the Project</b>	
Country: Indonesia	Project title: Irrigation Engineering Service Center Project (IESC)
Issue/Sector: Irrigation/ Water Resources	Cooperation scheme: Project-type Technical Cooperation
Division in charge:	Total cost: 384 million Yen
Period of Cooperation	R/D: 10 June 1994 - 9 June 1999 F/U: June 10, 1999 - June 30, 2001
	Partner Country's Implementing Organization: Directorate of Technical Guidance, Directorate General of Water Resources Development, Ministry of Public Works (DGWRD) Supporting Organization in Japan:
Related Cooperation	Construction Guidance Service Center (CGSC)
<p><b>1. Background of the Project</b></p> <p>In 1981, Japan implemented grant aid and project-type technical cooperation for seven years at the Construction Guidance Service Center in Indonesia to improve the agriculture base and contribute to the dissemination of irrigation facility construction technology for the purpose of increasing food production. An additional two years of aftercare cooperation was implemented in 1990. However, because an emphasis was placed on construction management technology, other important field such as design, maintenance, and a general information/database system were not initially subject to cooperation.</p> <p>Against this backdrop, the Government of Indonesia, based on the result of the project, decided to reorganize the Construction Guidance Service Center, a center that focused on construction techniques, into the Irrigation Engineering Service Center (IESC), which handles the entire spectrum of irrigation technology, and thereby aim to improve the level of Indonesia's irrigation technology based on a consistent technological system. For this purpose, Indonesia asked Japan for project-type technical cooperation.</p> <p><b>2. Project Overview</b></p> <p>(1) Overall Goal</p> <p style="padding-left: 40px;">To establish in Indonesia appropriate irrigation projects, in which irrigation establishments are appropriately maintained, managed, repaired and renovated.</p> <p>(2) Project Purpose</p> <p style="padding-left: 40px;">To develop the needed technology standards for the implementation of the irrigation projects, and to establish a structure for dissemination.</p>	

## (3) Outputs

- a) To create three fields of technology standards: “Investigation, Planning and Design”, “Operation and Maintenance”, and “Rehabilitation and Up-grading”.
- b) To create guidelines and manuals for these three fields
- c) To implement training at the IESC geared towards irrigation technicians.

## (4) Inputs

Japanese side:Long-term Expert 11 manShort-term Expert 30 manTrainees received 22 manEquipment (approx) 285 million YenLocal cost (approx) 99 million Yen

Others Yen

Indonesia side:Counterpart 41 manLocal cost 42 million yen(approx. 2,883.7 million rupiah)**II. Evaluation Team**

Members of Evaluation Team	Irrigation Engineering Specialist : Besar Hatmaya Assistant Engineer : Nani Susanti	
Period of Evaluation	Day/Month/Year~Day/Month/Year 14 March 2005 - 31 March 2005	Type of Evaluation: Ex-post Evaluation

**III. Result of Evaluation****1. Summary of Evaluation Result**

## (1) Impact

The guidelines and manuals resulted from IESC project (P&D, O&M, R&U) has been disseminated to some irrigation institutions and implemented in some irrigation projects in Indonesia. The irrigation projects activities in planning and design, operation and maintenance, rehabilitation and upgrading become easier and cheaper than before since the guidelines and manuals complement to the existing guidelines. The established irrigation projects are become appropriately maintained, managed, repaired and renovated. From the facts, it can be concluded that the Overall Goal of the IESC project has been highly achieved.

The other positive impacts are: (i) transfer of knowledge and technology from Japanese experts to Indonesian counterpart was running well and they continue to disseminate the knowledge and technology to their colleagues in water resources institutions; (ii) some water resources institutions such as Experimental Station for Irrigation, province irrigation services, irrigation projects and even water user associations have improved their capabilities in planning and design, operation and maintenance, and rehabilitation and up-grading. There is no negative impact observed during the evaluation study.

The influencing factors which enhance the achievement of project purpose and overall goal are high spirit of the Indonesian counterparts and full support of the concerned irrigation institutions in implementing the IESC project and applying the result in real irrigation activities.

**(2) Sustainability**

The Experimental Station for Irrigation in Bekasi under management of Research Institute for Water Resources, MSRI in Bandung continuously conducts the dissemination and training of irrigation activities and use some equipments procured under IESC for their daily activities. The Secretariat of DGWR, MSRI take care some other equipments for continuously conducts dissemination and training of water resources activities in the frame of Public Information Guidance Sub-project. The province irrigation services disseminate the guidelines and manuals to district irrigation services and apply it in managing the irrigation schemes. In view of institutional and outcomes, it can be concluded that the IESC project purpose and overall goal are highly sustainable.

The outcomes of the project which technologically appropriate to the requirement of irrigation development policy become the influencing factor which supports the sustainability of project purpose and overall goal.

**(3) Others**

Due to change organization of Ministry of Public Works to be Ministry of Settlement and Regional Infrastructure, most of the IESC Staffs has been scattered in some water resources institutions, but mostly working in the sector of water resources or irrigation and disseminate the knowledge gained from the IESC project to their colleagues.

The transfer of technology continues among the ex-counterpart of IESC project and their colleges and their working discipline as well as mind frame has been improving.

They keep contact and coordinate with the concerned institutions in conducting their activities in water resources sector.

**2. Factors that have promoted project in the aspect of:****(1) Impact**

The Experimental Station for Irrigation, Province Irrigation Services and irrigation projects are highly enthusiastic in dissemination and applying the guidelines and manual. Even the character or law level of the guidelines and manuals is still in recommendation basis, the guidelines and manuals are widely applied in general and specific conditions due to easy and practical in implementation. In future, when the law status of guidelines and manuals become SNI (Standard National Indonesia) which has the power to enforce the implementation, the project impact will be more promoted.

**(2) Sustainability**

There are still irrigation institutions such as Experimental Station for Irrigation and Irrigation Services that take place the role of IESC project. Most of the ex-counterpart of IESC project work in the Experimental Station for Irrigation and other irrigation institutions continue to provide training on irrigation activities.

**(3) Others**

The change of irrigation authority due to decentralization system pushes the regional irrigation institution to improve their institutional and human resources capability for managing the irrigation schemes.

### **3. Factors that have inhibited project in the aspect of:**

#### **(1) Impact**

After completion of the IESC project, a system for dissemination and application of the guidelines and manuals has been set up. However, due to budget constraint, only some provinces can be included in an annual program.

Due to implementation of the regional autonomy, the change of structure and personnel some times cut the link or networks that have been established before.

#### **(2) Sustainability**

The guidelines and manuals have been applied in the field; however, a clear system for monitoring the application has not been established yet in each local government's irrigation services.

Lack of financial resources in local governments' irrigation services caused less smooth dissemination and implementation of the guidelines and manuals.

#### **(3) Others**

Change of organization of the Ministry of Public Works to be Ministry of Settlement and Regional Infrastructures caused some person in charge for irrigation institutions move to other sectors. The networks established during the project implementation become weak.

### **4. Conclusion**

The project highly achieved the purpose and overall goal. Experimental Station for Irrigation and some other irrigation institution under DGWR and local governments continue to disseminate and apply the guidelines and manuals resulted by IESC project. It can be concluded that the IESC project has highly impact and sustainability.

The impact will be more promoted by improvement of law status, additional financial support and establishment of monitoring system for implementation of the guidelines and manuals.

### **5. Recommendations**

To extent the impact and sustainability of the project, the following recommendations is suggested to the Government of Indonesia through the DGWR:

#### **(1) Impact**

The status of guidelines and manuals should be up-graded from voluntary to be compulsory as National Standard issued by BSN (National Standard Agency). The guidelines and manuals should be included in the contract documents of irrigation projects implementation.

#### **(2) Sustainability**

It is required to establish strong coordination among the institutions concerned in monitoring the application of guidelines and manuals. Feedback taken from the problems encountered during the implementation should be inputted for improving the guidelines and manuals.

It is required to develop the services of Experimental Station for Irrigation by providing Outdoor Laboratory for Irrigation Scheme Model. The laboratory might be used for training practical in planning and design, operation and maintenance as well as rehabilitation and upgrading.

It is required to develop such kind of Irrigation Information Center which functioning for development of irrigation information service website, and dissemination of applied irrigation technique.

**6. Lessons Learned**

In formulating the project design, it should consider the system for disseminating the project benefits and to establish strong coordination for monitoring the impacts, problems encountered and getting feedback for improvement of the project.

**7. Follow-up Situation**

The DGWR continues the activity of IESC project by implementing Empowerment of Water User Association Project in satellite model area in South Sulawesi.

The Experimental Station for Irrigation in Bekasi continues to conduct trainings, seminars and workshops for disseminating the technical standards, manuals and guidelines, attended by the provinces and districts irrigation services staffs.

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# CHAPTER I

## INTRODUCTION

### 1.1. Background of the Project

In 1981, Japan implemented grant aid and project-type technical cooperation for seven years at the Construction Guidance Service Center (CGSC) in Indonesia to improve the agriculture base and contribute to the dissemination of irrigation facility of construction technology for increasing food production. An additional two years of aftercare cooperation was implemented in 1990. However, because an emphasis was placed on construction management technology, other important field such as design, maintenance, and a general information/database system were not initially subject to cooperation.

Based on the result of the CGSC Project, the Government of Indonesia decided to reorganize the CGSC, a center that focused on construction techniques, into the Irrigation Engineering Service Center (IESC), which handles the entire spectrum of irrigation technology, and thereby aim to improve the level of Indonesia's irrigation technology based on a consistent technological system. For this purpose, Indonesia asked Japan for project-type technical cooperation.

In order to improve self-reviewing process and accountability to the general public, Japan International Cooperation Agency (JICA) is conducting ex-post evaluation study for Irrigation Engineering Service Center (IESC) that have passed more than 3 (three) years after the end of cooperation period.

### 1.2. Purpose of the Study

Main purposes of our ex-post evaluation study are as follows:

- (i) to assess the current situation of past project mainly from the *impact* and *sustainability* point of views;
- (ii) to draw *lessons-learned* and *recommendations* from these process, and then
- (iii) to feed-back to the improvement of future JICA Project(s) management in the similar fields, at the same time to increase accountability to the stakeholders and general public.

The evaluation is expected to verify the important issues relating to the **impact** and **sustainability** of the project at the stage of more than 3 (three) years after the end of cooperation period. More specifically, the evaluation will seek answers to the following main evaluation questions:

#### **Impact of the Project**

- To what extent has the project's "Overall Goal" been achieved since the time of terminal evaluation?
- What "positive" and "negative" impacts are observed because of the project?

- How has the project contributed to the improved institutional capacity of the implementing institution?
- Are there any external factors that have contributed to (or impeded) the achievement of “Overall Goal” of the project?

**Sustainability of the Project**

- To what extent have the benefits of the project continued (maintained) since the end of cooperation period?
- To what extent is the outcome of the project expected to be maintained?
- What are the major factors that have enhanced (or impeded) sustainability of the project?

## **CHAPTER II**

### **PROJECT INFORMATION**

#### **2.1. Overall Goal**

The Overall Goal of the Project is to establish in Indonesia appropriate irrigation projects, in which irrigation establishments are appropriately maintained, managed, repaired and renovated.

#### **2.2. Project Purpose**

The Project purpose is to develop the needed technical standards as well as guidelines and manuals necessary for the appropriate implementation of the irrigation projects, and to establish a structure for dissemination.

The technical standards as well as guidelines and manuals will be continuously improved/developed and extended through the implementation of training by DGWRD, MPW.

#### **2.3. Outputs**

The Outputs of the Projects are:

- (1) The technical capability of IESC technical staffs are to be enhanced;
- (2) The technical standards, guidelines, and manuals including related computer system in the fields of investigation, planning, design, operation and maintenance, and rehabilitation and up-grading are to be developed and improved;
- (3) The training of capable irrigation technical staffs in the fields mentioned in the fields of investigation, planning, design, operation and maintenance, and rehabilitation and upgrading are to be implemented.

#### **2.4. Inputs**

The Inputs of the Project consisted of Japanese Input and Indonesian Input, as follows:

##### **(1) Japanese Input**

###### **a. Dispatch of Expert**

A total of 11 long-term experts and 30 short-term experts have been dispatched. They include a team leader and two coordinators, as well as personnel with expertise in Investigation, Planning and Design, Operation and Maintenance, Rehabilitation and Upgrading and System Development.

###### **b. Acceptance of Trainees**

A total of 22 counterparts have been visited Japan to participate in technical training. All of them are Irrigation and Drainage Engineers having expertise in Investigation, Planning and Design, Operation and Maintenance, Rehabilitation and Upgrading and System Development.

c. Provision of Machinery and Equipment

Machinery and equipment were provided in order to carry out the Project activities effectively. All machinery and equipment provided have contributed to the development and enhancement of the activities of the Project.

d. Supplementary Funds to Cover Local Cost

The Japanese side paid part of the project management cost and local cost for training the staffs of IESC in order to implement the Project effectively.

e. Dispatch of Study Teams

During the implementation of the Project, the Japanese side dispatch some study teams to support the Project as follows:

- Preliminary Survey Team (Oct. 13 – 25, 1992)
- Long Term Survey Team (Sept. 7 – Oct. 25, 1992)
- Implementation Survey Team (Feb. 27 – March 9, 1994)
- Consultation Study Team (March 7 – 17, 1995)
- Advisory Team (Dec. 9 – 21, 1996)

(2) Indonesian Input

a. Provision of land, buildings and facilities

The Government of Indonesia provided land, buildings and facilities required for implementation of the project in DGWRD headquarters, IESC Bekasi and the model satellites.

b. Allocation of Budget

The Indonesian side allocated 2,884 million rupiahs for operational cost from 1994 up to 1999. Those budgets have been provided for salary, materials, machinery, equipment, transport and travel allowances and others.

c. Assignment of Counterparts and other personnel

Indonesian counterparts and other personnel under DGWRD and Irrigation Agency, Research Institute for Water Resources in Bekasi were assigned for the implementation of the Project.

d. Supply and Replacement of Machinery and Equipment

## 2.5. Project Activities

The Project activities covered five (5) sectors of activity as follows:

### (1) Investigation, Planning and Design (IP&D)

In this sector, the IESC project prepared technical standards, guidelines and manuals for planning irrigation schemes such as Guideline for Irrigation Investigation Planning, Guideline for Design of Fill Dam, and Guideline for Countermeasure for Soft Soil, etc.

Beside, the project also developed technical calculation programs such as water hammer for simple pipeline, water level calculation on canal by non-uniform, etc. In addition, the project also conducted several kinds of survey for the case study.

### (2) Operation and Maintenance (O&M)

In this sector, the IESC project prepared the technical guidelines for O&M, examined and introduced irrigation water management for efficient use of water resources, and improved O&M information procedure as model.

### (3) Rehabilitation and Upgrading (R&U)

In this sector, the IESC project prepared the technical guidelines for R&U such as for Open Canal and Head Work. The technical specification for the R&U works was also prepared.

### (4) System Development (SD)

The project developed technical calculation system and data base system.

### (5) Training

Training, workshops and seminars were carried out, participated by engineers and technicians of both central and local government. Through these activities, new technology was introduced and the developed guidelines and calculation programs were diffused.

## **CHAPTER III**

### **APPROACH AND METHODOLOGY**

#### **3.1. Methodology of the Study**

The evaluation include visits to the project sites and interviews with concerned institutions, such as Directorate General of Water Resource, Ministry of Settlement and Regional Infrastructure, Research Institute of Water Resources, Provincial Irrigation Services, Provincial Irrigation Projects, and so forth.

The Consultant conducted the following evaluation steps for the evaluation study effectively and efficiently:

##### **i) Desk study for reviewing documents relating to the projects**

JICA provided necessary documents related to the projects at the preliminary meeting. Based on the documents, the Consultant prepared narrative summary for evaluation.

The Consultant collected other relevant data in the concerned agencies as mentioned above.

##### **ii) Identification of major questions and key informants for the evaluation study**

The Consultant formulated the Evaluation Design by devising evaluation questions. Based on the Terms of Reference (TOR) from JICA, in this Ex-post Evaluation Study, the Consultant focused on the Impact and Sustainability.

###### **(1) Impact**

Identify the extent to which the overall goal of the project has been achieved, and verify intended and unintended, direct and indirect, positive and negative changes in technical, social-economic, institutional and environmental aspects because of the project.

###### **(2) Sustainability**

Question whether project benefits are likely to continue after completion of the project. This criterion will include a study of technical, institutional, and financial aspects in O&M agency/organization, condition and status of equipment/facilities procured by the project, technology transfer, and ownership of beneficiaries. It will also include an analysis of issues and constraints, which may impede sustainability of the project.

##### **iii) Collection of background data needed for evaluation analysis;**

The Consultant collected all data required, if available, in all concerned agencies, such as Directorate General of Water Resource, Ministry of Settlement and Regional

Infrastructure, Research Institute of Water Resources, Provincial Irrigation Services, Provincial Irrigation Projects, and so forth. The Consultant sorted and extracted the data for answering the evaluation questions and for the evaluation analysis.

#### iv) **Observation of project site and key informant interviews**

The Consultant visited the project site to understand the real situation of the project result, including operation and maintenance. Direct interview to the key persons has been conducted to hear their response, requirements and suggestions for the project. The key persons interviewed and their agencies and position is given in Table - 1.

#### v) **Analysis of collected data, including result of interviews**

The Consultant analyzed the collected data and result of interview. The analyses covers the evaluation points, points to be checked, indicators, data sources, questionnaires and interview result.

#### vi) **Drafting of report**

The report of the evaluation studies will present **recommendations** and **lessons-learned**. **Recommendations** will describe practical and specific suggestions to enhance the positive impact and sustainability of the evaluated projects. On the other hand, **lessons learned** will present specific suggestions for the better formulation and implementation for future projects in the similar field based on the evaluation analysis.

### 3.2. **Implementation Schedule**

The study has been carried out for 3 (three) weeks during March, 2005. The process of the study will be as follows:

- |   |   |                                     |
|---|---|-------------------------------------|
| (1) Preliminary meeting and preparation | : | 2 <sup>nd</sup> week of March, 2005 |
| (2) Observation and interviews          | : | 3 <sup>rd</sup> week of March, 2005 |
| (3) Drafting of Report                  | : | 4 <sup>th</sup> week of March, 2005 |

The implementation schedule is shown in Figure - 1.

### 3.3. **Member of Evaluation Team**

The Consultant assigned the following experts to conduct the Ex-post Evaluation Study on Irrigation Engineering Service Center (IESC) Project:

#### 1. Team Leader, Ex-post Evaluation Specialist

Ir. Hadiono Sastrodihardjo, senior Ex-post Evaluation Specialist, graduate in Agricultural, Faculty of Agriculture, Gadjah Mada University, Yogyakarta, 1968.

#### 2. Irrigation Engineering/Evaluator Specialist

Ir. Besar Hatmaya, senior Irrigation Engineering Specialist graduated Water Resources Engineer from Bandung Institute of Technology, Bandung, 1985.

3. Assistant Evaluator Specialist

Ir. Nani Susanti, assistant Evaluator Specialist graduated Environmental Engineer from Environmental Engineering College, Yogyakarta, 1996.



## **CHAPTER IV**

### **RESULT EVALUATION AND FINDING**

#### **4.1 Present Status of Project**

##### **(1) Technical Standards, Guidelines and Manuals**

At the end of project completion, all of the planned activities have been completed except guidelines for countermeasure for soft soil and water hammer for simple pipeline. The countermeasure for soft soil was prepared just up to draft guideline, while guideline for water hammer for simple pipeline was not prepared. The comparison of planned project activities and actual result is shown in Table - 2.

After completion of the technical standards, guidelines and manuals, socialization and dissemination was carried out in the provinces of East Java, Central Java, West Java, Lampung, South Sulawesi, North Sulawesi, Bali, West Nusa Tenggara, Maluku, and West Sumatra in the form of formal and in-formal workshops, seminars and trainings as well as technical practice in the fields. Engineers and technicians from the irrigation institutions and agencies such as province and district water resources services, province irrigation projects, research institute on water resources and other concerned agencies participated in the activities.

Due to budget constraint, the dissemination of the technical standards, guidelines and manuals for others provinces was not conducted in the provinces, but they were invited to participate the workshops and training conducted in Experimental Station for Irrigation Bekasi, a center under the Research Institute of Water Resources, which take place the role and function of IESC project. The list of participants and material training are shown in Table – 3 and Table – 4.

In view of development of technical standards for the implementation of the irrigation projects, and to establish a structure for dissemination, the project purpose has been highly achieved.

##### **(2) Satellite Model for Irrigation Water Management in Lampung**

Computerized information procedure for O&M irrigation system in Lampung province was established for the Way Sekampung Irrigation System and handed over in December 1998. Even the system was improving the irrigation water management by fair and effective distribution of water, decreased water loss, etc., unfortunately, this system was not quite running well at present due to change of the system management.

At the time of implementation, the management of the system was under Central Lampung Irrigation Service. Due to regional autonomy, the region was divided into three (3) regions, i.e., Central Lampung, East Lampung and Metro. The management of the system becomes more complicated. In addition, due to development of the irrigated area, the point dam of Agro Guruh was not suitable any longer due to shortage of irrigation water supply.



Field visit at Lampung Irrigation Scheme

At the time of implementation, the management of the system was under Central The Lampung Province Irrigation Service consider Batutegi dam for the point dam of the irrigation system management.

The comparison condition between planned and actual for the Satellite Model in Lampung is given in Table – 5.

## 4.2 Impact

### (1) Positive Impacts

#### a. Impact on Ex-Counterparts of IESC Project

During the implementation of the IESC Project, the Indonesian Counterparts, which mostly came from various sections of DGWRD worked together with the Japanese Experts. They also participated in training conducted in Japan.



The transfer knowledge from the Japanese Experts to the Indonesian Counterparts was running well, the ex-counterparts have improved their capabilities and got good experiences in IP&D, O&M, R&U and SD.

Due to change organization of Ministry of Public Works to be Ministry of Settlement and Regional Infrastructure, most of the IESC Staffs has been scattered in some water resources institutions, but mostly working in the sector of water resources or irrigation and disseminate the knowledge gained from the IESC project to their colleges.

The transfer of technology continues among the ex-counterpart of IESC project and their colleges in their new institutions and their working discipline as well as logical frame has been improving. They keep contact and coordinate with the concerned institutions in conducting their activities in water resources sector.

### **b. Impact on Experimental Station for Irrigation**

Some of the ex-counterparts of IESC Project continue working in Experimental Station for Irrigation as trainers. After completion of the IESC Project in 1999, the Experimental Station for Irrigation continues to develop technical standards, guidelines and manuals in irrigation sectors manuals based on their experiences and problems encountered during implementation in real irrigation projects.



Some of the technical standards, guidelines and manuals are as below:

In IP&D sector:

1. Technical guideline on paddy field water feeding by Surjan System
2. Technical guideline on gabion weir construction with semi impermeable screen on village irrigation
3. Water requirement for land preparation, planting and growing on new paddy field
4. Guideline on determination of manual work unit price analysis on tertiary irrigation networks

In O&M sector:

1. System water feeding of rotation, intermittent and flushing on irrigation canal
2. Guideline on Irrigation Networks Operation

In R&U sector:

1. Leakage countermeasures on irrigation canal by concrete mattress

In SD sector:

1. Water user empowerment in operation & maintenance of irrigation networks

The Experimental Station for Irrigation has improved the institution capability in developing the technical standards, guidelines and manual, continuing the function and role of IESC Project.

### **c. Impact on Province Irrigation Services**

The technical standards, guidelines and manuals have been disseminated in the province/district irrigation institutions as mentioned in the clause 4.1.(1), while for the

other provinces were invited for attending the training conducted in the Experimental Station. The dissemination means not only deliver or give the technical standards, guidelines and manuals, but also giving the comprehensive knowledge on the objective, function and implementation of the guidelines and manuals.

#### **d. Impact on Irrigation Projects**

Some of the guidelines and manuals resulted from IESC project (IP&D, O&M, R&U) have been disseminated and implemented in some irrigation projects in Indonesia. In some areas, the dissemination conducted only in general comprehensive. It has not reached to the implementation level that functioning in operation of sustainable irrigation.

Even though, in some irrigation projects, the activities in planning and design, operation and maintenance, rehabilitation and upgrading become easier and cheaper than before since the guidelines and manuals complement to the existing guidelines.

By applying the same standards, it will form same comprehensive and logical frame in the implementation and operation of irrigation scheme. This is the base for establishing the efficient and sustainable of irrigation system.

The IESC project contributed in achieving the Overall Goal to establish appropriate irrigation projects, which are well maintained, managed, repaired and renovated.

#### **e. Impact on the Farmers and Water User Association (WUA)**



Socialization of Guidelines & Standard to WUA

The skills of farmers as the members of Water User Association in South Sulawesi Province were improved by socialization of operation & maintenance and rehabilitation & upgrading guidelines. Irrigation satellite model system in Lampung has improved irrigation water supply to the farmer's paddy fields.

Through socialization of O&M and R&U guidelines to Water User Associations have improved the management of irrigation network.

#### **(2) Negative Impact**

There is no negative impact realized during the Evaluation Study.

#### **(3) Monitoring System**

There is no clear monitoring system on the application of the technical standards, guidelines and manuals resulted from IESC project and Experimental Station for Irrigation in Bekasi after the project. The present activity of the DGWR or the Experimental Station for Irrigation is aimed to make general uniform understanding on the guidelines. They

conduct training only on the application. There is no effective direct connection to monitor the benefit of the guidelines at site.

It is required to establish benefit monitoring system at site by formulating indicators and scoring system and followed by evaluation and further improvement and development of the guidelines.

#### **(4) Improvement System**

Experimental Station for Irrigation in Bekasi continues for reviewing the technical standards, guidelines and manuals inline with the change and development of the regulations and policies and also the development of the society demand.

One of the efforts is to up-grade the status of the guidelines to be SNI (National Indonesian Standard), by further process specified by National Standardization Agency. This effort will be more effective if based on the monitoring and evaluation result.

### **4.3 Sustainability**

#### **(1) Institutions**

To continue the function of CGSC Project, the Experimental Station for Irrigation in Bekasi is established in 1986 under the management of Research Institute for Water Resources, Ministry of Public Works. It has the function for research and development of water resources, especially in irrigation sector.

The implementation of IESC Project (1994 – 1999) was under management of Directorate of Technical Guidance, DGWRD, but supported by the personnel and facilities from the Experimental Station for Irrigation.

After completion of the IESC Project, some of the ex-counterparts work in the Station as trainer. The Experimental Station for Irrigation in Bekasi seem take place the role and function of IESC project for developing technical standards, guidelines and manuals for irrigation engineering. The Station continuously conducts trainings and workshops for dissemination of the technical standards, guidelines and manuals of irrigation activities. The Station maintains and use some equipments procured under IESC for their daily activities. The relationship of IESC Project and the Experimental Station for Irrigation is shown in Figure - 2.

On the other hand, Secretariat of DGWR, MSRI take care some other equipments for continuously conducting dissemination and training of water resources activities in the frame of Public Information Guidance Sub-project. The Secretariat of DGWR also continues the activity of IESC project in the satellite model area in South Sulawesi by implementing Empowerment of Water User Association Project. The relationship of the Experimental Station for Irrigation with the Secretariat of DGWRD is shown in Figure - 3.

Starting in 2002, the training activities are conducted by other directorates by using some materials as the product of IESC Project. In regional autonomy era and in line with the

change and development of government regulations and policies, the direction of training to irrigation implementing agencies is stressed to the function of regional government (district/city), where the province or central governments give support in any forms, such as: funds, instructors, materials, models, etc. In this connection, the objective of the training is guidance on deep understanding in the form and model of the implementation.

In the level of province, the province irrigation services and province irrigation projects coordinate to the central governments (DGWR or the Experimental Station for Irrigation) for training and disseminating the guidelines and manuals to district irrigation services and will continue or apply the knowledge gained from the training in their areas by adjusting based on the local site conditions.

## (2) Operation and Maintenance of the Equipments

The laboratory equipments in Experimental Station for Irrigation in Bekasi are still functioning as the facilities for improvement of human resources capability of the Station, and universities in surrounding Bekasi area. This equipment is ready to be functioned any time for irrigation activities.

The facilities and equipments are maintained periodically, but not all of the equipments can be maintained optimally. The effective maintenance can be conducted proportionally if the equipments are functioning well as planned. Therefore, the function of the equipments needs to be developed.



Equipments provided under IESC Project

For supporting the operation and maintenance and the activities, the Experimental Station for Irrigation in Bekasi gets the routine and projects budget from the governments. The budget consists of salary of the staffs, procurement of materials and operation and maintenance. The budget gradually increases from Rp. 800 millions in 2000 to be Rp. 1,590 millions in 2004. The budget for the Station from 2000 to 2004 is given in Table – 6.

The budget is sufficient for minimal standard of maintenance only. Functionally, it should be increased inline with the efforts of improvement and development of the function and benefits of the Experimental Station. The Station conducts the cooperation with the local governments and private to fulfill the requirement of proper maintenance.

Some of the equipments of IESC Project kept by the Secretariat of DGWR are still useful, but some are damage or out of date. The equipments are maintained as required for the activities of Public Information Guidance Sub-project.

### **(3) Social**

By the activities of IESC Project, there are some changes or improvements of the logical thinking of the concerned staffs on understanding the irrigation management problems. The works discipline of the concerned staffs is also improved.

#### **4.4 Factors affecting the impact**

##### **(1) Promoting Factors**

Experimental Station for Irrigation, Province Irrigation Services and irrigation projects highly enthusiasm in dissemination and applying the guidelines and manuals. The guidelines and manuals are applicable in general condition and more practical comparing to previous guidelines and manuals.

It is required the uniform pattern and clear steps to be followed to reach the effective and efficient of irrigation management in national level. The wide dissemination and application of the standards, guidelines and manuals will also improve the human resources capability in managing the irrigation system and further more promote the impact of the project benefits.

##### **(2) Preventing Factors**

The main preventing factor for the project impact is no clear system for dissemination and application of the standards, guidelines and manuals after completion of the IESC project. There is no institution who has clear responsibilities for dissemination and application of the standards, guidelines and manuals.

In addition, the character of the standards, guidelines and manuals is voluntary that has no strong power to force the institution concerned or irrigation project to apply or obey the guidelines and manuals. It is required to up-grade the status of the standards, guidelines and manuals to be SNI (National Indonesian Standard). In this case, the standards, guidelines and manuals have strong power to be applied and might be included in the Technical Specification of the irrigation project implementation.

Moreover, in the implementation of the regional autonomy, the change of structure and personnel some times cut the link or networks that have been established before. In the regions with these conditions, the comprehensive of the regional staffs in managing irrigation system is not properly. It is required to conduct training intensively to the new staffs for applying the guidelines and manuals. In some cases, there are some districts/cities need to establish regional regulation for applying the standards, guidelines and manuals.

## **4.5 Factors affecting the sustainability**

### **(1) Promoting Factors**

There are still irrigation institutions such as Experimental Station for Irrigation and Irrigation Services that take place the role of IESC. Most of the ex-counterparts of IESC project continue working in the Station and provide training on irrigation activities. The Experimental Station for Irrigation in Bekasi (with the human resources and facilities) is still relevant to handle the function in realizing the sustainable irrigation system.

The implementation of regional autonomy (decentralization system) caused adjustment and change of organization structure and personnel at district/city and development of society demand. The autonomy gives more authority to the regional government to manage their owned irrigation scheme. This condition pushes the regional irrigation institution to improve their institution and human resources capability for managing the irrigation schemes.

### **(2) Preventing Factors**

The budget allocated by irrigation institutions for dissemination and training is very limited. This caused no regularly training per year for the irrigation middle-level technicians.

For exam, due to finance constraint in Lampung province water resources services, the operation and maintenance of irrigation model system in Lampung is quite suspended, some operators searched for other side job and the equipment maintenance is not appropriately conducted in line with the operation manual.

The coordination among the concerned institutions in monitoring the application of the guidelines and manuals at project site is very weak. They cannot see the problems immediately and less feed back input.

Change of organization of the Ministry of Public Works to be Ministry of Settlement and Regional Infrastructures caused some person in charge for irrigation institutions move to other sector. The networks established during the project implementation become weak. The present institutions where the ex-counterparts are working is presented in Table - 7.



## **CHAPTER V**

### **LESSONS LEARNED**

In line with the present function and role of the government, the lessons-learned to be taken from the implementation of the IESC Project are as follows:

- 1) The preparation of manuals, guidelines and standards of irrigation implementation in various sectors and levels are very relevant and required in realizing the facilities and efforts for improvement of the capability of regional government staffs and the other stakeholders.
- 2) The dissemination of the guidelines, manuals and standards through training which conducted by the IESC Project in the past, supported by proper and appropriate facilities, is urgently required in the future. By adjustment of the requirement to the present conditions, such training will support the government efforts in development of the irrigation scheme, which is appropriate, well maintained, renovated and up-graded.
- 3) In formulating the project design, it should consider the system for disseminating the project benefits and to establish strong coordination for monitoring the impacts, problems encountered and getting feedback for improvement of the project

## **CHAPTER VI**

### **OVERALL CONCLUSION**

The project highly achieved the purpose and contributed for realizing the overall goal. Experimental Station for Irrigation and some other irrigation institution under DGWR and local governments continue to disseminate and apply the guidelines and manuals resulted by IESC project.

No clear system of dissemination and the status of the guidelines and manuals become the inhibited factor of the project impact. Lack of coordination among the concerned institution inhibited the sustainability of the project.

## **CHAPTER VII**

### **RECOMMENDATION**

#### **(1) Impact**

The utilization of assets in the Experimental Station for Irrigation in Bekasi, such as training facilities, testing and research equipments, etc, should be functioned optimally to improve the capability of the stakeholders of irrigation implementation.

The status of guidelines and manuals should be up-graded from voluntary to be compulsory as National Standard issued by BSN (National Standard Agency). The guidelines and manuals should be included in the contract documents of irrigation projects implementation.

#### **(2) Sustainability**

It is required to establish strong coordination among the institutions concerned in monitoring the application of guidelines and manuals. Feedback taken from the problems encountered during the implementation should be inputted for improving the guidelines and manuals.

#### **(3) Others**

It is required to develop the services of Experimental Station for Irrigation by providing Outdoor Laboratory for Irrigation Scheme Model. The laboratory might be used for training practical in planning and design, operation and maintenance as well as rehabilitation and upgrading.

It is required to develop such kind of Irrigation Information Center which functioning for development of irrigation information service website and dissemination of applied irrigation technique. The Center will be the communication node between the stakeholders in central as well in the regional areas.

**Table - 1**  
**List of Respondent on Irrigation Engineering Service Center (IESC) Project**

<b>No.</b>	<b>Person in-charge</b>	<b>Position</b>	<b>Contact Number</b>
1	Mr. Yusyar	Chief of Irrigation Center, Bekasi	0815-14014144, 0812-1928266
2	M. Subari, ME	Staff of Irrigation Center, Bekasi (Ex-Counterpart O&M)	0812-8784436
3	Mr. Subari, BE	Staff of Irrigation Center, Bekasi (Ex-Counterpart RU)	
4	Mr. Tommy	Head of Sub-Directorate of Ground water, Swamp and Coastal Area (Ex-Project Manager of IESC)	0812-8550000
5	Mr. Danang Baskoro	Technical Affair of DGWRD (Ex-Counterpart O & M)	
6	Mr. Adi Pramudyo	Staff of Sub-Directorate of Institution of DGWRD (Ex-Counterpart IP&D)	0818-119120
7	Mr. Muqorobin	Staff of Irrigation Center, Bekasi (Ex-Counterpart IP&D)	
8	Mr. Sumudi Kartono	Staff of Secretariat of Directorate General of DGWRD (Ex-Counterpart IP&D)	0815-9895336
9	Mr. Hasan	Technical Affair of DGWRD (Ex-Counterpart SD)	0818-701443
10	Mr. Dianto	PPSDA Hidrologi (Ex-Counterpart SD)	0813-10259589
<b><u>Project and Dinas</u></b>			
11	Mr. Achmad Syahril, ST., SP.	Head of Province Irrigation Service Office, Lampung	0721-482210
12	Mr. K. Sembiring	Head of Planning of Province Irrigation Service Office, Lampung	0721-481171
13	Mr. Edi Suherman	Proyek Irigasi Andalan Lampung	0721-489180, 0815-40933045
14	Ir. Darmawan, Dipl, HE.	Head of Province Water Resources Development Service Office, West Java	022-4219848
15	Ir. Suardi, Meng.	Head of Program of Province Water Resources Development Service Office, West Java	022-4207064, 0811-223214
16	Ms. Diah	Head of Research and Development Center for Water Resources Development	022-2501083
17	Mr. Permana	Proyek Irigasi Andalan Jawa Barat	022-4219384, hm: 022-5231812

**Table - 2 Plan and Actual Comparison of IESC Project activities**

No.	Plan	Actual
1.	Investigation, Planning & Design	
	- Guideline for Irrigation Investigation Planning	- as planned -
	- Guideline for Design of Fill dam Volume I	- as planned -
	- Guideline for Design of Fill dam Volume II	- as planned -
	- Guideline for countermeasure for soft soil	Draft only
	- Water hammer for simple pipeline program	Not be implemented yet
	- Water level calc. on canal by non-uniform	- as planned -
2.	Operation & Maintenance (O&M)	
	- Completing the existing O&M guideline to be national guideline and its dissemination	- as planned -
	- Introduction of irrigation water management technology for efficiency of water resources utilizing (Torrent Intake)	- as planned -
	- Improvement of O&M information procedures	- as planned -
3.	Rehabilitation and Upgrading (R&U)	
	- Preparation of R&U guidelines for open canal, head work, small dam, including preparation of technical specification for R&U works	- as planned -
4.	System development (SD)	
	- Technical calculation system development and data base	- as planned -
5.	Training	
	- preparation of training plan, curriculum and material, and training implementation	- as planned -

Source : Interview Result, 2005

**Table – 3**  
**LIST OF PARTICIPANTS TRAINING IN IRRIGATION CENTER, BEKASI**  
**IN THE YEAR OF 2000, 2001 AND 2004**

1. Dinas Sumber Daya Air, Propinsi Nanggroe Aceh Darussalam
2. Dinas PU Pengairan, Propinsi Sumatera Utara
3. Dinas Pengelolaan Sumber Daya Air, Propinsi Sumatera Barat
4. Dinas Pemukiman dan Prasarana Wilayah Propinsi Riau
5. Dinas Pemukiman dan Prasarana Wilayah Propinsi Jambi
6. Dinas Pemukiman dan Prasarana Wilayah Propinsi Bangka Belitung
7. Dinas Pekerjaan Umum Pengairan, Propinsi Sumatera Selatan
8. Dinas Pemukiman dan Prasarana Wilayah Propinsi Bengkulu
9. Dinas Pengairan, Propinsi Lampung
10. Dinas Pekerjaan Umum, Propinsi Banten
11. Dinas Pekerjaan Umum, Propinsi DKI Jakarta
12. Dinas Pengelolaan SDA, Propinsi Jawa Barat
13. Dinas Pengelolaan SDA, Propinsi Jawa Tengah
14. Dinas Pekerjaan Umum, Propinsi DI Yogyakarta
15. Dinas PU Pengairan, Propinsi Jawa Timur
16. Dinas Pemukiman dan Prasarana Wilayah Propinsi Kalimantan Barat
17. Dinas Pekerjaan Umum, Propinsi Kalimantan Tengah
18. Dinas Pemukiman dan Prasarana Wilayah Propinsi Kalimantan Selatan
19. Dinas Pekerjaan Umum dan Pemukiman Prasarana Wilayah, Propinsi Kalimantan Timur
20. Dinas SDA, Propinsi Sulawesi Utara
21. Dinas Pekerjaan Umum dan Pemukiman Prasarana Wilayah, Propinsi Gorontalo
22. Dinas Pemukiman dan Prasarana Wilayah Propinsi Sulawesi Tengah
23. Dinas Pengelolaan SDA, Propinsi Sulawesi Selatan
24. Dinas Pemukiman dan Prasarana Wilayah Propinsi Sulawesi Tenggara
25. Dinas Pekerjaan Umum, Propinsi Bali
26. Dinas Pemukiman dan Prasarana Wilayah Propinsi Nusa Tenggara Barat
27. Dinas Pemukiman dan Prasarana Wilayah Propinsi Nusa Tenggara Timur
28. Dinas Pekerjaan Umum, Propinsi Maluku
29. Dinas Pemukiman dan Prasarana Wilayah Propinsi Maluku Utara
30. Dinas Pekerjaan Umum, Propinsi Irian Jaya

**Table – 4**  
**LIST OF TRAINING MATERIAL**

- (I) Investigation, Planning and Design (IP & D)
  - 1) General Aspects
    - Introduction of Irrigation Knowledge
    - Irrigation water usage for plant
    - Relation among water, soil and plant
    - Irrigation water usage for fishery
  - 2) Operational Data Aspects
    - Collection and processing of irrigation network operational data
    - Analysis on irrigation network operational data
    - Climatology
    - Debit measurement on irrigation network
  - 3) Operation Plan Aspects
    - Water requirement calculation by Pastern and FPR method
    - Water requirement calculation by Factor K method
    - Grouping and planting pattern system
  
- (II) Operation and Maintenance (O & M)
  - Irrigation network maintenance
  - Arrangement, Distribution and Supplying of water
  
- (III) Establishment and Extension Aspects
  - Irrigation extension
  - Establishment of irrigation network utilization
  - Water User Association role on operation and maintenance of irrigation network
  - Establishment and empowerment of Water User Association (WUA)
  
- (IV) Monitoring and Operation Evaluation Aspects
  - Monitoring and operation evaluation of irrigation network
  
- (V) Miscellaneous Aspects
  - Reporting
  - Paddy field forming technique
  - General guideline for handling over of irrigation management to WUA
  - Irrigation water tariff management (IPAIR)
  - Environmental Impact Assessment
  - Construction supervision

**Table - 5. Plan and Actual Comparison of Irrigation System Model in Lampung**

No.	Design components	Plan	Present condition
1.	Irrigation scheme area	44,000 ha	> 44,000 ha
2.	Point dam	Agro Guruh	No quite properly, be recommended at Batu Tegi Dam
3.	System management	Central Lampung Service Office	Difficulties in the system management, due to regional autonomy, the region become three regions authority Central Lampung, East Lampung and Metro.

Source : Interview Result, 2005



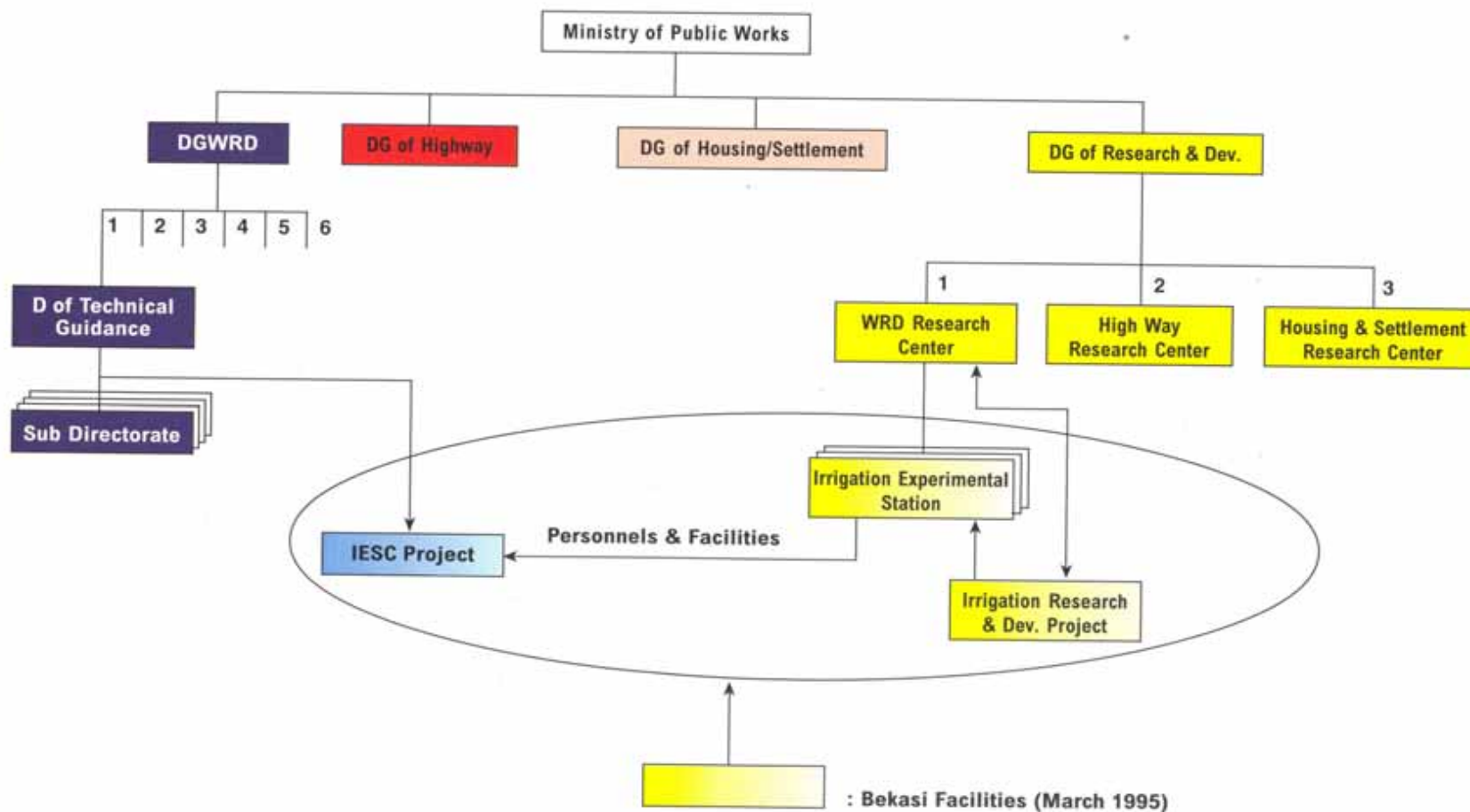
**Table - 7**  
**LIST OF PRESENT ASSIGNMENT OF EX- COUNTERPART**

No.	Name	Assignment Position
1.	Mr. M.Napitupulu,Dipl.HE	Retired
2.	Mr. Suwardi,Dipl.HE	Retired
3.	Mr. A.T.M.Sitompul,M.eng	Technical Affair of DGWRD
4.	Mr. Subari,BE	Irrigation Center, Bekasi
5.	Mr. Subari,ME	Irrigation Center, Bekasi
6.	Mr. Adi Pramudyo	Sub-Directorate of Institution of DGWRD
7.	Mr. Bambang Sugiarto	Retired
8.	Mr. Danang Baskoro	Technical Affair of DGWRD
9.	Mr. Muryadi Rahmaru,ME	Retired
10.	Mr. Bambang Waluyono	Retired
11.	Mr. Darwin Lubis	Irrigation Project, Bandung
12.	Mr. Darmono	Retired
13.	Mr. Surya Dewanto	Retired
14.	Mr. Soekrasno	PPSDA of DGWRD
15.	Mr. Kamran Erang	Retired
16.	Mr. Hasan Maryadi	Technical Affair of DGWRD
17.	Mr. Zainuddin	Retired
18.	Mr. Ketut Kaler	Retired
19.	Mr. Bambang Prihono	Retired
20.	Mr. Dicky Supodo	Retired
21.	Mr. Wayan Suyadnya	Retired
22.	Mr. Dianto	PPSDA Hidrologi of DGWRD

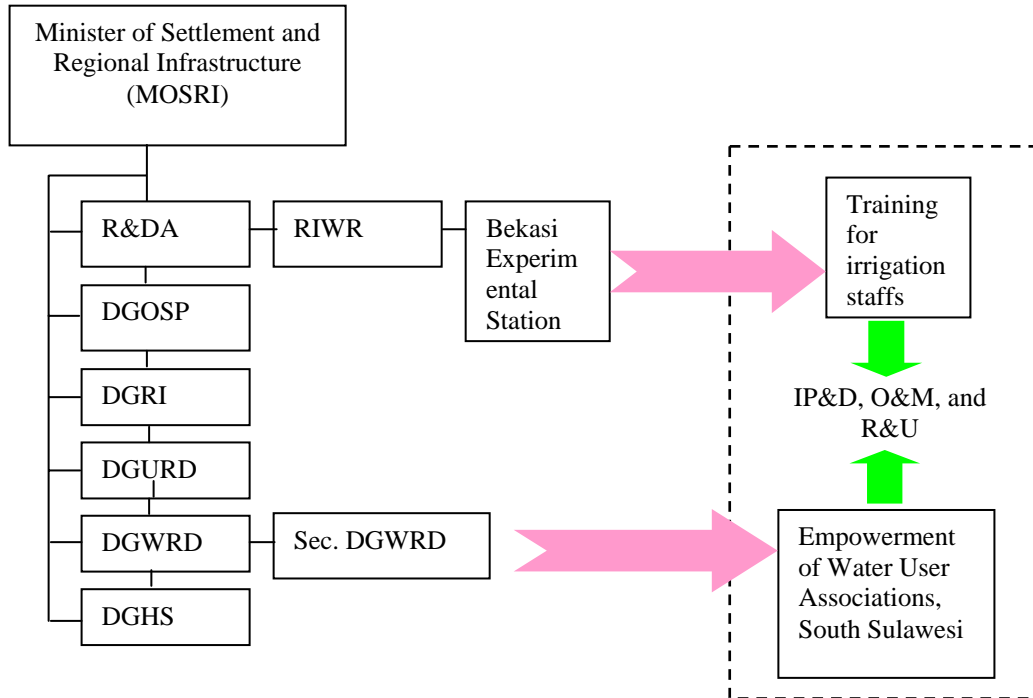


Figure - 2

The relationship of Bekasi's and MPW's organization



**Figure 3. Flow Chart of Followed-up IESC Project**



Note :

- R&DA = Research and Development Agency
- DGOSP = Directorate General of Spatial Planning
- DGRI = Directorate General of Regional Infrastructure
- DGURD = Directorate General of Urban and Rural Development
- DGWRD = Directorate General of Water Resources Development
- DGHS = Directorate General of Housing and Settlement
- RIWR = Research Institute for Water Resources



Photograph No. 1. Recording rain gauge and evaporator ERR-101 still functioned well at Irrigation Center, Bekasi

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Photograph No. 2. Asphalt sprayer 200 liters rare be utilized, still functioned well at Irrigation Center, Bekasi



Photograph No. 3. Computer procured under IESC Project was utilized in Directorate General of Water Resources Development office at Jakarta.

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Photograph No. 4. Cylinder Mold BBC is functioned well and often be utilized at Laboratory of Irrigation Center, Bekasi.