Ministry of Health, Labour and Welfare
Japanese Government

Study on Improvement of FS for Water Supply System Development in Southern Bali Area the Republic of Indonesia Fiscal Year 2019 (Period 1)

January 2020

Sansui Consultants Co., Ltd.

Exchange Rate (as of January 10, 2020)

1 USD =13,744 IDR **(**Indonesian Rupiah**)**
1 IDR = 0.008 Yen
1Yen = 124.3 IDR

Study on Improvement of FS for Water Supply System Development
in Southern Bali Area, the Republic of Indonesia, Fiscal Year 2019 (Period 1)

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Summary

S.1 Business Background

S.1.1 Background

The Republic of Indonesia (hereinafter referred to as "Indonesia") is located in Southeast Asia and the capital city is Jakarta. Located almost equatorial south of the Indochina Peninsula, it borders Papua New Guinea in the east and faces the Australian continent. It borders Philippines in the northeast, Singapore in the northwest, and Malaysia, and faces the Indian Ocean in the south.

In this project, SARBAGITA Region, which consists of Denpasar city and Badung, Gianyar, and Tabanan Regencies in southern Bali Province, is operated by PDAM, a public utility under the jurisdiction of each city and regency, to provide public water supply services. In Bali, population growth and an increase of tourist number are expected, especially in southern Bali, due to future economic development, and the development of infrastructure for the future has become an urgent task. Against this background, measures to cope with the increasing water demand have been under consideration for some time. Until now, the World Bank, Japan International Cooperation Agency, Japan International Corporation of Welfare Services, and others have formulated various water supply development projects, and some of them have proposed the introduction of private-sector funds as financial resources, but none of these projects have been realized.

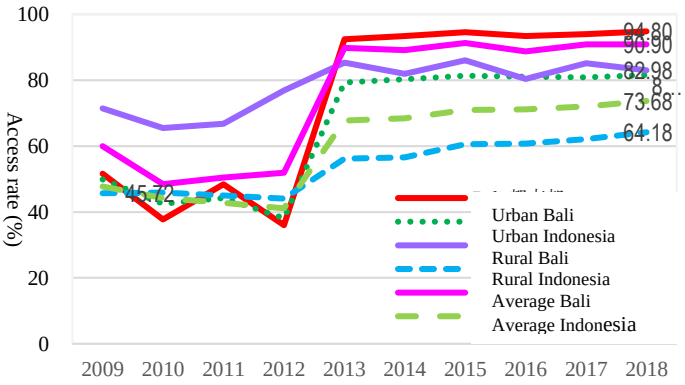
S.1.2 Purpose

The purpose of this operation is to improve the ability of central and local governments in developing countries to formulate water supply project, and to promote the formation of high-quality and highly skilled projects in which Japan's knowledge and experience can be fully utilized. This is achieved through the provision of advice and guidance based on professional and technical knowledge, which contributes to the formulation of projects to solve specific problems in the water supply sector (facility development, management and maintenance, human resource development, etc.).

S.2 Current Status and Problems of Water Supply Projects in SARBAGITA Region

S.2.1 Current Status of Water Supply Business

Indonesia's National Medium-Term Plan aims to achieve 100 % access to safe drinking water by 2019. However, the figure for 2018 is as shown in Figure S-1, the state of achievement is severe. The access rate in Bali Province is higher than the national average, and the access rate in rural areas is higher than the urban rate until 2012, which is distinctive of the national average transition.



Source : BPS-RI, Susenas 2009-16

Figure S-1 Access Rate to Safe Drinking-Water 2009-2018

Other water sources include pumped water, bottled water, wells, springs, river water, rainwater, etc. Bottled water has increased from 0.86 % in 2000 to 29.50 % in 2015 across the country, and the contribution of bottled water is increasing. However, because bottled water used by residents in areas without piped water supply, especially the poor, is a relatively expensive resource, the development of piped water supply systems is also an urgent issue from the viewpoint of poverty alleviation.

In the SARBAGITA Region, urban water supply is implemented in Denpasar City and Badung, Gianyar,

and Tabanan Regencies. Each PDAM has plural water supply systems (hereinafter referred to as SPAM) and groundwater such as deep wells owned by PDAM.

A common feature of the four PDAMs is the installation of small-scale distribution ponds (50-200 m^3). In addition, groundwater is frequently used, and many small wells of several liters/sec are used.

Table S-1 shows the current status of the existing water supply facilities owned by the four PDAMs.

Table S-1 Strategic Plan for Water Supply

Item	Denpasar	Badung	Gianyar	Tabanan
Number of Water Treatment Plant (WTP)	4	2	2 (BBT & Petanu)	7
Capacity (ℓ/sec)	500/50/150/150	-	200 & 350	1 WTP (8lt/s) Lalanglinggah
Location	Belusung Waribang	-	BBT (Payangan) Petanu (Blahbatu)	Desa Lalanglinggah
Commencement of operation	1995/2000/2003/2017		BBT in 2008 BBT in 2014	TH 1996
Number of distribution reservoirs	5	12	27	54
Major distribution reservoir capacity (m^3)	12,700	1,400	5,230	-
Number of pumping stations	7	-	-	20
Water intake amount (ℓ/sec)	1,364	-	1,019	Potential capacity: 2,881.81 Actual one: 803.90
Groundwater chlorine concentration (mg/ℓ)	325 (Regulated value 250)	--	-	-
Planning capacity (ℓ/sec)	1,457	1,432	823	849
Actual production (ℓ/sec)	1,218	1,251	716	610

Source : Survey Team

The pipe length of PDAM Denpasar is about 1,600 km, 40 % of which are aged over 40 years. In addition, polyvinyl chloride (PVC) pipes are commonly used for each PDAM.

Table S-2 shows the current status of existing water pipes owned by each PDAM.

Table S-2 Existing Water Pipes owned by each PDAM

Item	Denpasar	Badung	Gianyar	Tabanan
Length of water pipe (m)	4,106	50,527	No data	94,437
Length of distribution pipe (m)	1,605,005	1,350,529	1,180,964	849,936

Source : Survey Team

S.2.2 Problems with Water Supply System

(1) Problems with Water Supply System

In Indonesia, decentralization has been implemented since January 2001 in accordance with the Local Autonomy Law (Law No. 22 of 1999) and the Law No. 25 of 1999 (Law No. 25 of 1999). However, since water supply projects are entrusted to local governors and mayors, it is difficult to reflect national policies. Therefore, securing funds for development has become an important issue for water supply projects. On the other hand, PDAM, which is responsible for the water supply business, also faces a number of challenges in management, finance, and technology. The financial system for the financing of the water supply sector is challenging, and the water supply coverage rate is not improving.

As shown in Table S-3, the strategic plan (RENSTRA 2010-2014) prepared by the Department of Human Settlements of the Ministry of Public Works and National Housing (Cipta Karya) should continue to address the following issues related to water supply projects in Indonesia.

Table S-3 Strategic Plan for Water Supply System

Classification	Item
Organization and System	1) Local water utilities and staff capacities remain low. 2) Improving awareness of the mission and role of water utilities and its staff is necessary. 3) Staff recruitment is not carried out in line with the human resources development program, and basic water utilities operating rules are not observed.
Fund Procurement	1) Funding for water supply facilities is difficult due to low water tariff and a large amount of debt. 2) Much of the funding for water supply facilities development depends on foreign loans rather than on domestic sources. 3) Funding engagement and low priority for local governments to develop water supply facilities.
Issues of Water Sources	1) Limited water availability due to inadequate source management. 2) The quality of the water source has deteriorated due to an increase in the inflow of wastewater from untreated households and factories. 3) Due to the priority of local water rights, there are conflicts in the use of water sources across administrative boundaries. 4) There are conflicts among water users due to inadequate control of water rights of water sources.
Water Services	1) Water leakage rates in distribution networks are high (30-50 %) averaging 37 % and water pressure in distribution networks remains low. 2) Urban water services are limited to middle-and higher-class areas and not supplied to poor areas. As a result, poor people procure high-priced water.
Private Sector Participation	1) Enterprises and society still have low interest in water service business.

Source : RENSTRA 2010-2014, strategic plan prepared by Cipta Karya

(2) PDAM Issues in SARBAGITA Region

(a) Insufficient Water Supply

The island of Bali, SARBAGITA Region, are home to many tourist destinations and there is concern that water supply will be insufficient due to the increasing population and the increase in tourists. Demand forecasts are discussed in FS 2015, and the target year is 2034. Tables S-4 and S-5 show the current status and regional characteristics of each city/regency in the SARBAGITA Region, and changes in water demand.

Table S-4 Current Situation and Features of SARBAGITA Region

Name	Population, area size, Population density (2014)	Regional Characteristics and Water Resource Development
Denpasar City	Population: 856.412 Area: 127.78 km^2 Population density: 67.0 persons/ha	• It is home to Sanur, the island's third largest tourist destination. • Water supply shortage due to population increase is expected. • There are no new water sources in the city, and water supply services are provided by PDAM Badung and PT. Tirtaartha Buanamulia (PT. TB).
Badung Regency	Population: 590,062 Area: 418.52 km^2 Population density: 14.1 persons/ha	• With the largest tourist destinations in Bali, Kuta, Nusa Dua and Legian • These area are served by PT.TB, a private water company with 45 % PDAM ownership (the remaining 55 % is from three private companies in Bali and Jakarta). • Bali International Airport is connected to the water supply network of PDAM, but because of the shortage of water, groundwater from deep wells on the site supplies the majority of the water in the airport.
Gianyar Regency	Population: 510,180 Area: 360.0 km^2 Population density: 13.9 persons/ha	• The island is home to Ubud, the fourth tourist area on the island, and there are concerns about insufficient water supply. • It has a developable water source, but it is financially impossible to develop its own water.
Tabanan Regency	Population: 457,114 Area: 839.3 km^2 Population density: 5.4 persons/ha	• Rivers and groundwater are used. • It has a developable water source (surface water), but it is financially impossible to develop its own water.

Source : Survey Team

Table S-5 Transition of Water Demand in SARBAGITA Region

Name of City/Regency	Supply (ℓ/sec)	Demand (ℓ/sec)			
	2015	2018	2023	2028	2034
Denpasar	1,625.0	2,198.5	3,223.7	4,435.2	6,095.5
Badung	1,103.7	1,645.8	2,629.7	3,942.5	6,006.7
Gianyar	428.8	810.5	1,073.4	1,333.8	1,622.2
Tabanan	219.4	381.4	533.2	672.7	804.6
Total	3,376.9	5,036.2	7,460.0	10,384.2	14,529.0

Source : FS 2015

(b) Inconsistent Water Supply Facility Projects

In Southern Bali, supply has not been able to keep pace with the increase in demand due to the increase in population and tourists. In response, the projects determined independently by each PDAM are not consistent with the regional water supply projects spanning plural cities and regencies, and the current situation is not understood in detail. Therefore, the water supply projects overlapped, and were unevenly distributed within the same city and regency.

(c) Salinization and Subsidence due to Excessive Groundwater Exploitation

Groundwater flows are very small relative to its enormous abundance. Therefore, the groundwater level drops due to excessive groundwater exploitation. Significant groundwater degradation can lead to sequential groundwater exploitation failures from shallow wells. When the sea is close to the ground, the sea water penetrates deep into the ground water, and the groundwater becomes saline. Once salinization begins, it takes a long time to recover, and treatment with an expensive reverse osmosis membrane (RO) rather than a conventional treatment method is required to reduce salinity. The groundwater chloride ion concentration (Cl^-) is, according to the WHO Guidance on Water Quality Standards, limited to about 200 mg/ℓ and 300 mg/ℓ for agricultural use, considered to cause growth impairment in most crops at 500 mg/ℓ and above. The standard chloride ion concentration in drinking-water in Indonesia is 250 mg/ℓ, but the chloride ion concentration in groundwater from deep wells in Denpasar has already exceeded the standard of 325 mg/ℓ.

On the other hand, excessive sampling of groundwater reduces the pore pressure within the stratum, squeezes the groundwater in a soft clay layer, shrinks the clay layer, and settles the ground. Low-lying areas due to land subsidence are vulnerable to storm surges and floods. It occurred in the center of Denpasar City and the northern part of Badung Regency. In Denpasar City, groundwater is currently cheaper and is likely due to the large number of users of groundwater and the large number of deep wells used in the northern part of Badung Regency.

S.3 Project to Instruct

S.3.1 Outline of the Project

As a solution to the problems described in (2) above, the proposed project is combination of development study and technical cooperation (improvement of the NRW rate and groundwater exploitation regulations). The purpose of development study is to increase the water supply and that of technical cooperation is to promote the effects of the facilities to be constructed.

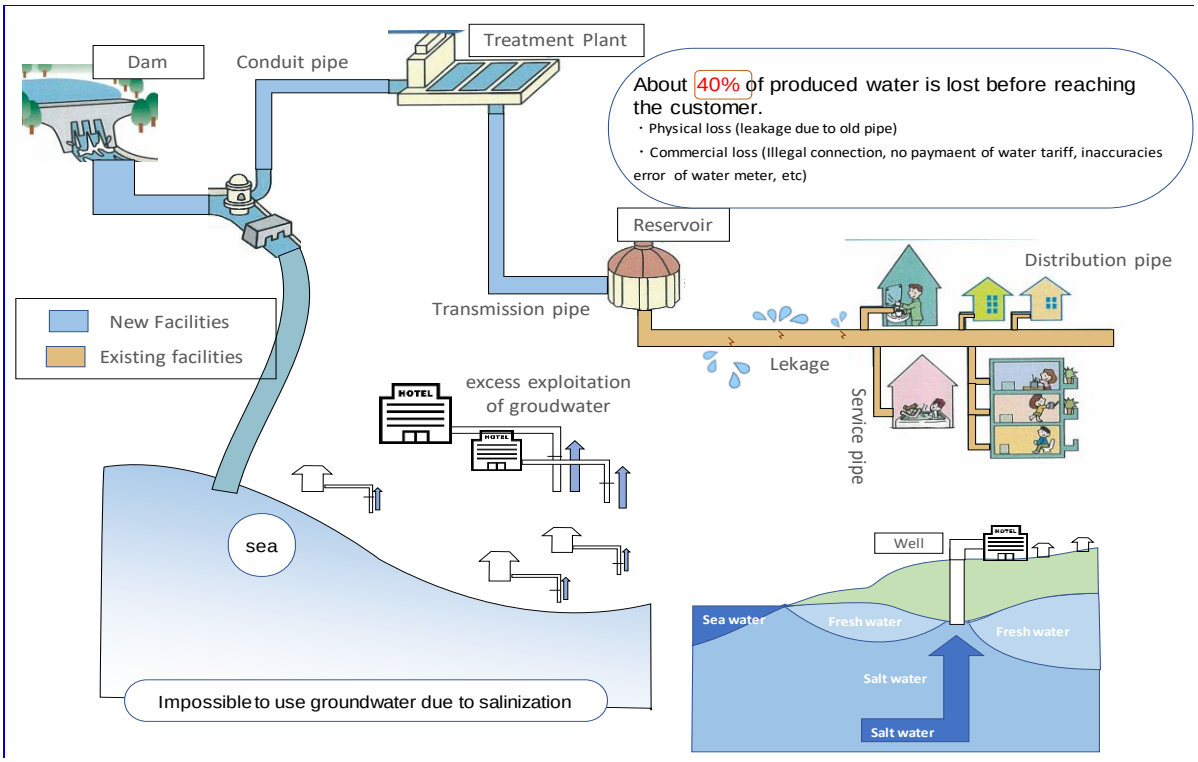
The reasons for inclusion of technical assistance projects are as follows.

(1) Even if new water supply facilities are constructed, as shown in Fig. S-2, the area up to the distribution reservoir will be constructed, and the subsequent water will be supplied via the existing water pipes. However, the NRW rate for these facilities is high at around 40 %. If these water pipes are left unchanged, even if new facilities are constructed and the water supply volume is increased, only about 60 % of them will be supplied to the terminal facilities.

(2) Commercial facilities such as hotels in major tourist destinations consume large quantities of water, but they are not required to install a water meter for groundwater exploitation, and

groundwater usage fees are lower than those for piped water by PDAM.

As a result, groundwater exploitation volume is increasing, and groundwater salinization in coastal areas and land subsidence in inland areas are occurring.



Source : Survey team

Figure S-2 Issues to be expected without Technical Cooperation in Proposed Project

Table S-6 Overview of Technical Cooperation for Development Planning

Action Items	Description	Specific Survey Items
Review of the MPs in the southern Bali	• Analysis of existing water supply facilities and services in the project area • Preparation of a water resource utilization plan that is consistent with the water demand forecast in the project area and the water supply plan of each PDAM and wide area • Review and formulation of water supply MP	• Existing water supply MP review • Collection and analysis of existing data and information • Urban planning, land-use planning, and arrangement of natural, social and economic conditions • Survey of the current state of water supply facilities • Review of areas subject to water supply plans
FS of priority projects and identification of emergency projects	• Priority Project Selection and FS Formulation • Strengthening Water Supply Planning Capacity of Officials of Relevant Agencies (Bali, each PDAM)	• Revision of basic plan specifications (population, basic unit, etc.) • Extraction of the progress and issues of water source plans (each PDAM and regional plans) • Water pipeline planning • Plan for reservoir • Water supply plan • Phased water supply development plan • Review of estimated operating expenses • Economic and financial assessments • Proposals for priority projects • Priority project FS
Capacity building for regulating groundwater over-exploitation	• Capacity building of PDAM officials in regulating water exploitation • Increase in each PDAM's income due to groundwater charge collection • Control of salinity intrusion and ground subsidence	• Transition survey of national and state groundwater regulations • Status of enactment and operation of ordinances (if enacted) • Identification of operational issues • Implementation of registration system of

Action Items	Description	Specific Survey Items
		groundwater user • High-efficient meter installation and appropriate groundwater tariffs in accordance with the amount of extracted water
Capacity building and dissemination support for NRW reduction measures	• Capacity building of each PDAM staff for water-free management • Strengthening the capacity of each PDAM staff to detect and repair water leaks	• Basic knowledge and education for reducing non-repair water • Formulation and implementation of pilot activity plans • Promotion of installation, renewal, and calibration of water measuring instruments • Guidance for improving the ability of metering staff • Leak detection and repair activities (training, on-the-job training, preparation of manuals) • Promotion of NRW water measures in other cities • Evaluation and proposal of effects
Introduction of Anti-seismic technology		• Introduced in the above facility design

S.3.2 Emergency and Priority on the Part of the Recipient Country for the this Project

This project is positioned as a regional water supply project promoted by the central government. In recent years, the improvement of the access rate to safe drinking water in rural areas has improved, however in urban area, this rate has gradually decreased. Therefore, it is necessary to rectify this situation by providing support for urban water supply. This project has an important position as assistance for urban water supply.

S.4 Conclusion

(1) Japan's Basic ODA Policy for Indonesia

(a) Ultimate Goal

In order to achieve balanced development in Indonesia, Japan will provide support for improving international competitiveness and realizing a safe and fair society through high quality infrastructure development, etc. Japan will also provide support for improving capacity to respond to the challenges facing the Asian region and the international community.

(b) Priority Areas (Medium-Term Goals)

1) Support to enhance International Competitiveness

In order to achieve economic growth in the globalizing Indonesian economy by enhancing the international competitiveness of private enterprises, Japan will provide with assistance for the development of business and investment environments and human resources through the development of high-quality infrastructure such as transport, logistics, energy and telecommunications networks, and the improvement of various regulations and systems.

2) Assistance toward the Realization of a Safe and Fair Society through Balanced Development

In order to realize a safe and fair society, in order to improve the quality of life, the Government will support the development of not only large cities but also rural areas, and the improvement of administrative functions such as disaster prevention measures.

(2) Positioning of this Project

With regard to the medium-term targets (b) in particular 2), cooperation will be provided to promote

regional development, agriculture, fisheries, and other regional industries. This will be done at the beginning of the year to assist in improving the living environment in the areas, such as water supply, sewage and waste, and to promote balanced development by correcting the growing regional disparities accompanying economic growth, in order to improve the quality of life. In addition, Japan and Indonesia are both disaster-prone countries, and Japan and Indonesia will strive to build a cooperative relationship by making use of the knowledge and experience of both countries and share their experiences with the world.

This project, the South Bali Water Supply Development Project, can be said to have exactly been in conformity with 2) above. Indonesia, like Japan, is a country prone to earthquakes and suffers severe damage from earthquakes once in a few years. As the region is on average 400 or more earthquakes with a magnitude of 4 or more each year, the introduction of anti-seismic technology for water supply facilities is essential to minimize the damage caused by the earthquake.

In accordance with Japan's basic policy on ODA to Indonesia, the present state of water supply projects in the SARBAGITA Region in South Bali and the necessity for the development of water supply facilities are considered to be of high urgency and relevance for this project, including support for the formulation of water supply project incorporating anti-seismic technology, reduction of the NRW rate, and measures to control groundwater exploitation. In particular, while the reduction of the NRW rate and the control of groundwater exploitation are steady activities, the improvement of the financial position of PDAM and the supply of high-quality groundwater at a reasonable price ultimately contribute to the improvement of the living environment of local residents through the improvement of the water management capacity of PDAM and the improvement of water supply services.

Basic Profiles

Key Economic Indicators

Indicator	2015
Population	Approximately 255 million people
National land area	Approximately 1.89 million square kilometers
% of urban population	53.70 %
GDP per capita	3,605 USD
Economic growth rate	4.8 %
Ratio of Employment Population by Industry	Primary industry 13.7 %, Secondary industry 40.3 %, Tertiary industry 46 %
External debt stocks	354.35 billion USD (2017)
Classification	Lower Middle Income Countries (DAC Classification)

Source : Ministry of Land, Infrastructure, Transport and Tourism Country Data Book 2018

Major indicators of the Millennium Development Goals (MDGs)

Indicator	Unit	Basic data		Latest data	
Percentage of people living on less than $1.25 a day	%	54.3	(1990)	16.2	(2011)
Net enrolment ratio in primary education	%	97.9	(1990)	95.3	(2012)
Ratio of girls to boys in primary education (number of girls with boys as 1)	Person	0.96	(1990)	1.0	(2012)
Under-five deaths per 1,000 live births	Person	84.3	(1990)	29.3	(2013)
Maternal deaths per 100,000 live births	Person	446	(1990)	126	(2015)
HIV prevalence among people aged 15-49 (estimated annual incidence per 100 people)	%	0.02	(1990)	0.06	(2013)
Proportion of population using an improved drinking	%	69.5	(1990)	87.4	(2015)

Source : MOFA Country Data Book 2016

Infant Mortality Rate, Maternal Mortality Ratio and Life Expectancy at Birth

Indicator	1990	2000	2010	2015
Infant mortality rate (/1000)	62	35	27	22
Maternal mortality ratio per 100,000 live births	-	-	220 2010 Adjusted Value	126 (2015 Adjusted)
Life expectancy at birth (years)	-	66	69	69

Source : The State of the World Children

Location Map

Island of Bali

Photo Album 1/3

No.1 First kick-off Meeting (Jakarta)

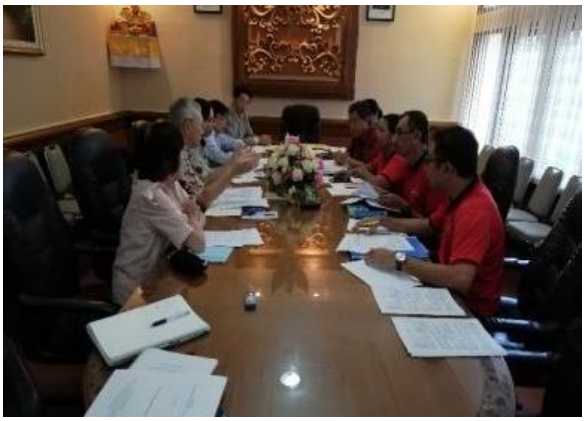
(Joint consultations with PUPR and BAPPENAS at the Ministry of Public Works and Housing) 13 participants

No.2 Consultation with BPPW Bali

(Human Settlement Center at Bali Region)

No.3 Consultation with UPTD

(Regional Agency of Technical Development for Water Supply of Bali Province)



No.4 Discussions with BAPPEDA Bali

(Regional Development Planning Agency for Research & Development at Bali Province)

No.5 First kick-off Meeting (Bali)

32 attendants

No.6 Discussions with PDAM Badung

Photo Album 2/3

No.7 Discussion with PDAM Denpasar

No.8 Discussions with PDAM Gianyar

No.9 PDAM Tabanan appearance

No.10 Second Wrap-up Meeting (Bali)

45 attendees

No.11 Second Wrap-up Meeting (Bali)

Group picture

No.12 Second wrap-up meeting (Bali)

Minute of Meeting Signature

Photo Album 3/3

No.13 Brushn Water Treatment Plant (Denpasar)

No.14 Brushn Water Treatment Plant

Explanation at the Brushn Water Treatment Plant.

No.15 Sedimentation Tank in Brushn Water Treatment Plant

No.16 Filtration Tank in Brussels Water Treatment Plant

No.17 Chemical Injection Facilities in Brushn Water Treatment Plant

No.18 Chemical Injection Facilities in Brushn Water Treatment Plant

Definition and Abbreviation

Abbreviations	Official name	English name
ADB		Asian Development Bank
APBD	Anggaran Pendapatan dan Belanja Daerah	Local government budget
ASEAN	Association of South-East Asian Nations	Association of Southeast Asian Nations
BAPPEDA	Badan Perencana Pembangunan Daerah	Regional agency for planning and development
BAPPENAS	Badan Perencanaan Pembangunan Nasional	Ministry of National Development Planning
BLU	Badan Layanan Umum	Public service agency
BOT		Build Transfer Operate
BPPSPAM	Badan Peningkatan Penyelenggaraan Sistem Penyediaan Air Minum	Water Supply Development Support Agency
BPPW	Balai Prasarana Permukiman Wilayah Bali	Human Settlement Center at Bali Region
BPS	Badan Pusat Statistik	Statistic Indonesia
BWS	Balai Wilayah Sungai Bali-Penida	Water Resource Agency at Bali Province
Cipta Karia	Direktorat Jendral Cipta Karya	Directorate General of Human Settlements
Dinas PUPR	Dinas Pekerjaan Umum Dan Penataan Ruang	Local Agency of Public Works and Spatial Planning
DPU	Badan Layanan Umum	Department of Public Works
DWSD		Directorate of Water Supply Development
EIA		Environmental Impact Assessment
FS		Feasibility study
GCA		Government Contracting Agencies
IIGF		Indonesia Infrastructure Guarantee Fund
IPA	Instalasi Pengolahan Air	Water Treatment Plant
JICA		Japan International Cooperation Agency
M/P		Master plan
ODA		Official Development Assistance
PDAM	Perusahaan Daerah Air Minum	Drinking Water Supply Company
PERPAMSI	Persatuan Perusahaan Air Minum Selurch Indonesia	Indonesia Water Supply Association
PLN	Perusahaan Listrik Negara	State Electricity Company
PPP		Public-private partnership
PPPB, PUPR	Peraksannan Prasarana Permukiyan Wilayah Bali	Bali Regional Center, Human Settlements Division, Ministry of Public Works and National Housing
PT.	Perseroan Terbatas	Company limited by Shares
PUPR	Kementerian Pekerjaan Umum dan Permahan Rakiat	Ministry of Public Works and National Housing
SARBAGITA	Denpasar, Badung, Gianyar and Tabanan	4 Sites (Denpasar, Badung, Gianyar, Tabanan)
SATKER	Satuan Kerja	Working unit
SDA	Direktorat Jendal Sumber Daya Air	Directorate General of Water Resources
SDGs		Sustainable Development Goals
SPAM	Sistem Penyediaan Air Minum	Water Supply System
STEP		Special Terms for Economic Partnership
UPTD	Usaha Pengembangan Teknik Daerah. Penyediaan Air Minum, Provinsi Bali [Eng]Regional Agency of Technical Development for Water Supply of Bali Province	Bali Department of Technology and Development (Water)
VGF		Viability Gap Funding
WHO		World Health Organization

Chapter 1 Introduction

1.1 Purpose

1.1.1 Background

The Republic of Indonesia (hereinafter referred to as "Indonesia") is located in Southeast Asia and the capital city is Jakarta. Located almost equatorial south of the Indochina Peninsula, it borders Papua New Guinea in the east and faces the Australian continent. It borders the Philippines in the northeast, Singapore in the northwest, and Malaysia, and faces the Indian Ocean in the south.

SARBAGITA (Denpasar-Badung-Gianyar-Tabanan) Region is comprised of Denpasar city and Badung, Gianyar and Tabanan Regencies in southern Bali. PDAM, which is a public utility under the jurisdiction of each municipality, provides public water supply services. In Bali, population growth and an increase in the number of tourists are expected, especially in southern Bali, due to future economic development, and the development of infrastructure for the future has become an urgent task. Against this background, measures to cope with the increasing water demand have been under consideration for some time. Until now, the World Bank, Japan International Cooperation Agency, Japan International Corporation of Welfare Services, and others have formulated various kinds of water supply development plans, and some of them have proposed the introduction of private-sector funds as financial resources, but none of these projects have been realized.[1]

1.1.2 Purpose

The purpose of this survey is to improve the capability of central and local governments in Indonesia to formulate water supply project, and to promote the formation of high-quality and highly skilled projects in which Japan's knowledge and experience can be fully utilized. This is accomplished through the provision of advice and guidance based on professional and technical knowledge, based on information on specific issues in the water supply sector (facility development, management and maintenance, human resources development, etc.), which Japanese companies and water utilities are independently aware of, and on the basis of public-private cooperation.

1.2 Processes and Methods

Table 1-1 shows the survey schedule. The survey period is approximately six months, and the period of submission of the report is also shown in Table 1-1. Table 1-2 shows the content of the survey.

Table 1-1 Survey Schedule

Item		2019					2020
		August	September	October	November	December	January
Domestic work							
	Preparation (implementation policy, etc.)		■■■■■		■■■■■■■■■■		■■■■■
	Investment, analysis				■■■■■■■■■■■■		■■■■■
	Preparation of a report						
On-site survey							
	On-site survey			■■■■			
	On-site instruction			■■■■			
Submission of report							
	Draft report			■			■
	Final Report						□
	Project Implementation Results Report						◎

Source : Survey Team

[1] The area of the Bali metropolitan area consisting of one city and three regencies of Badung, Gianyar, and Tabanan, formed under Presidential Decree No. 45 of 2011 and amended by Presidential Decree No. 51 of 2014.

Table 1-2 Content of Survey

Survey	Timing	Survey Content
Domestic work (1)	Late August to early October	· Review of existing plans, investigation, etc. · Preparation of contents of on-site instruction and schedule · Preparation of questionnaire · Drafting of report
On-site guidance	Mid-October	· Consultations with the Government of Indonesia, the Government of Bali and PDAMs and relevant organizations · On-site inspection
Domestic work (2)	Early November to January of the following year	· Preparation of a report

Source : Survey Team

1.3 On-Site Training Schedule

Table 1-3 Schedule of Survey

No.	Date		Stroke		Matters to be confirmed
1	10/14	Mon.	Moving from Haneda, Narita Jakarta		
2	10/15	Tues.	14:00-15:30	DITPSPAM & BAPPENAS	**First kick-off meeting in Jakarta** · Water Supply Initiatives for water supply system · Probability of introducing PPP schemes · Possibility for borrowing Yen loan
3	10/16	Wed.	8:00 - 9:00	Japanese Embassy	· Courtesy call with explanation of purpose and outline of the survey
			11:00-12:00	JICA Indonesia Office	As above
			Move from Jakarta to Denpasar		
4	10/17	Thur.	9:00 - 11:30	Satker, BPPW Bali, PUPR	· Arrangement of the schedule
			Afternoon	Internal meeting	
5	10/18	Fri.	7:30 - 9:00	BAPPEDA	· Confirmation of progress of FS 2015 · Acquisition of detailed information of MP in south Bali · Feasibility of introducing PPP scheme · Financial support of competence of PDAM
			10:00-12:00	PDAM Denpasar	1. Data Collection · Current problem of water supply · Business plan 2. Transitions in revising water tariff · Initiative by reflecting Bali MS · NRW countermeasures · Organizations and institution · Efforts to increase the water tariff collection rate · Efficient public relations and hearings · Field survey of water facilities
			Afternoon	Internal meeting	
6	10/19	Sat.	Collection pf materials and information		
7	10/20	Sun.	Afternoon	Internal meeting	
8	10/21	Mon.	7:30 - 9:00	UPTD PAM Bali	· Confirmation of the progress of FS 2015 · Acquisition of detail of MP · Feasibility of PPP scheme · PDAM's financial capability support
			13:00-14:30	PDAM Badung	Same as PDAM Denpasar
9	10/22	Tues.	11:00-13:00	PDAM Gianyar	Same as PDAM Denpasar
			16:00-18:00	BWS	· Confirmation of the progress of FS 2015 · Acquisition of detail of MP · Feasibility of a PPP scheme · PDAM's financial capability support
10	10/23	Wed.	10:00-13:00	Bali, four PDAMs	**First kick-off meeting (Bali)** · Introduction of the purpose of the survey · Request for cooperation in the survey · Issues to be solved
			13:30-14:30	PDAM Denpasar	Collection of data
11	10/24	Thur.	9:00 - 10:00	PDAM Badung	· Confirmation of interest in SPAN Ayung Project · Site visit
			10:30-11:30	Bellusung Water Treatment Plant	

No.	Date		Stroke		Matters to be confirmed
			14:00-15:30	PDAM Gianyar	· Confirmation of interest in SPAN Ayung Project · Site visit
			16:00-17:00	Air Jeruk Water Treatment Plant	
12	10/25	Fri.	10:00	PDAM Denpasar: Office & Belusung/Petanu Water Treatment Plant	· Confirmation of interest in the SPAM Ayung Project · Site visits
			14:00	PDAM Tabanan	
13	10/26	Sat.	Document arrangement and internal meeting		
14	10/27	Sun.	Document arrangement and internal meeting		
15	10/28	Mon.	Morning UPTD (Cancelled)		
			9:00 - 11:00	Internal meeting	· Confirmation of interest in the SPAM Ayung Project
			11:00-13:00	Satker, BPPW Bali, PUPR	
16	10/29	Tues.	8:00 - 10:00	BAPPEDA Bali Province, Dinas PUPR (Spatail Planning) Bali Province, UPTD Bali and BPPW Bali, PUPR	Report of the result of the survey · Future cooperation of the full-scale FS · Confirmation of interest in the SPAM Ayung Project · Drafting of MOM
17	10/30	Wed.	10:00-13:15	Bali, four PDAMs	**Wrap-up Meeting (2nd Bali)** · Report of the result of the survey · Future Cooperation of Full-Scale FS · MOM's signature
			Move from Denpasar to Jakarta		
18	10/31	Thur.	15:30-16:40	BAPPENAS	**Wrap-up Meeting (2nd Jakarta)** · Report of the result of the survey
19	11/1	Fri.	9:15 - 10:30	Japanese Embassy	· Report of the result of the survey
			11:15-13:00	JICA PPP expert	· Introduction of PPP activities in Indonesia
			Moving from Jakarta to Narita and Haneda		
20	11/2	Sat.	Narita and Haneda		

Source : Survey Team

1.4 Composition of the Team

The survey team members are shown in Table 1-4.

Table 1-4 Survey Team Members

Name	Assigned tasks	Affiliation
Ryuichi Morishita	Supervision of the survey	International Health and Cooperation Division, Office of Global Health Corporation, International Affairs Division, Ministry of Health, Labour and Welfare
Osamu Nakagome	Team leader/General Manager	Sansui Consultant Co., Ltd.
Shigeru Sugawara	Coordination of collaboration	Japan International Corporation of Welfare Services
Hiroko Kamata	Instruction on project planning	Sansui Consultant Co., Ltd.
Hiroyuki Kojima	Project Coordinator	Sansui Consultant Co., Ltd.

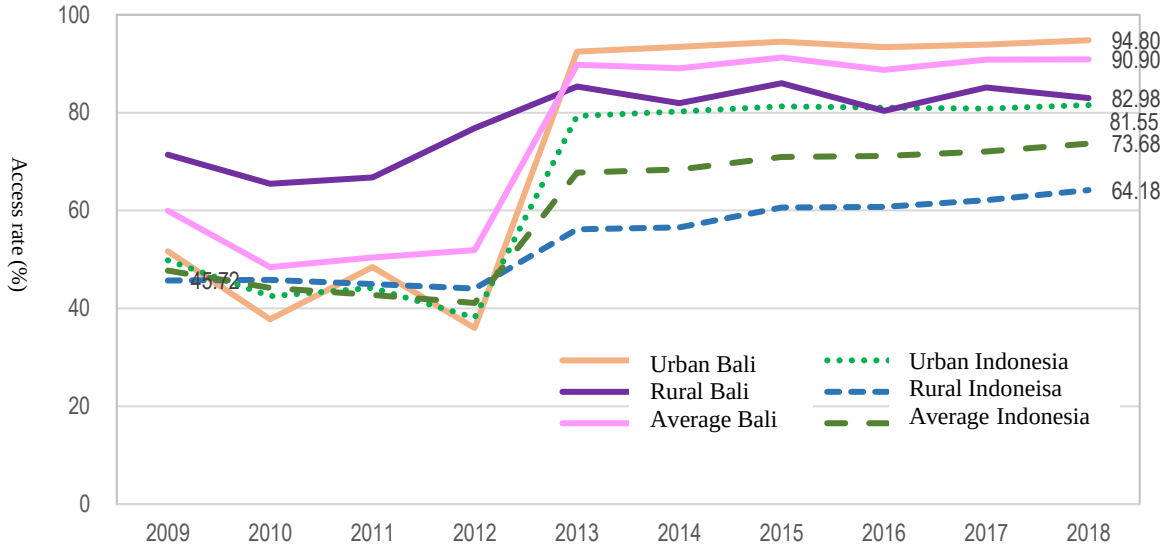
Source : Survey Team

Chapter 2 Understanding of the Current Status of Projects

2.1 Water Supply Operation and Problems

2.1.1 Current Status of the Water Supply Sector (at the National Level)

Indonesia's National Medium-Term Plan aims to achieve 100 % access to safe drinking water by 2019. However, this goal might be difficult to achieve based on the value in 2018 as shown in Figure 2-1. The access rate in Bali Province is higher than that in the national average, and the access rate in rural areas is higher than that in urban rate until 2012, which differs from Transition of national average.



Source : BPS-RI, Susenas 2009-16

Figure 2-1 Access Rate to Safe Drinking-Water 2009-2018

Pipe water coverage ratio dropped from 19.08 % in 2000 to 10.87 % in 2015 in Indonesia, and in particular from 45.37 % in 2000 to 14.37 % in 2015 in Jakarta.

Other sources besides tapped water include groundwater by pumped water, bottled water, wells, springs, river water, rainwater, etc. Bottled water has increased from 0.86 % in 2000 to 29.50 % in 2015 across the country, and the contribution of bottled water is increasing. However, because bottled water used by residents in areas without piped water supply, especially the poor, is a relatively expensive resource, the development of piped water supply systems is also an urgent issue from the viewpoint of poverty alleviation.

2.1.2 Problems in Water Supply Services (at the National Level)

(1) Strategic Planning Challenges

In Indonesia, decentralization has been implemented since January 2001 in accordance with the Local Autonomy Law (Law No. 22 of 1999) and the Law No. 25 of 1999 (Law No. 25 of 1999). However, securing funds for development is an important issue because national policies are difficult to reflect since water supply projects are entrusted to local governors and mayors, On the other hand, PDAM, which is responsible for the water supply sector, also faces a number of challenges in management, finance, and technology. The water supply coverage ratio is not improving due to the financial system of the water supply sector. In addition, PDAM is required to be either Perumda or Perseroda by the end of 2019 by the government regulation No. 54/2017 about regionally owned enterprises. After the reorganization, the city hall no longer intervenes in the past, making it possible to manage the water service enterprise more independently. (Please refer to 2.3.6 and Table 2.28).

As shown in Table 2-1, the strategic plan (RENSTRA 2010-2014) prepared by the Department of

Human Settlements, Department of Public Works and National Housing (Cipta Karya) should continue to address the following issues related to water projects in Indonesia.

Table 2-1 Challenges in Water Supply

Classification	Item
Organization and System	1) Local water utilities and staff capacities remain low. 2) Improving awareness of the mission and role of water utilities and its staff is necessary. 3) Staff recruitment is not carried out in line with the human resources development program, and basic water utilities operating rules are not observed.
Fund Procurement	1) Funding for water supply facilities is difficult due to low water tariff and a large amount of debt. 2) Much of the funding for water supply facilities development depends on foreign loans rather than on domestic sources. 3) Funding engagement and low priority for local governments to develop water supply facilities.
Issues of Water Sources	1) Limited water availability due to inadequate water source management. 2) The quality of the water source has deteriorated due to an increase in the inflow of untreated wastewater from households and factories. 3) Due to the priority of local water rights, there are conflicts in the use of water sources across administrative boundaries. 4) There are conflicts among water users due to inadequate control of water rights of water sources.
Water Services	1) The range of water leakage rate in distribution networks is high (30-50 %), and averaging 37 %, and water pressure in distribution networks remains low. 2) Urban water services are limited to middle-and higher-class areas and not supplied to poor areas. As a result, poor people are obligated to procure high-priced water.
Private Sector Participation	1) Enterprises and society still have low interest in water service business.

Source : RENSTRA 2010-2014, Strategic Plan prepared by Cipta Carya

In this way, PDAM in Indonesia is not well managed because of its excessive liabilities and poor management. However, the Solo Water Authority, established in 1929, plays an important role in sound financial management by active consumer groups. It is also responding appropriately to complaints and requests, and is working for cooperation between the environment around the water source and the neighboring community.

For PDAM, issues are summarized in 2.3.6.

(2) Privatization

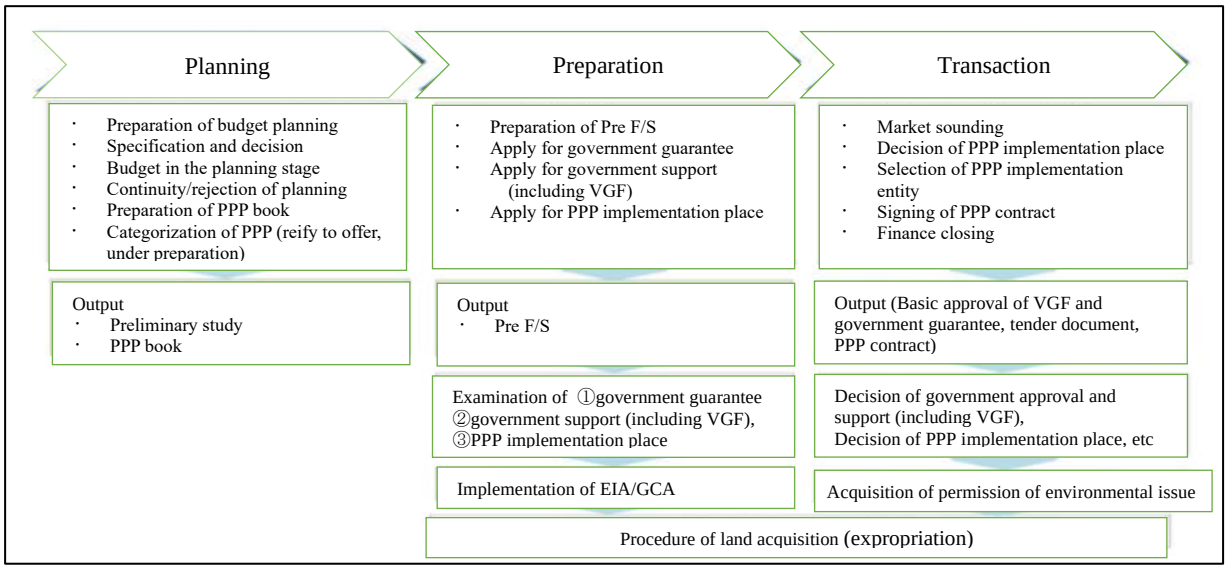
In order to achieve the goal of making Indonesia one of the world's 10 largest economies by 2025, the Indonesian government formulated the Masterplan for Acceleration and Expansion of Indonesia's Economic Development (MP3EII) in May 2011, which covers the whole of Indonesia. This plan is expected to be realized by building close cooperative relations between the central government, local governments, state-owned enterprises, and the private sector, and by making contributions through private funding. In the water supply sector, PPP and BOT based on the Presidential Decree (Water Management Act) coexist, as shown below.

In 2015, the Government enacted the Decree on the Drinking-water Supply System (No. 122/2015), which prohibited any direct contracts between local governments and private companies. In the future, the contracting entity for private companies will be limited to PDAM. In addition, since water supply projects are supposed to be carried out on the responsibility of public entities, the scope of projects that can be carried out by private business operators is limited to the development and operation management of water intake and water treatment plant, and the operation and management to improve the efficiency of the operation of water supply businesses based on contracts between PDAMs and private enterprises based on B to B Contract. Therefore, it is believed that it will be difficult for private business operators to carry out water supply projects under the concession method, which entrusts the operation of water supply businesses to the private sector. However, the scope of the project that private businesses can implement is not necessarily clear.

1) Based on Presidential Decree

In 2005, President Yudhoyono enacted the Presidential Decree on the PPP (No. 67, 2005), but in 2015, and later President Joko enacted the Presidential Decree on the PPP (No. 38, 2015), and the new presidential decree was effectively applied.

As of the end of 2016, eight projects had been selected and contracts concluded based on the new presidential decree, and finalized finances. These included one project for coal-fired thermal power generation in Central Java, two projects for the optical trunk network in central and western regions, one project for Umbura Water Supply, and four projects for toll roads. Figure 2-2 and Table 2-2 show the outline of the legal system related to the promotion of PPP water supply system in Indonesia.



Source : Project on Utilization of Water Supply to the Private Sector, June 2017 JICA

Figure 2-2 PPP Project Formulation Process based on Presidential Decree

Table 2-2 Outline of Legal Systems of PPP Scheme

Basic items	Detailed item			Description	
Basic laws and regulations	Basic laws related to private participation			Presidential Regulation Number 38 Year 2015	
	Basic water-related laws and regulations			Government Regulation No. 122/2015	
	Water-related policies			Regulation of Indonesian Minister for Public Works and National Housings No. 29 Year 2016	
Organization	PPP Association Organization	Ministry of Finance		Ministry of Finance	
		Approved organization		BAPPENAS	
		Organization dedicated to promoting private participation		PPP Center Unit, BAPPENAS	
	Relevant Organizations	Central Government	Development of water sources	Directorate General of Water Resources, Ministry of Public Works and National Housing	
			Water supply	Directorate General of Human Settlements, Ministry of Public Works and National Housing	
		Business Units		Perusahaan Daerah Air Minum (PDAM)	
Government support measures	Subsidy and VGF			The Ministry of Finance provides VGF (less than half of the total cost of construction)	
	Policy finance			PT Sarana Multi Infrastraktur (Personro) (PTSMI) (State-owned enterprises)	Investments and loans
				PT Indonesia Infrastructure Finance (PT IIF) (semi-governmental and non-governmental)	Long-term loans and guarantees
				Government Investment Center under the jurisdiction of the Ministry of Finance	Investments and loans through funds
	Public guarantee			Guarantee system established by Indonesia Infrastructure Guarantee Fund (IIGF), wholly owned by the Ministry of Finance	
Water supply and private activity	Performance (GWI data)			37 Cases (1990-2015)	
	Major forms of private participation			• 27 BOT cases (27 cases) • Utility Concessions (6 cases) • Joint Ventures (2 cases) • Book (1 case) • O & M Contract (1 case)	

Source : Project on Utilization of Water Supply to the Private Sector, June 2017 JICA

2) Under the laws and regulations of each sector (hereinafter referred to as the "Sector Law")

PPP projects usually refer to those implemented in accordance with the Presidential Decree on PPP. However, infrastructure projects have been opened to the private sector, and there are projects that can be referred to as "public-private partnerships" in a broad sense. These public-private partnerships in a broad sense are implemented not under the presidential decree but under the laws and regulations of each sector (hereafter referred to as the "Sector Act"). The main sectors are the electric power sector (independent power generation business), the toll road sector (BOT business), the water sector, and the special railway sector (inter-company transaction business).

Water supply projects are also expected to be promoted in the future, as PDAMs have begun to purchase water in bulk and do not bear the risk of customers' demand. The water sector-specific challenges in PPP implementation are shown in Table 2-3.

Table 2-3 Water Sector Specific Challenges in Implementing PPP in PDAM

Government contracting agencies	Project Formulation and Implementation Status	Sector-specific challenges to PPP implementation
PDAM	Tenders are expected for the following water supply projects: 1. Lampung 2. Pondockgede 3. West Semarang	• Previously, the government contracting agencies for PPP projects were local governments, but with the revision of the law (Decree No. 122 of 2015 and Ministerial Decree on Public Works, No. 19 of 2016), they have been converted to PDAM. • The financial position of PDAMs is often weak, and IIGF's guarantee of contract fulfillment of PDAMs is expected to become increasingly important in the future. • In order to ensure the profitability of water supply services, which are difficult to raise water tariffs, the government must provide financial support, such as VGF and Availability Payment.

VGF: Viability Gap Funding: Government Funding for PPP Projects
BOT: Build Transfer Operate: A method in which the private sector takes charge of construction and financing, transfers ownership to the public after completion, and then entrusts the operation to the same private sector for a certain period.
GCA: Government Contracts Agency
IIGF: Indonesia Infrastructure Guarantee Fund: Name of Indonesian Government Guarantee Agency
Availability Payment: PPP system in which compensation is paid for the results of the operation and management of a private business (concession company). Since the payment is not due to demand, it is a form of contract that is less risky for a private business than a fee collection system in which usage fees are financed by revenue. There is a need for appropriate performance indicators that are aligned with public sector service objectives as incentives for private sector operators.

3) Case of Jakarta

Privatization is expected to improve water services and revitalize water services, while private water utilities need to generate profits. Therefore, it is a problem that water tariff increases and water services stipulated in the original contracts are delayed.

For example, the Jakarta water supply project was privatized in 1998, but the contract target was to increase the water coverage ratio from 46 % to 75 % and reduce the NRW rate from 61 % to 25 % over a 10-year period. However, the water coverage ratio fell to 64 % and the NRW rate fell to 50 % in 2008, during which time the water tariff tripled.

Table 2-4 shows the water supply services in the six major cities. The privatized Jakarta City has the highest NRW rate (44 %) and the lowest water coverage (59 %), despite being the highest water tariff among six cities.

Table 2-4 Comparison of Water Supply Services in Major Cities

City name	Management	Average water tariff (Rp/m^3)	NRW rate (%)	Service rate (%)
Surabaya City	Public	2,800	34	87
Palembang City	Public	3,800	30	93
Banjarmasin City	Public	4,120	26	98
Medan City	Public	2,226	24	67
Malan City	Public	4,000	30	80
Jakarta City	Private	7,800	44	59

Source : The Indonesian Drinking Water Associations (Perpamsi) 2003

In 2011, a civil society group that viewed private companies as problematic appealed to President and Vice President, Minister of Public Works and National Housing, Governor of Jakarta, and two private

companies, claiming that water tariffs were set at high prices while water network development was delayed. After the district court (ruling of unconstitutionality and victory of plaintiffs) and the court of second instance (ruling of defeat of plaintiffs) in 2011, the Supreme Court decided on October 10, 2017, that the privatization of water services had failed to protect the rights of the inhabitants to water, and ① privatization of water services in Jakarta would be terminated by 2023. ② contracts with private water suppliers shall be void. ③ decision was taken to implement drinking water management in Jakarta in accordance with the "rights and values with respect to water" set out in articles 11 and 12 of the International Covenant.

2.1.3 Sanitation-related and Waterborne Disease Issues (at the National Level)

As shown in Table 2-5, Indonesia's health indicators show that the infant mortality rate per 1,000 live births in 2015 is 27.2 (per 1,000 live births) and the neonatal mortality rate per 1,000 live births (per 1,000 live births) is the fifth and fourth lowest among ten ASEAN countries. Therefore, it is necessary to reduce the mortality rate by almost half in order to achieve the SDG target (3.2) of 12 and 25. Indonesia has generally poor sanitation, and safe drinking water supply is an urgent issue among the ASEAN countries with which Japan has close socio-economic ties.

Table 2-5 Health Indicators (SDGs 3 and 6)

SDG Target	3.2		3.9	6.1
Target of 2030	Infant deaths <=12/1,000	Neonatal deaths <=25/1,000	Significant reduction in mortality caused by unsafe WASH services (%) (per 100,000 people)	Proportion of people using improved drinking-water sources = 100 %
ASEAN country	2015	2015	2012	2015
Singapore	2.7	1.0	0.1	100
Malaysia	7.0	3.9	0.4	98
Brunei	10.2	4.3	<0.1	-
Thailand	12.3	6.7	1.9	98
Vietnam	21.7	11.4	2.0	98
Indonesia	27.2	13.5	3.6	87
Philippines	28.0	12.6	5.1	92
Cambodia	28.7	14.8	5.6	76
Myanmar	50.0	26.4	10.4	81
Laos	66.7	30.1	13.9	76
Japan (2014)	2.7	0.9	0.1	100

Source : World Health Statistics 2016, WHO

The incidence of waterborne disease is shown in Table 2-6.

Table 2-6 Incidence of Waterborne Disease

Item	2015	2016	2017
Diarrhea	1,213	198	1,725

Source : Ministry of Health of the Republic of Indonesia, Indonesian Health Profile 2017-2018

2.1.4 Current Status of Water Supply Services (Target Areas)

This section provides an overview of the water supply systems of the four PDAMs that comprise SARBAGITA Region.

(1) Overview of Water Supply Facilities

In the SARBAGITA Region, PDAM in Denpasar City and Badung, Gianyar, and Tabanan Regencies implement the urban water supply. Each PDAM has plural water supply systems (hereinafter referred to as SPAM) and groundwater such as deep wells owned by PDAM. A common feature of the four PDAMs is the installation of small-scale distribution ponds (50-200 m^3). In addition, groundwater is often used, and many small wells of several liters/sec are used. However, there is also a leakage of water, and the supply of all PDAMs is insufficient to meet the current increase in demand. (See Table 2-10)

Table 2-7 shows the current status of the existing water supply facilities owned by the four PDAMs.

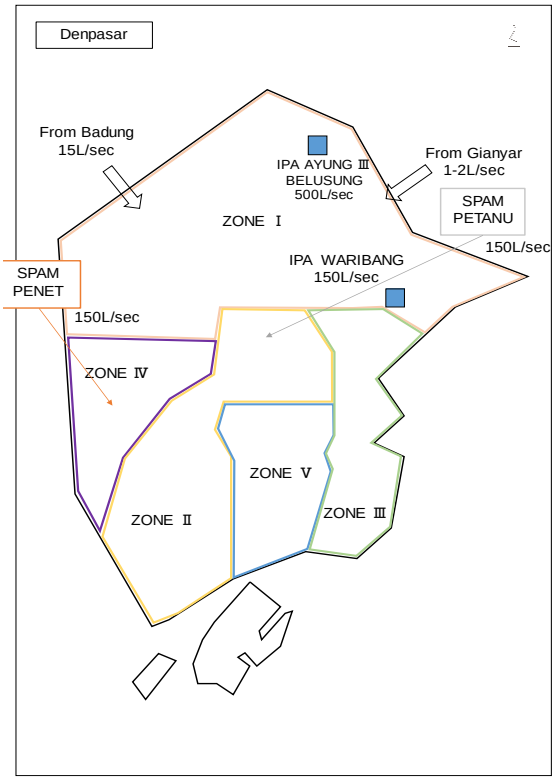


Figure 2-3 Water Supply Facilities in PDAM Denpasar

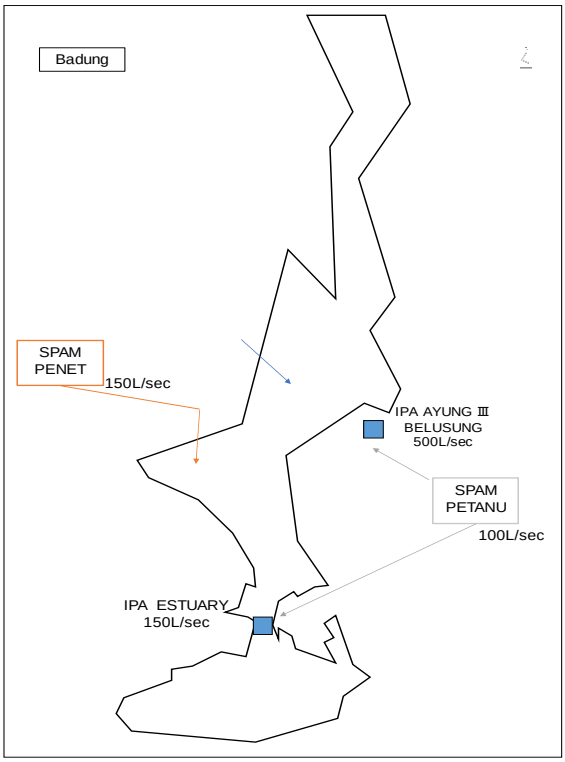


Figure 2-4 Water Supply Facilities in PDAM Badung

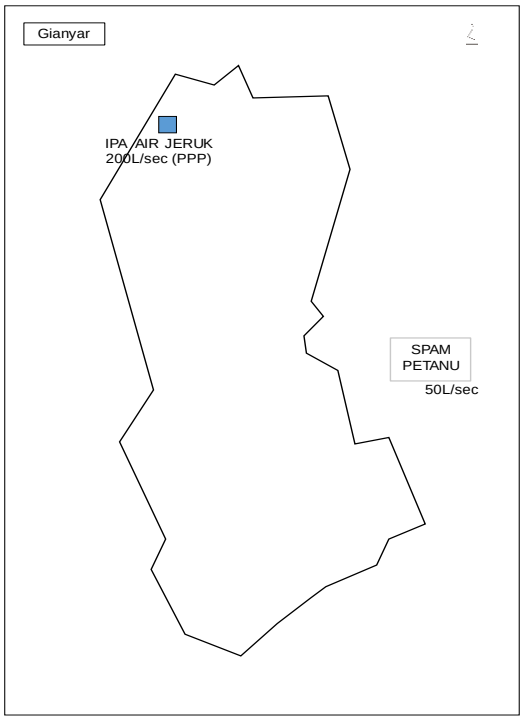


Figure 2-5 Water Supply Facilities in PDAM Gianyar

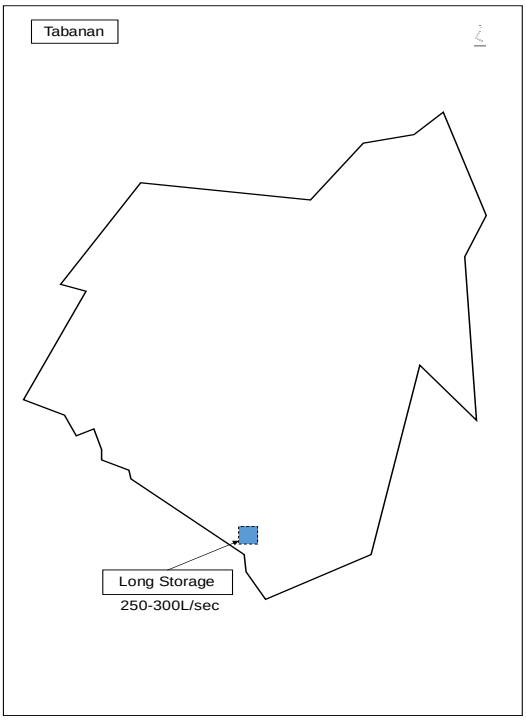


Figure 2-6 Water Supply Facilities in PDAM Tabanan

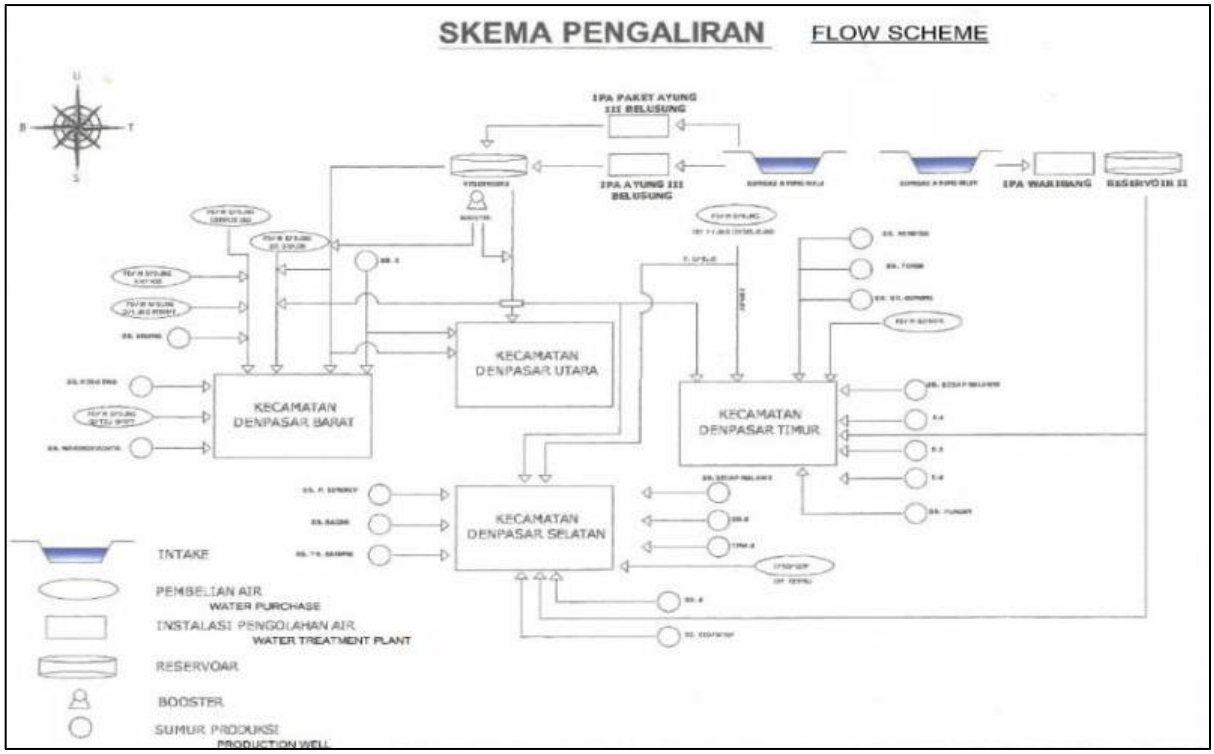
Table 2-7 Current Status of Existing Water Supply Facilities in each PDAM

Item	Denpasar	Badung	Gianyar	Tabanan
Number of water treatment plants (WTP)	4	2	2 (BBT & Petanu)	7
Capacity (ℓ/sec)	500/50/150/150	-	200 & 350	1 WTP (8 ℓ/sec) Lalanglinggah
Location	Belusung Waribang	-	BBT (Payangan) Petanu (Blahbatu)	Desa Lalanglinggah
Commencement of operation	1995/2000/2003/ 2017		BBT in 2008 BBT in 2014	TH 1996
Number of distribution reservoirs	5	12	27	54
Major distribution reservoir capacity (m^3)	12,700	1,400	5,230	-
Number of pumping stations	7	-	-	20
Water intake amount (ℓ/sec)	1,364	-	1,019	Potential: 2,881.81 (Actual: 803.9)
Groundwater chlorine concentration (mg/ℓ)	325 (Regulated value 250)	--	-	-
Planning capacity (ℓ/sec)	1,457	1,432	823	849
Actual production volume (ℓ/sec)	1,218	1,251	716	610

Source : Survey Team (based on interviews)

(2) Flow of Water Supply in each PDAM

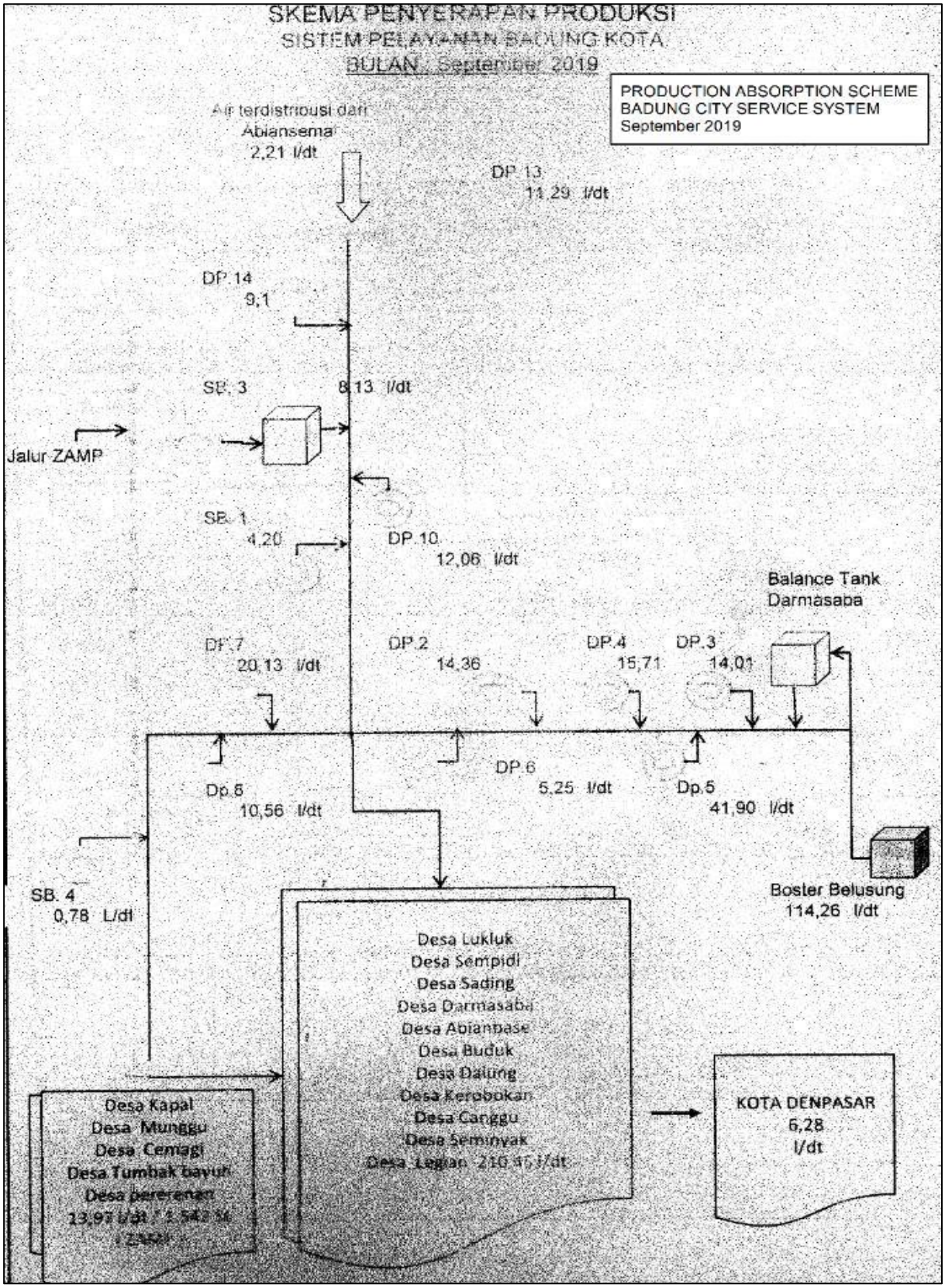
(a) Denpasar



Source PDAM Denpasar

Fig. 2-7 Flow of Water Supply in PDAM Denpasar

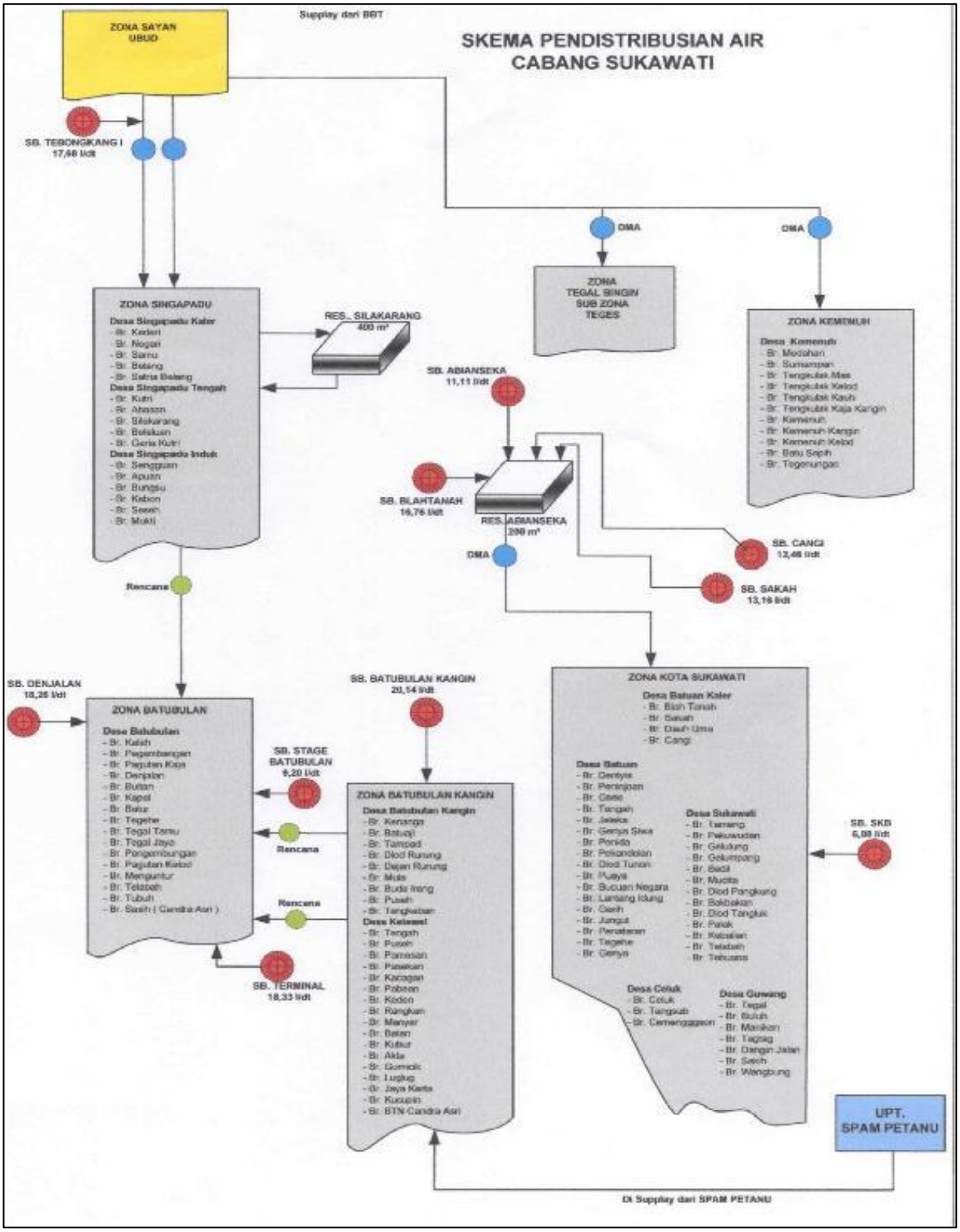
(b) PDAM Badung



Source: PDAM Badung

Fig. 2-8 Flow of Water Supply in PDAM Badung

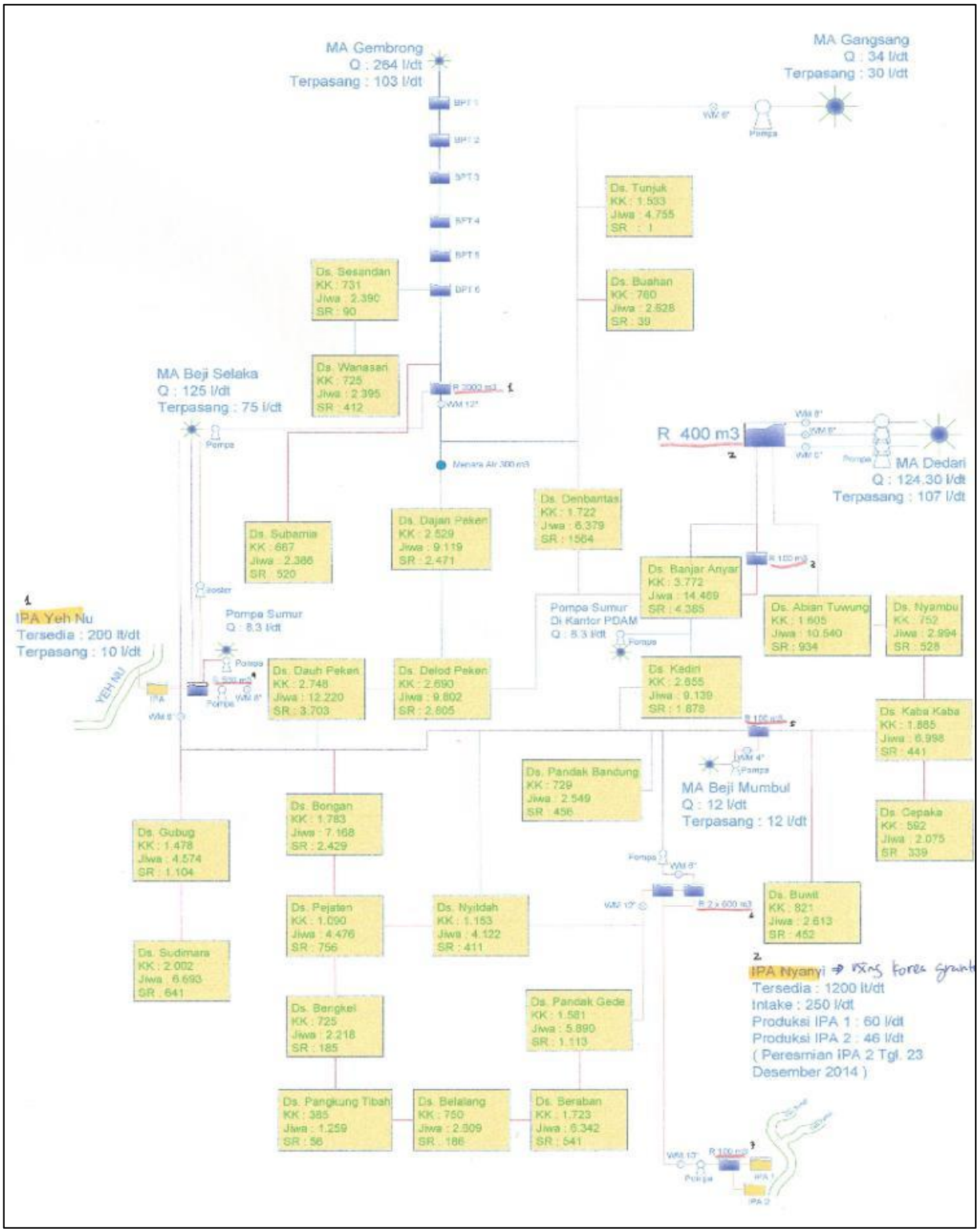
(c) PDAM Gianyar



Source : PDAM Gianyar

Figure 2-9 Flow of Water Supply in PDAM Gianyar

(d) PDAM Tabanan



Source: PDAM Tabanan

Fig. 2-10 Flow of Water Supply in PDAM Tabanan

(3) Current Status of Water Distribution and Water Supply Facilities

Table 2-8 shows the current status of existing water pipes owned by each PDAM.

The pipe length of PDAM Denpasar is approximately 1,600 km, 40 % of which is aged over 40 years. In addition, many polyvinyl chloride pipes (PVC pipes) are commonly used in each PDAM.

Table 2-8 Length of Existing Pipe in each PDAM

Item	Unit	Denpasar	Badung	Gianyar	Tabanan
Length of water pipe	m	4,106	50,527	No data	94,437
Length of the distribution pipe	m	1,605,005	1,350,529	1,180,964	849,936

Source: Survey Team

(4) Water Tariff

The Ministry of the Interior's Water Tariff Standard (No. 23/2006), Chapter 2, Section 2, stipulates that water tariffs should be determined by: 1) fair and appropriate pricing; 2) quality of services; 3) cost recovery; 4) proper use of water; 5) transparency and accountability; and 6) protection of water sources. Water tariffs are based on the affordability to pay and are categorized into five categories: social, household, commercial, industrial and special.

(a) Determine the appropriateness of the unit water supply cost/m^3 which is calculated by dividing total operation cost consisting of source management, treatment, distribution, labor, and management for PDAMs, etc. by actual distribution volume with subtracting ineffective water volume.

(b) Water tariffs are set at up to 4 % of minimum wages. In consideration of the poor, the tariff should be low if the water consumption is 10 m^3/month or less.

(c) Chapter 6, Section 24 of the Standard stipulates that local government budgets (APBDs) must be used to cover deficit when water tariffs are below the water supply cost.

(d) Water tariffs are adjusted annually based on price changes and can usually be reviewed every five years.

(e) Efforts to improve the water tariff collection rate (average: about 80 % in Indonesia, 95 % or more in Japan)

PDAM can review the tariffs according to changes in conditions such as price fluctuations as shown in (d), but review of tariffs is subject to the approval of the mayor of the city/regency under the supervision of the governor of the province. Under national laws and regulations, the heads of local governments have the authority to revise water tariffs and do not require parliamentary approval. However, some local governments require parliamentary approval by ordinance. Therefore, there are two ways to revise water tariffs based on the proposals of PDAM.

(a) The city/regency mayor decides after getting the approval of the assembly of the local government

(b) The decision is made only by the approval of the city/regency mayor

In the particular case of (a) as above-mentioned, it is difficult to obtain approval from the legislature by raising tariff because local legislators are reluctant to raise tariff for fear of impact on election.

If the mayor does not approve the revision of the water tariff of PDAM and the income from water tariff does not cover the expense of water supply, the local government budget (APBD) must be used to compensate the deficit of water supply cost (Chapter 6, Section 24 of the standard).

2.1.5 Problems with Drinking-Water Supplies (Target Areas)

(1) Insufficient Water Supply

Table 2-9 shows the current status and regional characteristics of each city/regency in the SARBAGITA region. There are many tourist sites in this area, and there are concerns that water supply will be insufficient due to an increasing population and an increasing number of tourists. Table 2-10 shows supply volume in 2015 and demand forecasts till 2034 discussed in FS 2015.

Table 2-9 Current Situation and Features of SARBAGITA Region

Name	Population, area size, population density (2015)	Regional Characteristics and Water Resource Development
Denpasar City	Population: 914,301 Area: 127.78 km^2 Population density: 71.6 persons/ha	• It is home to Sanur, the island's third largest tourist destination. • Water supply shortage due to population increase is expected. • There are no new water sources in the city, and water supply services are provided by PDAM Badung and PT. Tirtaartha Buanamulia (PT. TB).
Badung Regency	Population: 616,400 Area: 418.52 km^2 Population density: 14.7 persons/ha	• It includes the first and second-largest tourist spots in Bali, Kuta, Nusa Dua and Legian • These areas are served by PT.TB, a private water company with 45 % PDAM ownership (the remaining 55 % is from three private companies in Bali and Jakarta). • Although Bali International Airport is connected to PDAM Badung water supply network, groundwater from deep wells on the site supplies the majority of the water in the airport.
Gianyar Regency	Population: 503,900 Area: 360.0 km^2 Population density: 14.0 persons/ha	• It is home to Ubud, the fourth tourist destination, and there are concerns about insufficient water supply. • It has a developable water source, but it is financially impossible to develop it independently.
Tabanan Regency	Population: 441,000 Area: 839.3 km^2 Population density: 5.3 persons/ha	• Rivers and groundwater are used. • It has a developable water source (surface water), but it is financially impossible to develop it independently.

Source : Survey Team

Table 2-10 Water Demand Forecast in SARBAGITA Region

City/Regency name	Supply (ℓ/sec)	Demand (ℓ/sec)			
		2018	2023	2028	2034
Denpasar City	1,625.0	2,198.5	3,223.7	4,435.2	6,095.5
Badung Regency	1,103.7	1,645.8	2,629.7	3,942.5	6,006.7
Gianyar Regency	428.8	810.5	1,073.4	1,333.8	1,622.2
Tabanan Regency	219.4	381.4	533.2	672.7	804.6
Total	3,376.9	5,036.2	7,460.0	10,384.2	14,528.8

Source : FS 2015

(2) Salinization and Subsidence due to Excessive Groundwater Exploitation

(a) Characteristics of Groundwater

Groundwater flows are very small relative to its enormous abundance. Therefore, the groundwater level drops due to excessive water exploitation. Significant groundwater level degradation can lead to sequential water exploitation restrain from shallow wells. When the sea is close to the ground, the sea water penetrates deep into the ground water, and the groundwater becomes saline.

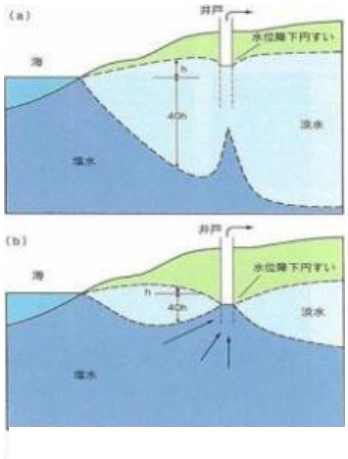
On the other hand, excessive exploitation of groundwater reduces the pore pressure within the stratum, squeezes the groundwater in a soft clay layer, shrinks the clay layer, and settles the ground. Low-lying areas due to land subsidence are vulnerable to storm surges and floods.

(b) Chlorination of Groundwater

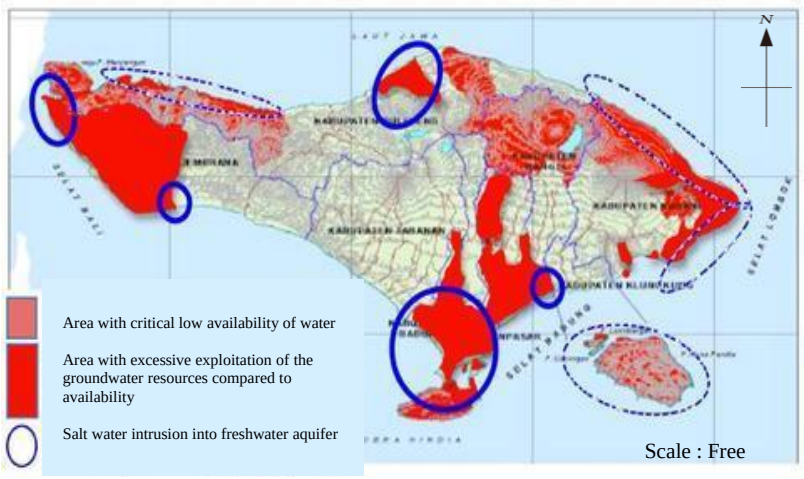
The groundwater is distributed in a lens-like fashion above salty water according to the difference of specific gravity of salty water and fresh one as shown in Figure 2.11. Excessive exploitation causes a conical drop in the top surface of the lens and a conical rise in the bottom surface of the salt water, eventually allowing salt water to penetrate into the well. The groundwater chloride ion concentration (Cl^-) is, according to the WHO Ordinance on Water Quality Standards, limited to about 200 mg/ℓ and 300 mg/ℓ for agricultural use, considered to cause growth impairment in most crops at 500 mg/ℓ and above. The standard chloride ion concentration in drinking-water in Indonesia is 250 mg/ℓ, but the chloride ion concentration in groundwater from deep wells in Denpasar is 325 mg/ℓ, which has already exceeded the standard of 250 mg/ℓ. Once salinization begins, it takes a long time to recover, and treatment with an expensive reverse osmosis membrane (RO) rather than a conventional treatment

method is required to reduce salinity.

A brief model of groundwater salinization and the current state of salinization in Bali is shown in Figure 2-11.



Source : Basis and application of land and water information



Source : Thirst-quenching probe, Bali's contaminated water, August 2017, Environmental Justice Foundation.

Figure 2-11 Salinity Intrusion in Bali

(a) Ground Subsidence

Figure 2-12 shows the situation in the subsurface of the southern part of Bali. The yellow portion shows the part where the subsidence occurred larger than the other parts.

This shows that land subsidence occurred in the center of Denpasar City and the northern part of Badung Regency. In Denpasar City, the large number of customers use groundwater due to cheaper cost of groundwater in comparison with that of PDAM water. There are a large number of deep wells used in the northern part of Badung Regency.

Source : Survey team

Figure 2-12 Ground Subsidence in the Southern Part of Bali

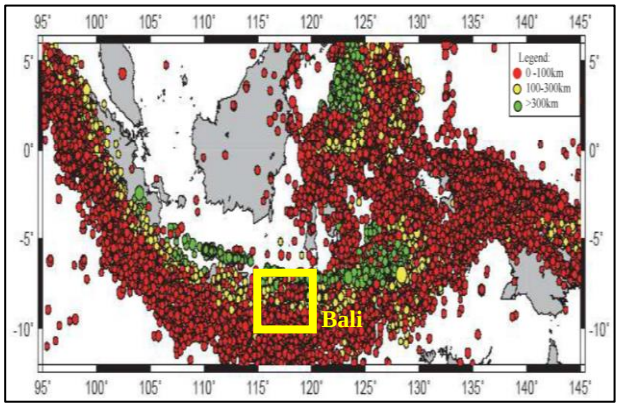
2.1.6 Anti-Seismic Technology

(1) Initiatives in Indonesia

Depending on its topographical conditions, Indonesia suffers many natural disasters, including earthquakes, tsunamis, volcanoes, floods, landslides, droughts, and forest fires. Like Japan, Indonesia is also a country prone to earthquakes, suffering major earthquakes once in a few years. Indonesia is an earthquake-prone region with an average of more than 400 earthquakes with a magnitude of 4 or more per year. Figures 2-13 and 2-14 show the occurrence of earthquakes in Indonesia.

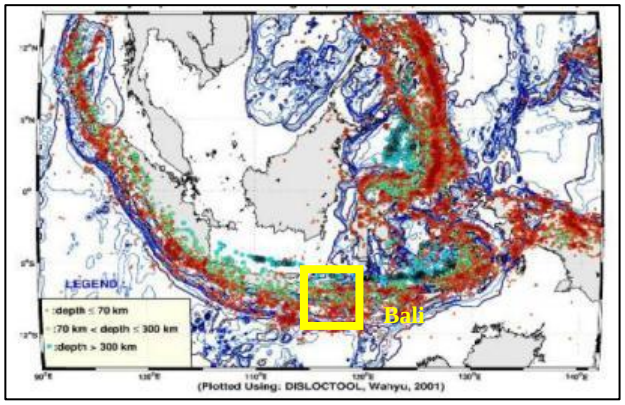
According to the 2012 Perka BNPB No.2, the National Agency for Disaster Management (BNBP) has calculated a disaster risk index (IRB) that combines hazard, vulnerability and capacity values to assess the degree of risk to local disasters. In the development agenda of the "National Medium-Term Development Plan," one of the priority areas is "Natural Resource Conservation, Environment and Disaster Risk Reduction," and it stipulates the development of early warning systems (earthquake and tsunami, meteorology, climate) and capacity building of the government sector in response to disasters.

In the IRB, the risk of disaster risk reduction in the SARBAGITA region is high. However, the SPAM Ayung Project in the SARBAGITA region, does not consider the anti-seismic technology.



. Source : USGS, ISC, Hamzah & Pupito, BMKG, the Period 1779-2010

Figure 2-13 Earthquake Occurrence with a Magnitude of 4 or higher



Source : Formulation of Nation Resilient to Natural Disasters-Japan-Indonesia Cooperation on Disaster Risk Reduction

Figure 2-14 Seismic Map by Depth of Seismic Sources

(2) Japan's Assistance Initiatives

(a) JICA

In the wake of the earthquake that struck central Java in May 2006, JICA implemented the "Project for Reconstruction Assistance for Earthquake Disaster in Central Java Island" (August 2006 to March 2007), it became clear that although there are building codes and building confirmation application systems in Indonesia, local governments (state and provincial/municipal governments) are not fully operating the system. Under these circumstances, the Indonesian government requested technical cooperation to improve the anti-seismic performance of buildings, particularly ordinary houses, in order to improve the capacity of building administration.

In response to this, JICA implemented the "Project on Capacity Building Administration Improvement for the anti-seismic Buildings" from September 2007 to July 2010 with the General Administration of Residence, Ministry of Public Works and National Housing as a partner organization. In the meantime, a component was added to support the reconstruction of houses in West Sumatra, mainly in Padang Pariaman Regency, which suffered severe damage from the earthquake that occurred off the coast of Padang on September 30, 2009, and the project period was extended to March 2011.

(b) Japan Science and Technology Agency and Japan International Cooperation Agency

Japan Science and Technology Agency (JST) and Japan International Cooperation Agency (JICA) conducted research on design-input earthquake ground motion, ground disaster hazard map, and building countermeasures between the University of Tokyo Earthquake Research Institute and the Indonesian Association for Earthquake and Volcano Disaster Prevention from April 2009 to 2011. under the scheme of SATREPS (**S**cience **a**nd **T**echnology **Re**search **P**artnership for **S**ustainable Development).

(3) Anti-seismic technology in Indonesia[2]

The Technical Guideline was established by the Ministry of Public Works and National Housing through the Public Works Ministerial Decree 2006-19, which covers new construction of small buildings and reinforcement of existing buildings. Technical Standards were also established by the Indonesian National Bureau of Standards for Anti-Seismic Design SNI 03-1726-2002, which defines anti-seismic input, verification methods, loads, material strength, etc., by region. (The Ministry of Public Works and

[2] Tatsuo Narafu, JICA expert, Study Group on Comparative Housing and Urban Areas, April 16, 2013

National Housing, Human Settlements Research Institute is in charge of the construction field.)

Three to four technical staff in each city/regency examine the status of design, referring to the technical standards, but the actual fact is that they do not have the technical standards in the office. The calculation software of the Indonesian technical standard is used for the actual structure design, but the Indonesian standard alone is insufficient. Therefore, the standards of the United States and other countries are used as necessary.

(4) Interest of PDAMs in Introducing Anti-Seismic Technology

Some PDAMs show interest in anti-seismic technology and believe that the introduction of anti-seismic technology for facilities should be promoted. However, they do not clearly specify the means of introduction. It is necessary to review the plan incorporating the anti-seismic design of the facilities.

In Japan, the guidelines for anti-seismic technology have been compiled to reflect the findings from past earthquakes. In February 2020, these technologies were introduced at a seminar hosted by the Ministry of Health, Labour and Welfare in Japan. In addition, relevant PDAM officials will participate in this seminar to determine their level of interest in anti-seismic technology.

2.2 Related Plan

2.2.1 Outline of Development Plan

Indonesia's National Development Policy is based on a 20-year National Development Plan (RPJPN2005-2025) by the Ministry of National Development Planning (BAPPENAS), which corresponds to the socio-economic development plan. The plan sets out basic policies for improving safe, pro-poor water supply systems.

Indonesia's Medium-Term Development Plan 2015-2019 aims to "achieve 100 % access to safe drinking water by 2019."

2.2.2 High-Level and Related Plans

As water services play an important role in public health (WASH) services, Indonesia has already developed water safety planning guidelines to ensure not only water quantity but also water quality in order to achieve SDG 6: “Ensuring Access and Sustainable Management of Water and Sanitation for All” by 2030 in the water sector.

(1) SPAM Ayung Project

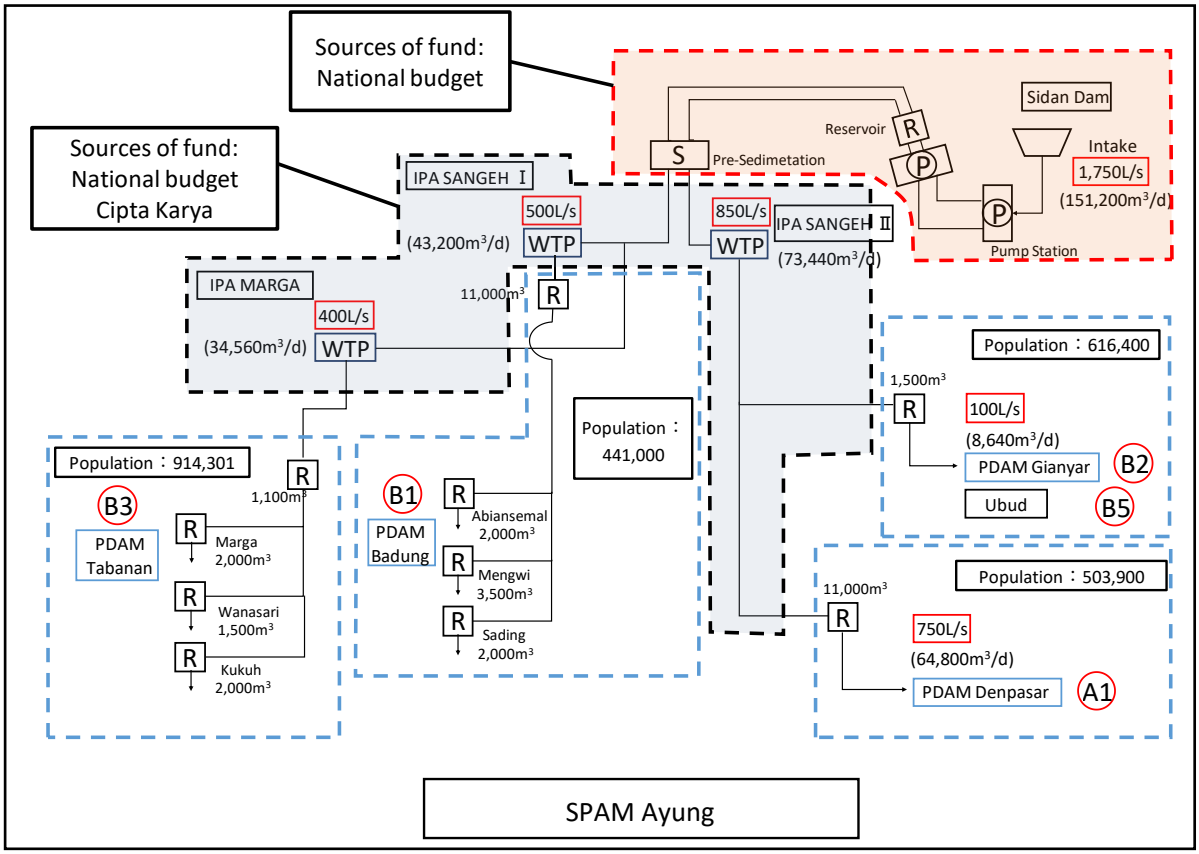
In southern Bali, a water supply plan has been formulated that covers one city and six regencies. This survey covers the SPAM Ayung Project (2018-2023) with SARBAGITA consisting of one city and three regencies. This project was developed based on the plan of Waduk Ayung (Ayung Dam) of the "Integrated Water Resources Development and Management Planning Study in Bali," a JICA development study conducted during 2004-2006. Figure 2-15 shows the conceptual diagram of the SPAM Ayung Project (2018-2023).

1,750 ℓ/sec of water will be supplied to PDAM Denpasar, 500 ℓ/sec to PDAM Badung, 100 ℓ/sec to PDAM Gianyar (Ubud), and 400 ℓ/sec to PDAM Tabanan from the Sidan dam being constructed upstream of the Ayung River. The construction of this dam started in April 2019. The land area covers 82.73 ha (168 districts in five villages) covering Badung, Gianyar, and Bangli Regency. The total capacity is 3.13 Million m^3. The dam height is 68 m. The project cost Rp 786.32 billion (the budget from the Ministry of Public Works and National Housing and the General Department of Water Resources and Regional Office of the Bali Province) is scheduled to be completed by 2021.

In case of acquiring land, an independent agency is currently calculating the amount of compensation, and after the amount of compensation is determined, it is decided to purchase the land. However, residents are allowed to widen the access road and pass heavy vehicles and machinery. In addition to supplying 1,750 ℓ/sec to SARBAGITA, the Sidan dam is a multi-purpose dam for irrigation of 4,595 ha

of paddy fields and micro-power generation (0.65 MW). In addition, there is a plan to use the dam site as a tourist destination.

Meanwhile, the Bali Regional River Bureau of the Ministry of Public Works and National Housing (hereinafter referred to as "BWS") has been implementing the detailed design of the SPAM Ayung Project based on FS 2015 from April to November 2019, and is considering either one water treatment plant in the Region or one water treatment plant in each region from Sidan dam. Subsequently, the EIA survey will be conducted over a period of 10 months, but as will be discussed later, the final decision on the implementation of the SPAM Ayung Project will be on the agenda.



Source : Survey Team

Figure 2-15 Outline of the SPAM Ayung Project

Table 2-11 Outline of SPAM Ayung Project (Scheduled)

Item	Unit	SPAM SARBAGITA = SPAM AYUNG = SPAM SIDANG			
Commencement of operation		2022 (Planning)			
Operator		UPTD			
Name of the water treatment plant		Petang (planned)			
Water treatment plant design capacity	ℓ/sec	1750			
Bulk water distribution		Denpasar	Badung	Gianyar	Tabanan
Quota	ℓ/sec	750	500	100	400
Actual amount of water received	ℓ/sec	-	-	-	-
Reservoir name		Not yet determined	Not yet determined	Not yet determined	Not yet determined
Reservoir capacity	m^3	11,000	11,000	1,500	1,100
Sales price	Rp/m^3	-	-	-	-
Average tariff	Rp/m^3	-	-	-	-

Source : Survey Team

Table 2-12 Relationship between Water Supply and Demand in the Project Area

City /Regency	Registered site	Demand (ℓ/sec)				Supply (ℓ/sec)		
		2018	2023	2028	2034	At present	SPAM Ayung Project	Total
Whole Denpasar City	North Denpasar	487.6	715.0	983.7	1,352.0	1,625.0	750.0	2,375.0
	East Denpasar	380.7	558.2	767.9	1,055.4			
	South Denpasar	692.2	1,015.0	1,396.4	1,919.1			
	West Denpasar	638.0	935.6	1,287.2	1,769.0			
	Subtotal	2,198.5	3,223.7	4,435.2	6,095.5			
Badung Regency in part	Abiansemal	255.1	407.6	611.1	931.0	86.5	500.0	1,603.7
	Mengwi	359.8	575.0	862.0	1,313.3	69.5		
	North Kuta	380.8	608.5	912.2	1,389.8	209.1		
	Kuta	269.2	430.2	645.0	982.7	738.6		
	South Kuta	380.8	608.5	912.2	1,389.8			
	Subtotal	1,645.8	2,629.7	3,942.5	6,006.7	1,103.7		
Gianyar Regency in part	Sukawati	272.3	360.7	448.1	545.0	127.9	100.0	528.8
	Blahbatuh	160.2	212.1	263.6	320.6	99.7		
	Gianyar	210.8	279.2	346.9	421.9	157.6		
	Ubud	167.2	221.5	275.2	334.7	43.7		
	Subtotal	810.5	1,073.4	1,333.8	1,622.2	428.8		
Tabanan Regency in part	Tabanan	179.7	254.2	323.3	389.2	219.4	400.0	619.4
	Kediri	201.7	279.0	349.4	415.4			
	Subtotal	381.4	533.2	672.7	804.6			
Total		5,036.2	7,460.0	10,384.2	14,528.8	3,376.9	1,750.0	5,126.9

Source : FS 2015

(2) Other Related Projects

In addition, SPAM Petanu, SPAM Penet have been implemented, and SPAM Unda (SARBAGIKUNG) are planned as multi-PDAM projects, such as the SPAM Ayung Project in the study area. In addition, there are cases where each PDAM has its own plans. Tables 2-13 to 2-15 show the outline of the above three projects.

Table 2-13 Outline of SPAM Petanu Project (completed)

Item	Unit	SPAM Petanu			
Commencement of operation		2015			
Operator		UPTD			
Name of the water treatment plant		Petanu			
Water treatment plant design capacity	ℓ/sec	300			
Bulk water distribution		Denpasar	Badung	Gianyar	Tabanan
Quota	ℓ/sec	150	100	50	-
Actual amount of water received	ℓ/sec	-	25	14 - 17	-
Reservoir name		-	-	-	-
Reservoir capacity	m^3	-	-	-	-
Sales price	Rp/m^3	2,300	2,400	2,300	-
Average tariff	Rp/m^3	5,000	-	3,000	-
Collection efficiency	%	93	-	-	-
Accrued water ratio	%	39	-	-	-
Interest in anti-seismic technology		-	-	-	-

Source : Survey Team

SPAM Petanu overlaps with SPAM Waribang, which is the own SPAM project of PDAM Denpasar, in eastern and southern part of Denpasar, while it also supplies the water in the northern part of Badung.

Table 2-14 Outline of SPAM Penet Project (completed)

Item	Unit	SPAM Penet
Commencement of operation		2017
Operator		UPTD
Name of the water treatment plant		Penet
Water treatment plant design capacity	ℓ/sec	300

Item	Unit	SPAM Penet			
Bulk water distribution		Denpasar	Badung	Gianyar	Tabanan
Quota	ℓ/sec	150	150	-	-
Actual amount of water received	ℓ/sec		75	-	-
Reservoir name		-		-	-
Reservoir capacity	m^3	-		-	-
Sales price	Rp/m^3	2,400		-	-
Average tariff	Rp/m^3			-	-
Collection efficiency	%			-	-
NRW rate	%			-	-
Interest in anti-seismic technology				-	-

Source : Survey Team

Table 2-15 Outline of SPAM Unda Project (Scheduled)

Item	Unit	SPAM Unda (=SARBAGIKUNG)			
Commencement of operation		2022 on-going			
Operator		PPP			
Name of the water treatment plant		Not yet determined			
Water treatment plant design capacity	ℓ/sec	2,350			
Bulk water distribution		Denpasar	Badung	Gianyar	Tabanan
Quota	ℓ/sec	200	2,000	50	50
Actual amount of water received	ℓ/sec				
Reservoir name					
Reservoir capacity	m^3				
Sales price	Rp/m^3	4,000	4,000	3,200	3,000
Average tariff	Rp/m^3			-	-
Collection efficiency	%			-	-
NRW rate	%			-	-
Interest in anti-seismic technology				-	-

Source : Survey Team

2.2.3 Emergency and Priority for this Project

(1) Importance of Assistance to Urban Water Supplies

This project is positioned as a regional water supply one promoted by the central government. In Indonesia, as shown in Figure 2-1 in Section 2.1.1, the improvement of the access ratio to safe drinking water in rural areas in recent years improved, however, in urban area, this rate has gradually decreased. Therefore, it is necessary to rectify this situation by providing support for urban water supply. This project has been positioned as an important form of assistance for urban water supply.

(2) Necessity of comprehensive assistance, such as collaboration with the health sector

As shown in Table 2-16, infant and neonatal mortality rates are 27.2 (per 1,000 births) and 13.5 (per 1,000 births), respectively, which remains the fifth and fourth lowest among the ten ASEAN countries. The future water supply projects targeted by this proposal aim for a stable drinking water supply, which is also important from the perspective of progress in the health sector, as well as the achievement of the third goal of the SDGs, namely "ensuring healthy living for all people of all ages and promoting welfare."

Table 2-16 Health Indicators (SDGs 3 and 6)

SDG Target	3.2		3.9	6.1
Target of 2030	Infant deaths <=12/1,000	Neonatal deaths <=25/1,000	Mortality due to unsafe WASH services (%) (per 100,000 people)	Usage of improved drinking-water sources
ASEAN countries	2015	2015	2012	2015
Singapore	2.7	1.0	0.1	100
Malaysia	7.0	3.9	0.4	98
Brunei	10.2	4.3	<0.1	-
Thailand	12.3	6.7	1.9	98
Vietnam	21.7	11.4	2.0	98
Indonesia	27.2	13.5	3.6	87

SDG Target	3.2		3.9	6.1
Target of 2030	Infant deaths <=12/1,000	Neonatal deaths <=25/1,000	Mortality due to unsafe WASH services (%) (per 100,000 people)	Usage of improved drinking-water sources
ASEAN countries	2015	2015	2012	2015
Philippines	28.0	12.6	5.1	92
Cambodia	28.7	14.8	5.6	76
Myanmar	50.0	26.4	10.4	81
Laos	66.7	30.1	13.9	76
Japan (2014)	2.7	0.9	0.1	100

Source : World Health Statistics 2016, WHO

(3) Population Size

SARBAGITA's water supply area is a medium-sized city following the three largest cities in Jakarta, Surabaya, and Medan. Table 2-17 shows the ratio of urban population in six which was higher than that in Bali, among 33 provinces in Indonesia in 2010, and the whole country from 2010 to 2035.

Bali Province has the seventh highest urban population ratio in 2010 (60.2 %). However, the rate of increase until 2035 is 21.0 %, which is the highest among the seven provinces, and it is expected to increase to 81.2 % in 2035. Therefore, the development of urban water supply is an urgent issue.

Table 2-17 Ratio of Urban Population by Province 2010-2035

Province	2010 (1)	2015	2020	2025	2030	2035 (2)	Increase (3) =(2)–(1)
Special Capital Region of Jakarta	100.0	100.0	100.0	100.0	100.0	100.0	0
Riau Islands	82.8	83.0	83.3	83.8	84.5	85.3	2.5
Banten	67.0	67.7	69.9	73.7	78.8	84.9	17.9
Special Region of Yogyakarta	66.4	70.5	74.6	78.0	81.3	84.1	17.7
West Java	65.7	72.9	78.7	83.1	86.6	89.3	23.6
Eastern Kalimantan	63.2	66.0	68.9	71.8	74.8	77.7	14.5
Bali	60.2	65.5	70.2	74.3	77.8	81.2	21.0
Indonesia as a whole	49.8	53.3	56.7	60.0	63.4	66.6	16.8

Source : Badan Pusat Staistik (Indonesia Central Statistics Bureau, as of February 18, 2014)

2.3 Responsible Authorities and Implementing Agencies

2.3.1 Relevant Government Offices

With the enactment of the Decentralization Act in 1999 and the accompanying reorganization of the fiscal system, the shift from a centralized administrative system to a decentralized system was promoted. In the water supply and sewerage sector, as shown in Table 2-18, the roles and responsibilities for the provision of water and sewerage services have been changed, and the municipal water supply system (urban and small cities) is operated by PDAM under the jurisdiction of the local government.

Table 2-18 Role of Organization in Charge of Developing Water Supply Facilities

Classification		Role and Development Policy for Water Supply Facilities	Maintenance, and management
Municipality	Cities	Financing from private banks On the assumption of full cost recovery	PDAM (including consignment to private sector under concession contract, etc.)
	Small cities	Central government supports water intake and treatment facilities at IKK* Local Government Supported the Water Supply Network	PDAM
	Development of water sources and bulk water supply	Supported by central and local governments	Public service agency
Village water supply		Supported by central/local governments in Pamsimas and dak	Community and water-use associations

* IKK is an abbreviation of Ibukota Kecamatan, (a water supply and sanitation development program for small-scale clusters).
Source : Director, Water Department, Cipta Karya, Water Sector, Republic of Indonesia, Survey of Information Collection and Confirmation, May 2017, JICA

The central government has jurisdiction over water services, which is the Directorate General for Human Settlements of the Ministry of Public Works and National Housing. It focuses not on direct management of service delivery, but on the development of systems and guidelines for water services, the formulation of policies and strategies, and the oversight of implementation. An important challenge for the central government is to build the capacity of local governments to carry out the delegated roles in the planning, development and management of services and to provide effective means of doing so responsibly.

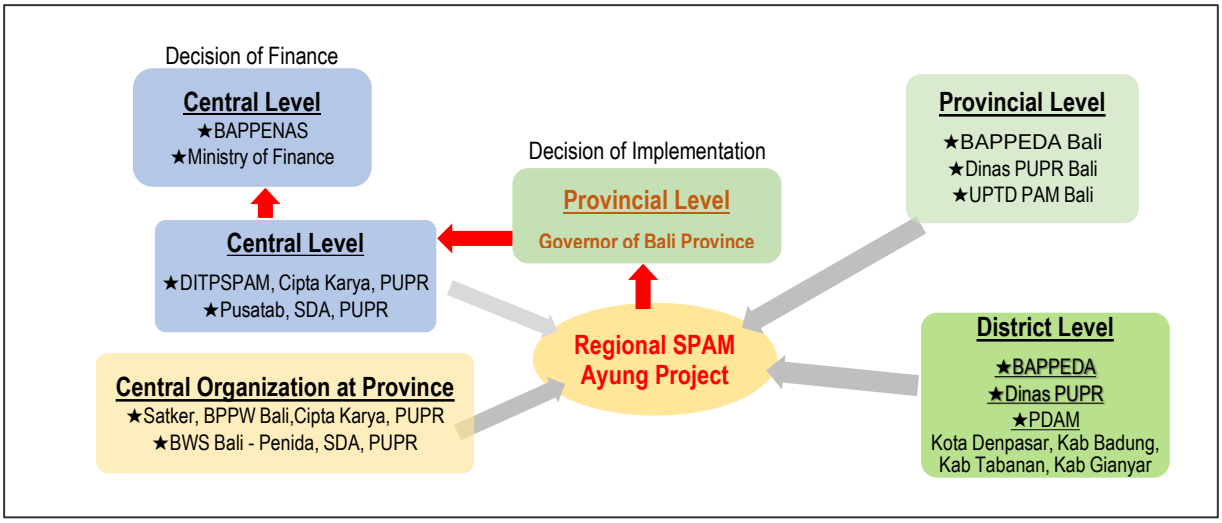
While the central government's strategic plan aims to enable local governments to provide water supply services through technical assistance and private sector investment or financing through on-lending, the central government continues to invest more money in local water and sanitation infrastructure than the local government, including the construction of water source infrastructure in water-scarce and troubled remote and border areas.

Table 2-19 shows the central government and relevant government offices in Bali. BAPENAS (Department of National Development Planning) and BAPPEDA (the Bali Branch) compiled the National Development Plan. Figures 2-16, 17, and 18 show the name and role of relevant organizations and the involvement from the planning stage to operation and maintenance one.

Table 2-19 Water Utilities in Indonesia

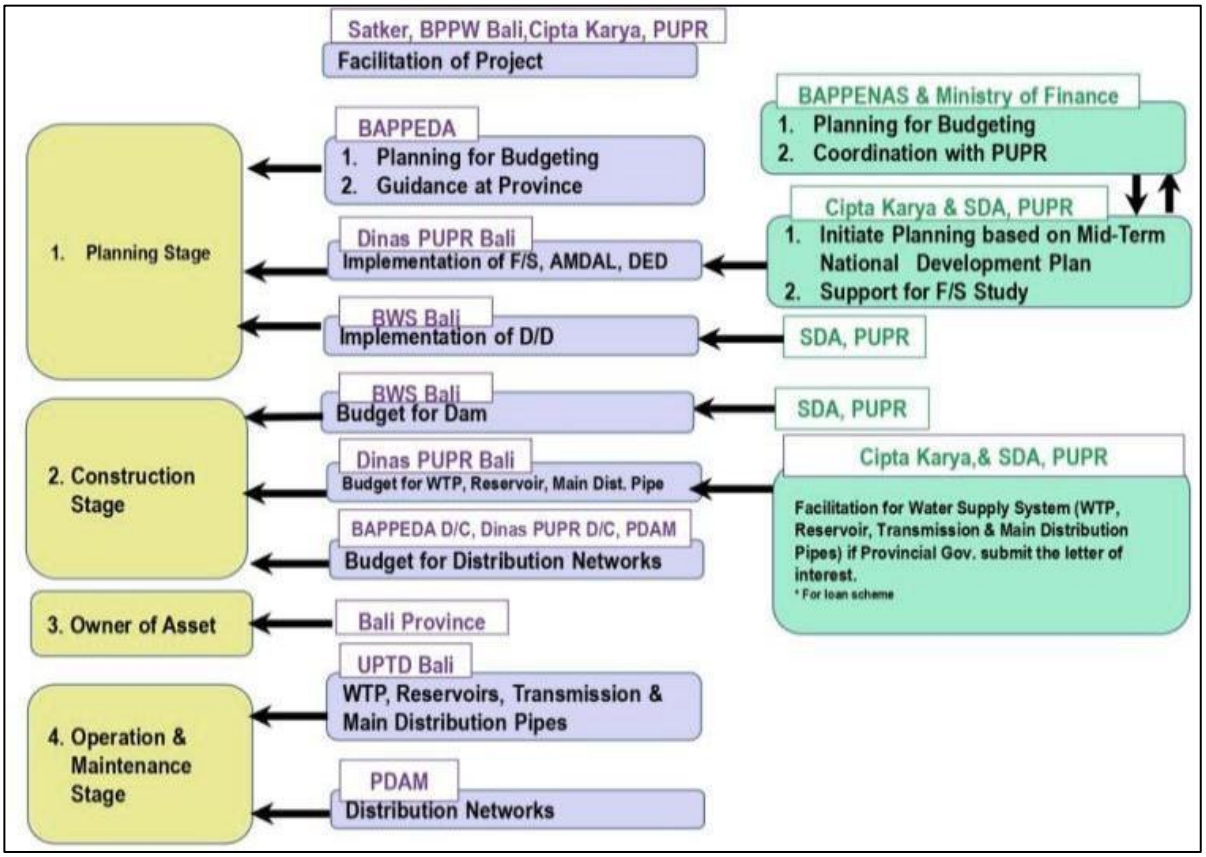
Indonesian language	Abbreviation	English translation
Central Ministries and Departments		
Kementerian Pekerjaan Umum dan Permahan Rakiat	PUPR	Ministry of Public Works and National Housing (MPWH)
Direktorat Jendral Cipta Karya, PUPR	Ditjen Cipta Karya, PUPR	Directorate General of Human Settlement, MPWH
Direktorat Pengembangan SPAM, Ditjen Cipta Karya, PUPR	DITPSPAM, Cipta Karya, PUPR	Directorate of Water Supply System Development, Directorate General of Human Settlement (DGH), MPWH
Kasubdit Perencanaan Teknis, Direktorat PSPAM, Ditjen Cipta Karya	KPT, DITPSPAM, Cipta Karya, PUPR	Subdivision of Technical Planning, DGH, MPWH
Kasubdit SPAM Wilayah 3, Direktorat PSPAM, Ditjen Cipta Karya	Kasubdit SPAM Wilayah 3, DITPSPAM, Cipta Karya, PUPR	Subdivision of Water Supply System Region 3, DGH, MPWH
Balai Prasarana Permukiman Wilayah Bali, PUPR	BPPW Bali, PUPR	Human Settlement Center at Bali Region, MPWH
Satuan Kerja Pelaksanaan Prasarana Permukiman Provinsi Bali	SATKER, PPPB, PUPR	Working Unit, Implementation of Human Settlement at Bali Province, MPWH
Bali Province		
Balai Wilayah Sungai Bali-Penida, PUPR		Water Resource Agency at Bali Province, MPWH
BAPPEDA Litbang Provinsi Bali		Regional Development Planning Agency for Research & Development at Bali Province
Dinas Pekerjaan Umum dan Penataan Ruang Provinsi Bali	Dinas PUPR, Bali	Public Works and Spatial Planning of Bali Province
Usaha Pengembangan Teknik Daerah. Penyediaan Air Minum, Provinsi Bali	UPTD. PAM, Bali	Regional Agency of Technical Development for Water Supply of Bali Province
City/Regency		
Dinas PUPR Denpasar	Dinas PUPR Denpasar	Public Works and Spatial Planning of Denpasar City
Dinas PUPR Badung	Dinas PUPR Badung	Public Works and Spatial Planning of Badung Regency
Dinas PUPR Gianyar	Dinas PUPR Gianyar	Public Works and Spatial Planning of Gianyar Regency
Dinas PUPR Tabanan	Dinas PUPR Tabanan	Public Works and Spatial Planning of Tabanan Regency
Perusahaan Daerah Air Minum Denpasar	PDAM Denpasar	Water Supply Company of Denpasar City
Perusahaan Daerah Air Minum Badung	PDAM Badung	Water Supply Company of Badung Regency
Perusahaan Daerah Air Minum Gianyar	PDAM Gianyar	Water Supply Company of Gianyar Regency
Perusahaan Daerah Air Minum Tabanan	PDAM Tabanan	Water Supply Company of Tabanan Regency

Source : Survey Team



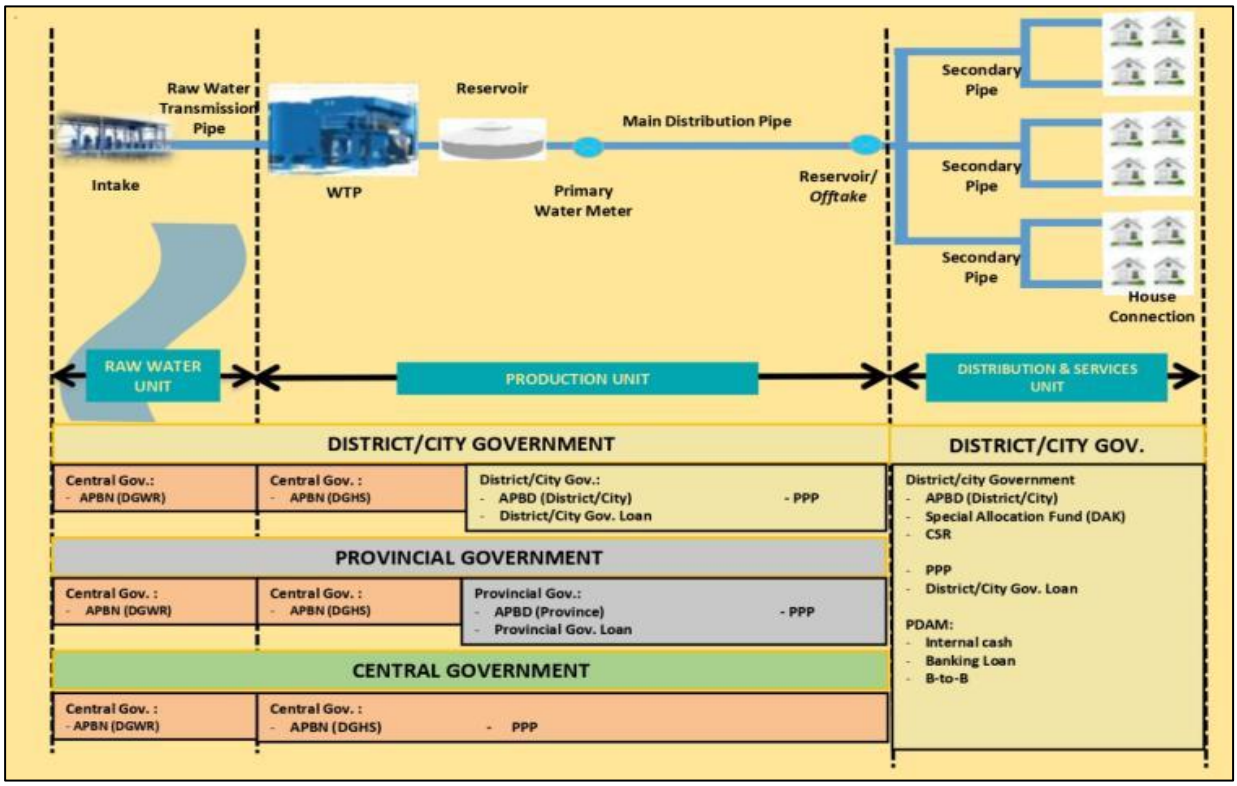
Source : Survey Team

Figure 2-16 Relevant Organizations involved in SPAM Ayung Project



Source : Survey Team

Figure 2-17 Role of relevant Organizations from planning to O&M stage

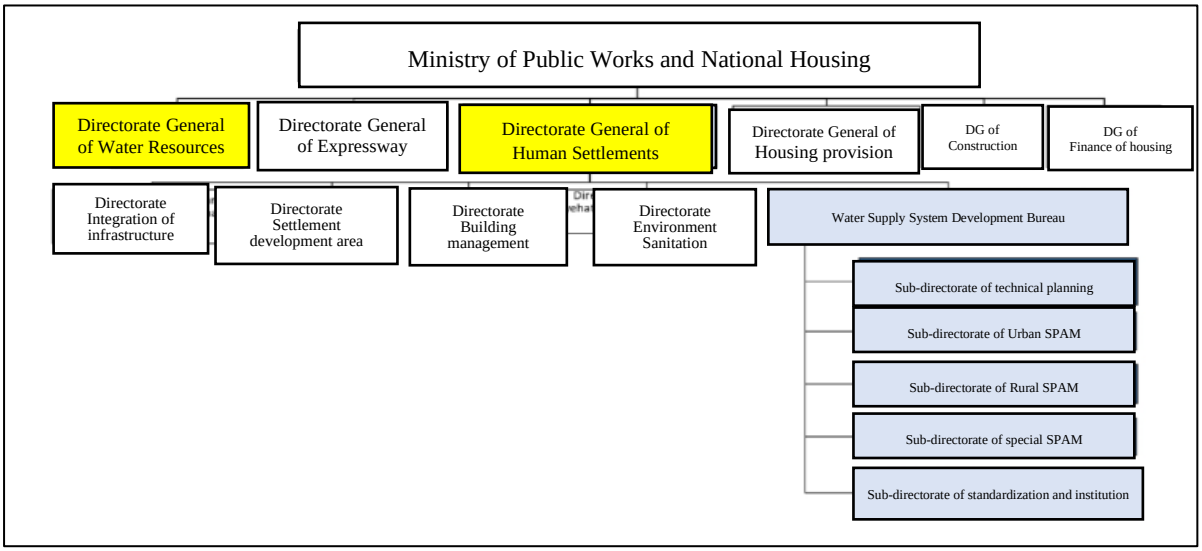


Source : Survey Team

Figure 2-18 Funding Source for Water Supply Facilities

2.3.2 Ministry of Public Works and National Housing

The Presidential Decree on the Development of Water Supply Systems (PP16/2005), issued in June 2005, states that the president is ultimately responsible for all water supply systems and sewage treatment in the lives of the people, and that the Ministry of Public Works and National Housing is the specific administrative agency responsible for the system. The Directorate General for Human Settlements (Cipta Karya) is responsible for water services, and that of Water Resources (SDA) is responsible for formulating national policies, standards, guidelines, and manuals for water resources development. Figure 2-19 shows the organization chart of the Ministry of Public Works and National Housing.

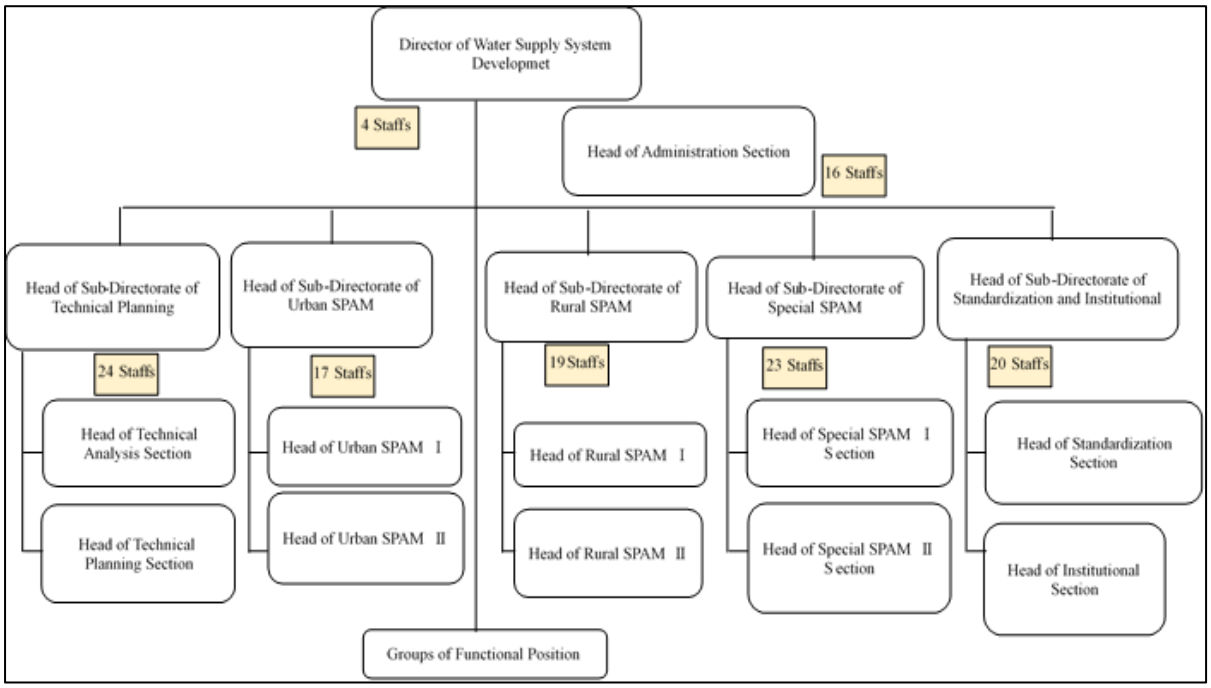


Source : Ministry of Public Works and National Housing website

Figure 2-19 Organizational Chart of the Ministry of Public Works and National Housing

Figure 2-20 shows the organization chart of the Directorate of Water Supply Development (DWSD), which consists of five Sub-Directorates, in order to promote water services under the Directorate General for Human Settlements from the aspects of administration, technology, and funding.

This bureau divides Indonesia into Region I (Sumatra to Java) in the western region and Region II (Kalimantan, Sulawesi and Bali) in the eastern region. Region II is in charge of Bali.



Source : Ministry of Public Works and National Housing website

Figure 2-20 Organizational Chart of the Directorate of Water Supply Development

2.3.3 BAPPEDA

Local projects are implemented by local governments, but the central government can also be involved. BAPPEDA is a local branch under the central government (BAPPENAS) and plays a coordinating role between the central government and local governments. BAPPEDA is equally related to BAPPENAS, PU, and the UPTD of the local government in the SPAM Ayung Project.

BAPPEDA's function is to guide the Governor's vision and mission, including long-term goals (20 years), medium-term goals (5 years), and short-term goals. BAPPEDA will adjust the business plan to achieve the Gov't Vision & Mission and the Mid-term Plan targets, including the Water Supply Project.

The initial plan for SPAM Ayung Project was drafted by the central government (Cipta Karya). However, this is based on the challenges in southern Bali and was previously reported by BAPPEDA. Water is a high priority of the Bali government, mostly in southern Bali.

2.3.4 UPTD (Usaha Pengembangan Teknik Daerah. Penyediaan Air Minum, Provinsi Bali)

The role of the Bali Department of Technology and Development (UPTD) is to deal with the water supply from raw water to tapping points (where PDAMs takes water) and to distribution. The regional SPAM is operated by UPTD, and the four SPAM projects described in Section 2.2.2 above are or will be operated by UPTD.

2.3.5 BWS (Balai Wilayah Sungai Bali-Penida, PUPR)

The role of the BWS relates to prove raw water units, transmit raw water units and prove water treatment plants and the main role is to develop water sources. With regard to the SPAM Ayung Project, the BWS is responsible for constructing facilities from the water source to the water treatment plant.

2.3.6 PDAM (Perusahaan Daerah Air Minum)

(1) Number of PDAMs, Configuration, etc.

In Indonesia, since the decentralization of power in 1999, PDAMs under the jurisdiction of the provinces (PAM Jaya in the Jakarta Special Province, PDAM Tirtanadi in the North Sumatra Province, and Tanjung Pinang only), the regency (Kabupaten) and the ordinance-designated city (Kotamadya) have been operating the water supply system. PDAM-based water service areas are limited to urban areas due to geographical constraints and delays in facility development. In 2011, the water service coverage ratio was only 27.0 % on national average. In other areas, water supply by spring and wells is carried out in each community.

In principle, PDAM of each city/regency is responsible for the water supply project, but the Ministry of Public Works and National Housing is responsible for the water supply project that spans two or more provinces.

According to the Water Supply Association of Indonesia (PERPAMSI), the number of members as of 2015 was 425, with 386 for PDAM, 21 for BLUDs/UPTD/BPAM, and 18 for PT. All PDAMs except the above three states are operated at the provincial or municipal level. Most PDAMs are very small, with 154 (42 %) PDAMs serving less than 10,000 households and 40 (11 %) PDAMs serving more than 50,000 households. All PDAMs serving more than 50,000 households are in sound condition, but 6 % of PDAM 154 serving fewer than 10,000 households are in poor one.

(2) Construction, Maintenance and Management of Water Supply Facilities

The Department of Public Works (DPU) is responsible for construction of water supply facilities in coordination with the Development Planning Department (BAPPEDA) and PDAM in each city. In addition, the establishment of the Public Service Agency (BLU) is permitted for the development and supply of raw water across plural local governments (regencies, ordinance-designated cities), and it is possible to establish and impose tariff system.

PDAM is financially an independent entity operating on the basis of water revenue, and the operation and maintenance of water utilities are covered by water revenue. However, the expansion of the distribution network and large-scale repairs are financed by local government budgets and are not currently fully independent entities. Local governments have conflicting interests in the water utility as well as in ownership and oversight agencies. In addition, local governments have the authority to appoint the director-general of PDAM and to revise water tariffs. Strong leadership in the heads of local governments is essential to improve the management of PDAM.

The budget of PDAM is divided into two categories: operation, maintenance and management, and facility maintenance. The following features are provided by PDAM.

(a) Facility development costs, such as expansion of the distribution network and large-scale repairs, are typically subsidized by central and local governments.

(b) As a rule, the cost of maintenance and management should be covered by water tariff. However, it is actually decided that water tariff should be 4 % or less of the minimum wage. Although water tariff can be determined independently by PDAM, some municipal ordinances require approval by the legislature, making it difficult to properly and timely raise water tariff.

It can be said that the current low-cost water rate system, which does not allow all of the facility maintenance and management costs to be recovered, is a main factor in the lack of significant progress in PPP projects for which cost recovery is required.

(3) Evaluation

Since 2005, the BPPSPAM, an independent organization under the Minister's Secretariat of the Ministry of Public Works and National Housing, has been evaluating the soundness of PDAM's business

management in 18 items in four fields as shown in Table 2-20. A perfect score for all fields is 5, but a higher score than 2.8 is sound, 2.2-2.8 is unsound, and a lower score of less than 2.2 is poor.

Table 2-20 Items and Allocation Rates for evaluating the Performance of PDAMs

Field	Item	Allocation rate	
Financial Management	1) Return on Equity (ROE)	0.250	0.055
	2) Operating ratio		0.055
	3) Reserve rate		0.055
	4) Rate of collection		0.055
	5) Ability to pay		0.030
Service	1) Dissemination rate	0.250	0.05
	2) Increase in customers		0.05
	3) Customer complaint handling rate		0.025
	4) Water quality at customer taps		0.075
	5) Household water consumption		0.05
Operations	1) Production efficiency	0.350	0.07
	2) NRW rate		0.07
	3) Water supply time		0.08
	4) Feed water pressure		0.065
	5) Water meter replacement		0.065
Human resources	1) Percentage of employees per 1000 plugs	0.150	0.07
	2) Percentage of trained staff		0.04
	3) HR development costs as a percentage of employee costs		0.04

Source : HP of BPPSPAM

Tables 2-21 and 22 and Figure 2-21 show that the percentages of the BPPSPAM evaluation results are almost even for sound and unsound. The reasons for this are as follows.

(a) Water tariff are low, which cannot cover maintenance and capital costs. While the government mandates cost recovery for PDAMs, only 26 % of all PDAMs are recoverable, while the remaining 74 % are not recoverable.

(b) NRW rate is high.

(c) Inability to pay excessive debt due to projects undertaken by past external agencies

Table 2-21 Evaluation Results of Performance of PDAM 2013-2017

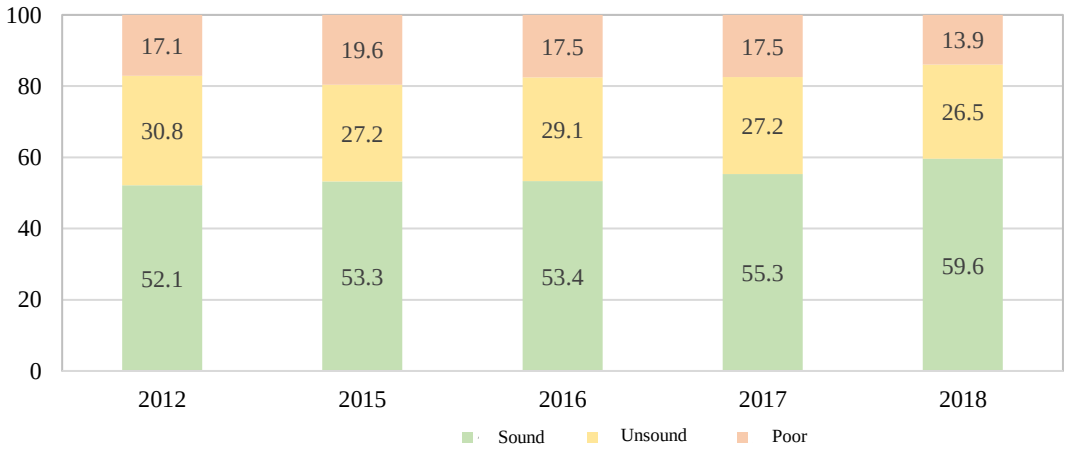
	Item	Unit	2013	2014	2015	2016	2017
1	Dissemination ratio	%	81.61	76.29	72.61	73.08	
2	Consumption water use		24,709,658	24,349,881	24,571,902	25,546,911	26,472,331
3	NRW	%	30.34	29.80	30.07	33.03	34.32
4	Net Sales		184,365.79	183,788.52	182,974.62	223,450.66	239,953.23
5	Pre-tax profit		65,419.53	35,314.85	25,217.06	42,450.88	42,008.67
6	Profit ratio	%	35.5	19.2	13.8	19.0	17.5
7	ROE	%	29.37	15.25	10.93	15.93	
8	Rate of operation		0.81	0.84	0.87	0.82	
9	Into cash	%	84.18	69.11	68.41	126.10	
10	Collection rate	%	92.25	86.72	85.42	96.78	
11	Ability to pay	%	318.44	353.45	360.93	360.92	
12	Management index value		81.2	73.13	66.53	70.93	
13	Evaluation results		4.06	3.96	3.74	3.79	

Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)

Table 2-22 Transition of Evaluation Result of PDAM

Performance evaluation	2012		2015		2016		2017		2018	
	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)	Number	Ratio (%)
Sound	171	52.1	196	53.3	198	53.4	209	55.3	223	59.6
Unsound	101	30.8	100	27.2	108	29.1	103	27.2	99	26.5
Poor	56	17.1	72	19.6	65	17.5	66	17.5	52	13.9
Total	328	100	368	100.0	371	100.0	378	100.0	374	100.0

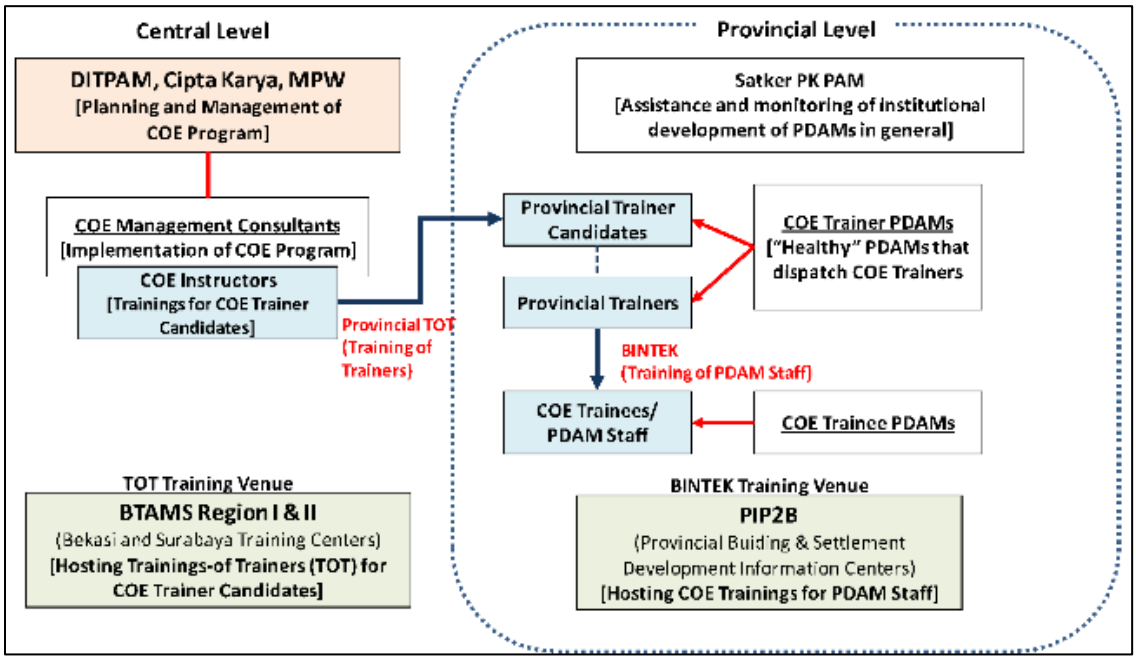
Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)



Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)

Figure 2-21 Evaluation Results of PDAM

In response, the Indonesian government provided technical and financial support through the Debt Restructuring Program (DPR) and the Directorate General of Human Settlements of the Ministry of Public Works and National Housing implemented the COE (Center for Excellence) Program. This is to select and implement TOT (Training of Trainer) personnel from sound PDAM personnel and dispatch them as instructors to other PDAMs. As a result of these efforts, the proportion of sound PDAMs is gradually increasing, but still remains at around 60 % in 2018.



Source : PUPR

Figure 2-22 Outline of COE

(4) Evaluation of Target PDAMs

(a) Key Indicators for 2018

Table 2-23 shows the key indicators of four PDAMs in 2018.

Table 2-23 Key Indicators of four PDAMs in 2018

	Item	Unit	Denpasar	Badung	Gianyar	Tabanan
1	Total administrative population*	Person	914,301	616,400	503,900	441,000
2	Total population of* development areas	Person	914,301	590,201	457,125	350,036
3	Target population*	Person	444,223	426,008	360,722	338,307
4	Number of customers*	Eaves	83,470	70,707	57,316	56,010
5	Number of families/ houses*	Person	5.3	6	6.3	6
6	Maintenance ratio	%	48.6	72.2	78.9	96.6
7	Share of household use	%	96.8	87.19	89.6	78.21
8	Number of employees	Person	311	352	230	363
9	Number of employees/ 1,000 connections		3.7	5	4	6.5
10	Water bill collection rate	%	97.7	85.9	98.4	100
11	Annual production	m^3/year	37,964,007		1,907,208	18,517,723
12	Annual consumption	m^3/year	23,233,514		21,629,950	13,694,735
13	NRW	%	36.8	35.7	44.6	20.5
14	Average unit price of water	IDR/m^3	5,020	8,568	4,425	4,590
15	Gross fixed assets	1,000 Rp	124,542,476	203,137,211	46,890,791	76,964,788
16	Total assets	1,000 Rp	172,989,253	341,183,298	106,461,266	90,086,220
17	Present liabilities	1,000 Rp	16,055,292	35,059,706	6,544,597	7,295,671
18	Long-term debt	1,000 Rp	13,992,089	-	-	151,415
19	Total capital	1,000 Rp	142,878,370	268,881,119	99,915,659	82,639,133
20	Gross revenues	1,000 Rp	131,939,850	239,270,395	59,686,024	66,805,784
21	Average unit price	Rp/m^3	5,020	8,568	4,425	4,590
22	Non profit after taxation	1,000 Rp	8,081,572	35,931,951	1,294,238	2,342,011
23	Chemical substance cost	Rp/m^3	150	224	7	62
24	Energy costs	Rp/m^3	470	946	530	519
25	Maintenance costs	Rp/m^3	309	760	96	443
26	Average employee costs	Rp/employee/month	10,522,979	15,178,645	6,852,366	6,255,143
27	Evaluation results		Sound (3.82/5)	Sound (3.79/5)	Sound (3.585/5)	-

* Number in 2015 based on FS 2015
Source : Buku Kinerja PDAM 2018

(b) Major Indicators 2013-2017

Table 2-24 to 2.27 show the transition of major indicators for the period from 2013 to 2017 of four PDAMs.

Table 2-24 Key Indicators of PDAM Denpasar

Item	2013	2014	2015	2016	2017
A. Public Finance					
1. Profitability					
a. ROE	51.9 %	43.1 %	16.3 %	7.3 %	5.7 %
b. Rate of operation	0.8	0.80	0.86	0.9	0.92
2. Liquidity					
a. Cash ratio	190.9 %	113.4 %	86.4 %	121.4 %	175.3 %
b. Validity of the claim	99.1 %	92.4 %	99.1 %	97.6 %	97.7 %
3. Affordability to pay	122.7 %	144.1 %	144.8 %	460.4 %	574.5 %
B. Service					
1. Service ratio	43.3 %	44.3 %	45.6 %	49.2 %	48.6 %
2. Increase rate in subscriber number	2.7 %	4.7 %	4.3 %	2.5 %	1.4 %

Item	2013	2014	2015	2016	2017
3. Complaint resolution rate	99.1 %	99.9 %	100.0 %	100.0 %	100.0 %
4. Customer-supplied water quality	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
5. Household water consumption	27.7	25.8	24.65	24	22.36
C. Operation					
1. Production efficiency	98.2 %	93.4 %	93.4 %	95.5 %	83.6 %
2. NRW rate	34.3 %	34.0 %	36.5 %	37.6 %	36.8 %
3. Supply time/day	21	21	21	21	22
4. Water supply pressure	90.0 %	91.8 %	99.3 %	88.4 %	88.6 %
5. Water meter replacement ratio	11.7 %	13.2 %	15.8 %	19.1 %	15.2 %
D. SDM					
1.Number of employees/1,000 connections	3.4	3.4	3.65	3.46	3.73
2.Education & Training/Capacity Development	31.2 %	36.7 %	100.0 %	37.9 %	99.4 %
3. Training/Personnel costs	7.1 %	6.1 %	6.2 %	1.1 %	2.0 %
Total evaluation value	3.98	4.16	4.02	3.83	3.82
Evaluation	Sound	Sound	Sound	Sound	Sound

Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)

Table 2-25 Key Indicators of PDAM Badung

Item	2013	2014	2015	2016	2017
A. Public Finance					
1. Profitability					
a. ROE	29.4 %	15.3 %	10.9 %	15.9 %	13.4 %
b. Rate of operation	0.8	0.80	0.87	0.82	0.8
2. Liquidity					
a. Cash ratio	117.5 %	69.1 %	68.4 %	126.1 %	148.1 %
b. Validity of the claim	92.2 %	86.7 %	85.4 %	96.8 %	85.9 %
3. Affordability to pay	318.4 %	353.5 %	360.9 %	360.9 %	471.9 %
B. Service					
1. Service ratio	81.6 %	76.3 %	72.6 %	73.1 %	72.2 %
2. Rate of increase in the number of subscribers	87.3 %	94.3 %	3.0 %	3.0 %	1.2 %
3. Complaint resolution rate	100.0 %	100.0 %	72.9 %	100.0 %	99.5 %
4. Customer-supplied water quality	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
5. Household water consumption	23.1	22.7	22.0	22.2	21.7
C. Operation					
1. Production efficiency	69.8 %	77.1 %	78.2 %	77.5 %	87.4 %
2. NRW rate	30.3 %	29.8 %	30.1 %	33.0 %	35.1 %
3. Supply time/day	22	22	23	23	23
4. Water supply pressure	87.1 %	86.5 %	88.7 %	93.9 %	89.1 %
5. Water meter replacement ratio	19.2 %	12.3 %	23.7 %	7.4 %	2.4 %
D. SDM					
1. Employee number/1,000 connections	5.0	4.5	5.6	5.2	5.0
2. Education and Training/Capacity Development	16.1 %	26.9 %	22.4 %	24.9 %	85.2 %
3. Training/Personnel costs	0.9 %	1.9 %	1.8 %	1.6 %	1.6 %
Total evaluation value	4.06	3.96	3.74	3.79	3.79
Evaluation	Sound	Sound	Sound	Sound	Sound

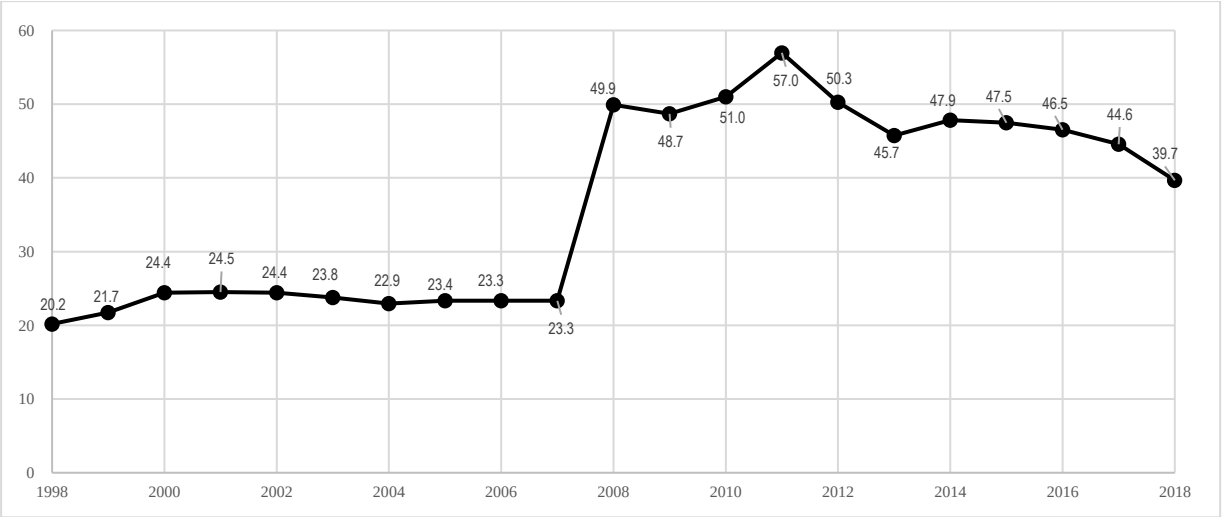
Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)

Table 2-26 Key Indicators of PDAM Gianyar

Item	2013	2014	2015	2016	2017
A. Public Finance					
1. Profitability					
a. ROE	16.0 %	2.7 %	2.3 %	2.0 %	1.3 %
b. Rate of operation	0.9	1.0	0.99	0.99	0.98
2. Liquidity					
a. Cash ratio	132.4 %	43.1 %	171.8 %	430.9 %	339.1 %
b. Validity of the claim	99.6 %	97.4 %	98.0 %	99.4 %	98.4 %
3. Affordability to pay	302.4 %	304.9 %	377.5 %	1,394.1 %	1,626.7 %

Item	2013	2014	2015	2016	2017
B. Service					
1. Service ratio	69.9 %	69.9 %	68.6 %	78.1 %	78.9 %
2. Increase rate in subscriber number	2.3 %	3.9 %	1.8 %	2.7 %	3.2 %
3. Complaint resolution rate	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
4. Customer-supplied water quality	88.7 %	90.6 %	84.1 %	89.9 %	85.1 %
5. Household water consumption	16.7	16.4	16.7	17.0	16.5
C. Operation					
1. Production efficiency	81.7 %	76.4 %	79.0 %	78.7 %	87.0 %
2. NRW rate	45.7 %	47.9 %	47.5 %	46.5 %	44.6 %
3. Supply time/day	21	22	21	23	22
4. Water supply pressure	48.0 %	74.0 %	61.7 %	56.5 %	66.5 %
5. Water meter replacement ratio	9.0 %	11.6 %	9.4 %	6.6 %	7.0 %
D. SDM					
1. Employee number/1,000 connections	4.8	4.5	4.35	4.2	4.01
2. Education and Training/Capacity Development	16.7 %	22.5 %	14.9 %	21.0 %	30.4 %
3. Training/Personnel costs	0.5 %	1.4 %	2.1 %	1.5 %	2.1 %
Total evaluation value	3.44	3.21	3.27	3.25	3.38
Evaluation	Sound	Sound	Sound	Sound	Sound
Average water tariff (Rp/m^3)	4,277.60	4,366.88	4,389.55		
Cost of sales	2,744.24	2,946.03	3,014.12		
Status FCS	FCR	FCR	FCR		
NRW (%)	45.74	47.85	47.47		

Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)



Source : Laporan Pelaksananan-Program Penangulangwan Kehilangan Air Tahun 2018

Figure 2-23 Transition of NRW rate of PDAM Gianyar (1998-2018)

Table 2-27 Key Indicators of PDAM Tabanan

Item	2013	2014	2015	2016	2017
A. Public Finance					
1. Profitability					
a. ROE	10.8 %	5.7 %	0.8 %	4.2 %	2.8 %
b. Rate of operation	0.9	1.00	0.98	0.94	0.95
2. Liquidity					
a. Cash ratio	21.7 %	23.9 %	14.8 %	25.8 %	20.0 %
b. Validity of the claim	98.9 %	96.5 %	98.2 %	89.1 %	100.0 %
3. Affordability to pay	306.1 %	343.7 %	321.3 %	331.5 %	1209.7 %
B. Service					
1. Service ratio	89.8 %	93.9 %	95.4 %	96.1 %	96.7 %
2. Increase rate in subscriber number	4.9 %	6.0 %	4.1 %	2.2 %	1.7 %
3. Complaint resolution rate	100.0 %	96.0 %	96.8 %	100.0 %	100.0 %

Item	2013	2014	2015	2016	2017
4. Customer-supplied water quality	94.9 %	99.7 %	100.0 %	100.0 %	100.0 %
5. Household water consumption	16.1	16.2	16.9	17.0	16.5
C. Operation					
1. Production efficiency	79.6 %	78.7 %	76.3 %	72.7 %	71.9 %
2. NRW rate	26.4 %	25.1 %	22.5 %	21.8 %	20.5 %
3. Supply time/day	24	22	24	24	24
4. Water supply pressure	53.0 %	72.0 %	72.5 %	70.9 %	75.1 %
5. Water meter replacement ratio	3.0 %	3.0 %	16.7 %	25.5 %	25.2 %
D. SDM					
1. Employee number/1,000 connections	6.5	6.2	6.17	6.35	6.48
2. Education and Training/Capacity Development	9.4 %	8.7 %	12.6 %	6.9 %	87.6 %
3. Training/Personnel costs	1.3 %	1.5 %	1.9 %	1.9 %	2.7 %
Total evaluation value	3.55	3.5	3.71	3.78	3.98
Evaluations	Sound	Sound	Sound	Sound	Sound

Source : Assessment report of KINERJA PDAM, BPPSPAM (PDAM)

(4) Reorganization from PDAM to Perumda or Perseroda

As a result of the Government Regulation No. 54/2017 concerning regionally owned enterprises, PDAM has become required to be either Perumda or Perseroda by the end of 2019. After the reorganization, the city hall's intervention will be eliminated, PDAM makes it possible to manage the PDAM itself more independently, and make PPP easier to implement. Table 2-28 compares business form of PDAM, Perumda, and Perseroda.

While most of the nearly 400 PDAMs in Indonesia currently will choose Perumda's business structure, some PDAMs may choose Perseroda, whose business format is closer to that of the private sector.

All four PDAMs selected Perumda:

Denpasar (completed by October 2019), Badung (in progress in October 2019), Gianyar (in progress from the interview survey) and Tabanan (in progress from the interview survey).

Table 2-28 Comparison among PDAM, Perumda and Perseroda

Item	PDAM	Perumda	Perseroda
Condition	Public sector for water services alone	Another service deployment possible	Private form of organization in which all services are virtually available
Asset owners (KPMs)	Mayor/Governor	Mayor/Governor or a person appointed by Governor	Representative of Perseroda (who owns the best assets)
Number of supervisors	Directors and above	Same as a director	Unknown
Director	Mayor/Governor	Nomination by KPM	Unknown
Term of Office of Directors	Four years	Five years	Unknown
Distribution of Profits from Production Services	Automatic allocation 10 %	5 %, not an automatic assignment	Unknown
Frequency of elections for directors	Twice	Three times	Unknown
Management agreement of the directors	Not stated	Depend on performance	Unknown
Money grants	From the city/area	From the city/area	None

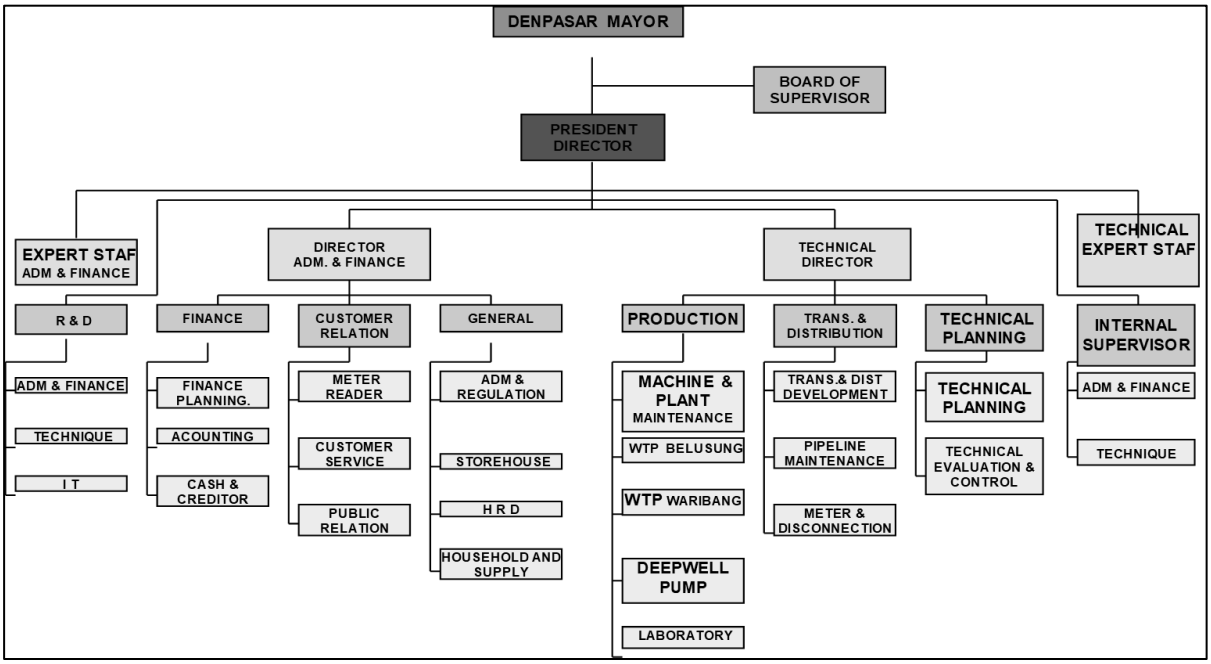
Source : De Perturan Pemritah No. 54/2017 tentang badan usahah milik daerah

For convenience, PDAM will be used in this report continuously.

(5) Organizational Chart of four PDAMs

Figures 2-24 to 2-27 show the organization chart of four PDAMs.

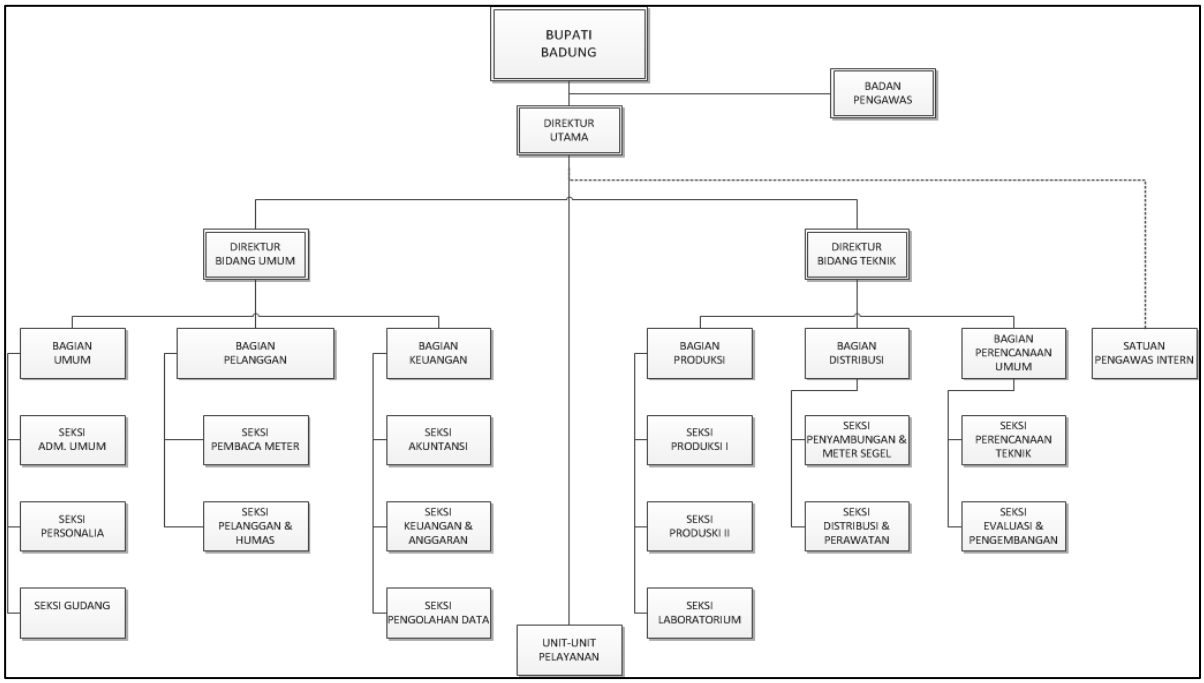
(a) PDAM Denpasar



Source PDAM Denpasar

Figure 2-24 Organization Chart of PDAM Denpasar

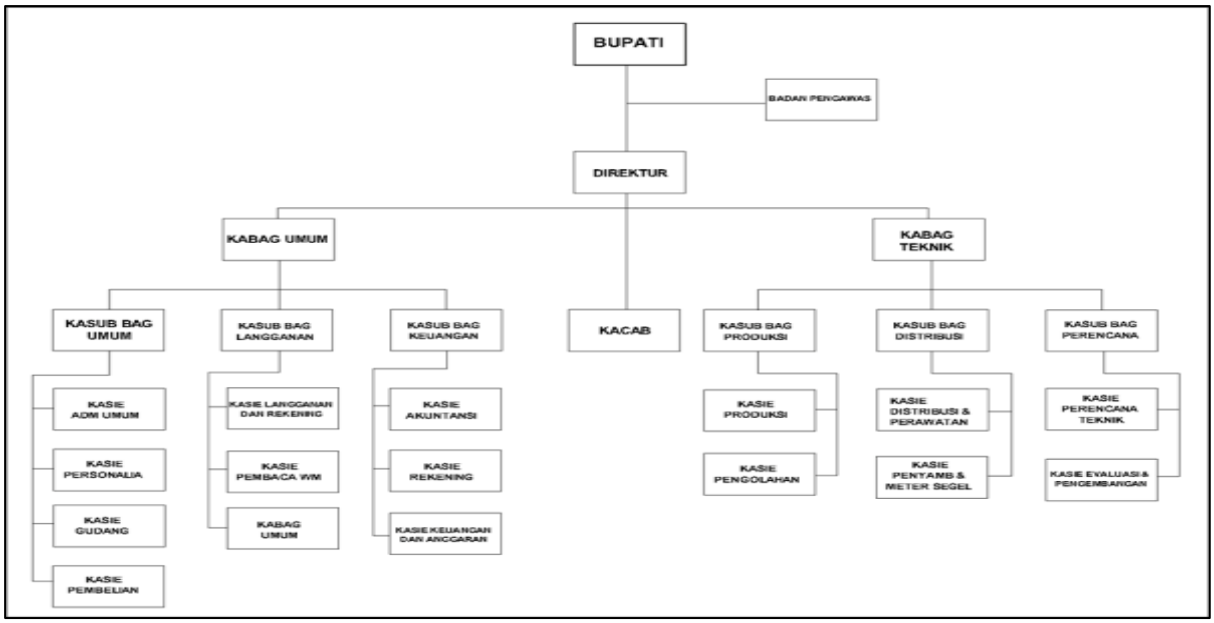
(b) PDAM Badung



Source: PDAM Badung

Figure 2-25 Organizational Chart of PDAM Badung

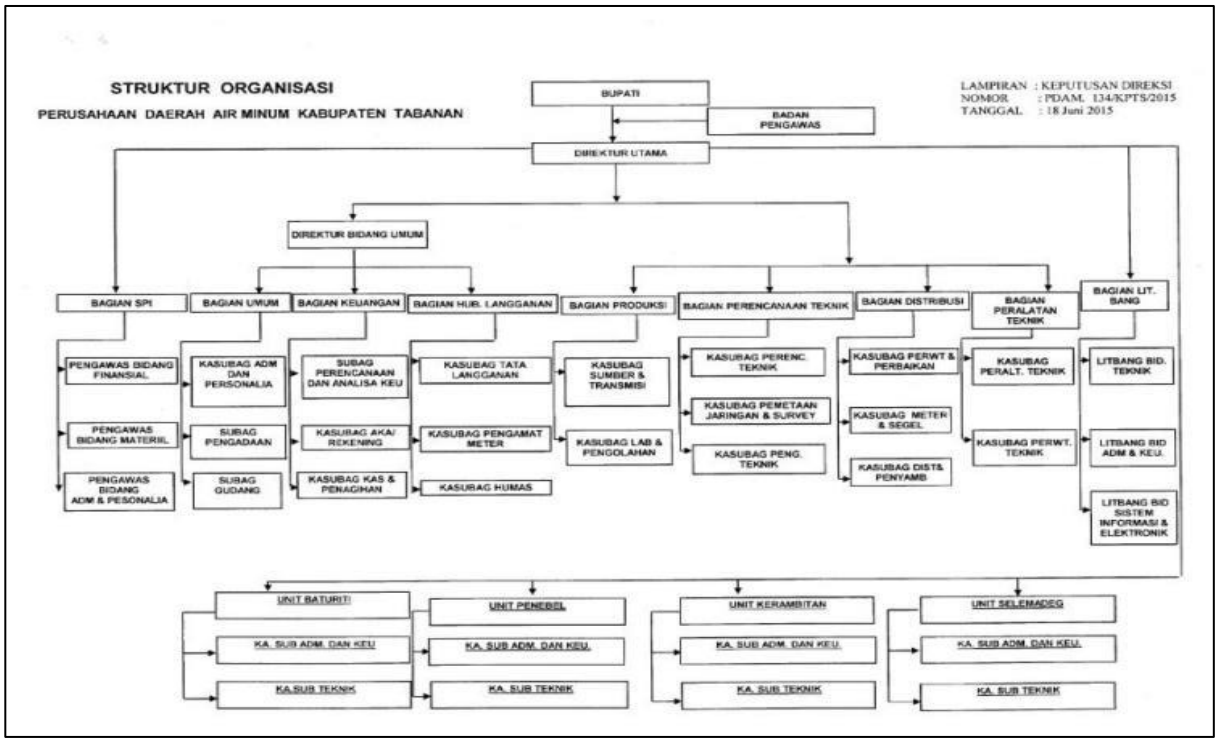
(c) PDAM Gianyar



Source : PDAM Gianyar

Figure 2-26 Organization Chart of PDAM Gianyar

(d) PDAM Tabanan



Source : PDAM Tabanan

Chart 2-27 Organizational Chart of PDAM Tabanan

(6) Problems of PDAM

(a) PDAM Denpasar

The deterioration of the pipeline network and water leakage are major problems in PDAM Denpasar. The water leakage rate is high at 39 %, and the water pipes are old. There are about 6 kilometers of

asbestos pipes since 1970. In addition, the water distribution network in the city is not managed by the distribution block system, so the NRW rate is high because there is no district stop valve even if there is a water leakage.

(b) PDAM Badung

1) PDAM Badung cannot receive the scheduled amount of water from two existing SPAM Regional Projects.

a) Since SPAM Petanu distributes the water to the northern part of Badung, PDAM Badung wants water supply in the southern part of Badung. Since the pipe diameter of the receiving side is smaller than that of the supply side, the water receiving amount and the water pressure are not obtained sufficiently.

b) The rubber dam system of the water intake system of the SPAM Penet is problematic, and water intake is stopped for three days to a week due to the damage to the rubber. This has caused problems in the continuity of the water supply system.

2) Since SPAM Unda is too expensive for water supply, PDAM Badung prefers to reduce this cost, which is similar to that of SPAM Petanu.

3) There are many deep wells in the north, and PDAM Badung is planning to reduce the use of deep wells in the north.

(c) PDAM Gianyar

1) Water from the Jeruk reservoir is used, but it has not been used optimally.

2) Only 14-17 ℓ/sec is actually supplied while the water supply volume of the existing SPAM PETANU is planned to be 50 ℓ/sec due to water pressure. PDAM Gianyar requires the installation of a pump station.

(d) PDAM Tabanan

1) PDAM Tabanan plans its own SPAM, Yeh Empas (Long Storage). This plan is to construct a water treatment plant with a capacity of 200-250 ℓ/sec. There are concerns that the Yeh Empas Water Supply Project and the SPAM Ayung project will overlap.

2) When the SPAM Ayung project is completed, PDAM Tabanan will receive water supply by 400 ℓ/sec, but there is no big demand from various SPAM projects. So PDAM Tabanan would like to reconsider the allocation amount from SPAM Ayung Project.

2.4 History of Japan's Cooperation

2.4.1 History of Loan and Grand –Aid Project

Japan is the largest donor to Indonesia, and Indonesia is the largest recipient of Japan's ODA (on a cumulative basis). Japan's economic cooperation to Indonesia has contributed greatly to the development of Indonesia through human resources development and the development of economic and social infrastructure, etc. since the acceptance of trainees in FY1954. Japan's ODA disbursements to Indonesia are shown below.

Table 2-29 Financial Disbursements (in billion yen)

Fiscal year	ODA Loans	Grant Aid
2012	154.9	60.97
2013	821.82	10.6
2014	-	3.19
2015	1,400.51	2.68
2016	739.83	2.31

Source : MOFA Country Data Book 2017

In addition, the specific results of Japan's cooperation in the water supply sector by scheme are summarized below.

Table 2-30 Disbursements of Loan

Fiscal year	Project Name	Millions of Yen
1971	Jakarta Water Supply Project (Master Plan E/S)	142
1971	Jakarta Water Supply Construction Project (Emergency Project)	547
1972	Jakarta Water Supply Construction Project (Additional Emergency Project)	487
1974	Jakarta Water Supply System Construction Project (Phase 1 of Medium-Term Plan)	231
1976	Jakarta Water Supply Construction Project (Phase 1 of Medium-Term Plan)	2,796
1976	Jakarta Water Supply Construction Project (Phase 2 of Medium-Term Plan)	147
1980	Jakarta Water Supply Construction Project (Phase 2 of Medium-Term Plan)	2,670
1981	Jakarta Water Supply Construction Project (Second Project of Second Medium-Term Plan)	3,064
1981	Sulawesi Small and Medium City Water Supply Project	559
1982	Jakarta Water Supply Construction Project (Phase 2 of Medium-Term Plan, Phase 3)	5,730
1982	Water supply business around Surabaya (E/S)	280
1984	Jakarta Water Supply Project (Phase 2 Emergency Project)	4,500
1985	Second Water Supply Project in Jakarta (Phase 1)	10,923
1986	Ujung Pan Water Supply Project (E/S)	701
1988	Ujung Pan Water Rehabilitation Project	1,364
1990	Jakarta Water Supply System Development Project	6,446
1992	Surabaya Urban Environmental Improvement Project (I)	113
1993	Ujung Pandan Water Supply Project	7,034
1994	Rural Infrastructure Development Project (II)	297
1995	Housing Environment Improvement Project (II)	122
1998	Rural Infrastructure Development Project (II)	200
1999	Bilibili Multipurpose Dam Construction Project (I)	67
2001	Bilibili Multipurpose Dam Construction Project (III)	208
2001	Rural Infrastructure Development Project (III)	297
2001	Bilibili Multipurpose Dam Construction Project (III)	35

Source : Survey Team

Table 2-31 Disbursement of Grant Aid

Fiscal year	Project Name
1970	Jakarta Water Supply Emergency Project
1971	Jakarta Water Supply Emergency Project
1972	Jakarta Water Supply Emergency Project
1973	Jakarta Water Supply Development
1988	Project for Construction of Water Supply Environmental Sanitation Training Center
1991	Sulawesi Provincial City Water Supply Development Project (1/2)
1992	Project for the Improvement of Water Supply System in Rural Cities in Sulawesi (Phase II)
2000	Sulawesi Rural Water Supply Development Project (1/3)
2001	Sulawesi Rural Water Supply Development Project (Phase II)
2002	Sulawesi Rural Water Supply Development Project (Phase III)
2006	Project for the Improvement of Water Supply in Gunungkidul Regency (1/2)
2007	Project for the Improvement of Water Supply in Gunungkidul Regency (Phase II)
2007	Project for Rural Water Supply in East and West Nusa and Tenggara Provinces

Source : Survey Team

Table 2-32 Development Studies

Fiscal year	Project Name
1980	Project for Improvement of Water Supply in Local Small Cities
1984	Project for Improvement of Jakarta City Water Supply
1985	Project for Improvement of Water Supply System in Ujung Pandang
1989~1992	Rural Water Supply Development Project
1994~1997	Jakarta City Water Supply Development Project (Review) Survey (Implementation Study)
2000~2002	Project for Rural Water Supply in East and West Nusa Tenggara Province
2004~2006	Integrated Water Resources Development and Management Plan in Bali

Source : Survey Team

2.4.2 History of Technical Cooperation

The following shows Japan's assistance disbursements for technical cooperation.

Table 2-33 Transition of Disbursement of Technical Cooperation (Unit: JPY100 million)

Fiscal Year	Technical Cooperation	
2012	82.91	(61.68)
2013	82.23	(60.06)
2014	75.53	(54.08)
2015	68.07	(59.7)
2016	61.92	-

Note:

1. In principle, the classification and amount of ODA loans and grant aid for a fiscal year are based on the expenses incurred for the budget year, while those for technical cooperation are based on the expenses for the budget year.

2. The figures for FY2012-2015 are those for Japan as a whole. Since the disbursements for FY2016 are being tabulated, only JICA disbursements are shown. Figures in parentheses are the disbursements and cumulative amount of technical cooperation implemented by JICA.

Source : MOFA Country Data Book 2017

Table 2-34 Disbursements of Technical Cooperation

Fiscal year	Project Name
1985	Project for Jakarta City Water Supply Development
1991~1997	Project for Water Supply Environmental Sanitation Training Center
1995~1996	Project for Improvement (Review) of Water Supply System in Jakarta
2001~2002	Project for Rural Water Supply in East and West Nusa Tenggara Province
2003~2006	Rural Water Supply Project
2006~2008	Project for Improvement of Water Supply System in Yogyakarta Special Region
2006	Project for Rural Water Supply in Nusa Tenggara Province
2007	Sector Study on PPP Schemes in the Water Sector
2008	Thematic Evaluation Study on Water Supply Sector, Management, and Maintenance
2009~2012	Project for Improvement of Water Supply and Water Services in Maminasata Metropolitan Area in South Sulawesi
2009	Preparatory Study for the Southern Bali Water Supply Project
2010	Preparatory Study for Rural Water Supply (IKK) Sector Loan Project
2010~2012	Preparatory survey for water cooperation for Bali reclamation
2010~2011	Makassar Water Supply Project Phase 2 Preparatory Study
2013	Water Supply Sector Information Collection and Confirmation Study
2015~2018	Strengthening Human Resources Development for Water Supply Public Corporation (COE) Project
2017	Project for Supporting Ground Subsidence Countermeasures in Jakarta (Development Plan Survey Type)

Source : Survey Team

The results of cooperation by water utilities in Japan are shown below.

(1) Expert dispatched to the Project

A number of long-term and short-term project experts were dispatched to the following on-site training projects since 1973. However, information on the number of persons is not available and is unclear.

- Government Official Training Project (1973-1975)
- North Sumatra Regional Health Control Project (1983-1989)
- Water Supply Environmental Sanitation Training Center Project (1989-1997)

(2) Grassroots Grant Aid

Table 2-35 shows the cooperation disbursements for the Grassroots Technical Cooperation Project (Special Limit for Regional Revitalization) by water utilities. Many Japanese water utilities have

provided technical assistance directly to local water utilities, but no Japanese water utilities have cooperated in the target area, SARBAGITA.

Table 2-35 Disbursement of Technical Cooperation Disbursements for Grassroots Projects

Project Name	Period	Implementation/counterpart entity	
Water Treatment Technology Improvement Project in Solok	2015~2017	Toyohashi City Water and Sewerage Bureau	PDAM in Solok City
Improvement of water quality in the typical tropical peatlands in Bunkaris, Riau Province, based on Basic Environment Plan supported by the Ube System	2015~2018	Ube City Water and Sewerage Bureau	PDAM in Bunkaris Regency
Technical Support for Water Leakage Prevention in Bandung City	2016~2019	Hamamatsu City Water and Sewerage Bureau	PDAM in Bandung City
Project on Capacity Building for Underground Water Leakage Countermeasures in Makassar-Towards Effective Use of Water Resource	2018~2021	Kawasaki City Water and Sewerage Bureau	PDAM in Makassar City
Project for Strengthening Water Supply Services in Solok City	2019~2021	Toyohashi City Water and Sewerage Bureau	PDAM in Solok City
Medan Water Service Safe 24-Hour Water Supply Capacity Building Project	2019~2021	Yokohama City Water Bureau	PDAM in North Sumatra Province

Source : Survey Team

(3) Japan International Corporation of Welfare Services

Table 2-36 Survey Results of the Japan International Corporation of Welfare Services

Fiscal year	Project Name
1988	Rural Water Supply Survey (South Sulawesi)
1990	Project for Integrated Waste Management on Batam Island
1992	Survey on current status of industrial waste management
1992	Denpasar City and Badung Regency Urban Waste Management Project
1995	Project for Rural Water Supply Development in Nusa and Tenggara Region
1999	Project for Introduction of Septic Tank in Chilebon City
2018.9	Survey for Water Supply Development in Southern Bali
2019.3	Survey for Water Supply Development in Southern Bali

Source : Survey Team

2.4.3 Opinions on the above-mentioned Cooperation by Counterpart Organizations

The survey team received a supporting letter of fully cooperation for this survey from the Bureau of Waterworks Development of the Bali Province, and is expected to implement the project.

2.5 History of Cooperation by Third Countries/International Organizations

2.5.1 Record of Assistance and its Type related to the Project

No third-country/international organizations have provided with assistance regarding the proposed projects.

2.5.2 Request for the Project and the Result

No requests are made to third countries or international organizations regarding the proposed project.

2.5.3 Consistency with Japan's ODA Policy (Country Assistance Policy, Water and Sanitation, Broad Partnership Initiative, etc.)[3]

(1) Aims of Development Cooperation for the Countries and Regions

Indonesia has the largest population and land population in Southeast Asia, the largest core country in

[3] Country Assistance Policy for Indonesia September 2017

ASEAN, and the largest Muslim population in the world. It is also a coastal state of the Strait of Malacca, an important hub for international maritime traffic.

Japan is a strategic partner with a long and friendly relationship, sharing fundamental values such as democracy, human rights and a rules-based multilateral trading system. In the economic field, a number of Japanese companies, including manufacturers, have been operating in Indonesia for many years, and as of 2016, more than 1,800 Japanese companies were operating in the country. With the entry into force of the Japan-Indonesia Economic Partnership Agreement in July 2008, economic relations between Japan and Indonesia have become even closer. Indonesia is an important supplier of natural gas, coal and other energy sources for Japan, and it has a deep relationship with Japan and Japanese companies in the energy field, such as the development of gas fields. In 2015, the ASEAN Community was inaugurated, strengthening economic integration and connectivity within the ASEAN region, among other measures. In this context, Indonesia is becoming increasingly important for Japanese companies that have invested heavily in Indonesia. Thus, the economic development of Indonesia is of great importance not only for the benefit of the Indonesian people, but also for Japan's development with the countries in the Asian region, including Southeast Asia.

In Indonesia, President Joko Widodo was inaugurated in October 2014, and in January 2015, the "National Medium-Term Development Plan 2015-2019" incorporating the "nine priorities programs (Nawa cita)" was announced, confirming policies such as improving international competitiveness, developing infrastructure, and reducing regional disparities. As Indonesia is only G20 member in ASEAN, it is expected to play a major role in the international community. Provision of assistance based on these development policies contributes to the stability and development of Asia, including Japan, which is indispensable for the stability and development of the region.

(2) Japan's Basic ODA Policy (Major Objectives): Assistance to Indonesia for Balanced Economic Development and Capacity Building to Address International Issues

In order to achieve balanced development in Indonesia, Japan will provide support for improving international competitiveness and realizing a safe and fair society through quality infrastructure development, etc. Japan will also provide support for improving capacity to respond to the challenges facing the Asian region and the international community.

(3) Priority Areas (Medium-Term Goals)

(a) Support to Enhance international competitiveness

In order to achieve economic growth in the globalizing Indonesian economy by enhancing the international competitiveness of private enterprises, Japan will provide with assistance for the development of business and investment environments and human resources through the development of high-quality infrastructure such as transport, logistics, energy and telecommunications networks, and the improvement of various regulations and systems.

Table 2-37 Policy to support the Improvement of International Competitiveness

Item	Infrastructure development with high quality	Improving of environment and development human resources
Current challenges	• Infrastructure development in Indonesia has not kept pace with the rapid economic growth. • This is a hindrance to sustainable growth, and the country's lack of infrastructure and low quality in the transport sector, such as land, airports and ports, as well as the constraints and instability of its electricity supply, are serious problems. • In order to improve international competitiveness and achieve further economic growth and job creation, these challenges need to be addressed.	• Further growth of the private sector is necessary for the sustainable development of Indonesia's society and economy, and it is essential to improve the business and investment environment. • Important issues include transparency of various legal systems (tax system, customs and tariff system, labor, intellectual property, etc.), improvement of stability, and administrative procedures, and development of higher human resources.

Policies for dealing with development issues	• Japan will support Indonesia's sustainable economic growth through the elimination of bottlenecks to growth and the improvement of international competitiveness by promoting infrastructure development in the areas of transportation, transportation, electricity, communications, and urban infrastructure, which are the challenges Indonesia faces.	• Taking into account the improvement of the business and investment environment, Japan's economic policies, and the needs of the private sector in both countries, Japan will provide assistance for the tax system, customs and tariffs, intellectual property rights, competition policy, SME promotion, human resource development, improvement of legal systems such as labor, tax, and finance, and improvement of operational capabilities. • In doing so, Japan will also give due consideration to the economic partnership between the two countries in such fora as the Japan-Italy Economic Partnership Agreement (EPA). • From the viewpoint of developing advanced human resources, Japan will provide with assistance for capacity building of education and human resources development institutions, including the Indonesian central university, which have been established by Japan, to provide human resources and research meeting the development status and requirements of Indonesia's economy. • Attention will also be paid to strengthening human networks between the two countries by making use of networks between Japanese and ASEAN universities.
Cooperation program	1. Logistics, Transport and Infrastructure Development Program 2. Stable Power Supply Program	1. Program to improve systems related to the business environment 2. Industrial human resources and higher personnel development program

Source : Country Assistance Policy for Indonesia September 2017

(b) Assistance toward the Realization of a Safe and Fair Society through Balanced Development

In order to realize a safe and fair society, in order to improve the quality of life, the Government will support the development of not only large cities but also rural areas, and the improvement of administrative functions such as disaster prevention measures.

Table 2-38 Policy to improve Quality of Life

Issue	Support for rural development to improve quality of life	Disaster prevention measures for a safe and fair society and improvement of administrative functions
Current challenges	• In rural areas where development is lagging, the development of infrastructure to improve the quality of life is an issue. • There are large differences in population, industrial and income levels between the Java Islands and rural areas. In order to achieve both sustainable economic growth and social stability, it is necessary to promote balanced development and improve the quality of life of the people.	• In Indonesia, natural disasters such as earthquakes, tsunamis, volcanoes, floods, and sediment-related disasters occur frequently, causing many damages each year. From the standpoint of disaster prevention, the BNPB and the Regional Bureau for Disaster Management (BPPD) are responsible for capacity building, flood control through integrated water resources management, and institution building for earthquake-resistance of housing. • The present administration has pledged the realization of effective administration and the establishment of a clean and reliable government. It is an issue to provide high-quality administrative services and to realize a safe and fair society.
Issue	Support for Rural Development to Improve Quality of Life	· Disaster prevention measures for a safe and fair society and improvement of administrative functions

Policies for dealing with development issues	• In order to improve the quality of life, assistance will be provided to improve the living environment in rural areas, such as water supply, sewage and waste, and to promote balanced development by correcting the widening regional disparities accompanying economic growth. This will be the beginning of the year, and cooperation will be provided for the development of regional industries, including agriculture and fisheries. • Support will be provided for the improvement and strengthening of systems and organizations that contribute to the promotion of local development and the correction of disparities, making use of past support results.	• Japan and Indonesia are both disaster-stricken countries, and based on the enactment of the "World Tsunami Day" by the United Nations, Japan and Indonesia will work to build cooperative relations based on mutual knowledge and experience, including the experience of reconstruction from the 2004 Indian Ocean tsunami disaster and lessons learned from the Great East Japan Earthquake, and will share their experiences with the world. • Expansion of disaster prevention measures to regional cooperation will be examined, considering the establishment of relations with the ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) in Jakarta. • In addition, Japan will provide with assistance for capacity building and institutional strengthening for the improvement of administrative organizations in various sectors, such as social security and civil police activities, which are related to the creation of a safe and fair society, and for addressing the SDGs, which widely engage in sustainable and balanced development.
Cooperation program	1. Regional development and industry promotion program 2. Living environment improvement program	1. Program for improving disaster prevention and administrative functions

Source : Country Assistance Policy for Indonesia September 2017

(c) Assistance for capacity building to address challenges in the Asian region and the international community

Japan will provide with assistance for measures against climate change and environmental conservation, which are issues of the Asian region and the international community. Japan will also provide with assistance for capacity building as a donor country, as well as for maritime safety and capacity building against terrorism and infectious diseases.

Table 2-39 Policy for Natural Environmental Conservation Measures

Item	Climate Change and Natural Environment Protection Measures	Challenges in the Asian Region and the International Community
Current challenges	• Indonesia's greenhouse gas emissions (GHG) are said to be the fifth largest in the world in 2012 after China, the United States, India, and Russia, when carbon dioxide emissions from loss of forests and degradation of peatlands are added. • At COP 21 in 2015, the country set a national goal of reducing its GHG emissions by 29 % by 2030 and positioned climate change measures as an important policy agenda. • The loss of forests and peat fires are particularly serious, and this is an issue that needs to be addressed. It is also recognized that further efforts are needed to realize a low-carbon society, such as the introduction of energy-saving technologies.	• As a member of the G20, Indonesia has expanded its voice in world politics and economy, and has shown a positive stance on international and regional issues as well as South-South cooperation. • In particular, they are expected to play a subjective role in policy coordination, institutional improvement, and sharing of experiences in democratization within ASEAN.
Policies for dealing with development issues	• In order to promote climate change mitigation and adaptation measures, Japan will support the improvement and improvement of policies and institutions, capacity building of governments, and the introduction and development of low carbon technologies, while utilizing Japan's strengths. • Coordinate with the progress of bilateral cooperation frameworks such as the bilateral credit mechanism.	• Japan will provide with assistance for capacity building on maritime security, counter-terrorism and counter-infectious diseases, which are important challenges not only for Indonesia but also for neighboring countries including Japan. • The two countries will strengthen their collaboration in dealing with international

	Japan will also cooperate with the government on adaptation measures, such as water resource management and the introduction of agricultural insurance. Cooperate with regard to biodiversity conservation, including the effective use of biological resources.	issues, and support Indonesia in its capacity to provide with assistance as a partner to become a donor country.
Cooperation program		1. Program to support responses to issues in the Asian region and the international community 2. Other

Source : Country Assistance Policy for Indonesia September 2017

(4) Points of Concern

Foreign investment is important for Indonesia's economic development. In order to attract investment, it is important to improve the business and investment environment, such as improving predictability and stability. Therefore, it is necessary to continue to make a request to the Indonesian government.

With regard to (3) (c), countermeasures against violent extremism are a serious issue that should be addressed not only within Indonesia but also in the region and the international community, and Indonesia is putting its efforts into this area. Therefore, it is necessary to consider the future of cooperation.

(5) Positioning of this project

The Water Supply Development Project in southern Bali is considered to be consistent with the Development Cooperation Policy (3) and (b) Assistance towards the realization of a safe and fair society through balanced development.

2.5.4 Necessity of Collaboration with Other International Donors

No other direct donor assistance has been provided for the part of the project. However, since the Republic of Korea has recently commenced grant aid and technical cooperation for PDAM Denpasar, which is within the scope of this project, the collaboration with this project is necessary.

2.5.5 Reasons for the Other International Donors not show Interest to the Project

This is a project that Japan is proceeding with ahead of others, and it will be necessary to confirm whether Japan will discuss this issue with international organizations in near future.

Chapter 3 Outline of Proposed Plan/Project

3.1 Approaches to Improving Problems

3.1.1 Problems in Water Supply Sector (Country Level)

Problems with national water services are described in 2.1.2 of the previous section.

3.1.2 Current Status of Water Supply Problems in the Target Area and Relation to the Target Project

Problems with drinking-water supply in the southern part of Bali Island are described in 2.1.5 of the previous section, of which the following are particularly serious.

(1) Issues common to all PDAMs

(a) Excessive Groundwater Exploitation

Many tourist accommodations in Bali use groundwater.

1) Denpasar City enacted an ordinance to impose a tax on groundwater users in 2010. However, it cannot be said that this ordinance has been effective as prescribed. According to an interview of PDAM Denpasar, only five of the 100 hotels in Denpasar City use the water from PDAM Denpasar.[4]

2) There are 1,022 customers in Kuta, one of the most prominent tourist attractions in Badung Regency, of which 499 have zero water usage of PDAM Badung, and they are likely to use groundwater.

3) There are 1,000 potential customers in Ubudo in Gianyar Regency, but only 50 of them use PDAM water.

This is due to the fact that the volume of water consumption by hotels in particular, is large enough, but the installation of water meters for exploitation pumps for extracting groundwater is not mandatory at present, and groundwater tax are also low compared to water tariffs.

As a result, salinization of groundwater by intrusion of seawater along the coast and ground subsidence problems in the inland areas are occurring. Denpasar's salt concentration in groundwater exceeds the regulatory limit of 250 mg/ℓ at 325 mg/ℓ.

In the future, even if the planned amount of water supply increases due to the new water supply project, if the water tariff is still high, users will not use water from new water sources with high unit price and continue to use groundwater or dig new wells, which will not be able to make effective use of new water sources developed. Therefore, it is necessary to strictly enforce restrictions on use of groundwater at the same time.

(b) Very High NRW Rate

The NRW ratio of each PDAM is high at around 40 %. If NRW ratio is not improved, nearly 40 % of the water from new developed water sources will not be supplied. So serious efforts must be made to improve this ratio in conjunction with the

The high NRW rate is attributable to both ① physical losses due to water leakage from obsolete pipes, and ② commercial losses due to under indications of water meters, unauthorized/unregistered connections and non-payment of water tariff. Therefore, it is desirable that PDAM should first identify the ratio of physical and commercial loss and then vigorously tackle the commercial loss countermeasures to reduce the loss as much as possible, and formulate a repair plan, by calculating the

[4] Mayor Denpasar, Regional Regulation of Denpasar City, Number 6 of 2010 about Groundwater tax

project cost necessary for reducing physical loss.

(c) Improper Revision of Water Tariff System

PDAM Tabanan has been using the same water tariff system since 2010 due to the reason that it was impossible to raise tariffs in a timely manner because the tariff revision required parliamentary approval from the Tabanan regency. In principle, the revenue mainly from water tariff has to cover the expenditure for PDAMs. However, each city and regency usually compensates the deficit of each PDAM. However, since the water supply service rate of Denpasar is 53.9 % in 2018, the tax of 46.1 % of people who do not use the water supply system of PDAM Denpasar will be used for this purpose, which is not fair.

It goes without saying that PDAM makes efforts to reduce expenditures, but it is a prerequisite for sound management to revise the tariff system on a regular basis in order to smoothly proceed the necessary works.

(2) Current Status and Challenges of each PDAM

Table 3-1 shows the current status and challenges of each PDAM.

Table 3-1 Current Status and Challenges of each PDAM

Name	Current Status and challenges
Denpasar	• Bulk water is adequate, but the service population is around 40 % due to inadequate distribution reservoirs and pipes. Tariff collection ratio is 90 %, 80 % of customer is for domestic and 5-10 % for hotels and other commercial facilities. Many people still use groundwater because it is cheaper. In PDAM, water is purchased from UPTD at 2,300 Rp/m^3, 5,000 Rp/m^3 for domestic use and 20,000 Rp/m^3 for commercial and industrial use. • PDAM Denpasar does not does not use 125 ℓ/sec of capacity from PDAM Petanu. Denpasar has SPAM Waribang, which overlaps the SPAM Ayung Project in the eastern and southern regions but lacks water supply in the western regions. On the other hand, according to the Denpasar City Interview Survey, the biggest challenge for Denpasar is to replace aging water pipes, since 40 % of the 1,600 km water pipes are old and the NRW rate is close to 40 %. • Bali has a water supply plan from Sidan dam to the Unda River, but new water supply pipes are required because of the distribution reservoir and obsolete pipes. • The conditions of receiving water from the service water supply system differ between the dry and rainy seasons and are not stable. During the dry season, there is an adjustment of supply, especially between the upstream and traditional irrigation systems. In order to solve this problem, we would like to complete the SPAM Ayung Project. • The water leakage rate is high at 39 %, and the water pipes are old. Six kilometers of asbestos pipe have been present since 1970. The city's water distribution network has not been blocked. In order to address the above issues, the ROK Ministry of Public Works and National Housing and K-Water have started providing technical assistance, and a master plan has been prepared for converting the city's pipeline network to smart water from October 2018 to July 2019. However, the project has not yet been implemented.
Badung	• Existing SPAM Petanu supplies water in the northern area of the country but PDAM Badung desires to supply water in the southern area of the regency. Since the pipe diameter of the receiving side is smaller than that of one of water supply side, the water receiving amount and the pressure are not obtained sufficiently. Damage to the rubber dam of the existing SPAM Penet intake system has resulted in water withdrawal being suspended for three days to a week, causing problems in the continuity of the water supply system. Thus, water is not received in full of the two existing SPAM Regional Projects. • While water leakage due to old pipes and water shortage occurs in the southern area, the SPAM Ayung Project supplies the water in the northern area. Hotels in the southern region use groundwater as a means of self-employment. A pump (125 ℓ/sec) is planned to be set in this southern area with SPAM Petanu. • In order to supply water to the north, SPAM SARBAGIKUNG is too expensive to receive water. Therefore, we would like to make it the same level as SPAM Petanu. On the other hand, the groundwater usage fee should be the same as that of PDAM. (PDAM: 17,000 Rp/m^3; groundwater: 4,500 Rp/m^3) • There is interest in introducing anti-seismic technology for new facilities, but we do not know how to introduce it. Already, distribution reservoirs (50-100 m^3) have been constructed in compliance with Indonesia's National Standards (SNI).

Name	Current Status and challenges
Gianyar	• While Since Petanu Water Treatment plant is located at low sea level and one pump is installed here, currently, there is insufficient water pressure in one pump. Distribution system from Petanu is single. • In 1973, a large-scale earthquake occurred in Buleleng Regency in the northern part of Bali. • The piping has already been constructed in accordance with Indonesia's national standards (SNI). (Presence of anti-seismic-related standards for general building standards) • At present, based on asset management, materials and equipment are selected from the viewpoint of life cycle cost to introduce materials that can be used for a long period of time. • Purchased from SPAM Patina and BBT at 2,700 Rp/m^3 and 2,614 Rp/m^3, respectively. Replacement with water pipes to the airport is required. Hotel water tariff is 17,000 Rp/m^3.
Tabanan	• Water supply service ratio is 70.5 %. • Under a contract with BWS, PDAM Tabanan plans to receive 300 ℓ/sec of water in 2020 as Yeh Empas' water supply project. Furthermore we have a plan of water treatment plant with a capacity of 200-250 ℓ /sec. Both the Yeh Empas water supply Project and the SPAM Ayung Project overlap. • If SAPN Ayung Project starts operation, the water supply will increase by 400 ℓ/sec in addition. However, there is no demand for water of this volume. Therefore, PDAM Tabanan wishes to review allocation amount in the SPAM Ayung Project.

Source : Results of interviews with survey Teams

3.1.3 Scope of Cooperation

The scope of Japan's cooperation will include technical cooperation, including the utilization of Japan's technology, in order to operate water efficiently and effectively. Since the current SPAM Ayung Project issues are as follows, projects contributing to the resolution of these issues will be implemented.

(1) Review of Water Supply Facilities downstream from Sidan Dam

In the initial FS 2015, the water downstream from the dam were to be treated at three water treatment plants and supplied to each PDAM via distribution reservoirs as shown in Figure 2.15. However, from April to November 2019, the BWS, which is a bureau of the Bureau of Water Resources (SDA) of the Ministry of Public Works and National Housing, procured a consultant, PT Geodinamik Konsultan, to investigate whether the detailed design should be changed to one or four water treatment plants. The change of number of water treatment plants result in the review of water supply facilities downstream from the dam.

(a) When a water treatment plant is located in one place, it is difficult to secure a site because it requires a large area, and pumping stations, and if a problem occurs in this water treatment plant, it affects all PDAMs.

(b) On the other hand, the installation of four treatment plants in each PDAM have the advantages of being able to supply water by gravity without pumping station and having a small site area for a water treatment plant. Needless to say, however, construction costs do not enjoy the scale merit, and the unit price per unit water volume is high, and there are concerns that maintenance and management costs including human expenses s will be higher.

Therefore, it is not clear which plan will be finalized, while BWS believes that it is preferable to establish a water treatment plant in each regency. However, they have not discussed with each PDAM yet, they plan to share information in the near future.

The location of the water treatment plant and distribution reservoir has not been determined, but the water treatment plant in Badung assumes that the distribution reservoirs in Desa Carangsari, Gianyar and Tabanan are Kedewatan and Luwus Village, respectively.

According to the explanation of the BWS, after this detailed design has been completed, the EIA will be carried out over a period of 10 months. However, as will be described later, whether SPAM Ayung will be implemented or not will finally be decided in the future.

(2) Water Supply

The amount of water supplied from Sidan dam is 1,750 ℓ/sec, and it is estimated that 750 ℓ/sec, 500 ℓ/sec, 100 ℓ/sec, and 400 ℓ/sec will be supplied to each of PDAMs of Denpasar, Badung, Gianyar, and Tabanan. However, in PDAM Tabanan, for example, 400 ℓ/sec is said to be too large, and it is unlikely that the amount of water supplied was determined based on the request of each PDAM.

For example, Gianyar has a own plan to supply water to Ubudo, and SPAM Petanu (2015) and SPAM Penet (2017), which have already started operation by UPTD, are unable to supply water as planned and are wasted. On the other hand, SARBAGIKUNG will be planned under PPP scheme in the future. In addition, BWS requested consideration of Selat Kanan (2,000 ℓ/sec), which is currently undergoing detailed design.

It is essential to reconsider the amount of water supply, which is consistent with these projects and accurately ascertained the actual requirements of each PDAM and its water supply system. Table 3-2 shows the water supply by each PDAM from various kind of the projects.

Table 3-2 Various Kind of Regional Water Supply Projects

Project name	Unit	Denpasar	Badung	Gianyar	Tabanan	Klungkung
SPAM Ayung	ℓ/sec	750	500	100	400	
SPAM Petanu	ℓ/sec	150 (0)	100 (25)	50 (14-17)*		
SPAM Penet	ℓ/sec	150 (0)	150 (75)			
SPAM SARBAGIKUNG	ℓ/sec	200	2,000	50		50

Note: Figures in parentheses indicate actual water supply volumes

* Only 14-17 ℓ/sec is used because the Petau treatment plant is in the south and water supply is limited to the low Kecamatan Zukawati area.

At present, Badung has its own water supply project. As shown in Table 3-3, the amount of unused water is 550 ℓ/sec, which is 40.7 % of the original water flow.

Table 3-3 Various Kind of Projects for Supplying Water to PDAM Badung

Name of Water treatment plant	Unit	Initial planned water volume	Amount of water used		Unused amount of water	
Petau	ℓ/sec	100	25	(25.0 %)	75	(75.0 %)
Penet	ℓ/sec	150	75	(50.0 %)	75	(50.0 %)
Blusngan	ℓ/sec	600	200	(33.3 %)	400	(66.7 %)
Estuari	ℓ/sec	500	500	(100.0 %)	0	(0.0 %)
Total	ℓ/sec	1,350 (100 %)	800	(59.3 %)	550	(40.7 %)

(3) Matters to be Concerned in Implementation Stage

The current situation of each PDAM is not necessarily the same, and the relevant organizations are thought to have set up various projects independently without sufficient mutual cooperation. Therefore, it is necessary to revise the plan with the following points in mind.

(a) When determining the water supply and distribution reservoir locations, each PDAM should thoroughly discuss the current status, the identification of water insufficient areas, and measures to be taken with each other.

(b) To ensure consistency between the projects determined by each PDAM and the regional water supply projects spanning plural cities and regencies.

(c) As shown in Figure 2-19, these projects involve a number of agencies, including central and Bali branch of ministries, the Bali province, local city/regency which approve water tariffs and business plans, and PDAMs. At present, each PDAM sets its own water tariffs, but when implementing a regional water supply project or determining appropriate groundwater usage tariffs, cooperation between relevant organizations is essential. At present, there is no strong leadership from any institution, but in the future, the establishment of councils will be effective for promoting mutual understanding.

3.1.4 Form of Cooperation

Initially, SPAM Ayung Project FS 2015 was planned to be reviewed, but based on the results of the on-site survey, the following study will be proposed.

The form of cooperation is assumed to be Japanese Technical Cooperation for Development Planning Scheme. This technical cooperation involves the transfer of research and analysis and planning methods, and other technologies to counterparts in developing countries, while supporting the formulation of policies and of public works projects in developing countries.

After the completion of this study described below, the Indonesian government will implement the project with funding from JICA and/or other external agencies based on the results of this study. In addition, as shown in (5) below, the Japanese side shall explain to the Government of Indonesia that if Japan's anti-seismic technology is introduced, it will be subject to the Japanese STEP loan. The Government of Indonesia shall make efforts to request for the STEP loan. The terms and conditions for ODA Loans including STEP loan rate are attached to the Annex -6.

(1) Review of the MPs in the Southern Bali

Since the water supply project determined by each PDAM is not consistent with the regional one which covers plural cities/regencies and the current situation is not properly grasped, the Southern Bali MP will be prepared to solve these problems. While it is said that Bali province has already prepared a such plan, this plan will be revised in such a case,

As seen in the agreement at Bali on 30th in October (see 3.1.6), Bali's side wants to prepare a consistent MP.

(2) FS of Priority Projects and Identification of Emergency Projects

SARBAGITA Region expects the SPAM Ayung Project to be realized, but the urgency of the project is not same among them. Therefore, priority projects, especially those with high emergency, will be selected and FS will be implemented.

(3) Capacity Building for Regulating Groundwater Over-Exploitation

(a) One PDAM will be selected as a model case to implement activities related to improving the capacity of regulating groundwater exploitation.

(b) The personnel trained in this model PDAM will be dispatched to disseminate the result of training and develop the activity including actual practice in the remaining PDAMs.

(4) Capacity Building and Dissemination Support for the NRW Reduction Measures

As none of PDAM received technical support from external agency, one PDAM will be selected as a model case to implement activities to reduce NRW ratio. The procedure for disseminating the activity for reducing NRW will be the same as the above the activity described in (2)

(5) Introduction of Anti-seismic Technology

Indonesia is one of the world's largest earthquake-prone countries, and Bali has experienced many earthquakes. Japan has advanced anti-seismic technologies based on lessons learned from past damage experience for all water supply facilities, including water treatment plant, distribution ponds, and distribution pipes. Therefore, Japan is considering applying these technologies to the water supply facilities as STEP loan project.

Regarding the anti-seismic technology, each PDAM has different intentions, such as concerns about the high cost of facilities despite their interest. PDAM Badung is active, but PDAM Tabanan doesn't think it is particularly necessary, and the position of PDAM Denpasar and Gianyar for this issue is neutral. Therefore, it is necessary to decide which facilities (water treatment plants, water distribution reservoirs, water pipes, etc.) are to be installed by using anti-seismic technology, in consideration of the needs of

each PDAM. In February 2020, the Ministry of Health, Labour and Welfare will hold a seminar to confirm their level of interest in anti-seismic technology.

3.1.5 Implementation Schedule

Table 3-4 shows the implementation schedule of this project.

Table 3.4 Implementation Schedule

	First year												Second year												Third year												Total
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Review of MP																																					11
FS for Implementation																																					9
Regulation of Groundwater Exploitation																																					13
NRW Improvement																																					14

Source : Survey Team

3.1.6 Indonesian Concern for this Project

The wrap up meeting was held between the survey team and Indonesian officials (BPPW, BAPPEDA) on October 30, 2019, and both side signed the MOM with regard to these issues. The content of MOM is shown in Appendix-5.

(1) Current Status of the SPAM Ayung Project (The Facts)

(a) The Project is still open for everybody and many possibilities

(b) The authority of SPAM regional Ayung is under Bali Province. Directorate General of Human Settlement role is facilitating the implement project in technical term. Especially if the project proposed by Bali province in order to be implemented through central budget. At this moment, there is no official commitment related to financial scheme.

(c) Water supply project is high priority project in Bali Province.

(d) In southern Bali area, there are several regional SPAMs. Therefore the MP should be reviewed so that there will not be any contradiction between the projects.

(e) The financing aspect for loan is under authority of Bappenas and MOF. It needs further review FS to decide the financial scheme.

(f) If the project will be funded by loan, the procedure is that the province Government propose to the Ministry of Public Works and Housing through Planning and Foreign Cooperation Bureau. And then will be forwarded to Bappenas. Bappenas and MOF will decide whether the funding will come from the local budget, national budget or from external funding. If the source of budget came from loan, then it has to be listed in Bluebook.

(g) Sidan Dam construction will be finished in 2021. So, Water Supply Facilities have to be constructed, before starting the project, it needs impounding test for durability for one year.

(h) To implement Spam Project, MOU is needed among Central Government, Province, City and District. There are no MOU for Spam Ayung at the moment.

(i) Currently, there is a rule regarding retribution of groundwater usage. But there is no policy of usage limitation. This is one of the reason, large water users such as Hotels do not buy PDAM water.

As a result of discussions, both sides came to understanding concerning the matters referred to as below.

(2) Mutual Understandings (Conclusions)

(a) All attendants agreed about the facts (a) to (i) above.

(b) All attendants consider to review the SPAM Regional Projects MP in Bali Province. Also we are interested in utilization of the JICA scheme for this study.

(c) If the Indonesian side interested in Japanese Anti Seismic Technology for Water Supply System,

Japanese ODA Loan (STEP Loan) is considerable. However, regarding the SPAM Ayung Project still needs further discussion among the related organizations.

3.2 Objectives of the Project

3.2.1 Short-term Objectives

Supply capacity of South Bali in 2018: 3,427.26 ℓ/sec cannot meet water demand of 5,018.35 ℓ/sec. However, when Sidan dam was completed in 2021, the supply capacity will be increased by constructing water supply facilities downstream. This will contribute to the supply of water to residents in South Bali and the development of tourism, which is the main industry.

3.2.2 Medium-and Long-Term Objectives

A new development of 9,286.52 ℓ/sec will be required to meet the water demand in southern Bali in 2033 at 14,463.78 ℓ/sec. Plans for the development of water resources include Selat Kanan Dam and Selat Kiri Dam, but there is no concrete plan. In addition, there are plans such as Mua Unda Dam, Oos Dam, Melangit Dam, and Blusung Dam, but they are still in the planning stage, and they all take a great deal of time and money to implement. Medium-and long-term water supply plans should be considered with these development plans in mind.

The purpose of the project is to address future water demand by indicating the soft and hard measures, the project cost, and the procurement method thereof. However, it is also important to consider the wise use of water based on the amount of water that can be developed up to 2033, rather than developing new water sources in response to demand. If the NRW rate is improved from 40 % to 20 %, the amount of supplied water will increase by 33 %. Through the NRW rate improvement project, it is possible to cope with the current and future increase in water demand due to the renovation and renewal of existing facilities. The purpose of the project is to improve the living environment, sanitation, and tourism in the future.

3.3 Details of the Project

3.3.1 Outline of the Project

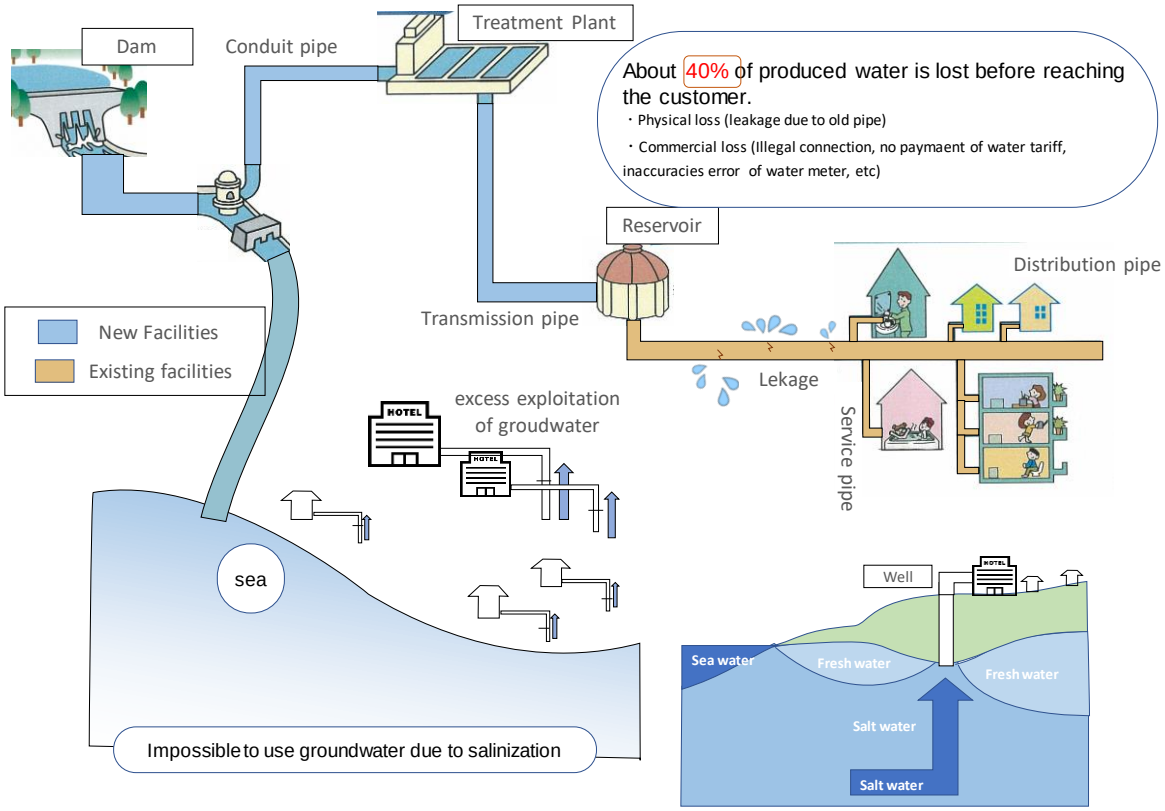
The proposed project is the combination of development planning study to construct the new water supply facilities in response of the demand increase and technical cooperation consisting of improvement of NRW rate and groundwater exploitation regulations to realize the effects of the facilities to be constructed.

(1) Background of the Plan

In Southern Bali, various kinds of water supply projects are prepared and implemented by various entities. However, these projects are not consistent with each other, and they do properly reflect a detailed understanding of the current situation. Therefore, there is overlapping of projects, resulting in uneven distribution of water supply within the same city and regency.

On the other hand, even if a new water supply facilities are constructed, as shown in Fig. 3-1, the target facilities to be constructed is up to the distribution reservoir, and then the water will be transferred by using the existing water supply/distribution pipes. However, the NRW ratio for these facilities is high at around 40 %. So even if new facilities till the reservoirs are constructed and the water supply volume is increased, only about 60 % of the water will be supplied to the terminal facilities.

In addition, commercial facilities such as hotels in major tourist destinations consume large quantities of water, but they are not required to install water meters for measuring the volume of exploited groundwater, and groundwater usage fees are lower than that of PDAM. As a result, groundwater exploitation volume is increasing, resulting in groundwater salinization in coastal areas and land subsidence in inland areas here and there.



Source : Survey Team

Figure 3-1 Issues to be expected without Technical Cooperation in Proposed Project

(2) Target of Usage of Proposed Project

The results of the MP and FS investigations are approved by the Indonesian government.

(3) Targets achieved by Usage of MP and FS

Water services in southern Bali improve.

(4) Results

(a) Review of the MPs in the southern Bali

1) Analysis of existing water supply facilities and services in the project area

2) Prediction of water demand in the project area and formulation of water resource utilization plans consistent with each PDAM's own and regional water supply projects

3) Improvement of planning capabilities of Staff in relevant organizations, including each PDAM

4) Review and develop the MP

(b) FS of priority projects and identification of emergency projects

1) Priority Project Selection and Formulation of FS

2) Identification and preparation of requests for emergency projects

(c) Capacity building for regulating groundwater over-exploitation

1) Surveys of national and provincial groundwater regulations

2) Status of enactment and operation of ordinances (if enacted)

3) Identification of issues in the operation stage

4) Thorough implementation of registration system

For example, the Article 6 in Denpasar ordinance enacted in 2010 stipulates that the six items of "① Type of water source, ②location of water source, ③purpose and use of groundwater, ④amount of exploited water, ⑤water quality, and ⑥level of adverse impact on the environment" should be registered, however it is not thorough. It might be effective to promote coordination with other municipal permits (for example, in the case of the Pattaya in Thailand, the city has issued a tourism business permit and has taken measures such as revocation of business licenses for non-registered commercial facilities).

5) Effective and efficient water meter reading

6) Establishment of appropriate groundwater usage fees in accordance with the amount of groundwater and in balance with water tariff

(d) Capacity building and dissemination support for the NRW measures

1) To calculate the proportions of physical and commercial losses

2) Activities against physical loss

① Training for acquiring skills in underground water leak detection technology
② Improvement of capabilities of water facility management including hydraulic control
③ Pipe replacement plan (selection of necessary locations, cost, schedule, etc.)

3) Activities against commercial losses

① Improvement of water meter reading ability of staff such as disclosure of illegal connection to distribution pipe, followed by subsequent guidance including applying strict penalty
② Revision of the verification system and replacement frequency of water meters, etc.
③ Improvement of the water tariff collection rate (strict application those in arrears)

(e) Introduction of anti-seismic technology

(5) Main Activities

(a) Implementation of the basic survey
(b) Reviewing the water supply MPs in accordance with the water supply plans established independently by each PDAM and regional SPAMs in the southern Bali region
(c) Priority project as FS
(d) Technology transfer to counterparts (OJT, training, etc.)

(6) Implementation system

(a) Implementing agencies: Department for Public Works Spatial Planning and Technology Development (technical and operational) in Bali Province and BAPPEDA Bali (financial and policy)
(b) Relevant organizations: PDAM Denpasar, Bandung, Gianyar, Tabanan and the Public Works and Space Department of each local government

(7) Project Time Frame

The implementation period of the project shall be approximately three years.

3.3.2 Detailed Scale and Quantities of the Project

Table 3-5 shows the contents of the Technical Cooperation Project for Development Studies.

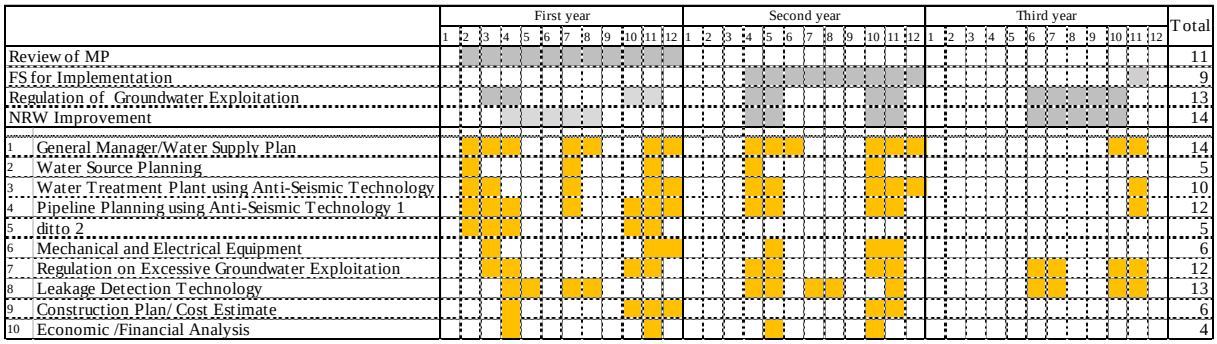
Table 3-5 Overview of Technical Cooperation for Developing Planning

Action Items	Description	Specific Survey Items
Review of the MPs in the southern Bali	• Analysis of existing water supply facilities and services in the project area • Preparation of a water resource utilization plan that is consistent with the water demand forecast in the project area and the water supply plan of each PDAM and regional area • Review and formulation of water supply MP	• Existing water supply MP review • Collection and analysis of existing data and information • Urban planning, land-use planning, and arrangement of natural, social and economic conditions • Survey of the current state of water supply facilities • Review of areas subject to water supply plans
FS of priority projects and identification of emergency projects	• Priority Project Selection and FS Formulation • Strengthening Water Supply Planning Capacity of Officials of Relevant Agencies (Bali, each PDAM)	• Revision of basic plan specifications (population, basic unit, etc.) • Extraction of the progress and issues of water source plans (each PDAM and regional plans) • Water pipeline planning • Plan for distribution pond facilities • Water supply plan • Phased water supply development plan • Review of estimated operating expenses • Economic and financial assessments • Proposals for priority projects • Priority project FS
Capacity building for regulating groundwater exploitation	• Capacity building of PDAM officials in regulating water exploitation • Increase in each PDAM's income due to groundwater charge collection • Salinity intrusion and ground subsidence control	• Transition survey of national and province groundwater regulations • Status of enactment and operation of ordinances (if enacted) • Identification of operational issues • Thorough implementation of registration system • Highly efficient metering • Establishment of appropriate ground water tariffs in accordance with amount of extracted water and in balance with water tariff
Capacity building and dissemination support for the NRW reduction measures	• Capacity building of each PDAM staff for water-free management • Strengthening the capacity of each PDAM staff to detect and repair water leaks	• Basic knowledge and education for reducing non-repair water • Formulation and implementation of pilot activity plans • Promotion of installation, renewal, and calibration of water measuring instruments • Guidance for improving the ability of metering staff • Leak detection and repair activities (training, on-the-job training, preparation of manuals) • Promotion of NRW reduction measures in other cities • Evaluation and proposal of effects
Introduction of anti-seismic technology		• Introduced in the above facility design

3.3.3 Dispatch of Experts and Equipment to be provided

Table 3-6 shows the details of the Technical Cooperation Project for Development Studies.

Table 3-6 Implementation Schedule including Dispatch of Experts



(1) Dispatch of Experts

Table 3-7 shows the experts and their main activities for the project.

Table 3-7 Input of Experts and Main Activities

Expert	Main activities
1. General Manager/Water supply Plan	• Project Summary • Formulation of MP • FS of priority scheme
2. Water Source Planning	• Assessment of new and existing water sources • Exploration for groundwater
3. Water Treatment Plant using Anti-Seismic Technology	• Formulation of MP • FS of priority scheme
4. Pipeline Planning using Anti-Seismic Technology 1 5. Pipeline Planning using Anti-Seismic Technology 2	• Formulation of MP • FS of priority scheme • Hydraulic control plan
6. Mechanical and Electrical Equipment	• Formulation of MP • FS of priority scheme
7. Regulation on Excessive Groundwater Exploitation	• Survey of water exploitation in commercial facilities • Registration system for commercial facilities • Measurement of exploitation volume • Setting appropriate groundwater usage fees
8. Leakage Detection Technology	• Pilot project implementation • Technical training for detecting water leaks
9. Construction Plan/Cost Estimate	• Construction plan • Cost estimate
10. Economic/Financial Analysis	• Formulation of MP • FS of priority scheme • Economic and financial assessments

Source : Survey Team

(2) Provision of Equipment and Materials

(a) Provision and installation of measuring equipment
(b) Provision of equipment for water leakage detection
(c) Provision of equipment for measuring water exploitation amount

3.3.4 Estimated Project Cost

The project cost is estimated to be 285 million Yen as Japanese Technical Cooperation for Development Planning Scheme.

Breakdown of approximately 285 million yen: expert dispatch 87 MM, 230 million yen, in equipment and materials provision, 15 million yen, in training expenses and others. 40 million yen)

3.3.5 Alternative Options for the Matter

The above-mentioned project is based on the premise that the design of water supply facilities should consider the anti-seismic structure of the facilities. However, it is assumed that the design of water supply facilities will not necessarily incorporate anti-seismic technology, as the level of Indonesian side's interest in the anti-seismic technology seminar to be held by the Ministry of Health, Labour and Welfare of Japan in February this year is greatly affected.

On the other hand, salinization and land subsidence of groundwater due to excessive groundwater exploitation are urgent issues, and the establishment of a system to control them is essential, and contributes to the improvement of the financial situation of PDAM.

Therefore, when it is impossible to include the contents of anti-seismic technology, only the technical cooperation of "improvement of the capacity to regulate groundwater overflow" and " Capacity building and dissemination support for the NRW reduction measures" described in 3.3.1 4) c) d) above will be extracted and conducted.

3.4 Site Conditions

3.4.1 Location (Land Acquisition, Land Use, Potential Pollutant of Contamination, etc.)

(1) Location

Bali island consists of one city and eight regencies. The survey was conducted in the southern part of Bali, Indonesia. The SARBAGITA Region in this project consists of Denpasar City, Badung, Gianyar, and Tabanan Regency as shown in Figure 3-2.

Source : Survey Team

Figure 3-2 Location of Proposed Project

(2) Securement of Necessary Site

The site for this project is secured by the Bali State National Land Agency (BPN). The planned construction site of Sidan dam was decided in October 2017.

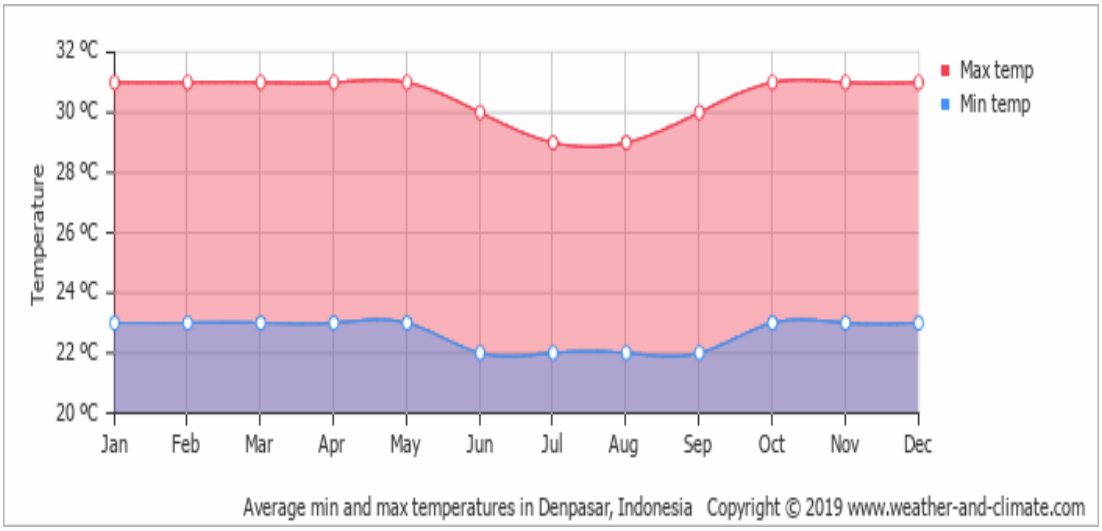
(3) Potential Pollutant of Contamination

The water supply facility on Bali Island is based on rivers located in the mountains as the water source, and is based on downstream flow by gravity. There is neither development nor facilities which might become a pollutant which might become a pollutant in the upstream area.

3.4.2 Natural Conditions

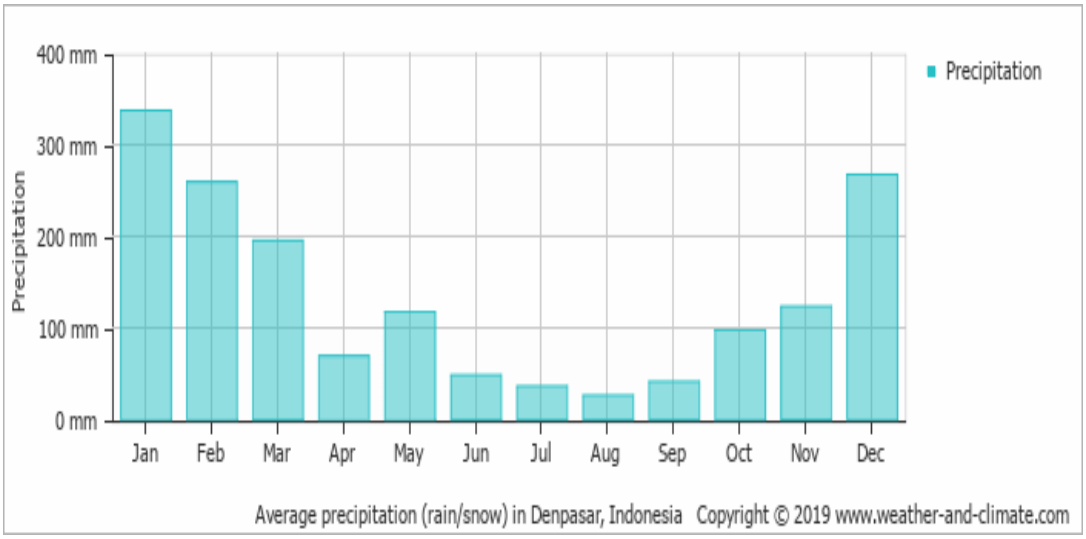
(1) Temperature and Precipitation

Bali belongs to the tropical monsoon climate. There are rainy and dry seasons, and the average annual temperature is about 28 degrees Celsius, which is a very warm climate.



Source Weather and Climate.com

Figure 3-3 Monthly Maximum/Minimum Temperatures in the Target Area



Source : Weather and Climate.com

Figure 3-4 Monthly Precipitation in the Target Area

(2) Water Sources

Table 3-8 shows the usage of groundwater in the target area.

Table 3-8 Use of Groundwater in the Target Area

Name	Groundwater usage
Denpasar City	• There are many hotels in Denpasar City, but many of them use groundwater. • When groundwater is used, a tax of 4,000 Rp/m^3 (Treasury tax) is levied. However, the actual situation is unclear, although the use of wells is advancing even in commercial facilities such as hotels and homes to avoid instability/supply disruptions, enjoy low-cost groundwater supply in comparison of water tariff of PDAMs.
Badung, Gianyar	• There are reportedly over 1,000 hotels in Ubud in Gianyar Regency, nearly half of which use groundwater without using PDAM water. • For the use of the hotel's groundwater, a flow meter is installed in the pumps of the hotel, and a tax is imposed based on the amount of exploited groundwater. However, not all pumps are equipped with a flow meter, resulting in the omission of tax.

Source: Survey Team

3.4.3 Access

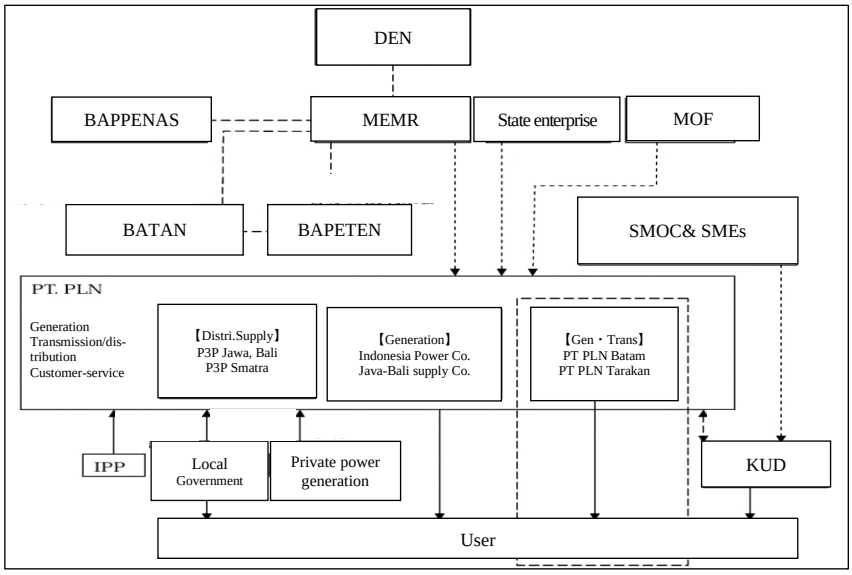
Denpasar City in southern Bali has an international airport in Kula Reye, which is approximately two hours by air from Jakarta, and is well accessed by the capital. In addition, each PDAM has access to the target facilities by road, and the distance from Denpasar City within about 1-2 hours by car.

3.4.4 Electricity and Communication Means

(1) Electricity Situation

The current electric utilities system is operated by PLN (Perusahaan Listrik Negara; State Electricity Company') and PLN subsidiaries, or IPP (Independent Power Producer), and PLN dominates the transmission and distribution division. PLN promotes the spin-off and division system, with power generation subsidiaries and subsidiaries in charge of power generation, transmission, and distribution in specific development areas such as Batam Island aiming at the second Singapore and introduction of business units with self-supporting accounting. Regarding rural electrification, there are resident organizations called "village cooperatives (KUDs)" scattered across the country under the jurisdiction of the "Cooperative and SME Ministers of State (SMOC & SMEs)" and they supply electricity in remote areas isolated from the PLN's electric power system.

As shown in Figure 3-5, the administrative organizations involved in the electric power sector include the National Energy Council (DEN), which is responsible for formulating integrated policies in the field of energy development and use; the National Development Planning Agency (BAPPENAS), which is responsible for formulating and coordinating national development policies; the Ministry of Energy and Mineral Resources (MEMR), which is responsible for overseeing PLNs and overall in the field of natural resources and energy; the Ministry of State Affairs, which owns and manages PLNs; the Ministry of Finance (MOF), which approves budgets; the National Energy Coordination Commission (BAKOREN), which is responsible for formulating and coordinating energy policies; the National Nuclear Energy Agency (BATAN), which is responsible for research and development related to nuclear power generation; and the Nuclear Energy Regulation Agency (BAPETEN), which is responsible for regulating nuclear power generation.



Source : Overseas Electric Power Research Council, Supplementary edition of Electricity Project Part 1 for Overseas Countries, Energy and Electricity Conditions in Major Asian Countries 2011

Figure 3-5 Electricity Utilities in Indonesia

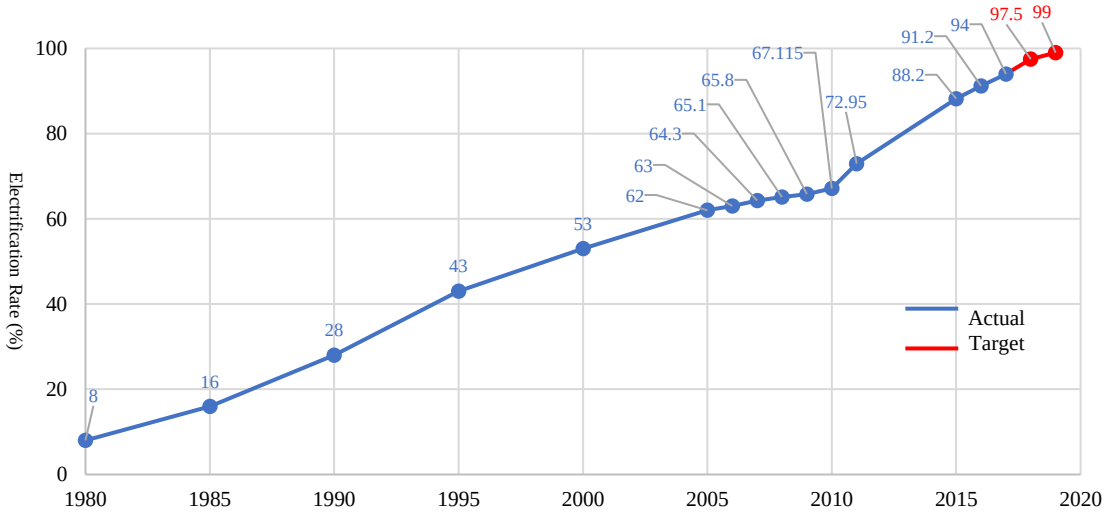
Indonesia's electrification rate was 88.3 % in 2015, 91.2 % in 2016, and 94.9 % in 2017. According to Indonesia's Ministry of Mining and Energy, the government has set a target of 97.5 % electrification rate in 2018 and 99 % by the end of 2019. The 2011 results are shown in Figure 3-6.

In the larger Java-Bali region, the power generation division owns two power generation subsidiaries (Indonesia Power Company and Java-Bali Power Company), and the transmission and distribution are separated within the PLN (Java-Bali Power Transmission and Distribution Center (P3B Jawa Bali) and five distribution offices). In the Sumatra region, it operates two power generation business units (North Sumatra Power BU and South Sumatra Power BU) and the Sumatra Power Transmission and Supply Center (P3B Sumatra) and seven regional branches. In other regions, the company operates in a

vertically integrated manner as a regional branch. Other PLN subsidiaries include PLN Batam, which supplies electricity in specific areas, and PLN Tarakan, which operates on Tarakan Island in Eastern Kalimantan. Table 3-9 summarizes the power generation and distribution systems in each region.

Source: Overseas Electric Power Research Council, Supplementary edition of Electricity Project Part 1 for Overseas Countries, Energy and Electricity Conditions in Major Asian Countries 201

Figure 3-6 Electrification Rate in Indonesia



Source: Overseas Electric Power Research Council, Supplementary edition of Electricity Project Part 1 for Overseas Countries, Energy and Electricity Conditions in Major Asian Countries 201

Figure 3-7 Transition of Electrification Rate (1980-2020)

Table 3-9 Regional Power Generation and Distribution Systems

Item	Java Bali	Sumatra	Other
Power generation	• PLN power stations • Indonesia Power • PT. PLN Pembangkitan Tenaga Listrik Jawa Bali II • IPP	• Northern Sumatra Power BU • South Sumatra Power BU • IPP	• Nine regional branches (vertically integrated) • PLN Batam • PLN Tarakan
Transmission and transformation	• Java Bali Power Trans-mission and Distribution Center (P3B Jawa Bali)	• Sumatra Power Transmission and Supply Center (P3B Sumatra)	
Distribution and sales	• Five distribution offices	• Seven regional offices	

Source: Materials of the Overseas Electric Power Research Committee

Most of Indonesia's electricity is consumed on the Java Island, especially in the western part of Jakarta. Table 3-10 shows the transition in electric power sales from 2008 to 2012. The share of the Java-Bali region is gradually decreasing, but it accounted for about 74 % in 2012.

Table 3-10 Electricity Sales in PLN (GWh)

Year	Region	Java-Bali		Outer island		Total	
2008	Electricity sales (GWh)	100,774	(78.1 %)	28,244	(21.9 %)	129,018	(100 %)
	% change from previous year	5.4		0.9		6.4	
2009	Electricity sales (GWh)	101,319	(75.3 %)	33,263	(24.7 %)	134,582	(100 %)
	% change from previous year	0.5		17.7		4.3	
2010	Electricity sales (GWh)	110,309	(74.9 %)	36,988	(25.1 %)	147,297	(100 %)
	% change from previous year	8.9		11.2		9.4	
2011	Electricity sales (GWh)	117,593	(74.4 %)	40,399	(25.6 %)	157,993	(100 %)
	% change from previous year	6.6		9.2		7.3	
2012	Electricity sales (GWh)	128,513	(73.9 %)	45,478	(26.1 %)	173,991	(100 %)
	% change from previous year	9.3		12.6		10.1	

Source: Yearly version of the PLN Annual Report

The main characteristics of electricity tariffs in Indonesia are as follows.

(a) Five tariff categories (S: Public (including small-lot), R: Home, B: Commercial, I: Industry, P: Government agency/public street lighting)

(b) Electricity tariff system

- The 900VA base is composed of the basic charge plus the metered charge.
- There is no basic charge for more than 900 VA, but only a specific charge. Provided, however, that if the amount used is less than the prescribed level, a minimum fee shall be paid.

(c) Advance Payment of Electricity Charge

Low-voltage electric power has a prepaid electricity rate system, which allows users to choose between "prepaid" and "deferred" rates at their option.

On February 11, 2007, the Ministry of Energy and Mineral Resources (MEMR) announced that it would introduce the Fuel Cost Adjustment System (Fuel Cost Adjustment System) in April and reflect the fluctuations in fuel prices for the three months in electricity tariffs. Current electricity rates are 1,467 Rp/kWh (about 12.0 yen/kWh) for household use, 1,115-1,467 Rp/kWh (about 9.1-12.0 yen/kWh) for commercial use, and 997-1,115 Rp/kWh (about 8.6-9.1 yen/kWh) for industrial use.

(2) Communication Method (as of February 2018)

(a) Fixed Telephone

The number of fixed-line telephones is 22.38 million (8.8 % of the total telephone density), but satellites are being used to secure communication between islands, and undersea optical fiber networks are being developed.

(b) Mobile Phones

Mobile phone subscriptions totaled 338.42 million, or 132.2 % of the total subscriptions. Major carriers are Telekomunikasi Selular (Telkomsell), Indosat Oredoo (formerly Satelindo and Indosat MultiMedia Mobile), Hutchson 3 Indonesia (Tri), and XL Axiata, which have more than 300 million subscriptions, accounting for about 95 % of the market. In October 2014, the government permitted the operation of 4G networks in several regions, and in December 2014, Telkomsel began providing commercial services. Each company has successively launched 4G services in major cities such as the Tokyo metropolitan area, Bali, Surabaya and Medan.

In September 2014, the government announced the "Indonesia Internet Network Plan 2014-2019" and began developing the MVNO business in Japan. In March 2016, Bakrie Telecom emerged as the first MVNO operator using Smartfren's facilities.

(c) Fixed Broadband

The number of fixed broadband subscribers is 2.78 million (1.1 %). Telkom began commercial ADSL services in 2001. In the Tokyo metropolitan area, cable television providers provide Internet access services, and FirstMedia is actively deploying its services. Telkombision also provides bundled services for cable television services and Internet connections. As of June 2017, the number of broadband subscribers is estimated to be around 9.56 million. In July 2009, eight WiMAX operators were licensed, and commercial services began in 2010.

3.4.5 Safety

According to the Ministry of Foreign Affairs Overseas Safety Information, the following information has been continuously provided for Indonesia since August 7, 2018, and security in the region covered by this project is considered good.

- Level 2: Travel to Papua (Punchak Jaya and Mimidca only) and Poso in Central Sulawesi Province.
- Level 1 (be very careful) for all regions except the above (including the capital Jakarta and Bali Island).

Chapter 4 Guidance Plan, Effects and Impact of the Project

4.1 Effects of the Project

4.1.1 Degree of the Resolution of the Current State of the Water Sector

Table 4-1 shows the service ratio of water supply as of 2015 and the forecast population for 2033 in SARBAGITA, which is the target area of this project. The service ratio of water supply in SARBAGITA of service population to administrative one and is only about 60 % of the population in the administrative area and the population in the water supply area, respectively.

Table 4-1 Service Coverage Population in 2015 and Forecast Population in 2033

PDAM	Water supply population, etc. (as of 2015)					Forecast Population in Administrative Regions (2033)
	Population of Administrative Regions (1)	Population of Water Supply Areas (2)	Water supply population (3)	Service ratio (%)		
				(3)/ (1)	(3)/(2)	
Denpasar	914,301	914,301	444,233	48.6	48.6	2,442,174
Badung	616,400	590,201	426,008	69.1	72.2	2,290,727
Gianyar	503,900	457,125	360,722	71.6	78.9	663,299
Tabanan	441,000	350,036	338,307	76.7	96.6	330,613
Total	2,475,601	2,311,663	1,569,270	63.4	67.9	5,726,813

Source: FS 2015

Table 4-2 shows the capacity of water supply to each PDAM when the SPAM Ayung Project was implemented and the service ratio of water supply to the population in 2033. In 2019, the service ratio of water supply can reach almost 100 %, except for Gianyar Regency. However, the service ratio would fall to 35.79 % in 2033 if no further new facilities are planned thereafter. In other words, it is difficult to achieve the SDGs Goal by 2030 through only the SPAM Ayung Project.

By implementing this plan, we can aim to increase the service ratio.

Table 4-2 Water Supply Capacity after Completion of SPAM Ayung Project

Name	Existing capacity in 2017	Water demand in 2018	New facility supply capacity in 2019	Total capacity of existing and new facilities in 2019	Service ratio in 2019 based on total of existing & new facilities	Water demand in 2033	Service ratio in 2033 based on total of existing & new facilities
	(1)	(2)	(3)	(4)=(1)+(3)	(5)=(4)/(2)	(6)	(7)=(5)/(6)
Unit	ℓ/sec	ℓ/sec	ℓ/sec	ℓ/sec	%	ℓ/sec	%
Denpasar	1,625.00	2,198.51	750.00	2,375.00	108.03	6,095.44	38.96
Badung	1,154.08	1,627.94	500.00	1,654.08	101.61	5,941.62	27.84
Gianyar	428.82	810.55	100.00	528.82	65.24	1,622.15	32.60
Tabanan	219.36	381.35	400.00	619.36	162.41	804.57	76.98
Total	3,427.26	5,018.35	1,750.00	5,177.26	103.17	14,463.7	35.79

Source: FS 2015

4.1.2 Degree of Resolution of Drinking-Water Supply Problems

The increase in the service ratio of each PDAM is shown in Table 4-2. However, when looking at each case individually, overlap with other regional projects, and uneven distribution within the same city/regency and necessarily distribution to area with water shortage has been pointed out. Accordingly, when preparing the M/P, the current status and their own plans of each PDAM shall be accurately grasped.

4.1.3 Degree of Resolution of Sanitation-related and Waterborne Disease Issues

Improving water distribution capacity can improve the safety and stability of water supplies, and the use of hygienic water improves the sanitation environment, leading to a reduction in health hazards due to water-related infectious diseases. However, since data on waterborne diseases in Bali were not available, it is unclear to what extent the above-mentioned problems will be solved by this water supply project.

4.2 Impact of the Project Implementation

4.2.1 Political Impact

The tourism is the main industry in Bali. The number of tourists is expected to increase further in the future. In order to cope with this, the development of water supply facilities, which are the social infrastructure, is an important issue. Therefore, the implementation of this project is expected to have a major political impact.

4.2.2 Social Impact

The project is considered to have a significant impact on the local community because it is possible to improve the living environment by realizing water supply and water quality improvement, which are urgent issues, and distributing water that is stable and good for the local residents. In addition, the project will start supplying water of high quality to the residents who are currently purchasing water, which will lead to the improvement of the living environment. As a result, it can help the poor and have a substantial social impact.

Projects that supply water from new resources to the region will improve user satisfaction, reduce the risk of waterborne infectious diseases, improve the sanitation environment of residents, and prevent salinization of groundwater through unregulated groundwater development.

4.2.3 Economic Impact

As mentioned in the section in “4.2.1 on Political Impacts”, economic development is expected in the target areas of this project. It is clear that the current level of water services is a barrier to urban development in the target cities where the infrastructure is still inadequate. Therefore, realizing the project will have a major impact not only on economic benefits but also on other areas.

4.2.4 Technical Impact

Technological impacts on the site are expected to be significant through the construction of transmission pipe line, water treatment plants, reservoir, connecting pipes to existing ones. It would be meaningful for the Indonesian side as well as the Bali area to promote technology transfer through cooperation on the Japanese side in areas such as water system design technology.

It is also meaningful for the Indonesian side to train engineers with basic knowledge and operation skill in water treatment management. The implementation of this project will also have a significant impact on improving water supply services and improving the financial status of PDAMs.

4.2.5 Diplomatic and Public Relations Impact

Japan's cooperation in the water and sanitation sector in the target areas, where further economic development is expected, will directly influence Indonesia's economic development and people's lives, which is an issue for Indonesia. Thus, Japan's contribution will be further enhanced. In the future, the implementation of cooperation on the water and sanitation sector by Japan in the target areas where tourism development is expected will increase Japan's presence in the area and have a major impact on public relations.

Chapter 5 Matters Concerning the Validity of the Project

5.1 Results of Comparison with Major Alternative Proposals

There are no alternatives for this project.

5.2 Organizational Validity and Sustainability of the Project

5.2.1 Organization Management Capacity

Although each PDAM should basically be self-supporting, in reality, even if revenues fall below expenditures, each city/regency is compensating them, resulting in tendency to lack the toughness of management. Therefore, even if the ratio of NRW exceeds 40 % and groundwater is used without permission, there is a weak incentive to actively improve and crack down on it to increase revenues.

5.2.2 Organization Construction Capacity

The construction will be carried out by the provincial government and the agencies of the Bali Branch of the central government. However, these agencies have experienced the construction of not only water supply but also many infrastructures, and there seems to be no particular problem with the construction. Needless to say, when introducing anti-seismic technology, guidance from the Japanese side is essential.

5.2.3 Organization Operational and Maintenance Capacity

Since the maintenance and management of the water treatment plant in Gianyar Regency is operated by PPP scheme, the capacity of PDAM Gianyar for these activities is unknown. However, since the remaining three PDAMs maintain and manage the water treatment plant, it can be said that they have the capacity for the maintenance and management of the water treatment plant.

On the other hand, there are some areas where water pipes are aging and asbestos pipes are used, as can be seen in the NRW rate of 40 %. However, it was not possible to check how these pipes were maintained and managed.

5.2.4 Relationship with Local Residents

Water supply facilities are essential lifelines for local residents, and the interest and expectations of the residents are high. On the other hand, it is said that there are cases in which people dig wells by themselves to suppress household budgets at high water tariff. However, since there are no data on wells, it was unclear to what extent residents are satisfied with the water supply services provided by each PDAM.

5.3 Financial Validity and Sustainability for Project Implementation

5.3.1 Funding Sources for the Cost borne by Indonesian Side

In this study, Indonesia's share of the cost is mainly from the deployment of counterparts. However, if Indonesia has equipment for preventing water leaks, it is conceivable that Indonesia will provide some of the equipment.

5.3.2 Current Status of Water Supply Service Indicators

This is described in "2.3.6 (4) Evaluation of each target PDAM".

5.3.3 Transitions in Fiscal Financial Balance

(1) List of Financial Indicators

Tables 5-1, 5-2, show the financial indicators and structure of each PDAM.

Table 5-1 Management Indicators of each PDAM

PDAM	Year of survey	Contract Number	Staff Numbers	Staff number/ 1,000 units	Expenditure /Income	Water bill (Rp/m^3)	NRW Rate (%)	Total assets/ total liabilities (%)
Denpasa	2012	71,664	238	3.3	0.9	3,087	31.1	90.4
Badung	2011	32,017	218	6.8	0.8	4,236	22.4	260.3
Gianyar	2013	51,115	246	4.8	0.9	3,732	45.7	628.0
Tabanan	2012	46,594	316	6.8	0.9	3,400	28.4	185.6

Source: Detailed Planning Survey for the Project for Sector Survey on PDAM Asset Management in the Republic of Indonesia, September 2014, JICA

Table 5-2 Financial Structure of each PDAM

Item	Unit	Denpasar	Badung	Gianyar	Tabanan	Total
Fixed capital turnover ratio (target: 150 %)	%	56	20	44	31	
Liquidity rate (target: 125 %)	%	47	76	96	18	
Operating profit margin	%	42	4	30	11	17
Water Supply	ℓ/sec	923	497	386	287	2,204
Net sales	10^6 Mil Rp	29.108	15.673	12.173	9.051	69.505
Unit price of water supply	Rp/m^3	850	484	625	664	703
	US$/m^3	0.10	0.06	0.07	0.08	0.08
Cost of water supply	Rp/m^3	495	447	436	584	491
Water supply difference	Rp/m^3	355	37	189	80	212

Source: Water Supply Project in the Southern Part of Bali

Table 5-3 Description of Indicators of Financial Structure

Index name	Descriptions of indicators
Fixed capital turnover	• This indicator indicates the appropriateness of income (sales) generated from fixed capital (buildings, facilities, land, and securities). • The lower limit is 150 % for private companies, but all four PDAMs are between 20 % and 56 %, indicating that past investment effects are not as expected. • This is the fate of public works, but the low turnover rate must be improved in water services, which should be profitable from the profits generated by the operation of the business.
Liquidity rate	• Liquid assets/current liabilities, an indicator of short-term funding capacity. • The liquidity ratio of 150 % or more is targeted for private projects, but the lower limit is considered to be 125 % considering the public nature of water projects. • If this rate falls below 100 %, short-term funding would be impossible, but PDAM Badung, Denpasar, and Tabanan are 76, 47, and 18, respectively. • This indicates that the public water supply operated by PDAM is covered by subsidies from the city/regency if it is 100 % or less. It is very difficult to promote the private sector in such a situation, and it is necessary to take measures to increase operating income as soon as possible.
Operating profit margin, Cost of water supply/unit price	• Operating profit margin is an indicator of profitability. • The difference between the unit water supply price and cost (the yellow marker in Table 5.2) is the lowest 37 Rp/m^3 in PDAM Badung and the highest 355 Rp/m^3 in PDAM Denpasar. This is a difference of 4 % and 42 %, respectively.

Source: Water Supply Project in the Southern Part of Bali

PDAM is an independent entity operating with water tariff revenues as its financial structure. However, although water tariff revenues cover only the operation, maintenance and management of water utilities, the expansion of the water network and large-scale repairs are financed by local government budgets and central one through BAPPEDA, which is not fixed. So PDAM is not full independent entity.

(2) Financial Balance of PDAM

Table 5-4 to 5.7 show the financial balance of each PDAM with unit of IDR from 2016 to 2018.

(a) PDAM Denpasar

Table 5-4 Financial Balance of PDAM Denpasar

Item	2016	2017	2018
Water revenues	116,733,377,450	118,259,959,660	124,261,458,415
Income other than water	14,756,367,811	14,346,436,000	17,328,752,323
Other income	642,332,369	1,333,454,015	771,856,563
Income	132,132,077,630	131,939,849,675	142,362,067,301
Raw water and bulk loads	15,018,213,330	15,936,255,866	13,216,565,753
Fuel charge	588,151,535	639,334,562	646,689,208
Impact of chemical substances	5,885,042,110	5,756,835,590	6,379,281,858
Expenses for supporting materials	305,010,085	252,741,750	266,482,700
Maintenance costs	15,636,253,713	11,853,069,312	14,172,114,402
Personnel expenses	34,617,020,478	39,271,757,526	38,888,382,784
Office expenses	10,240,695	1,063,809,708	1,147,736,071
Electric power load	17,024,932,220	17,411,756,366	18,306,586,833
ATK costs and printed materials	557,672,777	612,576,440	532,805,835
Loan expenses	1,401,492,366	1,069,717,261	893,925,915
Other operating expenses	7,617,028,800	8,605,680,898	9,249,017,108
Attributable tax burden	129,813,859	125,356,680	182,593,967
Rent expenses	42,973,778	44,540,440	37,182,109
Other benefits	530,029,491	294,980,429	840,797,543
Burden of research and development	54,407,600	211,738,857	195,731,661
Depreciation and amortization	17,995,893,362	17,434,934,475	19,559,325,043
Other expenses	8,921,770	20,024,004	27,566,223
Expenditure	118,471,097,959	120,605,110,164	124,542,785,013
Income before tax/loss	13,660,979,671	11,334,739,511	17,819,282,288
Estimated income tax	3,961,21,8750	3,253,167,500	4,797,854,750
Income after tax	9,699,760,921	8,081,572,011	13,021,427,538

Source: PDAM Denpasar Business Plan 2018-2022

(b) PDAM Badung

Table 5-5Financial Balance of PDAM Badung

Item	2016	2017	2018
Water sales revenue	208,226,369,793	218,592,096,523	217,201,972,838
Income other than water	15,224,290,022	17,537,895,993	14,490,445,035
Non-operating income	1,469,783,200	3,140,402,071	43,247,292,814
Income	224,920,443,015	239,270,394,587	274,939,710,687
Personnel expenses	58,237,841,507	64,114,598,033	65,531,653,019
Fuel consumption cost	300,130,000	367,584,000	194,442,360
Electric power load	34,818,338,415	36,946,477,078	38,285,779,405
Burden of use of subsidiary materials	661,452,660	621,213,670	444,215,640
Other operating expenses	424,881,375	70,384,750	560,321,140
Maintenance costs	21,572,204,447	29,978,912,985	25,701,449,498
Raw water and bulk water load	5,594,094,200	6,017,829,100	11,032,803,100
Chemical load	11,795,696,198	8,828,844,248	12,014,861,042
ATK costs and printed materials	1,091,418,425	1,576,352,350	1,213,512,930
Office expenses	1,682,107,738	2,183,234,782	2,624,141,940
Other operating expenses	6,231,316,244	7,497,688,656	8,071,129,479
Promotional expense	205,530,500	249,195,500	229,598,500
Taxes and usage fees	16,004,504,679	2,036,458,558	4,644,713,382
Research and development expenses	374,312,820	377,712,100	291,252,340
Borrowing costs	-	-	-
Rent expenses	284,593,387	135,073,450	153,564,191
Allowance and elimination expenses	2,238,258,860	2,932,544,842	2,016,240,573
Depreciation and amortization	20,946,337,161	25,603,096,537	31,496,184,167
Bank charge	6,543,000	7,362,008	10,181,397
Impairment loss	-	-	-
Expenditure	182,469,561,616	189,544,562,648	204,516,044,103
Income before tax/loss	42,450,881,399	49,725,831,939	70,423,666,584
Estimated income tax	15,555,091,500	13,793,881,250	12,890,723,250
Net income	26,895,789,899	35,931,950,689	57,532,943,334

Source: PDAM Badung Business Plan 2018-2022

(c) PDAM Gianyar

Table 5-6 Financial Balance of PDAM Gianyar

Item	2017 (Audited)	2018 (Unaudited)
Water revenues	53,852,479,150.00	65,808,901,030.00
Income other than water	4,851,412,003.00	4,570,795,420.50
Other income	982,132,859.15	904,822,665.08
Income	59,686,024,012.15	71,284,519,115.58
Burden on employees	18,912,531,295.00	22,212,222,114.25
Fuel charge	692,482,933.00	809,744,709.00
Electric power load	11,079,141,309.00	11,185,970,800.50
Costs for using supporting materials	499,107,699.45	279,405,431.55
Impact of chemical substances	152,189,500.00	166,526,250.00
Maintenance costs	2,158,968,572.85	2,118,104,192.70
Other operating expenses	3,227,123,247.00	4,280,913,828.90
Amount of raw water	13,067,806,513.20	14,143,729,376.00
Research and depreciation burden	6,228,091,901.82	9,124,982,337.94
Burden of research and development	9,253,741.00	75,000.00
ATK costs and printed materials	201,292,570.00	314,691,455.85
Financial expenses	590,000.00	420,000.00
Office expenses	878,368,949.01	888,459,700.80
Rent expenses	58,223,995.96	81,608,993.46
Taxes and personnel expenses	7,968,677.00	1,500,000.00
Promotional expense	4,613,000.00	7,596,003.00
Notes and accounts receivable	152,097,064.81	190,121,332.01
Expenditure	57,529,850,969.10	65,806,071,525.96
Operating profit	2,156,173,043.05	5,478,447,589.62
Other expenses	121,086,467.54	106,451,375.48
Income before tax/loss	2,035,086,575.51	5,371,996,214.14
Estimated income tax	740,849,075.00	1,611,598,864.24
Net Income/Loss	1,294,237,500.51	3,760,397,349.90

Source: PDAM Gianyar Business Plan 2019-2023

(d) PDAM Tabanan

Table 5-7 Financial Balance of PDAM Tabanan

Item	2016	2017	2018
Income from water sales	57,789,771,702.00	61,433,093,513.00	63,283,343,860.00
Price of water	36,511,340,802.00	37,039,709,513.00	38,484,487,860.00
Fixed cost	21,278,430,900.00	24,393,384,000.00	24,799,856,000.00
Non-airline revenue	6,202,250,576.00	5,221,730,317.00	6,906,410,054.54
Income other than water	4,441,936,302.00	3,400,353,761.00	5,166,619,816.54
New access registration revenues	81,565,000.00	69,400,000.00	85,150,000.00
Resumption of faucet revenues	-	-	-
Penalty income	1,612,001,084.00	1,700,387,064.00	156,684,697,400.00
Revenue from water meters	2,300,278.00	1,071,187.00	-
Water pipe revenue	-	-	-
Other non-water revenues	36,801,204.00	41,801,838.00	32,737,593.00
Planning	27,646,708.00	8,716,467.00	5,505,567,100.00
Income Partnership	-	-	-
Wastewater revenues	-	-	-
Operating income total	63,992,022,278.00	66,654,823,830.00	70,189,753,914.54
Non-operating income	150,981,129.00	150,960,445.00	110,465,922.00
Checking account trade	-	-	48,333,800.00
Receipt of write-offs	-	-	5,034,437.00
Miscellaneous income	-	-	5,709,768,500.00
Income	64,143,003,407.00	66,805,784,275.00	70,300,219,836.54
Burden on employees	23,516,883,297.00	27,247,401,424.61	28,039,920,088.00
Fuel charge	458,472,711.00	284,826,081.00	310,050,445.00
Expenses for use of supporting materials	32,748,000.00	33,441,000.00	37,725,000.00
Impact of chemical substances	1,187,636,200.00	1,201,518,145.00	1,387,649,695.00
Electric power load	9,580,496,399.00	9,706,778,410.00	10,451,353,333.00
Raw water and bulk loads	126,694,368.00	1,062,214,418.00	1,038,207,834.00

Item	2016	2017	2018
Maintenance costs	9,649,463,732.00	8,518,956,836.50	9,579,537,013.85
SR installation load	2,678,204,612.00	2,467,615,359.50	3,275,061,090.50
ATK costs and printed materials	445,357,346.00	424,314,812.00	509,210,150.00
Promotional expense	32,530,000.00	19,500,000.00	12,250,000.00
Office expenses	1,064,335,445.00	994,952,997.00	783,504,507.00
Burden of research and development	96,031,000.00	79,082,100.00	68,858,000.00
Loan expenses	-	-	-
Rent expenses	124,909,722.00	163,369,720.00	179,135,278.00
Taxes and license fees	73,437,903.00	26,705,497.00	38,074,596.00
Other benefits	174,119,943.00	82,785,728.00	102,064,295.00
Depreciation and amortization	9,105,270,717.87	9,427,885,990.93	9,552,864,824.61
Other operating expenses	2,119,051,784.00	1,602,519,795.00	1,168,584,216.04
Operating expenditures	60,465,643,179.87	63,343,868,314.54	66,524,050,366.00
Shutdown expenditures	-	9,535,130.00	-
Expenditure	60,465,643,179.87	63,353,403,444.54	66,524,050,366.00
Income before tax/loss	3,677,360,227.13	3,452,380,830.46	3,776,169,470.54
Estimated income tax	1,150,564,250.00	1,110,370,000.00	1,106,327,264.00
Net Income/Loss	2,526,795,977.13	2,342,010,830.46	2,669,842,206.54

Source: PDAM Tabanan Business Plan 2014-2018

(e) Summary

Figure 5-1 shows the transition in net income and profit ratio (net income/income) for four PDAMs. which shows an increase in net income for four PDAMs, while gradual increase in the profit ratio in Badung and Gianyar. Of four PDAMs, Badung has the highest net income and a remarkable increase in its profit ratio.

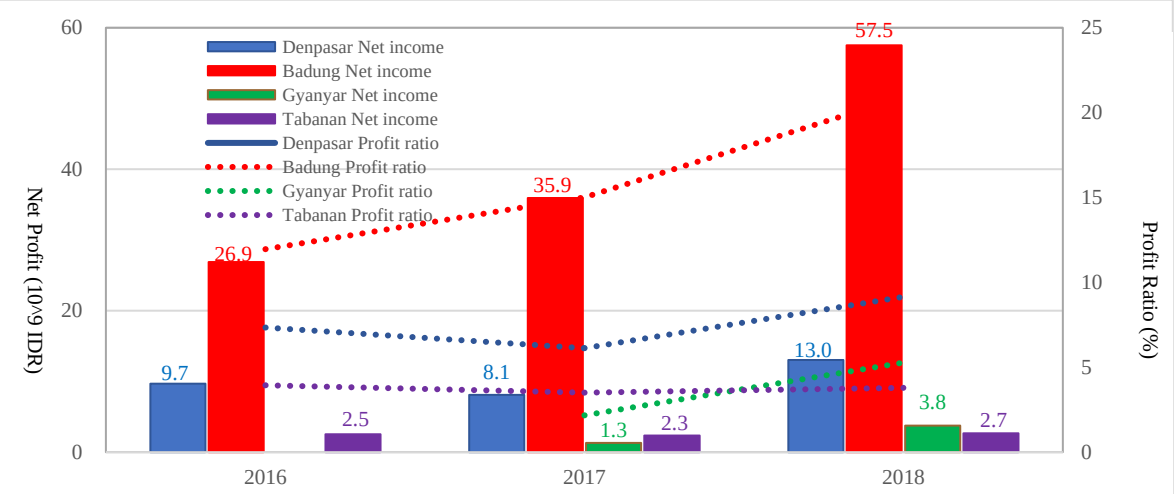


Figure 5-1 Transition of Net Income and Profit Ratio in each PDAM

5.3.4 Prospect of Fiscal Financial Balance

(1) PDAM Badung

Tables 5-8 and 5-9 shows the fiscal financial balance projection from 2020 to 2022 based on the Business Plan 2018-2022 in Badung and Gianyar, respectively.

Table 5-8 Projection of Financial Balance of PDAM Badung

Item	2020	2021	2022
Water revenues	269,134,088,370	285,569,742,039	307,030,586,677
Income other than water	19,194,674,178	33,757,560,406	20,248,689,366
Income	290,791,112,547	308,035,887,446	330,238,719,543
Burden on employees	83,156,557,354	83,570,937,133	88,942,545,953
Fuel consumption cost	562,030,483	591,355,892	623,836,107
Electric power load	38,064,167,404	40,170,271,501	43,449,773,294
Burden of subsidiary materials	1,284,020,855	1,362,352,425	1,455,810,612
Other operating expenses	688,701,581	729,543,626	782,128,196
Maintenance costs	31,651,075,173	33,233,628,931	34,895,310,378
Raw water and bulk water load	7,750,388,466	8,137,907,889	8,544,803,284
Chemical load	11,924,458,037	12,517,460,725	14,336,229,728
ATK costs and printed materials	2,928,694,128	3,102,374,371	3,325,989,541
Office expenses	3,334,503,403	3,532,249,339	3,786,849,346
Other operating expenses	10,302,088,763	10,817,193,201	11,358,052,861
Promotional expense	283,730,550	300,556,613	322,220,348
Taxes and usage fees	1,289,203,916	1,405,578,456	1,515,957,467
Research & development expenses	472,010,176	500,001,779	536,041,267
Rent expenses	210,250,219	222,718,680	238,771,957
Allowance/elimination expenses	75,788,742	80,283,239	86,069,952
Depreciation and amortization	43,431,306,589	53,837,685,213	58,681,007,050
Bank charge	8,459,197	8,960,852	9,606,739
Expenditure	237,417,435,036	254,121,559,865	272,901,004,077
Profit and loss before tax	53,373,677,511	53,914,327,581	57,337,715,466
Estimated income tax	13,343,419,378	13,478,581,895	14,334,428,867
Net Income/Loss	40,030,258,134	40,435,745,686	43,003,286,600

Source: PDAM Badung Business Plan 2018-2022

(2) PDAM Gianyar (2020-2022)

Table 5-9 Projection of Financial Balance of PDAM Gianyar

Item	2020 (1,000 IDR)	2021 (1,000 IDR)	2022 (1,000 IDR)
Income	89,624,732	91,575,254	95,349,048
Expenditure	68,429,201	69,563,319	71,703,235
Net income	5,073,191	5,516,658	6,486,851

Source: PDAM Gianyar Business Plan 2019-2023

Data on the fiscal financial balance projections of PDAM Denpasar and Tabanan could not collected.

5.4 Technical Validity and Sustainability of the Project

5.4.1 Consistency with the Ttechnology Level of Indonesia

Indonesia has an experience of implementation of the plan such as the proposed water supply plan for this project in the past and can manage adequately this project and no problem from the technical point of view. In formulating short-and long-term plans, due consideration will be given to ensuring consistency with the technical standards of Indonesian countries.

However, in case of introducing anti-seismic technology, technical guidance from Japan is essential for this, while they only have experiences of introducing the Indonesian technical standard (SNI03-1726-2002) and no advanced anti-seismic technology like Japan.

5.4.2 Staffing and Retention Status

Japanese Technical Cooperation for Development Project aims to contribute to improving the planning capacity of Bali and other PDAMs as well as the capacity to control groundwater exploitation and reduce NRW by improving individual capacity while supervising operations carried out by assigned counterparts and identifying appropriate measures.

The deployment of Indonesian counterparts is essential for the effective implementation of the project, and in fact, the staff of Bali and each PDAM will be committed.

5.4.3 Status of Operation and Maintenance of Facilities and Equipment

As the maintenance and inspection of facilities and equipment is the basis of all, technical guidance should be provided to ensure full understanding of this. In addition, when formulating projects, consideration will be given to the introduction of appropriate technologies that ensure the maintenance and management of facilities and equipment.

5. 5 Environmental Consideration

5.5.1 Expected Environmental Impact

There is no impact on the environment of the Technical Cooperation for Development Planning.

5.5.2 Evaluation of Environmental Effects

There is no environmental and social impact of the Technical Cooperation for Development Planning.

5.5.3 Environmental Impact of Project Implementation

The Environmental Impact Assessment System in Indonesia was introduced for the first time in 1986 under the provisions of Article 16 of the old Environmental Management Law (Law No. 4 of 1982) (for projects that may have a significant impact on the environment, an Environmental Impact Assessment must be conducted). Subsequently, in 1993, the "Decree on Environmental Impact Assessment" (Decree No. 51 of 1993) drastically amended the system, including simplification of the initial screening process and strengthening of the authority of the Environmental Management Agency regarding the examination of projects involving plural ministries, and established the current environmental impact assessment system in Indonesia, known as AMDAL (abbreviation of the Indonesian term for environmental impact assessment). In 2015, the government of Bali conducted an analysis of environmental considerations in the SPAM Ayung FS 2015, and it is said that the plan to reduce negative environmental impacts at both the construction and maintenance stages has been examined.

(1) Projects subject to Environmental Impact Assessments

Decree No. 51 of 1993, which is the basic regulation for environmental impact assessment, lists nine items including ① topographical and natural environmental changes and ② processes and activities that may cause destruction and degradation due to the generation of waste and the use of natural resources with respect to projects and activities that may have a significant impact on the environment.

The projects subject to the environmental impact assessment are listed in detail in Table 5-10 of the 1994 Ministerial Ordinance on the Types of Projects and Activities Requiring Environmental Impact Assessment (Ordinance of the Minister of the Environment No. 11 of 1994). The list is divided into 14 categories, including mining, energy, public works, industry, transportation, and hazardous waste management.

Table 5-10 Project or Activity subject to Environmental Impact Assessment

Field	Type of business or activity	Scale
I. Mining and energy	1. Following mining area (during mining)	
	・ Coal	≧200 ha/≧200,000 t/year
	・ Primary ore	≥ 60,000 t/year
	・ Secondary ore	> 100,000 t/year
	・ Non-metallic minerals, sand and gravel	≥ 300,000 t/year
	・ Radioactive materials (including mining, processing and refining)	
	2. Transmission lines	150 kV
	3. Power generation facilities (diesel, natural gas, steam and combined cycle)	100 MW
	4. Hydropower facilities (excluding small-scale and direct currency power generation facilities)	
	5. Geothermal power generation facilities	55 MW
	6. Other power generation facilities	5 MW
	7. Drilling for oil and natural gas	
	8. Processing (refining) of oil and natural gas	
	9. Oil and natural gas pipelines	≧25 km
II. Health care	1. Hospitals (Class A)	
	2. Hospitals (equivalent to Class A or I)	
	3. Other hospitals	>400 rooms
	4. Full nursing hospital	
	5. Basic drug manufacturing facilities	
III. Public work	1. Construction of dams or levees	Height≥15 m/storage area≥100 ha
	2. Development of irrigated areas	Irrigation area ≧2,000 ha
	3. Development of tidal flats	Area ≥ 5,000 ha
	4. Coastal conservation in large cities	Population ≧ 500,000
	5. River improvement in major cities	Population ≧ 500,000
	6. Canal or flood control facilities in large cities	Length ≥ 5 km/width ≥ 20 m
	7. Other canals (coastal areas, wetlands, etc.)	Length ≥ 25 km/width ≥ 50 m
	8. Construction of expressways and grade crossings	
	9. Construction of highways	Length ≧ 25km
	10.Construction and rehabilitation of major roads other than major cities or metropolitan areas	Length ≥ 5 km or area ≥ 5 ha
	11. Waste incinerators	≧800 ton/ha
	12. Waste disposal sites (landfill)	≧800 ton/ha
	13. Waste disposal sites	≧80 ton/ha
	14. Drainage facilities in large cities and metropolitan area	Major products
	15. Wastewater treatment:	
	・ Wastewater Treatment Facilities in urban areas	Area ≥ 50 ha
	・ Sewage system	Processing area ≧ 2,500 ha
	16. Water intake facilities from lakes, rivers, springs, etc.	
	17. Public housing	Area ≥ 200 ha
	18. Urban renewal	Area ≥ 5 ha
	19. High-rise buildings and condominiums	Height ≧ 60m
IV Agriculture	1. Aquaculture of shrimp and fish	Area ≥ 50 ha
	2. Paddy field development in forest areas	Area ≥ 1,000 ha
	3. Plantation	Area ≧ 10,000 ha
	4. Farms of market crops	Area ≥ 5,000 ha
V Tourism	1. Hotel	200 or more rooms/area ≥ 5 ha
	2. Golf course	
	3. Recreation park	≧100 ha
	4. Tourist resort area	
VI Migration & residence	Construction of settlement areas for migrants	Area ≥ 3,000 ha
VII Industry	1. Cement	
	2. Pulp and paper	
	3. Chemical fertilizer (synthetic)	
	4. Petrochemicals	
	5. Steel making	
	6. Lead refining	

Field	Type of business or activity	Scale
	7. Copper refining	
	8. Alumina production	
	9. Manufacture of special ropes	
	10. Aluminum production	
	11. Metal pelleting	
	12. Pig iron production	
	13. Ferroalloy production	
	14. Industrial park	
	15. Shipbuilding	
	16. Aircraft manufacturing	
	17. Plywood production (including related facilities)	
	18. Manufacture of weapons, munitions and explosives	
	19. Batteries	Ship ≧ 3,000 dwt
VIII Transportation	1. Construction of railways	Prolongation ≧ 25 km
	2. Construction of a subway	
	3. Construction of ports (Grade 1-3) and related facilities	
	4. Construction of a special port	
	5. Coastal landfill	
	6. Harbor dredging	Area ≥ 25 ha
	7. Cargo handling area	Volume ≧ 100,000 m^3
	8. Airports and related facilities	
IX Trade and commerce	Trade Center or Shopping Center	Area ≥ 5 ha/Building area ≥ 10,000 m^2
X Defense and safety	1. Construction of munitions storage facilities	A-C class
	2. Construction of a naval base	A-C class
	3. Construction of an air base	A-C class
	4. Combat training sites or firing training areas	Area ≧ 10,000 ha
XI Nuclear energy	1. Construction and operation of nuclear reactors	
	・ Energy production furnace	
	・ Research furnace	
	2. Construction and operation of nuclear energy facilities other than reactors	≧100 kw
	・ Production of nuclear material	
	・ Radwaste Storage Facility	≧ Fuel type 50/year
	・ Radiation source	
	・ Production of radioisotopes	≧1,850 TBq
XII forest	1. Construction of the Safari Park	≧250 ha
	2. Construction of zoos	≧100 ha
	3. Felling of forests (HPH)	
	4. Felling of sago palm forests	
	5. Felling of industrial afforestation (HTI)	
	6. Construction of parks (national parks, hunting districts in nature conservation areas, coastal parks, wildlife reserves, biosphere reserves, etc.)	
XIII. Hazardous waste management	Construction of a hazardous waste treatment facility	
XIV. Integrated/Plural Ministries	Relevant activities in the same type of ecosystem (each covered by the EIA) and under the jurisdiction of several ministries and agencies	

Source : Motoichi Iwata, "Environmental Conservation Measures in Indonesia," 1995

(2) Organization conducting the Environmental Impact Assessment

The authority to conduct an environmental impact assessment is vested in the central government, which is responsible for the project, and the states and special administrative districts throughout the country. Each organization has an Environmental Impact Assessment Committee, which reviews the content of the prior screening and environmental impact assessment document. The Central Environmental Impact Assessment Committee, established at the center, is chaired by the director of the central government agency with jurisdiction, while the Local Environmental Impact Assessment Committee is chaired by the governor of the province. The committee is composed of a standing committee with the participation

of representatives of relevant administrative organizations, environmental experts, environmental organizations, etc., and a non-standing committee with the participation of representatives of citizens.

Separately, the Comprehensive Environmental Impact Assessment Committee was established in 1994. The committee consists of representatives from the Environmental Management Agency, the Ministry of the Interior, the Investment Coordination Agency, and the National Land Authority to strengthen the implementation of environmental impact assessments of multi-faceted projects involving more than one competent authority.

On the other hand, the Environmental Management Agency is expected to act as the overall coordinator for environmental impact assessments. The Agency is responsible for supervising comprehensive environmental impact assessments covering other sectors, developing guidelines for conducting environmental impact assessments, and monitoring the progress of environmental impact assessments.

(3) Implementation Procedures for Environmental Impact Assessment

As shown in Table 5-10, the facilities planned for this project are to newly construct water treatment plants, water distribution ponds and pipes. The facilities required for "III public facilities" are as shown in "Section 16. Water intake facilities from lakes, rivers, springs, etc. " However, in the SPAM Ayung project, Sidan dam is already being constructed and the construction of the water intake facilities seems to have already been constructed, and the implementation of the EIA is not considered necessary. However, if the MP review necessitates the construction of a new water intake facility, an EIA should be implemented.

The procedures for preparing the environmental impact statement are shown below for reference.

(a) Environmental Impact Assessment Implementation Process

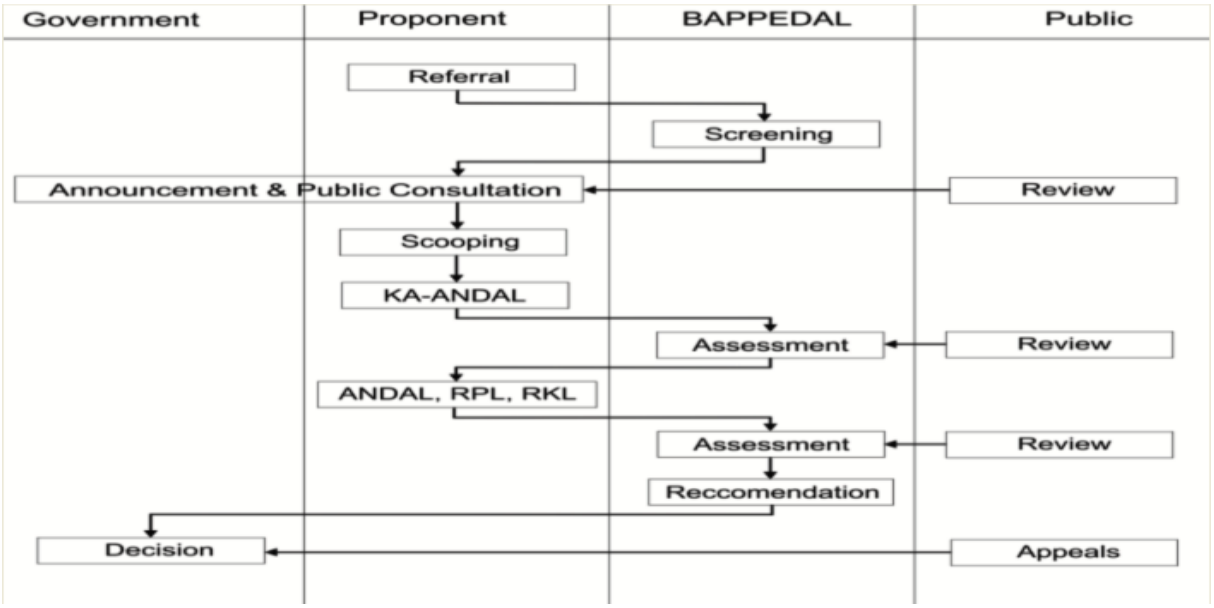
The environmental impact assessment process is initiated by the project planner contacting the competent authority. (Figure 5-2). First, the Environmental Impact Assessment Committee established within the competent authority determines whether or not an environmental impact assessment is necessary for a planned project (this process is called screening). The competent authority is as shown in below:

1) In case that it does not receive domestic or foreign investment or privilege from the government, thee authority that has jurisdiction over the project.

(a) In case that domestic or foreign investment is accompanied, the investment coordinating authority accepts the business plan and instructs it to the appropriate operating authority

The Environmental Impact Assessment Committee, which has received the project through the competent authority, determines whether the project may have a significant impact on the environment and whether it is included in the list of projects of the Ministerial Ordinance on Environmental Impact Assessment required, and makes a decision as to whether it is necessary to conduct the environmental impact assessment or not. As a result, even if an environmental impact assessment is not required, the project planner will not be able to obtain a project license without preparing an environmental management plan (RKL) and an environmental monitoring plan (RPL) under the guidance of the competent authority.

The Environmental Management Plan describes the activities to reduce the impact on the environment, the organization in charge, and budgetary estimates for those activities. The Environmental Monitoring Plan describes the methods and activities to monitor the environmental changes expected from the implementation of the project.



Source : Interpretation of Government Regulation No. 27/2012 and Minister of Environment Regulation No. 17/2012

Figure 5-2 EIA Procedures in Indonesia

(b) Preparation of Environmental Impact Statement

In the case of a project that has been determined to require an environmental impact assessment, the implementation plan (KA-ANDAL) that describes the scope of the environmental impact assessment survey and the methods for collecting and analyzing the data shall be submitted to the Environmental Impact Assessment Committee. If the protocol is reviewed by the Environmental Impact Assessment Committee within 12 days and approved, the project planner will begin preparing an Environmental Impact Statement (ANDAL) as a next step. In addition, the content of the protocol is normally coordinated between the Environmental Impact Assessment Committee and the project planner within 12 days.

The Environmental Impact Assessment Document prepared by the project planner is then submitted to the Environmental Impact Assessment Committee together with the Environmental Management Plan and the Environmental Monitoring Plan required to be prepared. The Environmental Impact Assessment Committee that has received these documents must review the content of the Environmental Impact Assessment Report, etc. within 45 days to decide whether or not to approve the document. After receiving a decision and report from the Environmental Impact Assessment Committee, a provisional business license is granted by the competent minister at the national level and by the governor of the state at the local level. However, a permanent business license will be issued after confirming that the contents of the environmental management plan and the environmental monitoring plan submitted in conjunction with the environmental impact statement have been implemented successfully. If the EIA is rejected, the project planner will choose to re-establish or abandon the project.

In Indonesia, the government decree on environmental impact assessment (Decree No. 51 of 1993) calls for the disclosure of information to the general public. Therefore, the Environmental Impact Assessment Committee is composed of citizens' representatives, and citizens can express their opinions orally or in writing about the environmental impact assessment before the license is granted.

(4) Issues of the Environmental Impact Assessment System

Although Indonesia's environmental impact assessment system is structured, several operational issues have been pointed out. Although the government's cabinet order stipulates the involvement of citizens, it still has a number of problems, including the provision of relevant information to citizens, which have not been sufficiently implemented as prescribed.

Chapter 6 General Remarks

6.1 Significant Issues

The supply volume has not been sufficient to cope with the increase of population and tourism industry in the SARBAGITA region in southern Bali. The water supply rate is slightly less than 50 % in the Denpasar City, and the other three regencies are also around 70 %. The NRW rate is also high at 40 %. On the other hand, the Bali Province proposed a new regional project, the SPAM Ayung Project, FS was completed in 2015, and Sidan dam, which is currently under construction, is scheduled to be completed in 2021. However, it is considered necessary to review the MP itself rather than the FS because the existing water supply projects (already implemented and currently planned) are not consistent with the SPAM Ayung Project.

As for the water supply project in the target area, the Republic of Korea formulated a project to introduce smart meters to the Denpasar City, but this project has yet to be implemented. ADB is also said to be interested in building some facilities, but the details are unknown.

South Bali is one of Indonesia's fastest-growing areas, and other donors may be interested in it. However, it is desirable to quickly implement a robust water supply system incorporating anti-seismic technology and associated cooperation with technical cooperation.

Each PDAM in Indonesia faces common problems, such as pipe age, imbalance between supply and demand, and high NRW rate. Through this project, the improvement effect of four PDAMs in the SARBAGITA area can be expected to have a significant impact on other PDAMs.

6.2 Precautions for Implementation of the Project

The main points of this project are the incorporation of anti-seismic technology for water supply facilities and technical cooperation for improving the NRW rate and for controlling groundwater exploitation.

(1) As for anti-seismic design technology, although four PDAMs are interested, the Indonesian National Standards Bureau has established the anti-seismic design standard SNI03-1726-2002 as a technical standard, and there are concerns that the construction cost of facilities will increase due to the introduction of anti-seismic design technology. Therefore, as described before, we would like to have the Indonesian National Standards Bureau participate in the anti-seismic design seminar held by the Ministry of Health, Labour and Welfare of Japan in February 2020 to understand the contents of anti-seismic design technology in Japan. The FS will be conducted based on an agreement with Indonesia's side.

(2) Improvement of the NRW rate is a major issues, which have been also conducted in JICA's technical cooperation projects in many developing countries, but it is difficult to produce tangible results. This time, one of the four PDAMs will be selected as a model case, and the trained personnel will be dispatched as instructors for the other PDAMs to improve the NRW rate by disseminating the technology.

(3) Similarly, measures to control groundwater use the same method as the NRW rate improvement, using PDAM, where salinization and ground subsidence are severe, as model case.

When technical projects are implemented and the other party's PDAMs show visible financial effects, there are changes in the attitudes of the other party. Therefore, the first step is to demonstrate concrete effects to the senior management level of the other party's PDAMs, and to obtain their understanding and cooperation.

6.3 Conclusion

(1) Japan's Basic ODA Policy for Indonesia

(a) Ultimate Goal

In order to achieve balanced development in Indonesia, Japan will provide support for improving international competitiveness and realizing a safe and fair society through high quality infrastructure development, etc. Japan will also provide support for improving capacity to respond to the challenges facing the Asian region and the international community.

(b) Priority Areas (Medium-Term Goals)

1) Support to enhance International Competitiveness

In order to achieve economic growth in the globalizing Indonesian economy by enhancing the international competitiveness of private enterprises, Japan will provide with assistance for the development of business and investment environments and human resources through the development of high-quality infrastructure such as transport, logistics, energy and telecommunications networks, and the improvement of various regulations and systems.

2) Assistance toward the realization of a safe and fair society through balanced development

In order to realize a safe and fair society, in order to improve the quality of life, the Government will support the development of not only large cities but also rural areas, and the improvement of administrative functions such as disaster prevention measures.

(2) Positioning of this Project

With regard to the medium-term targets (b) in particular 2), cooperation will be provided to promote regional development, agriculture, fisheries, and other regional industries. This will be done at the beginning of the year to assist in improving the living environment in the areas, such as water supply, sewage and waste, and to promote balanced development by correcting the growing regional disparities accompanying economic growth, in order to improve the quality of life. In addition, Japan and Indonesia are both disaster-prone countries, and Japan and Indonesia will strive to build a cooperative relationship by making use of the knowledge and experience of both countries and share their experiences with the world.

This project, the South Bali Water Supply Development Project, can be said to have exactly been in conformity with 2) above. Indonesia, like Japan, is a country prone to earthquakes and suffers severe damage from earthquakes once in a few years. As the region is on average 400 or more earthquakes with a magnitude of 4 or more each year, the introduction of anti-seismic technology for water supply facilities is essential to minimize the damage caused by the earthquake.

In accordance with Japan's basic policy on ODA to Indonesia, the present state of water supply projects in the SARBAGITA region in South Bali and the necessity for the development of water supply facilities are considered to be of high urgency and relevance for this project, including support for the formulation of water supply projects incorporating anti-seismic technology, reduction of the NRW rate, and measures to control groundwater exploitation. In particular, while the reduction of the NRW rate and the control of groundwater exploitation are steady activities, the improvement of the financial position of PDAM and the supply of high-quality groundwater at a reasonable price ultimately contribute to the improvement of the living environment of local residents through the improvement of the water management capacity of PDAM and the improvement of water supply services.

6.4 Comments

The necessity and urgency of this project are clear, and the Indonesian side basically agrees with it in the local agreement document (October 30, 2019: Appendix-5). In addition, the current population of SARBAGITA is approximately 2.5 million, and the benefits are great. Therefore, the project is highly

valid.

However, the decision to organize PDAM is inevitably made at the stage where decentralization, which has been promoted since 1999, will be greatly advanced. It appears that the function of PDAM will be closer to that of the private company. In the process of deciding the implementation of a water supply project (e.g., the SPAM Ayung project targeted in this study), the central government, local governments and local government agencies are expected to make delicate balance decisions, as shown in Figure 2-16. However, the final decision on the project remains with the Bali State Government. This point is expected to become one focus in formulating this Project.

The project implementation process is unique to Indonesia, such as determining the project and technology levels, determining funding sources, and agreeing with PDAMs concerned. In this context, the Japanese side wishes to carry out a project with yen loan at least, and ideally STEP loan with the introduction of Japan's first anti-seismic technology in Indonesia. However, as mentioned above, consensus building with the relevant organizations is required (to be carried out during the MP period).

In this survey, the survey team grasped the above decision-making process in Indonesia beforehand, so the number of participants in the kick-off meeting and the wrap-up meeting was 32 and 45, respectively, and consensus was reached through consultation among them. However, Japanese side intends to introduce anti-seismic technology and decide on STEP loan in the future. As they are interested in anti-seismic technology, they wanted to attend a seminar on anti-seismic technology hosted by the Ministry of Health, Labour and Welfare in Jakarta in February 2020.

In light of the current situation described above, a development study with Japanese Technical Cooperation for Development Planning is the ideal scheme. The main pillars of the technical assistance are water leakage, groundwater regulation, and anti-seismic technology. The Bali province Government and related PDAMs will benefit greatly. The implementation of this project will greatly contribute to the improvement of the standard living of life for the people in Bali province and local residents by eliminating the demand - supply gap, improving the profitability of PDAM, and strengthening the groundwater regulation measures (soft aspects).

Appendix

1. List of Interviewees
2. List of Collected Materials
3. Four PDAM Water Price Schedule
   - 3-1 PDAM Denpasar Water Tariff System
   - 3-2 PDAM Badung Water Tariff System
   - 3-3 PDAM Gianyar Water Tariff System
   - 3-4 PDAM Tabanan Water Tariff System
4. Notice Letter from Japanese Government
5. Agreement with BPPW and PUPR
6. Table of Terms and Conditions of Yen Loan

1 List of Interviewees

Affiliation	Name	Position
Embassy of Japan in Indonesia	Daisuke Inoue	First clerk
Japan International Cooperation Agency, Indonesia Office	Kanda Satsuki	JICA Indonesia Planning and Research Representative
Department of Water Systems Development, Directorate General of Human Settlements, Ministry of Public Works and National Housing	Kurniati W	Head of Technical Planning Section
	Ade Syaiful	Head of Subdivision of SK
	Sully M.H.	Head of Special SPAM II Section
	Elly Kanalia	Staff
Bali Regional Centre Working Unit, Human Settlements Division, Ministry of Public Works and National Housing	Didik W.	Head of SATKER PPPB,PUPR
Bali Regional River Bureau, Department of Water Resources, Ministry of Public Works and National Housing	Danang R. P.	PPK Planning
	Harni Harumi P.	Staff
	I Gst Ngr Bisma A.	Staff
Ministry of National Development Planning	Tirta Sutedjo,ST.MWRM	Deputy Director
	Syaidina Agusta S	Staff
Department of National Development Planning, Bureau of Research and Development Bali	Ekapria Dharana Kubontubuh	Head of Division Infrastructure and Territorial Affairs
	Ni Luh Putu Nia A.S.	Head of sub Division Public Works Infrastructure
	I Wayah Sudarsa	Head of sub division Social Welfare
Bali Public Works Space Planning Agency	Nyoman Sumeta	Head of Dinas PUPR
Bali Department of Technology and Development (Water)	R. Agung Somarsetiono	Head of UPT. PAM Bali
	Made Nunuk Yuswari	Head of Money Section
Denpasar City Water Authority	Ida Bagus Gede Arsana	Director
	I Putu Yasa	Technical Director
Badung Regency Water Authority	I Wayan Suyasa	Technical Director
Tabanan Regency Water Authority	I Made Megayasa	Head of R&D Section
	I Nengah Suartana	Head of Planning Section
	I putu Sadria Wibawa	Staff
Gianyar Regency Water Authority	Agus Mahardhana M	
	Bapak Ida Kade Ramadika	

2 List of Collected Materials

Name of the material	Size	Page No.	Hard/Soft Copy	Publisher	Description	English translation
LEMBAR DISPOSISI	F4	20	HC	PDAM BADUNG		
TREND OPERASIONAL PDAM TIRTA MANGUTAMA KABUPATEN BADUNG TAHUN 2014 SAMPAI	F4	3	HC	PDAM BADUNG		OPERATIONAL TREND OF PDAM TIRTA MANGUTAMA, BADUNG uh, 2014 TO 2018
SKEMA PENYERAPAN PRODUKSI	F4	5	HC	PDAM BADUNG	Water Supply System	PRODUCTION ABSORPTION SCHEME, BADUNG CITY SERVICE SYSTEM
LAPORAN PERSONALIA BULUN : SEPTEMBER 2019 DATA STATUS PEGAWAI	F4	1	HC	PDAM BADUNG	Employees number in each department	MONTHLY PERSONAL REPORT: SEPTEMBER 2019, EMPLOYEE STATUS DATA
PERNCANAAN UMUM 1. PIPE TRANSMISI	F4	3	HC一	PDAM BADUNG	Type and length of water pipe	GENERAL PLANNING 1. TRANSMISSION PIPE
VOLUME AIR YANG DIPRODUKSI PERIODA TAHUN	F4	1	HC	PDAM BADUNG		WATER VOLUME PRODUCED IN 2018 PERIOD
Kuisioner ke PDAM Badung	F4	6	HC	PDAM BADUNG		QUESTIONNAIRE TO PDAM BADUNG
LAPORAN AUDITOR INDEPENDEN	A4	36	HC	PDAM BADUNG		INDEPENDENT AUDITOR'S REPORT
TARIF AIR MINUM PERSAHAAN DAERAH AIR MINUM TIRTA MANGUTAMA KABUPATEN BADUNG	F4	1	HC	PDAM BADUNG	Water Tariff	WATER CHECK RATES THE TIRTA MANGUTAMA WATER DRINKING COMPANY, BADUNG REGENCY
LAPORAN RENCANA USAHA PDAM BADUNG Periode 2018-2022	A4	124	HC	PDAM BADUNG	Business Plan	PDAM BADUNG BUSINESS PLAN REPORT 2018-2022
LOKASI PELANGGAN & SITUASI JALUR PIPA KEC. KUTA & KUTA SELATAN	A0	6	SC	PDAM BADUNG		CUSTOMER LOCATION & SITUATION OF PIPE PATH KEC. KUTA & KUTA SOUTH
LAPORAN PELKSANAAN PROGRAM PENANGGULANGAN KEHILANGAN AIR TAHUN 2018	A4	36	HC	PDAM GIANYAR		REPORT OF IMPLEMENTATION, WATER LOSS DISTRIBUTION PROGRAM OF 2018
PETA LOKASI SUMBER KABUPATEN GIANYAR	A4	1	HC	PDAM GIANYAR		GIANYAR REGENCY SOURCE LOCATION MAP
PETA JARINGAN KABUPATEN GIANYAR	A4	1	HC	PDAM GIANYAR		GIANYAR REGENCY NETWORK MAP
DAFTAR RESERVOIR PDAM KABUPATEN GIANYAR	A4	1	HC	PDAM GIANYAR		LIST OF RESERVOIR OF PDAM, GIANYAR REGENCY
Kuisioner untuk PDAM Gianyar (Response Version)	A4	6	HC	PDAM GIANYAR		Questionnaire for PDAM Gianyar (Response Version)
SKEMA RENCANA PENGEMBANGAN JARINGAN PIPA DISTRIBUSI UTAMA (JDU) MENURUT POTENSI SUMBER AIR BAKU PDAM KABUPATEN GIANYAR	A4	9	HC	PDAM GIANYAR		PLAN OF MAIN DISTRIBUTION PIPE NETWORK DEVELOPMENT (JDU) ACCORDING TO THE POTENTIAL OF RAW WATER SOURCES

Name of the material	Size	Page No.	Hard/Soft Copy	Publisher	Description	English translation
DAFTAR RESERVOIR PDAM KABUPATEN GIANYAR	A4	1	HC	PDAM GIANYAR		LIST OF RESERVOIR OF PDAM, GIANYAR REGENCY
PENYESUAIAN TARIF AIR MINUM DAN RESTRUKTURISASI GOLONGAN PELANGGAN RUMAH TANGGA PADA PERUSAHAAN DAERAH AIR MINUM KABUPATEN GIANYAR	F4	6	HC	PDAM GIANYAR		ADJUSTMENT OF DRINKING WATER RATES AND RESTRUCTURING OF HOUSEHOLD CUSTOMERS IN THE GIANYAR REGENCY WATER COMPANY
Hasil Permeriksaan Kimia Air Minum	A4	1	HC	PDAM GIANYAR		Drinking Chemistry Examination Results
STRUKTOR ORGANISASI PDAM GIANYAR	F4	1	HC	PDAM GIANYAR		Organization chart of PDAM Gianyar
LAPORAN KEPEGAWAIAN PERIODE SEPTEMBER 2018	F4	2	HC	PDAM GIANYAR		STATEMENT OF PERSONNEL SEPTEMBER 2018
LAPORAN EVALUASI KINERJA PERUSAHAAN DAERAH AIR MINUM (PDAM) KABUPATEN TABANAN TAHUN BUKU 2018	A4	63	HC	PDAM TABANAN		PERFORMANCE EVALUATION REPORT OF DRINKING WATER COMPANIES (PDAM) TABANAN DISTRICT, BOOK OF 2018
TARIF AIR MINUM PDAM KABUPATEN TABANAN	F4	7	HC	PDAM TABANAN	Tabanan PDAM Water Tariff	DRINKING WATER RATES, PDAM TABANAN REGENCY
Existing SELEMADEB exploitation facility	F4	8	HC	PDAM TABANAN		
Existing exploitation facilities in the KOTA region	F4	14	HC	PDAM TABANAN		
Existing exploitation facilities in the BATURITI region	F4	5	HC	PDAM TABANAN		
KERAMBITAN existing exploitation facilities	F4	12	HC	PDAM TABANAN		
STRUKTOR ORGANISASI PDAM KABUPATEN TABANAN	F4	2	HC	PDAM TABANAN		Organization chart of PDAM Tabanan
TARIF AIR MINUM PDAM KABUPATEN TABANAN	A4	1	HC	PDAM TABANAN		Tabanan PDAM Water Tariff
PENILAIAN TINGKAT KESEATN MENURUT BPPSPAM PDAM KABUPATEN TABANAN TAHUN BUKU 2014-2018	F4	9	HC	PDAM TABANAN		SSESSMENT OF HEALTH LEVEL ACCORDING TO BPPSPAM PDAM TABANAN DISTRICT, 2014-2018 BOOK
PDAM KABUPATEN TABANAN SKEMA SISTEM PENYEDIAAN AIR BERSIH	A3	5	HC	PDAM TABANAN	Tabanan PDAM Water Supply System Diagram	PDAM TABANAN DISTRICT SCHEME OF CLEAN WATER SUPPLY SYSTEM
LOKASI RENCANA LONG STORAGE TUKAD YEH EMPAS	A3	6	HC	PDAM TABANAN		Location of Long Storage
BUISINESS PLAN PDAM KABUPATEN GIANYAR TAHUN 2019-2023	A4	189	HC	PDAM GIANYAR	PDAM Gianyar business plan	
TARIF AIR MINUM PDAM BADUNG KABUPATEN BADUNG	A4	1	HC	PDAM BADUNG	PDAM Badung water tariff	DRINKING WATER TARIFF PDAM BADUNG, BADUNG REGENCY

Name of the material	Size	Page No.	Hard/Soft Copy	Publisher	Description	English translation
TENTANG PENETAPAN TARIF AIR MINUM PDAM KOTA DENPASAR	A4	1	HC	PDAM DENPASAR	PDAM Denpasar water tariff	CONCERNING DETERMINATION OF DRINKING WATER TARIFF, PDAM DENPASAR
SKEMA PENGALIRAN	A4	2	HC	PDAM DENPASAR		FLOW SCHEME
REKAPITULASI PIPA TRANSMISI DISTRIBUSI & SERVICE CONECTION	F4	2	HC	PDAM DENPASAR		DISTRIBUTION & SERVICE CONNECTION TRANSMISSION PIPE RECIPITULATION
KAPASITAS TERPASANG DAN PRODUKSI TAHUN 2018	A4	2	HC	PDAM DENPASAR		INSTALLATION CAPACITY AND PRODUCTION IN 2018
HASIL PEMERIKASAAN SAMPEL AIR SUMUR BOR SIDAKATYA	A4	1	HC	PDAM DENPASAR		RESULTS OF EXAMINATION OF WELL DRILL WATER SAMPLE SIDAKARYA
HASIL PENGECEKAN KWALITAS AIR PADA SUMUR PRODUKSI	A4	4	HC	PDAM DENPASAR		RESULTS OF WATER QUALITY CHECK IN PRODUCTION WELLS
VOLUME PRODUKSI PERIODE TH.2019 UNIT IPA BELUSUNG & IPA PAKET	F4	1	HC	PDAM DENPASAR		VOLUME OF PRODUCTION PERIOD TH.2019 VILLAGE UNIT & IPA PACKAGE UNIT
LAKASI SUMBER PRODUKSI PDAM KOTA DENPASAR	F4	1	HC	PDAM DENPASAR		Location of production source in PDAM kota Denpasar
RENCANA ZONASI PENGALIRAN	F4	1	HC	PDAM DENPASAR		FLOW ZONATION PLAN
VOLUME PRODUKSI PERIODE TH.2018 SUMOR BOR PRODUKSI	F4	1	HC	PDAM DENPASAR		VOLUME OF PRODUCTION PERIOD TH.2018 WELL DRILL PRODUCTION
Data TDS Air Di Jln.Pendidikan 2 Oktober 2019	A4	1	HC	PDAM DENPASAR		TDS Air Data on Jl. Pendidikan 2 October 2019
LAPORAN RINGKASAN KEGIATAN UTAMA	F4	1	HC	PDAM DENPASAR		REPORT SUMMARY OF MAIN ACTIVITIES
PEKAPITULASI AIR YANG TERJUAL MELALUI WATER METER PELANGGAN	F4	1	HC	PDAM DENPASAR		RECAPITULATION OF WATER SOLD THROUGH CUSTOMER WATER METERS
IKTHISAR REKENING MENURUT JENIS PELANGGAN	F4	1	HC	PDAM DENPASAR		SUMMARY OF ACCOUNT ACCORDING TO TYPES OF CUSTOMERS
REKAP PENERAAN DAN PENGETESAN WATER METER TAHUN:2019	F4	1	HC	PDAM DENPASAR		RECORD OF FEETING AND TESTING WATER METERS YEAR: 2019
LAPORAN PEMBACAAN STAND WATER METER INTERCONECTION WILAYAH KOTA DENPASAR	F4	1	HC	PDAM DENPASAR		REPORT OF READING STAND WATER METER INTERCONECTION AREA KOTA DENPASAR
PERUSAHAAN DAERAH AIR MINUM KOTA DENPASAR PERHITUNGAN LABA RUGI TAHUN YANG BERAKHIR PER 31 DESEMBER 2014 DAN 2013	F4	1	HC	PDAM DENPASAR		REGIONAL DRINKING WATER COMPANY DENPASAR CITY CALCULATION OF INCOME ENDED DECEMBER 31, 2014 AND 2013

Name of the material	Size	Page No.	Hard/Soft Copy	Publisher	Description	English translation
PERSAHAAN DAERAH AIR MINUM KOTA DENPASAR NERACA TAHUN YANGBERAKHIR PER 31DESEMBER 2014 DAN TAHUN 2013	F4	2	HC	PDAM DENPASAR		REGIONAL DRINKING WATER COMPANY, DENPASAR BALANCE, YEAR ENDED 31 DECEMBER 2014 AND 2013
PERSAHAAN DAERAH AIR MINUM PERHITUNGAN LABA RUGI TAHUN YANG BERAKHIR PER 31 DESEMBER 2015 DAN 2014	F4	1	HC	PDAM DENPASAR		COMPANY OF DRINKING WATER AREA CALCULATION OF INCOME ENDED DECEMBER 31, 2015 AND 2014
PDAM KOTA DENPASAR PENILAIAN TINGKAT KESEHATAN MENURUT BPPSPAM TAHUN 2014	F4	2	HC	PDAM DENPASAR		PDAM KOTA DENPASAR ASSESSMENT OF HEALTH RATE BY BPPSPAM IN 2014
PDAM KOTA DENPASAR PENILAIAN TINGKAT KESEHATAN MENURUT BPPSPAM TAHUN 2015	F4	2	HC	PDAM DENPASAR		PDAM KOTA DENPASAR ASSESSMENT OF HEALTH RATE BY BPPSPAM IN 2015
PDAM KOTA DENPASAR PENILAIAN TINGKAT KESEHATAN MENURUT BPPSPAM TAHUN 2016	F4	2	HC	PDAM DENPASAR		PDAM KOTA DENPASAR ASSESSMENT OF HEALTH RATE BY BPPSPAM IN 2016
PDAM KOTA DENPASAR PENILAIAN TINGKAT KESEHATAN MENURUT BPPSPAM TAHUN 2017	F4	2	HC	PDAM DENPASAR		PDAM KOTA DENPASAR ASSESSMENT OF HEALTH RATE BY BPPSPAM IN 2017
PDAM KOTA DENPASAR PENILAIAN TINGKAT KESEHATAN MENURUT BPPSPAM TAHUN 2018	F4	2	HC	PDAM DENPASAR		PDAM KOTA DENPASAR ASSESSMENT OF HEALTH RATE BY BPPSPAM IN 2018
The Data to be collected for SWM master plan	A4	16	HC	PDAM DENPASAR		
SWM for Denpasar City Interim Result	A4	14	HC	PDAM DENPASAR		
SWM for Denpasar City Initial Review on collected data	A4	15	HC	PDAM DENPASAR		
JAWABAN KUESIONER STUDI KELAYAKAN PENGEMBANGAN SPAM WILAYAH BALI SELATAN	F4	4	HC	UPTD		ANSWER TO QUESTIONARY FEASIBILITY STUDY FOR THE DEVELOPMENT OF SOUTH BALI SPAM
Bab 1 Pendahuluan Converted	A4	6	SC	PDAM TABANAN		
BUKU KINERJA PDAM 2017	A4	46	SC	BPPSPAM,PUPR		PDAM Performance Report 2017
BUKU KINERJA PDAM 2018	A4	84	SC	BPPSPAM,PUPR		PDAM Performance Report 2018
KPBU SPAM SARBAGIKUNG	A4	3	SC	BPPSPAM,PUPR		Cooperation Between Government with Private Sector Regarding Sarbagikung
STUDI KELAYAKAN KPBU SPAM REGIONAL SARBAGIKUNG BALI	A4	97	SC	BPPSPAM,PUPR		Feasibility Study about Sarbagikung
REVIEW DESAIN BENDUNGAN SELAT KANAN PROVINSI BALI	A4	46	SC	BWS Bali-Penida		Information Regarding Selat Kanan Dam

Name of the material	Size	Page No.	Hard/Soft Copy	Publisher	Description	English translation
PERATURAN DAERAH KOTA DENPASAR NOMOR 6 TAHUN 2010 TENTANG PAJAK AIR TANAH DENGAN RAHMAT TUHAN YANG MAHA ESA WALIKOTA DENPASAR,	A4	18	SC	DENPASAR		Information Regarding the Groundwater Tariff and Tax
RENCANA PEYERAPAN IPA PETANU DAN IPA PENET DI KOTA DENPASAR 2015 S/D 2017	A4	28	SC	PDAM DENPASAR		Planning Usage for IPA Petany & IPA Penet
Rencana Penyediaan Air Baku Provinsi Bali BWS Bali-Penida	A4	16	SC	BWS Bali-Penida		Related Data Regarding ADB for BWS
	A4	9	SC	Cipta Karya, PUPR		Scheme Regarding Petanu & Penet

3 Four PDAMs Water Tariff System

3-1 PDAM Denpasar Water Tariff System

Announcement Number: PDAM.61/AM/2/2018

Determination of drinking water tariffs in Denpasar city water supply

Following Rule no 31 Year 2013 issued by the Mayor of Denpasar on 8 October 2013, regarding the progressive adjustment of Water Tariffs for PDAM Denpasar, we herewith inform all customers that the tariffs for accounts in October 2018 that will be billed in October 2014 are set as follows:

Date:30.10.2018

Class	Customer Group	Definition of each group		Electricity supply (VA)	Tariff (Rp/m^3)		
					0-10m^3	10-20m^3	>20m^3
1 Social	A. Social A & G	Daily activities provide services for the public interest, especially services for people with low incomes, including: Public bathrooms Public toilets, water terminals, and public hydrants			750		
	B. Social B	Daily activities provide services for the benefit of the public and society and which obtain funding to source most of their activities, including: social orphanages foundation, worship place			770	1,820	3,470
2. Non commercial	A. House-hold A1	Access road wide including got (a drain besides a road) and verge	0 to 3.99 m	450 900 900-2200 > 2200	1,240 1,350 1,460 1,560	3,010 3,360 3,700 4,020	4,750 5,300 5,830 6,360
	B. House-hold A2		4 to 6.99 m	450 900 900-2200 > 2200	1,670 1,800 1,940 2,070	3,090 3,430 3,770 4,410	5,030 5,570 6,130 6,670
	C. House-hold A3		7 to 10 m	450 900 900-2200 > 2200	2,870 3,090 3,290 3,530	3,250 3,600 3,970 4,310	5,190 5,760 6,340 6,920
	D. House-hold A4		≧10 m	450 900 900-2200 >2200	2,880 3,110 3,340 3,550	3,270 3,610 3,980 4,360	7,100 7,890 8,680 9,470
	E. House-hold B	Plots of land as well as residential homes which also have a type of business including: small stalls, small shops, boarding houses with less than 5 (five) rooms, tailors, hairdressers, cobblers, tier repairman, bicycle/motorcycle workshops, locksmiths, motorcycle wash		450 900 900-2200 > 2200	2,900 3,140 3,360 3,580	3,300 3,700 4,070 4,420	7,180 7,990 8,790 9,570
	F. Agencies	Electric power including: government facilities and agencies, other government organizations, government offices, social and cultural organizations, foreign representatives, government polyclinics, health centers, government laboratories, public universities, public schools, traditional markets		450 900 900–2,200 >2,200,	3,640 3,940 4,220 4,500	4,070 4,500 4,950 5,410	7,700 8,560 9,420 10,260

Class	Customer Group	Definition of each group	Electricity supply (VA)	Tariff (Rp/m^3)		
				0-10m^3	10-20m^3	>20m^3
3. Commercial	A. Small Businesses	Road in front of their business operations that is up to 6.99 m wide including got and verges including : Stores, offices, home offices, private offices/companies, clinics, agencies, consultants, lawyers, notaries, restaurants and cafes more than 2 tables, boarding houses with five (5) rooms and above, stores, mini market, state enterprises, private laboratories, clinics, private maternity clinics, midwives practices, cargo companies, public/private hospitals, gas stations, show rooms/dealers, private educational institutions, beauty salons, laundries, sports/arts enterprises, massage parlors, car repair shops/washes, tele-communications/business information, graphics/printing, other private business, trade, agents /distributors, drug stores, pharmacies, importers/exporters, forwarders, educational institutions in the form of courses, photocopy businesses, private financial institutions and banks	450 900 900–2,200 >2,200	4,110 4,420 4,740 5,050	5,610 6,260 6,890 7,490	10,020 11,140 12,230 13,340
	B. Medium Businesses	Road in front of their business operations 7-10 m wide including got and verges	450 900 900–2,200 >2,200	6,960 7,500 8,030 8,570	9,050 10,070 11,060 12,070	15,390 17,110 18,800 20,530
	C. Large Businesses	Areas of business larger than 3 acre (Sda.3.a) and road in front of their business operations more than 10 m wide including got and verges	450 900 900–2,200 >2,200	7,050 7,600 8,140 8,600	9,150 10,160 11,180 12,200	15,530 17,270 18,990 20,700
4. Industrial	A. Industry	Large or industrial businesses including: garments, business convection, small ranches, manufacture of household goods, non-star hotels, inns, industrial crafts, slaughterhouses, other industrial businesses, water refill, night clubs, discotheques, karaoke, entertainment areas, private swimming pools, super-markets, malls, plazas, villas, art shop, bars and restaurants, apartments, condominiums	450 900 900–2,200 >2,200	7,280 7,820 8,380 8,940		16,260 18,070 19,880 21,690
	B. Large Industry	Large industrial enterprises including: -starred hotels with 1 to 4 stars, canneries, wineries, ice plants and cold storage, large ranches, recreational parks	450 900 900–2,200 > 2,200	9,770 10,520 11,260 12,000		17,440 19,370 21,300 23,240
5. Special		port, customers who have a seaport business		33,750		

Drinking Water Tariff
PDAM Tirta Mangutama Kabupaten Badung

Based on the Letter of Pj. Badung Regent No: 412,21/4857a/Adm.Ek, dated November 12, 2015 concerning the Decree on Drinking Water Tariffs in 2016 hereby was announced to all drinking water customers of PDAM Tirta Mangutama, Kabupaten Badung, which counted the March 2016 account for drinking water tariffs to be as follows:

No	Customer Group		Water Consumption (m^3)	Tariff Rp/m^3
1.	Social A & G	Public Hydrant, Public Bathroom, Public Toilet, Water Terminal, Public Faucet.	Average	883
2.	Social B	Social Foundations, Public/Private Schools, Orphanages, Houses of Worship.	0 - 10 >10	1,197 1,704
3.	Household A1/D1	Residential which has road width in front of the house that include sewers and berm — 0 – 3.99 m	0 - 10 >10	2,235 5,716
4.	Household A2/D2	4 – 6.99 m	0 - 10 >10	3,073 6,941
5.	Household A3, A4/D3	≧7 m	0 - 10 >10	3,911 7,757
6.	Household B Agency/D4	Households that have small businesses without a business permit, Government Agencies, Foreign Representative Offices.	0 - 10 >10	4,749 8,165
7.	Small Business/E1	Kiosks, Stalls, Shops, Corporate Offices, Private Medical Practices, Service Bureaus, Restaurants, Losman, Lodging, BUMD/ BUMN, Type D Hospitals with a road width — 0 - 6.99 m	0 - 10 >10	8,165 10,615
8.	Large Business/E2	≧7 m	0 - 10 >10	8,410 13,065
9.	Small Industry/F1	Non-starred hotels, budget hotels, villas, garments, convection businesses, small farms, other small industries.	0 - 10 >10	8,492 15,514
10.	Large Industry/F2	Starred Hotels, Canning plants, Ice Factories, Cold Storage, Beverage Factories, Large Farms.	0 - 10 >10	8,574 17,964
11.	Special	- Sea/Airport - Irrigation	Average	17,467 10,778

Subscription load every month:

No.	Size (Inch)	Maintenance Fee per Meter (Rp.)	Administration. Fee (Rp.)	Amount (Rp.)
1	½	7,700	3,000	10,700
2	¾	13,200	3,000	16,200
3	1	23,100	3,000	26,100
4	1 ½	50,600	3,000	53,600
5	2	93,500	3,000	96,500
6	3	115,500	3,000	118,500
7	4	132,000	3,000	135,000
8	6	167,200	3,000	170,200

3-3 PDAM Gianyar Water Tariff System

LAMPIRAN KEPUTUSAN BUPATI GIANYAR
NOMOR 96/J-01/HK/2018
TENTANG PENYESUAIAN TARIF AIR MINUM DAN RESTRUKTURISASI GOLONGAN PELANGGAN RUMAH TANGGA PADA PERUSAHAAN DAERAH AIR MINUM KABUPATEN GIANYAR KABUPATEN GIANYAR

DAFTAR PENYESUAIAN TARIF AIR MINUM DAN RESTRUKTURISASI GOLONGAN PELANGGAN RUMAH TANGGA PADA PERUSAHAAN DAERAH AIR MINUM KABUPATEN GIANYAR

A.	KELOMPOK TARIF AIR MINUM							
	I	KELOMPOK I						
		a.	Sosial Umum (S1)	(0 - 10)	M^3	Rp	20.000	/bln
				11 - 20	M^3	Rp	2.300	/M^3
				Diatas 20	M^3	Rp	2.700	/M^3
		b.	Sosial Khusus (S2)	(0 - 10)	M^3	Rp	20.000	/bln
				11 - 20	M^3	Rp	3.000	/M^3
				Diatas 20	M^3	Rp	4.125	/M^3
	II	KELOMPOK II						
		a.	Rumah Tangga A	(0 - 10)	M^3	Rp	30.000	/bln
				11 - 20	M^3	Rp	3.300	/M^3
				Diatas 20	M^3	Rp	4.950	/M^3
		b.	Rumah Tangga B	(0 - 10)	M^3	Rp	37.500	/bln
				11 - 20	M^3	Rp	4.950	/M^3
				Diatas 20	M^3	Rp	6.600	/M^3
		c.	Rumah Tangga C	(0 - 10)	M^3	Rp	45.000	/bln
				11 - 20	M^3	Rp	6.600	/M^3
				Diatas 20	M^3	Rp	8.250	/M^3
		d.	Rumah Tangga D	(0 - 10)	M^3	Rp	52.500	/bln
				11 - 20	M^3	Rp	8.250	/M^3
				Diatas 20	M^3	Rp	9.900	/M^3
	III	KELOMPOK III						
		a.	Instansi Pemerintahan	(0 - 10)	M^3	Rp	57.750	/bln
				11 - 20	M^3	Rp	8.250	/M^3
				Diatas 20	M^3	Rp	10.500	/M^3
		b.	Niaga Kecil (N1)	(0 - 10)	M^3	Rp	66.000	/bln
				11 - 20	M^3	Rp	8.250	/M^3
				Diatas 20	M^3	Rp	9.075	/M^3
		c.	Niaga Sedang (N2)	(0 - 10)	M^3	Rp	66.000	/bln
				11 - 20	M^3	Rp	8.250	/M^3
				Diatas 20	M^3	Rp	10.750	/M^3

		d.	Niaga Besar (N3)	(0 - 10)	M^3	Rp	90.750	/bln
				11 - 20	M^3	Rp	11.550	/M^3
				Diatas 20	M^3	Rp	13.200	/M^3
		e.	Industri Kecil (I1)	(0 - 10)	M^3	Rp	49.500	/bln
				11 - 20	M^3	Rp	8.250	/M^3
				Diatas 20	M^3	Rp	10.395	/M^3
		f.	Industri Sedang (I2)	(0 - 10)	M^3	Rp	74.250	/bln
				11 - 20	M^3	Rp	9.900	/M^3
				Diatas 20	M^3	Rp	11.550	/M^3
		g.	Industri Besar (I3)	(0 - 10)	M^3	Rp	115.500	/bln
				11 - 20	M^3	Rp	13.200	/M^3
				Diatas 20	M^3	Rp	15.675	/M^3
	IV.	KELOMPOK IV						
		Golongan Khusus		Sesuai Surat Perjanjian				
B.	JENIS PELANGGAN							
	I.	KELOMPOK I						
		a.	Sosial Umum (S1)	- Terminal air, hidran umum, kran umum - Kamar mandi umum - WC umum				
		b.	Sosial Khusus (S2)	- Puskesmas - Klinik/Rumah Sakit Pemerintah - Tempat ibadah - Sekolah negeri/swasta - Panti asuhan, yayasan sosial				
	II.	KELOMPOK II						
		a.	Rumah Tangga A (RT A)	- Rumah sangat sederhana/rumah sederhana dengan PLN 450 KWH - Rumah sangat sederhana dengan PLN 900 KWH				
		b.	Rumah Tangga B (RT B)	- Rumah sangat sederhana dengan PLN ≥ 1300 KWH - Rumah sederhana dengan PLN 900/1300 KWH - Rumah adat/permanen dengan PLN 450/900 KWH - Rumah mewah/bertingkat dengan PLN 450 KWH				
		c.	Rumah Tangga C (RT C)	- Rumah sederhana dengan PLN > 1300 KWH - Rumah adat/permanen dengan PLN 1300 KWH - Rumah mewah/bertingkat dengan PLN 900 KWH				
		d.	Rumah Tangga D (RT D)	- Rumah adat/permanen dengan PLN > 1300 KWH - Rumah mewah/bertingkat dengan PLN ≥ 1300 KWH				

III.	KELOMPOK III		
	a.	Instansi Pemerintah (II)	- Sarana/instalasi Lembaga Pemerintah - Tempat ibadah di lingkungan Instansi Pemerintah - Perguruan Tinggi Negeri - Lain-lain lembaga/instansi Pemerintah - Kolam renang umum milik Pemerintah
	b.	Niaga Kecil (N1)	- Warung/kios - Salon kecantikan/Spa - Tempat perbaikan sepeda motor - Praktek dokter umum, biro jasa - Rumah jasa/rumah kos/sewa - Rumah sakit swasta type D - Lembaga keuangan mikro
	c.	Niaga Sedang (N2)	- Toko, art shop - Perusahaan Swasta (PT, CV, Fa) - Perguruan Tinggi Swasta - Rumah sakit/Kkinik milik swasta type A/B - Praktek dokter spesialis - Pasar Swalayan, SPBU, distributor - Kolam renang milik swasta - Laundry - Bengkel sepeda motor besar
	d.	Niaga Besar (N3)	- Tempat cuci mobil - Tempat hiburan milik swasta - Bengkel mobil
	e.	Industri Kecil (I1)	- Industri rumah (Air bukan sebagai komponen utama) - Kerajinan tangan - Kerajinan rumah tangga - Sanggar seni - Usaha konveksi - Peternakan kecil - Usaha industri kecil lainnya
	f.	Industri Sedang (I2)	- Hotel non bintang - Pondok wisata - Restoran/rumah makan/cafe
	g.	Industri Besar (I3)	- Hotel berbintang - Industri perikanan - Pabrik es - Pabrik minuman dan sejenisnya - Pabrik mobil - Pabrik kimia - Pertambangan

3-4 PDAM Gianyar Water Tariff System

1.	Sosial Umum (Golongan A)	Rata - Rata	Rata - Rata	Rp.	606
2.	Sosial Khusus (Golongan B)	Blok Konsumsi	0 - 10	Rp.	634
			11 - 20	Rp.	1.028
			21 - 30	Rp.	1.481
			31 - 40	Rp.	1.650
			41 - 50	Rp.	1.733
			> 50	Rp.	1.819
3.	Non Niaga (Golongan C1)	Blok Konsumsi	0 - 10	Rp.	800
			11 - 20	Rp.	1.257
			21 - 30	Rp.	1.372
			31 - 40	Rp.	1.752
			41 - 50	Rp.	1.840
			> 50	Rp.	1.932
4.	Non Niaga (Golongan C2)	Blok Konsumsi	0 - 10	Rp.	915
			11 - 20	Rp.	1.257
			21 - 30	Rp.	1.422
			31 - 40	Rp.	1.811
			41 - 50	Rp.	1.901
			> 50	Rp.	1.996
5.	Non Niaga (Golongan C3)	Blok Konsumsi	0 - 10	Rp.	1.028
			11 - 20	Rp.	1.548
			21 - 30	Rp.	1.860
			31 - 40	Rp.	2.298
			41 - 50	Rp.	2.413
			> 50	Rp.	2.533
6.	Non Niaga (Golongan C4)	Blok Konsumsi	0 - 10	Rp.	1.205
			11 - 20	Rp.	1.664
			21 - 30	Rp.	1.920
			31 -40	Rp.	2.517
			41 - 50	Rp.	2.643
			> 50	Rp.	2.775
7.	Non Niaga (Golongan C5)	Blok Konsumsi	0 - 10	Rp.	1.257
			11 - 20	Rp.	1.716
			21 - 30	Rp.	1.970
			31 - 40	Rp.	2.685
			41 - 50	Rp.	2.819
			> 50	Rp.	2.960

8.	Non Niaga (Golongan C6)	Blok Konsumsi	0 - 10	Rp.	1.374
			11 - 20	Rp.	1.945
			21 - 30	Rp.	2.079
			31 -40	Rp.	3.013
			41 - 50	Rp.	3.164
			> 50	Rp.	3.322
9.	Instansi Pemerintah (Golongan D)	Blok Konsumsi	0 - 10	Rp.	1.548
			11 - 20	Rp.	2.060
			21 - 30	Rp.	2.298
			31 - 40	Rp.	3.282
			41 - 50	Rp.	3.447
			> 50	Rp.	3.619
10.	Niaga Kecil (Golongan E1)	Blok Konsumsi	0 - 10	Rp.	1.374
			11 - 20	Rp.	1.945
			21 - 30	Rp.	2.079
			31 - 40	Rp.	3.013
			41 - 50	Rp.	3.164
			> 50	Rp.	3.322
11.	Niaga Kecil (Golongan E2)	Blok Konsumsi	0 - 10	Rp.	1.487
			11 - 20	Rp.	2.174
			21 - 30	Rp.	2.517
			31 - 40	Rp.	3.064
			41 - 50	Rp.	3.217
			> 50	Rp.	3.378
12.	Niaga Besar (Golongan F1)	Blok Konsumsi	0 - 10	Rp.	2.060
			11 - 20	Rp.	3.089
			21 - 30	Rp.	3.610
			31 - 40	Rp.	4.158
			41 - 50	Rp.	4.366
			> 50	Rp.	4.584
13.	Niaga Besar (Golongan F2)	Blok Konsumsi	0 - 10	Rp.	2.236
			11 - 20	Rp.	3.317
			21 - 30	Rp.	3.940
			31 - 40	Rp.	4.924
			41 - 50	Rp.	5.170
			> 50	Rp.	5.428
14.	Industri (Golongan G)	Blok Konsumsi	0 - 10	Rp.	2.807
			11 - 20	Rp.	3.547
			21 - 30	Rp.	4.378
			31 - 40	Rp.	5.471
			41 - 50	Rp.	5.745
			> 50	Rp.	6.032

4 Notice Letter from Japanese Government

Ministry of Health, Labour and Welfare
Japanese Government
1-2-2, Kasumigaseki,
Chiyoda-ku, Tokyo 100-8916
Tel + 81-3-5253-1111

日本国厚生労働省
〒100-8916
東京都千代田区
霞が関1－2－2
電話 03-5253-1111

In this regard, it is very important to have joint meetings at Bali. We are planning to have two meetings as follows.

(1) Kick-off meeting on 21st October 2019
(2) Wrap-up meeting on 30th October 2019

In relation to the said meetings, we would like to meet you and DitSPAM, Cipta Karya and discuss, in the beginning of our study, in the morning on 15th October 2019 at your office, and also report the study result in the morning on 31st October 2019 at your office after the said consensus forming meetings in Bali.

Besides, other than the above requested meetings, the study team has to conduct meetings in Jakarta with BAPPENAS and in the fields in Bali such as Bali Province, BAPPEDA Bali, BWS Bali, UPTD Bali, Balai Prasarana Permukiman Wilayah Bali, Kota Denpasar, Kab. Badung, Kab. Gianyar, Kab. Tabanan and 4 PDAMs BUMD (Kota Denpasar, Kab. Badung, Kab. Gianyar, Kab. Tabanan).

In this respect, it is very much appreciated if you could accept our study team and also arrange the said meetings (BAPPENAS at Jakarta and Bali Province, BAPPEDA Bali, BWS Bali, UPTD Bali, Balai Prasarana Permukiman Wilayah Bali, Kota Denpasar, Kab. Badung, Kab. Gianyar, Kab. Tabanan and 4 PDAMs BUMD (Kota Denpasar, Kab. Badung, Kab. Gianyar, Kab. Tabanan) in Bali also necessary field visits with the related organizations according to the attached study schedule.

Thanking you in advance for your courtesy,

Sincerely yours,

平若 勝

Masaru HIRAIWA
Deputy Assistant Minister for International Policy Planning
International Affairs Division
Minister's Secretariat
Ministry of Health, Labour and Welfare (MHLW)
Government of Japan

Ministry of Health, Labour and Welfare
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1-2-2, Kasumigaseki,
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Copy submitted to;

Kepala Direktorat Pengembangan SPAM, Cipta Karya, PUPR

Kepala Balai Prasarana Permukiman Wilayah Bali, PUPR

Kepala Subdit SPAM Wilayah III, DitSPAM, Cipta Karya, PUPR

Kepala Subdit Perencanaan Teknis, DitSPAM, Cipta Karya, PUPR

Embassy of Japan, Jakarta

JICA Office at Jakarta

Attachment List

1． Study Schedule

No.	Date		Schedule	Activity
1	10/14	Mon	Flight:Narita,Haneda→Jakarta	
2	10/15	Tue	DITPSPAM BAPPENAS	Kick-off Meeting(First at Jakrta) ・Indonesia's Effort for water supply ・Probability of introducing PPP Project ・Realization of Yen Loan
3	10/16	Wed	Japanese Embassy	Courtesy call with explanation of Outline of survey
			JICA Indonesia Office	ditto
			Flight:Jakarta→Denpasar	
4	10/17	Thu	Bali Province ・BAPPEDA ・Sakter	・Confirtmation of Progress of the FS2015 ・Acquisition of detailed information of MP ・Feasibility of PPP Scheme ・Support financial Competence of PDAM
5	10/18	Fri	Bali Province ・BWS ・UPTD	ditto
6	10/19	Sat		
7	10/20	Sun		
8	10/21	Mon	Related organization such as Bali Province and 4 PDAMs and etc,	Kick-off Meeting(First at Bali) ・Intoroduction purpose of the survey ・Request for cooperation ・Issue to be solved
9	10/22	Tue	PDAM Kota Denpasar	Data collection ・Current problem of water supply ・Buisiness Plan ・Trend of water charge revision ・Initiative reflected FS2017,Bali Province MS ・Non-revenue water countermeasure ・Organization,Institution ・Effort of increse water charge collection rasio ・Efficient publicity and public hearing ・Facility field trip
10	10/23	Wed	PDAM Kab. Badung	ditto
11	10/24	Thu	PDAM Kab. Tabanan	ditto
12	10/25	Fri	PDAM Kab. Gianyar	ditto
13	10/26	Sat		
14	10/27	Sun		
15	10/28	Mon	Bali Province	Report of Outline of survey
				Future coorperation for full scale FS
16	10/29	Tue	Aditional Information Collection	
17	10/30	Wed	Related organization such as Bali Province and 4 PDAMs and etc,	Wrap up Meeting(Second at Bali) ・Report of Outline of survey ・Future coorperation for full scale FS ・Signing of MM
			Flight:Denpasar → Jakarta	
18	10/31	Thu	DITPSPAM BAPPENAS	Wrap up Meeting(Second at Jakarta) ・Report of Outline of survey ・Future coorperation for full scale FS
19	11/1	Fri	Japanese Embassy	Report of Outline of survey
			JICA Indonesia Office	ditto
			Flight:Jakarta → Haneda,Narita	
20	11/2	Sat	Haneda,Narita	

2. Member list

2.1. Official Adviser

Name	Position, Affiliation
Mr. Ryuichi Morishita	Assistant Director, Office of Global Health Cooperation International Affairs Division Minister's Secretariat Ministry of Health, Labour and Welfare

2.2. Member of Study Team

Name	Position, Affiliation
Mr. Osamu Nakagome (Team Leader)	General Manager, Water Supply Department, Overseas Office Sansui Consultants Co., Ltd.
Dr. Shigeru Sugawara (Liaison-Networking Coordination)	Director for Safe Drinking-water, International Cooperation and Training Department Japan International Corporation of Welfare Services (JICWELS)
Ms. Hiroko Kamata (Guidance for Water Supply Planning)	Chief Engineer, Water Supply Department, Overseas Office Sansui Consultants Co., Ltd.
Mr. Hiroyuki Kojima (Coordinator)	Staff, Overseas Office Sansui Consultants Co., Ltd.

5 Agreement with BPPW and PUPR

MINUTES OF MEETING
BETWEEN
JAPANESE SIDE
(Ministry of Health, Labour and Welfare Japanese Government, Study Team)
AND
THE MINISTRY OF , DEPARTMENT OF

ON
COOPERATION
FOR
IMPROVEMENT OF F/S FOR WATER SUPPLY SYSTEM DEVELOPMENT IN SOUTHERN BALI AREA
(SPAM AYUNG PROJECT)

Japanese side, headed by Mr. Osamu NAKAGOME (hereinafter referred to as "the Team") and headed by Ida Ayu Mira as Technical Staff of Bali Settlement Infrastructure Center (BPPW) and Luh Putu Nia Arisantini Sudibia as Head of sub division of Public Works Infrastructure, Infrastructure & Region division, Bappeda Research and Development, (hereinafter referred to as "the Attendees of the Meeting") have fully discussed on the matter from 23 October to 30 February 2019.

1. The Fact

1.1 At the Kick Off Meeting on 23rd of October

Japanese Study Team explained what they would like to do for SPAM Ayun Project: Japanese Anti-Seismic (Earthquake) Technology with STEP Loan (0.1% interest rate) . And suggested full Scale of FS of the Project.

→ Indonesian side want to know more about the Technology. MHLW is planning seminar in February,2020 (It was requested by DG of Cipta Karya (Dr. Ir. Danis Hidayat Sumadilaga)

1.2 The Situation of SPAM Ayung Project.

1. The Project is still open for everybody and many possibilities
2. The authority of SPAM regional Ayung is under Bali Province. Directorate General of Human Settlement role is facilitating the implement project in technical term. Especially if the project proposed by Bali province in order to be implemented through central budget. At this moment, there is no official commitment related to financial scheme.
3. Water supply project is high priority project in Bali Province.
4. In southern Bali area, there are several regional SPAMs. Therefore the MP should be reviewed so that there will not be any contradiction between the projects.
5. The financing aspect for loan is under authority of Bappenas and MOF. It needs further review FS to decide the financial scheme.
6. If the project will be funded by loan, the procedure is that the province Government propose to the Ministry of Public Works and Housing through Planning and Foreign Cooperation Bureau.

And then will be forwarded to Bappenas. Bappenas and MOF will decide whether the funding will come from the local budget, national budget or from external funding. If the source of budget came from loan, then it has to be listed in Bluebook.

7. Sidan Dam construction will be finished in 2021. So, Water Supply Facilities have to be constructed、before starting the project, it needs impounding test for durability for one year.
8. To implement Spam Project, MOU is needed among Central Government, Province, City and District. There are no MOU for Spam Ayung at the moment.
9. Currently, there is a rule regarding retribution of groundwater usage. But there is no policy of usage limitation. This is one of the reason, large water users such as Hotels do not buy PDAM water.

As a result of discussions, both sides came to understanding concerning the matters referred to as below

2. Mutual Understandings (Conclusions)

1. All attendants agreed about the facts No.1 to No.9
2. All attendants consider to review the SPAM Regional Projects MP in Bali Province. Also we are interested in utilization of the JICA scheme for this study.
3. If the Indonesian side interested in Japanese Anti Seismic Technology for Water Supply System, Japanese ODA Loan (STEP Loan) is considerable. However, regarding the SPAM Ayung Project still needs further discussion among the related organizations.

Bali, 30 October 2019

Osamu NAKAGOME (Leader of the Team) Director Overseas Office SANSUI CONSULTANTS CO., LTD.	1. Ida Ayu Mira **Technical Staff of Bali Settlement Infrastructure Center (BPPW)** 2. **Luh Putu Nia Arisantini Sudibia** **Head of sub division of Public Works Infrastructure, Infrastructure & Region division, Bappeda Research and Development**

6 Table of Terms and Conditions of Yen Loan

Terms and Conditions of Japanese ODA Loans
(Effective from October 1, 2019)

Category	GNI Per Capita (2017)	Terms	Fixed/Floating	Standard/Option	Interest Rate (%)	Repayment Period (years)	Grace Period (years)	Conditions for Procurement
Low-Income Least Developed Countries [1] (- US$ 995)					0.01	40	10	Untied
Least Developed Countries or Low-Income-Countries (- US$ 995)		STEP [2, same as below]	Fixed	Standard	0.10	40	12	Tied
		Preferential Terms for High Specification [3,same as below]	Fixed	Standard	0.25	30	10	Untied
				Option1	0.20	25	7	
				Option2	0.15	20	6	
				Option3	0.10	15	5	
		Preferential Terms [4, same as below]	Floating [5, same as below]	Longer option	¥ LIBOR+35bp	40	12	
				Standard	¥ LIBOR+25bp	30	10	
				Option1	¥ LIBOR+20bp	25	7	
				Option2	¥ LIBOR+15bp	20	6	
				Option3	¥ LIBOR+10bp	15	5	
			Fixed	Standard	0.55	30	10	
				Option1	0.45	25	7	
				Option2	0.30	20	6	
				Option3	0.15	15	5	
		General Terms	Floating	Longer option	¥ LIBOR+45bp	40	12	
				Standard	¥ LIBOR+35bp	30	10	
				Option1	¥ LIBOR+30bp	25	7	
				Option2	¥ LIBOR+25bp	20	6	
				Option3	¥ LIBOR+20bp	15	5	
			Fixed	Standard	0.65	30	10	
				Option1	0.55	25	7	
				Option2	0.40	20	6	
				Option3	0.25	15	5	
Lower-Middle-Income Countries	US$ 996 - US$ 3,895	STEP	Fixed	Standard	0.10	40	12	Tied
		Preferential Terms for High Specification	Fixed	Standard	0.50	30	10	Untied
				Option1	0.45	25	7	
				Option2	0.40	20	6	
				Option3	0.35	15	5	
		Preferential Terms	Floating	Longer option	¥ LIBOR+85bp	40	12	
				Standard	¥ LIBOR+65bp	30	10	
				Option1	¥ LIBOR+55bp	25	7	
				Option2	¥ LIBOR+45bp	20	6	
				Option3	¥ LIBOR+35bp	15	5	
			Fixed	Standard	0.95	30	10	
				Option1	0.80	25	7	
				Option2	0.60	20	6	
				Option3	0.40	15	5	
		General Terms	Floating	Longer option	¥ LIBOR+105bp	40	12	
				Standard	¥ LIBOR+85bp	30	10	
				Option1	¥ LIBOR+75bp	25	7	
				Option2	¥ LIBOR+65bp	20	6	
				Option3	¥ LIBOR+55bp	15	5	
			Fixed	Standard	1.15	30	10	
				Option1	1.00	25	7	
				Option2	0.80	20	6	
				Option3	0.60	15	5	
Upper Middle Income Countries and Uppermost-Middle-Income Countries	US$ 3,896 -	Preferential Terms for High Specification	Fixed	Standard	0.70	30	10	Untied
				Option1	0.65	25	7	
				Option2	0.60	20	6	
				Option3	0.55	15	5	
		Preferential Terms	Floating	Longer option	¥ LIBOR+105bp	40	12	
				Standard	¥ LIBOR+85bp	30	10	
				Option1	¥ LIBOR+75bp	25	7	
				Option2	¥ LIBOR+65bp	20	6	
				Option3	¥ LIBOR+55bp	15	5	
			Fixed	Standard	1.15	30	10	
				Option1	1.00	25	7	
				Option2	0.80	20	6	
				Option3	0.60	15	5	
		General Terms	Floating	Longer option	¥ LIBOR+125bp	40	12	
				Standard	¥ LIBOR+105bp	30	10	
				Option1	¥ LIBOR+95bp	25	7	
				Option2	¥ LIBOR+85bp	20	6	
				Option3	¥ LIBOR+75bp	15	5	
			Fixed	Standard	1.35	30	10	
				Option1	1.20	25	7	
				Option2	1.00	20	6	
				Option3	0.80	15	5	
Consulting Services		For consulting services, the interest rate will be minimal (0.01%) and the repayment, grace periods and conditions for procurement will be the same as those for main components.						
Options for Program Type Japanese ODA Loan		In case of co-financing, it is possible to apply the same repayment terms as co-financer's lending while maintaining the concessionality of Yen loans.						

[1] For Low-Income LDCs, the term and condition of 0.01% interest rate and 40-year repayment period including 10-year grace period are applied, irrespective of sectors and fields. Three-year transition period will be granted to recipient countries that will move from the category of Low-Income LDCs, and, during the period, the terms and conditions for Low-Income LDCs will be applied to the projects of the countries.

[2] Special Terms for Economic Partnership (STEP) is extended to the projects for which Japanese technologies and know-how are substantially utilized, based on the recipient countries' request to utilize and transfer excellent technologies of Japan. Countries (except LDCs), which are eligible for tied aid under Arrangement on Officially Supported Export Credits issued by OECD, are eligible for STEP terms.

[3] Preferential Terms for High Specification will be applicable to projects promoting quality infrastructure.The applicability of the terms will be decided on a case-by-case basis.

[4] Preferential Terms are applied to the following sectors and fields:
(i) Issues on Global Environmental and Climate Change
(ii) Health and Medical Care and Services
(iii) Disaster Prevention and Reduction
(iv) Human Resource Development

[5] The base rate of floating rate is the value of the 6-month Japanese Yen LIBOR, and the fixed spread remains constant over the life of the loan. If the base rate plus fixed spread is lower than 0.1%, the interest shall be 0.1%.

Irrespective of the income category, the term and condition of 0.01% interest rate and 40-year repayment period including 10-year grace period are applied to projects assisting recoveries from disasters, including Stand-by Emergency Credit for Urgent Recovery (SECURE). For Stand-by Emergency Credit for Urgent Recovery (SECURE), the term and condition of 20-year repayment period including 6-year grace period, or 15-year repayment period including 5-year grace period are also available, in order to apply Currency Conversion Option.

[7] For Contingent Credit Enhancement Facility for PPP Infrastructure Development (CCEF-PPP), only floating rate will be applied irrespective of income category. The terms on conditions are individually set within the following range of interest rate as well as repayment period (In the case of short term financial support, however, the repayment period is 10 years).
-Interest rate: ¥ LIBOR + 30 ～50bp
-Repayment period: maximum 40-year(maximum 30-year drawdown period plus 10 year)

Notes

・For countries complying with ongoing IMF-supported programs or receiving grants from IDA, it is possible to modify the terms and conditions of the ODA Loans so as to meet the IMF's concessionality criteria.
・For General terms and Preferential terms, fixed rate for all countries (except Low-Income LDCs) will be revised on a regular basis so that its concessionality will be equal to that of floating rate.
・For Upper-Middle-Income Countries and Uppermost-Middle-Income Countries, floating rate will be applied in principle, although fixed rate could be applied.