REPUBLIC OF INDONESIA
MINISTRY OF PUBLIC WORKS

REPUBLIC OF INDONESIA
THE PREPARATORY SURVEY
FOR
IKK WATER SUPPLY SYSTEM DEVELOPMENT
SECTOR LOAN PROJECT

FINAL REPORT

VOLUME III
MAIN REPORT
PART 1: EVALUATION OF SPAM IKK PROJECT

NOVEMBER 2010

JAPAN INTERNATIONAL COOPERATION AGENCY

NIPPON KOEI CO.,LTD
KRI INTERNATIONAL CORP.

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Exchange Rate

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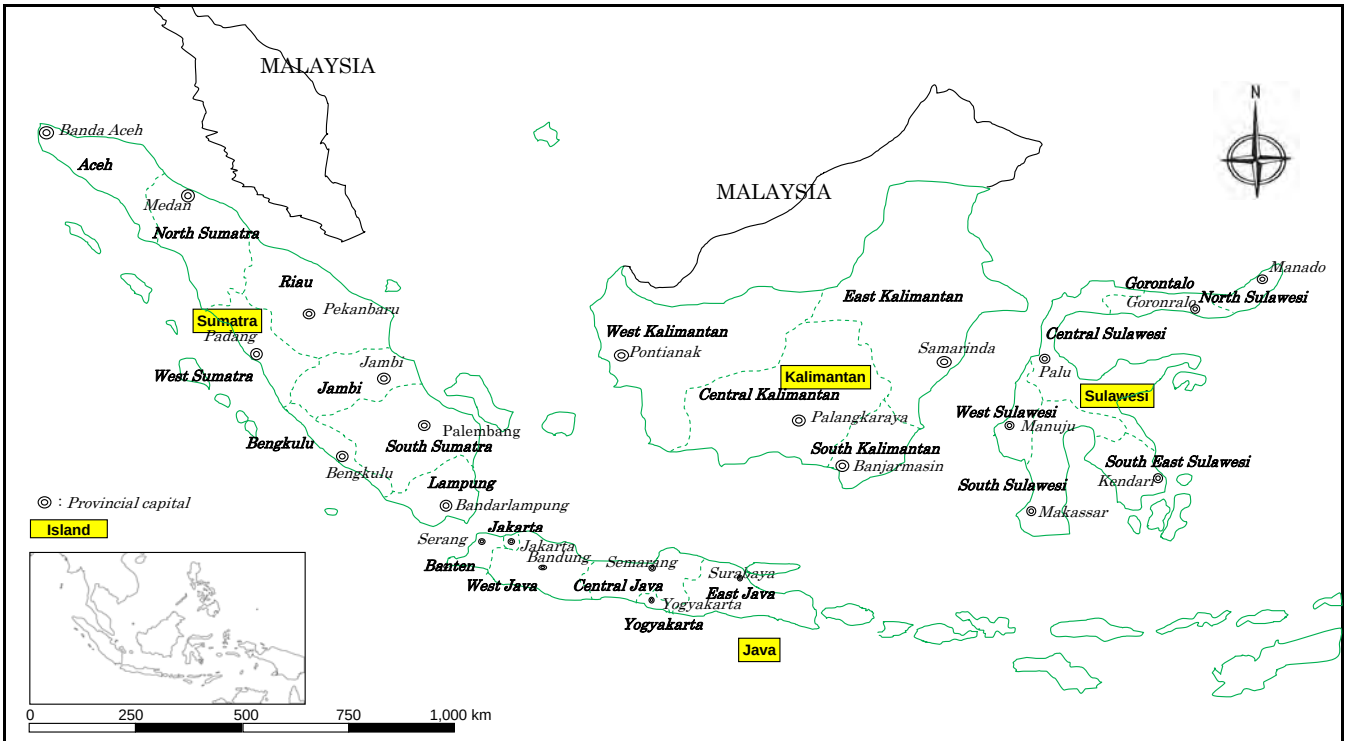


Island	Province	Number of SPAM IKK					on-site review	
		2008	2007	2006	2005	total	First	Second
Sumatra	NAD	3	2	2	3	10		
	North Sumatra	3	1	4	4	12	2	
	West Sumatra	4	3	5	2	14		2
	Riau	3	1	1	1	6		2
	Kepulauan	2	0	0	0	2		
	Jambi	1	1	4	2	8		2
	South Sumatra	3	2	0	2	7		2
	Bangka Belitung	2	2	1	0	5		
	Bengkulu	2	1	2	0	5		2
	Lampung	3	1	0	1	5		1
	sub-total	26	14	19	15	74	2	11
Java	Banten	2	0	0	0	2		1
	West Java	8	2	0	0	10		4
	Central Java	4	3	3	5	15	2	3
	Yogyakarta	2	1	0	0	3		2
	East Java	6	4	7	2	19		5
	sub-total	22	10	10	7	49	2	15
Kalimantan	West Kalimantan	3	3	1	2	9	2	
	Central Kalimantan	3	0	2	2	7		2
	East Kalimantan	3	5	4	3	15		2
	South Kalimantan	2	3	2	0	7		2
	sub-total	11	11	9	7	38	2	6
Sulawesi	North Sulawesi	2	0	3	2	7		2
	Gorontalao	2	2	1	2	7		2
	West Sulawesi	2	4	0	3	9		
	Central Sulawesi	3	2	2	1	8		3
	South Sulawesi	6	4	2	0	12	2	2
	South-East Sulawesi	2	2	1	3	8		1
	sub-total	17	14	9	11	51	2	10
	total	**76**	**49**	**47**	**40**	**212**	**8**	**42**

Location Map and List of SPAM IKK (2005-2008)

(Source: Menuju Pencapaian Target MDGs Bidang Air Minum)

THE PREPARATORY SURVEY
FOR
IKK WATER SUPPLY SYSTEM DEVELOPMNET SECTOR LOAN PROJECT

Study Period: February - November 2010
Counterpart Agency: Directorate General of Human Settlement, Ministry of Public Works, Republic of Indonesia

OUTLINE OF THE STUDY

1. OBJECTIVES

The following are the objectives of the Study:

(1) To comprehend and analyze the present conditions and issues of the Drinking water supply system in the core area of a sub-district area (SPAM IKK) implemented by the Directorate General of Human Settlements (DGHS) of the Ministry of Public Works (MPW);

(2) To take appropriate countermeasures against present issues and support the formulation of a prospective yen-loan-financed project

2. STUDY AREA

The preparatory survey is carried out in Jakarta, and in 50 on-site review areas which are selected from the existing project sites in Sumatra, Java, Kalimantan and Sulawesi islands.

3. PRESENT CONDITIONS AND ISSUES OF SPAM IKK

During the on-site review of 50 SPAM IKK, it was observed that the facilities are operated properly in 42 SPAM IKKs, while the facilities are not properly operated or not in operation in eight SPAM IKKs. In such SPAM IKKs, several problems were observed as follows:

1) Planning stage
- Idling capacity of treatment plants
- Unpredictable selection results of proposal
- Weak design quality

2) Construction stage
- Leakage from fiber reinforced plastic (FRP) tanks.
- Insufficient coordination in implementation between APBN and APBD portions

3) Operation stage
- Small number of house connections
- Low treated water quality

- Low profitability of water works

4. OUTLINE OF THE PROPOSED PROJECTS

The sector loan will finance SPAM IKK projects (sub-projects) in the selected provinces to increase the piped water supply from the semi-urban population. Before considering the sector loan project, it is necessary to take actions to solve the issues described in this report.

4.1 Basic Concepts (Selection of Provinces for Sector Loan Project)

The selection of the province should be conducted under the following criteria.

- Population density (High density > Low density)
- Access to safe water (Poor access > Normal access)
- Number of district (Great number > Small number)
- Number of existing SPAM IKK (Great number > Small number)
- Number of planning SPAM IKK (Great number > Small number)
- Number of healthy Regional Drinking Water Enterprise (PDAM) (Great number > Small number)
- Capacity for SatKer (High potential capacity > Low potential capacity)

The population density, access to safe water and the number of district are indicator for necessity for water supply systems. The number of existing SPAM IKK projects and capacity for Working Unit (SatKer) are the indicators of for the potential capacity for implementation of sub-project under the sector loan project. The number of planning SPAM IKK projects and the number of healthy PDAMs, meanwhile, are indicators of the validity.

4.2 SECTOR LOAN PROJECTS

(1) Basic Concepts for the Formulations of sub-projects

As a result of the selection, the province for the sector loan project should be selected at Central Java and East Java in Region I and South Sulawesi in Region II. From 2010 to 2014, implementation of 632 SPAM IKKs is planned in Sumatra, Java, Kalimantan and Sulawesi Islands. On the average, six SPAM IKKs programs implemented in one province each one year. Finally, 60 SPAM IKKs programs are implemented in the three selected provinces (Central Java, East Java and South Sulawesi) in three years.

(2) The Proposed sub-projects

- A typical sub-project in the sector loan is planned as 10L/s of the size. The target number of connections is 1,000 house connections
- The project composed of 60 sub-projects in three provinces in three years.
- The design population to be served in 60 sub-projects in three provinces is about

300,000.

- The projected total demand of the 60 sub-projects is approximately 75,000m3/day. The number of house connection will eventually reach about 60,000.

Number of the Project for SPAM IKK in sector loan

	Number of Planned SPAM IKK (2010-2014)	Number of Planned SPAM IKK in Sector Loan in three years	Number of Planned SPAM IKK in Sector Loan per one year
CENTRAL JAVA	65	27	9
EAST JAVA	39	18	6
SOUTH SULAWESI	34	15	5
TOTAL	138	60	20

Source: JICA Study Team 2010

4.3 Cost Estimates

(1) Construction costs (base cost)

The construction cost is estimated by the number of sub-project and unit cost of the sub-projects.

Construction Cost

	Q'ty	Unit Price		Total	
		FC (USD)	LC (mil. Rp)	FC (USD)	LC (mil. Rp)
Sector Loan					
Central Jawa	27	0	4,879	0	131,733
East Jawa	18	0	2,615	0	47,070
South Sulawesi	15	0	6,295	0	94,425
				Total	273,228
Counterpart fund (APBD/PDAM)					
Central Jawa	27	0	2,285	0	61,695
East Jawa	18	0	2,285	0	41,130
South Sulawesi	15	0	2,285	0	34,275
				Total	137,100

Source: JICA Study Team 2010

(2) Project costs

Construction cost in the following table consists of the base cost, price escalation, and physical contingency. Total project cost is nearly USD 74 million (Rp. 625,448 million) and the total amount of sector loan is nearly USD 45 million (Rp. 380,340 million).

Summary of the Project Cost

	FC (USD)	LC (mil. Rp)	Total Equivalent (USD)
1. Construction Cost (Sector Loan)	**0**	**341,214**	**40,365,666**
Base Cost	0	273,228	32,322,872
Price Escalation &Contingency	0	67,986	8,042,793
2. Construction Cost (APBD&PDAM)	**0**	**171,214**	**20,254,633**
Base Cost	0	137,100	16,218,930
Price Escalation &Contingency	0	34,114	4,035,703
3. Consulting Service (Sector Loan)	**1,672,516**	**18,678**	**3,882,166**
Base Cost	1,512,000	15,973	3,401,630
Price Escalation &Contingency	160,516	2,705	480,536
4. Land Acquisition	**0**	**0**	**0**
5. Administration	**0**	**25,621**	**3,031,015**
6. Tax	**0**	**57,087**	**6,753,348**
Total Project Cost	**1,672,516**	**613,815**	**74,286,826**
Sector Loan Portion	**1,672,516**	**359,893**	**44,247,831**
Interest and Commitment Charge	1,160,618	0	1,160,618
Total Loan Amount (USD)			**45,408,449**

Source: JICA Study Team 2010

5. CAPACITY DEVELOPMENT FOR SPAM IKK

5.1 Overall Goal

Capacity Development (CD) is a process where the gap between APBN and APBD will be buried continuing for the achievement of MDGs and progress of the effective assistance. MDGs will be achieved as results of acquiring ability to achieve voluntarily by MPW's self efforts.

5.2 Project Purpose

The capacity of staff of MPW (PMU, DirPAM, DirBP of Cipta Karya) and Provincial SatKers of participating provinces in project planning, construction, monitoring, of the SPAM IKK projects is enhanced

5.3 Outputs

- Selection procedure and criteria of SPAM IKK is strengthened.
- Capacity of provincial SatKer staff in project planning, design and screening of SPAM IKK is strengthened.
- Capacity in training of operation and maintenance function of provincial SatKer is strengthened.
- Management capacity of PMU,Dir BP, Dir PAM, of CiptaKarya and provincial SatKer for SPAM IKK monitoring and evaluation r is strengthened.

5.4 Expertise and Advisory Functions Required/Activities

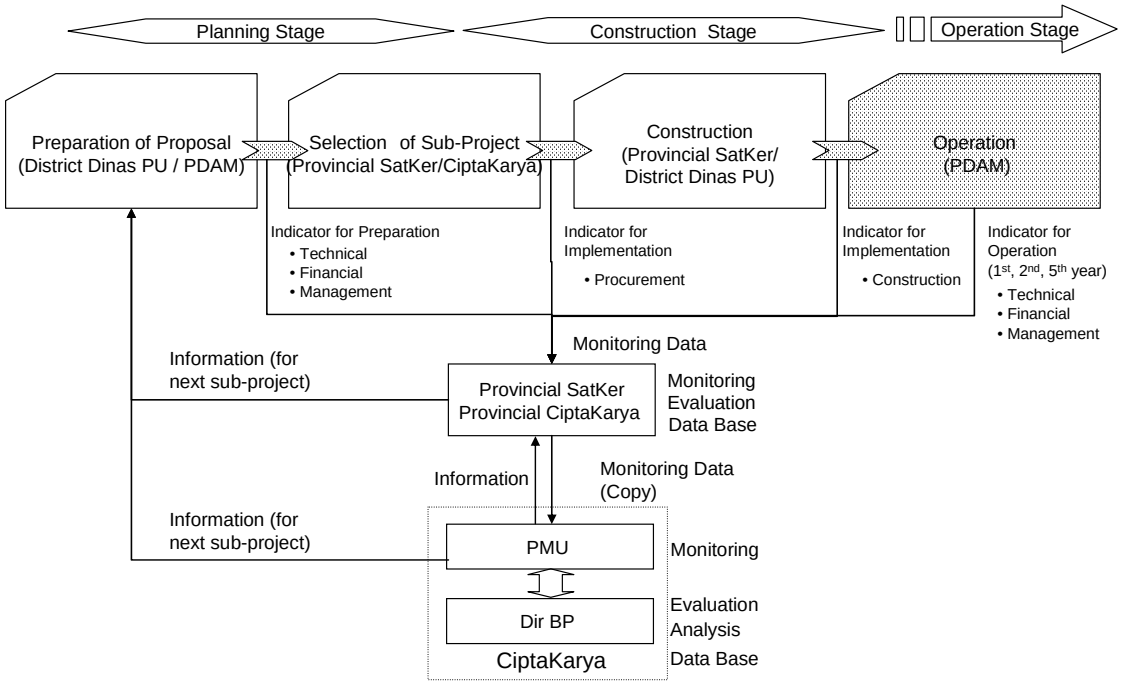
Cipta Karya and provincial SatKer are provided with the required expertise and advisory function by the technical assistance, after confirmation of organizational capacities to perm the SPAM IKK projects, and individual capacities of technical skills, knowledge and experience concerned with SPAM IKK project. The district level is also provided it through provincial SatKer.

6 MONITORING SYSTEM FOR MANAGEMNET, OPERATION AND MAINTENANCE

6.1 Monitoring System

The current capacity of the PMU is very limited as it has a few staff and no experience, therefore; Therefore, the PMU should be strengthened to perform monitoring works. The PMU and Dir BP, Cipta Karya should conduct collect and analyze the monitoring data submitted by the provincial SatKer/provincial Cipta Karya. The collection and compiling of the monitoring data shall be carried out by the PMU while the evaluation and analysis shall be done by Dir BP's their main task in term of monitoring system.

The monitoring structure is shown in below figure. The evaluation data will be taken at each stage, namely: planning stage, construction stage and operation stage. The planning stage data will be taken after submission of the proposal to provincial SatKer. The construction stage data will be taken after completion of the construction work and before facilities' handover to operation organization (PDAM).The operation stage data will be taken on the 1st, 3rd and 5th year after completion of the work. Cipta Karya should monitor the constructed SPAM IKK constantly through PDAM and provincial SatKer. Each PDAM has to establish a constant monitoring system for SPAM IKK with the assistance of provincial SatKer since SPAM IKK is conducted using the national budget.



Source: JICA Study Team 2010

Proposed Monitoring Structure

6.2 Monitoring and Evaluation Indicator

The PMU, Cipta Karya should monitor during the project period and Dir BP should also evaluate the monitoring data each year. The quantitative indicators for the sector loan should be proposed as shown in the table below. The result shall be disclosed to the organization concerned including the foreign donor.

Proposed Quantitative Indicators for Sector Loan Project Monitoring

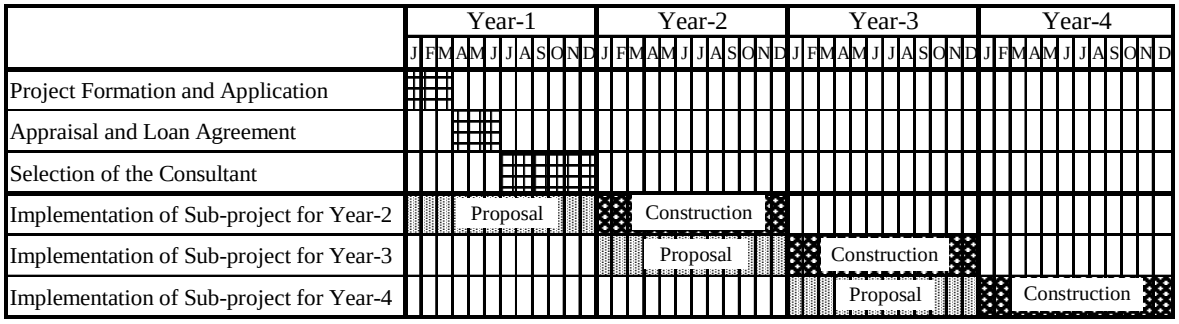
Quantitative Indicators	Targets
The number of 24 hours/day operated SPAM IKK systems.	50 out of 60 SPAM IKKs within two years after construction completed by APBN.
Total water consumption (L/s)	500 L/s (around 80% of total water consumption of sub-project)
Total house connection numbers	50,000 out of 60,000 number of house connection
Number of sub-project	60 nos. (100%)
Selection ratio of approved Sub-project	>90%

Source: JICA Study Team 2010

7 IMPLEMENTATION PLAN

7.1 Implementation Schedule

The implementation schedule of the Sector Loan has been worked out based on the assumption that the Government of Indonesia is with its application for the project, after confirming present issues that needed to be solved through the implemented countermeasures. The implementation schedule of the outline is shown in figure below.



Source: JICA Study Team 2010

Outline of the Implementation Schedule

7.2 Proposed Project Structure

(1) Options for Project Structure

How to implement and fund the distribution network development is the key to ensure the project outcome. Presented below are the options of the funding structure and the demarcation of responsibility between the central and local governments.

Option 1: Present Structure with Sector Loan Funding

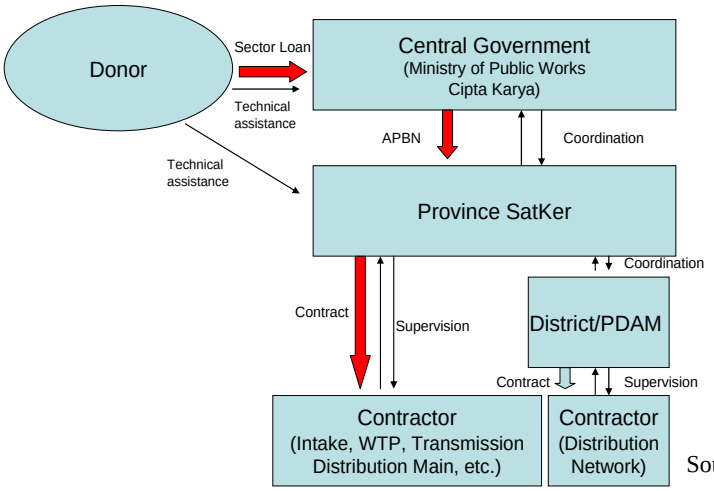
Option 2: Expanded APBN Project Scope

Option 3: Single Contract with Mixed Funding

Option 4: On-lending Loan for Distribution

(2) Proposed Project Structure

Among the four options, Option 2 (Expanded APBN Project Scope) as shown below figure is recommended to be adapted as the project structure for the proposed sector loan because it secures more funding for distribution facilities and increases control over the project scope; and it is more adaptable to the present SPAM IKK program framework due to its moderate requirement for regulatory/institutional adjustments.



Source: JICA Study Team 2010

Expanded APBN Project Scope

8. PROJECT EVALUATION

8.1 Financial Evaluation

FIRR by the sub-project type are calculated as shown in the table below. Compared with the weighted average cost of capital of 3.44% calculated from foreign loan 1.4% per annum (weight: 60%) and local budget cost assumed as the government bond coupon rate 6.5% per annum with over 10 year maturity (weight: 40%), the results show that the sub-projects under the current tariff level are not considered financially viable except for the type 1A with the least cost.

Results of FIRR Calculation

Item	Sub-project Type			
	Type 1A	Type 1B	Type 2A	Type 2B
Distribution Main Length	1,000m	1,000m	5,000m	5,000m
WTP	Without WTP	With WTP	Without WTP	With WTP
FIRR	5.90%	3.18%	0.81%	-0.92%

Source: JICA Study Team 2010

8.2 Economic Evaluation

EIRR by the sub-project type are calculated as shown in the table below, ranging from 13.78 to 26.51%. Compared with the generally accepted opportunity cost of capital of 10 to 12%, the results indicate that the sub-projects under the aforementioned assumptions are economically viable.

Results of EIRR Calculation

Item	Sub-project Type			
	Type 1A	Type 1B	Type 2A	Type 2B
Distribution Main Length	1,000m	1,000m	5,000m	5,000m
WTP	Without WTP	With WTP	Without WTP	With WTP
EIRR	26.51%	20.73%	16.24%	13.78%

Source: JICA Study Team 2010

9. Recommendations

Steps toward the Sector Loan Project

1) In order to increase the access to safe water of semi-urban population and thereby achieve MDGs targets, the existing SPAM IKK program is deemed as one of the crucial national programs implemented by MPW. To cope with its fiscal and technical constraints, financial assistance through the sector loan project is considered necessary.

2) However, it is recommended that MPW take necessary actions to solve the issues described in this report before considering the sector loan project for SPAM IKK to ease the foreseen risks against efficient implementation of the future financial assistance.

3) After completion of the Study, MPW should prepare the capacity development plan to improve the current SPAM IKK program as proposed in this report. Technical assistance from donors should also be considered to support such efforts by MPW for its capacity development.

Capacity Development for SPAM IKK Program

4) Based on the existing framework and guidelines for the current SPAM IKK program, it is required to make (i) clearer standards for the site selection criteria and (ii) close coordination among the concerned agencies at the central and local levels. The latter is highly important to solve imbalanced investment between APBN and APBD portions and improve project monitoring.

5) The Cipta Karya, PMU, the selected provincial SatKer, and concerned districts/PDAM are the main subject agencies of the capacity development. As described in Chapters 1 and 6, Main Report Part 2 in detail, the emphasis should be put in the establishment of a firm process management and monitoring system to reduce uncertainty and unpredictability in the project selection and execution.

6) It is recommended that MPW enhance its human resources to implement the proposed capacity development especially for PMU..

Improvement of SPAM IKK Program

7) During the planning stage, the SPAM IKK site should be selected in view of operation efficiency. Especially, a needs assessment among beneficiaries is necessary to grasp the actual demand and should be one of the prerequisites for the SPAM IKK application.

- MPW should establish clear selection criteria with definite indicators based on the existing SPAM IKK guidelines to increase predictability of site selection process for local governments to ensure their smooth implementation of APBD investment.
- APBN project scope should be amplified partially to cover investment in distribution network to reduce financial burden of local governments.
- Responsibility of provincial SatKers in project screening should be increased at local level. Close monitoring and strict appraisal by SatKers and MPW is required in project planning and construction especially on distribution network development by local governments.

8) Construction deficiencies are less observed by the on-site review than insufficient level of planning works and operation except several problems of construction quality in projects with FRP tanks.
   - It is recommended to reinforce provincial SatKer's function in construction supervision and inspection.

9) During the operation stage, the biggest issues are small number of house connections and low treated water quality.
   - High connection fee is one of the obstacles for beneficiaries willing to have tap water connections. Connection fee plan should be improved by PDAMs through introducing monthly payments, discount campaign.
   - Most household without water connections possess alternative water sources such as shallow wells attached to their residence. To ensure efficient investment based on the real demand for water connections, it is also required to do strict project screening based on needs survey and socialization on planning stage as a prerequisite of SPAM IKK site selection.
   - Lack of technical knowledge among PDAM staff causes inappropriate operation of the water works. No design plans or operating manuals are transferred in many SPAM IKK projects. Most projects do not follow five-day commissioning test requirement prescribed in the guidelines. Provincial SatKers should ensure technical transfer from contractor to PDAM in construction stage.
   - Training programs for PDAM staff should also be reinforced by utilizing the MPW training centers and PERPAMSI trainings to increase skilled operators.

10) Strengthening of PDAM in the financial and managerial aspects is another factor for

a sustainable SPAM IKK operation. It is recommended for district governments to consider more flexible tariff setting and connection fee plan to meet the financial burden borne by PDAMs that operate SPAM IKK. In general, the technical level of PDAM staff has to be enhanced also through other instruments such as the existing training system and other technical support.

- During the construction stage, proper inspection by the provincial SatKer and technical transfer from contractors to PDAM should be more emphasized for appropriate operation and service quality of SPAM IKK.

THE PREPARATORY SURVEY
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IKK WATER SUPPLY SYSTEM DEVELOPMENT SECTOR LOAN PROJECT

FINAL REPORT
MAIN REPORT
PART 1: EVALUATION OF SPAM IKK PROJECT

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Outline of the Study

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Abbreviations

Abbreviation	Indonesian/English
ADB	Asian Development Bank
APBD	Anggaran Pendapatan dan Belanja Daerah Tingkat (District Budget)
APBN	Anggaran Pendapatan dan Belanja National (National Budget)
BAPPEDA	Badan Perencanaan Pembangunan Daerah Tingkat-I and Tingkat-II (Development Planning Board for Provincial and District Level)
BAPPENAS	Badan Perencanaan Pembangunan Nasional (National Development Planning Board)
BLU	Badan Layanan Umum (Public Service Agency)
BPS	Biro Pusat Statistik (Central Bureau of Statistics)
BPAM	Badan Pengelola Air Minum (Management Board for new Drinking Water Projects before being established as a PDAM)
BPKP	Badan Pengawas Keuangan Pembangunan (Financial Supervisory Agency for Development)
BPPSPAM	Badan Pendukung Pengembangan Sistim Penyediaan Air Minum (Supporting Agency Water Supply System Development)
Broncapturing	Any small structure built to 'capture' a water source
Bupati	Kepala Kabupaten (Head of a District; sometimes called "Regent")
Camat	Kepala Kecamatan (Head of a Sub-District)
Cipta Karya	Direktorat Jenderal Cipta Karya (Directorate General of Human Settlements DGHS)
Dinas	Provincial or District level governmental department
DirBP	Direktorat Bina Program (Directorate of Progamme Development)
DirPAM	Direktorat Pengemgangan Air Minum (Directorate of Water Supply Development)
FRP	Fiber Reinforced Plastics
GIP	Galvanized Iron Pipe
GSP	Galvanized Steel Pipe
HC	House Connection (To a piped water supply system, usually metered)
HDPE	High Density Polyethylene Pipe
IBRD	International Bank for Reconstruction and Development (World Bank)
IKK	Ibu Kota Kecamatan (Core Area of a Sub-District)
JICA	Japan International Cooperation Agency
Kabupaten	District (Local Government level II)
Kecamatan	Sub-District (Local Government level III)
Kotamadya	City - equivalent administrative status to a Kabupaten
MDGs	Millennium Development Goals
MOH	Ministry of Health
MPW	Ministry of Public Works
Musrembang	Musyawarah Rencana Pembangunan (The Council Development Plan)
NGO	Non-governmental Organization
PAM	Perusahaan Air Minum (Water Enterprises) Generic term used for PDAM and BPAMs
PDAM	Perusahaan Daerah Air Minum (Regional Drinking Water Enterprise)
PERPAMSI	Persatuan Perusahaan Air Minum Seluruh Indonesia (Indonesian Water Supply Association)
PH	Public Hydrant
PLN	Perusahaan Listrik Negara (National Electricity Enterprise)
PMU	Program Management Unit
RPIJM	Rencana Program Investasi Jangka Menengah (Medium Term Investment Program Plan)
PU	Generic term for all departments of Public Works
PVC	Unplasticized Polyvinyl Chloride (Pipe)
Propinsi	Province (First level of local government Tk.I.)
RC	RC (Reinforced Concrete)

RENSTRA	Rencana Strategis (Strategic Plan)
RPJPN	Rencana Pembangunan Jangka Panjang Nasional (National Long Term Development Plan)
RPJMN	Rencana Pembangunan Jangka Menengah Nasional (National Medium Term Development Plan)
RSF	Rapid Sand Filter (Water Treatment Plant)
SatKer	Satuan Kerja (Working Unit)
SPAM IKK	Program for Development of Drinking Water Supply System in Sub District Areas
SSF	Slow Sand Filter (Water Treatment Plant))
T/A	Technical Assistance
UFW	Unaccounted-for-Water
YPTD	Yayasan Pendidikan Tirta Dharma (Tirta Dharma Eduacation Foundation)
WSLIC-2	Second Water & Sanitation for Low Income Communites Project
WTP	Water Treatment Plant

CHAPTER 1 INTRODUCTION

1.1 Background of the Study

According to the Ministry of Public Works (MPW) 2008 Yearly Performance Report, the current access rate to water supply services (piped water supply) in Indonesia is 25.61% of the entire population. This is by far below the Five-Year Mid-term National Development Plan 2005-2009 (RPJM) target set at 66%, and is among the lowest as compared to that of the neighboring middle income countries. Especially, the access rate to water supply services is even lower in rural areas. Therefore, extensive investment in the water supply sector maintains its importance.

In sub-district areas located between regional capitals and the rural areas, MPW has been implementing the Program for Development of Drinking Water Supply System in Sub District Areas (SPAM IKK) to mitigate water scarcity. SPAM IKK has initially planned to construct 600 drinking water supply facilities within the timeframe of RPJM 2005-2009; however, only 433 facilities had been constructed so far. At present, SPAM IKK is planning to construct 820 water supply facilities within the next RPJM 2010-2014 and therefore requires a donor's cooperation for its enhancement and promotion.

Meanwhile, the National Development Planning Agency (BAPPENAS) deems that many existing SPAM IKK facilities are not operational or underutilized due to malfunctioning equipment and management problems. Therefore, a cautious approach is required to formulate a project based on the study of present issues.

Under such situation, Japan International Cooperation Agency (JICA) mission held discussions with the officials of the MPW on the scope of work of the Preparatory Survey for IKK Water Supply System Development Sector Loan Project (the Project). Consequently, the JICA mission, MPW and BAPPENAS agreed upon the scope of work of the preparatory survey for the Project in August 2009.

1.2 Objectives of the Study

The following are the objectives of the Study:

(1) To comprehend and analyze the present conditions and issues of SPAM IKK implemented by the Directorate General of Human Settlements (DGHS) of MPW;
(2) To take appropriate countermeasures against present issues and support the formulation of a prospective yen-loan-financed project

1.3 Study Area

The preparatory survey is carried out in Jakarta, and in 50 on-site review areas which are selected from the existing project sites in Sumatra, Java, Kalimantan and Sulawesi islands.

CHAPTER 2 IKK WATER SUPPLY DEVELOPMENT POLICIES AND PLANS

The water supply sector in Indonesia is very weak. A socio-economic survey (SUSENAS) in 2004, found that urban areas have about 30% coverage while rural areas have only 7% coverage of piped water. In the National Medium Term Development (RPJMN 2004-2009), the access rate to piped water was planned to reach 40% of households (30% in rural areas and 66% in urban areas) by the end of 2009. However, the achieved rates of about 15% remain much lower than the planned target at 2009, as shown in Table 2.1.1.

According to "Achieving for the Millennium Development Goals (MDGs) Target of the Directorate General of Human Settlements (Cipta Karya) on 31 May 2010", target of people proportion against clean water access is set up 60.3% (57.5% in urban and 61.6% in rural area) by the end of 2015, from 47.6% in 2009. The new coverage ratio (piped water supply) target is 36.4% (47.4% in urban and 19.8% in rural area) in 2015, from 25.6% in 2009 in whole country as shown in Table 2.1.1.

Table 2.1.1 Access Proportion to Clean Water and Piped Water

Year		2009	2015
		(Present) (*2)	MDGs Target of the Cipta Karya(*2)
Population(*1)	(Million)	231.4	247.6
Clean Water Access	Urban (%)	49.8	57.5
	Rural (%)	45.6	61.6
	Nation (%)	47.6	60.3
Piped Water Supply	Urban (%)	35.0	47.4
	Rural (%)	14.3	19.8
	Nation (%)	25.6	36.4

Source: *1) Trends of the Selected Socio-Economic Indicators of Indonesia, October 2009, The Indonesia Statistics Institute (BPS), number of population in 2009, 2015 is projection of intercensal population survey 1995.
*2) Acceleration of MDGs Target Achieving on Cipta Karya Section, 31 May 2010

The government proposed a strategy to improve PDAM's performance and implement 820 SPAM IKK development programs in 32 provinces in the next five years, requiring an amount of Rp.4,929 billion as shown in the MPW Strategic Plan (RENSTRA 2010-2014) .

CHAPTER 3 BACKGROUND INFORMATION ON THE WATER SUPPLY SYSTEM IN IKK

3.1 Executing Agency and Responsibility

The executing agency for the development of water supply system in the core area of a sub-district (SPAM IKK) is the MPW, Directorate General of Human Settlements (Cipta Karya). Such projects are implemented based on the division of roles between the central, provincial and local governments. The agencies and scope of responsibility of each with respect to SPAM IKK projects are as shown in Table 3.1.1. In particular, on the central government level, numerous agencies based around Cipta Karya are involved from the planning through construction stages. Since the PDAM conduct operation and maintenance (O&M) of SPAM IKK after construction, the local government, which has jurisdiction over regional administration, is greatly involved in the operating systems and policies for SPAM IKK.

Table 3.1.1 SPAM IKK Related Agencies and Responsibilities

Agency		Scope of Responsibility
Central Government		
National Development Planning Agency (BAPPENAS)		- Formulation of medium and long-term national development plans - Setting of sector-based development goals and development budget, - Implementation of program coordination, - Project assessment and proposal of new projects.
Ministry of Public Works Directorate General of Human Settlements (Cipta Karya)	Directorate of Program Development	-Planning, monitoring and evaluation agency in charge of water supply and public sanitation infrastructure development. -Preparation of development policy and program for water supply and sanitation infrastructures.
	Directorate of Water Supply Development	- Executing agency in charge of water supply and public sanitation infrastructure development - Preparation of technical manuals and guidelines concerning development
	Project Management Unit (PMU),	- Planning and controlling of program implementation, - Coordination between/with central SatKer and local government for SPAM IKK development, - Evaluation and recommendation on the progress of the work at site.
	Central SatKer	- SPAM IKK selection, budget allocation, implementation monitoring , - Responsibility for central government budget, - Collaboration and coordination with the provincial government
Ministry of Public Works,	Support Agency for Water Supply System	- Evaluation of PDAM management and performance, - Support to formulate sector policy and strategy, - Cooperation with the private sector in water supply

Agency		**Scope of Responsibility**
Cabinet Secretary	(BPP-SPAM)	
	Bukasi & Surabaya Training Center	- Provision of training services for provincial and district government personnel and water supply maintenance personnel
Ministry of Home Affairs, Directorate General of Regional Development (DGRD)		- Water tariffs, PDAM operation, loan adjustment, financial assessment and supervision based on the Law No. 22/1999 regarding Regional Owned Enterprises, - General support for improvement of management in the regional water supply enterprises.
Ministry of Finance (MOF)		- Budget allocation and financing for project implementation, - Ownership of fixed assets held by regional water supply enterprises, - Responsible agency (debtor) with respect to overseas loans, - Holding of government assets.
Financial Supervisory Agency for Development (BPKP)		- Audit and accounting agency for public works
Ministry of Health, Directorate General of Disease Control and Environmental Health (DG DCEH)		- Preparation of water safety standards and guarantee of quality of potable water - Quality control of water provided by water supply enterprises, - Inspection and monitoring to ensure potable water is appropriately treated
State Ministry of Environment (SME)		- Policy making concerning water pollution supervision and environmental protection, - Setting of environmental standards and support for environmental preservation initiatives, - Coordination of activities by the Environmental Impact Management Board (BAPPEDAAL)
Ministry of Mines and Energy (MME)）		- Supervisory agency for groundwater development
Local Government		
Provincial Governments	Provincial SatKer,	- The provincial working unit (provincial SatKer) that generally manages the water supply projects in local government (kabupaten), - Coordination between central Sakter and local government.
	Development Planning Board for Provincial Level (BAPPEDA)	- Preparation of annual and mid-term development plan for infrastructure development in the province, - Coordination between provincial SatKer and BAPPEDA (district level) concerning water supply development plan.
District Government (Kabupaten)	Dinas PU	- Design and construction supervision of infrastructure development including water supply project in the districts, - Coordination between provincial Sakter, BAPPEDA and PDAM.
	Development Planning Board for Provincial Level	- Preparation of annual and mid-term development plan for infrastructure development in the province, - Coordination between provincial SatKer and BAPPEDA (district level) concerning water supply development plan.

Agency		Scope of Responsibility
	(BAPPEDA)	
	PDAM	- Designated as the water supply agency in the district (Kabupaten), but act as independent body. - In charge of SPAM IKK operation and water supply services to district residents.
	Public Service Agency (BPAM/BLU)	- Also act as the water supply agency in the district (Kabupaten), but is directly controlled by Dinas PU.
Others		
Indonesian Association of Water Works Enterprise (PERPAMSI)		- Capacity building of PDAM through seminar, twinning program, provision of training program of PDAM

Source: Ministry of Public Works, Ministry of Finance, BAPPENAS, PERPAMSI

There are many agencies involve in the SPAM IKK project, however the level of cooperation among this agencies are still poor and as a result the system can not be fully utilized as targeted.

3.2 Governing Structure

SPAM IKK facilities are composed of several components, i.e., intake facilities, water transmission facilities and water treatment plants constructed with under national budgets (APBN), and distribution mains (occasionally borne by APBN), and distribution networks constructed under local government budgets (APBD).

Operation and management of SPAM IKK projects is carried out by PDAM under the district or municipal jurisdiction or the public services agency (BLU) established under the jurisdiction of local governments.

Structure of PDAM consists of head of local government (Bupati), Control Board and General Director (refer to Fig.5.3.3 Organization Structure of PDAM in Chapter 5). General Director is appointed by Bupati based on proposal of Control Board. PDAM organization structure and management are approved by Control Board which consists of three to five members. Operation budget for SPAM IKK is PDAM own budget based on water sales revenue. PDAM staff is employee based on PDAM employee rule. PDAM is established by local government and independently operation body headed by Bupati for water supply in IKK under supervision of Control Board according to the Ministry of Home Regulation No.2/2007 concerning PDAM Employee Affaires and Organization.

PDAMs are entrusted with the management and operation of water supply facilities following their construction by the district government. One PDAM manages several SPAM IKKs, ranging from three in small SPAM IKKs to ten or more in larger

establishments in each district. Basically PDAM water services are provided for 24 hours, however, many SPAM IKKs can only supply water for limited hours (several hours) per day. Moreover, within the same PDAM, there are cases where service times vary according to the SPAM IKK (even when the service times are limited, the same tariff as for 24-hour supply is charged). PDAMs adopt an independent accounting system (Ministry of Home Affairs Notice No. 23/2006). However, many PDAMs face severe financial conditions because their water sales prices (tariffs) are less than the production costs (refer to Chapter 9 and 10). Some PDAMs are striving to reduce expenses through outsourcing water fee collection work in return for paying a percentage of the collected water fee.

Each SPAM IKK generally forms an independent water supply area. It is treated as a single business establishment of PDAM. Meanwhile, PDAM employees conducting O&M consist of a manager and water treatment plant operators, water meter readers and water fee collectors. There are many SPAM IKKs with five or less number of staff tasked to carry out water services. The responsible personnel are trained managers in some cases; however, there are many SPAM IKKs where other employees and part-time staff do not receive the necessary trainings for conducting maintenance. The SPAM IKK service population ranges from 50 to 1,000 or more households; however, O&M structures do not always commensurate to size. Accordingly, even under the same PDAM management, the conditions can vary between an inadequate maintenance structure of SPAM IKK that is overstaffed and needless spending in less important activities.

3.3 Technical Aspects

Water supply system of SPAM IKK is composed of water intakes, treatment facilities, distribution facilities and water services facilities as follows. The detailed information obtained through on-site review is described in the Chapter 10.

3.3.1 Water Intakes

Types of water sources for SPAM IKK are classified into surface water, spring water, and groundwater.

Surface water is drawn from river or irrigation canal or lake. In case of gravity system, raw water is collected by channel located on the side of the water source. In case of pump system, raw water is collected by a pump set installed to the pier of the water source or the intake well (or basin) at the side of the water source. Incidentally, in case there is an unstable water level fluctuation at the site, a weir made up of reinforced concrete is often provided to maintain the water level of the water source stable.

Spring water is collected by broncapturing and conveyed through gravity system. Groundwater meanwhile is taken from wells using a pump.

3.3.2 Treatment Facilities

(1) Rapid Sand Filtration System

Most surface water will require treatment for water supply use. Rapid sand filtration system is generally applied to surface water with turbidities. Structural material of these plants is generally made of steel. However, fiber reinforced polymer (FRP) is installed in some cases where the plant is expected to have a long service life such as acid-resistance, and considering the availability of material in remote area and ease in assembly of members. Most of these facilities comprising flocculation tank, settling tank, and rapid filter tank, are applied as the unit package plant.

Flocculation tank: The agitation is done slowly to make floating masses (flock) of water turbidity materials after mixing coagulant with raw water.

Settling tank: The enhanced sedimentation equipment are installed in order to precipitate the flock. Some of these tanks are provided with roofs on top. The roofs are intended to prevent algae breeding in the tank..

Rapid filter tank: Open type gravity system and sealed type pressure system are generally used to rapid filter tank. The open type gravity system is not complicated for inspection and maintenance, because it is possible to see the inside of tank directly. Meanwhile, the rapid filter of sealed type pressure system is installed in a sealed tank. Self-washing type is generally applied as the back washing methods of these tanks, which do not require particular equipment for back washing..

Chemicals and injection equipment: In the water treatment processes, flocculants that accelerate the coagulation process of impurities in raw water, disinfection and pH correction are carried out to ensure drinking water quality. The injection equipments of these coagulants consist of the injection tank installed with electric mixer and the dissolver tank installed with the injection pump.

Water laboratory: For water treatment plant that adopts the rapid filtration method, a water laboratory is established, which has Jar tester, turbidity meter, pH meter, etc. At the laboratory, the qualities of raw water are measured. The results are then reflected in the operation of chemical dosing in water treatment.

(2) Slow Sand Filtration System

Slow sand filtration system is applied to some water treatment plants where surface

water has low turbidity. In this system consists of a bed of sand used for treatment and do not use chemical dosing. Raw water move slowly through the sand filter layers downwards, its quality is improved considerably.

3.3.3 Distribution Facilities

Distribution method is classified into gravity system and pumping system. Distribution method is mainly selected based on the required head due to the elevation difference between the distribution facilities and the water service areas, and the head losses. In case of gravity system, distribution facilities mainly consist of only ground type reservoirs that are made of reinforced concrete. In case of the pump system, house for mechanical and electrical equipment are installed. Most of the water distribution system is supplied with comparatively high water pressure. Materials used as Distribution pipes are mainly made of PVC, and GIP, and applied HDPE partly.

3.3.4 Water Service Facilities

In principle, the level of water supply service of SPAM IKK project is house connection (HC) supplies. The service pipe for HC is connected with the distribution pipe, and installed at each house with water meter and water tap. PVC is mostly used as service pipes.

In special cases, public hydrant (PH) is installed at temporary in case delays occur in the construction of distribution pipes and in case that the new system connects with the old water distribution network. The PHs which are often used consist of circular shaped tanks made of polyethylene equipped with service taps.

3.4 Governing Laws

Decentralization has also been extended to the water supply sector. Following the emergence of problems over water rights and so on, the Law of Water Resources underwent review in 2004, and the regulation for the Development of Drinking Water Supply System was enforced in 2005. As a result, Cipta Karya in the MPW was designated as the responsible organization for providing guidance on water supply development in districts (kabupaten) and cities. Meanwhile, provincial SatKer in the provincial government provides coordination and support on issues with multiple districts and cities.

Following the revision of the Law of Water Resources in 2004, central government supervisory authority and functions were strengthened in the following areas:

1) According to the MPW Ordinance No.294/2005, the organization for monitoring operations of PDAM and offering policy recommendations was strengthened with

the establishment of BPP-SPAM under the direct control of the MPW.

2) The Minister of Home Affairs (MHA) Ordinance No23/2006 led to the creation of guidelines for setting water tariffs geared to recovering costs, which helped boost the autonomy of the PDAMs. However, irrespective of the MHA Ordinance, many district governments still require assembly approval for tariff hikes, which is a troublesome process. The MHA Ordinance recommends that water tariffs be revised at least every five years; however, some PDAMs do this every two years, while others have not altered tariffs for eight years or more. Due to the effects of decentralization, the MHA Ordinance has not always been thoroughly enforced within the district governments that administer the PDAMs.

3) Cipta Karya established the PMU in order to conduct unified control and coordination of projects according to the guideline for the SPAM IKK development program. Moreover, because management conditions failed to improve in many PDAMs, President Declaration No.5/2008 was issued with the aim of improving the financial condition of PDAMs. Subsequently, the Ministry of Finance Ordinance No. 53 made it compulsory for PDAMs to formulate financial recovery action plans (FRAP) and business plans (Ministry of Finance Ordinance No. 120). Moreover, financial relief measures such as review of principal repayments on loans were devised for struggling PDAMs.

4) The MPW compiled the Technical Guideline of Feasibility of SPAM Investment Development Proposal in order to promote SPAM IKK projects through private bank loans for PDAMs. This guideline is applied to new SPAM IKK undertakings to be implemented between 2009~2014.

Requirements concerning water quality are stipulated in Ministry of Health Ordinance No. 23 (1992). Ordinances, regulations and guidelines related to the implementation and O&M of recent water supply projects by PDAMs are summarized in the following table.

Table 3.4.1 Applicable Legislation and Guidelines concerning SPAM IKK

Legislation	Legislation Number and Year Issued
Water Resources	Law No.7/2004 of the Government Republic of Indonesia
Development of Drinking Water Supply System	Regulation No.16/2005 of the Government of Republic of Indonesia
Guidelines of State Receivables Settlement sourced from Foreign Loan, Investment Fund Account, and the Regional Development Account to PDAM	Regulation No. Pre-53/PB/2006 of the Ministry of Finance
Technical Guideline and Procedure of Water Tariff Determination in PDAM	Regulation No.23/2006 of the Minister of Home Affairs

Legislation	Legislation Number and Year Issued
PDAM Employee Affairs and Organization	Regulation No.2/2007of the Ministry of Home Affairs,
Formation of Organization and Working System of the PMU for Development of Drinking Water Supply System in Cities in the SPAM IKK	Letter of Decision of Director General of Cipta Karya No. 09/KPTS/DC/2008
Guidelines for Implementation of Program for Development of Drinking Water Supply System in Cities in SPAM IKK	Decision of the Director General of Cipta Karya No.: 24/KPTS/DC/2008
Resolution of State Debts Originating from Subsidiary Loan Agreements, Investment Fund Accounts, and Regional Development Accounts of PDAM	Regulation No.120/PMK.05/2008 of the Ministry of Finance
Implementation of Economic Programs Year 2008 – 2009, The Increase in Performance for SPAM by PDAM	President Declaration No.5/2008
Provision of Guarantees and Interest Rates Subsidy by the Central Government in order to accelerate drinking water supply	President Declaration No.29/2009
Technical Guidelines for Feasibility of Investment of Drinking Water Supply System Development by PDAM	Regulation No. 21/PRT/M/2009 of the Ministry of Public Works

Source: JICA Survey Team 2010 based on collected regulations, president declarations and guidelines

3.5 Budget Allocation and Financial Sources

Each SPAM IKK project is implemented in two separate parts by different organizations. The upstream part consisting of the intake, conduit, water treatment plant and transmission facilities is constructed by MPW and provincial SatKers. The construction of the downstream part, i.e. distribution network and house connections, is under the responsibility of district governments and PDAMs. As shown in Table 3.5.1, the construction of the upstream part is financed with the central government budget (APBN), of which funding sources are tax revenues, national bonds, foreign assistance, etc. Besides the APBN budget for SPAM IKK, other APBN budget allocations for water supply development are also used by provincial SatKers to construct the remaining part in some projects. Meanwhile, the construction of the downstream part is financed by local government budget (APBD), of which funding sources are local tax revenues and the special allocation from the central government (DAK). Since water supply development is under the responsibility of the district/city governments, provincial APBD is not allocated for SPAM IKK as much as district/city APBD. In some projects, PDAM finances the construction of distribution and house connections with its own fund and loans from commercial banks.

Table 3.5.1 Central and Local Government Budgets for SPAM IKK

	Central Government (APBN)		Local Government (APBD)		PDAM
Budget	SPAM IKK	Other water supply development	Provincial APBD	District/City APBD	Own Budget
Sources	Tax Revenue, National Bond, Foreign Assistance/Loans		Local Tax Revenue, Special Allocation (DAK), etc.		Own Fund, Loans

Source: JICA Study Team 2010

3.6 Water Demand and Supply Amount

3.6.1 Unit of Water Supply Amount

SPAM IKK development is carried out under the request from the districts. In some cases, the district submits the proposal to the central government before a decision is made on the water supply plan as distribution pipeline installation plan. Therefore, a unit of water supply amount cannot be calculated for each SPAM IKK site. In accordance with the Guideline for Development of SPAM IKK 2008 by MPW, the minimum water consumption is 60 L/c/d.

MPW roughly estimates that one SPAM IKK system with 10 L/s of supply capacity can supply water for 700-800 households. If each household has five members, 10 L/s SPAM IKK system can supply water for 3,500-4,000 people. Therefore, the planning unit of water supply amount is roughly around 200-250 L/c/d. This seems too large for people living in sub-districts.

Table 3.6.1 shows the summary of SPAM IKK from 2005 to 2009. The water development yield per SPAM IKK is 15 L/s and the served population is around 10,000 people. These figures of it indicate the water supply amount per capita per day is 110 L/c/d. This is identified as suitable for the domestic water usage in the sub district.

Table 3.6.1 Summary of SPAM IKK from 2005 to 2009 (*: Included plan)

Year	Number (A)	For the year		Per one site		Water supply amounts per capita
		Water development yield (B) (L/s)	Served population (C) (People)	Water development yield (B/A) (L/s)	Served population (C/A) (People)	
2005	52	730	532,000	14	10,231	118
2006	52	855	684,000	16	13,154	105
2007	59	915	732,000	16	12,407	111
2008	93	1,339	1,071,200	14	11,518	105
2009*	155	2,314	1,851,200	15	11,943	109

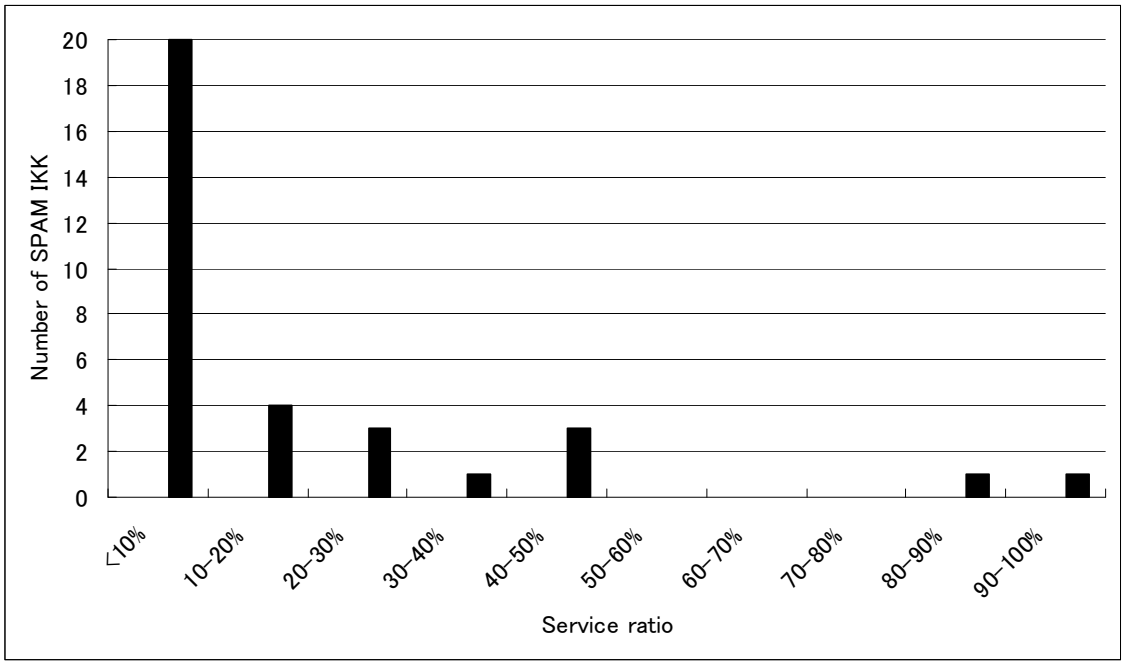
Source : Achievement of MDGs Target in Drinking Water Sector 2005-2009

3.6.2 Served Population, Households and Service Ratio

SPAM IKK is classified as the sub-urban area water supply. However, the SPAM IKK system does not always supply water to only IKK which is the core area of a sub-district. In fact, through on-site review, it is found that the water supply area of the SPAM IKK is not only limited to IKK but also includes other villages.

Therefore, the planned served population and households could not be computed because the water supply area was not clear during the planning stage. Thus, the service ratio cannot be calculated if the actual served population or household is not known. Consequently, the service ratio is calculated by using the number of households and actual served population in the IKK, which are defined by the Central Bureau Statistics.

The service ratios, which are calculated with the data defined above, are shown in Figure 3.6.1 based on the information from the on-site review. The service ratio is low in most IKKs even after the construction of SPAM IKK. It is evident that the SPAM IKK system does not only supply water to the IKK as determined from the statistics.



Source: JICA Study Team 2010

Figure 3.6.1 Proportion of Household to WTP Capacity

CHAPTER 4 OUTLINE OF THE SPAM IKK PROJECT

4.1 Scope of Project

(1) General

In line with Government Regulation No. 16, 2005 regarding development of SPAM, the SPAM IKK project, which provides water supply system in Ibu Kota Kecamatan (center of sub-district), is being implemented through the cooperation of the central and local governments.

(2) System Components

The Project facilities consist of the following components:

1) Intake Facility:
   Broncapturing, river intake, borehole, water conveyance pipeline (by gravity or by pumping)
2) Treatment Facility:
   Receiving well, water treatment plant (slow sand filter type and rapid sand filter type: conventional type or package plant made of steel or fiberglass), treated water reservoir, pumping facility, administration/laboratory building
3) Distribution Facility:
   Transmission pipeline, distribution main pipeline, distribution pipeline
4) Service Installation
   Service pipeline, house connection, public hydrant

(3) Budget Demarcation

The source of funds is the APBN, APBD and PDAM budget. The budget demarcation is shown in Table 4.1.1.

Table 4.1.1 Budget Demarcation of SPAM IKK Project

Facility		APBN		APBD		PDAM
		Central	Province	Province	District/ City	
Intake Facility		○	○			
Treatment Facility		○	○			
Distribution Facility	Transmission/Distribution main		○	○	○	
	Distribution pipeline			○	○	○
Service Installation					○	○

Source: Directory of SPAM IKK 2008, Final Report of Advisory Consultant SPAM IKK 2009

Intake and treatment facilities are implemented by the provincial/central SatKer (working unit), in line with the Decision of Director General of Cipta Karya, MPW

No.13/KPTS/DC/2009 regarding Guidelines for Implementation of Development Program of SPAM IKK.

The distribution facility and service installation are basically implemented by the local government utilizing APBD/PDAM budget. In some cases, the provincial SatKer implements the distribution facility (transmission/distribution main) utilizing APBN.

Proper coordination of the APBN and APBD portions is important, i.e. technical consistency, timely budget disbursement and proper transfer of facility to PDAM.

4.2 Technical Assistance and Training

The technical assistance and training for PDAM staff is carried out by the central government (MPW, BPP SPAM), provincial SatKer and the semi-private organization of PDAM, PERPAMSI. In these training, PDAM bears the transportation cost of PDAM staff. PDAM, which are financially weak find it difficult to dispatch their staff to a distant training venue.

4.2.1 By Central Government

The training is carried out in the training center (TC) of Bekasi and Surabaya. The TC is organized under the secretary of MPW. Initially, these are the object for PDAM staff technical support. However, the Bekasi TC provides priority to government staff while the Surabaya TC prioritizes PDAM staff.

The Bekasi TC and Surabaya TC had five and fifteen training courses for PDAM staff, respectively. The facility use of Bekasi TC remained low and does not meet the trainees requests. The facility use of Surabaya TC meanwhile is kept high.

The programs for the technical classes are intended for the operator and middle-level technical staff. Furthermore, there are other programs on the O&M class for management level.

BPP SPAM also conducts the training program for PDAM. However, they do not have a particular organization for the training. BPP SPAM is composed of three sections namely, “Program Strategy and Review”, “Monitoring and Service Performance Evaluation” and “Financial Analysis, Investment and Promotion”. Each department prepares and conducts the training for PDAM, government staff or the private sector. The following are the training programs for 2008, 2009, 2010 (planned).

- Program Strategy and Review
  Contents: Best practice PDAM and water supply regulations
  Participants: local government, PDAM
  Place : Surabaya, Makasar, Medan, Tangerang (2008)

Bandung, Manado, Banjarmasin, Palembang (2009)
Cirebon, Malang, Batam, Balikpapan, Denpasar, Kendari, etc. (2010)

- Monitoring and Service Performance Evaluation
  Contents: Production, distribution, NRW, ZAMP, etc.
  Participants: local government, PDAM
  Place: Jakarta, Bogor, Bali, Pontianak, Banjarmasin, Bandung, Batam, Palembang(2009)
  Bandung, Malang, Surabaya, Bali, etc. (2010)

4.2.2 By Provincial SatKer

Some SatKers have a training program for PDAM staff. It is however limited to technical topics (e.g. water supply planning, design and maintenance, etc.). The SatKer that has enough technical staff can usually carry out the training. However, most SatKers, especially in the local areas, cannot carry out the training due to shortage of staff and budget.

4.2.3 By PERPAMSI

PERPAMSI is a semi-private organization by PDAM. Its head office is in Jakarta and it has branch offices in most of the provinces. Their training programs cover all PDAM works which include the financial and operation aspects as well as technical ones. Tirta Dharma Education Foundation (YPTD), which was established under the PERPAMSI, is the actual organization for the training.

The following are some of the contents of the training programs:

1) Drinking water management
2) Taxation
3) Financial management
4) Accounting system
5) Preparation of performance improvement
6) Asset management
7) Reinforcement of leadership
8) Customer satisfaction survey
9) Customer relationship
10) Leakage reduction
11) Production
12) Distribution
13) Improvement of water quality

Financially weak PDAMs that cannot pay the contribution could not participate in the training. The operation cost of the PREPAMSI is not only from PDAM contribution but also from the water tariff from the national military base in each province.

4.3 Scale of Project

According to Cipta Karya, 600 SPAM IKK projects in total were planned from 2005 to 2009. However, only 433 projects (around 72%) were actually executed during the period. About 86 SPAM IKK projects have been implemented annually on average.

The average project cost (only APBN part only) amounts to Rp. 2,000-4,000 million per project and the installed water treatment plant capacity is 10-20 L/s for most projects. Some SPAM IKK projects are as small as 5 L/s while there are several much larger projects with treatment capacity of 50-60 L/s.

Table 4.3.1 SPAM IKK Projects 2005 - 2009

Year	Plan[*1] SPAM IKK	Actual SPAM IKK	Total WTP Capacity (L/s)	APBN Expenditure (Rp.million)	Average APBN Expenditure (Rp.million/project)
2005	N/A	52	690	76,076	1,463
2006	N/A	52	835	96,350	1,853
2007	N/A	56	795	105,087	1,877
2008	N/A	92	1,343	321,318	3,493
2009	155	181	2,676[*2]	389,667[*2]	2,153[*2]
合計 Total	600	433	6,339	988,498	2,283

Source: Cipta Karya "Achievement of MDGs Target in Drinking Water Sector 2005-2009", *[1]: DirPAM, Cipta Karya, *[2]: Plan PMU, DirPAM, Cipta Karya

4.4 Total Project Costs

Each SPAM IKK project is divided into upstream part with the APBN budget and the downstream part with APBD budget. Since MPW (Cipta Karya) does not efficiently monitor the implementation status of the APBD part, the total project costs are unclear in most SPAM IKK projects. Many provincial SatKers have no information on the APBD executing status depending on their institutional capability. As for the APBN execution status of individual projects, the information on the projects implemented by the central SatKer and provincial SatKers are kept separately. Consequently, integrated information for all SPAM IKK projects are not available. Cost data of SPAM IKK projects were collected during the on-site review (See Chapter 10).

4.5 Financial Flows

The central and local governments execute their budget for SPAM IKK projects in the same way as other public capital investment. Central government fund is disbursed under the contracts between the central or provincial SatKer and suppliers after the bidding process. Likewise, local government (district/city) fund is disbursed based on the contracts concluded by Dinas PU from its district/city budget allocated for SPAM IKK. Both central and local government parts of the constructed facilities are transferred to PDAM after the guarantee period. The constructed assets are then transferred to PDAM in the form of capital grant and the transaction does not involve such financial flows of lending/borrowing and repayments. The official procedure for the transfer of constructed facilities requires a cumbersome valuation process by MPW and MOF. Thus, most of the transfer of SPAM IKK project facilities has not been completed yet. To cope with this problem, MPW has issued an order to enable temporary transfer of the assets constructed by MPW to PDAMs through the district/city governments.

4.6 Project Schedule, Future Plan

(1) RENSTRA 2010- 2014 (Strategic Plan 2010 - 2014)

In "RENSTRA 2010-2014 Drinking Water Supply System", activities presented in Table 4.6.1 for water supply development are planned in 2010- 2014.

Table 4.6.1 Planned Water Supply Development Activities (2010-2014)

Activity	Performance Target	APBN Budget (Billion Rp.)
1. Development of urban water supply in low income community	577 areas	1,254
2. Development of SPAM IKK	820 IKK 8,200 lit./sec	4,929
3. Development of rural water supply	4,650 villages	4,223
4. Development of rural water supply specially for outskirt island, border area, remote area	100 areas 960 lit./sec	292
5. Development of rural water supply specially for fishing port	53 areas 310 lit./sec	186

Source: RENSTRA 2010-2014 Drinking Water Supply Development

Activity 2 indicated in Table 4.6.1 is planned for SPAM IKK project which targets 820 SPAM IKK to be constructed in 2010 - 2014. The planned number of SPAM IKK and APBN budget for each fiscal year is as shown in Table 4.6.2.

Table 4.6.2 Planned Number of SPAM IKKs and APBN Budget (2010-2014)

FY	2010	2011	2012	2013	2014	2010-2014
Number of IKKs	144	154	160	175	187	820
Budget (Billion Rp.)	605	924	1,028	1,150	1,222	4,929
Budget/IKK (Billion Rp./IKK)	4.20	6.00	6.43	6.57	6.53	6.01

Source: RENSTRA 2010-2014 Drinking Water Supply Development

(2) Plan of SPAM IKK Project in FY 2010

The budget for FY 2010 for the SPAM IKK project is shown in Table 4.6.3 below.

Table 4.6.3 Planned Number of SPAM IKKs and APBN Budget (2010)

Nos. of provincial SatKers by Island		Nos. of planned IKK	Budget (million Rp)	Buget/IKK (million Rp./IKK)
Provincial SatKer in Sumatra	10	38	178,488	4,697
Provincial SatKer in Java	5	39	145,080	3,720
Provincial SatKer in Kalimantan	4	17	59,493	3,500
Provincial SatKer in Sulawesi	6	24	88,561	3,690
Other islands	8	27	76,984	2,851
Central SatKer (*)		6	95,030	15,838
	Total	151	643,636	4,262

Note: (*) Central SatKer implements SPAM IKK projects in all Indonesia.
Source: RENJA KL TA 2010 (Implementation Plan for RENSTRA)

Above table shows that:

- About 151 SPAM IKKs are scheduled to be constructed in 2010
- The total budget in 2010 is approximately Rp. 644 billion
- The average budget amount for one SPAM IKK is approximately Rp. 4,262 million (Rp. 15,838 million for SPAM IKK by central SatKer)

The budget indicated in the above table is for construction cost only. In addition, the total of administration and consulting service costs, which is approximately 13 % of construction cost, is appropriated for each SatKer.

The construction works for the above 151 IKKs are scheduled to commence in June 2010 and scheduled to be completed by the end of 2010.

For the implementation of the SPAM IKK project, the budget for APBD's portion needs to be appropriated at each province, in addition to the above APBN budget. Table 4.6.4 shows funding requirement of SPAM IKK development (2008-2020) estimated by Cipta Karya on 2007.

Table 4.6.4 Funding Requirement (2008 - 2020)

Funding Source	Amount (Billion Rupiah)	
APBN	7,864	40%
APBD I (Province)	983	60%
APBD II (District/city)	10,812	
Total	19,659	100%

Source: Pemetaan Program Pengembangan SPAM IKK (2007)

As shown in the above table, the amount of required APBD budget is estimated at approximately 1.5 times of APBN budget for each project.

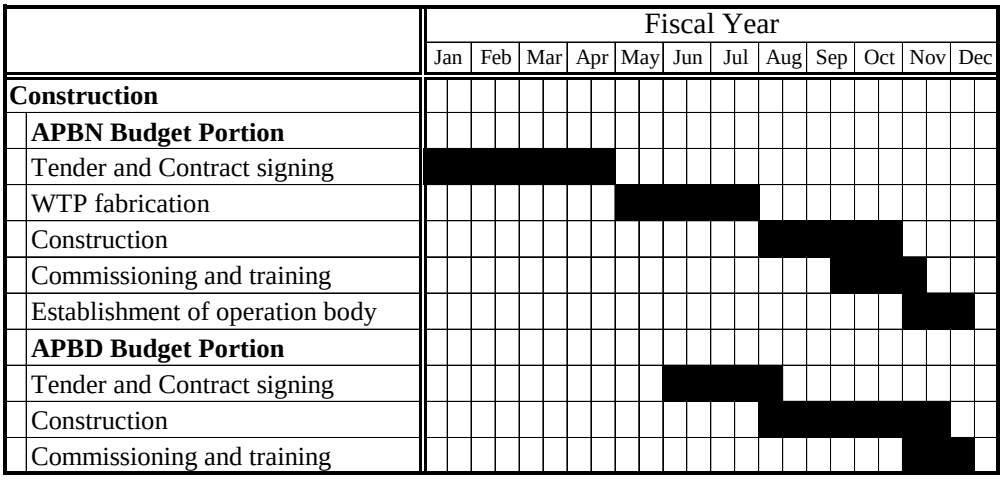
4.7 Procurement

(1) General

As mentioned in Section 4.1 above, the scope of the Project is divided into two portions: APBN and APBD. The procurement is conducted separately as follows:

For APBN portion: by Central Government (Central/Province SatKer)
For APBD portion: by Local Government (Dinas PU Province/District/City)

The typical procurement schedule is as shown in Figure 4.7.1.



Source: Directory of SPAM IKK 2008

Figure 4.7.1 Typical Procurement Schedule

As shown in Figure 4.7.1, the procurement of APBN portion usually commences at the beginning of the year while that of APBD commences at the end of May. Both portions are supposed to be completed within its fiscal year. In some cases, however, certain works are carried over to the next fiscal year. There are often cases when the allocation of APBD budget is delayed, consequently deferring commencement of the work to the next fiscal year.

(2) APBN portion

Scope: Intake facility, Treatment facility,Distribution facility
(Transmission/Distribution main bigger than dia 100 mm)

Implementation Agency:
Central/Province SatKer

Method of Procurement:
- General competitive bidding (pipe material)
- Competitive bidding with pre-qualification (construction work)
- The contract for treatment plant is made as a combined contract for manufacturing, installation and civil work.
- Three to four IKKs are developed as one contract package.
- The tender is usually announced and conducted on the website of PU.

(3) APBD portion

Scope: Distribution Facility, Service Installation

Implementation Agency:
Dinas PU (Province/District/City)

Method of Procurement:
- General competitive bidding (pipe material)
- Competitive bidding with pre-qualification (construction work)

(4) Transfer of the completed facility to PDAM

Commissioning test is performed after the facility is completed. Then, the facility is handed over to PDAM. The standard contract documents require that commissioning tests be performed for 5 days and training should be provided to the future operators during the tests.

4.8 Construction Methods and Performance

In the project scope for the construction stage in SPAM IKK project, the central government is in charge of water treatment facilities while the local government is in charge of distribution facilities. Hence, contractors are also different for each undertaking.

The water treatment facilities are built mostly with package plants using rapid sand filtration system. These plants are mainly produced in Jakarta and its neighboring regions. As a form of contract, these manufacturers have to undertake civil works including intake facilities, transmission pipes, and distribution main pipes. The manufactured plants are transported by land and sea to the site, and are then simultaneously set up with connecting pipes.

These manufacturers are major certified companies in Indonesia. From past experience,

it seems that these companies have enough capabilities in constructing steel plants as there were no confirmed records of sites with significant problems due to faulty construction. For FRP plants, meanwhile, it seems that they do not have enough capabilities as there were many sites which have been identified with construction problems on the accuracy of dimensions of members, assembly operations and FRP material quality.

The average duration for the construction of water treatment facilities, including civil works, in one site is about six months.

For distribution facilities, the main construction work is pipe installation. Related civil works meanwhile is conducted by local constructors. The construction scale of civil work items including excavation, pipe laying and backfill are minimal, while that of pipe installation is often extensive although it depends on the length of distribution pipes involved in the project. Therefore, in many cases, the construction works in each project is carried out by splitting the scope among the districts concerned, based on the local government budgets and the construction capacities of local constructors.

It is also noted that construction capacities of local contractors is not sufficient, although there are actually some regional variations. Many local constructors, have inadequate numbers of skilled workers and plumbers and there are many sites with construction defects caused by inaccurate pipe covering depth and pipe joint connection. Therefore, it is difficult to ensure uniform quality nationwide. In addition, there are some local districts that cannot participate in contracts involving large-scale construction.

Therefore, the construction schedule of distribution facilities tends to be longer than that of water treatment facilities due to cases such as large-scale construction and limited construction capacities. These are among the reasons why many projects still remain non-operational even after the water treatment facilities are already built.

4.9 Maintenance Management Plan, Improvement and Extension Plan

4.9.1 Maintenance Management Plan

The selection criteria for SPAM IKK do not include a maintenance management plan. Hence, few local governments or PDAMs arranged for it in advance.

SPAM IKK is operated mainly by PDAM. Some PDAM tasked to operate the SPAM IKK need to increase staff for the new system. PDAMs which were divided among districts do not have a balanced number of the technical staff and administration staff.

In accordance with the on-site review result, most SPAM IKK have not been actually

operated due to the absence of a maintenance management plan.

4.9.2 Improvement and Extension Plan

The SPAM IKK program is conducted basically for areas with no water supply. The program component includes construction of new water supply facilities, including intake facility and distribution network. However, the program does not include water facility improvement and extension plan. The constructed SPAM IKK facilities are basically transferred to PDAM upon completion of the water treatment plant and distribution network. Their responsibility includes maintenance and improvement of the distribution system.

In some cases, SPAM IKKs were connected to existing distribution network from new water treatment plant.

CHAPTER 5 IMPLEMENTATION STRUCTURE OF SPAM IKK

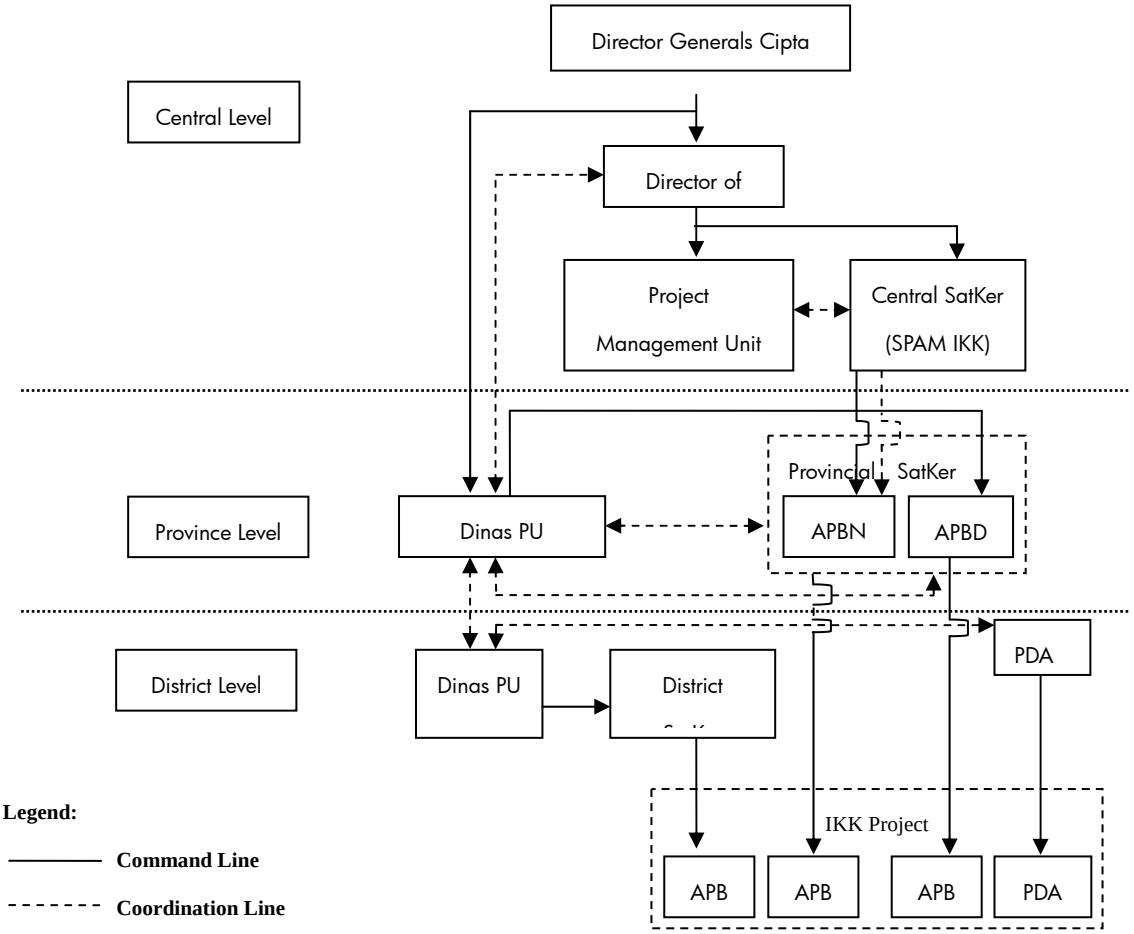
5.1 Relevant Authorities and Overall Implementation System

The Directorate General of Human Settlements (Cipta Karya) provides essential technical support and guidance to local governments for the design and implementation of water supply facilities, and is responsible for water supply projects funded by the central government.

Under regional autonomy, district governments are responsible for ensuring that water supply is provided in their districts (as well as its operation and management), similar to sanitation services and other basic infrastructure. Water supply is provided by PDAMs, which are enterprises under the jurisdiction of the district governments. Responsibility for operation and management for SPAM IKK is under PDAMs within their administration.

The overall implementation system of SPAM IKK entails collaboration between the central government and local governments. Figure 5.1.1 shows the SPAM IKK implementation structure.

As shown in said figure, construction supervision, progress management and budget control are carried out under a setup of collaboration between each responsible agency, until the completion of works according to the budget allocation and project cost division. The central and provincial governments are therefore responsible for the works related to the intake of water and operation of water treatment plants, while district governments are responsible for water distribution and house connections. Concerning project operation following the completion of works, PDAMs as executing agencies conduct O&M activities.



Source: Guideline for Implementation of Program for Development of Drinking Water Supply System in Cites in Sub-District (SPAM IKK) for Year 2008

Figure 5.1.1 SPAM IKK Implementation Structure

5.2 Sharing Roles among Relevant Authorities

5.2.1 Central Government Level

Cipta Karya – the executing agency –establishes a PMU to act as a dedicated SPAM IKK implementation team. Its involvement is on project execution and supervision in collaboration with the dedicated water supply working unit (provincial SatKer) established in the provincial government, from the initial stage through the completion of works in each project. The PMU is mainly responsible for coordinating works with related agencies and compiles the annual IKK project implementation plans, project selection, overall program coordination, budget allocation, monitoring and so on. In collaboration with the PMU, a central government working unit (central SatKer) is

established to be responsible for SPAM IKK projects. It consists of a department in charge of bidding for water supply facilities (basically includes water intake facility and treatment plant) under the central government budget (APBN). The central SatKer recruits consultant to perform planning and control of the program implementation, prepare bidding documents and control implementation of the work at the site until completion of the project (under APBN budget) if the provincial government working unit (provincial SatKer) is not functioning.

It also outlines a legal and regulatory framework for the sector in which policy-making and regulatory and service provisions are better delineated, with planning highlighted, and cost recovery made a priority. Based on this, MPW Decree 294/2005 established BPP-SPAM which is an advisory rather than a regulatory body helping to formulate sector policy and strategy, including the involvement of cooperatives and the private sector in water supply.

5.2.2 Provincial Level

Provinicial Working Units (provincial SatKer) are established in the provincial Cipta Karya as the executing agencies of water supply projects implemented under the central government budget (APBN). They are responsible for coordinating between the districts and central government, and supervising the construction of facilities implemented under the central government budget and APBN. The provincial SatKer is composed of employees of the provincial government and it implements all water supply projects in the province, including SPAM IKK projects implemented by each district belonging to the provincial government in collaboration with the district governments (Development Planning Board for District Level or BAPPEDA and Department of Public Works at District Level or Dinas PU). If district governments have no capacity in preparing SPAM IKK proposals or undertaking design, the provincial SatKer supports such proposal preparations and submits them to the central government.

5.2.3 District Level

At the district level, BAPPEDA compiles annual and mid-term infrastructure development plans (RPIJM five years), including water supply projects for the purpose of budget (APBD) allocation over the entire district. Meanwhile, the Dinas PU is in charge of preparation of design, bidding documents and construction supervision of the water supply projects (distribution network) which are already approved by the head of district (Bupati). Proposals and design for SPAM IKK projects are prepared and submitted to the provincial SatKer through the cooperation of BAPPEDA and

Dinas PU, although there are some district governments that directly apply to the central government. In such cases, copies of the application documents are distributed to the provincial SatKer.

PDAM is the water supply operator after the SPAM IKK projects constructed under APBN and APBD are handed over. However, in some cases, PDAM directly recruits the consultant to execute planning and construction of SPAM IKK under PDAM's own budget in consultation with Dinas PU.

BLU and BPAM are regional water supply agencies that are possible to be established by decision of the Head of the district (Bupati). There is a little proportion of BLU/BPAMs in Indonesia. BLU/BPAM's personnel is owned and directly controlled by Dinas PU. Annual O&M costs are borne by Dinas PU. BLU/BPAM is not required to make a profit, which is different from PDAM acting as a financially independent body.

5.3 Implementation System in Authorities Concerned

5.3.1 MPW

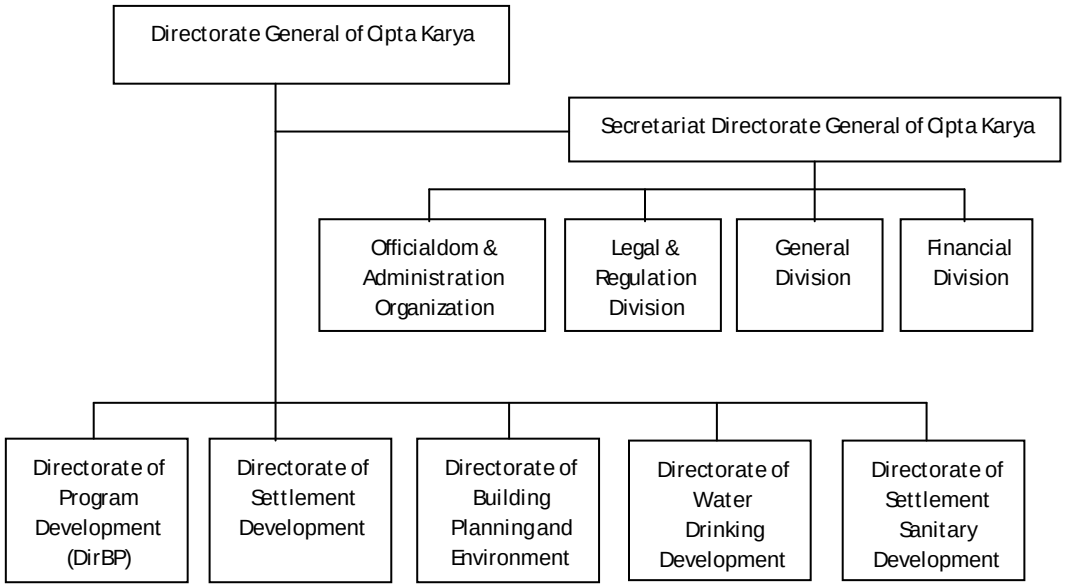
As shown in Figure 5.3.1 organizational structure of Cipta Karya, within the MPW, the Directorate General of Cipta Karya is in charge of water supply development. Two departments that are directly concerned with SPAM IKK are the Directorate of Water Supply Development (DirPAM) for technical guidance and the Directorate of Program Development (DirBP) for project planning. DirPAM consists of five sections, including Region I and II sections in charge of SPAM IKK in the western and eastern region of Indonesia, respectively. The PMUs are established as dedicated monitoring agencies for the SPAM IKK. Since the main activity consists of the annual planning and implementation of projects, SPAM IKK projects are conducted jointly with the central working unit (central SatKer).

PDAMs, which conduct O&M of SPAM IKK, and BPP-SPAM, as the dedicated agency for monitoring and assessing PDAMs, were established in 2005 under the direct control of the MPW. BPP-SPAM conducts a questionnaire for all PDAMs every year, analyzes the business condition of projects, and reports to the minister (refer to Chapter 9).

BPP-SPAM under the MPW consists of about 25 staff, including engineers, lawyers and economists and about 15 individual consultants outside the organization. The roles and functions of BPP-SPAM are defined as follows:

- Improve coordination and cooperation with stakeholders

- Encourage increased coverage and quality of service of SPAM
- Maintain a balanced interest between the customers and community organizers
- Strengthen efficient and effective organization
- Provide training services for PDAMs personnel.

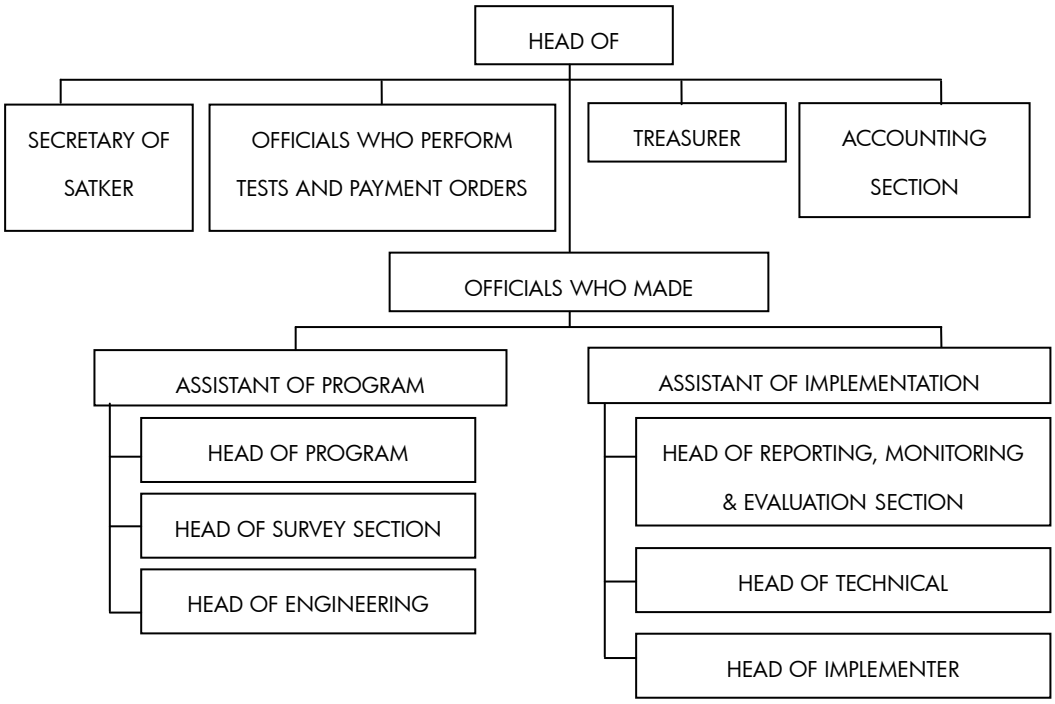


Source: www.pu.go.id, April 07, 2010

Figure 5.3.1 Organizational Structure of Cipta Karya

5.3.2 Provincial Working Units (Provincial SatKer)

The provincial SatKers are established as executing agencies in each province. They handle all water supply projects including SPAM IKK. Their employees belong to the provincial government, although in organizational terms, the provincial SatKers are directly linked to central PMU and Cipta Karya at provincial level. The central government provides all operating expenses (all office expenses including lighting and heating costs) other than the personnel expenses of the provincial SatKer. In reality, the provincial SatKers act as local branches of the central government implementing the SPAM IKK projects. In the case of SPAM IKK, the provincial SatKer cooperates with Dinas PU and BAPPEDA in coordinating the proposals submitted by each district and submitting them for application to the central government.



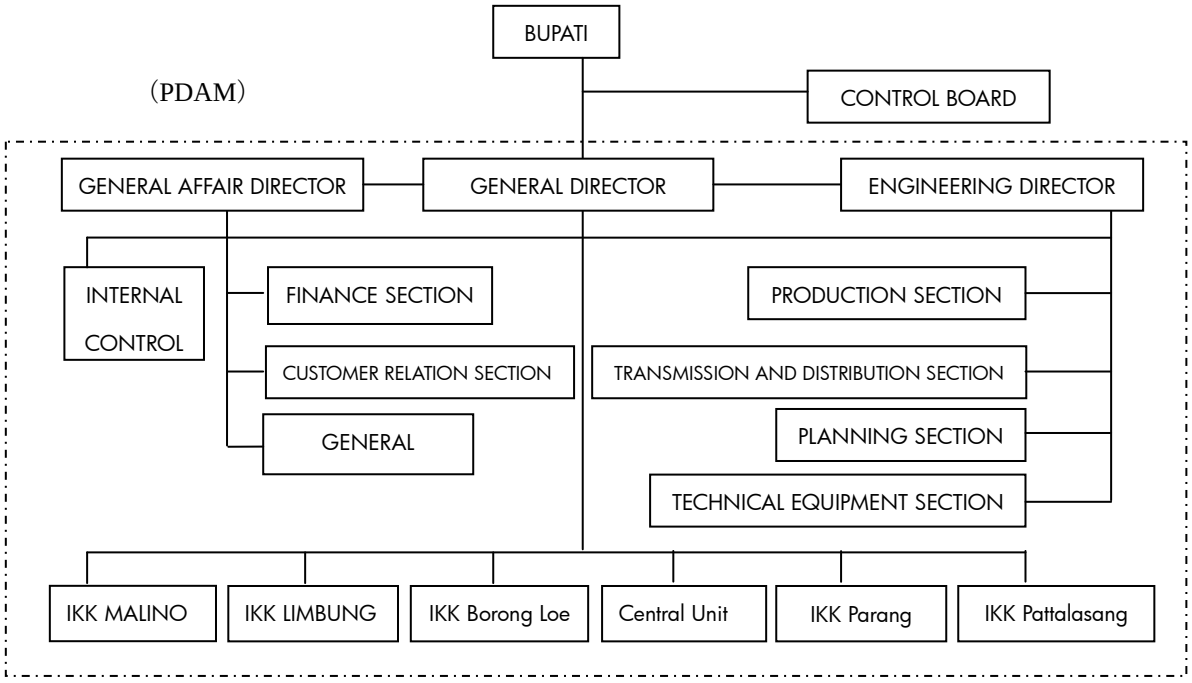
Source: Provinicial SatKer of Central Java

Figure 5.3.2 Organizational Structure of Provincial SatKer (Central Java)

5.3.3 District Level

On the district level, the Dinas PU and PDAM are the executing agencies. The basic role of each PDAM is to serve as the operator for SPAM IKK (refer to Figure 5.3.3 Organizational Structure of PDAM) and one of responsibility is obtaining the water right, if necessary. Dinas PU meanwhile compiles infrastructure development documents including those for water supply projects subjected to planning and implementation (from selection of contractors to construction supervision). It is also in charge of land acquisition for SPAM IKK.. District BAPPEDA compiles development plans including those in other sectors and prepares draft budget proposals (APBD). For example, the district Dinas PU basically prepares the documents required for making SPAM IKK proposals and it submits applications to the provincial SatKer. Depending on necessity, PDAM employs a consultant to design the SPAM IKK. However, if the projects are for implementation in the next medium-term development plan (RPIJM), applications are granted even though there is little chance of securing budget in the local level. This is under the assumption that the budget will be provided by the central government. As a result, there are cases where projects obtain central government approval, and water treatment plants are completed under the central

government budget. However, in spite of this, the overall water supply facility is unable to function because the necessary local government budget (APBD) is not available.

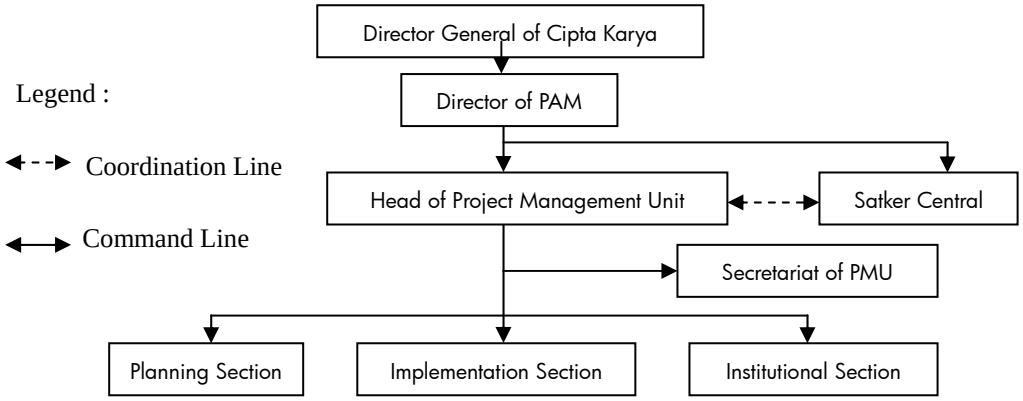


Source: PDAM of Gowa Province, South Sulawesi 2010

Figure 5.3.3 Organizational Structure of PDAM (GOWA)

5.4 Activities of Project Management Unit (PMU)

The PMU is the project unit in charge of the SPAM IKK projects out of the sectors managed by Cipta Karya. The PMU is composed of three sections, namely, the Planning Section, Institutional Section and Implementation Section (refer to Figure 5.4.1). The organization of the General Directorate comprises the Head of Cipta Karya and 15 executive members including the directors. However, since numerous members also work in the Directorate of Water Supply Development, the PMU only has five dedicated personnel supported by one contracted consultant. Accordingly, experienced staff in DirPAM jointly conducts PMU activities. The roles of each PMU section are as indicated in below Table 5.4.1 which is clearly specified in the guidelines, however, the actual state of activities is unclear and no archive of information is maintained concerning SPAM IKK. Accordingly, in order to strengthen the organization of the PMU, it is necessary to start from basic work such as the collection and analysis of data on SPAM IKK.



Source: Guideline for Implementation of Program for Development of Drinking Water Supply System in Cites in Sub-District (SPAM IKK) for Year 2008

Figure 5.4.1 Organizational Structure of PMU

Table 5.4.1 Key Tasks of PMU

Section	Tasks
Planning	➢ To facilitate the local government in compilation of schedule for Medium-Term Investment Program (RPIJM). ➢ To select the location and prepare the land for development of SPAM IKK. ➢ To create the schedule and program regarding implementation of development of SPAM IKK. ➢ To carry out evaluation of the program on implementation of development of SPAM IKK. ➢ To control quality regarding the work to create Detailed Engineering Design (DED).
Institutional	➢ To prepare the plan for organization and management (including determination of tariff) of the respective SPAM IKK. ➢ To assist closely in the forming of organization and control of SPAM IKK. ➢ To monitor organization and state of control of SPAM IKK. ➢ To carry out Training Needs Assessment (TNA) for human resources (SDM). ➢ To create training schedule for human resources (SDM) for implementation of SPAM IKK.
Implementation	➢ To formulate system for monitoring and evaluation of implementation results of physical work. ➢ To inspect study plan and documents for implementation of development activity of SPAM IKK. ➢ To collect the reports from Work Unit (SatKer) for improvement of performance of management of SPAM IKK. ➢ To identify the existing problems on the results of physical work at the site. ➢ To carry out analysis of all data on the results of implementation of activities at the site.

Source: Guideline for Implementation of the Program of SPAM IKK, 2008

5.5 Technical Level and Execution Capability

SPAM IKK projects are basically planned at the district level (BAPPEDA/Dinas PU) during the initial stage. It is necessary to attach in the proposal applications the

feasibility study and detailed design that includes construction cost estimates for each candidate project. Documents at this stage are prepared by the BAPPEDA, Dinas PU or PDAM. However, since many district governments have not acquired design technology, they either employ a consultant to perform the design, estimation and construction planning, or they entrust said work to the higher executing agency on the provincial level (provincial SatKer).

The provincial SatKer reviews the contents of applications received from Dinas PU and offers guidance on any documentation that needs to be modified or supplemented. However, it is not clear whether proposal applications made to the central SatKer will be approved by the central government. Moreover, there are some provincial SatKers that grant applications without conducting a full review of the proposals. As a result, problems sometimes occur after projects have been approved by the central government. Such problems include those concerning water rights and land acquisition, the unfeasible local government development budget (APBD) allocation, and so on.

Since the Cipta Karya gives priority to the utilization of budgets according to the national development plan, it does not always conduct adequate follow-up on the outputs of projects. Also, because there are some provincial SatKers that lack the capacity to properly review project applications, delays sometimes occur in the execution of district budgets (APBD), and projects do not always advance as planned. Aside from lack in individual staff capacity, the implementation system for the projects is not properly conducted with regards to application and review of proposals, and supervision of projects according to the guidelines.

Meanwhile, PDAM employs engineers to operate the water treatment plant facility. However, in PDAM, where management conditions are poor as there is not enough funds to cover maintenance expenses, numerous problems arise such as water leakage and deterioration of water quality and service level. Even in SPAM IKK projects where new water supply plans are constructed, future problems sometimes occurred because PDAM does not have sufficient funds to procure required chemicals or conduct proper training to operators. PDAM employees, other than executive managers, have few opportunities in terms of receiving formal training programs. It is also noted that almost all of its employees are assigned to small-scale SPAM IKK where no basic training is conducted. As a result, the quality of maintenance for the water treatment plants deteriorate.

Water fee invoices are created every month using a computer facility, considering the tariff structure system (meter rate for determining amount of water consumption

according to the tariff) set by PDAM individually. Meanwhile, because most of PDAMs' headquarters do not possess computers for conducting accounting procedures, staffs perform daily accounting jobs using electronic hand calculators while noting them manually in accounting books. Consequently, erroneous results are frequently obtained.

There is much room for improvement in terms of job efficiency. If management conditions are improved, there is potential in conducting adequate maintenance for SPAM IKK projects.

5.6 Financial Management Capacity of Implementation Agencies

5.6.1 MPW and Provincial SatKers

As for the implementation of SPAM IKK projects, MPW and provincial SatKers are considered capable of financial management, at least to execute the central government budget allocated for the construction of facilities. However, Cipta Karya has limited capability to monitor the budget execution status of each SPAM IKK project. Even for the central government portion, the information on the project implementation status is separately kept among the central and provincial SatKers and the availability of integrated information is limited. For the local government portion, Cipta Karya has no grasp on the implementation status of most of the SPAM IKK projects. Furthermore, there is very limited coordination between the central and local government works.

5.6.2 District and City Governments

In many SPAM IKK projects, serious delay in the construction of distribution facilities is caused by local governments' budget shortage. There is a substantial time lag between completion of the upstream part (intake and water treatment plant) and downstream part (distribution and house connections) resulting in large idling capacity of the treatment plants constructed under the central government budget. MPW recently has a policy to strictly examine RPIJM of each district concerned upon the appraisal of candidate SPAM IKK projects. However, the budget for each fiscal year cannot be allocated as planned in RPIJM, and hence, the SPAM IKK projects are still at risk in terms of delayed completion.

5.6.3 PDAMs

Most PDAMs are not financially sustainable due to water tariff revenue being below the cost recovery level. Many also owe a large amount of long-term debt from the central government for past foreign assistance projects. Thus, it is anticipated that few

PDAMs are capable of implementing new SPAM IKK projects with their own funds and loans from public or commercial entities.

5.7 Site Selection Criteria and Procedure for SPAM IKK Program

Cipta Karya of MPW stated the site selection criteria in the Guideline for Development of SPAM IKK on 2008. Consequently, the district governments require that the proposals comply with these criteria after 2008. Said criteria are shown in Table 5.7.1.

Table 5.7.1 Selection Criteria of SPAM IKK Program

No.	Description	Condition
I. General Condition		
1.	Condition of IKK	There are potable water problem.
		There is no SPAM IKK or if it exists, the facility has problems.
2.	Status of IKK	Candidate location for SPAM IKK is not proposed by other programs funded by the local budget, national budget and loan/grant from outside the country.
3.	Planning documents	To be listed in the Documents on the Medium-term Investment Program (RPIJM)
		Detailed Engineering Design (DED) or equivalent document of technical planning.
4.	Commitment of district	To be accompanied with the confirmation letter of the fund for development of distribution network and house connection signed by the head of local government and DPRD.
		New system management by PDAM or BLU. Fiscal health of management organization.
		The fund for O&M for new system.
II. Special Conditions		
1.	Technical Criteria:	Water consumption: minimum 60 L/person/day
		Water quality: portable water
		Operation hour: 24 hours.
		Proportion of house connection and public hydrant = 8:2
		To be equipped with the master meter for production and distribution zone.
2.	Procurement / installation.	Execution of procurement and installation of the facility funded by the national budget to complete within one annual period.
		More than 50% of the planning number of house connection and public hydrant shall be installed in the first year after completion of the project and all house connections and public hydrants shall be installed up to two years after.
3.	Condition of management organization	PDAM: Healthy category
		UPTD-BLU: to be established when PDAM is not healthy (Local government is obliged to give operational assistance/subsidy to the control unit of SPAM IKK until the said PDAM may achieve full cost recovery.)
4.	Proposal	Availability of land
		Acceptance of plan and design

		Acceptance of annual development program and execution schedule.
		Acceptance of O&M plan and cost. (Acceptance of O&M and implementation organization)
		Acceptance of technique and costs according to RPIJM (Medium-term Investment Program)
		Statement of Regent / Mayor and district assembly chairman

Source: Guideline for Development of SPAM IKK（2008, MPW）

District governments made the proposal following the criteria. Especially, water demand forecast and development impact was considered as the most important of all the criteria. Furthermore, the issue on water rights should also form part of the criteria.

5.8 Contents of Proposal

The necessary documents for proposal of SPAM IKK are summarized in Table 5.8.1. The proposals are generally prepared by BAPPEDA , Dinas PU, and PDAM. However, in some cases, PDAM does not participate in the proposal preparation. The design is sometimes prepared by the consultant employed by Dinas PU or PDAM. The proposal is then submitted to the provincial SatKer and evaluated. The evaluation is based on the criteria and discussions with BAPPEDA , Dinas PU and PDAM. In some cases, the district government prepares the budget after being notified by the Cipta Karya. This may fail in terms of preparation of local budget consequently leading to unsuccessful implementation of the project. Although the guideline mentions clearly the criteria for proposals and the evaluation process, the actual condition dictates the necessity for carrying out the detailed design in Central Java, since the pre-feasibility study conducted in South Sulawesi does not meet said criteria.

Table 5.8.1 Documents for Proposal of SPAM IKK

	Document	Department in Charge
1	DED (F/S +D/D)	PDAM/PU (or consultant)
2	SIAP (Acceptance of water rights)	PDAM/PU
3	Land acquisition	PDAM/PU
4	Dara Pendanping (Pledge of local budget)	BAPPEDA
5	Kasamp pan Menyhhda(Certificate of management for the system)	PDAM/PU
6	RPJM (Middle development plan of local government)	BAPPEDA

Note: In many cases, PDAMs do not participate in the preparation of the proposal
Source：SatKer Central Java 2010

CHAPTER 6 MANAGEMENT, OPERATION AND MAINTENANCE

6.1 Present Conditions of Existing Facilities

6.1.1 Operating Status

(1) General Outline (Inventory summary of operating condition of 50 SPAM IKKs)

The current operating conditions of 50 SPAM IKKs are summarized in Table 6.1.1 based on the site survey. The 50 SPAM IKKs range in the operation hours from 24 hours operation to non operation. Distribution system is divided into new and expansion projects based on the category of connected distribution system. New project is connected new distribution systems independent from existing distribution systems. Expansion project is connected to existing distribution system. The results of operating status analysis are shown following sentence..

Table 6.1.1 Summary of Operating Condition of 50 SPAM IKKs

No.	Province	District/City	Site No.	SPAM IKK	Project Year	Distribution	Operation Hours	Reason of not 24h running
1	North Sumatra	Dairi	A - 1	Sumbul	2008	New	-	Social Conflict
2		Asahan	A - 2	Kisaran	2006	Expansion	24	-
3	West Sumatra	Solok	B - 1	Nagari Kota Sani	2007	Expansion	-	Social Conflict
4		Kota Sawahlunto	B - 2	Sumpahan	2008	Expansion	24	-
5	Riau	Rokan Hulu	B - 5	Tandun	2007	New	8	Low Demand
6		Kuantan Singingi	B - 6	Inuman	2008	New	6	Low Demand
7	Jambi	Muaro Jambi	B - 7	Candi Muaro	2005	Expansion	2	Low Demand
8		Batang Hari	B - 8	Lubuk Ruso	2007	New	3	Low Demand
9	South Sumatra	Banyuasin	B - 3	Sungai Pinang	2007	New	6	Low Demand
10		Muara Enim	B - 4	Gelumbang	2008	New	3	Low Demand
11	Lampung	Lampung Selatan	B - 9	Way Lima	2007	New	12	Low Demand
12	Bengkulu	Rejang Lebong	B - 10	KotaPadang	2006	New	-	Under Preparing
13		Rejang Lebong	B - 11	Selupu Rejang & Curup Timur	2007	Expansion	24	-
14	Banten	Serang	B - 12	Cikande	2008	Expansion	24	-
15	West Java	Kuningan	B - 13	Garawangi	2008	Expansion	24	-
16		Kuningan	B - 14	Luragung	2008	Expansion	24	-
17		Cirebon	B - 15	Ciwaringin	2008	New	-	Low Demand
18		Kota Bogor	B - 16	Palasari	2008	New	6	Low Demand
19	Central Java	Grobogan	A - 3	Toroh	2005	Expansion	12	Low Demand
20		Grobogan	B - 18	Gubug	2007	New	4	Low Demand
21		Kendal	A - 4	Boja	2005	Expansion	8	Excessive Design
22		Boyolali	B - 17	Sawit	2005	New	3	Low Demand
23		Rembang	B - 19	Sulang	2007	Expansion	16	Lack of Raw water
24	East Java	Tuban	B - 20	Bancar	2006	Expansion	24	-
25		Ponorogo	B - 21	Jenangan	2006	Expansion	15	Lack of Electricity
26		Madiun	B - 22	Gemarang	2006	Expansion	16	Low Demand
27		Bangkalan	B - 23	Burneh	2007	Expansion	-	Low O&M Skills
28		Kediri	B - 24	Kepung	2008	New	1.4	Low Demand
29	Yogyakarta	Bantul	B - 25	Selopamioro	2007	Expansion	3	Social Conflict
30		Sleman	B - 26	Gamping	2008	Expansion	2	Excessive Design
31	West Kalimantan	Pontianak	A - 5	Jungkat	2007	Expansion	8	Low Demand
32		Singkawang	A - 6	Sei Bulan	2008	New	3	Social Conflict
33	East Kalimantan	Penajam Paser Utara	B - 27	Sepaku	2005	Expansion	24 (2 d/w)	Low Demand
34		Kutai Kertanegara	B - 28	Loa Janan	2007	Expansion	7	Low Demand
35	South Kalimantan	Banjar	B - 29	Kertak Hanyar	2005	Expansion	24	-
36		Tapin	B - 30	Binuang	2005	Expansion	24	-
37	Central Kalimantan	Katingan	B - 31	Kareng Pangi	2005	Expansion	21	Save of operation cost
38		Gunung Mas	B - 32	Tumbang Talakan	2008	Expansion	4	Low Demand
39	Central Sulawesi	Donggala	B - 33	Binanga	2005	New	24	Mistake of WTP choice
40		Donggala	B - 35	Sabang	2008	New	-	Low Demand
41		Palu	B - 34	Palu	2006	New	24	-
42	South Sulawesi	Takalar	A - 7	Pattallassang	2006	Expansion	24	-
43		Takalar	B - 37	Galesong Selatan	2008	New	12	Low Demand
44		Gowa	A - 8	Pattallassang	2008	New	10	Social Conflict
45		Jeneponto	B - 36	Parapa	2007	Expansion	24	-
46	South East Sulawesi	Kolaka	B - 38	Lakambaga	2008	Expansion	-	Low O&M Skills
47	North Sulawesi	Minahasa Utara	B - 39	Air Madidi	2006	New	24	-
48		Minahasa Selatan	B - 40	Amurang	2006	New	24	-
49	Gorontalo	Bone Bolango	B - 41	Suwawa	2006	New	-	Poor Construction (FRP Plant)
50		Gorontalo Utara	B - 42	Kwandang	2008	Expansion	10	Low Demand

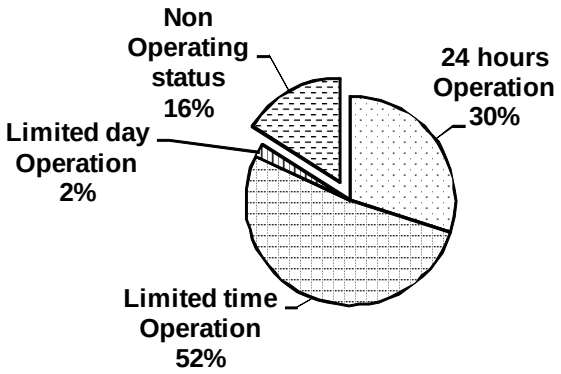
Notes: “New” is independent from existing systems. “Expansion” is the project connected to existing systems.

For the Site No., “A-“ indicates the first survey site while “B-“ indicates the second survey site.

Source: JICA Study Team 2010

(2) Non-operational System due to Incomplete Distribution Pipes and Other Reasons.

There are about 16 % of SPAM IKK sites with non-operational facilities as shown in Figure.6.1.1. For these sites, non-operating status is classified into two types. The first type is treatment plants which have not been functioning since construction completiono. The second type is treatment plants which have operated initially but have stopped running functioning. SPAM IKK is operated by PDAM or BLU..



Source: JICA Study Team 2010

Figure 6.1.1 Operating status of SPAM IKK

Those classified in the first type are due to the following main reasons:

- The facility could not accommodate the demand to operate due to the delay in the construction of distribution pipes and house connection.
- Operators and engineers of PDAM/BLU are still required a lot of training to operate the treatment facilities properly.
- The commissioning test of treatment plants are not finished due to poor construction work.

Meanwhile, those classified in the second type are due to the following main reasons:

- PDAM has suspended operations due to a lot of residents complaining on poor treated water quality.
- PDAM has suspended operations in order to repair the water treatment plant (especially FRP plant).

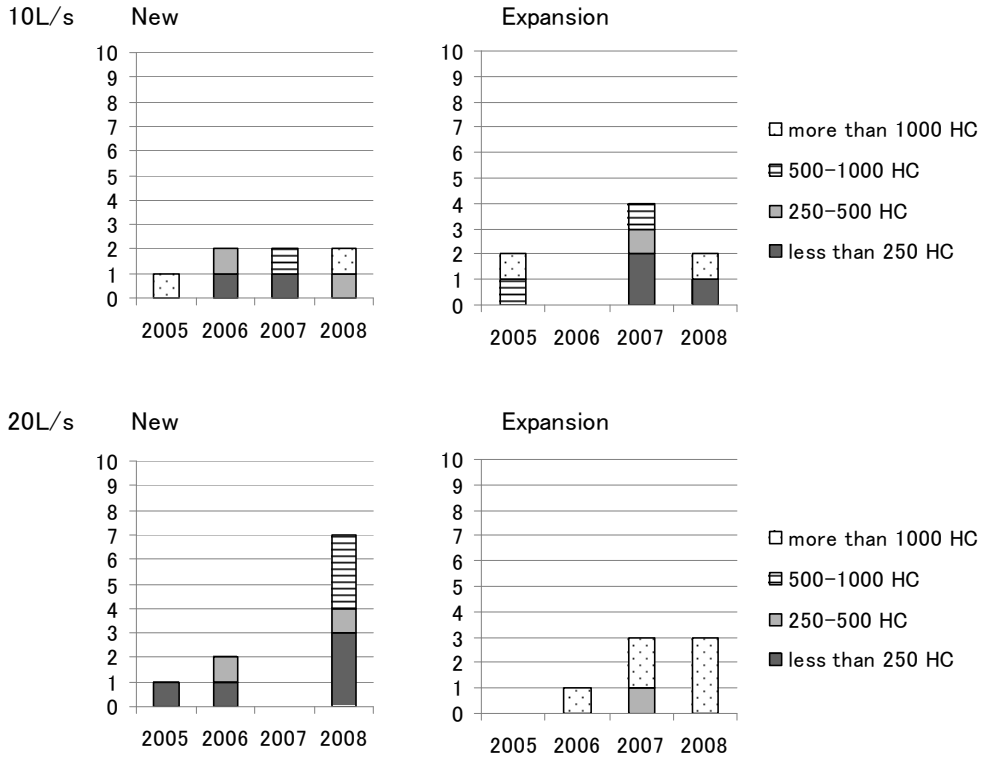
(3) Deficiency of Distribution Pipes (Delay of installation of distribution pipes)

The main reason for the deficiency of distribution pipes is the lack of budget of local governments that are responsible for the implementation of the distribution network construction.

(4) Small Number of House Connections

The small number of house connection (HC) is significantly below the intended

capacity of the water treatment plant (WTP). The number of HC for each established year in SPAM IKK sites is shown in Figure 6.1.2. The average house connection of 10L/s WTP in SPAM IKK is about 1,000 households. It is used a target for break-even of operation cost and water revenue. The highest case of achieving the target is 57% at 20 L/s in expansion project. The lowest case is 0 % at 20 L/s in new project. Some projects do not reach 250 HC, due to the short length of distribution pipes or high connection fee. This is largely attributed to the deficiency of distribution pipes. Therefore, it is necessary to speed up the installation of the distribution network pipes to increase the number of house connections.



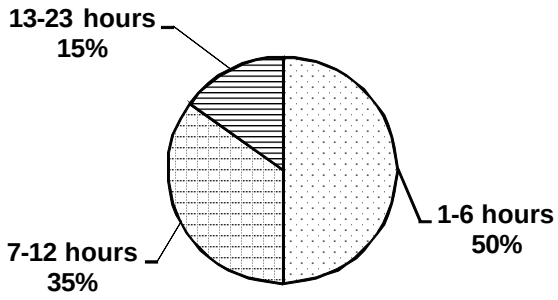
Source: JICA Study Team 2010

Figure 6.1.2 Number of HC per System Capacity

(5) Short-time Operation of WTP

Piped water should be supplied continuously (24 hours operation) in principle. However, in many sites (about 52% as shown in Figure.6.1.1), water supply systems

are operated for a limited time. The regulated daily operating hours of each SPAM IKK are as shown in Figure 6.1.3.



Source : JICA Study Team 2010

Figure 6.1.3 Regulated Daily Opertaion Hours at Each Site

The main reasons for regulated operations of water supply are as follows:

- The demand is significantly small to compared the intended capacity of the facility due to the delay in distribution network construction, which fail to meet the construction completion date of intake and water treatment facilities
- Connection work between treatment facility and distribution network is incomplete.

(6) Failure of Water Treatment Plants Made of FRP

Treatment plants made of FRP are adopted in about 18% of the survey sites. The substance of FRP plants, the following problems have occurred:

- Plant is not functioning due to water leakages at joints. This is caused by defective materials and poor construction works.
- Frequent repairs have been initiated after the start of operation. This is also caused by defective materials and poor construction works.
- The plant has never been operated because of some fults found during commissioning test.

Therefore, FRP treatment plant is considered not appropriate for SPAM IKK even though the FRP materilas have workable advantage in terms of delivery and assembly due to light weight properties of the material compared with steel made treatment plant.

(7) Malfunctioning Plants

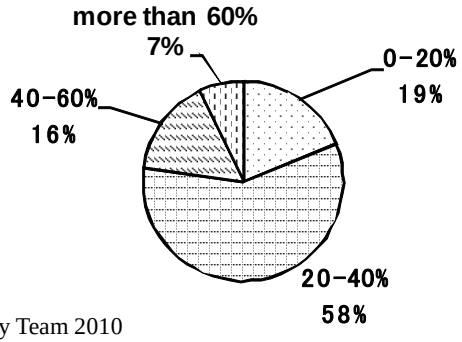
Serious operation problems are not found at the treatment plant except FRP made Steel made plant is generally operated well.

(8) Electrical Power Failure

Power supply for treatment plants is generally received from the electric company (PLN). However, about 30% of SPAM IKK sites applied generators to supply electricity for WTP, becasuse PLN power line system is not available near WTP. Meanwhile, sometimes power supply conditions of PLN is not stable due to power outages problems. WTP operation is frequently effected at some sites by the power outages. Therefore, back up generator is required to maintain the constant WTP operation.

(9) Water leakage and Unaccounted for Water (UFW)

According to the site survey, PDAM estimted the water leakage condition of SPAM IKK by percentage of Unaccounted for Water (UFW). UFW is calculated based on the propotaion of amounts of metered use to the amounts of production in SPAM IKK system. The range of UFW(%) at each SPAM IKK is as follows.



Source: JICA Study Team 2010

Note: In many sites, the exact amounts of “production” and “metered use” have not been recorded sufficiently.

Figure 6.1.4 Range of UFW

In most sites, UFW is high. About 58% of SPAM IKK shows 20 to 40 % UFW, in addition about 23 % of SPAM IKK shows more than 40% UFW. Therefore, all PDAMs have strong interest in the water leakage reduction.

6.1.2 Availability of Water Quantity and Quality

(1) Water Shortage during the Dry Season

There are about 10% of SPAM IKK sites where the necessary amount of raw water cannot be secured due to reduction of surface water during the dry season. Therefore, this has a significant impact on facility operations, including suspension of operation.

Measures to the problem on water quantity will require replacement or additional

water source and facilities. Therefore, the selection of water source is required to careful considerations during planning and design.

(2) High Turbidity during the Rainy Season

During the rainy season, surface water generally has high turbidity. At sites with such conditions and without sufficient operation capacity, treated water still contain turbidities as frequently complained by residents.

Measures to the problem on water quality are technical issues that can be resolved if proper operation management is conducted, even for existing treatment plants.

(3) Inadequate Water Treatment

Most SPAM IKK sites have problems on treated water due to turbidity. Main reasons of inadequate treated water are as follows:

- Skill of operator: Most operators do not understand adequately how to manage water quality in treatment plants
- Type of treatment system: Slow sand filtration system has been selected in spite of high raw water turbidity in some place.

(4) Low Quality Groundwater (Iron contents)

In some groundwater source contains the high rate of iron ion which exceeds the allowable limit of drinking water standards. However, most of groundwater is distributed directly to beneficiaries without removing the iron ion. Therefore, residents cannot use supplied water for drinking.

6.1.3 Operation and Maintenance (O&M) Technology

(1) Transfer of Knowledge on O&M

Transferring of knowledge on O&M to PDAM staff by contractors at commissioning test seems to be not sufficient. This is attributed to the takeover situation of design plans and operating manuals. It is noted that design plans and equipment operating manuals have not been handed over at 86% of the sites.

It confirms that there are many sites where the facilities are operated and maintained based only on the acquired experience of PDAM staff.

(2) Lack of Basic Operation Knowledge

From the implementation status of the education and training on facility operations for PDAM, the lack of basic operation knowledge is identified. It is noted that 94% of the sites do not conduct education and training for PDAM staff on facility operations.

Presently, there are 10% of sites where plant manufacturers conduct briefings for PDAM staff although these are not considered sufficient form of education and training.

It seems that most of the operators of each SPAM IKK project had no basic operation knowledge until the start of operation.

(3) Unskilled Operators

For operation of treatment plant, raw water quality management is important. Therefore, all facilities should basically be installed with jar tester and other instruments, and operation should be performed while carrying out measurements on water quality. However, at about 80% of SPAM IKK sites, operators do not know how to use these instruments. In addition, even if water quality measurement is done, operators do not know how to reflect the amount of chemical injection.

Therefore, it is considered that the operation on water quality management is not based on technical background. In order to improve water quality and ensure stability, thorough training on facility operation for unskilled operators is considered necessary.

6.2 Support System for O&M

The water supply facility constructed by the central government (Cipta Karya) and district government is transferred to the water supply management organization like PDAM. The central government does not support the O&M for the constructed facility. Financially weak PDAMs receives subsidy from the district government.

In some cases, the district government, Dinas PU, operates the new system by BLU which is established in areas with no PDAM as water supply system does not exist.

6.3 Monitoring System for Management, O&M

Nobody conducts the monitoring and evaluation for each SPAM IKK. Supporting Agency Water Supply System Development (BPP SPAM) conducts monitoring and evaluation of PDAM which operates the SPAM IKK system. PDAM submits the monthly statement report to the district, Control Bureau, and obtain approval from the assembly and head of district.

6.4 Organization Structure

The SPAM IKK system is generally operated by PDAM when an O&M office is provided as the PDAM branch office. The office staff consists of plant manager, operation staff and tariff collector. An average of 5 to 10 personnel is employed for one branch office.

6.5 Financial Conditions

Facilities constructed in most SPAM IKK projects are operated and maintained by PDAMs. PDAMs are public entities under the ownership and supervision of district/city governments and maintain independent accounting and organizational structure.

6.5.1 PDAM Performance Evaluation by BPP SPAM

BPP SPAM is the agency responsible to monitor and evaluate the financial and managerial performance of PDAMs. BPP SPAM issues Performance Assessment Report to PDAM annually based on the information collected from PDAMs through provincial SatKers. The latest performance assessment report issued in 2009, evaluates the financial status of 337 PDAMs from 2005 to 2008 through scoring method. The PDAMs are categorized according to soundness on financial and managerial status into “Healthy”, “Unhealthy” and “Sick”. Indicators applied in the evaluation are illustrated in Table 6.5.1. BPP SPAM has planned to apply improved indicators for its assessment in 2010.

Table 6.5.1 PDAM Performance Evaluation Indicators

Category	Indicator	Weight
Financial (Weight: 0.55)	Operating Ratio (Cost/Revenue)	0.150
	Debt to Total Assets	0.125
	Income to Total Debt	0.100
	Cash to Earnings per Day	0.175
Management (Weight: 0.30)	Water Consumption（m^3/customer/month）	0.090
	Customer Structure (Industry & Business, Households, Social)	0.195
	Staff per 1,000 customers	0.015
Technical (Weight: 0.15)	Water Loss	0.055
	Production Efficiency	0.035
	Operating Hours (hours/day)	0.040
	Distribution Efficiency	0.020

Source: PDAM performance assessment 2008 (BPP SPAM 2009)

Table 6.5.2 shows the evaluation results by BPP SPAM. Number of PDAMs evaluated as “Healthy” is increased from 89 in 2007 to 103 in 2008; however, this is represent a mere of about 30 % of all PDAMs.

Table 6.5.2 PDAM Performance Evaluation Results (2007 and 2008)

PDAM Healthiness		2008		2007	
Category	Score	PDAM	%	PDAM	%
Healthy	> 2.0	103	30.56	89	27.38
Unhealthy	1.7 – 2.0	115	34.13	119	36.62
Sick	< 1.7	119	35.31	117	36.00
Total		337	100	325	100

Source: BPP SPAM Assessment Report 2009

As shown in Table 6.5.3, provinces with "Healthy" PDAMs are in Java and Bali iIslands while majority of "Sick" PDAMs are in the Sumatra and Sulawesi provinces.

Table 6.5.3 PDAM Evaluation Results by Province (2008)

	Province	Healthy	Unhealthy	Sick	Total
1	Nangroe Aceh Darussalam	1	6	5	12
2	North Sumatra	4	2	9	15
3	West Sumatra	4	5	6	15
4	South Sumatra	3	5	5	13
5	Riau	1	2	2	5
6	Riau Islands	0	2	1	3
7	Bengkulu	0	2	4	6
8	Jambi	0	3	6	9
9	Bangka Belitung	0	1	2	3
10	Lampung	0	1	6	7
11	DKI Jakarta	0	0	1	1
12	Banten	5	0	1	6
13	West Java	13	5	4	22
14	Central Java	24	5	6	35
15	DI Yogyakarta	2	2	1	5
16	East Java	15	8	15	38
17	South Kalimantan	4	7	1	12
18	East Kalimantan	5	7	1	13
19	West Kalimantan	1	6	1	8
20	Central Kalimantan	2	8	4	14
21	South Sulawesi	3	7	10	20
22	North Sulawesi	0	2	5	7
23	Gorontalo	0	1	2	3
24	Southeast Sulawesi	1	2	4	7
25	Central Sulawesi	2	5	1	8
26	West Sulawesi	1	1	2	4
27	Bali	4	3	2	9
28	West Nusa Tenggara	2	3	1	6
29	East Nusa Tenggara	2	7	3	12
30	Maluku	1	2	4	7
31	North Maluku	2	0	2	4
32	Papua	1	4	1	6
33	West Papua	0	1	1	2
	Total	103	115	119	337
	%	30.6%	34.1%	35.3%	100.0%

"Healthy" PDAMs more than other categories
"Sick" PDAMs more than other categories

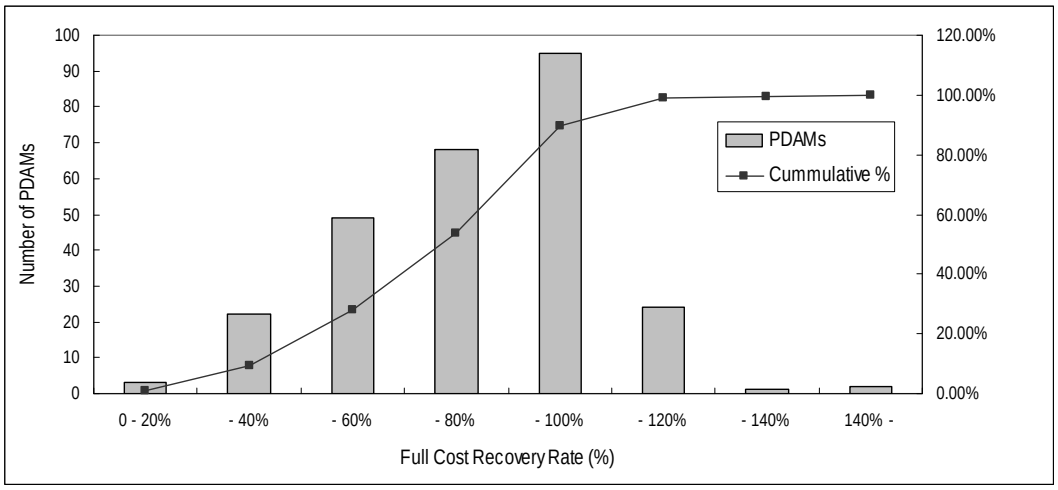
Source: JICA Study Team 2010 based on BPPSPAM Assessment Report 2009

6.5.2 Profitability

(1) Cost Recovery

According to "Compilation Report on Audit Result of All PDAMs in Indonesia 2008" by BPKP (August 2009), the average net profit of the audited 275 PDAMs was only 0.8% of total assets in 2008. About 183 PDAMs (66.6%) recorded net loss whereas only 92 PDAMs (33.5%) recorded net profit.

Both low water tariff level and inefficient operating cost hinder the profitability and financial sustainability of PDAMs. According to the data provided in the PDAM Performance Assessment Report by BPP SPAM, PDAMs that achieved full cost recovery only account for 10.2% out of 264 PDAMs in 2008 (Figure 6.5.1).



Source: JICA Study Team based on BPPSPAM 2009

Figure 6.5.1 Cost Coverage Rates

(2) Water Tariff

Water tariff setting is regulated by the guidelines of Ministry of Home Affairs (2006/No. 23). Water tariff is determined by Bupati or mayor of district/city based upon the proposal from PDAM. Primary criteria for the tariff setting are as follows:

- Affordability and fairness: Water tariff must be set at less than 4% of customers' income based on the provincial minimum wage. Cross subsidy is applied by differentiating tariffs among customer category to ensure fair charging.

- Service quality: Tariff shall be determined by taking into account the balance between tariff rate and quality of service received by the customers.

- Cost recovery: Full cost recovery shall be achieved by average tariff at least equal

to basic cost (water source, treatment and distribution costs, administration cost and financial costs). Appropriate profit rate shall be 10% of productive assets.

However, the water tariffs applied to most PDAMs are very low and most of the PDAMs have tariff below their cost recovery level. According to the guidelines, water tariff is determined merely by Bupati or mayor. However, approval by district/city assembly is required in some district/city.

Average tariff in 2008 was Rp. 2,951/m^3 which increased by 55% from 2007. However, it can cover only O&M cost and still remains at 91% of the full costs including administration and financial costs (Table 6.5.4).

Table 6.5.4 Average Water Tariff and Cost Coverage

	2007 (325 PDAMs Average)		2008 (375 PDAMs Average)	
	Rp./m3	Cost Coverage %	Rp./m3	Cost Coverage %
Average Tariff (Rp./m3)	1,907		2,951	
O&M Cost Recovery Level (Rp./m^3)	2,303	82.8%	2,590	113.9%
Full Cost Recovery Level (Rp./m^3)	2,932	65.0%	3,244	91.0%

Source: BPP SPAM 2009

(3) Cost Structure

Table 6.5.5 shows the cost structure of 275 PDAMs according to the BPKP report. Largest parts are employment cost (26.6%), depreciation (16.6%) and electricity and fuel cost (14.1%).

Table 6.5.5 Cost Structure of PDAM (2008)

Unit: Rp.

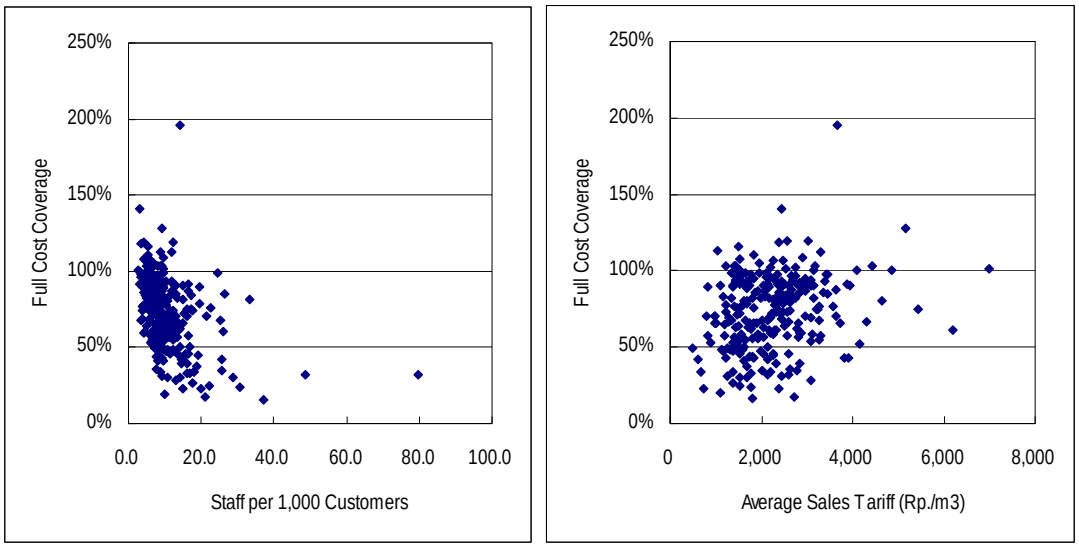
	Total 275 PDAMs	Average	%
Depreciation Cost	677,038,141,077	2,461,956,877	16.6%
Employment Cost	1,083,119,089,342	3,938,614,870	26.6%
Electricity/ Fuel Cost	576,923,411,680	2,097,903,315	14.1%
Maintenance Cost	222,420,426,241	808,801,550	5.5%
Interest Cost	201,751,185,592	733,640,675	4.9%
Other Costs	1,316,909,705,467	4,788,762,565	32.3%
Total	4,078,161,959,399	14,829,679,852	100.0%

Source: BPKP 2009

According to BPP SPAM data (2009), the number of employees per thousand customers was 10.5 on average in 2008 which is higher than BPP SPAM's evaluation criterion of 8.0. Correlation between number of employees and cost recovery rates of 264 PDAMs is -0.42, suggesting that inefficient high operating cost is the key issue for cost coverage besides the low tariff level (Figure 6.5.2). PDAMs with higher average

tariff alone are not necessarily achieving cost recovery (the correlation therein is only 0.25).

Another factor that increases the operating cost is water loss (leakage) in water supply systems. From 2006 to 2008, the average water loss rates remain as high as over 30%.



Source: JICA Study Team 2010 based on BPP SPAM 2009

Figure 6.5.2 Cost Coverage Rates vs. Staff per 1,000 Customers and Average Tariff

6.5.3 Assets and Debt

(1) Debt Status

Table 6.5.6 shows the summarized balance sheet of 275 PDAMs audited by BPKP. Accumulated loss accounts for over 50% of the total assets. Fifty five PDAMs (20%) have recorded negative net worth and are virtually in the state of insolvency. Their liabilities consist of electricity bills and other accounts payable due to O&M expenses as well as government loans from past donor assistance.

Table 6.5.6 Summarized Balance Sheet in 2008 (275 PDAMs)

Unit: Rp.

	Total 275 PDAMs	Average	%
Total Assets	9,404,597,350,565	34,198,535,820	100.0%
Total Liabilities	7,315,598,030,189	26,602,174,655	77.8%
Total Equity (Net Worth)	2,089,001,320,376	7,596,368,438	22.2%
Capital	6,841,898,435,678	24,879,630,675	72.8%
Accumulated Loss in Previous Year	-4,825,498,322,630	-17,547,266,628	-51.3%
Profit in 2008	72,601,207,328	264,004,390	0.8%
Total Liabilities and Equity	9,404,599,350,565	34,198,543,093	100.0%

Source: BPKP 2009

(2) Debt Restructuring Program

Ministry of Finance has a debt restructuring program to relieve PDAMs' long-term debts with the central government. In accordance with Ministry of Finance regulation (2008/No.120), the program aims at reducing non-principal debt (delinquent charge and interest) borne by PDAMs on condition that the subject PDAM shall achieve the water tariff revenue at the cost recovery level. As of March 2010, 104 out of 166 delinquent PDAMs have applied for the program with corresponding business plan. Fifteen PDAMs have already been approved for the debt reduction.

(3) Asset Transfer and Management

According to the Compilation Report by BPKP (2009), Rp. 2,028 billion of the assets constructed with government budget (central: Rp. 1,322 billion and local: Rp. 706 billion) have not yet been properly transferred to PDAMs. Depreciation of the said assets is not recorded in PDAMs' accounting, thus, the basic cost for the water tariff setting is not calculated appropriately.

CHAPTER 7 ENVIRONMENTAL CONSIDERATION AND IMPACTS

7.1 Environmental Assessment, Management and Monitoring Methods

7.1.1 Requirement of the Environmental Assessment (AMDAL) under the Ministry of Environment

Environmental Assessment in Indonesia is required for the projects which includes the activities having potential impact to environment under government regulation concerning Environmental Impact Assessment (EIA) (PP No.27 /1999 Analisis Mengenai Dampak Lingkungan Hidup). This regulation was established based on the Law of Environmental Management in 1997 (UU 23/1997). The projects that have potential impact to the environment are subject to the process of AMDAL which requires assessment report (ANDAL), Environmental Management Plan (RKL: Rencana Pengelolaan Lingkungan) and Environmental Monitoring Plan (RPL: Rencana Pemantauan Lingkungan).

Projects which require environmental assessment for the implementations are identified under Decree of State Minister for the Environment No.11/2006 on Types of Business and/or Activity Plans（KEP 11/2006 Jenis Rencana Usaha dan/atau Kegiatan yang Wajib Dilengkapi dengan Analisis Mengenai Dampak Lingkungan Hidup）. Said projects are required to be completed with the Environmental Impact Assessment. The decree has been superseded under the same title in 2000, and has three appendices attached. Appendix-1 provides the list of activities which had been changed from 14 to 13 activities under the former regulation. Appendix-2 lists the protected areas in Indonesia. Appendix-3 provides the screening process. The activities described in Appendix-1 and also those which are located in the area listed in Appendix-2 require AMDAL process.

Regarding water supply project, Appendix-1 of the above mentioned decree (KEP 11/2006), projects which require AMDAL includes water supply network installation at public work sector (corresponding to item H in the Appnedix) and groundwater pumping at energy and mineral resources sector (corresponding to item I in the Appendix). This process is applied to projects that cover more than 500 ha of service area or more than 10 km of water transmission network for the water supply project, and more than 250 L/s of surface water intake and 50 L/s of groundwater pumping.

Besides the identified projects listed in Appendix-1, Appendix-2 contains list of protected areas in Indonesia. Regardless of the type of project as per Appendix-1,

AMDAL is basically required if such project is located in protected areas listed in Appendix-2. Protected areas in Appendix-2 are summarized in Table 7.1.1 below (extracted from the regulation). The detailed explanation of each area is provided in the Presidential Regulation 32 in 1990, regarding the management of protected area (Keputusan Presiden No. 32/1990 Pengelolaan Kawasan Lindung).

Table 7.1.1 Protected Areas in Indonesia (Extracted from Appendix-2 of the Regulation)

1. Protected Forest (Kawasan Hutan Lindung).
2. Peat Swamp area (Kawasan Bergambut)
3. Watershed (Kawasan Resapan Air)
4. Coastal area (Sempadan Pantai)
5. Riverside area (Sempadan Sungai)
6. Surrounding area of lake/pond (Kawasan Sekitar Danau/Waduk)
7. Surrounding area of spring (Kawasan Sekitar Mata Air)
8. Natural Protected Area (Kawasan Suaka Alam)
9. Marine and other Aquatic Nature Reserve (Kawasan Suaka Alam Laut dan Perairan lainnya)
10. Coastal Mangrove Area (Kawasan Pantai Berhutan Bakau (mangrove)).
11. National Park (Taman Nasional)
12. Forest Parks (Taman Hutan Raya)
13. Natural Recreation Park (Taman Wisata Alam)

Source: KEPUTUSAN PRESIDEN REPUBLIK INDONESIA NOMOR : 32 TAHUN 1990 TENTANG PENGELOLAAN KAWASAN LINDUNG

7.1.2 Requirement of UKL and UPL under Ministry of Public Works (Kementrian Pekerjaan Umum)

Besides the abovementioned legislations of the Ministry of Environment, activities which require environmental management efforts (UKL) and environmental monitoring efforts (UPL) in the public works sector are regulated under the Regulation of the Minister of Public Works No. 10/PRT/M/2008: Determining type of business plan and / or activities of public works which requires the UKL and UPL. This supplementary provides the environmental study for activities with less impact than the abovementioned AMDAL.

The regulation provides the list of projects in its appendix. The list includes three main items, namely: I. Water Resources (Sumber Daya Air), II. Road and Bridge (Jalan dan Jembatan) and III. Human Settlements (Kecipta-karyaan). Under these three items, 16 activities are listed. Related to the SPAM IKK as water supply projects, activities which are mainly required to prepare documents are labeled as “12. Drinking water" in Table 7.1.2, as extracted from the regulation.

Water distribution projects covered under said regulation are those involving

distribution pipeline construction for 100 ha to 500 ha areas, construction of transmission pipeline with a total length of 5 km to 10 km in the metropolitan cities or big cities and 8 km to 10 km in middle cities or small cities. The cities are defined in accordance with the scale of population, i.e.: 1) metropolitan cities with population of more than 1,000,000 habitants, 2) big cities with population of 500,000-1,000,000 habitants, 3) medium size cities with population of 200,000-500,000 habitants, and 4) small cities with 20,000-200,000 habitants.

Water intake projects covered by the regulation include those involving intake of surface water from the river and lake with the amount of 50 L/s to 250 L/s and also from the spring with the amount of 2.5 L/s to 250 L/s. Also, water intake from groundwater with the amount of 2.5 L/s to 50 L/s for public purpose of drinking water service and those with amounts of 1 L/s to 50 L/s for commercial purpose are required to be provided with UKL and UPL. Basically, these items are similarly described in the Decree of State Minister for the Environment No. 11/2006(KEP11/2006). Meanwhile, large scale projects require AMDAL process as per said decree, such as those involving more than 500 ha of pipelines and more than 250 L/s of water intake (Refer to Section 7.1.1).

Table 7.1.2 Projects Requiring UKL/UPL According to Regulation of Minister of Public Works (10/PRT/M/2008, At July, 2008)

Activities	Scale of work activities
12. Drinking water	
a. Construction of distribution pipeline (service wide)	100 ha to 500 ha
b. Construction of transmission pipeline (length): 1. Metropolitan/big city - Length 2. Middle/little city - Length 3. Village area - Length	 5 km to 10 km 8 km to 10 km -
c. Raw water intake from river, lake, and other surface water sources (debit) 1. River, lake 2. Spring	 50 L/s to 250 L/s 2.5 L/s to 250 L/s
d. Construction of complete water treatment plant (debit)	50 L/s to 100 L/s
e. Groundwater intake for requirement of: 1. People service by implementer of SPAM 2. Other activity for commercial purpose	 2.5 L/s to 50 L/s 1 L/s to 50 L/s

Source: Regulation of the Minister of Public Works No. 10/PRT/M/2008: Determining type of business plan and/or activities of public works which require conducting the efforts of environmental management (UKL) and environmental monitoring efforts (UPL)

7.1.3 Permission on the Usage of the Water Resource

Prior to implementation of projects on SPAM IKK related to water intake from river, lake and ponds as surface water, water use permit (Srat Izin Pegambilian Air : SIPA) from the concerned public works office at central or regional level corresponding to the water resources should be taken. Concerned authorities which manage water use permits (SIPA) are: 1) Ministry of Public Works for international and inter-provincial water, 2) Provincial government for inter-district (kabupaten) water, 3) Governments of district/city (kabupaten/kota) managing water in the district/city.

In case of Central Java Province, the UKL and UPL are basically required prior to use of groundwater with some exemption such as 1) manual pumping, 2) less than 100 m^3/month of water use not using any pumping facility, and 3) water intake with small pipes of less than 2 inches in diameter for domestic drinking purposes or scientific research. To obtain permission, the following documents should be submitted to the relevant office in the public works.

Table 7.1.3 Required Information for Requesting Water Use Permit

1. Situation map （1:10,000） and topographic map（1:50,000） showing the location of groundwater or spring water
2. Information of well drilling plan
3. Information of well drilling implementer
4. Environmental Management Effort (UKL), Environmental Monitoring Effort (UPL) or Environmental Impact Assessment (AMDAL)

Source : Local Government Regulation of Central Java Province No. 6/2002 Concerning Removal of Groundwater (PERATURAN DAERAH PROPINSI JAWA TENGAH No 6/2002 TENTANG PENGAMBILAN AIR BAWAH TANAH)

7.1.4 Other Standards Related to Water Supply Development

Regarding water supply development, there are standards for water quality and for water treatment sludge. However, both standards are not fully adopted at the SPAM IKK. In case of Gronbogan in Central Java, periodic water quality tests are only conducted at the central city area surrounding Puruwowardi. The periodic tests by the PDAM do not cover the whole area of SPAM IKK which mainly focuses on the development of the facility at the central district (Ibu kota kecamatan).

7.1.5 Information Disclosure

Process for Information disclosure in the AMDAL is provided in the BAPEDAL Head Decree No. 08/2000 on Community Involvement and Information Openness in the Process of Environmental Impact Assessment (Keputusan Kepala Bapedal No. 08/2000, Keterlibatan Masyarakat Dan Keterbukaan Informasi Dalam Proses Analisis

Mengenai Dampak Lingkungan Hidup). Appropriate information disclosure of ANDAL, as a compiled report of AMDAL process, is obligated to achieve the following purposes: 1) protection of resident's rights, 2) reflection of the resident's opinion on the project implementation which potentially affects the environment, 3) securing the transparency of AMDAL process, and 4) sharing information among all stakeholders. However, small projects which do not require AMDAL, are not particularly regulated in its information disclosure.

Project schemes under SPAM IKK program are widely known throughout the country through various media including websites of Ministry of Public Works and Directorate General of Cipta Karya, as the program was launched in the 1980s. Also, in case of Central Java, the announcement of project implementation by the head of district (Bupati) is informed to the local residents through the village chief.

7.1.6 Situation on the Permission Process to Meet the Legislation

PDAM Kendal of Central Java had not processed the water use permit (SIPA) at the time of implementation, and hence, the permit was processed in 2009. In the province, regarding the water supply project, the use of groundwater requires UKL and UPL. The report was finalized in January 2010 upon hiring of the consultant (Peraturan Daerah Propinsi Jawa Tengah, No.6 Tahun 2002, Tentang Pengambilan Air Bawah Tanah, 2005). The report was approved by the Environmental Office in the district(Kantor Lingkungan Hidup in Kendal Kabupaten) in January 2010.

SPAM IKK projects sampled in this study include two cases of water supply facilities that belong to the area of protected forest (Hutan Lindung). The forests in Indonesia are categorized into three as shown in Table 7.1.4 below. In Indonesia, a lease permit for forest area use（Izin pinjam pakai kawasan hutan）is required if the people intend to use the protection forest for other purpose, in coordination with the Ministry of Forestry (regulated in PP No. 24/2010, Penggunaan Kawasan Hutan). In case of water supply, the activities are recognized as one of the important development in non-forestry activities, indicated in article 4 of the regulation (such as facilities and infrastructure, water resources, development network installation of water, and water channels and/or wastewater).

The major categories of forests in Indonesia are summarized in Table 7.1.4.

Table 7.1.4 Categories of Forests in Indonesia

Categories of Forests in Indonesia
1. Conservation Forest
• Sanctuary Reserve Area (Strict Nature Reserve & Wildlife Sanctuary)
• Nature Conservation Area (National Park (TN), Grand Forest Park (THR), Nature Recreation Park (TWA) and Game Hunting Park(TB))
2. Protection Forest
3. Production Forest

Source: Ministry of Forestry (2009) STATISTIK KEHUTANAN INDONESIA DEPARTEMEN KEHUTANAN Ministry of Forestry Oktober 2009 INDONESIA Forestry Statistics of Indonesia

The disturbance to the forest should be minimized not only to protect the natural environment but also to maintain the quality and quantity of water in the area. Because Indonesia is one of the countries that have abundant forest area, water supply system in the SPAM IKK may affect the forest area. The percentage of forest areas varies according to island, ranging from approximately 23% in Java Island to 97% in Papua Island.

7.2 Consistency of Current Environmental Framework in SPAM IKK Program with the Indonesian Laws

No particular environmental assessment studies (AMDAL) on the SPAM IKK projects, which were conducted under abovementioned legislation, have been found during the conduct of this study. SPAM IKK program is basically limited to projects involving treatment capacity of less than 50 L/s (2005-2009, SPAM IKK Implementation Report, Munuju Pencapaian Target MDGs Bidang Air Minum) and thus, do not require preparation of environmental study based on AMDAL process due to its small scale. However, the law of AMDAL indicates 13 types of protected areas which require environmental study prior to implementation. The environmental confirmation for the project implementation, mainly at planning stage, should be considered for these protected areas.

Prior to granting of application, some evaluation schemes may be required to confirm the environmental consideration of the project. Present guideline of SPAM IKK requires six documents as part of the application including a water use permit. As mentioned above, some projects may require preparation of UKL/ UPL documents to meet the requirement of water use permit which is regulated by the Ministry of Public Works. This is depending on the scale of the facilities and authorized organization as well as the type of water source.

7.3 Confirmation of the Current Environmental Management and Monitoring Methods in SPAM IKK based on the JICA Guidelines for Environmental and Social Consideration

At the time of the interim report, the environmental management and monitoring methods in the SPAM IKK are roughly confirmed based on the JICA Guidelines for Environmental and Social Consideration.

Because the scales of the projects are basically small, environmental impact assessments (AMDAL) are not conducted and environmental reports (ANDAL) are not prepared for most SPAM IKK. However, most of the projects require obtaining water use permit. Hence, UKL/ UPL documents are required.

Among the 50 SPAM IKKs in the study, UKL and UPL were prepared (or are still being prepared) for 11 projects in order to obtain water use permit. Moreover, the other three SPAM IKKs intend to prepare UKL and UPL to obtain said permit.

The simple comparison of the current implementation on the SPAM IKK does not easily confirm its compliance to the JICA Guidelines. During the field survey, a report on the environmental study was found in Central Java, Western Java and Yogyakarta provinces. The information on project implementation at local levels might not be properly shared by the central government, Cipta Karya and central SatKer. Table 7.3.1 shows the environmental checklist for the SPAM IKK.

Table 7.3.1 Environmental Checklist for the SPAM IKK based on the review of 50 SPAM IKKs

Categories	Environmental Items	Description
1. Permits and Explanation	(1) EIA and Environmental Permits	No EIA study under the environmental law but water permit should be obtained by the implementer prior to the project. Some projects require UKL and UPL. Some projects already prepared these requirements (among 50 sample projects, 14 projects recognized these requirements). Two cases are inside of the protection forest (Hutan Lindung). One case is close to the National Park. Water use permit document were processed in some cases.
	(2) Explanation to the Public	In most cases, indirect information to the local residents and objection of land use for intake were made.
2. Mitigation Measures	(1) Air Quality (2) Water Quality (3) Wastes (4) Soil Contamination (5) Noise and Vibration (6) Subsidence (7) Odor	(1)-(7) existing standard for the environmental items should be considered relative to project activities, i.e, during the construction and at the operation stages.
3. Natural Environment	(1) Protected Areas (2) Ecosystem (3) Hydrology (4) Topography and Geology	(1) Protected areas should be considered in the planning (two facilities are within the areas of protection forest and one facility is located near the National Park among 50 samples). New projects also are possibly to be located close to them. (2) In general, no serious impact to the ecosystem is envisaged. Related

		to the above protected areas, impact to the ecosystem should be minimized in case the area is involved. (3) Impact to the hydrology should be minimized. (4) In most cases, no large earthworks are associated with the projects and no serious impacts on the topography and geology are envisaged.
4. Others	(1) Impact during the construction (2) Monitoring	(1) During construction, some water turbidity in the water source will likely occur. (2) Monitoring of the environmental procedure should be taken whether the required process will be conducted.

Source: JICA Study Team 2010

7.4 Issues on Environmental Management and Monitoring Methods

SPAM IKK guideline compiled in 2008 describes the implementer for obtaining the land for the project and water permit (SIPA) prior to the implementation. However, projects which were implemented before the issuance of the guideline basically followed the same process but without any confirmation on the written documents.

Also, the SPAM IKK should follow the environmental screening based on the recently revised legislations relevant to AMDAL. As mentioned above, Environmental Minister Decree 11 in 2006, presents the revised list of projects subject to AMDAL. Furthermore, it requires implementation of screening process even if the project has lesser scale than those in the list. As also mentioned in the above section, although the scales of the activities are not subject to AMDAL process, location of the project including water treatment facility and pipeline should be confirmed during the planning stage whether any protected areas are closely located or not. This is intended to determine whether further environmental assessment on the protected area is required.

CHAPTER 8 SOCIAL CONSIDERATION AND IMPACTS

8.1 Necessity and Existence of Land Acquisition and Involuntary Resettlement

The selected land for the SPAM IKK is basically located in non-residential areas and at locations where no involuntary resettlement is necessary, according to Cipta Karya. At the implementation of the project, land acquisitions are required for all the projects with some exceptions that the public lands are available. PDAM and district government (kabupaten) are responsible for the land acquisition for the projects. Most cases, the land acquisition process are conducted by the PDAM or district government in their own budgets at the beginning of the project implementation after approval. The evidence on the availability of land including agreement of acquisition is requested during the application for SPAM IKK project, as one of the required documents.

Because the scale of the land is very small that is less than 1 ha, particular documents which contain baseline survey result such as land acquisition have not prepared and have not identified any cases required the documents. The land acquisition is mainly required for the water treatment site. Approximate land requirement for the Water Treatment Plant(WTP) is estimated by central SatKer. Those are capacity up to 5 lt / sec, minimum in 2,000 m^2 area, capacity 10 to 30 lt / sec, minimum in 2,400 m^2 area and capacity 40 to 80 lt / sec, minimum in 3,000 m^2 area.

The involuntary resettlements were avoided at the site selection. At the survey, any case of resettlement was not identified. Then, any resettlement plans which contain rehabilitation plan were not found in field survey at 50 sample projects.

At the land acquisition for the SPAM IKK which normally not accompanied involuntary resettlements, land owners are normally offered with monetary compensation for the land. Corresponding prices are decided between PDAM/government of district and land owners in mutual agreement under negotiations referring the general land price. The two types of pricing, i.e, the commercial rate and NJOP (Pajak: Tax Object Sales Value) are used for the general land price. Particular complain for the compensation, especially for its amount, has not been reported in field survey.

There were two cases in Central Java included in the study where lands for water treatment plants were obtained prior to the implementation. Toroh SPAM IKK in Grobogan District (kabupaten) rents the land from Department of Public Works and pays lease to the department. In case of the Bojo SPAM IKK in Kendal District, the

land was bought by Kendal PDAM.

The present guideline for the SPAM IKK requests implementers to provide document on the availability of lands for the projects which may be one of the most important matters for project implementation.

8.2 Approaches Regarding the Land Acquisition and Involuntary Resettlement

Involuntary resettlement will not likely occur for SPAM IKK. There is no involuntary resettlement found during the site survey. Most lands found for the SPAM IKK are agricultural lands where no constructed structures exist. Land acquisitions for the projects are conducted by government of district or PDAM. In the present SPAM IKK guideline, the agreement letters on the lands are supposed to be presented at the time of application.

Because the scale of the project area is small less than 1 ha, land acquisition process are conducted by the PDAM or district government in their own budget with the individual owners without particular land acquisition plan to be approved by the authority. The owner can express their objection directly at the negotiation which usually held at the beginning of implementation. The announcement of project implementation by the head of district (bupati) is informed to the local residents through the village chief when it is approved by central government.

8.3 Consistency with the Indonesian Laws on Involuntary Resettlement

Regarding involuntary resettlement, the following legislation provides compulsory acquisition for public purposes. Legislation related to land acquisition in Indonesia is summarized in Table 8.3.1. However, in most cases of SPAM IKK, involuntary resettlement does not usually occur. The land procurement is supposed to be confirmed according to the present guideline of SPAM IKK.

Table 8.3.1 Legislation related to Land Acquisition in Indonesia

1. Law No. 5 of 1960 concerning Basic Agrarian Law (UU No 5 /1960 Tentang Peraturan Dasar Pokok-Pokok Agraria)
2. Law No. 20/1961 concerning the Expropriation of Land and Objects Attached to the Land (UU No. 20/1961 Tentang Pencabutan Hak-Hak Tanah dan Benda-Benda yang Ada Diatasnya)
3. Law No. 24 of 1992 on Spatial Use Management (UU No24 /1992 Tentang : Penataan Ruang)
4. Presidential Decree No. 55/1993 on Land Acquisition for the Developments in the Public Interest.(KEP No 55 /1993 Tentang : Pengadaan Tanah bagi Pelaksanaan Pembangunan Untuk Kepentingan Umum)
5. Presidential Decree No. 36/2005 on Land Acquisition for the Developments in the Public Interest.(KEP 36/2005 Tentang:Pengadaan Tanah bagi Pelaksanaan Pembangunan Untuk Kepentingan Umum)
6. Presidential Decree No. 65/2006 on Changes in Presidential Decree No. 36/2005 on Land Acquisition for the Developments in the Public Interest.(KEP No. 65/2006 Temntang:

Perubahan AtasPeraturan Presiden Nomor 36 Tahun 2005 Tentang Pengadaan Tanah bagi, PelaksanaanPembangunan Untuk Kepentingan Umum)
7. Head of National Land Affairs Agency Decree No. 03/2007 on KEP No. 36/2005 and KEP No. 65/2006(PER KEPALABPN Tentang: Ketentuan KEP No. 36/2005 and KEP No. 65/2006)

Source: JICA Study Team 2010 based on the information from the Cipta Karya

8.4 Confirmation of the Current Social Consideration Management and Monitoring Methods in SPAM IKK based on the JICA Guidelines for Environmental and Social Consideration

In this study, implementation on the environmental social consideration has been confirmed based on the representative projects. As mentioned above, most of the projects did not have particular environmental reports which covers social environment. There is no any serious environmental and social problem related to the SPAM IKK according to the study. However, newly planned projects may need the system to confirm environmental situation of each project prior to implementation. This should be initiated through strict implementation of the present guideline for SPAM IKK and addition of the new item to be confirmed. During the progress of this study, the procedure following the present guideline and potential impact to social environment were confirmed as shown in Table 8.4.1.

Table 8.4.1 Environmental Checklist for the SPAM IKK based on the review of 50 SPAM IKK

Categories	Environmental Items	Description
1 Permits and Explanation (Same as in Natural Environment)	(1) EIA and Environmental Permits	No EIA study under the environmental law but water permit should be obtained by the implementer prior to the project. Some projects required UKL and UPL. Some projects already prepared these. (Among 50 sample projects, 14 projects have recognized these requirements) Two cases are inside the protection forest (Hutan Lindung). One case is close to the National Park. Water use permit in document were processed in some cases.
	(2) Explanation to the Public	Most cases indirect information is given to the local residents through village chief and objection of land use for intake were found in some cases.
2 Social Environment	(1) Resettlement (2) Living and Livelihood (3) Heritage (4) Landscape (5) Ethnic Minorities and Indigenous Peoples	(1) Basically no resettlement but land acquisition are required most of projects. (2) Consideration of the poor people in the payment systems. (Target of the project must be comparatively poorer peoples, sometimes can not afford to pay). (3) No particular impact to the heritage is envisaged. However, it should avoid the area of those confirming local authority at the planning. (4) No serious impact on the landscape is envisaged. (5) Customary groups should be considered especially related to their land with adjacent community.
3 Others	(1) Impact during the construction (2) Monitoring	(1) During construction, some water turbidity in the water source will likely occur. (2) Monitoring of the environmental procedure should be taken whether the required process will be conducted.

Source: JICA Study team 2010

CHAPTER 9 PROGRAM EFFECTS

9.1 Monitoring Indicators for SPAM IKK

(1) Organization of Monitoring and Evaluation

The PMU of SPAM IKK was established under the Cipta Karya to manage the SPAM IKK program. However, Cipta Karya has not grasped the current condition of SPAM IKK, because constant monitoring and evaluation for each SPAM IKK is not carried out.

(2) Monitoring and Evaluation Indicator

The Ministry of Public Works (MPW) does not have any monitoring and evaluation indicator for SPAM IKK. The provincial SatKer should take the evaluation data from each responsible organization and hence, the PMU and Cipta Karya should analyze for the background of successful or unsuccessful cases. These data and information are disclosed to all organizations concerned and they should also be advised of any successful outcomes.

9.2 Monitoring Progress and Results

Cipta Karya should monitor the constructed SPAM IKK constantly through PDAM and the provincial SatKer. PDAM has to establish a constant monitoring system for SPAM IKK, with the assistance of the provincial SatKer because since SPAM IKK is conducted using the national budget.

CHAPTER 10 ON-SITE REVIEW

The on-site review has been carried out to comprehend and analyze the present conditions and issues of existing SPAM IKKs on making sector loan program. The number of the site is 50 sites on 2005-2008 and the review survey is consisted in two stages, first survey on 8 sites and second survey on 42 sites.

10.1 Site Selection for On-Site Review

Cipta Karya has installed 224 SPAM IKKs* from 2005 to 2008 on Sumatra Island, Java Island, Sulawesi Island and Kalimantan Island. These SPAM IKK systems include various types with water resources, treatment process or capacity and so on. The JICA study team selected a total of 50 on-site review sites from the 224 SPAM IKKs based on the discussion with MPW Cipta Karya.

Site selection procedures were prepared such that the selected SPAM IKK represents various types of SPAM IKK by existing information of Cipta Karya. Therefore, the following site selection criteria are established on the basis of discussions with counterparts:

(1) Fiscal year: 2005, 2006, 2007, 2008

The Guideline of SPAM IKK established on 2007 and published on 2008. So, the system conditions are different between 2005 - 2006 SPAM IKK and 2007 – 2008 SPAM IKK. Therefore, the 30 sites are selected from 2007-2008 and 20 sites are from 2005-2006 on 50 on-site review sites.

(2) Capacity: more than or equal 20 L/s, less than 20 L/s

The water treatment plant capacity of existing SPAM IKKs is almost 10 L/s or 20 L/s. And planning SPAM IKK capacity is 10 L/s or 20L/s, too. Therefore, the selected 29 sites are less than 20 L/s and 21 sites are more than or equal 20 L/s capacity on 50 on-site review sites.

(3) Water source: Surface water, Spring, Groundwater

Water resources of most existing SPAM IKKs are chosen surface water. Therefore, the selected 40 sites are surface water and three sites are ground water, 7 sites are no information on 50 on-site review sites.

(4) Operating organization: PDAM, BLU

Basically, water supply system on urban and semi-urban area is operated by PDAM. So, the almost SPAM IKK systems are operated by PDAM. Therefore, the selected 41 sites are operated by PDAM, four sites are operated by BLU or District PU and 5 sites

are no information on 50 on-site review sites.

(5) Water conveyance: Gravity, Pump

The design, operation and maintenance for distribution pump system are complicacy more than gravity system's one. So, the review of the pump system condition is necessary more than the review of gravity system. Therefore, selected 37 sites use pump distribution system, 10 sites are gravity distribution system and 3 sites are no information on 50 on-site review sites.

(6) Treatment system and material: Rapid sand filtration method, Low sand filtration method / Steel made, FRP made, reinforced concrete made

The existing SPAM IKKs have many steel WTP systems. Therefore, selected SPAM IKKs include many steel types. The selected 34 sites are steel type, 4 sites are FRP types, 3 sites are reinforced concrete types and 9 sites are no information on 50 on-site review sites.

(7) Accessibility and security: Good, Poor / Safe, Risky

Accessibility and security condition of sites are considered to select the sites for limited study period and safety of the site survey.

The selection indicators of 50 sites are shown in Table 10.1.1. Two sites from each island are selected as the first on-site review sites from the 50 sites. Selection criteria for these sites are also considered in Table 10.1.1 The selected 50 sites are shown in Table 10.1.2. There are eight first on-site review sites indicated by No. A- , and 42 second on-site review sites shown as No. B-.

Table 10.1.1 Selection Indicator and Site for On-site Review

No.	Province/District/Kota	2008	2007	2006	2005	Total	Capacity >20 L/S	Capacity <20 L/S	river	GW/ Spring	PDAM	BLU/ PU	Pumping	Gravity	Steel WTP	FRP WTP	Concrete
	NORTH SUMATRA *	1		1		2	0	2	1	1	2		1	1	1		
	WEST SUMATRA	1	1			2	2	0	2		2		2		2		
	SOUTH SUMATRA	1			1	2	2	0	2		2		2		1		1
	RIAU	1	1			2	1	1	2		1	1	2		2		
	JAMBI		1		1	2	0	2	2		2		2		1		1
	LAMPUNG		1			1	0	1	1		1		1		1		
	BENGKULU		1	1		2	2	0	1		1		1		1		
	BANTEN	1				1	1	0	1		1		1		1		
	WEST JAVA	4				4	4	0	3		3		2	1	2		
	CENTRAL JAVA*		2		3	5	0	5	3	2	5		5		2		1
	EAST JAVA	1	1	3		5	2	3	2		2		2		2		
	YOGYAKARTA	1	1			2	0	2	2		1	1	2		2		
	WEST KALIMANTAN *	1	1			2	0	2	2		1	1	2		1	1	
	EAST KALIMANTAN		1		1	2	0	2			2		2		2		
	SOUTH KALIMANTAN				2	2	0	2	2		2		2		2		
	CENTRAL KALIMANTAN	1			1	2	0	2	2		2		2		2		
	CENTRAL SULAWESI	1		1	1	3	1	2	3		3		0	3	1	2	
	SOUTH SULAWESI *	2	1	1		4	4	0	4		4		4	1	5		
	SOUTH-EAST SULAWESI	1				1	1	0	1		1		1	1			
	NORTH SULAWESI			2		2	0	2	2		2			2	1	1	
	GORONTALO	1		1		2	1	1	2		1	1	1	1	2		
	Total	18	12	10	10	50	21	29	40	3	41	4	37	10	34	4	3
	note: * First on-site review	3	1	2	2	8	2	6	6	2	7	1	7	1	6	1	1

Source: Cipta karya / JICA Study Team 2010

*: 224 SPAM IKKs were described from "*Menuju Pencapaian Target MDGs Bidang Air Minum Hasil Pembangunan SPAM-IKK 2005-2009*"

Table 10.1.2 List of 50 Sites for On-site Review

No	Locations				
	Province	**District/Kota**	**No.**	**Year**	**IKKs**
1	North Sumatra	Dairi	A - 1	2008	Sumbul
2	North Sumatra	Asahan	A - 2	2006	Kisaran
3	West Sumatra	Solok	B - 1	2007	Nagari Kota Sani
4	West Sumatra	Kota Sawahlunto	B - 2	2008	Sumpahan
5	Riau	Rokan Hulu	B - 5	2007	Tandun
6	Riau	Kuantan Singingi	B - 6	2008	Inuman
7	Jambi	Muaro Jambi	B - 7	2005	Candi Muaro
8	Jambi	Batang Hari	B - 8	2007	Lubuk Ruso
9	South Sumatra	Banyuasin	B - 3	2007	Sungai Pinang
10	South Sumatra	Muara Enim	B - 4	2008	Gelumbang
11	Lampung	Lampung Selatan	B - 9	2007	Way Lima
12	Bengkulu	Rejang Lebong	B - 10	2006	Kotapadang
13	Bengkulu	Rejang Lebong	B - 11	2007	Selupu Rejang & Curup Timur
14	Banten	Serang	B - 12	2008	Cikande
15	West Java	Kuningan	B - 13	2008	Garawangi
16	West Java	Kuningan	B - 14	2008	Luragung
17	West Java	Cirebon	B - 15	2008	Ciwaringin
18	West Java	Kota Bogor	B - 16	2008	Palasari
19	Central Java	Grobogan	A - 3	2005	Toroh
20	Central Java	Grobogan	B - 18	2007	Gubug
21	Central Java	Kendal	A - 4	2005	Boja
22	Central Java	Boyolali	B - 17	2005	Sawit
23	Central Java	Rembang	B - 19	2007	Sulang
24	East Java	Tuban	B - 20	2006	Bancar
25	East Java	Ponorogo	B - 21	2006	Jenangan
26	East Java	Madiun	B - 22	2006	Gemarang
27	East Java	Bangkalan	B - 23	2007	Burneh
28	East Java	Kediri	B - 24	2008	Kepung
29	Yogyakarta	Bantul	B - 25	2007	Selopamioro
30	Yogyakarta	Sleman	B - 26	2008	Gamping
31	West Kalimantan	Pontianak	A - 5	2007	Jungkat
32	West Kalimantan	Singkawang	A - 6	2008	Sei Bulan
33	East Kalimantan	Penajam Paser Utara	B - 27	2005	Sepaku
34	East Kalimantan	Kutai Kertanegara	B - 28	2007	Loa Janan
35	South Kalimantan	Banjar	B - 29	2005	Kertak Hanyar
36	South Kalimantan	Tapin	B - 30	2005	Binuang
37	Central Kalimantan	Katingan	B - 31	2005	Kareng Pangi
38	Central Kalimantan	Gunung Mas	B - 32	2008	Tumbang Talakan
39	Central Sulawesi	Donggala	B - 33	2005	Binanga
40	Central Sulawesi	Donggala	B - 35	2008	Sabang
41	Central Sulawesi	Palu	B - 34	2006	Palu
42	South Sulawesi	Takalar	A - 7	2006	Pattallassang
43	South Sulawesi	Takalar	B - 37	2008	Galesong Selatan
44	South Sulawesi	Gowa	A - 8	2008	Pattallassang
45	South Sulawesi	Jeneponto	B - 36	2007	Parapa
46	South East Sulawesi	Kolaka	B - 38	2008	Lakambaga
47	North Sulawesi	Minahasa Utara	B - 39	2006	Air Madidi
48	North Sulawesi	Minahasa Selatan	B - 40	2006	Amurang
49	Gorontalo	Bone Bolango	B - 41	2006	Suwawa
50	Gorontalo	Gorontalo Utara	B - 42	2008	Kwandang

Note: “A-”: 1st on-site review site, “B-”: 2nd on-site review site.

Source: Cipta Karya / JICA Study Team 2010

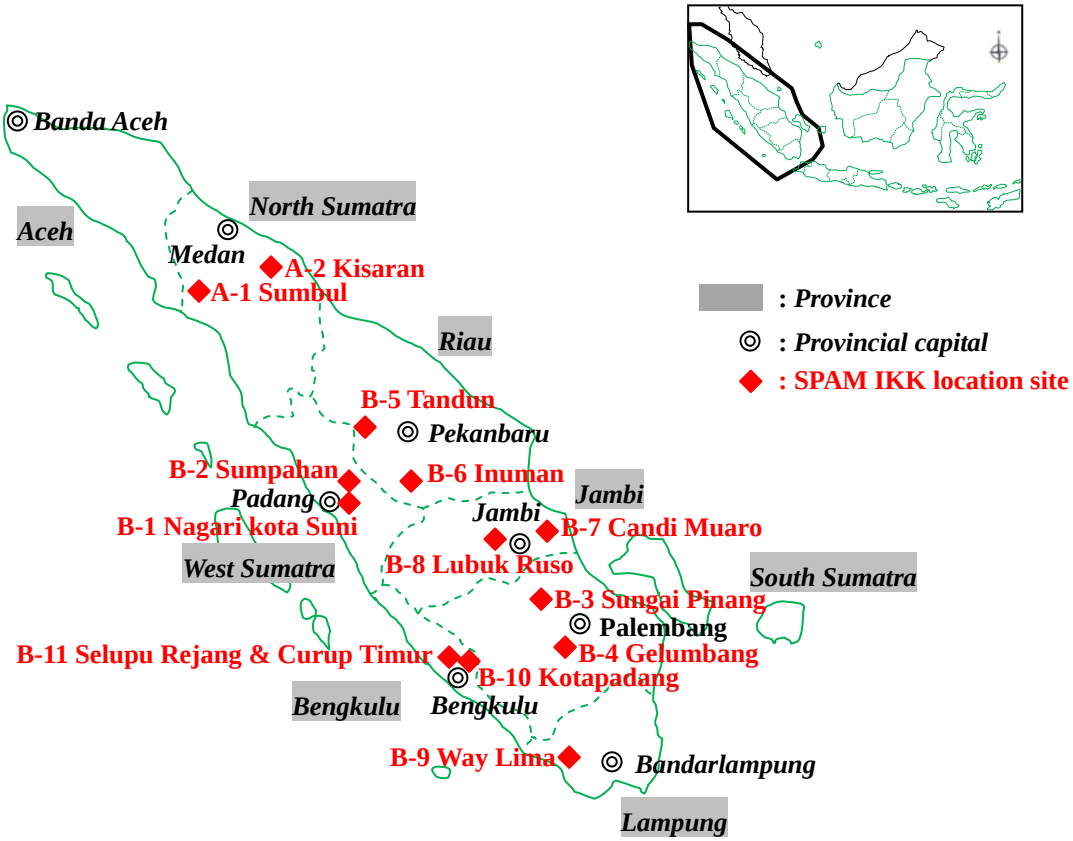


Figure 10.1.1 Location Map for SPAM IKK (Sumatra, 1/4)

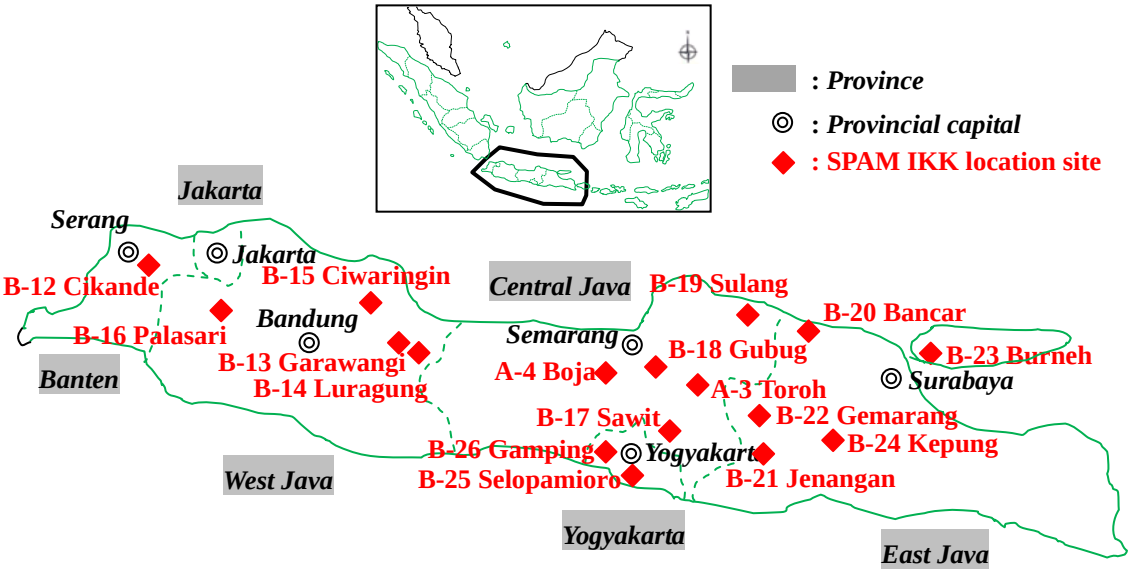


Figure 10.1.1 Location Map for SPAM IKK (Java, 2/4)

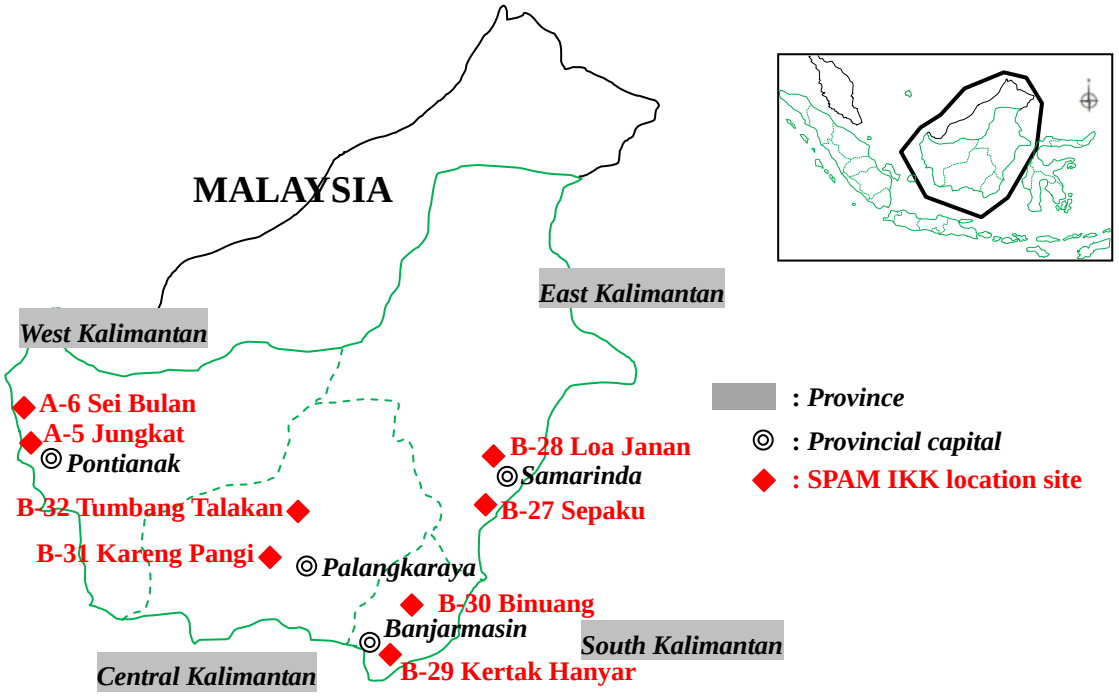


Figure 10.1.1 Location Map for SPAM IKK (Kalimantan, 3/4)

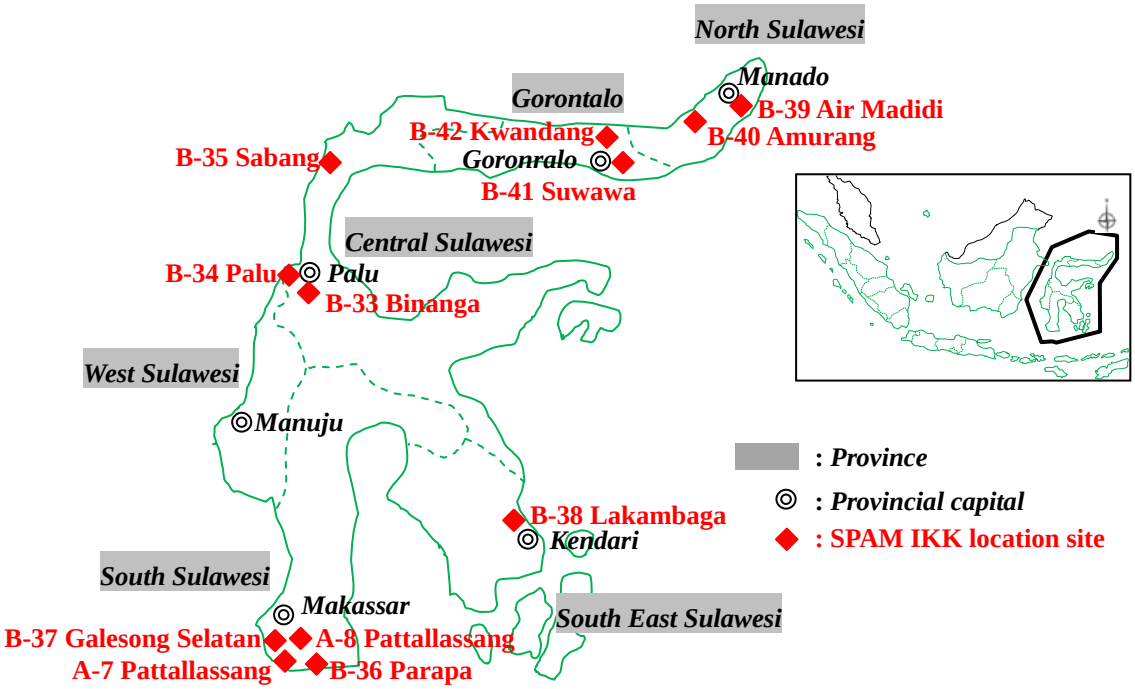


Figure 10.1.1 Location Map for SPAM IKK (Sulawesi, 4/4)

10.2 On-Site Review Approach

10.2.1 Field Survey

Field survey consists of the first and second on-site reviews.

The first on-site review was carried out by the JICA Study Team with some local consultant engineers and counterparts using questionnaire from March 15 to April 9, 2010 at eight SPAM IKKs in four provinces. This review involves the confirmation of contents of questionnaire, training of local consultant engineers and transfer of knowledge to counterparts.

During the site survey, the study team met with the provincial Cipta Karya, provincial SatKer, District Cipta Karya, District BAPPEDA and PDAM. In addition to the above meetings, interview surveys of beneficiaries of SPAM IKK were carried out in the service area.

The second on-site review was carried out by a local consultant team consisting of three members, namely: water supply management engineer, water supply engineer, and social expert, from April 19 to June 2, 2010 at 42 SPAM IKKs in 19 provinces using a revised questionnaire. The members of the JICA study team and counterparts joined several site surveys in the end of May.

10.2.2 On-Site Review Findings

In the following Sub-chapters 10.3 to 10.8, the findings at the 50 sites are described with respect to each of the following aspect:

- Planning and implementation of SPAM IKK
- Outline of SPAM IKK
- Outline of PDAM
- Interview Survey of Beneficiaries
- Social Baseline Data
- Environmental and Social Consideration

Findings at each SPAM IKK from the site survey are shown in APPENDIX 1, 2, 3 and 4.5 and 6.

From these findings, the main issues of SPAM IKK are summarized as follows:

- Project implementation

  Several SPAM IKKs are not yet operational after the construction of the WTP, which is built from the APBN portion of the budget, because of the delay of APBD budget for the installation of distribution pipes.

- Operation hours of WTP

Most WTPs could not operate for 24 hours because the number of house connection is small compared with the production capacity of the WTPs.

- Treated water quality

  The treated water of some WTPs has not removed the turbidity completely due to poor operation.

- Skill of operator

  Most WTPs of SPAM IKK are operated by unskilled operators without basic operation knowledge and operation manual.

- WTP made of FRP

  Most WTPs made of FRP could not work due to leakage or breakdown.

- Water tariff rate

  Most water tariffs of SPAM IKK (PDAM rate) are too low to cover the O&M costs.

10.3 Planning and Implementation of SPAM IKK

(1) Staffing of Provincial Work Unit (Provincial SatKer)

The work unit for water supply development (Provincial SatKer) established at each province is responsible for all activities regarding water supply development within its province. The number of staff members of each SatKer that the study team visited is shown in Table 10.3.1.

Table 10.3.1 Number of Staff of Provincial SatKer

Satker	No. of Staff	Education		Satker	No. of Staff	Education	
		University	Other			University	Other
North Sumatra	60	29	31	Yogyakarta	49	23	26
West Sumatra	30	12	18	West Kalimantan	26	14	12
Riau	37	15	22	East Kalimantan	29	13	16
Jambi	28	11	17	South Kalimantan	16	6	10
South Sumatra	49	21	28	Central Kalimantan	22	9	13
Lampung	31	8	23	Central Sulawesi	49	16	33
Bengkulu	37	23	14	Southl Sulawesi	66	28	38
Banten	18	10	8	Southeast Sulawes	43	19	24
West Jawa	26	7	19	North Sulawesi	46	21	25
Central Jawa	55	25	30	Gorontaro	7	7	0
East Jawa	35	23	12				

Source: JICA Study Team 2010

Provincial SatKer is responsible for implementation of the APBN portion of SPAM IKK project. Moreover, it is expected to coordinate the APBN and APBD portions.

(2) Observed Problems Regarding Implementation of SPAM IKK Project

During the on-site review of 50 SPAM IKK, it was observed that the facilities are operated properly in 42 SPAM IKKs, while the facilities are not properly operated or not in operation in eight SPAM IKKs. In such SPAM IKKs, several problems were observed as follows:

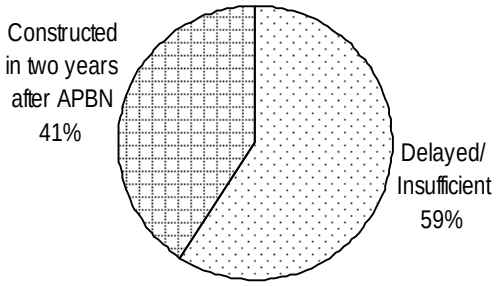
1) Planning stage

The preparation of the SPAM IKK project proposal is basically a responsibility of the Dinas PU of the concerned district/city, the provincial SatKer is required to support the Dinas PU. Although it is prescribed in the guidelines of Cipta Karya that the project proposals are to be evaluated first by the provincial SatKer, there were several cases wherein the project proposals were sent directly from the district/city to the central government.

- Inappropriate project formulation such as:
  - Lack of overall water supply master plan
  - Insufficient needs assessment
  - Inadequate selection of treatment method
  - Lack of proper operation plan
  - Limited consultation with stakeholders

Provincial SatKer is required to confirm the APBD budget allocation and its timely disbursement by the district/city. At the time of the on-site review, WTP does not operate due to incomplete distribution pipes in seven SPAM IKK sites. SPAM IKK projects has delayed or been insufficient though the distribution network must be constructed within two years upon APBN part construction in accordance with the SPAM IKK guidelines (See Figure 10.3.1).

- Insufficient APBD budget allocation
- Delay of APBD budget allocation
- Uncertain APBD budget plan and disbursement for distribution pipes
  - Insufficient WTP operation due to incomplete distribution pipes



Source: JICA Study Team 2010

Figure 10.3.1 Complete APBD Disbursement for Distribution (Total 22 New Projects)

2) Construction stage

- Inappropriate construction material and workmanship such as:
  - Leakage from FRP tank, etc.
- Insufficient technical transfer during commissioning such as:
  - Insufficient operation training on commissioning
  - Lack of transfer of technical documents such as commissioning test record, as-built drawings, and operation manual
- Limited linkage in the implementation between APBN and APBD portions

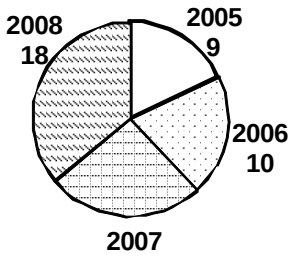
3) Operation stage

After the construction of SPAM IKK is completed, the operation and maintenance of facility is carried out by PDAM/BLU.

- Low quality of treated water
- High production cost and low water revenue
- Insufficient distribution network
- Limited house connections against system capacity

10.4 Outline of SPAM IKK (Infrastructures, O&M)

The outline of 50 SPAM IKKs for the on-site review is shown in Table 10.4.1. The range of the established year of 50 SPAM IKKs is shown in Figure10.4.1.



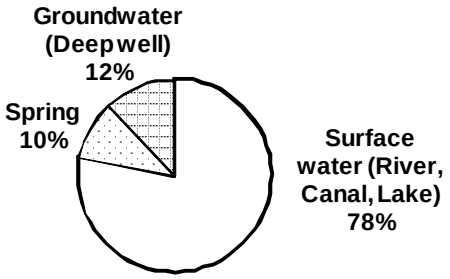
Source: JICA Study Team 2010

Figure 10.4.1 Established year of 50 SPAM IKKs

10.4.1 Intake Facilities

(1) Surface Water （River, Canal, Lake）

As water source for water treatment plant (WTP), the 78% of IKK sites take water sources from surface water as shown in Figure 10.4.2. The annual average turbidities of these water sources rang in NTU from about 10 to 100, based on the data of the sites where the water quality tests have been recorded. For these sites, the rainy season turbidities of river water range in NTU from 1,000 to 3,000. Hence, some facility operations is suspended temporary, because their WTPs cannot remove the very high turbidities (e.g., B-28 Loa Janan).



Source: JICA Study Team 2010

Figure 10.4.2 Category of Water source

As for the allowable capacity of surface water, there are many sites to meet the supply capacity because the capacity of WTP in SPAM IKK is mostly small, with ranging from 5 to 20 L/s. However, during the dry season, some sites suspend operations due to the shortage of raw water (e.g., A-3 Toroh, B-2 Sumpahan, B-19 Sulang, B-30 Binuang).

The types of intake facilities using surface water in SPAM IKK are mainly categorized into the following two types.

First type: Intake pump is installed directly at along a steel or wooden pier in river.
Second type: Intake pump is installed inside of an intake basin made of reinforced concrete or wood which is constructed at beside the river or irrigation canal.

Apparently, these types are composed of simple facilities with small equipment.

(2) Spring

As shown in Figure10.4.2, spring water accounts for 10% of SPAM IKK sites. Spring water, which has stable water quantity and quality is collected by broncapturing and conveyed by through gravity system.

The distance from spring intake to WTP ranges in meter from 100 to10,000. In some sites (e.g., B-16 Palasari, B-39 Air Madidi), the spring water is directly distributed to distribution network after disinfection.

Amount of intake water in the several spring sites (e.g., B-13 Garawangi, B-14 Luragung, B-16 Palasari, B-40 Amurang) are smaller than designed amount due to the decreasing of water yield after the design stage.

(3) Maintenance Status

Intake facilities and equipment are well functioning. However, in intakes of river and canal at some sites, the screen for intake pump is not set up around the intake. This is undesirable from the viewpoint of protecting the pump.

10.4.2 Deep Well

(1) Groundwater

As shown in Figure 10.4.1, groundwater accounts for 12% of SPAM IKK sites. Groundwater is pumped up from the deep wells and water quality is generally good and stable. In most of sites, therefore, groundwater from deep well is supplied directly without treatment. Disinfection facilities are equipped in some sites. Generally, the demand of deep well sites are relatively small because deep well capacity is usually small compared with surface water..

(2) O&M Conditions

O&M of the sites are stable since there is no necessity for significant work other than for operating pumps.

In the special case of A-4 Boja site, which contains iron ions in the raw water that exceed the allowable drinking water standards, iron removal facilities have been

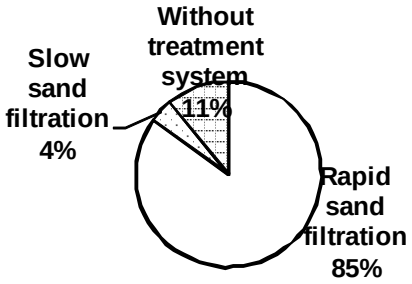
established through PDAM budget. The removal process is generally stable.

10.4.3 Water Treatment Facilities

(1) Rapid Sand Filtration System

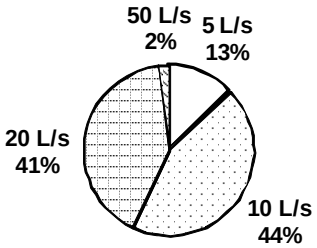
1) Treatment system and capacity

Rapid sand filtration system is employed at 85% of sites as shown in Figure10.4.3. The water treatment capacities of package plant type are mainly divided into three sizes, namely: 5 L/s, 10 L/s, and 20 L/s. The package plant is made of steel and FRP. The breakdown of WTPs based on capacity and material are shown in Figure10.4.4 and Figure10.4.5.



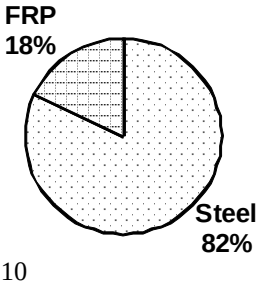
Source: JICA Study Team 2010

Figure 10.4.3 Treatment system of WTP



Source: JICA Study Team 2010

Figure 10.4.4 WTP capacity

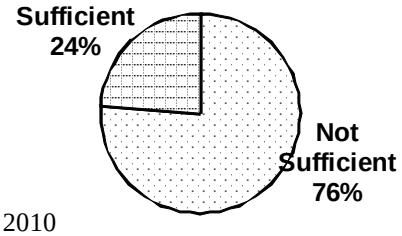


Source: JICA Study Team 2010

Figure 10.4.5 WTP material

2) Facilities operation status (Water quality measurement and dosing equipment operation)

In 76% of SPAM IKK sites, water quality monitoring equipment is not installed, or not used if actually installed as shown in Figure10.4.6. However, raw water quality monitoring is important in WTP. Even at the sites using monitoring equipment, operators have not knowledge how to interpret the results on chemical dosing although they understand how to test water quality. And in some sites, staff conducts manual dosing due to the reduction of electricity usage or unstable power supply.

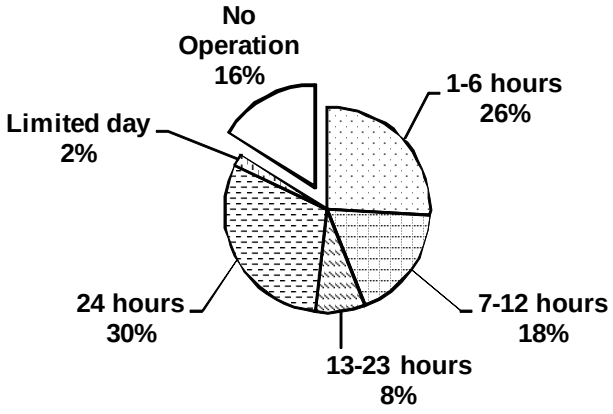


Source: JICA Study Team 2010

Figure 10.4.6 Water Quality Monitoring Status

3) Facilities operation status (Limited operation and non-operation)

In principle, water should be supplied continuously (i.e., 24 hours operation). However, 52% of SPAM IKK has limited operating time. The breakdown of operating hours per day is shown in Figure 10.4.7:

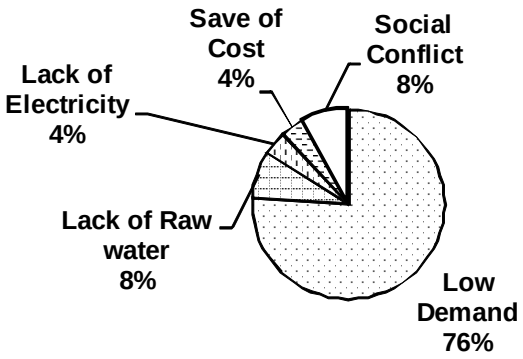


Source: JICA Study Team 2010

Figure 10.4.7 Operating Hours of the Facility

For the main reasons to operate by time regulation water supply, interview results are as follows.

- In 76% of SPAM IKK sites demand is not reached the capacity of WTP due to the delay in lying of distribution network.



Source: JICA Study Team 2010

Figure 10.4.8 Time limited Operation Reason

As shown in Figure10.4.7, 16 % of the facilities are still non-operational after construction or whose operations have been stopped. Main reasons are as follows:

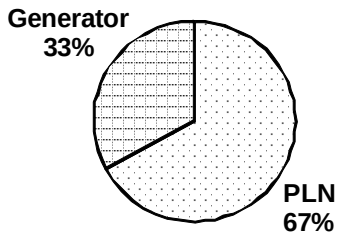
- Delay of distribution pipe construction and house connection (B-15 Ciwaringin, B-35 Sabang)
- Suspension of operations due to poor treated water quality (B-23 Burneh, B-38 Lakambaga)
- Lack of training of PDAM staff or undergoing testing operation (B-10 Katapadang)
- Water treatment facilities are under repair (B-41 Suwawa)

The special cases are as follows:

- Local residents claimed that the construction of auxiliary facilities (management road) will be in a sanctuary forest area. (A-1 Sumbul)
- There is a necessity for local coordination about the name of SPAM IKK project across multiple IKKs. (B-1 Nagari Kota Suni)

4) Electricity supply situation

Power supply in WTP is generally received from the electric company (PLN). This is considered to ensure a stable power supply continuously and considered to be less costly. However, there are about 30% of SPAM IKK sites where electricity is supplied by generators as shown in Figure 10.4.9.



Source: JICA Study Team 2010

Figure 10.4.9 Electricity Supply Situation

At present, there are some sites using or currently constructing generators in coordination with PLN. On the other hand, some sites have not yet planned. Moreover, power outages are frequent in some sites that receive power from PLN.

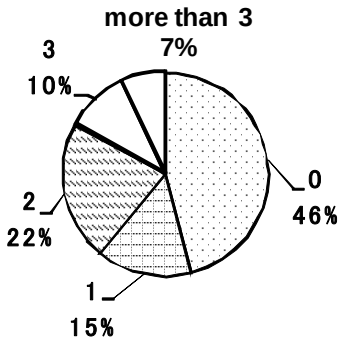
For the sites supplied by PLN, there are some problems as follows:

- The WTP cannot receive power supply from PLN during rains. (B-25 Selopamioro)
- The dosing is done manually in order to save electricity since electricity cost is a big burden in PDAM's management of the WTP. (B-11 Selupu Rejang & Curup Timur)

Some sites with large water service area have also established a separate generator due to the unstable power supply from PLN. During dosing, injection should be continuously uniform to ensure stable water quality. Therefore, dosing pump should be used during normal operation even if electricity cost increases.

5) Maintenance status

About 80% of SPAM IKK sites have WTPs with "insufficient" maintenance status in terms of deployment of resident engineers who are responsible for the facilities' maintenance and in ensuring working status as shown in Figure 10.4.10. At the sites considered "insufficient", number of engineers range from 0 to 2. In fact, inspections and repairs are not done even if some failure occurred.



Source: JICA Study Team 2010

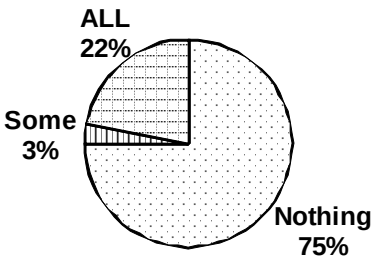
Figure 10.4.10 Deployment of Resident Engineers

About 50% of the sites have no engineer to maintain mechanical and electronic equipment. In the sites with engineer, there are no operation manuals and documentation, and sufficient inspections and repairs are not carried out.

6) Implementation status of transferring constructed facilities to PDAM

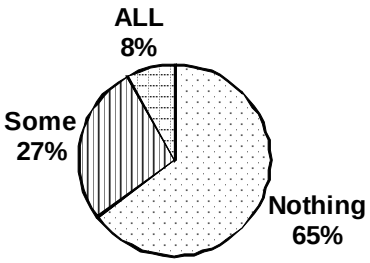
The technical transfer from the contractors to SAPM IKK operators (PDAM/BLU) are not sufficient concerning operation and maintenance of WTP. This is evident from the status of takeover situation of the design plans and operating manuals, and training for facility operations as shown in Figures 10.4.11 and 10.4.12.

- No takeover of design plans and equipment operating manuals : 75%
- No training for PDAM staff on facility operations : 65%



Source: JICA Study Team 2010

Figure 10.4.11 Takeover of the Design Plans and Equipment Operating Manuals



Source: JICA Study Team 2010

Figure 10.4.12 Training for PDAM Staff on Facility Operations

Presently, there are only eight percent of the sites where WTP manufacturers conduct briefings to PDAM staff as shown in Figure 10.4.12. These however are considered not "sufficient" forms of education and training. The above results confirm show that there are many sites to be operated only through the experience of PDAM staff. However, operations are not appropriate for lack of technical knowledge.

7) Material of WTP

Most WTPs are made of steel materials while FRP is employed in 18% of the sites as shown in Figure 10.4.5. In most sites of FRP plant are not functioning because of water leakage at joints of FRP pannels and some defects occurred during commissioning test.

- WTP is not functioning due to water leakages at joint. (B-3 Sungai Pinang)
- WTP cannot be operated at full capacity due to leakage problem at joint fiber. (B-19 Sulang)
- WTP has stopped operation due to leakage problem and poor quality of treated water. (B-23 Burneh）
- There has already been 10 times of repair after the start of operation. (B-28 Loa Janan)
- WTP has never been operated because some deficit has been found during commissioning test. (B-41 Suwawa）

WTPs using FRP tank structure at some other locations in the Province of Gorontalo are also facing the same problem. Adoption of FRP for WTP is considered difficult even though the FRP plants have good material properties, such as acid resistance and workability for carrying and assembly due to light weight.

(2) Slow Sand Filtration System

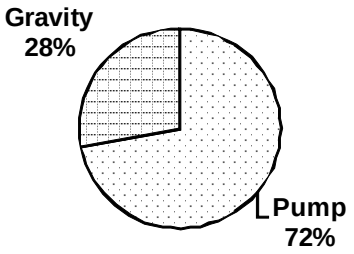
About four percent of SPAM IKK sites employed slow sand filtration systems as

shown in Figure 10.4.3 with capacities of 10 L/s and 20 L/s. This low adoption tendency is thought to be due to the high turbidity of surface water in general. This system is installed at high annual average turbidity of raw water that is about 400 NTU. In addition, the PDAM staff does not know how to maintain slow sand filtration, especially the frequency of scraping the filter surface. Therefore, water turbidity is generally not reduced to the satisfaction of consumer.

- WTP does not function properly, thus, the treated water has high turbidity and consumers do not use it as potable water.（A-3 Toroh）
- Condition of raw water turbidity is not suitable for WTP, hence, its operation is only about 16 days in a month.（B-33 Binanga）

10.4.4 Distribution Facilities

In about 70% of SPAM IKK sites, water is distribution by pump as shown in Figure 10.4.13. Regarding equipment specifications, the number of pumps is between 2 and 4, and the pump head is between 20 and 50 m. A configuration of distribution facility generally comprises the pumping plant and the reinforced concrete type ground reservoir having capacity of between 50 and 200 m^3. Three types of pipes are mainly used, namely: PVC, GIP, and HDPE. PVC is mainly used for transmission and distribution pipes. GIP and HDPE are also applied for some transmission pipes as pumping main from intake facilities.



Source: JICA Study Team 2010

Figure 10.4.13 Distribution System

About 54% of SPAM IKK sites are not operated 24 hours. Therefore, the water pressure in the distribution pipes change every day when distribution pumps start and stop, which could lead the water leakage from distribution pipes.

There are other problems as follows:

- Even if most pipes are PVC with low standards, the pump head is still around 80

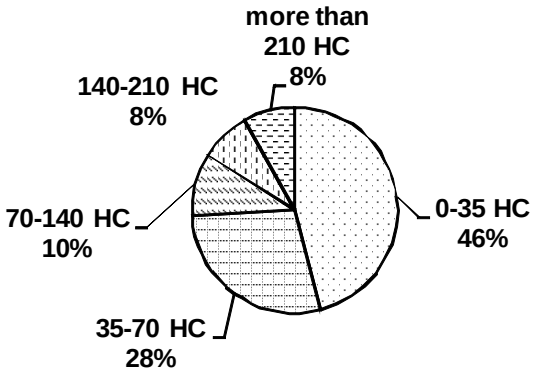
m. This is also a factor leading to water pipe leakage.（A-7 Pattallassang, A-8 Pattallassang, B-10 Kotapadang, B-25 Selopamioro, B-26 Gamping, B-37 Galesong）

- Illegal connections to distribution pipes.

10.4.5 Water Service Facilities

Piped water of SPAM IKK project is conveyed from distribution pipes to water tap of household (house connection) through water service pipes. Water meter is installed at each house connection to collect the water fee. Therefore, water meter maintenance is important aspects in the management of the water system. But for most PDAMs, the water meter installation and maintenance has not been recorded properly. According to the guideline, water meter should also be changed every four years. However, regular meter replacements have not been done by some PDAMs, such as province of Central Java, ensure the replacement of water meters every four years. Broken meters are replaced when found during the process of meter reading. In addition, meters are not set up in some sites, and a fixed water charge is imposed.

As shown in Figure 10.4.8, one of the limited time operation reasons is the low demand in the service area for each system capacity. This is caused by the construction delay of the distribution network and the house connection. The number of the house connection per system capacity (1 L/s) in each SPAM IKK site is shown in Figure 10.4.14. Appropriate number of house connection (HC) is 70-140 HC per L/s. It is equivalent to 125-250 lcd. However, 70-140 HC per L/s is only 10% of SPAM IKK. In addition about 74% sites show the less than 70 HC per L/s. This indicates that the progress has been delayed development of the house connection.



Source: JICA Study Team 2010

Figure 10.4.14 Number of HC per System Capacity (L/s)

The 10L/s capacity of WTP in SPAM IKK could be supplied an amount of water for

about 1,000 house connections per day. It is used as target figure for daily water demand per WTP with 10L/s capacity. According to the site survey, about 50 % of SPAM IKK with expansion projects has more than 1,000 house connections, while about 20 % of SPAM IKK with expansion projects has less than 250 house connections. Alternatively, about only 10 % of SPAM IKK with new project has more than 1,000 house connections, and about 40 % of SPAM IKK with new project has less than 250 house connections due to delay of distribution work.

10.4.6 Water Leakage

(1) Water Leakage Occurrence Status

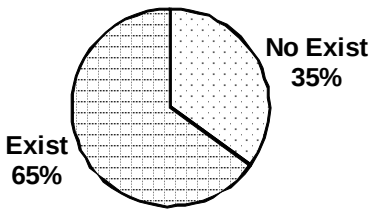
According to the interview survey to PDAMs about water leakage, PDAMs evaluate water leakage occurrence status from unaccounted for water (UFW). UFW is calculated based on the proportion of amounts of metered use to the amounts of production of each system that are recorded in facility operation reports by PDAM.

The range of the 50 SPAM IKK sites in terms of the percentage of UFW that indicates occurrence of water leakage is shown in Figure 6.1.4. The exact amounts of "production" and "metered use" has not been recorded in several sites (19 out of 50 sites).

It is assumed that the present UFW is 20-40% in most sites of SPAM IKK (58%), based on the PDAM's data. Alternatively, 23 % of SPAM IKK estimates to range more than 40% UFW. All PDAMs have strong interest in the water leakage reduction due to high rang of UFW.

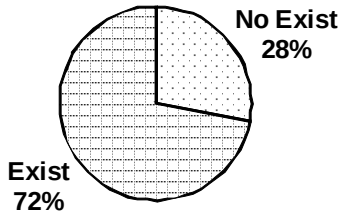
(2) Water Leakage Repair Status

According to the interview with PDAMs about the existence of distribution network maps and management and maintenance history records are shown in Figures 10.4.15 and 10.4.16



Source: JICA Study Team 2010

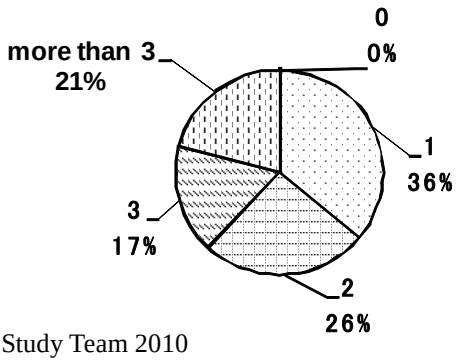
Figure 10.4.15 Existence of the Distribution Network Maps



Source: JICA Study Team 2010

Figure 10.4.16 Existence of the Maintenance History Records

In addition, the interview result on the number of engineers engaged in the maintenance of water leakage in the distribution network for each site is shown in Figure 10.4.17.



Source: JICA Study Team 2010

Figure 10.4.17 Number of Engineers Engaged in Maintenance of Distribution Network

10.4.7 Mechanical and Electrical Maintenance

Individual SPAM IKK has a few staff to manage the water facility operation and maintenance. Usually, they cannot able to the mechanical and electrical maintenance. Therefore, internal professional staff of PDAM is dispatched to a SPAM IKK site when mechanical and electrical repairs are required. Even if they are unable to repair, PDAM request to a plant manufacturer or professional contractor to solve the mechanical and electrical problems.

10.4.8 Mismatch between Design and on site Situation

The following are considered mismatches between the design plan and on site condition as confirmed by site survey:

- Distribution pump has not been operated since installed at the site, because water from WTP can distribute to network with natural gravity flow. (B-9 Way Lima)
- Sludge basins have not been used since installed at the site (A-8 Pattallassang)

Table 10.4.1 List of SPAM IKK 50 sites (1/4)

Province	North Sumatra		West Sumatra		Riau		Jambi		South Sumatra		Lampung	Bengkulu	
District/City	Dairi	Asahan	Solok	Kota Sawahlunto	Rokan Hulu	Kuantan Singingi	Muaro Jambi	Batang Hari	Banyuasin	Muara Enim	Lampung Selatan	Rejang Lebong	Rejang Lebong
No.	A-1	A-2	B-1	B-2	B-5	B-6	B-7	B-8	B-3	B-4	B-9	B-10	B-11
SPAM IKK	Sumbul	Kisaran	Nagari Kota Sari	Sumpahan	Tandun	Inuman	Candi Muaro	Lubuk Ruso	Sungai Pinang (Tanjung Kerang)	Gelumbang	Way Lima	Kota Padang	Selupu Rejang & Curup Timur
Established Year	2008	2006	2007	2008	2007	2008	2005	2007	2007	2008	2007	2006	2007
Type of SPUM IKK project	New Project	Expansion of Existing	Expansion of Existing	Expansion of Existing	New Project	New Project	Expansion of Existing	New Project	New Project	New Project	New Project	New Project	Expansion of Existing
Service area Popuration	9,970	334,981	26,046	11,198	5,773	3,698	2,286	3,294	2,490	30,965	25,912	No Data	41,413
Service area Popuration Coverage (%)	75.0	25.0	11.8	45.9	25.3	38.0	12.8	12.3	20.9	1.0	9.1	No Data	43.4
Service area House hold	2,240	32,983	5,209	2,240	1,411	1,067	457	650	498	6,193	6,478	No Data	9,669
House hold served	1,700	17,028	3,359	1,482	292	281	99	90	104	77	511	No Data	3,596
Service area House hold Coverage (%)	75.9	51.6	64.5	66.2	20.7	26.3	21.7	13.8	20.9	1.2	7.9	No Data	37.2
Type of Water Source	Spring	Groundwater	River	River	River	River	River	River	River	River	River	River	River
Turbility in Raw Water -Max-	No Data	1500	No Data	No Data	No Data	No Data	No Data	No Data	No Data	150	No Data	No Data	28
Turbility in Raw Water -Avarage-	No Data	90	No Data	No Data	No Data	No Data	71	No Data	No Data	40	No Data	No Data	2
Type of Intake	Weir	Weir	Weir	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Weir	Weir	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Weir	Weir	Weir
Transmission method	Gravity	Gravity	Gravity	Gravity	Pump	Pump	Pump	Pump	Pump	Pump	Gravity	Gravity	Gravity
Quantity of Transmission pipe	GIP	HDPE	GIP	GIP, PVC	PVC	GIP, PVC	PVC	PVC	PVC	PVC	PVC	HDPE	GIP, PVC
Total Length of Transmission pipe (m)	1,600	1,800	4,000	3,900	4,000	618	20	50	700	1,500	1,800	4,027	2,530
Capacity of WTP (l/s) / Production well	10	—	20	20	5	20	—	5	10	20	10	20	50
Treatment System	RSF	—	RSF	RSF	RSF	RSF	—	RSF	RSF	RSF	RSF	RSF	RSF
Material of Package plant	Steel	—	FRP	Steel	Steel	Steel	—	Steel	FRP	Steel	Steel	Steel	Steel
Power Source	Commercial grid	Diesel E. Generator	Diesel E. Generator	Commercial grid	Diesel E. Generator	Diesel E. Generator	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid
Distribution method	Gravity	Pump	—	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Gravity	Pump	Gravity
Pump Head (m)	Gravity	80	—	40	20	No data	10	7.5	45	30	Gravity	80	Gravity
Material of Distribution pipe	PVC	HDPE, GIP, PVC	—	HDPE, GIP, PVC	PVC	PVC	PVC	PVC	HDPE, GIP, PVC	GIP	PVC	PVC	PVC
Total Length of distribution pipe (m)	1,450	91,555	—	22,943	7,000	10,000	3,500	4,500	2,580	21,752	20,250	13,992	4,700
Operation status	Nothing	ALL	Nothing	Some	Some	Some	Some	Some	Some	Some	Some	Nothing	ALL
Operation Hours (hour)	-	24	-	24	8	6	2	3	6	3	12	-	24
Reason of not all runnning	Social Conflict		Social Conflict	Lack of Raw water	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Under Preparing	
Operation of WTP/Production well	—	Sufficient	—	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	—	Sufficient
Number of Engineer Staff for WTP	No Data	3	—	—	6	1	0	1	2	0	1	—	0
Number of Engineer Staff for Pipe Leakage	No Data	10	—	3	6	3	1	1	1	3	1	—	7
Maintenance tool and goods	—	Sufficient	—	Sufficient	Sufficient	Sufficient	Not Sufficient	Not Sufficient	Sufficient	Sufficient	No Data	Sufficient	Sufficient
Maintenance Record - Distribution Map	—	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	—	Yes
Maintenance Record - Leakage Repair	—	Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	—	Yes
UFW (%)	—	35	—	40	No data	No data	73	43	40	22.6	53	—	29.41
Handover Situation - Drawings and Manuals	—	No Data	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
Handover Situation - Education and Training	—	No Data	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing	Some	Some	Nothing	Nothing	Nothing

Notes : "RSF" is Rapid Sand Filtration. "Expansion of Existing" site includes the information of existing facilities.
"SSF" is Slow Sand Filtration.
Source : JICA Study Team 2010

Table 10.4.1 List of SPAM IKK 50 sites (2/4)

Province	Banten	West Java				Central Java					East Java					Yogyakarta	
District/City	Serang	Kuningan	Kuningan	Cirebon	Kota Bogor	Grobogan	Grobogan	Kendal	Boyolali	Rembang	Tuban	Ponorogo	Madiun	Bangkalan	Kediri	Bantul	Sleman
No.	B-12	B-13	B-14	B-15	B-16	A-3	B-18	A-4	B-17	B-19	B-20	B-21	B-22	B-23	B-24	B-25	B-26
SPAM IKK	Cikande	Garawangi	Luragung	Ciwaringin	Palasari	Toroh	Gubug	Boja	Sawit	Sulang	Bancar	Jenangan	Gemarang	Burneh	Kepung	Selopamioro	Gamping
Established Year	2008	2008	2008	2008	2008	2005	2007	2005	2005	2007	2006	2006	2006	2007	2008	2007	2008
Type of SPUM IKK project	Expansion of Existing	Expansion of Existing	Expansion of Existing	New Project	New Project	Expansion of Existing	New Project	Expansion of Existing	New Project	Expansion of Existing	Expansion of Existing	Expansion of Existing	Expansion of Existing	Expansion of Existing	New Project	Expansion of Existing	Expansion of Existing
Service area Popuration	36,101	52,443	41,560	23,553	20,921	21,777	8,851	43,548	11,194	12,813	12,817	13,231	25,272	21,193	36,565	13,895	18,346
Service area Popuration Coverage (%)	29.8	9.8	18.0	0.0	2.9	14.5	2.5	25.4	5.5	23.2	14.9	6.0	28.0	8.9	6.6	0.4	34.8
Service area House hold	9,025	12,812	12,941	7,385	6,002	6,475	2,853	10,130	2,589	3,199	3,608	4,104	6,318	3,213	9,054	4,271	4,358
House hold served	2,688	1,032	1,496	0	122	655	45	2,209	123	594	383	200	435	376	604	70	1,595
Service area House hold Coverage (%)	29.8	8.1	11.6	0.0	2.0	10.1	1.6	21.8	4.8	18.6	10.6	4.9	6.9	11.7	6.7	1.6	36.6
Type of Water Source	Canal	Spring	Spring	River	River	River	Canal	Groundwater	Groundwater	Lake	Groundwater	Groundwater	Groundwater	River	Canal	River	River
Turbility in Raw Water -Max-	400	No Data	No Data	No Data	36	1000	No Data	—	—	22	—	—	—	20	No Data	No Data	85
Turbility in Raw Water -Avarage-	60	No Data	No Data	No Data	35	400	No Data	—	—	5	—	—	—	5	No Data	No Data	10
Type of Intake	Raw water Collection (Basin/Well)	broncaptering	broncaptering	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Deep well	Deep well	Raw water Collection (Basin/Well)	Deep well	Deep well	Deep well	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)
Transmission method	Pump	Gravity	Gravity	Pump	Pump	Gravity	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump
Quantity of Transmission pipe	GIP	HDPE	HDPE	HDPE	GIP	GIP	GIP	—	—	PVC	—	—	—	GIP	HDPE, GIP	GIP	GIP
Total Length of Transmission pipe (m)	30	9,300	9,300	2,800	120	6	10	—	—	1,500	—	—	—	50	1,745	2,906	137
Capacity of WTP (l/s) / Production well	20	—	—	20	20	10	5	9.5	10	10	5	10	10	20	20	10	10
Treatment System	RSF	—	—	RSF	RSF	SSF	RSF	(Iron-removal)	—	RSF	—	—	—	RSF	RSF	RSF	RSF
Material of Package plant	Steel	—	—	Steel	Steel	Concrete	Steel	—	—	FRP	—	—	—	FRP	Steel	Steel	Steel
Power Source	Commercial grid	-	-	Diesel E. Generator	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Diesel E. Generator	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Commercial grid	Diesel E. Generator
Distribution method	Pump	—	—	—	Pump	Pump	Pump	Pump	Pump	Gravity	Pump	Pump	Pump	Pump	Pump	Pump	Pump
Pump Head (m)	60	—	—	—	30	40	60	50	40	Gravity	80	60	80	40	210	90	85
Material of Distribution pipe	PVC	—	—	—	GIP, PVC	PVC	PVC	PVC	PVC	PVC	PVC	GIP, PVC	PVC	PVC	GIP, PVC	GIP, PVC	PVC
Total Length of distribution pipe (m)	22,179	—	—	—	11,822	29,449	11,000	38,808	7,972	38,350	20,100	59,988	1,266	9,810	18,365	26,761	28,714
Operation status	ALL	ALL	ALL	Nothing	Some	Some	Some	Some	Some	Some	ALL	Some	Some	Nothing	Some	Some	Some
Operation Hours (hour)	24	24	24	-	6	12	4	8	3	16	24	15	16	-	1.4	3	2
Reason of not all runnning		-	-	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Low Demand (Distribution)	Lack of Raw water		Lack of Electricity	Low Demand (Distribution)	Low O&M Skills	Low Demand (Distribution)	Social Conflict	Low Demand (Distribution)
Operation of WTP/Production well	Sufficient	Sufficient	Sufficient	—	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	—	Sufficient	Sufficient	Sufficient
Number of Engineer Staff for WTP	2	—	—	—	0	0	0	3	0	2	2	4	2	0	3	2	2
Number of Engineer Staff for Pipe Leakage	2	—	—	—	2	1	1	3	2	2	3	4	4	3	2	2	2
Maintenance tool and goods	Sufficient	—	—	—	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient
Maintenance Record - Distribution Map	Yes	—	—	—	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Maintenance Record - Leakage Repair	Yes	—	—	—	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UFW (%)	12	—	—	—	37		2	38	25.4	35	35	26	27	33	No data	No data	26
Handover Situation - Drawings and Manuals	ALL	Nothing	Nothing	Nothing	Nothing	No Data	Nothing	No Data	ALL	Nothing	Some	Nothing	ALL	Nothing	ALL	ALL	ALL
Handover Situation - Education and Training	ALL	Nothing	Nothing	Nothing	Nothing	No Data	Some	No Data	Some	Some	Nothing	Some	Nothing	Some	ALL	Some	ALL

Notes : "RSF"is Rapid Sand Filtration. "Expansion of Existing" site includes the information of existing facilities.
"SSF"is Slow Sand Filtration.
Source : JICA Study Team 2010

Table 10.4.1 List of SPAM IKK 50 sites (3/4)

Province	West Kalimantan		East Kalimantan		South Kalimantan		Central Kalimantan	
District/City	Pontianak	Singkawang	Penajam Paser Utara	Kutai Kertanegara	Banjar	Tapin	Katingan	Gunung Mas
No.	A-5	A-6	B-27	B-28	B-29	B-30	B-31	B-32
SPAM IKK	Jungkat	Sei Bulan	Sepaku	Loa Janan	Kertak Hanyar	Binuang	Kareng Pangi	Tumbang Talakan
Established Year	2007	2008	2005	2007	2005	2005	2005	2008
Type of SPUM IKK project	Expansion of Existing	New Project	Expansion of Existing	Expansion of Existing	Expansion of Existing	Expansion of Existing	Expansion of Existing	Expansion of Existing
Service area Popuration	20,700	3,500	3,077	4,376	20,410	15,708	10,955	1,848
Service area Popuration Coverage (%)	2.6	17.6	38.0	56.0	62.9	81.8	16.0	22.2
Service area House hold	3,450	3,971	780	875	5,113	4,283	2,816	503
House hold served	182	250	234	490	2,569	2,569	348	82
Service area House hold Coverage (%)	5.3	6.3	30.0	56.0	50.2	60.0	12.4	16.3
Type of Water Source	River	River	River	River	River	River	River	River
Turbility in Raw Water -Max-	24	No Data	200	3000	1000	No Data	No Data	No Data
Turbility in Raw Water -Avarage-	21	No Data	54	500	100	No Data	No Data	No Data
Type of Intake	Weir	Weir	Weir	Weir	Pipe Tapping	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)
Transmission method	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump
Quantity of Transmission pipe	GIP, PVC	PVC	GIP	GIP	PVC	PVC	PVC	PVC
Total Length of Transmission pipe (m)	100	10,656	300	200	300	150	125	300
Capacity of WTP (l/s) / Production well	10	10	5	10	20	10	5	10
Treatment System	RSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF
Material of Package plant	Steel	Steel	Steel	FRP	Steel	Steel	Steel	Steel
Power Source	Commercial grid	Diesel E. Generator	Diesel E. Generator	Diesel E. Generator	Commercial grid	Commercial grid	Commercial grid	Diesel E. Generator
Distribution method	Pump	Pump	Pump	Pump	Pump	Pump	Pump	Pump
Pump Head (m)	50	35	20	40	30	30	20	60
Material of Distribution pipe	PVC	PVC	PVC	PVC	GIP, PVC	PVC	PVC	PVC
Total Length of distribution pipe (m)	20,519	1,645	53,974	10,500	14,720	13,639	18,574	4,866
Operation status	Some	Some	Some	Some	ALL	ALL	Some	Some
Operation Hours (hour)	8	3	24 (2 d/w)	7	24	24	21	4
Reason of not all runnning	Low demand (Distribution)	Social Conflict	Low Demand (Distribution)	Low Demand (Distribution)			Save of operation cost	Low Demand (Distribution)
Operation of WTP/Production well	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient
Number of Engineer Staff for WTP	0	1	2	0	0	0	1	0
Number of Engineer Staff for Pipe Leakage	1	1	2	4	1	1	1	1
Maintenance tool and goods	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Not Sufficient	Not Sufficient
Maintenance Record - Distribution Map	No	No	Yes	Yes	Yes	No	Yes	Yes
Maintenance Record - Leakage Repair	No	No	No	Yes	Yes	No	Yes	Yes
UFW (%)	63		43.8	10	25	33.2	12	50.8
Handover Situation - Drawings and Manuals	No Data	No Data	Nothing	Nothing	Nothing	Nothing	Nothing	Nothing
Handover Situation - Education and Training	No Data	No Data	Nothing	Nothing	Some	Nothing	Some	Nothing

Notes : "RSF"is Rapid Sand Filtration. "Expansion of Existing" site includes the information of existing facilities.
"SSF"is Slow Sand Filtration.
Source : JICA Study Team 2010

Table 10.4.1 List of SPAM IKK 50 sites (4/4)

Province	Central Sulawesi			South Sulawesi				South East Sulawesi	North Sulawesi		Gorontalo	
District/City	Donggala	Donggala	Palu	Takalar	Takalar	Gowa	Jeneponto	Kolaka	Minahasa Utara	Minahasa Selatan	Bone Bolango	Gorontalo Utara
No.	B-33	B-35	B-34	A-7	B-37	A-8	B-36	B-38	B-39	B-40	B-41	B-42
SPAM IKK	Binanga	Sabang (Damsol)	Palu	Pattallassang	Galesong Selatan	Pattallassang	Parapa	Latambaga	Air Madidi	Amurang	Suwawa	Kwandang
Established Year	2005	2008	2006	2006	2008	2008	2007	2008	2006	2006	2006	2008
Type of SPUM IKK project	New Project	New Project	New Project	Expansion of Existing	New Project	New Project	Expansion of Existing	Expansion of Existing	New Project	New Project	New Project	Expansion of Existing
Service area Popuration	10,446	8,424	110,218	31,229	67,685	20,373	69,264	54,558	No Data	3,615	18,670	10,667
Service area Popuration Coverage (%)	5.3	No Data	1.2	19.2	11.3	15.6	No Data	45.3	No Data	22.6	13.2	26.7
Service area House hold	2,607	1,866	22,044	7,510	16,354	3,131	15,461	12,443	No Data	944	3,697	2,849
House hold served	138	No Data	274	1,200	713	754	5,560	4,944	227	215	494	570
Service area House hold Coverage (%)	5.3	No Data	1.2	16.0	4.4	24.1	36.0	39.7	No Data	22.8	13.4	20.0
Type of Water Source	River	Lake	River	River	River	River	River	River	Spring	Spring	River	River
Turbility in Raw Water -Max-	No Data	No Data	No Data	100	50	1000	No Data	200	No Data	No Data	No Data	No Data
Turbility in Raw Water -Avarage-	No Data	No Data	No Data	40	30	120	No Data	15	No Data	No Data	No Data	No Data
Type of Intake	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Weir	Raw water Collection (Basin/Well)	Raw water Collection (Basin/Well)	Weir	Weir	Weir	Raw water Collection (Basin/Well)
Transmission method	Gravity	Pump	Gravity	Pump	Pump	Gravity	Pump	Pump	Gravity	Gravity	Gravity	Pump
Quantity of Transmission pipe	GIP	GIP	GIP	PVC	PVC	PVC	PVC	HDPE, GIP, PVC	GIP	PVC	HDPE, GIP, PVC	HDPE
Total Length of Transmission pipe (m)	60	10	5,050	2,414	700	4,200	780	10,960	142	3,000	1,028	1,500
Capacity of WTP (l/s) / Production well	20	10	10	20	20	20	20	20	10	20	20	10
Treatment System	SSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF	RSF
Material of Package plant	Concrete	Steel	FRP	Steel	Steel	Steel	Steel	Steel	Steel	Steel	FRP	Steel
Power Source	Diesel E. Generator	Commercial grid	Commercial grid	Commercial grid	Diesel E. Generator	Commercial grid	Diesel E. Generator	Diesel E. Generator	Diesel E. Generator	Diesel E. Generator	Commercial grid	Commercial grid
Distribution method	Gravity	Gravity	Gravity	Pump	Pump	Pump	Gravity	Gravity	Gravity	Gravity	Gravity	Gravity
Pump Head (m)	Gravity	Gravity	Gravity	80	80	80	Gravity	Gravity	Gravity	Gravity	Gravity	Gravity
Material of Distribution pipe	PVC	PVC	GIP, PVC	PVC	PVC	PVC	PVC	DCIP, GIP, PVC	PVC	PVC	PVC	GIP, PVC
Total Length of distribution pipe (m)	15,695	17,003	2,482	77,000	48,000	45,762	2,200	83,265	13,693	7,500	9,000	37,292
Operation status	Some	Nothing	Some	ALL	Some	Some	ALL	Nothing	ALL	Some	Nothing	Some
Operation Hours (hour)	24	-	24	24	12	10	24	-	24	24	-	10
Reason of not all runnning	Mistake of WTP choice	Low Demand (Distribution)	Low Demand (Distribution)		Low Demand (Distribution)	Social Conflict		Low O&M Skills		Low Demand (Distribution)	Poor Construction (FRP Plant)	Low Demand (Distribution)
Operation of WTP/Production well	Sufficient	—	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	—	Sufficient	Sufficient	—	Sufficient
Number of Engineer Staff for WTP	0	—	0	6	0	3	0	0	2	1	—	0
Number of Engineer Staff for Pipe Leakage	1	—	1	7	2	10	12	2	3	1	—	2
Maintenance tool and goods	Sufficient	—	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	Sufficient	—	Sufficient
Maintenance Record - Distribution Map	No	—	No	Yes	No	Yes	No	No	Yes	Yes	—	No
Maintenance Record - Leakage Repair	No	—	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	—	No
UFW (%)	No data	—	30	28	16.7		12	59	No data	No data	—	No data
Handover Situation - Drawings and Manuals	Nothing	ALL	—	No Data	Nothing	No Data	Nothing	Nothing	Nothing	ALL	ALL	Nothing
Handover Situation - Education and Training	Nothing	Nothing	—	No Data	Nothing	No Data	Nothing	Nothing	Nothing	Some	Nothing	Nothing

Notes : "RSF" is Rapid Sand Filtration. "Expansion of Existing" site includes the information of existing facilities.
"SSF" is Slow Sand Filtration.
Source : JICA Study Team 2010

10.5 Outline of PDAM/BPAM/BLU (Operation and Finance)

10.5.1 Operating Conditions

Table 10.5.1 shows the findings of the first and second site surveys. Outline descriptions are given below while details are shown in APPENDIX 3.

(1) Number of Water Supply Management Bodies and Year of Establishment

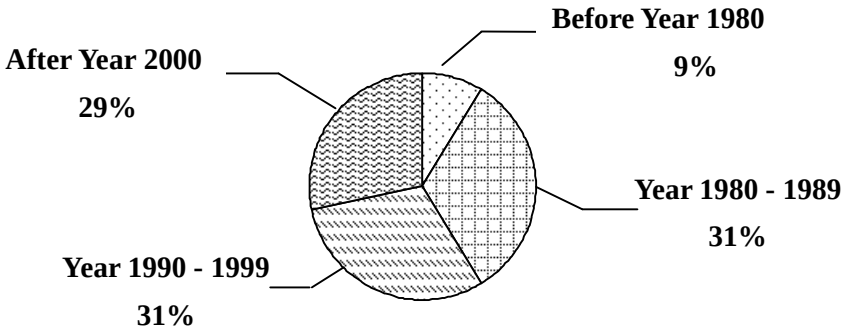
50 SPAMIKKs are managed by 45 water supply bodies such as PDAMs, BPAMs and BLU as shown in Table 10.5.2.

Table 10.5.2 Composition of Water supply bodies

Name of Bodies	No. of Bodies	Name of Sites
PDAM	41	Refer to Table 10.5.1
BPAM	3	Rokan Hulu, Kuantan Singingi, Bone Bolango
BLU	1	Gorontalo Utara
Total	45	

Source: JICA Study Team 2010

No. 1 item shows the establishment years of water supply bodies with 45 available data. Most of water supply bodies targeted in this survey were established since the 1980s (refer to Figure 10.5.1). Since many water supply bodies have been in existence for 20 years or more, it can be said that they have ample project experience.



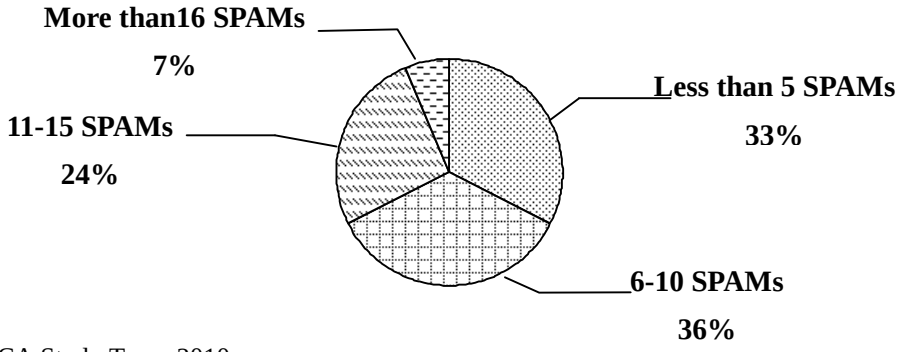
Source: JICA Study Team 2010

Figure 10.5.1 Year of Establishment

(2) Number of SPAM IKKs

A water supply body (PDAM, BSPAM or BLU) of each district is managed all SPAM IKKs in his district. Approximately one third (33%) of water supply bodies manage less than five SPAM IKKs. Some small PDAMs manage only two SPAM IKKs (Dairi and Asahan City in North Sumatra). However, more than 60% of water supply bodies

manage six or more projects (refer to Figure 10.5.2). It can be seen that the districts and cities where there are numerous SPAM IKKs are concentrated mainly in Java Island in areas of high population density (more than 1,000 persons/km^2).

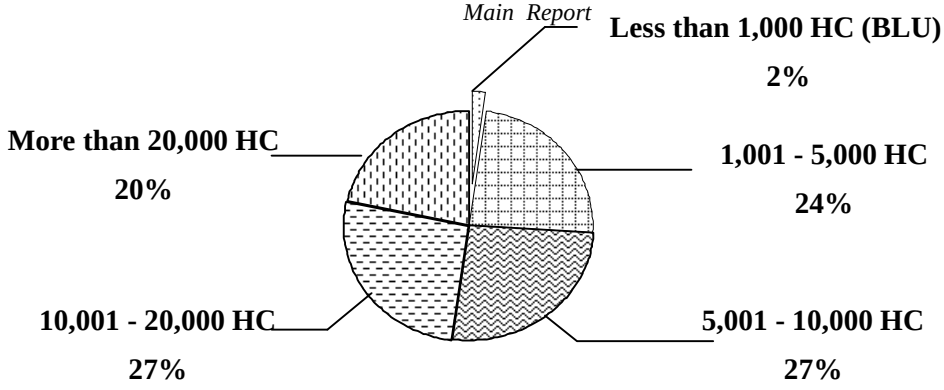


Source: JICA Study Team 2010

Figure 10.5.2 No. of SPAM IKK per Water Supply Body

(3) Number of House Connections

Water supply bodies of site survey has the number ranges from approximately 1,000 to 90,000 house connections. Kota Bogor in West Java is the largest number and other water supply bodies are less than half of this number of house connections. Especially, BLU (Gorontalo Utara) has small number of house connections with 1,000 or less (refer to Figure 10.5.3). Water supply bodies of site survey has about 13,800 house connections in average. This average number of house connection is less than 21,500 customers per PDAM in average, in accordance with the data of BPP-SPAM (PDAM Performance Assessment in Indonesia 2009). Approximately 20% of the surveyed water supply bodies have more than the average number of house connections with 20,000 (refer to Figure 10.5.3). The average number of customers per SPAM IKK is approximately 1,770 house connections. However, water supply bodies in areas of low population density (less than 100 person/km^2) such as Muaro Jambi, Batang Hari (Riau) in Jambi Province, Solok and Kota Sawahunto in West Sumatra, etc. have far lower than this average number. The number of house connections is relatively large in Central Java, since its local population is comparatively higher. This excludes Grobogan where there are so many SPAM IKKs (17), each with small number of house connections.

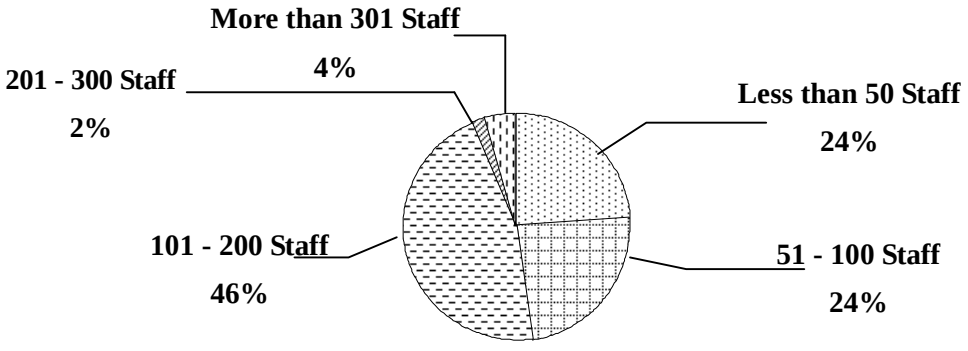


Source: JICA Study Team 2010

Figure 10.5.3 No. of House Connections per Water Supply Body

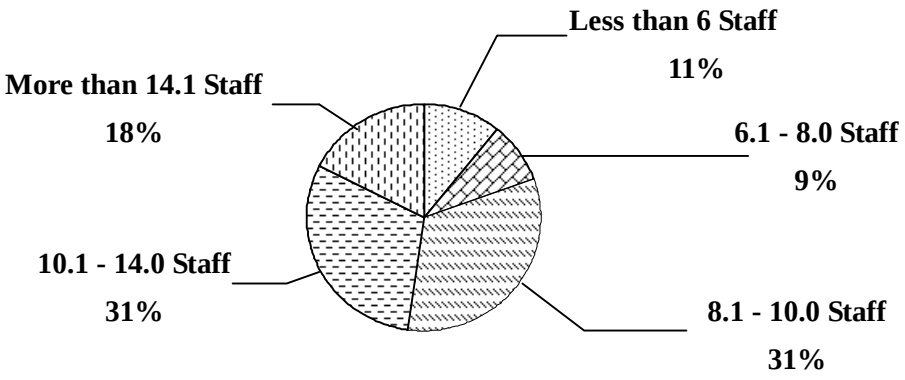
(4) Number of Staff

The smallest water supply body has only 19 staff (BLU of Gorontalo Utara) while the largest has 400 (PDAM of Kota Bogor). The average number of staff in all the surveyed PDAMs is 109. Almost half of water supply bodies has 101-200 staff (refer to Figure 10.5.4). The average number of staff per thousands connections is a management indicator of water supply organization. However, this figure differs greatly between each water supply body. BPP-SPAM sets the efficiency number of staff per 1,000 house connections at 8.0 as the guideline figure. The overall staffing level for surveyed PDAMs is 11.2 but 20% of water supply bodies is less than a guideline figure 8.0 for efficiency staff ratio (refer to Figure 10.5.5). Since personnel expenses have the largest proportion (30-40%) of water supply bodies operating expenses mentioned in Item (6) below, it is important to realize operation with an appropriate number of staff. Water supply bodies which have higher ratios of employees to the number of customers than the efficiency standard. Hence, there is a need to review their operation systems and employment plans.



Source: JICA Study Team 2010

Figure 10.5.4 No. of Staff per Water Supply Body

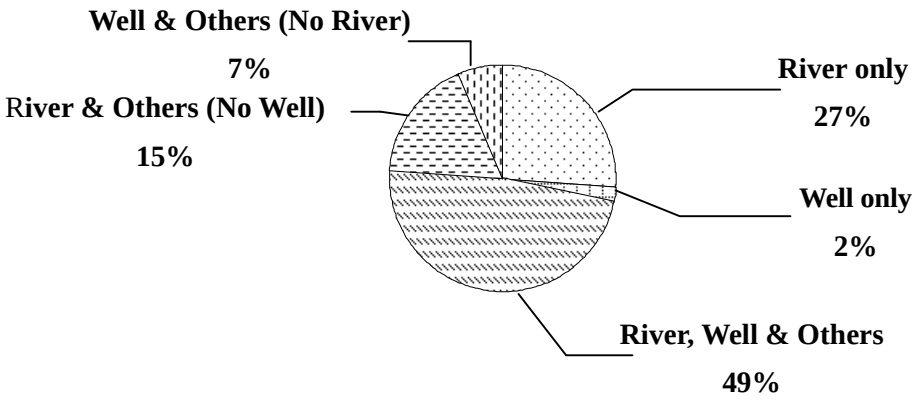


Source: JICA Study Team 2010

Figure 10.5.5 Staff Ratio (Ratio=No. of Staff/1,000 HC)

(5) Water Source

No. 7 item (Number of Water Sources) shows the breakdown of SPAM IKKs operated by water supply bodies according to the type of water sources with 45 available data. The number of rivers and deep wells accounts for a large proportion (49%) of water source in the total SPAM IKKs (refer to Figure 10.5.6). This trend is especially pronounced in Sumatra and Java. There is a relatively high degree of dependence on groundwater and spring in Central and East Java although the surveyed SPAM IKKs are mostly depending on river water.



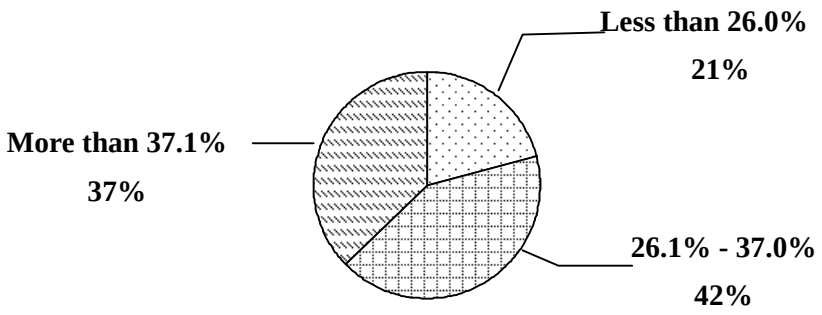
Source: JICA Study Team 2010

Figure 10.5.6 Different Kinds of Water Sources

(6) Major Cost Items (Personnel and Electricity Expenses)

Personnel and electricity expenses are major O&M costs in water supply bodies.

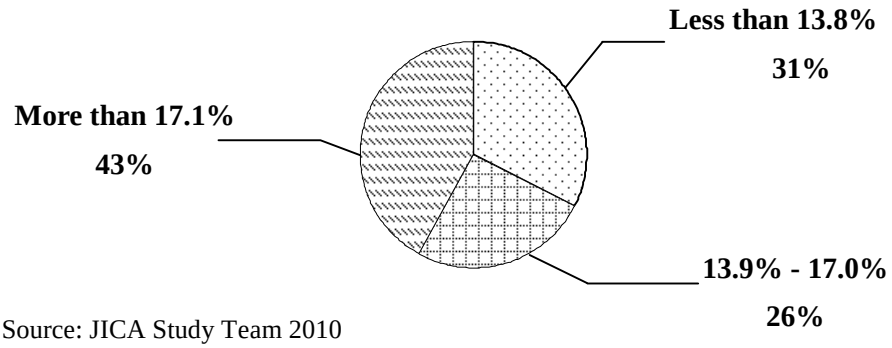
No. 8 item shows the results of the ratio of personnel expenses to the overall cost with 43 available data except for 2 BPAMs (Rokan Hulu and Kuantan Singingi in Riau Province) due to data is not available. As stated in above Item (4), most water supply bodies exceed the efficiency standard ratio for personnel employment. Personnel expenses account for the largest item in water supply bodies' O&M costs, ranging from around 30% to more than 40% in some water supply bodies and about 37% on the average. This ratio is very high compared with the ratio of 26%, which is the mean value of all water supply bodies based on the monitoring data of BPKP in 2008. Only 21% of water supply bodies is less than mean value of 26% (refer to Figure 10.5.7). Water supply bodies face the issue on improving business standing. Accordingly, the reduction of personnel expenses is the greatest factor in saving costs (refer to the number of employees discussed above).



Source: JICA Study Team 2010

Figure 10.5.7 Ratio of Personnel Expenses to Overall Cost (%)

No. 9 item shows the results of the ratio of electricity expense to the overall cost with 42 available data except for 2 BPAMs (Rokan Hulu and Kuantan Singingi in Riau Province) and 1 PDAMs (Minahasa Utara in North Sulawesi Province) due to data is not available. This expense is closely related to the operation system of SPAM IKK. In water supply systems that contain pumping stations and so on, the electricity expense accounts for a major cost item. There are some water supply bodies in which the electricity expense accounts for 17% of the overall cost. Moreover, in most cases (65%), it is greater than the mean ratio of 13.8% for all PDAMs in Indonesia based on the monitoring data of BPKP in 2008 and 31% water supply bodies show efficiency ratio less than the mean ratio (refer to Figure 10.5.8). These water supply bodies should review their operation systems in terms of cost reduction.

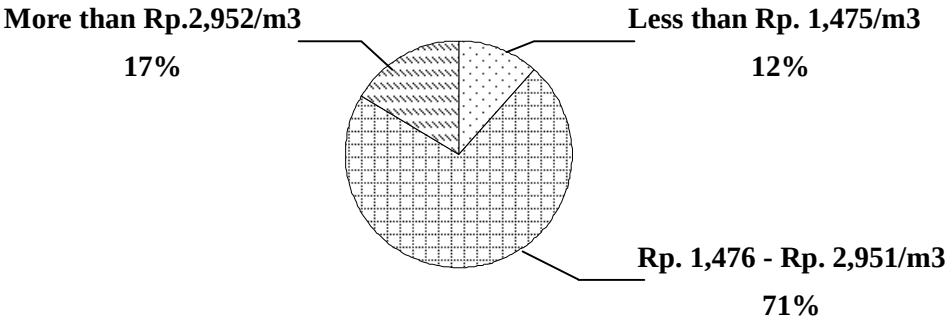


Source: JICA Study Team 2010

Figure 10.5.8 Ratio of Electricity Expenses to Overall Cost (%)

(7) Comparison of Water Production Cost and Selling Price

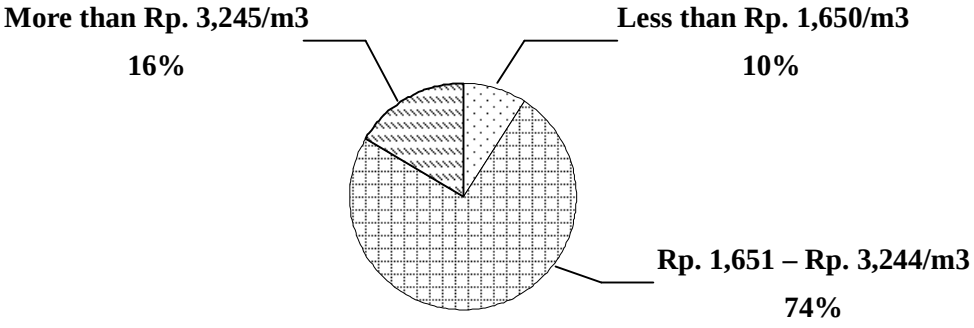
No. 10 item shows the mean price per cubic meter of water with 42 available data except for 2 PDAMs (Minahasa Utara and Selatan, Nourth Sulasesi Province) and 1 BLU (Gorontalo Utara, Gorontalo Province) due to data is not available. The mean price varies greatly among water supply bodies ranging from approximately Rp. 600/m^3 (Rokan Hulu) in the cheaper cases to more than Rp. 3,500/m^3 (Kota Bogor) in the expensive PDAMs. The mean selling price is Rp. 2,075/m^3 considering all PDAMs. According to the data of BPP-SPAM, the average price of all PDAMs in Indonesia is Rp. 2,952/$m^{3.}$ Thus, the mean price is approximately 35% less than the average price in whole country. However, the price of 14% of PDAMs is not less than the mean ratio of all PDAMs in Indonesia and more than 80% of water supply bodies is less than national mean sales price (refer to Figure 10.5.9).



Source: JICA Study Team 2010

Figure 10.5.9 Mean Water Sales Price (Rp/m3)

No. 11 item shows the mean production cost per cubic meter of water with 42 available data except for 2 PDAMs (Minahasa Utara and Selatan, Nourth Sulasesi Province) and 1 BLU (Gorontalo Utara, Gorontalo Province) due to data is not available. This ranges from approximately Rp. 1,000/m^3 (Dairi) in water supply bodies with the lowest production costs to more than Rp. 4,000/m^3 (Palu) in expensive cases. The mean production cost is Rp. 2,572/m^3 considering all water supply bodies. This cost is approximately 20% less than the mean production cost of Rp. 3,244/m^3 of all water supply bodies in Indonesia according to the data of BPP-SPAM. However, the production cost of 17% of PDAMs is higher than the mean production cost of all PDAMs in Indonesia (refer to Figure 10.5.10). These PDAMs should review their water distribution systems including water leakage for the purpose of cost saving.



Source: JICA Study Team 2010

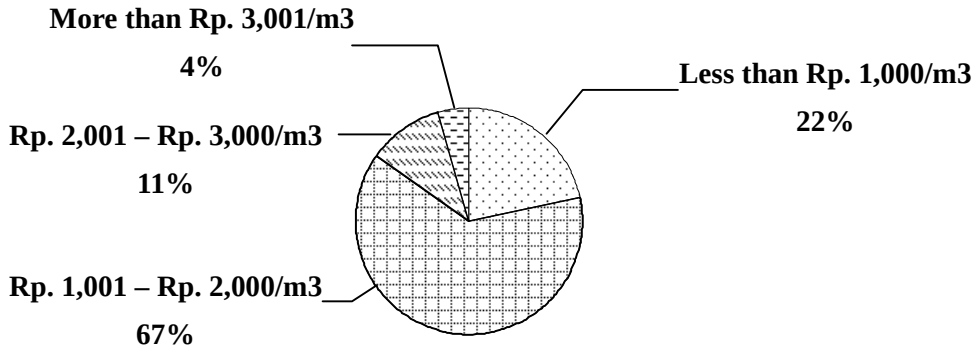
Figure 10.5.10 Mean Water Production Cost (Rp/m3)

No. 12 item shows the operating ratio (= production cost/water price) of water production cost with respect to water price. The detail of financial conditions of water supply bodies is described in Chapter 10.5.2.

(8) Water Tariffs and Billing Amounts

No. 13 item shows the minimum tariff per cubic meter applied to non-commercial category such as general households based on the tariff structures with 45 available data. Each water supply body is free to set its own water tariff. Tariff ranged between Rp.1,000/m3 and Rp.2,000/m3 is accounted for 63% (refer to Figure 10.5.11). However, most water supply bodies adopt the metered billing system according to the amount of consumption by each customer category (major four groups, namely: social, non-commercial, commercial, and industrial). Other water supply bodies treat the administration and maintenance fee as a fixed amount and add the water consumption

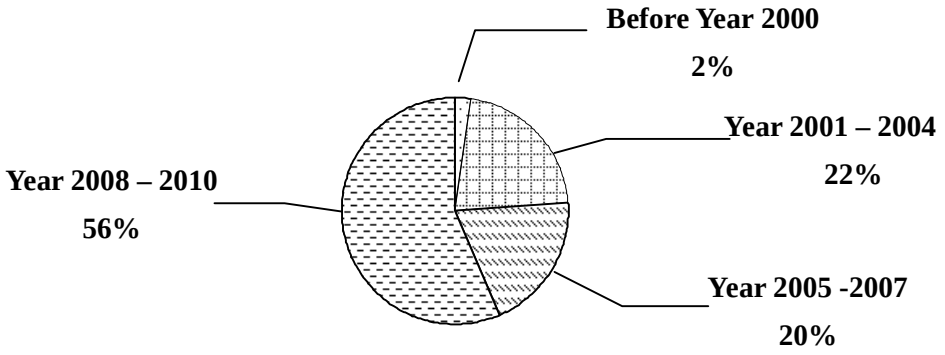
rate to this. In terms of consumer category, industrial rates are the highest, which are around three times higher than non-commercial rates applied for general households. Depending on the water supply bodies different tariff settings are adopted during the rainy and dry seasons. Tariffs for installing meters for individual connections are billed separately with respect to the new subscribers.



Source: JICA Study Team 2010

Figure 10.5.11 Minimum Tariff Rate for Non-Commercial Category

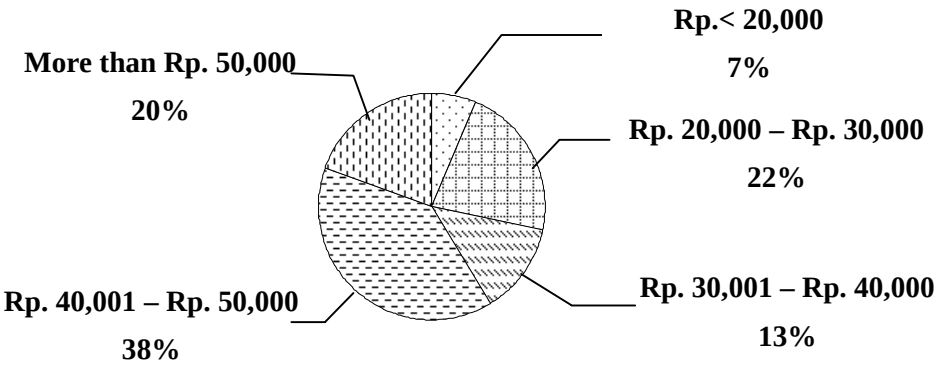
No. 14 item shows the years when tariffs were set with 45 available data (the upper row shows the year when former tariffs were set, while the bottom row shows the year when the currently applied tariffs were set). Most water supply bodies which have operation ratios of less than 1.0 changed their tariff since 2007. Some PDAMs plan regular tariff revisions (every two to four years). However, there are 11 water supply bodies that have not revised their tariffs in six years or more (refer to Figure 10.5.12). Since tariff revisions are subject to approval by the district assembly (DPRD Kabupaten) or district governor (Bupati), many water supply bodies are unable to revise tariffs due to political reasons. Nevertheless, the regulation of the Ministry of Finance recommends tariff change every 5 year interval.



Source: JICA Study Team 2010

Figure 10.5.12 Current Water Tariff Set Year

No. 15 item shows the mean billing amount and mean amount paid per customer (house connection) per month with 45 available data. The average amount paid is around Rp. 43,000. However, paid amount less than Rp.40,000 is accounted for more than 40% (refer to Figure 10.5.13). There are some water supply bodies where this exceeds Rp. 100,000 (Banjar). Judging from average household income (except for high income districts, i.e., Rokan Hulu in Riau, Cirebon in West Java and Katingan in Central Kalimantan) of Rp. 2 to 3 million per month, the average billing amount accounts for 1.5% to 2% of the monthly income per households (refer to Chapter 10.6). According to the table of applied tariffs, there are districts (Kabupaten) where water consumption is estimated to be almost 30 m^3/month or more. These billing amounts should be carefully studied to assess whether they are affordable or not considering households' income levels and district's economic activities.

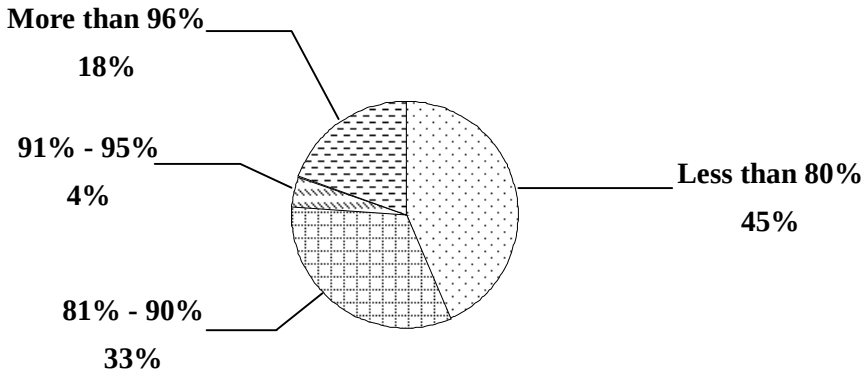


Source: JICA Study Team 2010

Figure 10.5.13 Mean Billing Amount (Rp) per HC/month

(9) Water Fee Collection Rate

No. 16 item shows the water supply bodies' water fee collection rates with 45 available data (refer to Figure 10.5.14). All the surveyed water supply bodies calculate monthly consumption from meter readings and bill consumers accordingly. The water meter installation rate is 100% (excluding Binanga). 4 PDAMs responded that they have a collection rate of 100% while most of them reported a rate of somewhere between 80-90%. However, 20 water supply bodies (45% of total) responded collection rate less than 80%. When delayed water fee collections from consumers with arrears are also included, the collection rate approaches nearly 100%, pointing to a very high water charge collection situation. A major factor behind this is that penalties such as higher tariff rates and eventually removal of water meters are imposed on consumers who fail to pay on time. Tariff collection methods are uniquely set by each water supply body. For example, there are some districts where a few village representatives collect water charge on behalf of the water supply bodies while there are other districts where consumers directly pay water charge to water supply body windows or bank accounts.



Source: JICA Study Team 2010

Figure 10.5.14 Water Fee Collection Rate

In conclusion, the above overall analysis indicates that approximately 25% of the surveyed water supply bodies are viable and sustainable water supply operators. However, the selected water supply bodies for site survey are relatively small scale and their activities are less than the mean value of all PDAMs in Indonesia since the selected areas are targeted for SPAM IKKs. Needless to say, these water supply bodies should have an improved management system for autonomous organization towards sustainable water supply, to serve the increasing number of residents.

Table 10.5.1 Summary Data of PDAM/BPAM/BLU (1/4)

Item No.	Province		North Sumatra		West Sumatra		Riau		Jambi		South Sumatra		Lampung	Bengkulu		Banten
	District/City		Dairi	Asahan City	Solok (Paket Wilayah)	Kota Sawahlunto	Rokan Hulu	Kuantan Singingi	Muaro Jambi	Batang Hari	Banyuasin	Muara Enim	Lampung Selatan	Rejang Lebong	Rejang Lebong	Serang
	Questionnaire No.		A-1	A-2	B-1	B-2	B-5	B-6	B-7	B-8	B-3	B-4	B-9	B-10	B-11	B-12
	Management Body (PDAM/ BPAM/ BLU)		PDAM	PDAM	PDAM	PDAM	BPAM	BPAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	-	PDAM
1	Establishment (Year)		1993	1990	1983	1992	2003	2001	2003	1999	2000	1986	2000	1978	-	1977
2	No. of SPAM IKK		2	2	11	3	4	7	7	10	9	15	4	9	-	12
3	No. of House Connections (HC)		10,000	9,750	7,905	5,012	1,900	2,292	3,620	3,902	6,342	15,686	7,752	7,852	-	11,376
4	Total Employees		91	156	104	46	58	30	56	40	91	144	97	100	-	96
5	Average No. of HC per IKK		5,000	4,875	719	1,671	475	327	517	390	705	1,046	1,938	872	-	948
6	Staff Ratio (Staff/ 1,000 connectios)		9.1	16.0	13.2	9.2	30.5	13.1	15.5	10.3	14.3	9.2	12.5	12.7	-	8.4
7	No. of Water Sources	River	8	3	6	7	4	7	6	4	3	6	14	1	-	7
		Deep Well	-	29	-	-	-	-	2	3	-	4	2	-	-	6
		Spring	-	-	13	-	-	-	-	10	-	1	3	6	-	1
		Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-
8	Ratio of Personnel Expenses in All Cost		65%	35%	57%	30%	-	-	35%	50%	16%	24%	45%	44%	-	40%
9	Ratio of Electricity Expenses in All Cost		20%	25%	1%	27%	-	-	25%	15%	9%	20%	30%	11%	-	18%
10	Mean Water Sales Price (Rp/m3)		660	2,500	1,469	2,420	600	1,600	1,700	2,050	1,825	1,377	2,800	1,500	-	1,700
11	Mean Water Production Cost (Rp/m3)		1,095	1,850	1,672	2,191	3,500	3,600	2,750	2,750	3,359	2,257	3,200	2,400	-	2,150
12	Operation Ratio (Production cost/Sales price)		2.78	1.11	1.17	1.08	-	-	2.45	1.81	1.90	1.30	1.01	1.63	-	0.87
13	Minimum Tariff for Non-Commercial (Rp/m3)		450	1,440	900	1,110	600	935	1,500	1,200	900	4,275	2,100	935	-	1,000
14	Water Tariffs Set Year	Previous	-	-	-	-	-	2003	-	2002	2002	-	2002	2002	-	2008
		Current	1993	2006	2007	2004	2003	2005	2003	2,009	2006	2008	2008	2006	-	2010
15	Mean Billing Amount per HC/month		13,179	27,500	24700	49,000	12,000	23,000	43,000	50,000	42,000	68,340	35,000	30,000	-	25,000
16	Water Fee Collection Rate		80%	80%	81%	90%	90%	80%	70%	70%	85%	85%	82%	80%	-	100%

Note; "-"means Not applicable or Not available.

Source: JICA Survey Team 2010 based on the interview of each PDAM/BLU

Table 10.5.1 Summary Data of PDAM/BPAM/BLU (2/4)

Item No.	Province		West Java				Central Java					East Java				
	District/City		Kuningan (Perpipaan)	Kuningan (Perpipaan)	Cirebon	Kota Bogor	Grobogan	Grobogan	Kendal	Boyolali	Rembang	Tuban	Ponorogo	Madiun	Bangkalan	Kediri
	Questionnaire No.		B-13	B-14	B-15	B-16	A-3	B-18	A-4	B-17	B-19	B-20	B-21	B-22	B-23	B-24
	Management Body (PDAM/ BPAM/ BLU)		PDAM	-	PDAM	PDAM	PDAM	-	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM
1	Establishment (Year)		1988	-	1988	1977	1986	-	1986	1978	1980	1983	1992	1987	1982	1992
2	No. of SPAM IKK		11	-	8	6	17	-	13	15	6	12	14	13	10	12
3	No. of House Connections (HC)		20,051	-	25,833	88,614	16,509	-	42,684	20,776	15,478	22,578	15,396	24,412	13,815	11,376
4	Total Employees		166	-	220	400	110	-	174	138	104	120	105	110	165	96
5	Average No. of HC per IKK		1,823	-	3,229	14,769	971	-	3,283	1,385	2,580	1,882	1,100	1,878	1,382	948
6	Staff Ratio (Staff/ 1,000 connectios)		8.3	-	8.5	4.5	6.7	-	4.1	6.6	6.7	5.3	6.8	4.5	11.9	8.4
7	No. of Water Sources	River	1	-	4	2	2	-	-	-	1	-	-	-	1	7
		Deep Well	-	-	2	-	-	-	9	12	1	11	22	34	12	6
		Spring	14	-	6	3	3	-	-	15	5	4	4	4	5	1
		Other	-	-	-	-	-	-	-	-	3	1	-	-	-	-
8	Ratio of Personnel Expenses in All Cost		39%	-	39%	28%	34%	-	25%	37%	19%	31%	40%	40%	42%	40%
9	Ratio of Electricity Expenses in All Cost		4%	-	8%	2%	15%	-	16%	26%	13%	29%	13%	27%	34%	18%
10	Mean Water Sales Price (Rp/m3)		2,241	-	2,980	3,485	2,506	-	3,261	2,611	1,736	1,600	1,400	1,750	3,013	1,750
11	Mean Water Production Cost (Rp/m3)		2,201	-	4,260	3,467	2,647	-	3,328	2,795	2,661	2,200	2,200	2,100	2,900	2,500
12	Operation Ratio (Production cost/Sales price)		1.08	-	1.04	0.74	0.98	-	0.92	0.94	1.22	0.87	1.32	0.85	0.93	1.49
13	Minimum Tariff for Non-Commercial (Rp/m3)		1,850	-	1,100	1,100	1,200	-	1,400	1,350	1,050	1,600	1,400	1,500	3,000	860
14	Water Tariffs Set Year	Previous	-	-	-	2009	2005	-	-	-	-	-	-	2007	2008	2007
		Current	2008	-	2009	2010	2009	-	2008	2009	2008	2009	2010	2009	2009	2009
15	Mean Billing Amount per HC/month		45,000	-	52,500	87,500	47,485	-	44,474	49,079	60,000	35,000	33,500	25,500	60,000	25,000
16	Water Fee Collection Rate		98%	-	85%	83%	80%	-	96%	97%	66%	98%	80%	96%	93%	100%

Note; "-"means Not applicable or Not available.

Source: JICA Survey Team 2010 based on the interview of each PDAM/BLU

Table 10.5.1 Summary Data of PDAM/BPAM/BLU (3/4)

Item No.	Province		Yogyakarta		West Kalimantan		East Kalimantan		South Kalimantan		Central Kalimantan		Central Sulawesi		
	District/City		Bantul	Sleman	Pontianak	Singkawang	Penajam Paser Utara	Kutai Kertanegara	Banjar	Tapin	Katingan	Gunung Mas	Donggala	Donggala	Palu
	Questionnaire No.		B-25	B-26	A-5	A-6	B-27	B-28	B-29	B-30	B-31	B-32	B-33	B-35	B-34
	Management Body (PDAM/ BPAM/ BLU)		PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	PDAM	-	PDAM
1	Establishment (Year)		1991	1992	1992	2008	2003	2002	1998	1991	1995	2007	1985	-	2002
2	No. of SPAM IKK		10	18	4	4	3	18	9	9	5	4	11	-	4
3	No. of House Connections (HC)		13,175	19,000	3,589	12,424	3,095	44,560	28,002	9,609	3,058	2,199	16,831	-	1,476
4	Total Employees		118	196	45	111	28	355	118	60	33	44	144	-	21
5	Average No. of HC per IKK		1,318	1,056	897	3,106	1,032	2,476	3,111	1,068	612	550	1,530	-	369
6	Staff Ratio (Staff/ 1,000 connectios)		9.0	10.3	12.5	8.9	9.0	8.0	4.2	6.2	10.8	20.0	8.6	-	14.2
7	No. of Water Sources	River	1	25	4	10	3	14	9	5	5	2	3	-	3
		Deep Well	17	12	-	-	-	4	2	-	-	-	1	-	1
		Spring	2	7	-	-	1	-	-	-	-	2	2	-	-
		Other	-	-	-	-	-	-	-	1	-	-	-	-	-
8	Ratio of Personnel Expenses in All Cost		30%	40%	35%	46%	35%	25%	33%	37%	20%	25%	32%	-	35%
9	Ratio of Electricity Expenses in All Cost		15%	15%	20%	27%	20%	10%	17%	21%	8%	37%	6%	-	0.2%
10	Mean Water Sales Price (Rp/m3)		2,850	3,000	1,500	1,230	1,700	3,000	4,087	1,900	1,417	1,593	1,640	-	2,267
11	Mean Water Production Cost (Rp/m3)		1,800	2,700	2,300	1,590	2,000	1,600	3,124	2,400	3,461	3,250	1,932	-	4,138
12	Operation Ratio (Production cost/Sales price)		0.93	1.22	1.07	0.85	1.75	0.98	0.84	0.94	1.55	1.29	1.36	-	1.01
13	Minimum Tariff for Non-Commercial (Rp/m3)		1,500	2,000	900	1,235	2,200	2,000	2,410	2,000	1,070	2,830	1,400	-	950
14	Water Tariffs Set Year	Previous	-	-	-	-	-	2002	-	2001	2005	2007	2001	-	2001
		Current	2007	2004	2002	2002	2004	2007	2008	2009	2008	2010	2008	-	2005
15	Mean Billing Amount per HC/month		50,000	50,000	13,250	60,000	60,000	50,000	110,000	30,000	35,000	50,000	48,700	-	43,500
16	Water Fee Collection Rate		80%	89%	70%	70%	100%	100%	83%	85%	80%	90%	70%	-	75%

Note; "-"means Not applicable or Not available.

Source: JICA Survey Team 2010 based on the interview of each PDAM/BLU

Table 10.5.1 Summary Data of PDAM/BPAM/BLU (4/4)

Item No.	Province		South Sulawesi				South East Sulawes	North Sulawesi		Gorontalo		Average or Total Value (Except BPAM and BLU)	Average or Total Value	Mean Value/Ratio of Whole PDAM in Indonesia	Ratio of Comparision with Whole PDAM in Indonesia
	District/City		Takalar	Takalar	Gowa	Jeneponto	Kolaka	Minahasa Utara	Minahasa Selatan	Bone Bolango	Gorontalo Utara				
	Questionnaire No.		A-7	B-37	A-8	B-36	B-38	B-39	B-40	B-41	B-42				
	Management Body (PDAM/ BPAM/ BLU)		PDAM	-	PDAM	PDAM	PDAM	PDAM	PDAM	BPAM	BLU				
1	Establishment (Year)		1982	-	1988	1988	1993	2007	2007	2004	2009	1,991	1,993		
2	No. of SPAM IKK		5	-	7	3	8	8	8	3	4	9	8		
3	No. of House Connections (HC)		3,344	-	12,714	5,560	9,746	5,961	7,200	1,060	863	14,836	13,653	21,498	16% (*1)
4	Total Employees		30	-	129	58	125	112	91	33	19	116	109		
5	Average No. of HC per IKK		669	-	1,816	1,853	1,218	745	900	353	216	1,908	1,769		
6	Staff Ratio (Staff/ 1,000 connectios)		9.0	-	10.1	10.4	12.8	18.8	12.6	31.1	22.0	10.0	11.2	8.0	73% (*1)
7	No. of Water Sources	River	1	-	7	1	7	2	6	1	4	191	207		
		Deep Well	1	-	-	1	-	3	2	-	-	199	199		
		Spring	1	-	-	1	2	5	3	-	-	124	124		
		Other	-	-	-	-	-	-	-	-	-	5	5		
8	Ratio of Personnel Expenses in All Cost		25%	-	28%	24%	30%	40%	50%	73%	66%	35%	37%	26.0%	79% (*1)
9	Ratio of Electricity Expenses in All Cost		22%	-	8%	23%	15%	-	25%	18%	18%	17%	17%	13.8%	67% (*1)
10	Mean Water Sales Price (Rp/m3)		2,500	-	2,000	3,250	1,900	-	-	800	-	2,158	2,075	2,951	14% (*1)
11	Mean Water Production Cost (Rp/m3)		2,000	-	2,765	3,185	2,400	-	-	1,350	-	2,553	2,572	3,244	21% (*1)
12	Operation Ratio (Production cost/Sales price)		1.26	-	0.93	1.24	1.31	-	-	-	-	1.23	1.23	1.03	36% (*2)
13	Minimum Tariff for Non-Commercial (Rp/m3)		2,000	-	2,000	3,250	1,800	2,000	2,000	570	1,050	1,628	1,554		
14	Water Tariffs Set Year	Previous	-	-	-	2005	2001	-	-	-	-				
		Current	2008	-	2008	2009	2009	2004	2004	2000	2009				
15	Mean Billing Amount per HC/month		61,500	-	46,478	45,000	47,000	37,000	37,000	23,000	28,000	45,053	42,960		
16	Water Fee Collection Rate		80%	-	80%	90%	85%	80%	90%	60%	75%	85%	84%		

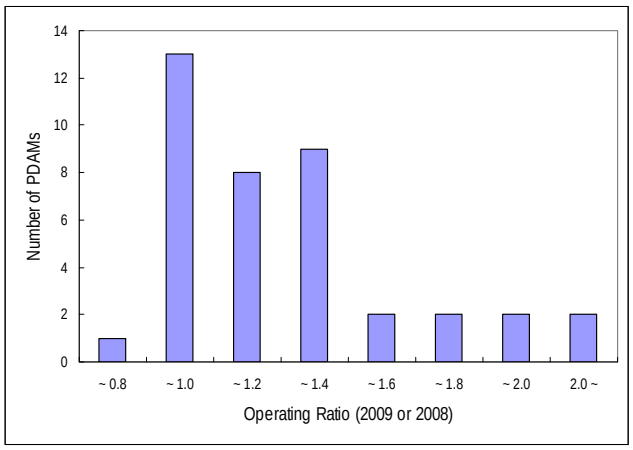
Notes; "-"means Not applicable or Not available, *1) ratio is not less than the mean of whole PDAMs,
*2) ratio is less than the value 1.0.

Source: JICA Survey Team 2010 based on the interview of each PDAM/BLU

10.5.2 Financial Conditions

During the on-site review, 45 water supply operators were surveyed. Four of these are operated directly by district governments in the form of BPAM or BLU. Accounting and financial managements of BPAM/BLU are not completely separated from those of the district governments.

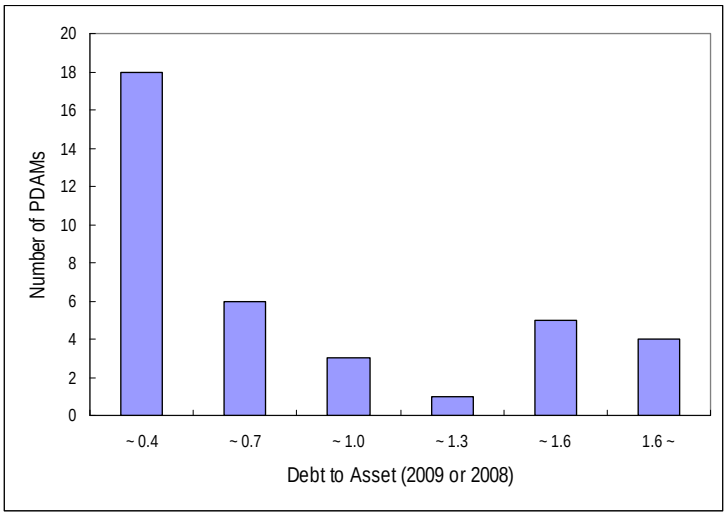
The remaining 41 operators are all PDAMs. As discussed in Chapter 6, the surveyed PDAMs also show their financial vulnerability as a whole. The average operating ratio is 1.23, which is the ratio of operating cost to revenue as shown in Table 10.5.1. This is worse than the nationwide average of all PDAMs of 1.03 (2008), indicating that many PDAMs with SPAM IKK are consistently recording an operational deficit. Among the samples, 25 PDAMs (64%) have recorded operating deficits with ratios over 1.00. Meanwhile, the minimum ratio of 0.74 is slightly higher than 0.7 as the evaluation criterion of BPPSPAM of 0.70 (Figure 10.5.15). As a result, the average return on asset is -5.1%. As for the efficiency of tariff collection, the receivables collection period ranges around 100 days while some PDAMs have recorded more than 200 days.



Source: JICA Study Team 2010

Figure 10.5.15 Operating Ratio

The debt to asset ratio, which is the ratio of debt burden to the total asset, is 0.75 on average, which is still higher than the BPPSPAM evaluation criterion of 0.45. It is noteworthy that there are 10 PDAMs (27%) with ratios over 1.00 indicating negative net worth (Figure 10.5.16). Majority of the PDAMs have moderate debt ratios less than 0.70; however, their financial sustainability is still considered weak because of the low profitability.



Source: JICA Study Team 2010

Figure 10.5.16 Debt to Asset Ratio

In the Debt Restructuring Program, MOF has approved the debt reduction of three PDAMs (Sleman, Madiun and Banjar). Other 11 PDAMs are currently being examined for approval but the majority of PDAMs with debts with the central government have not yet applied for the program.

In the on-site review, it is observed that PDAMs make capital investment such as small extension and rehabilitation of the existing network including house connection, but the installment of new production capacity and network heavily relies on funding from the central and local governments. For the proposed sector loan, the current financial conditions suggest that on-lending the national debt to PDAMs will greatly limit the participation of PDAMs qualified for the loan-based financial assistance.

As for the facilities constructed with APBN in SPAM IKK projects, most PDAMs record them as own assets upon temporary transfer from the central government and thereby include depreciation in their production costs. However, some PDAMs do not account the depreciation unless the official transfer is completed.

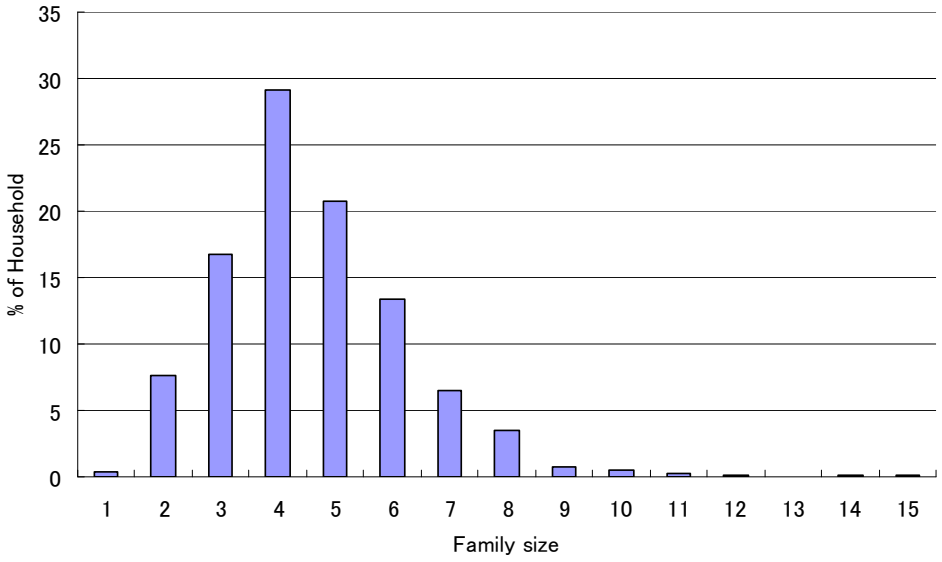
10.6 Interview Survey with Beneficiaries

Interview survey was done with households in the 50 SPAM IKKs, with total respondents of 750 households. The survey was done by visiting beneficiaries' houses. Since domestic water is a gender-sensitive issue, the survey included female and male respondents. Among 750 respondents, 380 are female and 370 are male. Respondents are selected based on the distribution of SPAM IKK service areas and randomly picked from the beneficiaries in selected areas. Surveyors consist of male and female surveyors to encourage participation of women in the interview process. The results of

interview survey by island are summarized in Tables 10.6.2 to 10.6.9.

10.6.1 Family Size and Age Structure

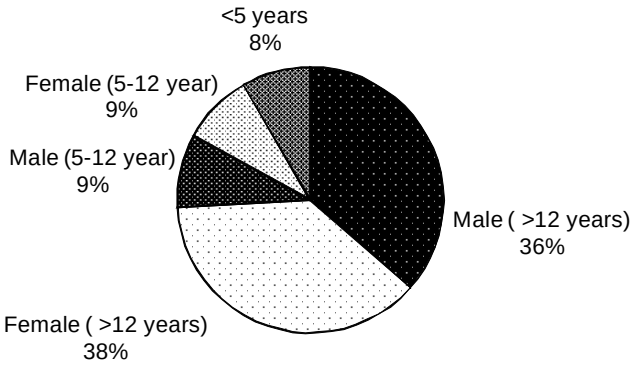
Respondents were asked to give information on the number and age of all people usually staying and sleeping in the house. The mean number of residents per household is 4.6 persons, ranging from 3.1 (B-22 Gemarang) to 6.1 (B-42 Kwandang). A household size of 4 is found in 28.8% of the total surveyed households, followed by a household size of 5 in 20.8% of the total surveyed households. The smallest size is 1 and the biggest size is 15. Only 1% of the surveyed households has size bigger than 10 as shown in Figure 10.6.1.



Source: JICA Study Team 2010

Figure 10.6.1 Distribution of Family Size of Beneficiaries of 50 SPAM IKK Service Areas

The age categories were under 5, 5-12 and over 12 for both male and female genders. For the region as a whole, age of >12 years share 74%. The proportion of those aged under 12 years was 26%, of whom 8% are children under 5 years old as shown in Figure 10.6.2 and Tables 10.6.2 to 10.6.5.

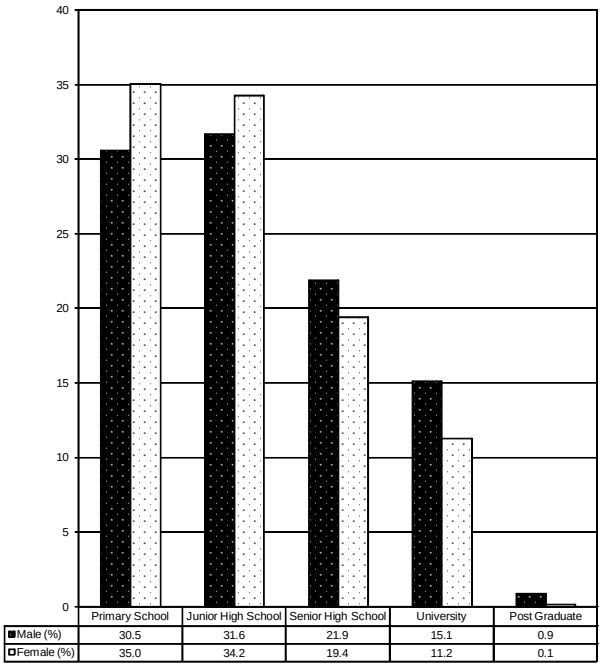


Source: JICA Study Team 2010

Figure 10.6.2. Ages and Sex of Beneficiaries of 50 SPAM IKK Service Areas

10.6.2 Education

In terms of education, about 63% of beneficiaries have education level of junior high school or lower. Comparing the level of education between husbands and wives in households, 35% of the wives have primary school level of education while only 30% of the husbands have same level. At the higher education level, 16% of the husbands have university level including post graduate while only 11% of the wives have university level including one with a post graduate education level as shown in Figure 10.6.3.



	Primary School	Junior High School	Senior High School	University	Post Graduate
Male (%)	30.5	31.6	21.9	15.1	0.9
Female (%)	35.0	34.2	19.4	11.2	0.1

Source: JICA Study Team 2010

Figure 10.6.3. Beneficiaries' Level of Education at 50 SPAM IKK Service Areas

10.6.3 Livelihood and Household Income

Household income is considered as the total income of all members of household in one year. The average household income of each SPAM IKK area is shown in Table 10.6.2 to 10.6.5. The annual income is classified into six categories as follows:

very low	: under Rp. 6,000,000;
low	: > Rp. 6,000,000 - Rp. 12,000,000;
lower middle	: > Rp. 12,000,000 - Rp. 18,000,000;
upper middle	: > Rp. 18,000,000 - Rp. 24,000,000;
high	: > Rp. 24,000,000 - Rp. 36,000,000; and
very high	: more than Rp. 36,000,000.

As 22.86% of the respondents are traders, 21.50% are farmers and 17.55% are civil servants. These figures show that the locations of SPAM IKK are mostly semi-urban areas with the characteristics of *"Ibukota Kecamatan"* as targeted by SPAM IKK. Most traders, civil servants and permanent employees have incomes above the poverty line while farmers are mostly in the slightly low and low-income categories as summarized in Table10.6.1.

Table 10.6.1 Beneficiaries' Occupation by Income Categories

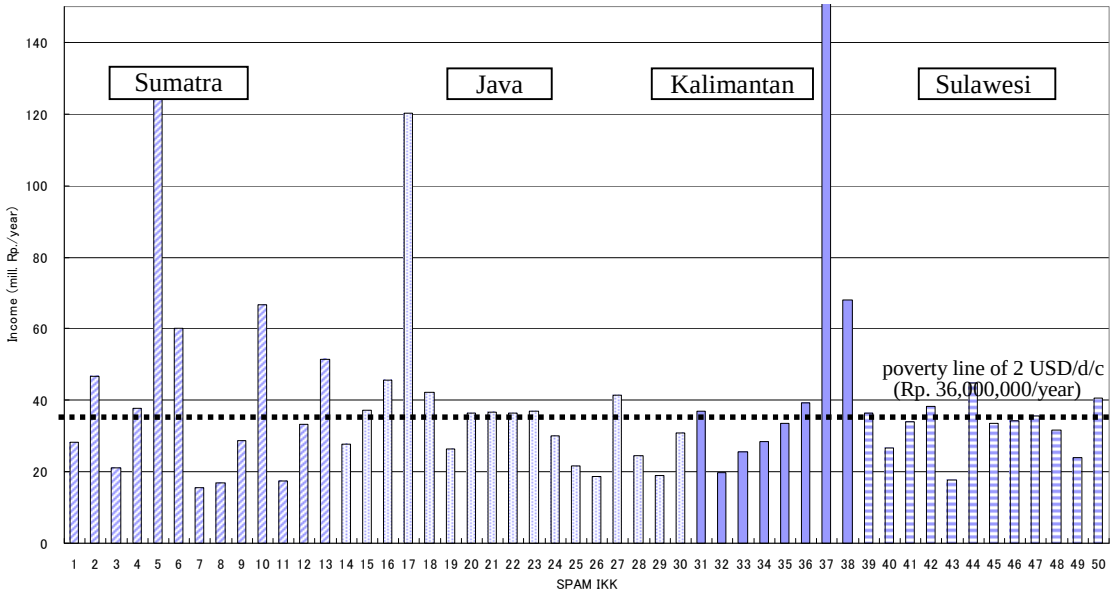
Income		Kind of occupation							
Category	Million Rp.	Trader	Farmer	Civil servant	Permanent Employee	Pension	Temporary Worker	Labour	Total
		% HHs							
Very Low	< 6	0.68	3.27	0.14	0.54	0.41	0.27	0.41	5.71
Low	> 6 - 12	2.86	4.63	0.27	2.31	0.95	1.50	2.45	14.97
Lower Middle	> 12 -18	3.54	4.76	0.82	1.90	1.09	2.31	2.04	16.46
Upper Middle	> 18 -24	3.81	2.72	1.50	1.90	1.36	0.82	0.54	12.65
High	> 24- 36	3.67	2.18	4.22	2.59	2.04	1.50	1.09	17.28
Very High*	> 36	8.30	3.95	10.61	5.17	3.27	1.22	0.41	32.93
Grand Total		22.86	21.50	17.55	14.42	9.11	7.62	6.94	100.0

Source: JICA Study Team 2010

Note: *:Above the poverty line of 2 USD/day/capita (Rp.36 million/year)

Average annual income of households in each SPAM IKK area is shown in Tables 10.6.2 to 10.6.5. Average annual income of households is Rp. 45,000,000. This average is above the poverty line of 2 USD/day/capita (Rp. 36,000,000/year) set up by the World Bank (2006). However, most of the beneficiaries (67%) live under the poverty line as shown in Figure 10.6.4. This condition meets the target of SPAM IKK

to give priority to poor community. The relatively high average is caused by the significantly higher annual income of several SPAM IKK beneficiaries. The highest income rate of Rp. 424 million is found at B-31 Kareng Pangi, followed by B-5 Tandun and B-15 Ciwaringin. All respondents (99.4%) of SPAM IKK Kareng Pangi belong to the very high income category of more than Rp. 36 million per year as shown in Table. 10.6.2 to 10.6.5.



Source: JICA Study Team 2010

Figure 10.6.4. Beneficiaries' Annual Income at 50 SPAM IKK Service Area

10.6.4 House Connection

There are 12% (6 out of 50) of SPAM IKK service areas that do not have house connections yet. The main reason is the delay of distribution pipe construction work caused by the unavailability of shared fund from the district (APBD). Other reasons are social and cross-sector problems concerning location. For example, there are problems with the Department of Forestry because the WTP is located in a protected forest. There are also social problems of naming service area in several sub-districts. Service hour varies from once a week to 24 hours per day. 40% of beneficiaries of operational SPAM IKK samples receive water continuously for 24 hours. All sample SPAM IKKs in South Sulawesi, Yogyakarta and Central Kalimantan are running for 24 hours. 90% of the samples in Sumatera and 60% in Java only have service for less than 12 hours/day. The worst condition, in terms of running hours, is in B-27 Sepaku, which is only running once a week, and in B-19 Sulang, which has no water at all in the dry season. Most problems in water quality are caused by turbid water especially in the rainy season. Nevertheless, 50% of the sample locations supplied good water

quality except for several locations that deliver very low quality of water. Regarding water quality, B-9 Way Lima, A-3 Toroh and A-5 Jungkat are considered as the worst as shown in Table 10.6.6~10.6.9.

10.6.5 Water Use Condition before Piped Water

Before getting water from SPAM-IKK, most of the beneficiaries utilized shallow wells or tube wells. All tube wells are in the house because they need electricity for the pumping machine while some shallow wells maybe in the neighborhood. In case groundwater is not available or the quality is low, people must fetch water from other places, mostly from river, lake and spring, or collect rain water. However, the distance to water source of sampled SPAM IKK is generally not so far, average of about 30 minutes on foot. The longest fetching hour is 3 hours to a river 3 km away from the residential area (B-1 Nagari Koto Sani and B-29 Kertak Hanyar). Several places already have piped water before but with worse condition. There are also places which used piped rural water supply before the SPAM IKK existed.

10.6.6 Domestic Use of Water

The survey attempted to get information on how the household members use the distributed piped water considering three categories, namely: for drinking and cooking, for bath and toilet, and for laundry.

Drinkable water is considered to have close relation with the quality of water. All respondents (except one or two HHs) boiled the water before using it as drinking water. The result shows that 16% (7 out of 44) of the operational SPAM IKKs delivered water which is not considered as drinking water by the beneficiaries. For the beneficiaries, the water is only valuable for laundry, bath and toilet. Several households still use existing shallow or tube wells in the house or nearby. One location uses river and spring water as an alternative water source for drinking water. In sites with better accessibility, mineral water in the form of refill gallon is a practical drinking water alternative for middle and high income households. All households also use the piped water for laundry and for bath and toilet, as summarized in Table 10.6.6 ~ 10.6.9.

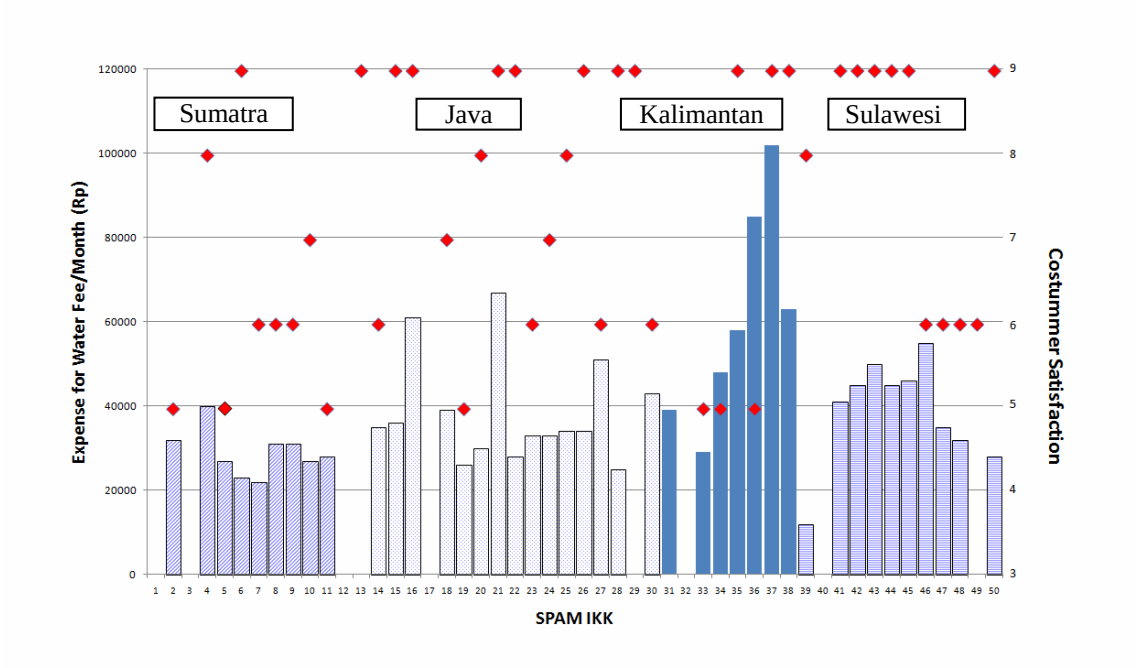
10.6.7 Beneficiaries Satisfaction

Beneficiaries' satisfaction is rated based on their satisfaction for water quantity, water quality and water supply system including services of PDAM/BLU or SPAM IKK management staff. Each indicator is rated as good (value = 3), fair (value = 2) and poor (value = 1). On average, satisfaction for water quantity is rated at 2.7. The

lowest rate for water quantity of 1 is only obtained by two SPAM IKKs which are A-2 Kisaran and B-5 Tandun. Water quality is rated slightly lower at 2.4 with the lowest rate in B-9 Way Lima in Sumatera and A-3 Toroh in Java. Water supply system and services are rated 2.7 with the lowest rate in B-27 Sepaku, B-28 Loa Janan and B-30 Binuang, all in Kalimantan as shown in Table 10.6.6~10.6.9.

Total satisfaction is the sum of the three indicators and these ranges from 3 to 9.

The result of the rating shows that almost 50% of the operational WTPs (21 out of 44) are successful in delivering good services to the beneficiaries. They obtain satisfactory rate between 7.0 and 9.0 as shown in Figure 10.6.5. The best province is South Sulawesi where all four SPAM IKKs surveyed were rated 9 by their beneficiaries. The beneficiaries' satisfaction is closely related to water quality rather than quantity. Several locations which only run for about 4 hours/day (B-2 Sumpahan and B-6 Inuman) are rated highly satisfactory as long as the water quality is good.



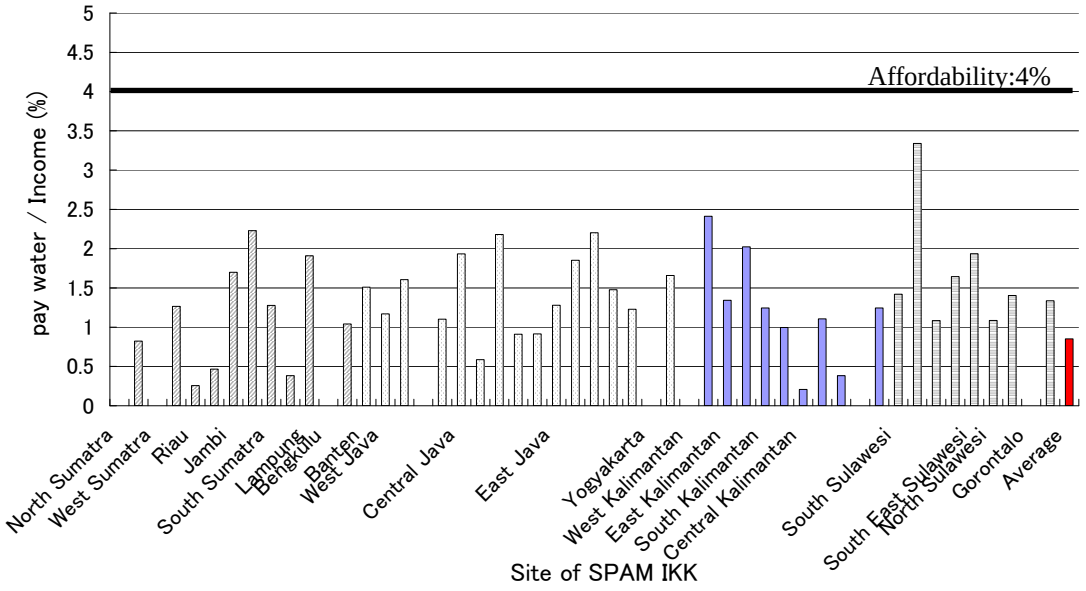
Source: JICA Study Team 2010

Figure 10.6.5. Beneficiaries' Satisfaction Rate and Household Expense for Water Bill in 50 SPAM IKK Areas

10.6.8 Household Expense for Water Bill and Affordability

On average, each household spent Rp. 40,500 per month for water bill, which is only about 1% of its mean income. The highest rate paid is in B-31 Kareng pangi (Rp.73,000) and the lowest amount paid is in B-33 Binanga (Rp. 12,000). Even though,

monthly water bill shows less than four percentage of its mean income as shown in Figure 10.6.6. All beneficiaries of SPAM-IKKs in Sumatera paid slightly lower amount than in Java. Beneficiaries in Sulawesi (except B-33 Binanga) show relatively higher amount which is within the national average. All beneficiaries of SPAM-IKKs in Kalimantan (except in A-5 Jungkat) paid the highest amount. Sulawesi has the highest satisfactory rate of 7.8 on the average. Sumatera and Kalimantan have relatively lower satisfaction of beneficiaries. However, the water bill in Sumatera is the lowest and water bill in Kalimantan is the highest. Main reason is that the rate of water tariffs is set by district governments for PDAMs. Water tariff in Sumatera is the lowest and highest in Kalimantan. Java has performed quite satisfactory but not succeeded in better water bill payment per household (mostly below Rp. 40,000/month) maybe due to relatively low quantity consumed by households because of inadequate water quantity. Enough quantity and relatively good water tariff in Sulawesi resulted to the highest beneficiaries' satisfaction (7.8 out of 9) and also better revenue for PDAMs (more than Rp. 40,000/household/month in most sample locations in Sulawesi).



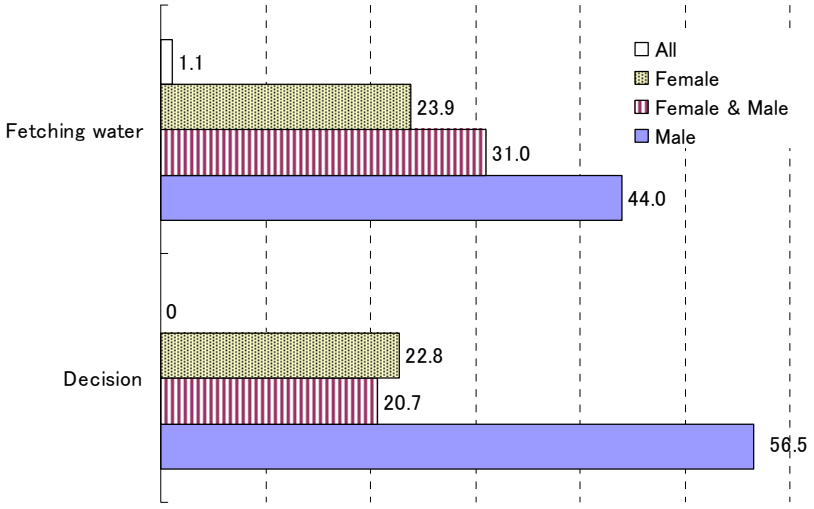
Source: JICA Team 2010

Figure 10.6.6. Comparison of Household Expense for Water Bill in 50 SPAM IKK Areas

10.6.9 Gender Related Issue

The level of education shows that in general, husbands have slightly higher education

level than their wives. Aside from the fact that men are significantly dominant in decision making regarding piped water connection (About 60% of decision making is carried out by male), they also took responsibility for fetching water as shown in Figure 10.6.7. The main reason is because they can drive a motorcycle to the water source. Fetching water is the responsibility of both gender and even all family members including children as shown in Figure 10.6.7. Women are still the main actors in domestic water use but now their burden is mostly shouldered by pumping machine. Again, the character of a semi-urban setting where motorcycle is the usual transportation mode has big influence on the everyday living condition. Most of the households own a motorcycle.



Note : M= Male and F=Female; All= all Household members including children
Source: JICA Study Team 2010

Figure 10.6.7. Comparison of Decision Making and Responsibility of Fetching Water by Gender in 50 SPAM IKK Areas

Table 10.6.2 Summary of Beneficiaries' basic data in Sumatra

Province	North Sumatra		West Sumatra		Riau		Jambi		South Sumatra		Lampung	Bengkulu	
District/City	Dairi	Asahan	Solok	Kota Sawahlunt	Rokan Hulu	Kuantan Singingi	Muaro Jambi	Batang Hari	Banyuasin	Muara Enim	Lampung Selatan	Rejang Lebong	Rejang Lebong
No.	A-1	A-2	B-1	B-2	B-5	B-6	B-7	B-8	B-3	B-4	B-9	B-10	B-11
SPAM IKK	Sumbul	Kisaran	Nagari Kota Sari	Sumpahan	Tandun	Inuman	Candi Muaro	Lubuk Ruso	Sungai Pinang (Tanjung Kerang)	Gelumbang	Way Lima	Kota Padang	Selupu Rejang & Curup Timur
Established Year	2008	2006	2007	2008	2007	2008	2005	2007	2007	2008	2007	2006	2007
Family size and Age structure													
Number Male >12 years	1.9	1.8	1.4	1.4	1.7	1.5	1.7	1.6	2.0	1.8	2.1	2.0	2.2
Number Female >12 years	1.6	1.9	1.4	2.2	1.9	1.5	1.7	1.9	1.9	1.8	1.7	1.7	2.1
Number Male (>5-< 12 year)	0.5	0.5	0.5	0.1	0.6	0.3	0.4	0.5	0.6	0.4	0.2	0.2	0.2
Number Female (>5-< 12 year)	0.6	0.5	0.3	0.3	0.5	0.2	0.1	0.4	0.3	0.2	0.1	0.4	0.1
Number Kids <5 years	0.6	0.9	0.8	0.5	0.5	0.2	0.4	0.3	0.4	0.4	0.2	0.3	0.2
Total Population in family	5.2	5.7	4.5	4.5	5.1	3.7	4.4	4.6	5.2	4.6	4.3	4.6	4.7
Education (%)													
Male-Primary School	18.8	7.7	14.3	8.3	14.3	28.6	38.5	76.9	40.0	42.9	60.0	46.2	7.1
Male-Junior High School	62.5	69.2	7.1	83.3	21.4	35.7	0.0	15.4	6.7	21.4	13.3	30.8	21.4
Male-Senior High School	0.0	0.0	35.7	8.3	64.3	28.6	61.5	7.7	33.3	21.4	26.7	23.1	35.7
Male-University	18.8	15.4	42.9	0.0	0.0	7.1	0.0	0.0	20.0	14.3	0.0	0.0	28.6
Male-Post Graduate	0.0	7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1
Female-Primary School	18.8	7.1	15.4	13.3	28.6	35.7	41.7	72.7	53.3	53.8	60.0	57.1	13.3
Female-Junior High School	62.5	78.6	15.4	20.0	28.6	35.7	33.3	18.2	26.7	15.4	6.7	7.1	6.7
Female-Senior High School	0.0	0.0	30.8	53.3	42.9	14.3	16.7	9.1	20.0	30.8	33.3	35.7	80.0
Female-University	18.8	14.3	38.5	13.3	0.0	14.3	8.3	0.0	0.0	0.0	0.0	0.0	0.0
Female-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Occupation (%)													
Trader	31.3	6.7	26.7	26.7	33.3	20.0	26.7	26.7	13.3	26.7	13.3	21.4	26.7
Farmer	18.8	0.0	26.7	0.0	40.0	40.0	46.7	46.7	26.7	46.7	20.0	64.3	13.3
Government	31.3	46.7	26.7	6.7	0.0	6.7	6.7	0.0	26.7	20.0	0.0	0.0	13.3
Employee	12.5	20.0	0.0	13.3	13.3	13.3	13.3	0.0	20.0	0.0	6.7	0.0	33.3
Pension	0.0	20.0	6.7	33.3	6.7	6.7	0.0	0.0	6.7	6.7	0.0	7.1	13.3
Temp	0.0	0.0	6.7	13.3	6.7	6.7	6.7	13.3	6.7	0.0	20.0	0.0	0.0
Labor	6.3	6.7	6.7	6.7	0.0	6.7	0.0	13.3	0.0	0.0	40.0	7.1	0.0
Income													
Household Income catecories (%)													
Under Rp.6,000,000	6.7	0.0	25.0	0.0	0.0	6.7	0.0	0.0	7.1	0.0	6.7	28.6	0.0
> Rp.6,000,000 - Rp.12,000,000	26.7	6.7	16.7	0.0	13.3	6.7	46.7	26.7	21.4	0.0	40.0	7.1	6.7
> Rp.12,000,000 - Rp.18,000,000	20.0	26.7	8.3	20.0	6.7	6.7	33.3	40.0	0.0	13.3	33.3	7.1	0.0
> Rp.18,000,000 - Rp.24,000,000	0.0	13.3	0.0	13.3	6.7	6.7	13.3	33.3	0.0	13.3	0.0	0.0	20.0
> Rp.24,000,000 - Rp.36,000,000	13.3	13.3	25.0	46.7	6.7	6.7	6.7	0.0	35.7	20.0	13.3	21.4	6.7
More than Rp.36,000,000	33.3	40.0	25.0	20.0	66.7	66.7	0.0	0.0	35.7	53.3	6.7	35.7	66.7
Household Income (Rp)													
Household Income (million Rp)	28.2	46.7	25.0	37.6	124.4	60.0	15.7	16.8	28.8	66.6	17.5	33.2	51.5

Source : JICA Study Team 2010

Table 10.6.3 Summary of Beneficiaries' basic data in Jawa

Province	Banten	West Java				Central Java					East Java					Yogyakarta	
District/City	Serang	Kuningan	Kuningan	Cirebon	Kota Bogor	Grobogan	Grobogan	Kendal	Boyolali	Rembang	Tuban	Ponorogo	Madiun	Bangkalan	Kediri	Bantul	Sleman
No.	B-12	B-13	B-14	B-15	B-16	A-3	B-18	A-4	B-17	B-19	B-20	B-21	B-22	B-23	B-24	B-25	B-26
SPAM IKK	Cikande	Garawangi	Luragung	Ciwaringin	Palasari	Toroh	Gubug	Boja	Sawit	Sulang	Bancar	Jenangan	Gemarang	Burneh	Kepung	Selopamioro	Gamping
Established Year	2008	2008	2008	2008	2008	2005	2007	2005	2005	2007	2006	2006	2006	2007	2008	2007	2008
Family size and Age structure																	
Number Male >12 years	1.9	1.9	1.7	1.9	2.1	0.9	1.2	1.6	1.5	1.6	1.6	1.4	1.4	1.1	1.4	1.7	1.7
Number Female >12 years	1.7	1.7	1.5	1.9	1.6	1.7	1.1	2.3	1.8	1.7	1.8	1.6	1.3	1.4	1.6	1.6	1.0
Number Male (>5-< 12 year)	0.5	0.1	0.3	0.5	0.3	0.7	0.2	0.3	0.3	0.3	0.3	0.3	0.2	0.4	0.4	0.3	0.6
Number Female (>5-< 12 year)	1.0	0.3	0.3	0.4	0.3	0.8	0.3	0.2	0.3	0.4	0.4	0.3	0.2	0.5	0.3	0.2	0.1
Number Kids <5 years	0.3	0.2	0.2	0.5	0.4	0.1	0.5	0.3	0.1	0.3	0.3	0.4	0.1	0.4	0.4	0.3	0.5
Total Population in family	5.4	4.2	4.0	5.3	4.7	4.3	3.3	4.7	4.0	4.3	4.4	4.0	3.2	3.8	4.1	4.2	3.9
Education (%)																	
Male-Primary School	40.0	25.0	33.3	38.5	26.7	18.2	7.1	88.9	33.3	21.4	31.3	41.7	46.7	7.1	26.7	61.5	13.3
Male-Junior High School	33.3	37.5	33.3	38.5	53.3	45.5	78.6	0.0	0.0	35.7	6.3	0.0	26.7	21.4	13.3	23.1	0.0
Male-Senior High School	20.0	0.0	0.0	0.0	0.0	0.0	0.0	11.1	33.3	35.7	43.8	50.0	20.0	57.1	46.7	15.4	46.7
Male-University	6.7	37.5	33.3	23.1	20.0	36.4	14.3	0.0	33.3	7.1	18.8	8.3	6.7	7.1	13.3	0.0	40.0
Male-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	0.0	0.0	0.0
Female-Primary School	60.0	28.6	50.0	69.2	33.3	27.3	13.3	25.0	28.6	40.0	37.5	30.8	40.0	23.1	26.7	57.1	13.3
Female-Junior High School	26.7	57.1	33.3	30.8	53.3	54.5	53.3	66.7	14.3	6.7	25.0	30.8	53.3	15.4	33.3	28.6	0.0
Female-Senior High School	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0	33.3	31.3	38.5	0.0	53.8	33.3	7.1	53.3
Female-University	0.0	14.3	16.7	0.0	13.3	18.2	33.3	8.3	7.1	20.0	6.3	0.0	6.7	7.7	6.7	7.1	33.3
Female-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Occupation (%)																	
Trader	26.7	0.0	16.7	42.9	20.0	6.7	33.3	21.4	13.3	20.0	62.5	20.0	6.7	35.7	33.3	20.0	6.7
Farmer	20.0	33.3	0.0	7.1	6.7	26.7	13.3	14.3	26.7	13.3	6.3	20.0	20.0	7.1	20.0	53.3	6.7
Government	6.7	11.1	33.3	7.1	26.7	13.3	6.7	14.3	40.0	13.3	18.8	13.3	6.7	35.7	6.7	6.7	20.0
Employee	6.7	0.0	16.7	35.7	33.3	13.3	26.7	14.3	6.7	6.7	12.5	6.7	0.0	14.3	13.3	0.0	60.0
Pension	0.0	44.4	16.7	0.0	6.7	26.7	13.3	28.6	6.7	46.7	0.0	0.0	6.7	0.0	13.3	0.0	0.0
Temp	33.3	11.1	16.7	0.0	0.0	6.7	6.7	7.1	6.7	0.0	0.0	6.7	40.0	7.1	6.7	6.7	6.7
Labor	6.7	0.0	0.0	7.1	6.7	6.7	0.0	0.0	0.0	0.0	0.0	33.3	20.0	0.0	6.7	13.3	0.0
Income																	
Household Income catecories (%)																	
Under Rp.6,000,000	0.0	11.1	0.0	21.4	0.0	6.7	0.0	6.7	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
> Rp.6,000,000 - Rp.12,000,000	0.0	0.0	16.7	0.0	0.0	26.7	26.7	6.7	0.0	13.3	6.3	40.0	60.0	21.4	33.3	20.0	0.0
> Rp.12,000,000 - Rp.18,000,000	26.7	22.2	16.7	14.3	20.0	13.3	20.0	13.3	13.3	6.7	6.3	26.7	13.3	21.4	20.0	46.7	26.7
> Rp.18,000,000 - Rp.24,000,000	26.7	0.0	16.7	0.0	20.0	6.7	13.3	0.0	6.7	20.0	43.8	6.7	6.7	0.0	13.3	20.0	20.0
> Rp.24,000,000 - Rp.36,000,000	33.3	33.3	16.7	7.1	20.0	20.0	6.7	33.3	26.7	0.0	18.8	6.7	6.7	14.3	20.0	13.3	26.7
More than Rp.36,000,000	13.3	33.3	33.3	57.1	40.0	26.7	33.3	40.0	40.0	60.0	25.0	20.0	13.3	42.9	13.3	0.0	26.7
Household Income (Rp)																	
Household Income (million Rp)	27.6	37.2	45.5	120.1	42.3	26.2	36.3	36.7	36.5	47.6	30.2	21.7	18.7	41.3	24.4	19.0	30.9

Source : JICA Study Team 2010

Table 10.6.4 Summary of Beneficiaries' basic data in Kalimantan

Province	West Kalimantan		East Kalimantan		South Kalimantan		Central Kalimantan	
District/City	Pontianak	Singkawan g	Penajam Paser	Kutai Kertanegar	Banjar	Tapin	Katingan	Gunung Mas
No.	A-5	A-6	B-27	B-28	B-29	B-30	B-31	B-32
SPAM IKK	Jungkat	Sei Bulan	Sepaku	Loa Janan	Kertak Hanyar	Binuang	Kareng Pangi	Tumbang Talakan
Established Year	2007	2008	2005	2007	2005	2005	2005	2008
Family size and Age structure								
Number Male >12 years	1.9	1.5	1.9	1.5	1.6	1.3	1.5	1.9
Number Female >12 years	1.9	1.6	1.7	1.5	1.5	1.3	1.7	2.0
Number Male (>5-< 12 year)	0.5	0.9	0.2	0.2	0.4	0.6	0.6	0.3
Number Female (>5-< 12 year)	0.6	0.5	0.2	0.2	0.3	0.5	0.7	0.5
Number Kids <5 years	0.5	0.3	0.5	1.0	0.5	0.4	0.3	0.7
Total Population in family	5.4	4.7	4.5	4.5	4.4	4.1	4.7	5.4
Education (%)								
Male-Primary School	40.0	40.0	42.9	15.4	15.4	41.7	33.3	20.0
Male-Junior High School	33.3	60.0	35.7	7.7	30.8	8.3	20.0	0.0
Male-Senior High School	0.0	0.0	7.1	76.9	46.2	33.3	33.3	60.0
Male-University	26.7	0.0	14.3	0.0	0.0	16.7	13.3	20.0
Male-Post Graduate	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.0
Female-Primary School	57.1	66.7	69.2	21.4	8.3	33.3	26.7	20.0
Female-Junior High School	35.7	26.7	15.4	50.0	50.0	20.0	26.7	13.3
Female-Senior High School	0.0	0.0	7.7	14.3	33.3	46.7	46.7	26.7
Female-University	7.1	6.7	7.7	14.3	8.3	0.0	0.0	40.0
Female-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Occupation (%)								
Trader	25.0	20.0	6.7	20.0	20.0	26.7	66.7	6.7
Farmer	12.5	26.7	20.0	0.0	20.0	6.7	0.0	13.3
Government	25.0	20.0	20.0	6.7	13.3	20.0	6.7	46.7
Employee	6.3	0.0	6.7	26.7	40.0	26.7	26.7	6.7
Pension	25.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7
Temp	6.3	6.7	13.3	40.0	6.7	20.0	0.0	0.0
Labor	0.0	26.7	33.3	6.7	0.0	0.0	0.0	0.0
Income								
Household Income catecories (%)								
Under Rp.6,000,000	6.3	6.7	0.0	0.0	0.0	0.0	0.0	6.7
> Rp.6,000,000 - Rp.12,000,000	6.3	33.3	13.3	13.3	0.0	6.7	0.0	6.7
> Rp.12,000,000 - Rp.18,000,000	18.8	20.0	26.7	13.3	6.7	13.3	0.0	6.7
> Rp.18,000,000 - Rp.24,000,000	18.8	20.0	13.3	26.7	33.3	13.3	0.0	0.0
> Rp.24,000,000 - Rp.36,000,000	0.0	0.0	26.7	26.7	33.3	26.7	6.7	26.7
More than Rp.36,000,000	50.0	20.0	20.0	20.0	26.7	40.0	93.3	53.3
Household Income (Rp)								
Household Income (million Rp)	37.0	19.8	25.5	28.5	28.3	39.3	424.3	68.1

Source : JICA Study Team 2010

Table 10.6.5 Summary of Beneficiaries' basic data in Sulawesi

Province	Central Sulawesi			South Sulawesi				South East Sulawesi	North Sulawesi		Gorontalo	
District/City	Donggala	Donggala	Palu	Takalar	Takalar	Gowa	Jeneponto	Kolaka	Minahasa Utara	Minahasa Selatan	Bone Bolango	Gorontalo Utara
No.	B-33	B-35	B-34	A-7	B-37	A-8	B-36	B-38	B-39	B-40	B-41	B-42
SPAM IKK	Binanga	Sabang (Damsol)	Palu	Pattallassang	Galesong Selatan	Pattallassang	Parapa	Latambaga	Air Madidi	Amurang	Suwawa	Kwandang
Established Year	2005	2008	2006	2006	2008	2008	2007	2008	2006	2006	2006	2008
Family size and Age structure												
Number Male >12 years	1.8	2.2	1.3	1.6	1.6	1.7	2.2	1.8	1.4	1.8	1.7	2.0
Number Female >12 years	1.9	2.0	1.5	1.5	1.9	1.7	1.9	2.2	1.5	1.6	1.9	2.9
Number Male (>5-< 12 year)	0.5	0.5	0.3	0.3	0.7	0.7	0.4	0.7	0.2	0.6	0.4	0.3
Number Female (>5-< 12 year)	0.4	0.4	0.4	0.5	0.4	0.4	0.5	1.0	0.5	0.4	0.6	0.5
Number Kids <5 years	0.1	0.3	0.7	0.0	0.4	0.5	0.1	0.3	0.6	0.3	0.5	0.4
Total Population in family	4.7	5.3	4.2	3.9	4.9	5.1	5.1	5.9	4.3	4.7	5.1	6.1
Education (%)												
Male-Primary School	21.4	20.0	0.0	0.0	69.2	33.3	33.3	21.4	0.0	14.3	46.7	54.5
Male-Junior High School	57.1	60.0	66.7	61.5	30.8	50.0	66.7	14.3	13.3	57.1	46.7	27.3
Male-Senior High School	0.0	0.0	0.0	0.0	0.0	0.0	0.0	42.9	53.3	14.3	0.0	0.0
Male-University	21.4	20.0	33.3	38.5	0.0	16.7	0.0	21.4	26.7	7.1	6.7	18.2
Male-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	7.1	0.0	0.0
Female-Primary School	26.7	26.7	7.1	15.4	73.3	50.0	40.0	33.3	6.7	26.7	26.7	40.0
Female-Junior High School	40.0	53.3	57.1	69.2	20.0	50.0	60.0	26.7	13.3	40.0	73.3	33.3
Female-Senior High School	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.7	66.7	20.0	0.0	0.0
Female-University	33.3	20.0	35.7	15.4	6.7	0.0	0.0	13.3	6.7	13.3	0.0	26.7
Female-Post Graduate	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0
Occupation (%)												
Trader	26.7	0.0	6.7	20.0	37.5	53.3	13.3	46.7	6.7	13.3	13.3	13.3
Farmer	26.7	46.7	0.0	13.3	50.0	20.0	40.0	20.0	0.0	13.3	20.0	33.3
Government	26.7	26.7	60.0	26.7	12.5	6.7	6.7	13.3	13.3	20.0	20.0	26.7
Employee	6.7	20.0	13.3	0.0	0.0	6.7	26.7	20.0	40.0	6.7	20.0	6.7
Pension	6.7	6.7	13.3	40.0	0.0	6.7	13.3	0.0	6.7	6.7	6.7	0.0
Temp	0.0	0.0	6.7	0.0	0.0	6.7	0.0	0.0	13.3	0.0	13.3	13.3
Labor	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	40.0	6.7	6.7
Income												
Household Income catecories (%)												
Under Rp.6,000,000	13.3	6.7	6.7	6.7	37.5	13.3	13.3	0.0	6.7	0.0	13.3	13.3
> Rp.6,000,000 - Rp.12,000,000	13.3	20.0	0.0	13.3	12.5	6.7	26.7	33.3	13.3	6.7	6.7	26.7
> Rp.12,000,000 - Rp.18,000,000	13.3	13.3	13.3	6.7	12.5	13.3	13.3	6.7	26.7	13.3	26.7	6.7
> Rp.18,000,000 - Rp.24,000,000	6.7	13.3	6.7	13.3	18.8	20.0	13.3	20.0	0.0	0.0	33.3	0.0
> Rp.24,000,000 - Rp.36,000,000	6.7	33.3	40.0	6.7	12.5	6.7	6.7	6.7	13.3	60.0	6.7	13.3
More than Rp.36,000,000	46.7	13.3	33.3	53.3	6.3	40.0	26.7	33.3	40.0	20.0	13.3	40.0
Household Income (Rp)												
Household Income (million Rp)	36.3	26.6	33.9	38.2	17.7	44.7	33.4	34.3	35.6	31.6	24.0	40.6

Source : JICA Study Team 2010

Table 10.6.6 Summary of Domestic use of Water in SPAM-IKK areas in Sumatra

Province	North Sumatra		West Sumatra		Riau		Jambi		South Sumatra		Lampung	Bengkulu	
District/ City	Dairi	Asahan	Solok	Kota Sawahlunto	Rokan Hulu	Kuantan Singingi	Muaro Jambi	Batang Hari	Banyuasin	Muara Enim	Lampung Selatan	Rejang Lebong	Rejang Lebong
No.	A-1	A-2	B-1	B-2	B-5	B-6	B-7	B-8	B-3	B-4	B-9	B-10	B-11
IKK	Sumbul	Kisaran	Nagari Kota Sari	Sumpahan	Tandun	Inuman	Candi Muaro	Lubuk Ruso	Sungai Pinang (Tanjung Kerang)	Gelumban g	Way Lima	Kota Padang	Selupu Rejang & Curup Timur
	1	2	3	4	5	6	7	8	9	10	11	12	13
Established by Budget year	2008	2006	2007	2008	2007	2008	2005	2007	2007	2008	2007	2006	2007
House Connection condition	0	1358	0	1192	292	350	99	73	106	90	511	0	1551
New connection from SPAM IKK (subscription year)					2008	2009	2006	2008	2008	2009			
Connected to available system (subscription year)		1990		1982							2008		1994
Not available / not operated	n/ a		n/ a									n/a	
Expense for water fee/ month (Rp)	0	32000	0	40000	27000	23000	22000	31000	31000	27000	28000	0	0 (new)
Quantity/ continuity of supplied water													
Dry season		3 hrs/ d		4 hrs/ d	3 hrs/ d	4.5 hrs/ d	2hrs/ d	2hrs/ d	11 hrs/ d	4 hrs/ d	12hrs/ d		24 hrs/ d
Wet season		5 hrs/ d		24 hrs/ d	3 hrs/ d	4.5 hrs/ d	2hrs/ d	2hrs/ d	11 hrs/ d	4 hrs/ d	12hrs/ d		24 hrs/ d
Quality of supplied water													
Turbid (T), Iron content (Fe), coloured (C), sticky (S), bad smell(B)		S,C		Good	T	Good	Good	Good	T	Good	T		Good
Consumer satisfaction													
Quantity		Bad		Good	Bad	Good	Fair	Fair	Fair	Good	Fair		Good
Quality		Fair		Fair	Fair	Good	Fair	Fair	Fair	Fair	Bad		Good
System/ service		Fair		Good	Fair	Good	Fair	Fair	Fair	Fair	Fair		Good
	0	5	0	8	5	9	6	6	6	7	5	0	9
Existing alternative water source				no									
Shallow well (W0) (distance in km)					0	0	0	0	1	0	0.01		0
Drilling well (W1) (distance in km)		0											
Deep well (W2) (distance in km)													
River (R) (distance in km)					0.2		0.05	0..1		0.5			
Spring (S) (distance in km)											0.3		
Lake (L) (distance in km)													
Rain water (P)													
Buy water from delivery seller(D)		no											
Category of water utilization by source (refer to point D above)													
For Cooking and drinking	W0,W1,W2,S	Piped	Gallon, S	Piped, Gallon	Gallon	Piped, W0,Ga	Piped,W0,R	Piped,W0,R	W0, Gallon	Piped	W0, S	W0	Piped
For shower and toilet	W0,W1,W2,S	Piped	S	Piped	Piped, R	Piped	Piped	Piped	piped	Piped	Piped	R	Piped
For laundry	W0,W1,W2,S	Piped	S	Piped	Piped, R	Piped	Piped	Piped	piped	Piped	Piped	R	Piped
Water source used before connection to piped water													
Kind of water source (refer to point D above)	W0,W1,W2,S	W1	S	old system	R	R	W0,R		W0	W0, R		W0,R	W
Distance from water source (km)	0.15	0	0	0	0.2	0.1	0.05	0.1	1	0.5	0.3	0.5	0
Fetching duration (hrs/ day)	0.5	0	3	0	0.5	0.2	0.2	0.3	1.5	2	0.3	0.5	0

Source: JICA Study Team 2010

Table 10.6.7 Summary of Domestic use of Water in SPAM-IKK areas in Jawa

Province	Banten	West Java				Central Java					East Java					Yogyakarta	
District/ City	Serang	Kuningan	Kuningan	Cirebon	Kota Bogor	Grobogan	Grobogan	Kendal	Boyolali	Rembang	Tuban	Ponorogo	Madiun	Bangkalan	Kediri	Bantul	Sleman
No.	B-12	B-13	B-14	B-15	B-16	A-3	B-18	A-4	B-17	B-19	B-20	B-21	B-22	B-23	B-24	B-25	B-26
IKK	Cikande	Garawangi	Luragung	Ciwaringin	Palasari	Toroh	Gubug	Boja	Sawit	Sulang	Bancar	Jenangan	Gemarang	Burneh	Kepung	Selopamioro	Gamping
	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Established by Budget year	2008	2008	2008	2008	2008	2005	2007	2005	2005	2007	2006	2006	2006	2007	2008	2007	2008
House Connection condition	3197	1032	1496	0	1400	631	45	2107	129	663	398	1201	1113	374	608	70	215
New connection from SPAM IKK (subscription year)	2009						2008								2010	2010	
Connected to available system (subscription year)		2000	1987		2007	1990		1989	2006	1990	1989	1995	1997	1997			2000
Not available / not operated				n/a													
Expense for water fee/ month (Rp)	35000	36000	61000	0	39000	26000	30000	67000	28000	33000	33000	34000	34000	51000	25000	0 (new star	43000
Quantity/ continuity of supplied water																	
Dry season	24 hrs/ d	24 hrs/ d	24 hrs/ d		6 hrs/d	12 hrs/d	5 hrs/d	24 hrs/ d	6 hrs/d	0	24hrs/3 d	15 hrs/d	6hours/d	13 hrs/d	6hours/d	24hrs/d	24hrs/d
Wet season	24 hrs/ d	24 hrs/ d	24 hrs/ d		24 hrs/d	6 hrs/d	5 hrs/d	24 hrs/ d	6 hrs/d	12hrs/2d	24hrs/3 d	15 hrs/d	6hours/d	13 hrs/d	6hours/d	24hrs/d	24hrs/d
Quality of supplied water																	
Turbid (T), Iron content (Fe), coloured (C), sticky (S), bad smell(B)	T	Good	Good		Good	Good	T	T	Good	T,B	Fe	Good	Good	T	Good	Good	T
Consumer satisfaction																	
Quantity	Fair	Good	Good		Fair	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Fair	Good	Good	Fair
Quality	Fair	Good	Good		Good	Bad	Fair	Good	Good	Fair	Fair	Good	Good	Fair	Good	Good	Fair
System/ service	Fair	Good	Good		Fair	Fair	Good	Good	Good	Fair	Good	Good	Good	Fair	Good	Good	Fair
	6	9	9	0	7	5	8	9	9	6	7	8	9	6	9	9	6
Existing alternative water source																	
Shallow well (W0) (distance in km)		0	0		0	0	0	30		0	0	0.05	0	0		0	0
Drilling well (W1) (distance in km)	0													0			
Deep well (W2) (distance in km)																	
River (R) (distance in km)																	
Spring (S) (distance in km)												0.5	0.2				
Lake (L) (distance in km)																	
Rain water (P)																	
Buy water from delivery seller(D)									0	0							
Category of water utilization by source (refer to point D above)																	
For Cooking and drinking	Piped,gallo	Piped,gallo	Piped,gallo	W0,R,gallo	Piped,gallon	Piped,Gallo	Piped,Gal	piped	Piped	D,gallon	W0,gallon	piped	piped	gallon	piped	piped	piped,gallon
For shower and toilet	Piped	Piped	Piped	W0,R	Piped	Piped,W0	Piped,W0	piped	piped,well	piped	piped	piped	piped	piped	piped	piped	piped
For laundry	Piped	Piped	Piped	W0,R	Piped	Piped,W0	Piped,W0	piped	piped,well	piped	piped	piped	piped	piped	piped	piped	piped
Water source used before connection to piped water																	
Kind of water source (refer to point D above)	W0,R	W0	W0	W0,R (pun	W0,R	W0,R	W0,S		W0	D,W0,S	W0		W), S	W0,W1	Com.pipe	W0	W0
Distance from water source (km)	0	0	0	0.5	0.4	0.3	0.2	60	0	4	2	0.6	0.4	0	0	1	0
Fetching duration (hrs/ day)	0	0	0	2	1	1	0.3	0.5	0	4	1	0.3	0.5	0	0	30	0

Source: JICA Study Team 2010

Table 10.6.8 Summary of Domestic use of Water in SPAM-IKK areas in Kalimantan

Province	**West Kalimantan**		**East Kalimantan**		**South Kalimantan**		**Central Kalimantan**	
District/ City	Pontianak	Singkawang	Penajam Paser Utara	Kutai Kertanega	Banjar	Tapin	Katingan	Gunung Mas
No.	A-5	A-6	B-27	B-28	B-29	B-30	B-31	B-32
IKK	**Jungkat**	**Sei Bulan**	**Sepaku**	**Loa Janan**	**Kertak Hanyar**	**Binuang**	**Kareng Pangi**	**Tumbang Talakan**
	31	**32**	**33**	**34**	**35**	**36**	**37**	**38**
Established by Budget year	**2007**	**2008**	**2005**	**2007**	**2005**	**2005**	**2005**	**2008**
House Connection condition	182	0	234	285	1842	1280	348	83
New connection from SPAM IKK (subscription year)			2006				2008	2009
Connected to available system (subscription year)	1990			2008	1997	2006		
Not available / not operated		n/a						
Expense for water fee/ month (Rp)	39000	0	29000	48000	58000	85000	102000	63000
Quantity/ continuity of supplied water								
Dry season	12hrs/d		24hrs/week	15hrs/wee	10 hrs/d	24hrs/2d	21hrs/d	3 hrs/d
Wet season	12hrs/d		24hrs/week	15hrs/wee	10 hrs/d	24hrs/2d	21hrs/d	3 hrs/d
Quality of supplied water								
Turbid (T), Iron content (Fe), coloured (C), sticky (S), bad smell(B)	C		T	T	Good	T	Good	Good
Consumer satisfaction								
Quantity			Fair	Fair	Good	Fair	Good	Good
Quality			Fair	Fair	Good	Fair	Good	Good
System/ service			Bad	Bad	Good	Bad	Good	Good
	0	0	5	5	9	5	9	9
Existing alternative water source								
Shallow well (W0) (distance in km)			0.1	0.5	0	1	0	0
Drilling well (W1) (distance in km)								
Deep well (W2) (distance in km)								
River (R) (distance in km)	0.5				1	1		
Spring (S) (distance in km)								
Lake (L) (distance in km)					1			
Rain water (P)	0							
Buy water from delivery seller(D)								
Category of water utilization by source (refer to point D above)								
For Cooking and drinking	R,gallon	R	piped	piped	piped	piped	piped	piped
For shower and toilet	piped	W1	piped	piped	piped	piped	piped	piped
For laundry	piped	W1	piped	piped	piped	piped	piped	piped
Water source used before connection to piped water								
Kind of water source (refer to point D above)	R	R,W1,PH	W0	W0	W0,R,L	W0,R,L	W0	W0
Distance from water source (km)	0	0.2	0.1	0.5	3	1	0	0
Fetching duration (hrs/ day)	0	0.3	0.5	0.5	3	2	0	0

Source: JICA Study Team 2010

Table 10.6.9 Summary of Domestic use of Water in SPAM-IKK areas in Sulawesi

Province	Central Sulawesi			South Sulawesi				South East Sulawesi	North Sulawesi		Gorontalo	
District/ City	Donggala	Donggala	Palu	Takalar	Takalar	Gowa	Jeneponto	Kolaka	Minahasa Utara	Minahasa Selatan	Gorontalo	Gorontalo Utara
No.	B-33	B-35	B-34	A-7	B-37	A-8	B-36	B-38	B-39	B-40	B-41	B-42
IKK	Binanga	Sabang (Damsol)	Palu	Pattallassang	Galesong Selatan	Pattallassang	Parapa	Latambaga	Air Madidi	Amurang	Suwawa	Kwandang
	39	40	41	42	43	44	45	46	47	48	49	50
Established by Budget year	2005	2008	2006	2006	2008	2008	2007	2008	2006	2006	2006	2008
House Connection condition	138	0	274	501	714	763	5560	5486	331	220	75	585
New connection from SPAM IKK (subscription year)						2008				2009		
Connected to available system (subscription year)	2005		2006	1989	2008		2005	1979	2004			
Not available / not operated		n/a										
Expense for water fee/ month (Rp)	12000	0	41000	45000	50000	45000	46000	55000	35000	32000	0	28000
Quantity/ continuity of supplied water												
Dry season	24hrs/d		12hrs/d	24hrs/d	24hrs/d	24hrs/d	24hrs/d	8hrs/2d	24hrs/d	24hrs/d	2 hrs/d	12 hrs/d
Wet season	24hrs/d		12hrs/d	24hrs/d	24hrs/d	24hrs/d	24hrs/d	8hrs/2d	24hrs/d	24hrs/d	2 hrs/d	12 hrs/d
Quality of supplied water												
Turbid (T), Iron content (Fe), coloured (C), sticky (S), bad smell(B)	T		Good	Good	Good	Good	Good	T	T	T	T	T
Consumer satisfaction												
Quantity	Good		Good	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good
Quality	Fair		Good	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good
System/ service	Good		Good	Good	Good	Good	Good	Fair	Fair	Fair	Fair	Good
	8	0	9	9	9	9	9	6	6	6	6	9
Existing alternative water source				no	no	no	no					
Shallow well (W0) (distance in km)	1.5							1	0	0		
Drilling well (W1) (distance in km)												
Deep well (W2) (distance in km)												
River (R) (distance in km)												
Spring (S) (distance in km)	0		1									
Lake (L) (distance in km)												
Rain water (P)												
Buy water from delivery seller(D)												
Category of water utilization by source (refer to point D above)												
For Cooking and drinking	W0,S,gallon	S,W	piped	piped	piped	piped	piped	piped	piped,W1	piped	piped	piped
For shower and toilet	piped	S,W	piped	piped	piped	piped	piped	piped	piped	piped	piped	piped
For laundry	piped	S,W	piped	piped	piped	piped	piped	piped	piped	piped	piped	piped
Water source used before connection to piped water												
Kind of water source (refer to point D above)	S,W	S ,W	S,W2	W0	W0	W0	W0	W0,S,R	W0,R	W0	W0	W0
Distance from water source (km)	1	2	2	0.6	1	0.5	1	1	2	0.3	0.05	0
Fetching duration (hrs/ day)	2	0	1	0.5	2	2	2	1	0.5	0.5	0.2	0

Source: JICA Study Team 2010

10.7 Social Baseline Data

Social baseline data are collected through two methods, namely, primary data collection and secondary data collection. Primary data were collected from the household survey whereas secondary data were collected at the district level. Results of primary data collection have been described in Chapter 10.6 while results of secondary data collection are presented in this section. Secondary data provide a picture of the demographic and accessibility of locations, including accessibility to educational and health facilities. Data are compiled into Data Book Profiles of Ibukota Kecamatan (IKK). SPAM IKK generally serves more than one village and even some serve several districts. In this case, all served district profile is also presented.

10.7.1 Location and Accessibility

Accessibility is denoted by distance and duration of travel time to IKK. In most cases, the distance is divided into two. The first is the distance and travel time from the provincial capital to the district capital and the second is the distance and travel time from district capital to IKK. Total travel time varied from 1 hour (e.g., B-25 Selopamioro and B-9 Way Lima, etc.) to 8 hours (B-4 Sungai Rotan-Gelumbang-Kelekar).

10.7.2 Area

Average area of sub-districts is 809 km^2 but it varies by island. In Java Sub-district, areas are relatively small; most sub-districts are about 50 km^2 and the largest is 112.37 km^2 (B-20 Bancar). In Sulawesi, larger areas are dominantly in Central Sulawesi Province with the largest having an area of 601 km^2 (B-35 Sabang). Sub-districts in Sumatra and Kalimantan are mostly larger than 200 km^2. The largest in Kalimantan is 1,373 km^2 (B-27 Sepaku) and the largest in Sumatera is 957 km^2 (B-8 Lubuk Ruso).

10.7.3 Demography

Population of sub-districts varies from 6,600 (B-32 Tumbang Talaken) to 76,862 (B-24 Kepung). On average, female population is slightly higher (50.3%) than male. Population density is related to the effective distribution of water. Population density of surveyed SPAM IKK is presented in Table 10.7.1. Average population density is 788 persons/km^2. Population density of sub-districts in Java island is very high. The highest is 3,783 persons/km^2 (B-16 Palasari). This is directly related to high total population. The lowest density is in Kalimantan at 5 persons/km^2 (B-32 Tumbang Talaken). B-32 Tumbang Talaken is the second largest sub-district with the lowest

population. In Sumatera, the lowest population density is 29 persons/km^2 (B-8 Lubuk Ruso). Sub-districts that are part of cities show higher population which resulted to higher population density compared with other sub-districts that are not part of cities.

10.7.4 Educational and Health Facilities

Access to educational and health facilities are considered as an important factor. Educational facilities are presented in terms of the number of primary schools, junior high schools, senior high schools and pupils in each sub-district. Health facilities are presented in Table 10.7.1 in terms of the number of health posts in each sub-district. Several sub-districts do not have any health post. Instead, there are several village health posts. In Sungai Rotan-Gelumbang-Kelekar, there is only one primary school for every 19 km^2, one junior high school for every 118 km^2, and two senior high schools in the whole sub-district of 473.79 km^2.

Table 10.7.1 Social Baseline Data of Sub-District related SPAM IKK (1/5)

Province		North Sumatra		West Sumatra		Riau		Jambi		South Sumatra		Lampung	Bengkulu	
District/City		Dairi	Asahan City	Solok	Kota Sawahlunto	Rokan Hulu	Kuantan Singingi	Muaro Jambi	Batang Hari	Banyuasin	Muara Enim	Lampung Selatan	Rejang Lebong	Rejang Lebong
Sub-district		Sumbul	Kisaran timur	X Koto Singkarak	Bbarangin	Tandun	Inuman	Maro sebo	Pemayung	Rambutan	Sungai Rotan Gelumbang Kelekar	Way Lima	Kota Padang	Curup Curup Timur
No. of SPAM IKK		A-1	A-2	B-1	B-2	B-5	B-6	B-7	B-8	B-3	B-4**	B-9	B-10	B-11**
Name of SPAM IKK		Sumbul	Kisaran	Nagari Kota Sani	Sumpahan	Tandun	Inuman	Candi Muaro	Lubuk Ruso	Tanjung Kerang	S. Rotan-Gelumbang-Kelekar	Way Lima	Kota Padang	Selupu Rejang & Curup Timur
Number of village in Sub-district	(number)	14	12	8	10	7	11	20	18	20	49	16	8	19
Number of serviced village	(number)	4 *	5	4 *	4	1	2	1	1	6	2	3	6*	14
Distance from district capital	(km)	21	0	42	2.5	60	60	20	38	85	150	6	74	6
Distance from provincial capital	(km)	156	158	37	94	200	254	25	63	90	196	30	157	85
Area of sub-district	(km2)	268.2	39.19	295.5	88.55	639	45	29,031	957.5	625.55	1,114.52	224.5	172.29	7
Total population of sub-district	(person)	41,081	68,139	34,030	16,158	22,837	15,714	30,202	28,362	42,037	82,008	33,835	10,913	50,645
Male population	(person)	20,595	33,910	16,032	7,942	11,979	7,810	15,121	14,411	20,867	39,892	17,483	5,496	25,505
Female population	(person)	20,486	34,229	17,998	8,216	10,858	7,904	15,081	13,951	21,170	42,116	16,352	5,417	25,140
Population density of sub-district	(person /km2)	153.2	1738.7	115.2	182.5	35.7	349.2	1.0	29.6	67.2	73.6	150.7	63.3	7393
Number of household		8,848	14,489	7,122	3,231	5,388	3,707	6,725	5,673	10,680	16,401	8,221	10,680	11,546
Average size of household	(population/household)	4.6	4.7	4.8	5.0	4.2	4.2	4.5	5.0	3.9	5.4	4.1	1.0	4
Number of health post	(number)	1	11	6	11	1	5	12	0	6	8	6	0	0
Number of village health post	(number)	5	0	16	0	14	0	0	6	16	27	0	8	12
Number of primary school	(number)	36	n/a	36	17	18	14	4	53	25	94	35	10	18
Number of junior high school	(number)	10	n/a	12	4	5	4	6	6	5	14	6	2	4
Number of senior high school	(number)	10	n/a	5	2	3	1	2	3	2	7	1	1	2

Source: Kecamatan Dalam Angka of each sub-district

Note: * Water supply service is not yet started.
** IKK system has area services more than one sub-district

Table 10.7.1 Social Baseline Data of Sub-District related SPAM IKK (2/5)

Province		Banten	West Java				Central Java				
District/City		Serang	Kuningan	Kuningan	Cirebon	Kota Bogor	Grobogan	Grobogan	Kendal	Boyolali	Rembang
Sub-district		Cikande Kibin	Garawangi Maleber Sindang Agung	Luragung Lebakwangi	Ciwaringin	Bogor Sltn Cijeruk	Toroh	Gubug	Boja	Sawit	Sulang
No. of SPAM IKK		B-12**	B-13**	B-14 **	B-15	B-16**	A-3	B-18	A-4	B-17	B-19
Name of SPAM IKK		Cikande	Garawangi	Luragung	Ciwaringin	Palasari	Toroh	Gubug	Boja	Sawit	Sulang
Number of village in Sub-district	(number)	21	45	27	8	25	16	21	18	12	21
Number of serviced village	(number)	7	17	10	5*	2	4	1	1	4	5
Distance from district capital	(km)	20	15	200	30	6	9	33	28	16	10
Distance from provincial capital	(km)	0	100	15	125	100	60	60	24	48	111
Area of sub-district	(km2)	82.74	96.68	86.56	17.79	67.31	119.3	71.2	64.1	17.24	83.68
Total population of sub-district	(person)	135,447	117,126	79,436	35,952	254,631	114,785	47,772	64,252	33,011	38,840
Male population	(person)	71,622	57,232	40,035	17,721	130,633	57,289	23,660	31,514	16,311	19,245
Female population	(person)	63,825	59,894	39,401	18,231	123,998	57,496	24,112	32,738	16,700	19,595
Population density of sub-district	(person /km2)	1637.0	1211.5	917.7	2020.9	3783.0	962.2	671.0	1002.4	1914.8	464.1
Number of household		27,089	30,655	22,122	11,394	60,943	33,471	22,144	16,106	7,815	9,640
Average size of household	(population/household)	5.0	3.8	3.6	3.2	4.2	3.4	2.2	4.0	4.2	4.0
Number of health post	(number)	0	0	0	1	0	1	n/a	2	1	1
Number of village health post	(number)	4	7	8	3	25	4	n/a	22	2	4
Number of primary school	(number)	54	64	50	17	90	26	50	65	22	26
Number of junior high school	(number)	12	6	6	4	30	5	8	5	3	5
Number of senior high school	(number)	7	2	4	4	19	2	8	2	1	2

Source: Kecamatan Dalam Angka of each sub-district

Note: * Water supply service is not yet started.
** IKK system has area services more than one sub-district

Table 10.7.1 Social Baseline Data of Sub-District related SPAM IKK (3/5)

Province		East Java					Yogyakarta	
District/City		Tuban	Ponorogo	Madiun	Bangkalan	Kediri	Bantul	Sleman
Sub-district		Bancar	Jenangan	Gemarang	Bumeh	Kepung	Imogiri	Gamping
No. of SPAM IKK		B-20	B-21	B-22	B-23	B-24	B-25	B-26
Name of SPAM IKK		Bancar	Jenangan	Gemarang	Bumeh	Kepung	Selopamioro	Gamping
Number of village in Sub-district	(number)	24	17	7	12	10	8	5
Number of serviced village	(number)	4	4	3	2	4	1	1
Distance from district capital	(km)	56	15	37	4	40	24	15
Distance from provincial capital	(km)	108	202	169	28	96	18	12
Area of sub-district	(km2)	112.37	59.47	101.97	62.4	101.53	54.49	29.25
Total population of sub-district	(person)	55,506	59,677	35,696	58,822	76,862	59,115	75,008
Male population	(person)	27,106	29,554	18,182	27,733	37,963	28,873	36,853
Female population	(person)	28,400	30,123	17,514	31,089	38,899	30,242	38,155
Population density of sub-district	(person /km2)	494.0	1003.5	350.1	942.7	757.0	1084.9	2564.4
Number of household		14,923	18,031	7,140	10,292	18,710	16,828	17,783
Average size of household	(population/household)	3.7	3.3	5.0	5.7	4.1	3.5	4.2
Number of health post	(number)	2	4	4	1	6	10	7
Number of village health post	(number)	3	0	0	9	0	0	0
Number of primary school	(number)	85	33	29	93	37	20	39
Number of junior high school	(number)	7	3	3	29	8	5	8
Number of senior high school	(number)	4	3	1	5	3	5	8

Source: Kecamatan Dalam Angka of each sub-district
Note: * Water supply service is not yet started.
** IKK system has area services more than one sub-district

Table 10.7.1 Social Baseline Data of Sub-District related SPAM IKK (4/5)

Province		West Kalimantan		East Kalimantan		South Kalimantan		Central Kalimantan	
District/City		Pontianak	Singkawang	Penajam Paser Utara	Kutai Kertanegara	Banjar	Tapin	Katingan	Gunung Mas
Sub-district		Siantan	North Singkawang	Sepaku	Loa Janan	Kertak Hanyar	Binuang	Katingan Hilir	Manuhing
No. of SPAM IKK		A-5	A-6	B-27	B-28	B-29	B-30	B-31	B-32
Name of SPAM IKK		Jungkat	Sei Bulan	Sepaku	Loa Janan	Kertak Hanyar	Binuang	Kareng Pangi	Tumbang Talaken
Number of village in Sub-district	(number)	5	7	13	8	13	8	8	12
Number of serviced village	(number)	4	7*	1	2	7	3	2	1
Distance from district capital	(km)	35	17	81	36	30	28	15	130
Distance from provincial capital	(km)	60	150	170	34	38	113	82	158
Area of sub-district	(km2)	324.31	94.35	1373	644.2	45.83	218.1	663	1113
Total population of sub-district	(person)	44,395	19,856	30,708	50,876	34,465	22,749	21,324	5,846
Male population	(person)	22,425	10,243	15,629	26,445	16,300	10,928	9,485	3,065
Female population	(person)	21,970	9,613	15,079	24,431	18,165	11,821	11,839	2,781
Population density of sub-district	(person /km2)	136.9	210.5	22.4	79.0	752.0	104.3	32.2	5.3
Number of household		10,580	6,274	7,025	12,950	8,325	6,540	5,993	1,877
Average size of household	(population/household)	4.2	3.2	4.4	3.9	4.1	3.5	3.6	3.1
Number of health post	(number)	2	2	0	9	4	4	1	0
Number of village health post	(number)	5	22	16	0	0	0	2	7
Number of primary school	(number)	22	13	26	35	25	23	16	15
Number of junior high school	(number)	5	4	7	10	5	6	8	3
Number of senior high school	(number)	2	2	5	5	1	3	8	1

Source: Kecamatan Dalam Angka of each sub-district

Note: * Water supply service is not yet started.
** IKK system has area services more than one sub-district

Table 10.7.1 Social Baseline Data of Sub-District related SPAM IKK (5/5)

Province		Central Sulawesi			South Sulawesi				South East Sulawesi	North Sulawesi		Gorontalo	
District/City		Sigi	Donggala	Palu	Takalar	Takalar	Gowa	Jeneponto	Kolaka	North Minahasa	Minahasa	Bone Bulango	East Gorontalo
Sub-district		West Dolo South Dolo Marawola	Damsol	South Palu	Pattallassang	Galesong Sltn Galesong Utra Galesong	Pattallassang	Tamalatea Arungkeke Binamu	Latambaga	Air Madidi Dimembe	West Amarung	Suwawa Tngh Suwawa Sltn Suwawa	Kwandang
No. of SPAM IKK		B-33**	B-35	B-34	A-7	B-37**	A-8	B-36**	B-38	B-39**	B-40	B-41**	B-42
Name of SPAM IKK		Binanga	Sabang	Kawatuna	Pattallassang	Galesong Selatan	Pattallassang	Parapa	Latambaga	Air Madidi	Amurang	Suwawa	Kwandang
Number of village in Sub-district	(number)	32	13	1	8	27	8	32	7	20	9	16	13
Number of serviced village	(number)	9	4*	1	1	9	8	3	5	5	2	6	4
Distance from district capital	(km)	47	196	5	1	15	4	5	5	15	10.4	5	10
Distance from provincial capital	(km)	20	160	5	40	40	11	90	175	25	54	15	60
Area of sub-district	(km2)	735.53	600.7	61.35	25.31	65.95	84.96	156.98	297.1	231.01	227.43	282.29	332.8
Total population of sub-district	(person)	50,228	29,416	110,218	31,819	90,919	18,511	105,360	14,373	45,849	14,373	19,464	34,648
Male population	(person)	23,354	14,519	54,603	15,364	43,807	9,114	50,819	7,261	23,215	7,261	9,798	17,282
Female population	(person)	26,874	14,897	55,615	16,455	47,112	9,397	54,541	7,112	22,634	7,112	9,666	17,366
Population density of sub-district	(person /km2)	68.3	49.0	1796.5	1257.2	1378.6	217.9	671.2	48.4	198.5	63.2	69.0	104.1
Number of household		10,813	6,002	24,277	6,420	22,775	3,840	23,808	5,810	13,100	3,963	4,507	9,058
Average size of household	(population/house hold)	4.6	4.9	4.5	5.0	4.0	4.8	4.4	2.5	3.5	3.6	4.3	3.8
Number of health post	(number)	1	13	5	1	0	1	1	1	n/a	4	0	0
Number of village health post	(number)	21	2	0	30	106	30	18	5	n/a	0	8	12
Number of primary school	(number)	55	29	51	18	82	18	78	15	24	14	35	35
Number of junior high school	(number)	13	5	16	2	9	2	18	2	6	6	11	15
Number of senior high school	(number)	7	2	17	2	6	2	11	1	3	1	2	3

Source: Kecamatan Dalam Angka of each sub-district

Note: * Water supply service is not yet started.
** IKK system has area services more than one sub-district

10.8 Environmental and Social Consideration

The following are the major findings of the site review related to the environment:

10.8.1 Natural Environment

(1) Environmental Problem

In most of the projects, environmental problems are not reported.

(2) Protection Forest

Among the 50 sampled SPAM IKK projects in this study, there are two cases wherein the water supply facilities fell into a protection forest (Hutan Lindung) area, i.e., in A-1 Sumbul IKK in Dairi, North Sumatra and B-41 Suwawa IKK in Gorontalo. The facts were found after implementation and agreements with the Ministry of Forestry were closed for the land use under the condition that disturbance to the forest/fauna should be minimized (No tree cutting). Protection forest and protected area (Kawasan Lindung) are different (refer to Chapter 7) although these are sometimes confused.

One project, B-13 Garawangi, was located closely to the National Park, a protected area which requires environmental assessment (refer to Chapter 7). The confirmation of the area might be required in future projects in relation to these protected areas at the planning stage.

(3) Environmental Study (AMDAL)

There is no Environmental Assessment Report (ANDAL) based on the AMDAL in all sampled projects due to the small scale of the projects.

(4) Other Environmental Studies

Some documents on environmental management effort (UKL) and environmental monitoring effort (UPL) and the current process mainly related to water permit (SIPA) were confirmed (three sets of UKL and UPL documents in A-4 2005, Boja, B-16 Palasari and B-25 2007,Bantul were found and 11 intentions of undergoing such process were confirmed).

Water use permits were not always kept in written documents in all projects: Majority of the competent authorities for the water permit of SPAM IKK projects were districts (kabupaten) headed by Bupati, which applied for the projects. Particular procedure was not required at the time of application.

10.8.2 Social Environment

(1) Environmental Problems

In most of the projects, social environmental problems are not reported.

(2) Resettlement:

In all sampled projects, there were no involuntary resettlements.

(3) Land Acquisition

Majority of the projects had successfully procured the lands where the facilities were installed. (In majority of the projects, lands were bought by PDAM.)

Opposition to land and water use by residents: In one project, B-35 Sabang, the change of the project site occurred because of the opposition to the land and water use by the residents.

(4) Complaint from Residents

There was a complaint from the community (B-2 Sumpahan) regarding the name of the water treatment plant as its name was taken from its distribution area which is the adjacent community. The community at the water source worries that the land will be condemned by the government and the land title will be changed in favor of the other community. The land for the WTP was provided by the community at the water source from its traditional land (Lahan adat). Similar problems also happen between the communities where the water source and water distribution are located separately in different community areas. In some cases, additional compensation was made by PDAM to the concerned community.

CHAPTER 11 ANALYSIS OF THE PROGRAM ACCOMPLISHMENTS AND ISSUES

11.1 Stage of Occurrence of Issues (Planning, Construction, Operation)

As a result of the survey, SPAM IKK issues are summarized and categorized under planning, construction and operation stages as follows:

11.1.1 Planning Stage

(1) Idling Capacity of Treatment Plants

Construction of distribution network is delayed or uncompleted even though construction of the intake and WTP (APBN parts) is completed, because APBD allocation for distribution network is slow and insufficient. The system can not work on full capacity. Construction of distribution network is delayed or incomplete in 59% of SPAM IKK (new systems) regardless of the guidelines (APBD part must be constructed within two years).

(2) Inadequate Technical Design and Review

The plan and design for the SPAM IKK system is carried out by the district PU/PDAM or central Satker. However, several problems found in some SPAM IKK sites due to inadequate technical design and review of the development plan. For example, water shortage and high turbidity problems occurred at the WTP draw from surface water sources. In addition, it is found issues of inappropriate elevation for each facility and electricity shortage area include unelectrified area for WTP location. Because, some planning and design of SPAM IKKs are carried out by limited site information with a little experience.

(3) Underinvestment on Production Capacity against Water Demand

Most of the SPAM IKKs were planned with a capacity of 10 L/s or 20 L/s regardless of the demand volume, due to limited budget. Total water demand in the sub-district is generally larger than 20L/s. Therefore, the comprehensive and systematic approach of water supply development plan is required.

(4) Noncompliant of Environmental Regulations

There is a lack of understanding about related regulations of SPAM IKK projects development. For example, the intake facility and WTP were constructed in the protected forest area without proper environmental procedure. Therefore, the SPAM IKK systems in north Sumatra could not start the operation due to insufficient

procedure.

(5) Limited Consultation with Stakeholders

Most residents and concerned parties did not receive adequate announcements of new piped water supply by SPAM IKK system before implementation of the project. Especially, It is important that local government should be carried out demand needs survey in planned area. Because, many residents in several sites are taken clean water from own existing shallow well. In that case, they did not wish to use the piped (paid service) water instead of existing shallow well.

11.1.2 Construction Stage

(1) Leakage from FRP Tanks

No major deficiencies in construction quality in reviewed 50 SPAM IKKs. However, seven sites of WTP tanks made of FRP are leaked at commissioning test except one case, based on the on-site review. Therefore, those FRP made tanks could not used for water supply facility of SPAM IKK system due to low in intensity of the material for WTP.

(2) Insufficient Coordination in the Construction of the APBN and APBD Part

The construction of one sub-project is conducted with separated contracts in APBN and APBD part respectively. The APBN part is constructed under the provincial SatKer and the APBD part is constructed under the District PU. This situation has affected the construction schedules, contract conditions and specifications for each part. Consequently, these differences make an influence on the whole water supply system of the SPAM IKK project.

And hence, the construction border line of APBN and APBD part are different at construction stage from that stated in the contract in several cases. Therefore, the construction border line has to be confirmed clearly between APBN part and APBD part contracts. According to the on-site review, the WTP had not connected with the distribution pipe and could not start operation due to the unclear construction border line between APBN and APBD part in one SPAM IKK.

11.1.3 Operation Stage

(1) Small Number of House Connections

70-140 household per 1 L/s of system capacity are connected appropriate level for the SPAM IKK system. However, only 10 % of reviewed 50 SPAM IKKs archived this target. 74 % is less than 70 house connections. Few connections were requested by

households and the number of house connections do not increase, due to limited distribution network and also availability of existing shall well and high connection fee.

(2) Low Treated Water Quality

Rapid sand filtration requires highly skilled operators. However, most WTPs are operated by unskilled operators without technical transfer of WTP from the contractor. Therefore, treated water has not been removed turbidity properly based on the on-site review results.

(3) Low Profitability of Water Works

Average operating ratio (operating cost to revenue) is 1.23 on sample PDAMs in reviewed 50 SPAM IKKs which is worse than national average (1.03). Most PDAM-operated SPAM IKKs gave low water tariff and high operation cost. In addition, customer number is not increased because of small number of house connections. Therefore, PDAM could not recover the cost.

11.2 Sources of Issues（Central Government, Local Government, PDAM/BLU）

The above mentioned issues can be divided according to the sources, namely: central government, local government and PDAM/BLU.

11.2.1 Central Government

The central government, which includes Dir PAM, PMU, central SatKar of Cipta Karya and provincial SatKar, implemented and arranged the project selection and bidding and construction supervision for the APBN portion. The provincial SatKar basically arranges the project with the local government but some SPAM IKKs are arranged under the central SatKar. In the latter case, the central SatKar contracts the supplier and the provincial SatKar only does the construction supervision work. They are mainly responsible for the following issues.

(1) Unclear Project Selection Procedure

The project is selected based on the submitted proposal of the local government considering the criteria of SPAM IKK guideline. The average range of successful proposal is only 50%. However, the local government does not know the reasons for unsuccessful proposals.

(2) Disbursement of APBN without Consideration of Disbursement of APBD

APBN portion covers the intake facility, transmission pipeline, WTP and reservoir (sometimes including a part of distribution pipeline). However, sometimes production

water could not be supplied to the local residents due to the delay of the APBD portion even though the WTP have already been constructed. The central government should monitor the disbursement of APBD portion for distribution network. The disbursement of APBN portion should be considered the distribution network development by the local governments.

(3) Inadequate Supervision for Construction Work

The provincial SatKar conducts the construction supervision of the SPAM IKK project of the APBN part. However, they could not find the FRP tank problems until commissioning test. As-built drawings, operation manuals and related documents for operation and maintenance of WTP are supposed to be handed over by contractors through the provincial SatKer and Dinas PU to PDAM/BLU. However, in most cases, PDAM/BLU has not received such documents from Dinas PU and cannot perform proper operation and maintenance..

(4) Out of Consideration of the APBD Portion of the Project

The provincial SatKar must conduct the coordination and monitoring of the project. Most of the SPAM IKKs could not operate at full capacity due to insufficient distribution network. They should advise and support the local government concerning the installation of the distribution network pipeline to increase house connections.

(5) Lack of Coordination among Concerned Organization

The SPAM IKK program is attended by several concerned organizations. The Cipta Karya (Dir PAM and PMU) and provincial SatKar should coordinate all of these organizations.

(6) Lack of Basic Training for WTP Operation Staff

MPW conducts PDAM/BLU staff training programs at the Bekasi and Surabaya training centers and BPP SPAM. However, participants in these training programs are limited because of the budget constraints of PDAM/BLU. Especially, the training at the Bekasi center is mostly participated by Dinas PU officials and not utilized by PDAM/BLU. The basic training opportunity for PDAM/BLU staff should be amplified. Especially, the training on rapid sand filtration system is necessary develop the skills of the operator in order to improve treated water quality as most SPAM IKKs adopted such for WTP.

11.2.2 Local Government

The organizations concerned with the SPAM IKK on the local government are Dinas

PU district and BAPPEDA. They implemented and arranged the project planning and design, coordination, and bidding/construction supervision for the APBD portion. They are responsible for the following issues.

(1) Inadequate Project Planning and Design

In the planning of the project, BAPPEDA is responsible for the financial aspect using RPIJM while Dinas PU district is responsible for the technical aspect. Few technical staff of Dinas PU district conducted the design in some SPAM IKKs. In this case, it is effective for the provincial SatKar to support them. The provincial SatKar staff should visit the site for plan and design during planning stage to get local information. And it is important that PDAM/BLU should consider this in the project planning for the success of the project.

(2) Delayed Disbursement of APBD

APBD portion covers the distribution pipeline. Most SPAM IKKs could not operate at full capacity due to the small area or non existing distribution network.

(3) No Explanation on the Project to Local Residents in the Project Area

Before starting the project, it is necessary to conduct socialization. Then, the project can be implemented smoothly and house connection can proceed easily.

(4) No Coordination between APBN and APBD Portions

The SPAM IKK project is planned and designed by the local government to be implemented using APBN portion and APBD portion. However, the APBN portion could not be handed by the local government in the construction stage.

(5) Implementation Quality for APBD Part

The Dinas PU district conducts the construction supervision for APBD, which is the distribution network. The contractor should hand over an as-built drawings, manuals and other related documents through Dinas PU to the PDAM/BLU.

(6) Small Number of House Connections

The project targets to increase the number of house connections. The local government should cooperate with PDAM/BLU to do need survey and socialization for house connection campaign in planning stage. Moreover, the local government should arrange and submit required data to the provincial SatKar for monitoring of the SPAM IKK projects...

(7) Insufficient Distribution Network

In some cases of the on-site review, the planned distribution network by APBD has been insufficient against the capacity of the production by APBN. Therefore, the local governments and the PDAM/BLU need to arrange the expansion of the distribution network.

(8) Low Water Tariff

District government takes initiatives to develop tariff price increase for resolution of the low profitability of water works. Because, present tariff level is generally lower than operation costs.

11.2.3 PDAM/BLU

PDAM/BLU implemented and arranged the planning, design, and O&M for the SPAM IKK project. They are responsible for the following issues.

(1) Limited Project Planning and Design

The current process of project planning and design is not follow the guideline of SPAM IKK project, so that many problems found in the existing SPAM IKK sites. For the success of the SPAM IKK, it is important that the suitable water supply area is selected based on the guideline. When the local government prepares the proposal for SPAM IKK, PDAM/BLU should propose the water supply area together with the O&M plan as well as house connection plan. The staff should visit the site for plan and design during planning stage.

(2) No Explanation of the Project to the Local Residents in the Project Area

The small number of connection is one of the most serious problems in SPAM IKK project. Because, most of local residents have own shallow well in there compound for domestic use. However, during the planning stage, local government planned SPAM IKK projects without explanation to the local residents in the project area. Therefore, before starting the project, it is necessary to conduct socialization for piped water supply. Then, the project can be implemented smoothly and house connection can proceed easily.

(3) Lack of O&M Technology

At present most of SPAM IKK operators (PDAM/BLU) have no O&M documents due to poor coordination of provincial SatKer and local government. PDAM/BLU should be received the as-built drawings, manuals and related documents from contractor through concerned organization to conduct proper O&M.

(4) Small Number of House Connections

The most important indicators for project evaluation are the number of house connections and service ratio on the planning area. However, most of SPAM IKK sites have small number of house connection, because the local resident has existing own shallow wells and they also feel connection fee is high. PDAM/BLU should take effort proceed to connect to the households.

(5) Insufficient Distribution Network

In some case, the planned distribution network by APBD has been insufficient against the capacity of production by APBN. Therefore, the local governments with the PDAM/BLU need to arrange the expansion of the distribution network.

(6) Unskilled Operator

The training on rapid sand filtration system is necessary to develop the skills of the operator in order to improve treated water quality as most SPAM IKKs adopted such system for WTP. However, training center of Bekasi and Surabaya has limited capacity for operators of PDAM/BLU. In addition to above trading center BBSPAM and the YPTD under the PERPAMSI, which is the association of PDAM/BLU, has training course for PDAM/BLU staff.

(7) No Operation Record Maintained at WTP

Proper O&M record of WTP is not available in most of the SPAM IKK project at present. PDAM/BLU should observe the project implementation and record the O&M data to maintain the WTP as its responsibility.

CHAPTER 12 PROPOSED COUNTERMEASURES

Chapter 11 discussed the issues being faced by the present SPAM IKK program in the planning, construction and operation stages of the implemented projects. These issues will seriously hinder the feasibility of the proposed sector loan project unless the current SPAM IKK implementation is improved in the respective aspects. From the point of view of the formulation of donor assistance, it is highly recommended to positively intervene in the SPAM IKK program implementation through the provision of sufficient technical assistance besides the financial assistance. The donor should also take into account further improvement by the Indonesian side upon consideration of the ODA loan. This chapter presents the proposed countermeasures to be taken for the improvement, and the concept of the proposed sector loan.

12.1 Proposed Countermeasures

Tables 12.1.1 through 12.1.3 below summarize the issues on the current SPAM IKK program and their causes, including the detailed countermeasures in the planning, construction and operation stages of SPAM IKK projects. The proposed countermeasures are also discussed below.

Table 12.1.1 Problems, Causes and Countermeasures (Planning)

Problem	Cause	Countermeasure	Responsibility
(1) Idling capacity of completed treatment plants.	(1-1) Distribution network capacity is insufficient compared to treatment plant capacity.	Responsibility of provincial SatKer in design review should be increased. Capacity development of provincial SatKer staff is required.	Provincial SatKer
	(1-2) APBD allocation for distribution network is slow and insufficient. (Delayed construction of distribution network by APBD)	It is required to closely monitoring and strictly appraisal on distribution network development by APBD on planning and construction stages.	Central Government Provincial SatKer
	(1-3) District government's financial burden in distribution system of SPAM IKK is still heavy (50% to 60% of total project cost)	APBN project scope should be amplified to partially distribution network (Joint implementation of distribution facilities by central and district governments)	Central Government
(2) Unpredictable selection results of proposal	(2-1) Weak performance in project identification, screening and execution at provincial and local levels	Responsibility of provincial SatKer in project screening should be increased at local level. Capacity development of provincial SatKer and district government staff in project planning is required.	Provincial SatKer District Government
	(2-2) Limited consultation with stakeholders	It is important that local government should carry out demand needs survey and do more consultation with stakeholders in planned area.	District Government
	(2-3) Unclear selection indicator of the current SPAM IKK Guidelines do not allow the proper screening by the provincial SatKer and district government.	Clear indicators under the selection criteria should be defined in the SPAM IKK Guidelines. Coordination among provincial SatKer, local government and stakeholders should be improved in the selection process including socialization.	Central Government
(3) Weak design quality	(3-1) Design capacity of district governments/PDAM is limited due to lack of experience on limited site information.	Capacity development of district government/PDAM staff in project planning and design is required.	District Government PDAM
	(3-2) Review and supervision capacity of provincial SatKer for facility design is weak	Responsibility of Provincial SatKer in design review should be increased. Henc, capacity development of provincial SatKer staff is	Provincial SatKer

Source: JICA Study Team 2010

Table 12.1.2 Problems, Causes and Countermeasures (Construction)

Problem	Cause	Countermeasure	Responsibility
(1) Leakage from fiberglass reinforced plastic (FRP) tanks	(1) The material of FRP is low in intensity for tank of WTP	Provincial SatKer's function in construction supervision and inspection should be reinforced. It is necessary to do material supervision and guidance before construction process.	Provincial SatKer
(2) Insufficient coordination in implementation between APBN and APBD portions	(2) Provinicial SatKer and district government could not try to coordinate the construction work each other.	Provincial SatKer's responsibility should be extended to monitoring and coordination including APBD portion (distribution facility construction).	Provincial SatKer District Government

Source: JICA Study Team 2010

Table 12.1.3 Problems, Causes and Countermeasures (Operation)

Problem	Cause	Countermeasure	Responsibility
(1) Small number of house connections	(1-1) High connection fee is lead to difficulty with house connection for beneficiaries (Average Rp. 850,000)	Connection fee plan should be improved (monthly payment, discount campaign, etc.)	PDAM
	(1-2) Residents in the service area are not required the house connections, because they utilize the shallow well in their compound for domestic use without charge.	It is required to do strict project screening based on needs survey and socialization during planning stage as a selection criterion of SPAM IKK sites.	Central Government Provincial SatKer District Government
	(1-3) Low quality service of piped water (water shortage and high turbidity water) is not accepted by beneficiaries.	Operator training to improve water service quality is required.	PDAM
(2) Low treated water quality	(2-1) Inappropriate operation is carried out by unskilled operator due to lack of technical knowledge for plant operation. The contractor does not hand over the operation manual to PDAM after completion of the WTP.	Provincial SatKer should ensure technical transfer from contractor to PDAM during the construction stage.	Provincial SatKer PDAM
	(2-2) Shortage of skilled operators of water treatment plant.	Training programs for PDAM staff by utilizing MPW training centers and PERPAMSI trainings should be reinforced.	Central Government PDAM
(3) Low profitability of water works	(3-1) Production cost per production volume is high due to inefficient design. (PDAM average water production cost: Rp.2,553/m3)	Capacity development of district government/PDAM staff in project planning and design is required to ensure energy-efficient design.	District Government PDAM
	(3-2) Inefficient daily O&M of PDAM staff	Capacity development of PDAM staff in O&M is required.	PDAM
	(3-3) Total revenue from water tariff does not meet production cost. (PDAM average water tariff: Rp.2,158/m3)	PDAM should increase the number of customers with house connections.	PDAM
		District governments should take initiatives to develop tariff increase plan .	District Government

Source: JICA Study Team 2010

12.1.1 Planning Stage

(1) Idling Capacity of Treatment Plants

Sluggish development of distribution networks due to limited APBD funding is one of the most serious issues in the SPAM IKK program. Financial assistance by APBN should be extended to a part of the distribution network which is currently under the sole responsibility of APBD. The improvement will be made through expansion of the APBN project scope.

In the current setup, the provincial SatKer's responsibility regarding distribution network development under APBD is unclear. In order to ensure the project outcome, SatKer's functions should include appraisal and monitoring of the network development plan by districts. A certain mechanism to ensure APBD execution will also be necessary, e.g., making APBD budget decision/implementation the trigger for APBN execution. Also, APBN funding should be extended to partially cover distribution network to ease the financial burden of the local governments by amplifying the APBN portion's project scope.

(2) Unpredictable selection results of proposal

The provincial SatKer's functions in project identification, screening and execution should be enhanced. In some provinces, SPAM IKK projects approved by Cipta Karya are only around 50% of the projects proposed by the SatKer, indicating its weakness in screening and facilitation of project planning. Each provincial SatKer has to proactively intervene and screen candidate projects in each province to ensure efficiency of process, not merely compiling the proposal requirements upon the districts' requests. It is also necessary to reinforce coordination and capacity development in project planning among the provincial SatKer, Dinas PU and PDAM at the provincial level as well as between the central government and provincial SatKers at the central level.

At central level, unclear indicators for project selection criteria of the current SPAM IKK guidelines (the guidelines mentioned only selection criteria) cause unpredictable selection results and do not allow the provincial SatKers and district governments to do proper project screening beforehand. The central government should establish clear selection criteria with definite indicators as reference values in the guidelines for qualified project proposals. For example, it is important that local government should carry out demand needs survey in the planned area.

(3) Weak design quality

To cope with the low design quality that causes ineffective operation such as raw

water shortage, capacity development of district government and PDAM staff is required in project planning and design works. Responsibility of provincial SatKers in design review should also be enhanced along with relevant capacity development.

12.1.2 Construction Stage

(1) Leakage from FRP Tanks

To cope with quality problems such as leakages from the fiberglass reinforced plastic (FRP) tanks, the provincial SatKer must perform appropriate inspection works on design and construction works. The central SatKer, at the national level, should collect and disseminate such technical information among the provincial SatKers.

(2) Insufficient Coordination in Implementation between APBN and APBD Portions

Present construction work of SPAM IKK is carrid out by APBN and APBD portions respectively based on the budget source even though one water supply system. Sometimes production water could not reach to the designated distribution networks due to poor coordiantion between prvincial StaKer (APBN portion) and local government (APBD portion). Coordination by provincial SatKers should be enhanced to increase linkage of implementation between APBN and APBD portions.

12.1.3 Operation Stage

(1) Small Number of House Connections

Many households do not request for house connections because of the high connection fee. Innovations on the connection fee plan such as introduction of monthly payments should be considered. There are instances that residents have existing water sources such as shallow wells and tube wells at their residences. It is therefore necessary to initiate a needs survey or resident consultation in the planning stage to determine the real demand in the project area. Low water service quality should be improved through training of operators to meet the residents' needs.

(2) Low Treated Water Quality

Provincial SatKers should ensure technical transfer from contractor to PDAMs in construction stage. Training of operators and technical transfer from the contractor will be necessary to improve treated water quality. Before the commissioning test, PDAM operators should take basic training on water treatment operation by rapid sand filtration. To increase the skilled operators, staff training should be reinforced by utilizing the existing MPW training centers and PERPAMSI training programs.

(3) Low Profitability of Water Works

Capacity development of district government and PDAM staff is required to avoid inefficient system design causing high production cost. Also, capacity development in

management and operation is necessary to improve PDAMs' financial status and management.

Low tariff level is another issue that hinders profitability of water works. District governments should take initiatives to develop tariff increase plan.

12.2 Project Concept for the Proposed Project (IKK Water Supply System Development Sector Loan Project) and Necessary Technical Assistance

Presented below is the project concept of the proposed sector loan reflecting the recommended countermeasures discussed in the previous section. As earlier mentioned, the provision of financial assistance should be considered on the condition that the Indonesian side takes proper countermeasures against the issues surrounding the present SPAM IKK program. Moreover, it is emphasized that the proposed technical assistance is highly important to improve the SPAM IKK program and enhance the feasibility of the sector loan project. The detailed plan of the sector loan including sub-project selection criteria, as well as the technical assistance, will be described in Chapters 13 to 18.

12.2.1 Implementation Setup

(1) Central Level

The implementing organization is MPW (Cipta Karya) as the counterpart to the donor.

(2) Provincial Level

Several provinces will be selected for the financial assistance by the sector loan. Provincial SatKers will be responsible for the identification, planning, implementation and monitoring of SPAM IKK projects in the selected provinces. Their role includes facilitation and screening of candidate project plans proposed by districts. Their responsibility should also be extended to the monitoring and facilitation of distribution network development funded by APBD. District governments (Dinas PU) and PDAMs are involved in the earlier stage of project planning and implementation.

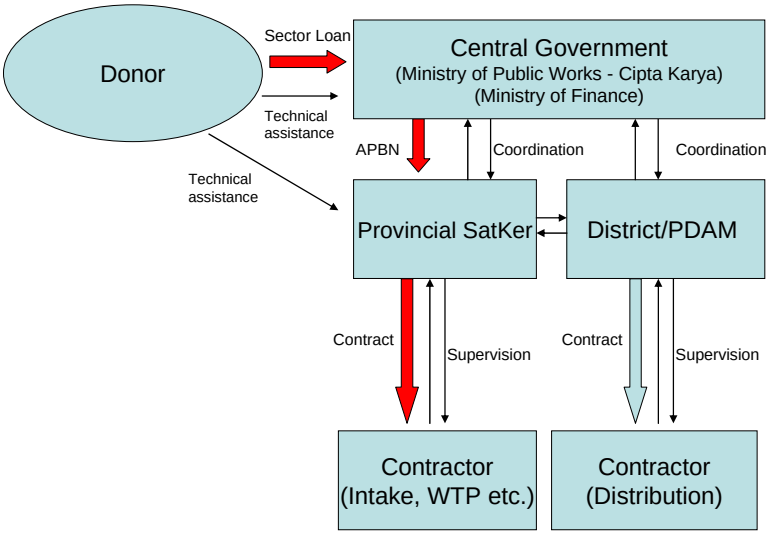
12.2.2 Project Structure Options

How to implement and fund the distribution network development is the key to ensure the project outcome. Presented below are options for the funding structure and the demarcation of responsibility between the central and local governments.

(1) Option 1: Present Structure with Sector Loan Funding

In this structure, the funding source of the APBN portion is replaced by the financial assistance. Project scope and implementation are the same as the present conditions. The structure is still highly weak in terms of the development of distribution networks

because there is no APBN investment for distribution to ease the financial burden of local governments; and the provincial SatKer's function remains limited to the implementation of APBN portion.

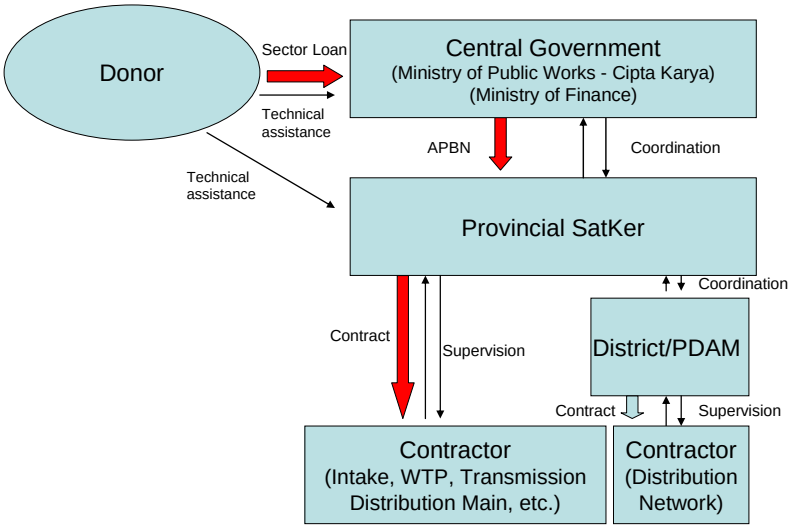


Source: JICA Study Team 2010

Figure 12.2.1 Present Structure with Sector Loan Funding

(2) Option 2: Expanded APBN Project Scope

The project scope funded by APBN is expanded to a certain part of the distribution network to reduce the financial burden of the districts and PDAMs. Provincial SatKers will be responsible to coordinate the implementation of the whole project scope. The APBD part is separately implemented by districts and PDAMs but the scope is limited to smaller-scale networks or only house connections. Some adjustments in the current regulations are thus required to be carried out to expand the project scope under APBN. On the other hand, the reduced financial burden of the district and PDAM for the distribution network will ensure smooth and timely implementation of the APBD project scope. From the district's point of view, participation in the sector loan project is also regarded as an incentive to local governments. The enhanced function of the provincial SatKer is also necessary for the central government to ensure the effective outcome of SPAM IKK program i.e. actual water supply to connected households, through the provincial SatKer's monitoring and coordination over the district's project scope in distribution.

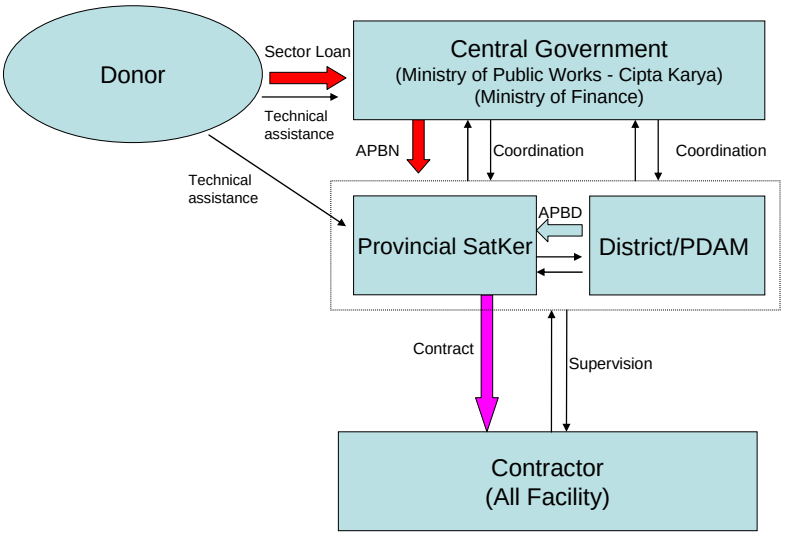


Source: JICA Study Team 2010

Figure 12.2.2 Expanded APBN Project Scope

(3) Option 3: Single Contract with Mixed Funding

Both the APBN funded by the sector loan and APBD are pooled in the provincial SatKer's account. Provincial SatKer is responsible for the whole project scope in coordination with each district/PDAM. In this structure, the project implementation commences after the APBD disbursement by the district to avoid any funding shortage for the distribution. A single contractor constructs all the necessary facilities so that problems concerning the linkage between treatment and distribution are not encountered. Contribution by the APBD is determined by a certain percentage and the total required project cost. Since the responsibility for the district's entire project scope is transferred to provincial SatKer, it will be required to make regulatory adjustment to a greater extent than Option 2 (expanded APBN project scope). New institutional setting will be also necessary to form a committee participated in by the provincial SatKer and the subject district government and PDAM for each sub-project to manage planning and implementation. On the other hand, the provincial SatKer can have direct control over the whole project scope so that smooth and timely implementation will be ensured.

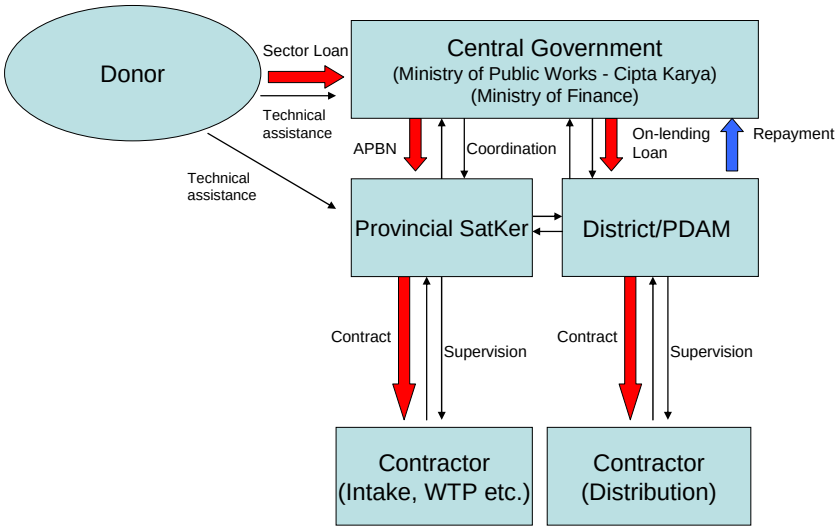


Source: JICA Study Team 2010

Figure 12.2.3 Single Contract with Mixed Funding

(4) On-lending Loan for Distribution

In this structure, the sector loan fund finances both APBN and APBD portions. Besides the APBN part constructed on a grant basis, the fund for APBD will be on-lent to PDAM through the central government (Ministry of Finance). Since the entire project scope is financed by the sector loan, the secured funding will ensure the timely implementation of sub-projects after approval. The on-lending funded by the sector loan for PDAM to implement the district network may also be an incentive for their participation in the project. However, the repayment requirement for the on-lending loan will greatly limit the number of PDAMs eligible for assistance considering the current financial conditions of PDAMs involved in SPAM IKK projects.



Source: JICA Study Team 2010

Figure 12.2.4 On-lending Loan for Distribution

12.2.3 Recommended Project Structure

Table 12.2.1 summarizes the comparison of the advantages and disadvantages of the options discussed above. Among the four options, Option 2 (Expanded APBN Project Scope) is recommended to be adopted as the project structure for the proposed sector loan because it secures more funding for distribution facilities and increases control over the project scope. It is likewise more adaptable to the present SPAM IKK program framework due to its moderate requirement for regulatory/institutional adjustments.

Table 12.2.1 Comparison of Project Structure Options

Options		Option1 Present Structure with Sector Loan Funding	Option 2 Expanded APBN Project Scope	Option 3 Single Contract with Mixed Funding	Option 4 On-lending Loan for Distribution
Advantages	Adaptability to present SPAM IKK program	✓✓	✓✓	–	✓
	Secured funding for distribution facilities	-	✓	✓	✓✓
	Control/ coordination over entire sub-project	-	✓	✓	-
Disadvantages	Risk of incomplete distribution facilities	XX	X	-	-
	Regulatory Adjustment Required	-	X	XX	-
	New institutional setup required	-	-	X	-
	Limited number of eligible PDAM	-	-	-	XX
	Weak monitoring	XX	-	-	X
Total Score		**-2**	**+2**	**-1**	**+/- 0**

Source: JICA Study Team 2010

12.3 Spread-out Strategy of the Project Concept

Apart from the financial assistance of the sector loan, its concept can be adopted to other SPAM IKK projects. Especially, the reinforcement of the provincial SatKer's functions should be prioritized to improve the whole SPAM IKK program. The proposed institutional setup at the provincial level may also be duplicated in other provinces to ensure more involvement of Dinas PU and PDAMs in SPAM IKK projects from the planning to implementation stages. During the implementation of sector loan project, technical assistance through consulting services should disseminate the lessons learned to other provinces.