

SYNOPSIS

The Comprehensive Study on Water Resources Development and Management in Bali Province in the Republic of Indonesia

Study Period: September 2004 – June 2006

Recipient Agency: Public Works Services Office, Bali Province
Directorate General of Water Resources, Ministry of Public Works

1 BACKGROUND TO THE STUDY

Bali is one of the leading international tourist spots in Asia, and its local economy is based upon tourism, being followed by agriculture centering on paddy cultivation and so on. However, due to the slow development of social infrastructure related to water resources, Bali is faced with such issues on water sector as water shortages, flood damage and river water pollution. These are hindering sustainable development of the local economy.

Moreover, in Indonesia, structural reform of the water resources sector is being advanced, and a new water resources law has been established in accordance with the principle of democracy, decentralization and transparency. Nowadays, the provinces and cities/regencies have been taking the initiative in implementing water resources development and management. For this purpose, it is necessary to compile master plans of comprehensive water resources development and management in units of river basin areas.

2 OBJECTIVES OF THE STUDY

The Study is being implemented to realize the following objectives, intending to achieve the sustainable development of local society and economy through the stable supply of safe water and reduction of flood damage:

- ◆ To compile a master plan of comprehensive water resources development and management in Bali Province up to the target year of 2025;
- ◆ To implement a feasibility study for priority projects selected in the master plan; and
- ◆ To implement technology transfer concerning comprehensive water resources development and management to the Indonesian counterparts through direct participation to the Study and training programs.

3 WATER DEMAND AND POTENTIAL

3.1 Future Socio-Economic Framework

Based on the current spatial plan of Bali Province and statistical data on socio-economy, future socio-economic framework for Master Plan was set as follows:

- 1) **Population:** Future population is estimated at 4,139 thousand in 2025, considering trend projection and development projection.
- 2) **Manufacturing Industry:** Economic growth rates until 2025 were calculated and industrial output in 2025 is estimated at Rp. 6,499 billion.
- 3) **Tourism:** Necessary hotel rooms were estimated at 38,100 rooms based on statistical data.

3.2 Water Balance between Demand and Potential

According to the balance between water resources potential and water demand in Bali Province shown in Table-1, the following water balance could be found in the future in Bali:

- ◆ Remaining potential in Denpasar City is limited and become less than its demand in 2025 of the target year.
- ◆ Integrated water resources development is essential for Denpasar, Badung and Gianyar since

demands are large, these three regencies form one economic block, and water resources in their territories are limited.

- ◆ Since other regencies have much water potentials, water resources in their own territory can be developed in stages to meet demand growth.

Table-1 Water Deficit and Remaining Potential in 2025

Denpasar	Deficit (PWS)	xx xx xx xx xx	xx xx xxx	1,690				
	Remaining Potential	-1,469						
Badung	Deficit (PWS)	xx xx xx xx xx xx		1,243				
	Remaining Potential	-2,833						
Gianyar	Deficit (PWS)	xx xx xx	550					
	Remaining Potential	00 00 00 00	779					
Tabanan	Deficit (PWS)	xxx	314					
	Remaining Potential	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	3,009			
Klungkung	Deficit (PWS)	x	48					
	Remaining Potential	00 00 00 00	809					
Jembrana	Deficit (PWS)	xxx	256					
	Remaining Potential	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00 00 00	4,640	
Buleleng	Deficit (PWS)	xx xxx	465					
	Remaining Potential	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00	7,756	00 00
Bangli	Deficit (PWS)	xx	167					
	Remaining Potential	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00	6,939	00 00
Karangasem	Deficit (PWS)	xxx	302					
	Remaining Potential	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00 00 00 00 00	00	14,340	00 00
REGENCY	UnitLit/s		1,000	2,000	3,000	4,000	5,000	

PWS: Public Water Supply

Remaining Potential: Sum of drought discharges (95% flow) of rivers which areas are 10km² and more

4 OUTLINE OF MASTER PLAN

4.1 Basic Concept of Master Plan

Vision and missions of water resources development in Bali Province are as follows:

Vision: Water resources is a component that forms identity of culture and development power of Bali People based on the philosophy of “Tri Hita Karana”.

Missions: 1) Improvement of water use, 2) Increase of food production, 3) Relief and improvement of eco-system, 4) Maintenance of identity of Bali cultures

In order to achieve above vision and missions, the following basic policies were set for Master Plan.

- ◆ Compliance with the New Water Resources Law
- ◆ Concept of “One basin (island), One plan, One management”
- ◆ Respect of Subak in water resources development and management
- ◆ Community participation in formulation process
- ◆ Prompt water resources development & allocation

4.2 Proposed Projects and Programs

The proposed projects and programs for water resources development and management and their implementation schedules are summarized in Table-2. Total project cost is estimated as Rp. 3.8 trillion (JPY 43.9 billion). Price level as average of May 2004 - April 2005, US\$1.00 = RP9,260 = ¥106.97.

Table- 2 Proposed Project and Program in Master Plan

Projects	(1)	(2)	(3)	(4)
	2006 - 2010	2011 - 2015	2016 - 2020	2021 - 2025
1. WATER RESOURCES DEVELOPMENT				
◆ Integrated Water Resources Development Projects				
➢ AYUNG Reservoir				
➢ BENEL Reservoir				
◆ Water Supply Projects				
➢ Water Supply for DENPASAR Metropolitan Area				
➢ Water Treatment (WARIBANG-2): DENPASAR				
➢ Water Treatment (BENEL): JEMBRANA				
➢ Water Supply – Well: Related Regencies				
➢ Water Supply – Spring : Related Regencies				
◆ Flood / Sediment Control Projects				
➢ BADUN/MATI River Flood Control				
➢ Flood Control for NEGARA Area				
➢ Flood Control for SINGRAJA Area				
➢ Flood / Sediment Control: Related Regencies				
◆ Irrigation Projects				
➢ Irrigation Improvement (from AYUNG Reservoir)				
➢ Irrigation Improvement (from BENEL Reservoir)				
➢ Irrigation Improvement: Related Regencies				
2. WATER RESOURCES MANAGEMENT				
◆ Institutional Reform				
➢ Establishment of DINAS-PSDA				
➢ Establishment of BALAI-PSDA				
➢ Establishment of W/R Coordination Council				
➢ Establishment of SEDAHAAN A. & SUBAK Coordination Unit				
➢ Preparation of Regulations & Guidelines for New WR Law				
◆ Water Environment Improvement				
➢ Public Education and Campaign				
➢ Environmental Flow for BADUN & MATI Rivers				
◆ River Basin Conservation				
➢ Forest and Land Rehabilitation				
➢ Sediment Control (Included in Flood Control)				
➢ Coastal Protection for Related Areas				
◆ Capacity Building Program				
➢ Personnel Assignment				
➢ Capacity Building Support for BALAI-PSDA				

4.3 Project Evaluation

(1) Technical Evaluation

The Master Plan is assessed to be technically feasible as results. However, the plan should be reviewed and changed if necessary according to the change of socio-economic conditions and accumulated collection of data.

(2) Economic and Financial Evaluation

Economic evaluation is conducted on the priority projects. For the economic evaluation, 12% of opportunity cost of capital and 30 years of evaluation time horizon is applied. The result of economic evaluation is summarized in Table-3 and Table-4.

Table-3 Result of Economic Evaluation

Items	Multipurpose Ayung Dam Project	Water Supply Project for Southern Area of Bali
EIRR	12.2 %	12.3 %

Source: Study Team

Table-4 Annual Average Benefit on Flood Damage Reduction

Item	Badung River Basin	Mati River Basin	Total
Annual Average Benefit	Rp.2.8billion	Rp.7.0billion	Rp.9.8billion

Source: Study Team

Comparing financial project costs and revenue of the Provincial Government, financing of central government loan and/or foreign soft loan would be inevitable in implementing the projects.

(3) Environmental and Social Evaluation

It is assessed that potential adverse effects on natural environment are considered as manageable and insignificant. However, AMDAL must be carried out before implementation of Ayung Dam project and Denpasar metropolitan water supply project.

The Master Plan was formulated with intensive dialogue with stakeholders through stakeholders meetings which held 22 times and opinions of stakeholders are fully reflected to the Master Plan.

5 OUTLINE OF THE FEASIBILITY STUDY

(1) Outline of the Project

The proposed projects consist of 1) Ayung Multipurpose Dam, 2) Southern Bali Water Supply (east, central, and west systems), and 3) Badung & Mati River Improvements. Capacity development support program for establishment of DINAS-PSDA and BALAI-PSDA is also included in conjunction with O/M plan for Ayung Multipurpose Dam and Southern Bali Water Supply. Project components and contents are summarized in Table-5, and their locations are shown in Figure-1.

Total project cost is estimated as Rp. 1.7 trillion (¥ 19.4 billion), consisting of Rp. 1.1 trillion for Ayung Multipurpose Dam, Rp. 0.48 trillion for Southern Bali Water Supply, and Rp. 0.14 trillion for Badung & Mati River Improvements. Price level as average in 2005, US\$ 1 = Rp. 9,750 = ¥ 110.74.

Table-5 Proposed Priority Projects

Project Component/Objectives	Project Location/Main Facilities and Works
<u>Multipurpose Ayung Dam</u> Development of Municipal Water, Hydraulic Power Generation, Irrigation, River Environment Maintenance	About 3km at down stream area from confluence of Ayung River and the tributary Siap Rive (Location name is Buaganga, near the regency boundary between Badung regency and Gianyar regency.): Main Dam, Spillway, Check Dam and Hydraulic Power Generation Facilities
<u>Water Supply (Western System))</u> Supply of Municipal Water (North Kuta district of Badung regency)	Weir and Treatment Plant: about 1km down stream from the confluence of Sungai river and Penet river (about 2kmupstream of river mouth) Intake Facilities: between Cemagi and Krobokan
<u>Water Supply (Central System)</u> Supply of Municipal Water (Denpasar City and South Kuta districts of Badung regency)	Weir and Treatment Plant : Existing Ayung River Treatment Plant
<u>Water Supply (Eastern System)</u> Supply of Municipal Water (Southern districts of Gianyar regency, and North Kuta district of Badung regency)	Weir and Treatment Plant: intersection of Petanu river and by-pass road (about 1km from river mouth) Intake Facilities: from Petanu river to Kuta district (Tuban) along the by-pass road
<u>Badung River Improvement for Damage Protection of Flood</u>	Middle stream area of Badung river: Riverbed excavation and bank heightening, etc
<u>Mati River Improvement for Damage Protection of Flood</u>	Middle stream area of Mati river: Banking, widening, etc of non-improved section, and conservation of retarding basin

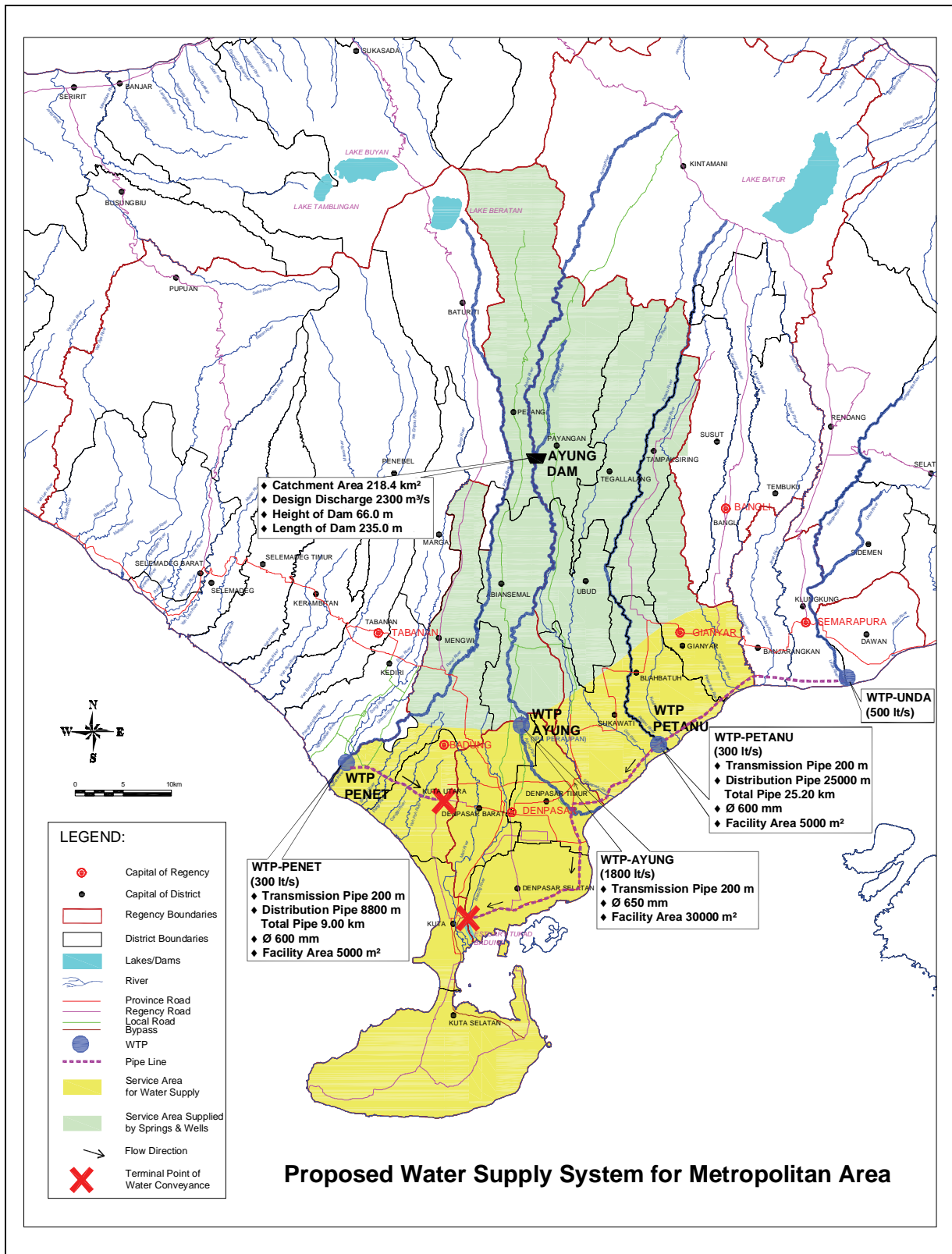


Figure-1 Locations of Proposed Priority Projects

5.2 Project Evaluation

(1) Technical Evaluation

Social and environmental conditions are fully considered in the planning and design such as setting the development capacity considering water rights downstream, examination of possibility quarry sites in Bali Island. Therefore, it is assessed to be technically feasible.

(2) Economic and Financial Evaluation

The economic evaluation is analyzed based on all data previously mentioned, and the results of the evaluation of water resources development projects (Multipurpose Ayung Dam Project and Water Supply Project for Southern Area of Bali), and Flood Control Project of Badung and Mati Rivers are presented in Table-6 and Table-7, respectively. EIRR of projects exceed 12% of opportunity cost of capital, and the projects are judged to be economically feasible.

Table-6 Result of Economic Evaluation of the Water Resources Development Projects

Items	Multipurpose Ayung Dam Project	Water Supply Project for Southern Area of Bali
EIRR	14.0%(14.2%)	12.5%

Source: Study Team

Note : () shows EIRR in case of including CDM benefit

Table-7 Annual Average Benefit on Flood Damage Reduction and EIRR

Item	Annual Average Benefit on Flood Damage Reduction			EIRR
	Year 2005	Year 2015	Year 2025	
Badung + Mati	Rp.15.5bi.	Rp.18.9bi.	Rp.20.8bi.	15.0%

Source: Study Team

(3) Environmental and Social Evaluation

According to the stakeholders meeting held in the Feasibility Study stage, proposed projects are welcomed by residents and prompt implementation is expected. However, some issues such as treat of holy places/springs, and compensation must be settled for implementation of Ayung Multipurpose Dam project. Endangered species does not exist in the projects sites. Other potential adverse effects on natural environment are considered as manageable and insignificant.

6 RECOMMENDATIONS

(1) Implementation of Projects Proposed in Master Plan

The Master Plan proposes the reasonable plans on the basis of the socio-economic framework up to the year of 2025 projected by the Study Team considering the existing plans and projection discussed in the latest Bali Spatial Plan.

The Master Plan prepared in such process proposes to solve or minimize water issues at present and in future. That is why the Master is useful and important plans to Bali people. It is very important to implement securely the plans or projects proposed in the Master Plan.

(2) Water Resources Development

The water resources are limited, effective water use (or appropriate water demand control) shall be employed. Water supply companies (PDAM) to supply water to the users shall take the following demand control methods:

- Leakage Management
- Reuse and Save Water
- Water Use Regulation

The Master Plan also discusses the water supply plans for the remote and isolated area. These plans will be sustainable if the construction is implemented with public investment (or subsidy), and users maintain the system by themselves.

(3) Water Resources Management

Water resources management plan discusses the institutional plans, water quality improvement plans, river basin conservation plans, database for water resources management and capacity building program.

The water resources database prepared in the Master Plan shall be used for the water resources

management. New observed data and information will be stored in this GIS. This system is able to be used for planning of water supply.

(4) Implementation of Priority Projects

Regarding the priority projects selected in the Master Plan the feasibility study was conducted. These projects will contribute greatly to the solution of water supply, irrigation, power generation and flood in the southern Bali areas. Urgent implementation of the projects is necessary. As EIRR of the projects are over 12%: Opportunity Cost of Capital – Indonesia, the projects are economically feasible. From the aspects of environment and social consideration, the feasibility of the projects is confirmed.

Before the implementation of the priority projects, the following matters shall be considered and conducted by the Government of Bali Province without fail:

- AMDAL – Regal Environmental Impact Assesment
- Monitoring of Water Demands
- Socialization of the Priority Projects
- Clarification of Current Water Right in Term of Discharge

As the cost of the projects is large, it is hard for the Bali Provincial Government to implement the project by himself due to the financial reason. It is recommendable that the central government gives financial assistant to the projects by employing the foreign soft loan.

(5) Disclosure of Information

To disclose more information on the Master Plan and the priority projects, it is recommendable to put the Study results in the Bali Government Homepage.

PART-I
STUDY OPERATION

CHAPTER 1 OUTLINE OF STUDY

1.1 Background to the Study

Bali is one of the leading tourist resorts in Asia, and its local economy is based on tourism, followed by agriculture centering on paddy cultivation and so on. However, due to the slow development of social infrastructure related to water resources, Bali is faced with such issues on water sector as, 1) water shortages, 2) flood damage, and 3) river water pollution. These are hindering sustainable development of the local economy.

Moreover, in Indonesia, structural reform of the water resources sector (WATSAL) is being advanced, and a new water resources law has been established in accordance with the principle of democracy, decentralization and transparency. Nowadays, the provinces and cities/regencies have been taking the initiative in implementing water resources development and management.

For this purpose, it is necessary to compile master plans of comprehensive water resources development and management in units of catchment areas. However, due to the lack of capability and experience in terms of organization and human resources, Bali Province issued a request to the Japanese Government for implementation of the master plan study.

In response to this, Japan International Cooperation Agency (JICA) was commissioned to dispatch the Preliminary Study Team in February 2004, and the Team held discussions and exchanged the signed S/W with the Directorate General of Water Resources (DGWR) under the Ministry of Public Works, and the Provincial Government of Bali for the study titled “the Comprehensive Study on Water Resources Development and Management in Bali Province” (the Study).

Finally, the team for the Study (the Study Team) was dispatched by JICA on the late September 2004 to conduct the Study.

1.2 Objectives of the Study

The Study is being implemented to realize the following objectives, intending to achieve the sustainable development of local society and economy through the stable supply of safe water and reduction of flood damage:

- ◆ Compile a master plan of comprehensive water resources development and management in Bali Province up to the target year of 2025;
- ◆ Implement a feasibility study for priority projects selected in the master plan; and
- ◆ Implement technology transfer concerning comprehensive water resources development and management to the Indonesian counterparts through direct participation to the Study and training programs.

1.3 Study Area

The Master Plan Study targets all Bali Province (5,632.86 km²) including the islands of Bali and Penida, while the feasibility study shall target the implementation sites of priority projects as well as the scope of effects and impacts. Refer to Figure-I.1.1.



Figure-I-1.1 Study Area

1.4 Study Schedule

The Study has commenced at September 22nd, 2004 and will finish 22 months later in June 2006. Table-I-1.1 indicates the Study phases, while Figure-I-1.2 shows the overall study implementation schedule.

Table-I-1.1 Study Phase

Fiscal Year	Study Phase	Study Period
2004/05	Preparation Works in Japan	September 2004
	Phase 1: Establishment of Framework for Water Resources Development and Management	September 2004 to March 2005
2005/06	Phase 2: Establishment of Master Plan for Water Resources Development and Management	May 2005 to July 2005
	Phase 3(1): Feasibility Study	October 2005 to March 2006
2006/07	Phase 3(2): Feasibility Study	May 2006 to July 2006

2004				2005									2006									
9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7
Phase 1				Phase 2									Phase 3									
Establishment of Framework for Water Resources Development and Management				Establishment of Master Plan for Water Resources Development and Management									Feasibility Study and Final Report Preparation									
▲				▲				▲				▲				▲				▲		▲
IC/R				P/R1			IT/R			P/R2			DF/R		F/R							
▲				▲				▲				▲				▲				▲		▲
SCM1				SCM2			SCM3			SCM4			SCM5		SCM6							
				▲				▲												▲		▲
1 st W/S				2 nd W/S					3 rd W/S													
▲				▲				▲				▲				▲				▲		
SHM1				SHM2			SHM3			SHM4			SHM5		SHM6							

Notes IC/R: Inception Report, P/R1: Progress Report (1), IT/R: Interim Report, P/R2: Progress Report (2), DF/R: Draft Final Report, SCM: Stirring Committee Meeting, W/S: Workshop, SHM: Stakeholder Meeting

Figure-I-1.2 Study Schedule

CHAPTER 2 STUDY ORGANIZATION AND OPERATION

2.1 Study Organization

The operating setup for the Study is as indicated in Figure-I-2.1. Steering Committee has organized by both Directorate General of Water Resources (DGWR), Ministry of Public Works and Department of Public Works, Government of Bali Province. Technical Committee has also organized chaired by I. Gusti Nyoman Sura Adnyana, MSc., Secretary for Steering Committee who calls for technical committee member out of the Counterpart Team and relevant organizations in accordance with necessity.

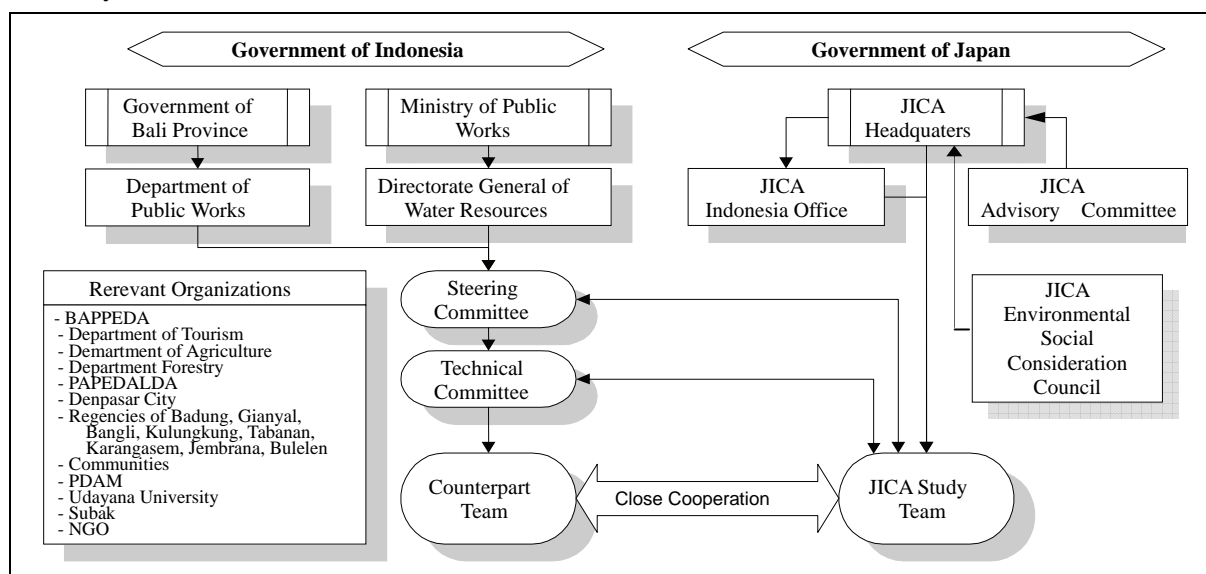


Figure-I-2.1 Study Organization

2.2 Main Meetings

The following main meetings shown in Table-I-2.1 were/will be held during the study period from September 22nd, 2004 to June, 2006.

Table-I-2.1 Main Meetings

Meeting	Date	Agenda
Preliminary SCM	October 5 th , 2004	Inception Report:
1 st TCM	October 1 st , 2004	
1 st SCM Denpasar	October 29 th , 2004	
1 st SCM in Jakarta	November 2 nd , 2004	
2 nd TCM	December 30 th , 2004	Study Progress
3 rd TCM	January 20 th , 2005	Study Progress
4 th TCM	February 25 th , 2005	Progress Report (1)
2 nd SCM	March 2 nd , 2005	Progress Report (1)
POLA Meeting	June 22 nd , 2005	Framework of Master Plan (Provincial Official Meeting on Water Master Plan)
5 th TCM	June 28 th , 2005	Alternative Plans and Programs for Water Master Plan
6 th TCM	July 11 th , 2005	Promising Alternative Plans and Programs for Water Master Plan
7 th TCM	August 1 st , 2005	Interim Report
3 rd SCM	August 2 nd , 2005	Interim Report
4 th SCM	October 28 th , 2005	Study Plan of Feasibility Study
8 th TCM	December 27 th , 2005	Progress Report (2)
5 th SCM	December 28 th , 2005	Progress Report (2)
9 th TCM	June, 2006	Draft Final Report
6 th SCM	June, 2006	Draft Final Report

Note) SCM: Steering Committee Meeting, TCM: Technical Committee Meeting

2.3 Workshop

The workshops are staged 3 times during the Study period in order to disclose information regarding the Study findings and to build consensus of public to the Study result.

The first workshop was staged on March 3rd, 2005 to open to the public the draft of the framework of the Master Plan for the water resources development and management, which was formulated by the JICA Study Team and Public Works service of Bali Province.

In the workshop, the Study findings in Phase 1 and the framework of the master plan were explained according to the program shown in Table-I-2.2. The number of attendants was about 150 consisting of government officials including central, university officials and stakeholders such as SUBAK, communities and NGOs.

Table-I-2.2 Program of the First Workshop

Schedule	Program	Organization in charge
AM	1. Opening remarks	Bali Province
	2. Philosophy of New Water Resources Law –Application to Bali	Ministry of Public Works
	3. Water Resources Development and Management in Bali Province	Bali Province
	4. Water Demand and Potential in Bali Province – Water Balance	JICA Study Team
PM	5. Balinese Society, Laws and Institutions on Water Resources	JICA Study Team
	6. Framework of Water Resources Master Plan in Bali Province	JICA Study Team
	7. Closing Remarks	Steering Committee
Place	Denpasar City	

The second workshop was held on August 3rd, 2005 to explain the master plan and priority project for the feasibility study. Besides, some contemporary measures to water resources issues were also introduced. Program of second workshop is shown in Table-I-2.3.

Table-I-2.3 Program of the Second Workshop

Schedule	Program	Organization in charge
AM	1. Opening remarks	Bali Province
	2. Master Plan of Water Resources Development and Management	JICA Study Team
	3. Dam Surrounding Area Development	JICA Advisory Committee
	4. River Environment Improvement Measures	JICA Expert
	5. Movement on Water Resources Management in Indonesia	Ministry of Public Works
	6. Institutional Reform for Water Resources Management	Bali Province
	7. Closing Remarks	Steering Committee
Place	Denpasar City	

The third workshop will be held on June 7th 2006 to explain the result of the Study including Master Plan and Feasibility Study with emphasizing integrated water resources management. Program of second workshop is shown in Table-I-2.4.

Table-I-2.4 Program of the Third Workshop

Schedule	Program	Organization in charge
AM	1. Opening remarks	Bali Province
	2. Master Plan of Water Resources Development and Management	JICA Study Team
	3. Effective Approaches for Water Resources Sector	JICA Advisory Committee
	4. Institutional Reform for Water Resources Management	JICA Study Team
	5. Closing Remarks	Bali Province
Place	Denpasar City (number of attendants: 150 expected)	

2.4 Sub-contracted Surveys

The surveys as shown in Table-I-2.5 were conducted during the whole study period. Above The results of sub-contracted surveys were fully utilized in the study and design as discussed in relevant chapters. In this chapter, purposes and contents of these surveys are briefly described.

Table-I-2.5 Sub-contracted Surveys

No.	Phase	Survey	Term
1	I	Survey on Flooding, Inundation and Sediment Disasters	Nov. 2004 – 2months
2		Inventory Survey of Water Management Facilities	Nov. 2004 – 2 months
3		Constructions of GIS Database	Nov. 2004 – 3.5 months
4		Survey on River Discharge	Nov. 2004 – 4 months
5		Water Quality Survey (1)	Nov. 2004 – 2 months
6	II	Social Survey (1)	Jun. 2005 – 40 days
7	III	River Longitudinal and Cross-Sectional Survey	Dec. 2005 – 1 month
8		Social Survey (2)	Dec. 2005 – 2 months
9		Survey for Water Conveyance Plan	Dec. 2005 – 40 days
10		Survey for Dam Plan	Dec. 2005 – 30 days
11		Water Quality Survey (2)	Nov. 2005 – 1 month
12		Environmental Impact Assessment Survey	Dec. 2005 – 2.5 months

(1) Survey on Flooding, Inundation and Sediment Disasters

The data/information to be collected is associated with 1) flood and 2) sediment related disaster such as debris/mud flow, slope failure and landslide. The data collection needs to identify disasters in the last twenty (20) years in general, but large disasters should be included even if they happened before over 20 years. Finally the inventory of flood and sediment disasters shall be prepared.

Based on the data collection, 10 major sites among the disasters listed in the inventory survey shall be selected in the Bali Province and the site survey shall be conducted at each site. Main purposes of the site survey are to confirm disaster conditions, such as area, depth, land level, damages and so on.

(2) Inventory Survey of Water Management Facilities

Inventory survey based on collection of information and materials from the Bali provincial government and related agencies shall be carried out on water management facilities over the whole of Bali Province, in order to clarify the particulars, objectives and intake quantities, etc. of water management facilities. In addition, current conditions of use and maintenance shall be verified by means of field reconnaissance.

(3) Constructions of GIS Database

GIS database consists of the two types, which are MapInfo file format and Microsoft Access format. The construction of GIS database shall include digitization/inputting of data to be provided mainly by the JICA Study Team, and programming to link “Access” database.

(4) Survey on River Discharge

Bali Province has relatively abundant, and fifty five (55) water level and flow observation stations; however, a survey for water level and flow was implemented in Ayung and Unda River upon confirming the state of these existing observation facilities. Basic quantities and specifications of water level and flow observations are as indicated in Table-I-2.6.

Table-I-2.6 Quantities and Specifications of Water Level and Flow Observations

Item	Unit	Amount	Remarks
Cross section survey at observation stations	Section	2	New observation stations
Installation of Staff Gauges	place	2	New observation stations
Water level observation	day	240	120day×2rivers、 2times/day
Discharge observation (low flow)	time	16	2times/month×4months×2rivers
Discharge observation (flood flow)	time	10	5times/river×2rivers

(5) Water Quality Survey (1)

The work site covered the inland water bodies (surface waters of rivers, lakes, reservoirs and ponds, groundwater and spring water) of the entire Bali Island (Bali Province) including the Nusa Penida Island and hence covers all 8 Kabupatens (Regencies), namely, Badung, Gianyar, Klungkung, Bangili, Karangasem, Buleleng, Tabanan and Jembrana, and the Kotamadya (Municipality) Denpasar of the Bali Province. Parameters examined are shown in Table-I-2.7.

Table-I-2.7 Specifications of Water Quality Survey

Classification	Water Quality Parameter	Remarks
(a) Basic Items	Water Temperature, pH, EC, DO, BOD/COD, Total/Faecal coliform number, SS, TO, TN, Cl ⁻ , NO ₂ , NO ₃	The items of water temperature, pH, EC and DO is to be measured at site with a portable water quality equipment.
(b) Specific Items	Pb, Cu, Zn, Hg, Mn, Fe, As, Cd, Cr ⁶⁺ , CN	To identify the effect of industrial wastewater at the points of Denpasar City and Badung Regency.

(6) Social Survey (1)

Social Survey (1) was conducted in Phase 2 of the Study for the purpose of collection of data and information on social and environmental impacts of the proposed projects. The four areas targeted for alternative plans are as follows.

- ◆ Ayung River Basin: Ayung Dam Project
- ◆ Badung and Mati River Basin: Flood Control Project
- ◆ Unda River Basin: Gunakusa Estuary Dam
- ◆ Teragawaja River Basin: Water Resources Development for Karangasem Regency

Survey Items and Method are summarized in Table-I-2.8.

Table-I-2.8 Specifications of Summary Social Survey (1)

Survey Items	Method
- Living conditions (living level, main income sources, hygiene, etc.) - Possibility of public participation to O&M of facilities - Public consciousness (approval/opposite) - Behavior to coordination of water rights	- Interview survey through questionnaire that is to be prepared by the Study Team - Target area: 4 areas - 5 days per 1 target area - Number of sampling: 100 persons per area

(7) River Longitudinal and Cross-Sectional Survey

River Survey was conducted at 110 sections in Badung River between Jemb.JL.Kumba karna and Jemb.JL.P Batanta (approx. 4,930m) and 100 sections in Mati River between Bd.Gerak Umadui weir and Jemb.Plasa bridge (approx. 4,521m).

(8) Social Survey (2)

Social Survey (2) was conducted for the purpose of grasp people's opinions to the proposed priority projects and to reflect them to the plan and design as well as to grasp social conditions of the people affected by the proposed project. Sample ere targeted to land owners, poor groups, subak members and local residents around proposed sites.

(9) Survey for Water Conveyance Plan

The survey covered topographic survey and soil test for design of water treatment plant and conveyance systems. Topographic survey contains longitudinal leveling survey, cross section survey and plane table survey. Soil test composed of drilling should be performed for the purpose of obtaining geotechnical data concerning the foundation of water treatment plant and transmission pipe as well as water-pipe bridges, etc. Work items of topographic survey are as shown Table-I-2.9.

(10) Survey for Dam Plan

The survey covered topographic survey and geological survey. Topographic survey contained longitudinal profile survey (10 sections with total length of 3,650m) and river cross section survey (11 sections with total length of 5,275m). Geological investigation works composed of core drilling (5 boreholes with total depth of 480m) with testing for the purpose of obtaining geotechnical data about the sub-surface conditions of proposed Ayung dam and material sources.

Table-I-2.9 Specification of Topographic Survey

Work Items	Contents or Specifications
1. Route Survey for Transmission pipe (Longitudinal leveling & Cross Section)	1) Western System Planned WT Cemagi (Penet River)→Kerobokan WTP Distance 7.0Km Typical Interval 100m with width 20m along the existing road including both ends of bridges, related facilities, etc.
	2) Eastern System Planned WTP (Petanu River)→Badung River Mouth (IPA Estuary) Distance 22.0Km Typical Interval 100m with width 50m along the existing road along the existing bypass road including both ends of bridges and related facilities, etc
2. Plane Table Survey for Water Treatment Plant	1) Central System(Vicinity of Existing IPA Ayung I,II,III) Plane Table Survey 12 ha, Scale=1: 500
	2) Western System(Right bank side of Penet River) Survey Area: 2 ha, Scale=1: 500

(11) Water Quality Survey (2)

The work site covered the river reaches of feasibility project areas, namely, the flood control project sites of Badung (Denpasar area) and Mati (Kuta area) rivers with one sampling location for each river, the multipurpose Ayung dam project site with 3 sampling locations, raw water intake reaches of Ayung river for central region water supply project with 4 sampling locations, raw water intake reaches of Penet river for west region water supply project with 2 sampling locations, raw water intake river mouth reaches of Petanu river for east region water supply project with 2 sampling locations and Oos river downstream river mouth reach with one sampling location. Accordingly the total sampling locations spanning the target rivers were 14. Survey items were same as the Water Quality Survey (1).

(12) Environmental Impact Assessment Survey

To conduct EIA Study conforming to the relevant regulations of Indonesia for the planned feasibility projects of significant scales that are subjected to mandatory EIA study. Projects subjected to mandatory EIA study are stipulated by the Decree of the Minister of State for Environment No.17/2001 of Indonesia.

The objectives of EIA Study could be summed up as follows;

- ◆ To identify possible environmental impacts caused by implementation of the proposed significant priority projects
- ◆ To formulate necessary and practical environmental impact mitigation measures so as to minimize potential adverse environmental and social impacts including the formulation of required environmental management and monitoring programs to facilitate the implementation of formulated environmental mitigation measures,

Survey items are as follows.

- ◆ Review of available data and studies (including the existing Ayun Dam AMDAL of 2003)
- ◆ Study of AMDAL laws and regulations
- ◆ Biological environmental survey
- ◆ Social environmental survey
- ◆ Definition baseline environmental condition
- ◆ Identification of significant and important impacts according to the 3 projects
- ◆ Assessment of significant and important impacts
- ◆ Formulation of mitigation measures for significant and important adverse impacts

2.5 Stakeholders' Meeting

2.5.1 Introduction

In order that a development project properly functions and sustainable development would be achieved, participation of stakeholders to decision making is essential. In the JICA Guideline for Environmental and Social Considerations, indispensability of democratic decision making and participation of stakeholders in any project stages are clearly mentioned.

The government of Bali Province independently implements stakeholder' meetings and the Study Team supports them on the following manner; 1) Meeting preparation (attendants of stakeholders, meeting contents, meeting information, meeting place), 2) Meeting implementation (administration, presentation, consensus building, recording), 3) After meeting (preparation of record of discussion, disclosure of information). The Study Team monitors the meetings and evaluates the meetings together with the government of Bali Province, and gives feedback on the monitoring results for the next stakeholders' meetings.

2.5.2 First Stakeholders' Meetings

(1) Selection of Stakeholders and Meeting Locations

The first stakeholders' meetings were held with the following objectives.

- ◆ To gain the understandings of the Study contents from stakeholders
- ◆ To explain JICA Environmental and Social Consideration Guideline
- ◆ To gain the understandings of TOR of IEE (draft) from stakeholders
- ◆ To identify issues and needs of stakeholders relevant to water

In the JICA Guideline, stakeholders are divided in two categories with the definitions as follows.

- Local Stakeholders : affected individuals or groups including squatters and local NGOs
- Stakeholders : individuals or groups who have views about cooperation projects, including local stakeholders

Although a stakeholders' meeting is intended mainly for local stakeholders as objective groups, it is impossible to define objective groups in the early stage of the Study. Therefore, various stakeholders as shown in Table-I-2.10 were invited after the discussion between the Study Team and the Counterparts with consideration to representativeness of various stakeholders especially vulnerable groups. Invited NGO's are the ones which act in whole Bali Province with concerning environment, sanitation, education, and local community and agriculture development. It is noted that Hindu Council (*PHDI*) of each district and some priests were invited considering religious aspect related to water. The regencies' governments selected the representatives of district (*kecamatan*), village (*Desa-dinas*), traditional organizations such as *Desa-adat*, *Banjar* and *Subak*, and NGOs. Invitation procedure was taken by the Counterparts in cooperation with regencies governments.

Considering water demand and potential as well as participants' accessibility, the stakeholder meetings were held in October 2004 in Denpasar, Karangasem, Buleleng, Jembrana and Penida Island. Stakeholders in Bangli, Gianyar, Klungkung, Badung and Tabanan were invited to the meeting in Denpasar, however, only a few participants from Denpasar, Bangli, Gianyar and Badung attended the meeting. Therefore, extra meetings for these regencies were held in December, 2004. This was a help for local residents especially vulnerable groups to attend meetings easily.

Table-I-2.10 Invited Participants for First Stakeholders' Meetings

Category	Stakeholders
Representative of Residents	Head of District, Head of Village, Head of <i>Banjar</i> , Head of <i>Subak</i>
NGO	Bali Fokus: Environment and Sanitation Bali HESG: Education and Human Resources Development Pembangunan Bali Berkelanjutan: Environment Bakti Wahana Bali: Environment Swalokapala Abhikama 2001: Community and Agriculture Development WWF: Flola, Coast and Ocean Conservation
University	Udayana, UNTAB, IKIP Singaraja
Local Governments (Province & Regency)	Development & Economic Bureau, Development Planning Board (<i>Bappeda</i>), Public Works, Tourism, Agriculture, Revenue Office, Environment (<i>Bapedalda</i>), Culture, Forestry, Fishery, Industry, Animal Husbandry, Estate
Others	Hindu Council (<i>PHDI</i>), Gender Organization (<i>PKK</i>), Drinking Water Enterprise (<i>PDAM</i>), Temple Priests, Bottled Water Company, Industry Association, Restaurant/Hotel Association, Mass Media

Total number of attendants to the first stakeholders' meeting is 311 and attendants can be categorized as shown in Figure-I-2.2. It is noted that representatives of local community such as *Desa*, *Desa Adat* (Customary Village) and *Subak* have majority.

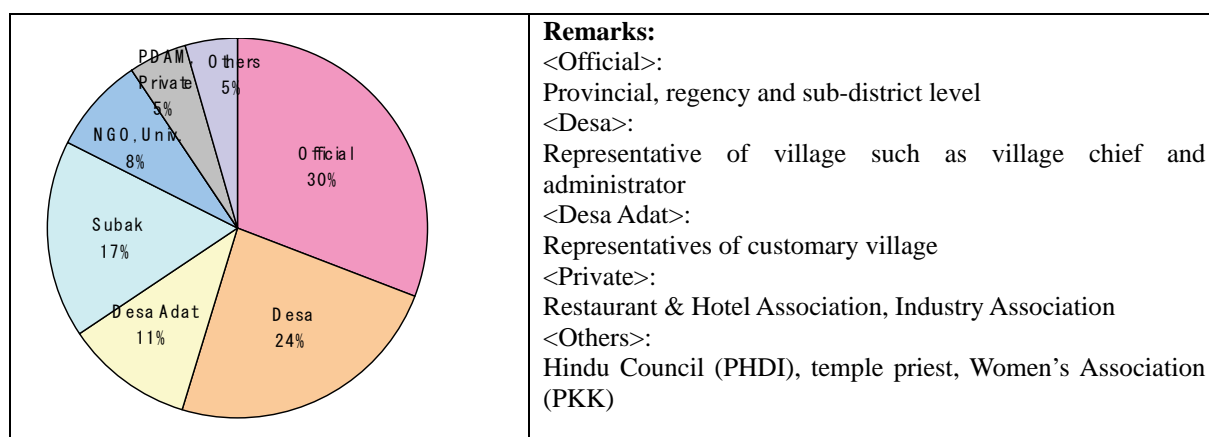


Figure-I-2.2 Proportion of Attendants (1st Stakeholders' Meetings)

(2) Agenda of the First Stakeholders' Meetings

The agenda of the first stakeholders' meetings were decided as shown in Table-I-2.11 based on the discussion between the Study Team and the Counterpart Team. After the plenary session (1), problem analysis was conducted with a form of a group meeting in order that stakeholders are able to frankly state their opinions, comments and suggestions.

Table-I-2.11 Agenda of First Stakeholders' Meetings

Program	Agenda	Contents
Plenary Session (1)	Introduction to the Study	Bali Province explains the Study contents such as objectives, schedule, main issues, strategy and implementation policies.
	JICA New Guideline on Environmental and Social Considerations	The Study Team explains the outline of JICA, JICA New Guideline on Environmental and Social Consideration, and status of a stakeholders' meeting in the JICA Guideline.
	TOR of IEE (draft)	Bali Province explains the purpose of IEE, activities to affect environment and environmental items to be considered.
	Q & A Session	Question and answer
	Briefing for Group Meeting	The Study Team explains the procedure of the group meeting.
Group Meeting (Problem Analysis)	Needs Assessment	Participants brainstorm on the water related issues which they are facing, and participants categorize them.
	Ranking	Participants prioritize the issues by ranking.
	Cause & Analysis	Participants analyze causes and effects on the priority issue(s).
	Preparation of Presentation	Each group prepares the presentation on the group meeting results.
Plenary Session (2)	Presentation of group meeting results	Each group makes presentation on group meeting results.

Participatory Rural Appraisal (PRA) Tools and Project Cycle Management (PCM) Method were introduced to the group meeting in order to collect broad opinions from all participants. Facilitators were appointed from the Counterpart Team, and the Study Team conducted briefing to the facilitators on the above method and group meeting demonstration.

(3) Result of Stakeholder Meetings

<Needs Assessment and Ranking>

Although the result of needs assessment and ranking varies depending on group and regency, prioritized issues by each regency/city are summarized in Table-I-2.12.

Evaluating the priority issues in whole Bali Province, the highest priority is given to lack of both domestic and irrigation water. Many regencies/city gave the priority to inundation and water conflict. Water quality issues were given high priority in Badung, Denpasar, Gianyar and Bangli which is urban areas and the center of tourism. It must be noted that forest degradation and improper drainage system have high priority in Jembrana and Klungkung respectively.

Table-I-2.12 Highly Prioritized Water Related Issues

Prioritized Issues	Jem	Bul	Tab	Bad	Den	Gia	Ban	Kul	Kar	Whole Bali
Lack of irrigation water	1	1	1	1	3	1	2	3	2	1
Lack of clean domestic water	3	2	2	3	2	2	1	1	1	2
Degradation of water quality/water pollution	-	x	5	2	1	3	3	-	-	3
Inundation of river water and drainage canals	5	4	-	4	4	5	x	-	x	4
Water conflict	-	x	3	5	-	4	5	-	5	5
Springs/groundwater not optimally utilized	-	x	-	-	-	x	4	5	3	6
Degradation of forest resources	2	3	-	-	-	-	-	-	4	6
Poor condition of irrigation structures /infrastructure	4	5	-	-	-	-	-	-	x	6
Inadequate irrigation and drinking water infrastructure	-	-	4	-	-	-	-	4	-	6
Saline water	-	-	-	-	-	-	-	2	-	6
Drainage system not functioning properly	-	-	-	-	5	-	-	-	-	6

Notes: Jem: Jembrana, Bul: Buleleng, Tab: Tabanan, Bad: Badung, Den: Denpasar, Gia: Gianyar,

Ban: Bangli, Kul: Klungkung including Nusa Penida, Kar: Karangasem

The number above indicates priority by each regency, (x) indicates issues identified but not prioritized, (-) indicates issues not identified by the participants.

<Cause and Effect Analysis>

Cause and effect analysis was conducted for selected priority issues. Number of the issues to be analyzed varied by group depending on the result of ranking. Since the most issues have relation each other, the results of the analysis have some similarity, and some issues raised in needs assessment became causes or effects of other issues. For instance, water conflict was brought by water shortage. On the other hand, some specific issues were also found in a local area such as saline water intrusion in Penida Island.

Based on the careful investigation of the results of analysis, water related issues in Bali Province are summarized into problem trees with setting highly prioritized issues, i.e. lack of domestic water, lack of irrigation water, inundation and water quality degradation, as core problems. The problem trees for these issues are shown in Figure-I-2.3 to Figure-I-2.6. In the problem tree, downward from core problem indicates causes and upward indicates effects.

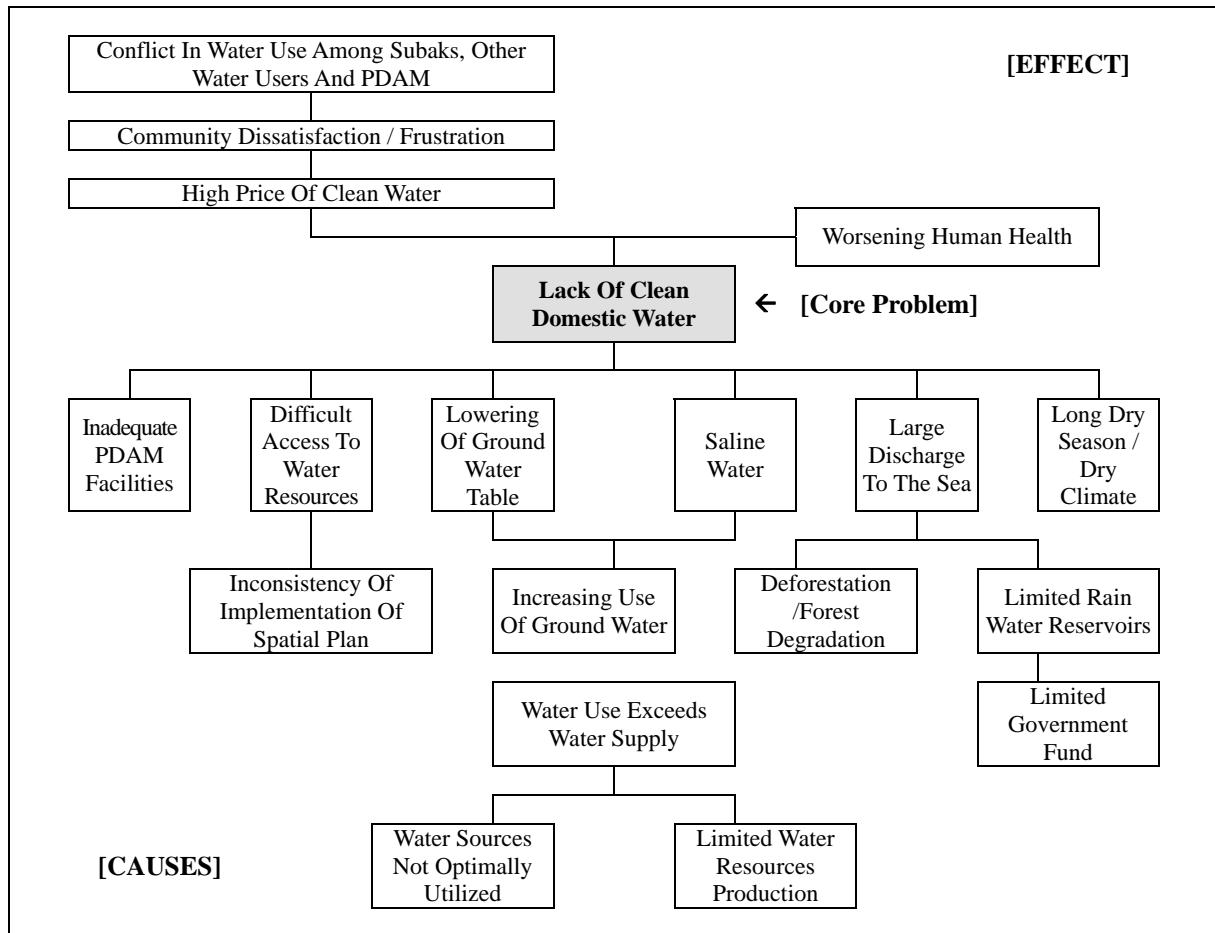


Figure-I-2.3 Problem Tree - Lack of Clean Domestic Water

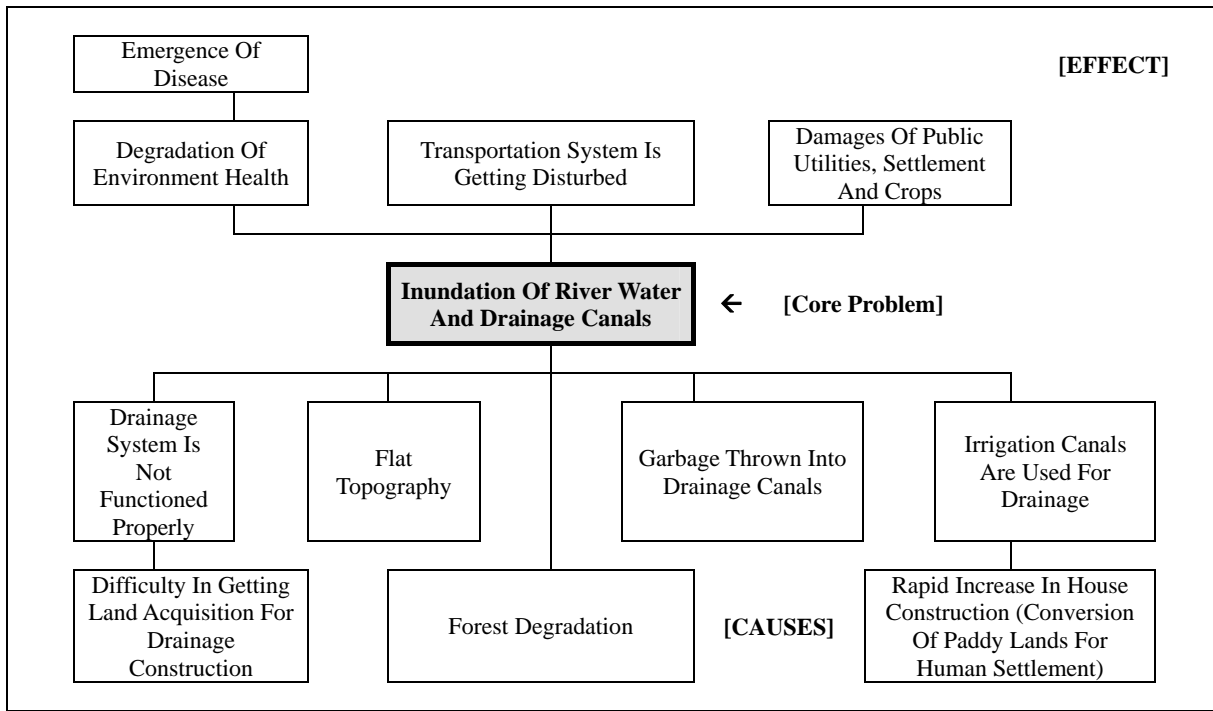


Figure-I-2.4 Problem Tree - Inundation of River Water and Drainage Canals

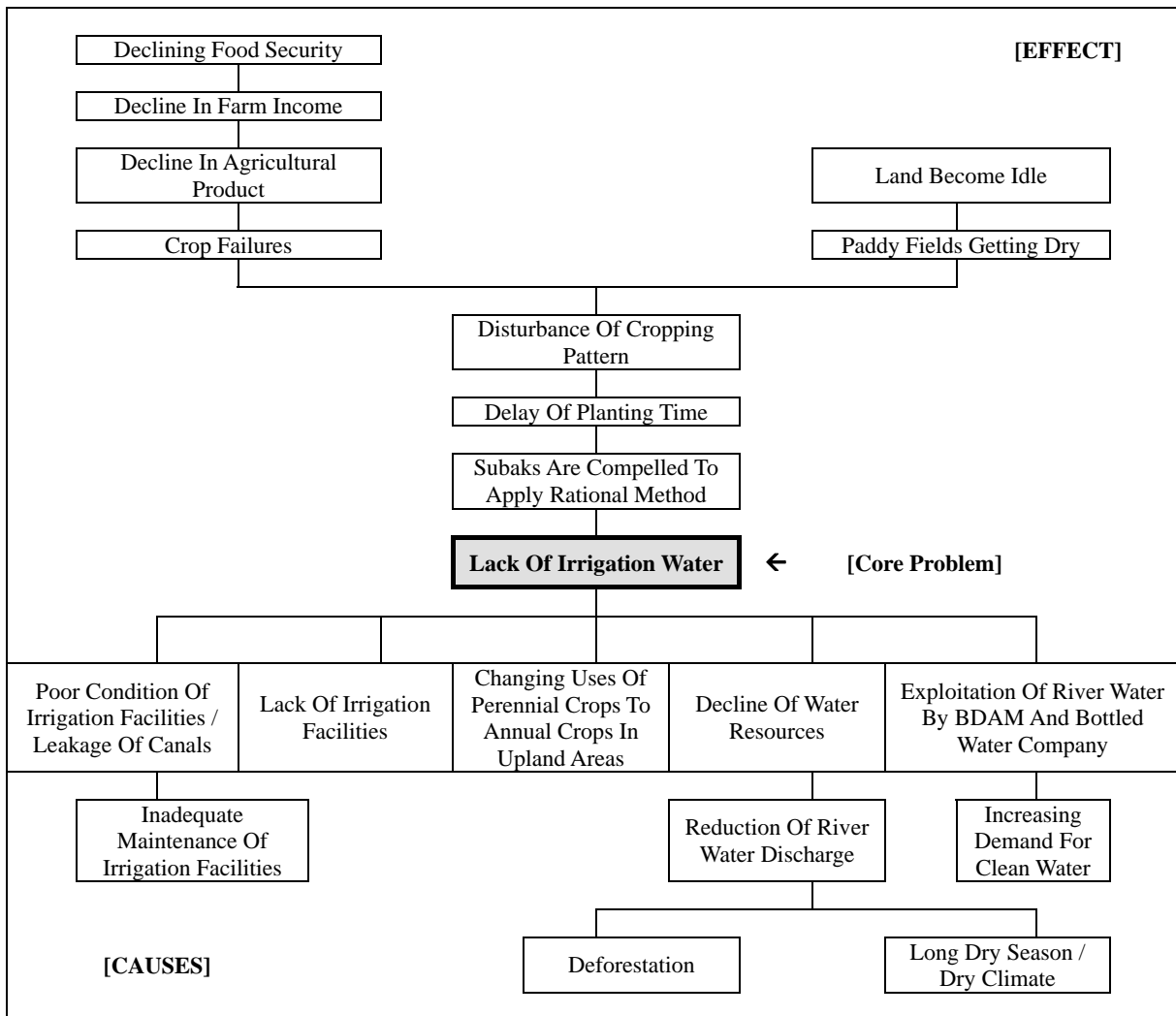


Figure-I-2.5 Problem Tree - Lack of Irrigation Water

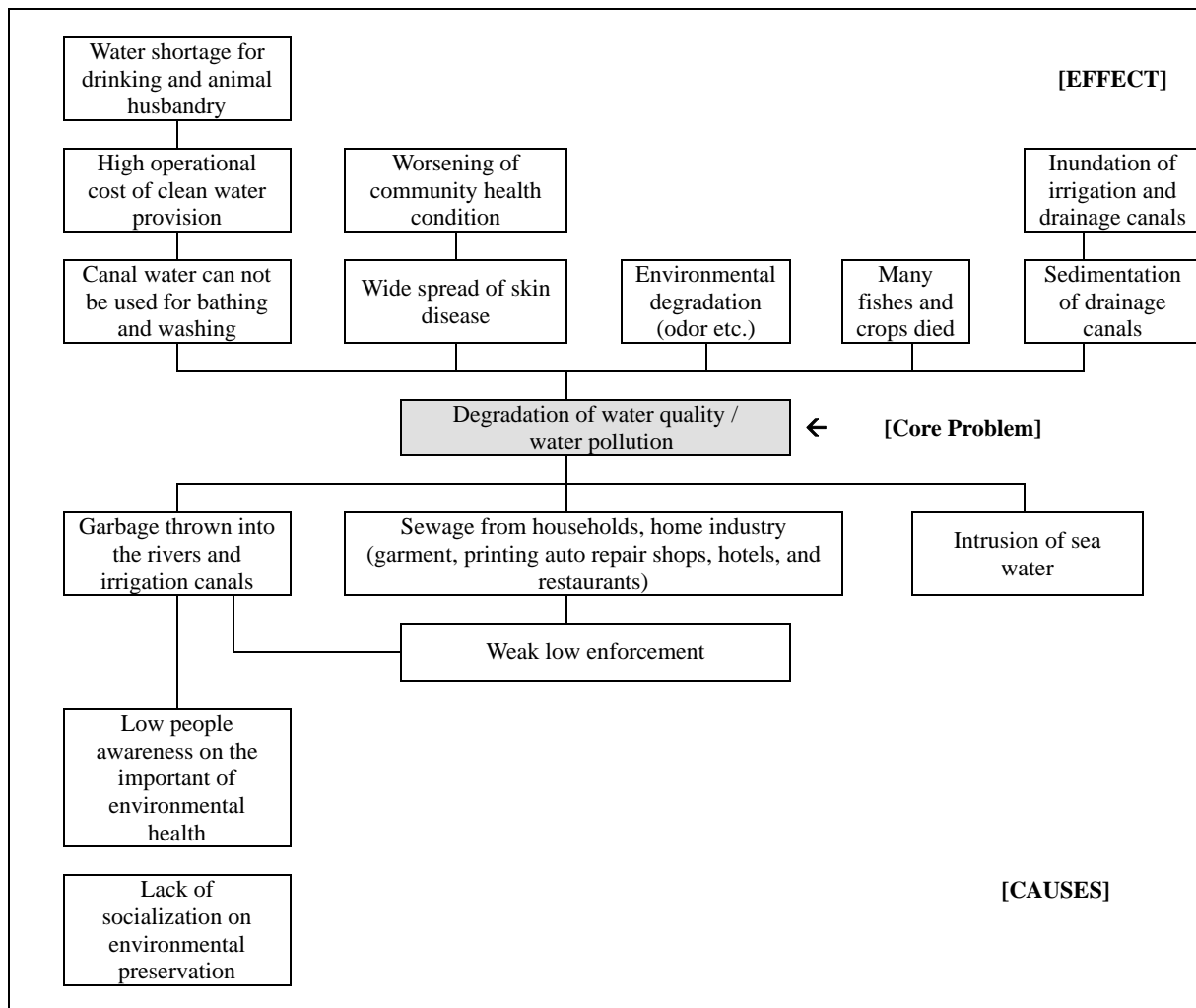


Figure-I-2.6 Problem Tree - Degradation of Water Quality / Water Pollution

(4) Conclusion of the First Stakeholders' Meetings

A number of problems/issues related to water resources development and management has been identified by the first stakeholders' meeting. The entire group meetings seemed to have identified more or less similar issues although the priority given to each of them was different. For Bali Province as a whole, there are four important issues that should be given highest priority in the Water Resources Master Plan. Those issues are follows:

- ◆ Lack of irrigation water
- ◆ Lack of clean domestic water
- ◆ Water pollution / degradation of water quality
- ◆ Inundation of drainage canals and river water
- ◆ Water Conflict

This awareness of stakeholders is consistent with perception of the Study Team, but it is new findings that there are so many water conflicts between Subak and other water users in Bali.

2.5.3 Second Stakeholders' Meetings

(1) Outline of Second Stakeholders' Meetings

Second stakeholders' meetings were staged in May – June, 2005 with the following objectives.

- ◆ To explain the framework of the master plan, expected project and programs, and draft of IEE
- ◆ To collect other alternative projects or programs for master plan
- ◆ To collect stakeholders opinion on the framework and expected projects or programs

Based on the experience of first stakeholders' meetings, second stakeholders' meetings were held in all regencies and various stakeholders were invited. Total number of attendants to the first stakeholders' meeting is 258 and attendants can be categorized as shown in Figure-I-2.7. Agenda of second stakeholders' meeting are shown in Table-I-2.13.

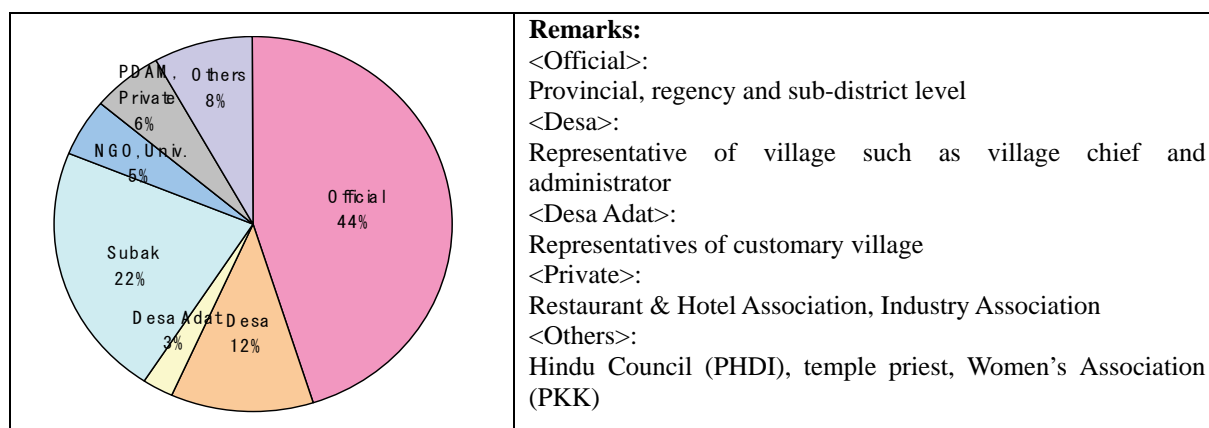


Figure-I-2.7 Proportion of Attendants (2nd Stakeholders' Meetings)

Table-I-2.13 Agenda of Second Stakeholders' Meeting

Program	Agenda	Contents
Plenary Session (1)	Framework of Master Plan	Bali Province explains the findings of the 1st phase study and framework of master plan.
	Draft IEE	Bali Province explains the draft of IEE.
	Q & A Session	Question and answer
	Briefing for Group Meeting	The Study Team explains the contents of group meeting.
Group Meeting (Expected Project)	Project Listing	Participants brainstorm on expected projects and programs for master plan.
	Comparison by Criteria	Participants compare the expected projects and programs by criteria.
	Prioritization of projects	Participants place in the order of the expected projects and programs with examining the reasons.
	Preparation of Presentation	Each group prepares the presentation on the group meeting results.
Plenary Session (2)	Presentation of group meeting results	Each group makes presentation of group meeting results.

In the plenary session (1), the following items were explained.

- ◆ Natural & Social Conditions
- ◆ Water Balance Study
- ◆ Water Related Issues (Raw Water Development, Irrigation, Flood, Water Quality, River Basin Conservation, Institutions)
- ◆ General Policy of Master Plan
- ◆ Alternatives of Institutional Strengthen
- ◆ Expected Projects and Programs

For subsequent group discussion, participants were divided into sub-group by the issues which identified as priority issues in the first stakeholders' meetings. These issues are;

- ◆ Domestic Water Supply
- ◆ Irrigation Water Development
- ◆ Flood Control
- ◆ Water Quality Improvement
- ◆ River Basin Conservation

However, some issues were not discussed in some regency because issues and participants interests were varied by regencies. Regarding the institutional strengthen, group interviews on *Sedahan Agung*,

which was a traditional position of government officials responsible for supervision and guidance of *Subaks* in regency, were conducted in some regencies.

In order to help participants to share same images to expected projects and programs as well as for prioritization, “Target Area”, “Main Activity”, “Input/Cost”, “Negative Impact” and “Operation & Maintenance” were set as criteria for prioritization.

(2) Result of Second Stakeholders’ Meetings

<Plenary Session>

In the Q & A sessions, many suggestive comments were obtained from participants. Major comments are as follows.

- ◆ Problem of coordination among agencies needs to be arranged in Provincial Government Regulation
- ◆ Early implementations of projects are required after the Study. Therefore, project preparation should be considered in the Study.
- ◆ Watershed conservation in upstream is necessary since water levels of rivers and lakes are rapidly decreased.
- ◆ Integrated river basin management from upstream until downstream is needed to minimize conflict among users along the river courses.
- ◆ River water pollution tends to increase. “Polluters pay” principle needs to be applied.
- ◆ Water use conflict between *Subaks* and PDAM must be solved, but how?
- ◆ Clean water for tourism and domestic is still needed but estuary dam at Benoa which is managed by PDAM still owes Rp. 35 billion.
- ◆ Water sources at Karangasem are also used by other Regency. Provincial government should be responsible for water resources development of cross-regency river basin.
- ◆ A system which people in upstream can get benefit by downstream water resources development projects is required.
- ◆ *Subaks* tend to refuse to give water to PDAM, because the burden of the *Subaks* in conserving water resources through rituals is not shared by PDAM.
- ◆ In northern part, spring water is abundant at coastal area. However, these waters are not utilized.
- ◆ There is misinterpretation about autonomy. Based on autonomy, people of certain regency recklessly cut the forest trees without taking into consideration on the adverse negative impact upon other regencies.

<Group Discussion>

As results of group discussions in regencies, stakeholders recognize that surface water developments are priority for both domestic and irrigation water developments. It might be because that potential of spring water is limited and people do not want to bear high cost for water, especially for irrigation water.

However, Groundwater development is a priority for domestic water in Jembrana Regency. This might be because people recognize that surface water potential is small due to small river basins in the Regency. In Buleleng Regency, spring water development is a priority because many spring waters at coastal area have not been developed. For flood control, people required integrated measures including watershed conservation and drainage improvement. For water pollution, people prefer soft measures such as public education and water quality monitoring.

Based on group interview/discussion with representatives from related government agencies and *Subaks* on whether or not the role of *Sedahan Agung* is still important for the *Subak* and which office would mostly appropriate to locate the *Sedahan Agung* the following information was obtained:

- ◆ Many regencies such like Badung, Denpasar, Karangasem, Jembrana, and Buleleng, have abolished the existence of *Sedahan Agung* and his responsibility in dealing with *Subak* affairs have been transferred to Cultural Office especially in relation to cultural aspect of *Subak* activities. Only at Tabanan and Bangli Regencies the existence of *Sedahan Agung* are still preserved and belonged to the Revenue Office. This situation has created confusion not only to the farmers /*Subaks* but also too many related government agencies as well. Especially for the *Subaks* they do not know how to do and where to report if any problem being encountered.

- ◆ Most participants agreed that the existence of *Sedahan Agung* should be restored and revitalized at each regency/city since it is inseparable part of the *Subak* existence, with the main function is dealing with *Subak* supervision and guidance rather than tax collection. One option is that it should be independent unit under the Head of regency/city.

(3) Application of the Meetings' Result to Master Plan Formulation

As shown in Table-I-2.14, the opinions raised by stakeholders are fully reflected to the Master Plan through objective evaluations by the Study Team.

Table-I-2.14 Stakeholders' Opinions and Applications to Master Plan

Issue	Stakeholders' Opinions	Proposals in M/P
Lack of Domestic Water	<ul style="list-style-type: none"> ➢ Surface water development with reservoir is prioritized in Denpasar and surrounding regencies. ➢ Surface water development upstream of Unda River is prioritized in Karangasem Regency. ➢ Spring water and groundwater development are prioritized in Buleleng and Jembrana Regencies. 	<ul style="list-style-type: none"> ➢ Surface water development for Denpasar Metropolitan Area is proposed. ➢ Small scale deep well development and spring water development are proposed for other regencies due to the potentials of groundwater and spring water in these regencies, and to scale of benefited areas.
Lack of Irrigation Water	<ul style="list-style-type: none"> ➢ Improvement of irrigation channel and surface water development by weir are prioritized. 	<ul style="list-style-type: none"> ➢ Improvement of irrigation efficiency through improvement of irrigation channel and review of irrigation scheme is proposed as priority measure. ➢ Surface water development with small scale pond construction is proposed as secondly measure.
Flood	<ul style="list-style-type: none"> ➢ Integrated measures including watershed conservation is emphasized. 	<ul style="list-style-type: none"> ➢ River basin conservation plan is proposed as well as flood control plan consisting both soft and hard measures.
Water Pollution	<ul style="list-style-type: none"> ➢ Public education is prioritized. 	<ul style="list-style-type: none"> ➢ Publication activity on conservation of water environment and capacity building program of BALAI-PSDA are proposed.
Water Conflict	<ul style="list-style-type: none"> ➢ As a solution for water conflicts, Existence of <i>Sedahan Agung</i> should be restored and revitalized at each regency/city 	<ul style="list-style-type: none"> ➢ Revitalization of <i>Sedahan Agun</i> and establishment of <i>Subak</i> Coordination Unit is proposed in each regency/city as a institutional development

2.5.4 Third Stakeholders' Meetings

(1) Outline of Third Stakeholders' Meetings

Third stakeholders' meetings were staged in July, 2005 with the following objectives.

- ◆ To gain the consensus among stakeholders on the master plan, proposed project and programs, and priority projects
- ◆ To collect local knowledge about priority projects
- ◆ To collect other alternative projects or programs for master plan

Meetings were held in 4 locations, namely Denpasar, Jembrana, Buleleng and Karangasem considering river system in Bali Island. Stakeholders of Tabanan, Badung, Gianyar, Bangli and Klungkung were invited to Denpasar. Same as previous meetings, various stakeholders were invited. Total number of attendants to the first stakeholders' meeting is 121 and attendants can be categorized as shown in Figure-I-2.8. Although number of attendants is relatively smaller than previous meetings, information disclosure on Master Plan was achieved enough since 2nd workshop was held around same time.

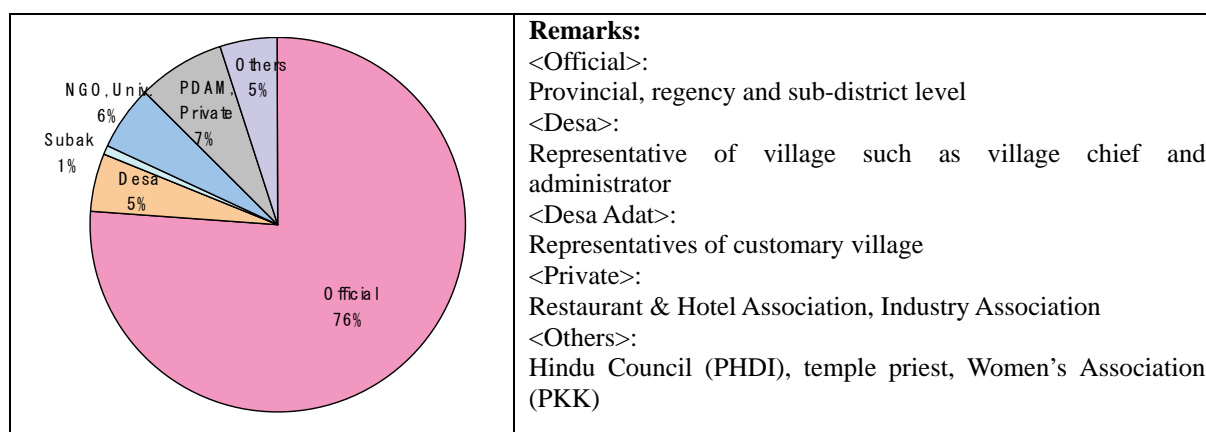


Figure-I-2.8 Proportion of Attendants (3rd Stakeholders' Meetings)

Agenda of third stakeholders' meeting are shown in Table-I-2.15.

Table-I-2.15 Agenda of Third Stakeholders' Meeting

Program	Agenda	Contents
Plenary Session (1)	Master Plan	Bali Province explains the water resources development and management master plan including the result of IEE.
	Q & A Session	Question and answer
	Briefing for Group Meeting	The Study Team explains the contents of group meeting.
Group Meeting	Project Mapping	<ul style="list-style-type: none"> ▪ Participants review the project list and state their opinion. ▪ Participants propose other alternatives
Plenary Session (2)	Presentation of group meeting results	Each group makes presentation of group meeting results.

In the plenary session (1), the results of the Master Plan Study were explained with the items as follows. And then, list of proposed projects of concerned regency was explained.

- ◆ Basic Strategies of Water Resources Development
- ◆ Alternatives for Denpasar Metropolitan Area Water Supply
- ◆ Strategy of Irrigation Plan
- ◆ Ayung Reservoir Project
- ◆ Strategy of Flood Control Plan
- ◆ Badung and Mati River Flood Control Project
- ◆ Water Resources Management (Water Quality Management, Basin Conservation, Institutional Development, GIS, Capacity Building)
- ◆ Evaluation of Master Plan

In the group discussion, participants discussed with drawing information on the Map of district. Topics are as follows.

- ◆ Issues on priority projects by the Study Team
- ◆ New proposal of the projects
(Location, Activities, Beneficial Area, Potential Problems, etc.)
- ◆ Priority of proposed projects by participants

An example of the map (hereinafter referred to as Project Map) is shown in Figure-I-2.9.

- ◆ Allocation pattern of water use right between *Subaks* and PDAM should be clearly formulated to minimize conflict.
- ◆ It is necessary to introduce technologies of water harvesting during the rainy season such as infiltration well and small reservoir.
- ◆ Upstream watershed conservation is necessary to protect spring waters as well as to regulate use of spring waters.
- ◆ Flood control measures should not only focused on hard measures but also public education how to properly manage domestic waste disposal, because garbage thrown into the drainage and rivers may result in river flooding and street inundation.
- ◆ Reforestation of mangrove is needed to protect the beaches in Jembrana.
- ◆ Inter regency water allocation must be considered.
- ◆ The basic philosophy of *TRI HITA KARANA* in developing and managing water resources should not be forgotten in the aspect of how to protect the water sources, and how to protect the users to ensure the equity and sense of fairness among users.
- ◆ Religious ritual and local wisdom in protecting the water sources should not be neglected. Water sources have degraded because we have forgotten the local knowledge once used by our predecessors in preserving the water sources.
- ◆ Downstream water users should contribute or give compensation to the preservation efforts done by the upstream community which are usually the farmers themselves.
- ◆ With regard to the transfer of water from Telagawaja amounted to about 0.5 m³/sec for developing Denpasar Metropolitan Water Supply, most participants did not accept it, and they prefer to develop micro reservoir to supply water for Kubu and Selat Sub districts.

<Group Discussion>

Project Maps of regencies are summarized in Figure-I-2.10 and Table-I-2.16.

Regarding domestic water development, improvement of water supply by spring protection and rehabilitation is proposed in most regency. On the other hand, integrated water supply system development is proposed in Denpasar. Stakeholders in Denpasar recognize it difficult to supply water in their own territory. Regarding irrigation, improvement of irrigation efficiencies by weir and channel rehabilitation is prioritized. Besides, watershed conservation and coastal protection including mangrove forest preservation are proposed in the whole Province.

Table-I-2.16 Number of Proposed Project

Proposed Project	Jem	Bul	Tab	Bad	Den	Gia	Ban	Kul	Kar	Whole Bali
Raw Water Supply	3	3	3	1	1		6			17
Large Reservoir Development			1						1	2
Groundwater Development	2								2	4
Rainwater Infiltration									8	8
Irrigation Improvement	2	4	9	4	8	10	3			40
Irrigation Water Development		5								5
Weir or Small Reservoir		10	1	1		1		3	5	21
Flood Control	3	6			6	2			4	21
Water Quality Monitoring			2	*	*					4*
River Basin Conservation		1		1			1		1	4
Spring Protection			2			3			8	13
Coastal Protection	4	13		7	4	8		2	3	41

Notes) *: proposed for many places

Jem: Jembrana, Bul: Buleleng, Tab: Tabanan, Bad: Badung, Den: Denpasar, Gia: Gianyar,

Ban: Bangli, Kul: Klungkung including Nusa Penida, Kar: Karangasem

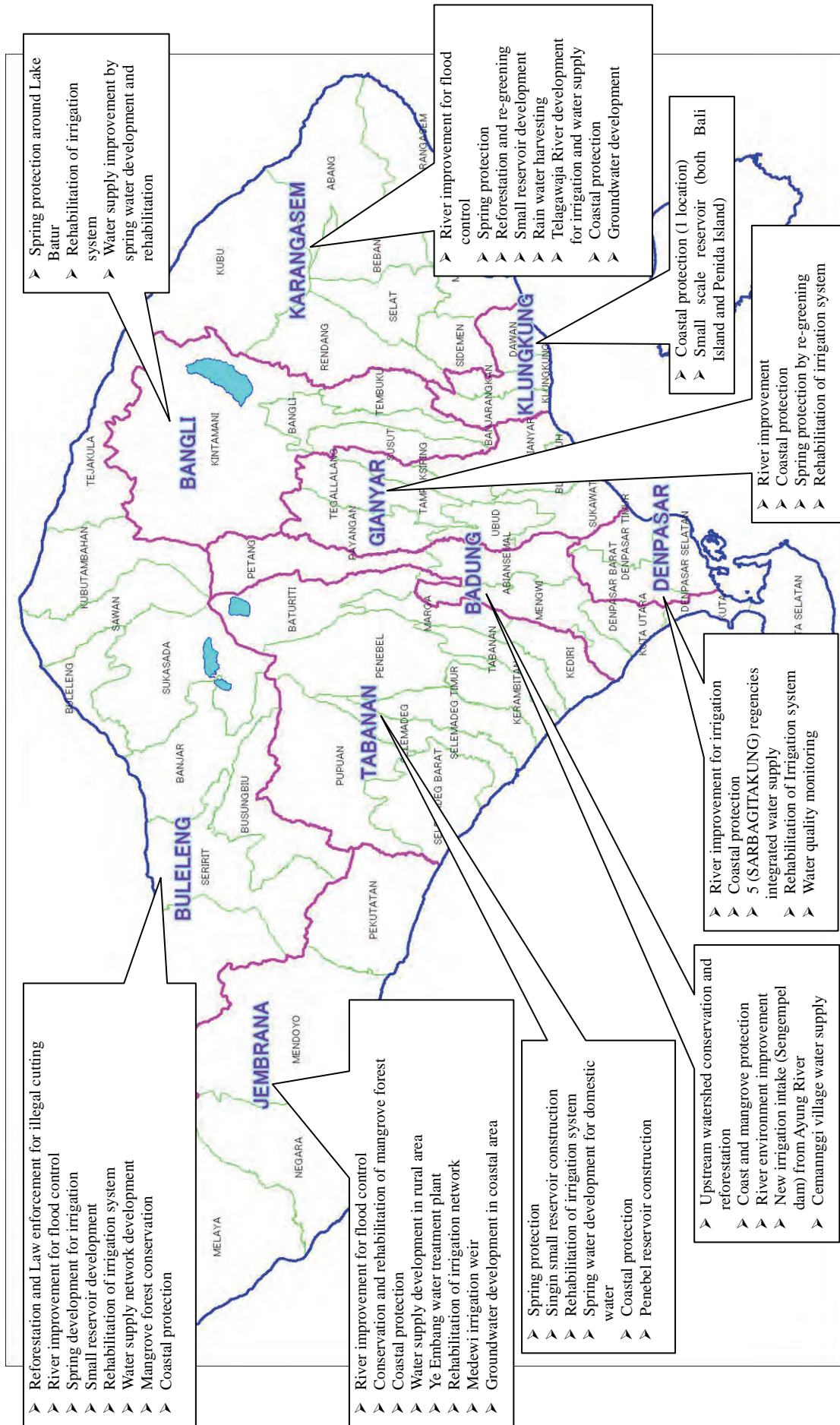


Figure-I-2.10 Proposed Projects/Programs by Stakeholders

(3) Stakeholders' Opinions of Priority Projects

Stakeholders' opinion of priority projects are synthesized as follows.

- ◆ Since integrated water supply system is proposed by stakeholders in Denpasar, needs for Integrated Water Supply for Denpasar Metropolitan Water Supply is considered as high. However, water rights between *Subaks* downstream should be carefully arranged.
- ◆ As a component of the eastern system of Integrated Water Supply for Denpasar Metropolitan Water Supply, intake from Telagawaja River is proposed since intake from Unda River mouth has disadvantages in aspect of water quality and transmission costs. However, Telagawaja River development for Denpasar is not accepted by stakeholders in Karangasem, and stakeholders require development for Karangasem itself. Further consensus building with stakeholders in Karangasem is necessary. Furthermore, system to make benefit to upstream by water resources development for downstream is essential for sustainable development of whole river basin.
- ◆ Reservoir development project at another location in Ayung River is proposed in the third stakeholders' meeting as well as Ayung Reservoir project was proposed in second stakeholders' meeting. It is judged that Ayung Reservoir Project is acceptable by the local stakeholders.
- ◆ Regarding flood control, stakeholders recognize that soft measures, especially measures to prevent garbage dumping to river, are important as well as hard measures. Besides, cooperation among concerned organizations is essential in order to deal with water resources management such as water quality management, river basin conservation and coastal protection. This must be considered in program formation of capacity building support for BALAI-PSDA.

2.5.5 Fourth Stakeholders' Meetings

(1) Outline of Fourth Stakeholders' Meetings

Forth to Sixth stakeholders' meetings are to be held for consensus building with the stakeholders on priority projects. As a first step of this consensus building, fourth stakeholders' meetings were staged in October, 2005 with the following objectives.

- ◆ To explain the outlines of project plan to the local stakeholders concerning the kind of project, its location (project's site, other important specifications of the project, and possible positive and negative impacts)
- ◆ To identify stakeholders who might be adversely affected by the project
- ◆ To get information on important characteristics of the stakeholders particularly related to the needs of / problems facing the stakeholders, matters which the stakeholders do not like to happen / worry about the project, their expectation to the project, and what form of involvement they can contribute to the project
- ◆ To accommodate recommendations for successful implementation of the project

Fourth stakeholders meetings are held for (1) Ayung Reservoir Project, (2) Penet Raw Water Development Project, (3) Petanu Raw Water Development Project, and (4) Badung & Mati River Flood Control Project. Considering local stakeholders' accessibility, meetings are held at the offices of village (*desa*) or sub-district (*kecamatan*) where project are planned. Especially for Ayung Reservoir Project, two meetings were held in both side of Dam site for Ayung Reservoir Project.

The stakeholders expected to participate during the Fourth Stakeholders' Meetings are mainly local stakeholders, living nearby the project sites or mostly to be affected by the project. Based on the discussion between the Study Team and the Counterparts, stakeholders shown in Table-I-2.17 were invited to the meetings.

Table-I-2.17 Invited Participants for Fourth Stakeholders' Meetings

Category	Stakeholders
Representative of Residents	Head of Village, Village Parliament member, <i>Vanjar</i> , Youth association of <i>Vanjar</i> , <i>Desa-adat</i>
<i>Subaks</i>	<i>Subaks</i> around and downstream of project sites
PDAM	PDAM's of concerned regencies
Private sector	Rafting company, Hotels
Religious Leader	Religious Leaders at village level
NGO	Local NGO's
Governmental Organizations	Regency's <i>Bappeda</i> , Regency's Dinas-PU, <i>Kecamatan</i>

Total number of attendants to the first stakeholders' meeting is 91 and attendants can be categorized as shown in Figure-I-2.11.

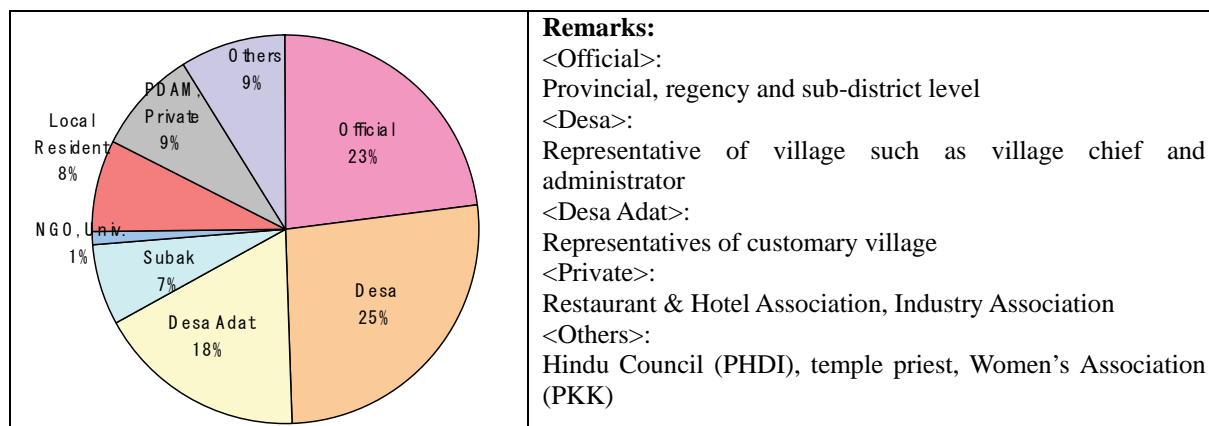


Figure-I-2.11 Proportion of Attendants (4th Stakeholders' Meetings)

(2) Procedure of Fourth Stakeholders' Meetings

As same as previous meetings, agenda of Fourth Stakeholders' Meeting consists of (1) Presentation by Bali Province, (2) Q&A session, (3) Group Meeting, and (4) Presentations and Q&A on Group Meeting's Results.

In the presentation by Bali Province, outline of the projects and suspected social and environmental impacts were explained. Example of Ayung Dam Project is shown in Table-I-2.18.

Table-I-2.18 Social and Environmental Impact by Ayung Dam Project

Stage	Item	Descriptions of Impact	Remarks
Pre Construction	Land Acquisition	Involuntary Resettlement might be occurred	✓ The Study Team found that there seems to be no settlement in the reservoir area. ✓ Small scale resettlement might be necessary around site. (construction road etc.) ✓ The Study Team will design so as to minimize resettlement.
		Some existing traditional or religious facilities might be moved or compensated.	✓ The Study Team will design so as to minimize movement of facilities. ✓ If movement is inevitable, governments shall compensate.
		Some farmland diminished.	✓ Since the topography of dam and reservoir site is steep valley, scale of farmland is small. ✓ Required compensation must be discussed.
		Some forests diminished.	✓ Compensation for diminished forest is necessary.
	Socio Economy	Some of location of rafting is drawn as reservoir	✓ Compensation is necessary.
	Socio Economy	Many workers are needed and related business can be developed.	➤ Local people gain job opportunity as workers, small merchant for workers, etc.
		Conflict between local people or Balinese workers and workers from outside	✓ Executing body must respect Balinese society and contribute ritual and religious ceremonies.

Stage	Item	Descriptions of Impact	Remarks
		Rafting business is obstructed.	✓ Compensation is necessary.
		Fishery is obstructed.	✓ Because of its topographical features, there seems to be no fishery around the dam site. ✓ No significant impact for upstream/downstream.
Construction	Natural Environment	Huge amount of material is necessary.	✓ Gravity type concrete dam is proposed for minimizing amount of construction material. ✓ Construction material will be acquired from authorized quarry sites.
		Flora, Fauna and Biodiversity in the area.	✓ Biodiversity around the site will be examined carefully by EIA Study.
		Appearance of construction vehicle/facilities	✓ There is a hotel upstream of dam site. Construction roads must be planned away from the Hotel.
	Pollution	Water Pollution	✓ Mitigation technologies will be applied.
		Traffic Disturbance	✓ Construction road and construction plan will be planned so as to minimizing traffic jam by construction vehicles.
		Air Pollution	✓ Because of the site located far from residential area, impact is not serious. ✓ Construction road and construction plan will be planned so as to minimizing traffic jam by construction vehicles.
		Noise and Vibration	✓ Because of the site located far from residential area, impact is not serious. ✓ Construction road and construction plan will be planned so as to minimizing traffic jam by construction vehicles.
Implementation	Direct Project Benefit	Current Water Use	➤ Current water utilization will be secured in drought years by stabilizing flow regime.
		New Drinking Water Supply	➤ 1,800 l/sec of drinking water for downstream area can be developed.
		New Irrigation Water Supply	➤ 1,000 ha new paddy irrigation will be available.
		Electricity	➤ About 6 MW of electricity can be developed.
		Environmental Water	➤ Through existing irrigation network, flushing of Badung and Mati River can be implemented for river environment improvement.
	Socio Economy	Reservoir can be utilized as new tourism spot	➤ Canoeing, fishing, camping, trekking around reservoir, and shops/restaurant/hotel can be developed
		Reservoir surrounding area development	➤ Dam crest can be used as a bridge. ➤ Construction roads can be used as local roads.
		Rafting	➤ Rafting business downstream become stable since dam control flow regime.
	Natural Environment	Flora, Fauna, Biodiversity	✓ Ecological system with focusing endangered species and migratory fish will be examined by EIA Study.
		Riverbed fluctuation (Riverbed aggradation upstream and degradation in downstream)	✓ As for upstream, the Study Team plans sabo dams and periodical mining of deposited sand. Mining of deposit will contributes local economy. ✓ Facilities for sediment flushing (gate, tunnel, or bypass) will be designed to prevent riverbed degradation downstream.
		Discharge of downstream	✓ Because the dam stored flood water (surplus water), discharge in dry season will actually increase.
		Bank collapse will occur at reservoir	✓ Geological feature will be examined and some measures will be taken if necessary.
		Landscape changes.	✓ Appearance of dam and reservoir can be a positive impact of landscape aspect.

Stage	Item	Descriptions of Impact	Remarks
	Pollution	Water quality deteriorated.	✓ Judging from land use upstream, quality of inlet water considered as good ✓ Since exchange of storage water is rapid, water quality deterioration will not occur.

Notes) ✓: Negative impact, ➤: Positive impact

In the subsequent group meetings, participants discussed the following topics with writing their statements on cards. Written statements were sorted by the category of stakeholders which participants represent such as village official, *Subak*, *Banjar*, etc.

- ◆ Problems encountered / needs of the concerned stakeholders
- ◆ Worry about the project / matters which they do not like to happen
- ◆ Expectations of stakeholders to the project
- ◆ Contribution to the project that can be provided by the stakeholders
- ◆ Recommendations for improvement of the project plan

(3) Result of Fourth Stakeholders' Meetings

Basically, proposed projects are welcomed by stakeholders. However, some issues which reflected to the project plans are obtained. Results of the meetings and remarks of the Study Team are summarized in Table-I-2.19. Some of stakeholders' opinions are directory reflected to project plans or designs, others are necessary to be confirmed by means of social survey and next stakeholder meetings.

Table-I-2.19 Stakeholders' Opinions and Remarks (4th SHM)

Stakeholder's Opinion	Remarks
Ayung Reservoir Project	
Conflict if non local workers are to be mobilized	This issue must be cared in construction stage for example executing body must respect Balinese society and contribute ritual and religious ceremonies.
Bali Province has a plan for bridge construction around dam site and basic design has finished. However, prospect of implementation is still far.	It is included in the plan to utilize dam crest as bridge.
Problems of land acquisition, thus intensive socialization to land owners is deemed necessary	Opinions from land owners are collected and examined by social survey.
Threat to certain temple' holiness, sacred cave, rare species, and holly spring	This issue is discussed by social survey and next stakeholders' meeting.
Employment and income generating activity to local community	Plans which contributing income generation is to be examined as dam surrounding development.
Avoid the removal of existing settlement	It has been confirmed that there is no settlement in the reservoir site. As for access road, it is to be discussed in next stakeholders' meeting that resident prefer widening of existing road or construction of new road.
<i>Subaks</i> still be able to draw water from their intakes and during construction stage cropping calendar is not to be disturbed	Temporary facilities must be provided.
Upstream residents should also be able to gain benefit from the project	Dam surrounding development benefits to residents upstream.
Penet River Raw Water Development Project	
Need to build access road to the site of water treatment plant.	Access road from main road to facilities is included in the plan.
Conservation of upstream river basin needs to be integrated with the project.	River basin conservation is proposed in the M/P.
Needs to listen to the opinion of the village heads and the residents of Munggu and Cemagi where the intake is to be located	Next stakeholders' meeting is to be held in the villages and invite residents as much as possible.
Need to build micro reservoir (<i>embung</i>) upstream	Intake volume of 300lt/sec is planned considering discharge in dry season.
Need to establish a legal framework for sustainable river basin management	Legal matters related WRM are studied in M/P Study.

Stakeholder's Opinion	Remarks
Petanu River Raw Water Development Project	
River bed degradation around river mouth	Current sediment discharge is examined and sand flushing facility is planned if necessary.
Disturbance of springs already used by local community	There is no affect springs around intake.
Disturbance of bathing and washing facility of local community	It is surveyed that relations between people's daily life and river. However, there is no affect because there is no house downstream of intake.
Landslides and erosion at upper stream of the reservoir	There is no affect because water storage by weir is few.
Threat to the temples' holiness	Temples' holiness is examined by social survey.
Badung & Mati River Flood Control Project	
Protection of the existing temples near the project sites	There is no affect since the proposed works are in the river courses.
Mitigation or avoiding of the negative impact of noise, dust, and traffic jam	Mitigation measures are examined in detail study stage.
Continuously supply irrigation water to the <i>Subak</i> during the construction stage	Temporary facilities must be provided.
Coordination with related agencies particularly concerning the utilization of land areas.	Opinions from land owners are collected and examined by social survey.
Utilize locally available potentials such as skilled and unskilled workers, construction materials and equipment.	This issue is examined in detail design stage.

2.5.6 Fifth Stakeholders' Meetings

(1) Outline of Fifth Stakeholders' Meetings

Fifth stakeholders' meetings are held at the middle stage of the Feasibility Study of December, 2005 in order to explain project descriptions to stakeholders especially local community concerned and to collect information on crucial social issues. Large flood occurred in Denpasar and Badung on December 12th, causing 1 causality and enormous victims. It is also discussed with the residents of Badung and Mati River basin that disaster conditions such as area, period and height of flood, damages and possible causes.

Meetings are held 5 times for 4 priority projects as same as fourth stakeholders' meeting. Since project sites have been specified through the investigations in the Feasibility Study and stakeholders who are most affected by the projects have been identified, village (Desa) offices of near the project sites are selected as meeting locations for facilitating local resident's participation.

Total number of attendants to the first stakeholders' meeting is 123 and attendants can be categorized as shown in Figure-I-2.12.

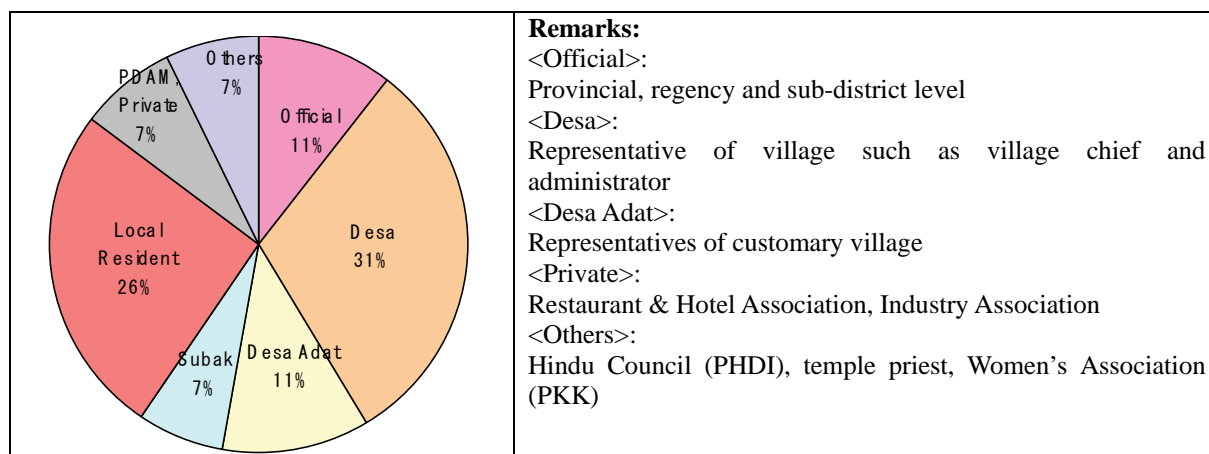


Figure-I-2.12 Proportion of Attendants (5th Stakeholders' Meetings)

Constitution of meeting agenda is same as previous meetings. In the plenary session, Bali Province presented descriptions of project as tentative results of investigations as well as result of investigation on alternatives including zero-option to explain the reasons these projects are selected.

In the group meetings, crucial social issues are discussed by means of semi-structural interview. These issues are raised through the investigations in the Feasibility Study such as social survey, interview to local residents in site reconnaissance, and previous stakeholders' meetings. These issues are intensively discussed among the Study Team and the Counterparts and simulated interview are conducted with facilitators in advance of the meetings. Issues in each project are as shown in Table-I-2.20 As principle of semi-structural interview, other issues which rose by interviewee are also discussed.

Table-I-2.20 Stakeholders' Opinions and Remarks from the Study Team

Project Plan / Site	Main Issues
Ayung Multi-purpose Dam	<u>Rafting disturbed</u> What compensation required? <u>Holy spring in the proposed reservoir</u> What local resident think about losing the springs? Can it be moved other place and where? <u>Access road to project site</u> Is widening of existing rural road preferable?
Penet River Raw Water Development	<u>Access road to the project site</u> It may need land acquisition. What kind of contribution the participant can give to the project? <u>Relation between river and daily life</u> How do you use river in your daily life such as bathing, washing, fishing, and ritual ceremony?
Petanu River Water Development	<u>Springs around the proposed weir</u> Where is the exact locations of springs and how to use them? <u>Land acquisition</u> What are the opinion of the local resident especially the owners of the land?
Badung & Mati River Flood Control	<u>Retarding basin</u> To what extent the landowners can participate? <u>Threat to existing irrigation intakes and weir</u> What the farmers think and suggest if they adversely affected? <u>Water pollution</u> What are causes of pollution; any solution suggested?

(2) Result of Fifth Stakeholders' Meeting

Result of group meetings including new issues rose from participants and remarks to these opinions are summarized in Table-I-2.21.

Table-I-2.21 Stakeholders' Opinions and Remarks (5th SHM)

Stakeholders' Opinion	Remarks
Ayung Reservoir Project	
[Rafting disturbed]	
<ul style="list-style-type: none"> ➤ One site is lost by reservoir. ➤ Rafting can not be conducted when flood and dry season in the expected lose site, and total business period is about 3 months. ➤ Most employees are local residents. Compensations for them during and after construction are necessary. ➤ As for the site downstream, flow must be secured for their business. 	<ul style="list-style-type: none"> ➤ Local workers shall be utilized for construction. ➤ Priority right of conduct business in/around dam site shall be given to local residents and rafting company who lose their site. ➤ Discharge downstream with certain water quality shall be secured.
[Holy place and Holy spring]	
<ul style="list-style-type: none"> ➤ There is no objection from local residents to sift or move holy places and springs. However, ritual and religious ceremony must be conducted following proper procedure. 	<ul style="list-style-type: none"> ➤ The counterparts will confirm necessary procedure and ceremony with Provincial Religious Affairs Office and Hindu Council. ➤ There are thousands of holy places and removal or sift of such holy places are frequently taken place.

Stakeholders' Opinion	Remarks
[Access road to project site]	
<ul style="list-style-type: none"> ➤ Utilization of existing rural roads is preferable. ➤ Widening of existing might be not necessary since width of existing road is 6m. 	<ul style="list-style-type: none"> ➤ In the F/S stage, utilization of existing road is not examined. In D/D stage, this must be investigated.
[Damage of crops by losing habitat of monkey]	
<ul style="list-style-type: none"> ➤ Monkey who sifts from reservoir site to upland or upstream might damage to crops. 	<ul style="list-style-type: none"> ➤ Mitigation measures for segmentation of habitat shall be examined. ➤ Green belt which contains fruit trees can be developed.
Penet River Raw Water Development Project	
[Access road to the project site]	
<ul style="list-style-type: none"> ➤ Existing farm road outside of settlement shall be developed as access road from the project site to main road. ➤ Construction along developed access road will be regulated as "Jalan Hijau (green road)" by village office. 	<ul style="list-style-type: none"> ➤ Access road plan based on the stakeholders' opinions is planned.
[Relation between river and daily life]	
<ul style="list-style-type: none"> ➤ People do not use the river for bathing or washing. ➤ Fishing as industry of self sufficient is not taken place. ➤ Ritual ceremony is conducted in beach, and there is no affect by the project. There is no shrine around the site. 	-
Petanu River Raw Water Development Project	
[Springs around the proposed weir]	
<ul style="list-style-type: none"> ➤ There are 3 springs upstream of proposed weir. There is worry that these spring sink by weir. 	<ul style="list-style-type: none"> ➤ Since weir does not storage water, there is no affect to existing springs.
[Relation between river and daily life]	
<ul style="list-style-type: none"> ➤ People do not use the river for bathing or washing. ➤ Fishing as industry of self sufficient is not taken place. 	-
Badung & Mati River Flood Control Project	
[Retarding basin]	
<ul style="list-style-type: none"> ➤ Regarding proposed retarding basin, land use might be changed in some distant future. 	<ul style="list-style-type: none"> ➤ Further discussion on land use regulation is necessary with related agency.
[Threat to existing irrigation intakes and weir]	
<ul style="list-style-type: none"> ➤ Intake function must be kept during construction. ➤ Regarding necessity of Ulung Tanjung weir, contradicting opinions are rose. 	<ul style="list-style-type: none"> ➤ Intake function shall be secured by means of temporary channels. ➤ Ulung Tanjung weir will be removed since it has not been functioned.
[Water pollution]	
<ul style="list-style-type: none"> ➤ Main causes of water pollution are illegal dumping of garbage and waste liquid from small scale factories along the rivers. 	<ul style="list-style-type: none"> ➤ Enhancement of river environment program (<i>PROKASIH</i>) is necessary since garbage damping also causes flood.

2.5.7 Sixth Stakeholders' Meetings

(1) Outline of Sixth Stakeholders' Meetings

Through the previous meetings and social surveys, especially which conducted in the Feasibility Study stage, most social issues related proposed project have been revealed and reflected to the plan/design. However, the Study Team and the Counterparts found that more clarification and dialogues are necessary for some issues such as treatment of holy spring and benefit generation around dam site for Ayung Reservoir Project, and landuse regulation to keep natural flood water retaining function upstream for Mati River Flood Control Project. Therefore, the sixth stakeholders' meetings were staged for these two projects. The meetings were held at the closest hamlet to the proposed project site and two meetings were held in both side of Dam site for Ayung Reservoir Project.

Total number of attendants to the first stakeholders' meeting is 174 and attendants can be categorized as shown in Figure-I-2.13.

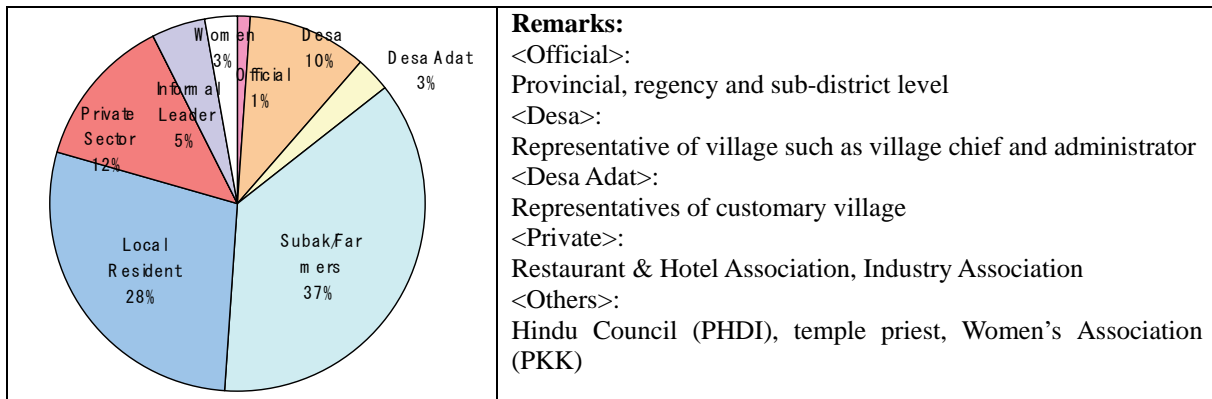


Figure-I-2.13 Proportion of Attendants (5th Stakeholders' Meetings)

Since the meetings were held in hamlets where residents have close relationship, meetings were preceded with leaderships of hamlet chiefs. The Counterparts explained alternative plans as a background of priority projects including zero option, and both positive and negative impacts prospected. Consequently, Q & A sessions were conducted.

(2) Result of Sixth Stakeholders' Meetings

During the discussion, many issues could be reconfirmed as well as issues which the Study Team/Counterparts expected to discuss. On the other hand, both the Counterparts and participants hesitated to discuss deeply on several issues such as land acquisition and issues regarding religion/rituals. It is considered that there are limits of discussion in the Feasibility Study stage of which project implementation and budgeting is not secured.

As results of lively discussion among participants and the Counterparts/Study Team, the followings were concluded as recommendations for further process of the projects.

<Ayung Reservoir Project>

- ◆ The participants questioning about what benefit they would get from the project, especially as regard to electricity, drinking water, and irrigation water.
- ◆ The local communities still need further socialization of detail information regarding the project plan especially the positive and negative effects. Besides, there is opinion that there should be written agreement between government/project implementer, contractor, and heads of related villages/sub districts prior to the implantation stage on matters related to compensation of land acquisition, damages of housing due to vibration of movement of heavy trucks, what kind of contribution the project could give to local community, etc. Project must be socialized more and monitored according to AMDAL.
- ◆ The participants again stressed the important of holy spring located in reservoir area. However, they would not be able to decide whether it can be replaced with other holy spring found some where along the river. The Study Team and the Counterparts have visited holy sites in the project site with guidance of priests and discussed with Hindu Council (PHDI). However, PHDI also could not decide herself. Participants suggested the Public Works Service to organize a special meeting between the relevant authority (high priest, temple priest, PHDI and local community) in order to get guidelines and advice how to solve this problem. When the religious authority could assure them that it is possible to search for other alternatives then they may likely to follow their advice.
- ◆ As is common with water resources development planning, the participants worried that the project benefit will be enjoyed only by the downstream community (for electricity, drinking water, and irrigation water), whereas for community at upper stream would get nothing. Benefit sharing between downstream and upstream shall be an important issue of integrated watershed management by Ayung Water Resources Coordination Council which proposed in the Feasibility Study.

<Mati River Flood Control Project>

- ◆ Land consolidation for housing development in the proposed natural retaining area is planned by National Land Agency (BPN). Although the information of the flood control plan has been disclosed through many meetings, the Public Works Service is not informed BPN's plan. Participants proposed other hard measures such as river widening or embankment. However, if natural retaining area is developed as housing, this area becomes flood prone area and it might be unfeasible to protect this area, since large scale construction including bridge improvement at Jl. Gunung Soptan Street is necessary. The Public Works Service shall discuss with Provincial Regional Development Agency (BAPPEDA) and BPN to coordinate this matter.

2.5.8 Conclusion

Through stakeholders' meetings which held total of 35 times, the JICA Study Team and the Counterparts understand stakeholders' perceptions and hope of water resources management in Bali. Most of opinions raised by stakeholders are fully refracted to the Study result. However, further dialogues are necessary for smooth implementation of the projects especially the following issues.

- ◆ Treat of holy places/springs
- ◆ Land acquisition or land use regulation
- ◆ Ritual and religious manner regarding construction project
- ◆ Construction and operation of facilities involving local resources
- ◆ Project surrounding area development

Besides, through implementation of series of stakeholders' meetings, it is transferred to the Counterparts that knowledge and skill for facilitating discussion, and principles of participatory planning. This will be a great help to formulate projects in the future by their own efforts.