

# JENERBERANG RIVER BASIN MANAGEMENT CAPACITY

Establishing of a Public Corporate in South Sulawesi Province  
in INDONESIA: Assessment and Stakeholders' Participation

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**KTH Chemical Engineering  
and Technology**

**Master of Science Thesis  
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*Disasters have spread throughout the land and sea,  
because of what the people have committed.  
He thus lets them taste the consequences  
of some of their works,  
that they may return (to the right works).  
Al-Furqan, 30 : 41*

*For my loving parents,  
Maria and Soenarto*

*"When planning for one year,  
there's nothing better than planting grain,  
When planning for ten years,  
there's nothing better than planting trees,  
When planning for a lifetime,  
there's nothing better than planting men".  
Guanzi, (551 - 479 BC)*

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My Creator, for His unlimited gifts and blessings...

Pandu SW. Ageng  
Stockholm, 18 November 2005

### Abbreviations and Acronyms

ADB	Asian Development Bank
BAPEKIN	Investment and Construction Development Agency
BAPPENAS	National Development Planning Agency
BAPPEDA	Regional Development Planning Agency
BAPEDAL	Environment Impact Management Agency
BAPEDALDA	Provincial Environment Agency
CBO	Community-Based Organization
DEPDAGRI	Ministry of Home Affairs
DGWR	Directorate General Water Resources
DPRD	Regional House of Representative
FORKAMI	Indonesia Drinking Water Communication Forum
GoI	Government of Indonesia
INFID	International NGO Forum on Indonesian Development
INMENDAGRI	Instruction of the Ministry of Home Affairs
IWRM	Integrated Water Resources Management
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
KEPMENDAGRI	Decree of Minister of Home Affairs
KEPMENKES	Decree of the Minister of Health
KEPPRES	Presidential Decree
KIMPRASWIL	Ministry of Settlement and Regional Infrastructure
MENDAGRI	Ministry of Home Affairs
NGO	Non Governmental Organization
OBA	Output Based Aid
PAD	Local Government Income/Revenues
PDAM	Municipal Water Authority
PEMDA	Provincial or Regional Government
PERDA	Provincial Regulation
PERMENDAGRI	Regulation of the Minister of Home Affairs
PERMENKES	Regulation of the Ministry of Health
PERPAMSI	Indonesia Water Supply Association
PJP	Long Term Development Plan
PJT	Perum Jasa Tirta, Public Water Service Corporation
PP	Government Regulation
UFW	Unaccounted for Water
UU	Law
WALHI	Indonesian Forum for Environment/Friends of Earth Indonesia
WATSAL	Water Resources Structural Adjustment Loan
WUA	Water User Association
YLKI	Indonesian Consumers Organization

### Abstract

A multi purpose dam called Bili bili have been built in Jeneberang river basin in eastern Indonesia in 1999 and providing water available to all customers. In 2004 a landslide occurred and impact to the quality of raw water, especially the amount of turbidity, dramatically increased. Landslide problems started with high sedimentation rates to water infrastructures. Technically the lifetime of Bili bili multi purpose dam and reservoirs will be shorter than planned. In contrast, we understand and agreed that sustainable development and ensuring the current use of a water resource as well as a dam should compromise its use by future generation. To reach progress in sustainability we need to establish governance structures and practices that can foster, guide and coordinated positive work by a host of actors on a complex of issues. Today, Indonesian Central Government is planning to establish a public corporate participation to comprehensive water resources management in eastern Indonesia. The important significant of stakeholders in order to develop comprehensive approaches, are water agencies: regional and local water institution that will manage catchments areas, water infrastructures and water utilities as provider of drinking water to municipalities. They will be acquainted to the water and water institutional capacity problems.

This research examines both the current impacts on and potential future for water management in eastern Indonesia. One of the objectives of this research will be to described the current of water resource organization, which is related to establishing of a public corporate, not only stakeholders involvement; management and organization; but also finances and investments; operation; distribution; regulation and policy. One objective of this research will be measured by conducting interactive interviews and dialogue with the representatives of the stakeholders. The last objective is evaluating the Human Resources Development performances of water resources management by a series of workshops. Additionally, some recommendations for a future water supply system will be provided as an input for the government and local authority in order to improve the capacity and water resources management in eastern Indonesia.

The results conclude that to meet the Millennium Development Goals, the establishment of a public corporate for supporting Indonesia's process of decentralization is necessary where the local level include customers can be a much more dynamic interaction between providers of services and water users. A participatory method is useful to raise problems, so while the Central Government can mandate a minimum service standard and the achievements of these standards can be monitored directly at the local level.

Accountability of water resources development should be considered as a vehicle when a problem occurs with insufficiency of the existing water facilities and a big demand of water purposes.

**Keywords: capacity, decentralization, human resources, Indonesia, Jeneberang, landslide, participatory, public corporate, river basin, turbidity and water resources management.**



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## CHAPTER 1: INTRODUCTION

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A multi purpose dam called Bili bili have been built in Jeneberang river basin in eastern Indonesia in 1999 providing water available to all customers. A landslide occurred in 2004 and impacts to the quality of raw water, especially the amount of turbidity, dramatically decreased. In 2004 one of data shows that the amount of raw water turbidity reached 11.600 nephelometric turbidity units (NTU). The Makassar water authority decided to stop both the supply of raw water and activities of their water treatment plant (Kompas, January 2005). During wet season the accumulative high rates of sedimentation due to excessive erosion occurred in the upstream of the Jeneberang watershed. Landslide problems started with high sedimentation rates to water infrastructures. The consequences of the water shortage will cause serious problems leading to local political instability and social unrest (Pasaribu, 2005). Technically the lifetime of Bili bili multi purpose dam and reservoirs will be shorter than planned. In contrast, we understand and agreed that sustainable development and ensuring the current use of a water resource, as well as a dam should compromise its use by future generation (WCED, 1987).

O'conor (in Michell, 2005) observed that source protection of water is the major barrier. He noted that typical approaches include watershed protection plans and he also recommended that the provincial government needed to develop a comprehensive approach to all aspect of drinking water, from source protection to the return of treated wastewater to the environment. Authority should educate the public to appreciate water scarcity; in particular accepting re-cycled treated water as a new source of water. To turn the principles of sustainable development into achievable policies and political will of interest groups, solutions must be based on fundamentally sound hydrology and technology (Sophocleous, 1998).

To reach progress in sustainability we need to establish governance structures and practices that can foster, guide and coordinated positive work by a host of actors on a complex of issues, through webs of interconnection and across multiple and diverse strengths, motives and capabilities, not only conventional government agencies and business interest, but also the full set of public, private, civil society players, collective and individual. The challenge is to achieve sufficient integration of understanding, direction and action to achieve the desired transition (Kemp, 2005). Today water resources management policies should be designed in order to correct the institutional failures present and manifest themselves in fragmented, conflicting and uncoordinated management of the various aspects of water resources (OECD, 1989).

Today, Indonesian Central Government is planning to establish a Public Corporate participation to comprehensive water resources management in eastern Indonesia. The important significant stakeholders in order to develop comprehensive approaches are water agencies: regional and local water institution that will manage catchments areas, water infrastructures and water utilities as provider for drinking water to municipalities. They will be acquainted to the water and water institutional capacity problems.

In this research I will examine both the current impacts and potential future for water management in eastern Indonesia. One of the objectives of this research will be to describe the current of water resource organization, which is related to establishing a Public Corporate, not only stakeholders involvement; management and organization; but also finances and investments; operation; distribution; regulation and policy.

Important perceptions and expectations of different stakeholders, as one objective of this research will be measured by conducting interactive interviews and dialogue with the representatives of the stakeholders. The method used is in accordance to some open-ended questions by conducting residential customer surveys using a standardized questionnaire. The last objective is evaluating the Human Resources Development performances of water resources management by a series of workshops. Additionally, some recommendations for a future water supply system will be provided as an input for the government and local authority in order to improve the capacity and water resources management in eastern Indonesia.

### 1.1 Water Resources Management in Indonesia

Indonesia is an archipelago nation consisting of five main islands and some 30 small archipelagos with 17.508 islands. The total area of Indonesia is estimated to be 5.193.250 km<sup>2</sup> and the sea territory is 3.166.163 km<sup>2</sup>. Indonesia's equatorial climate and weather is characterized by two seasons, the dry and rainy season. The monsoon type climate changes approximately every six months, where the dry season is from June to September and the rainy season from December to March (National Information Agency, 2002). Although in recent years weather patterns have been somewhat disrupted.



**Fig. 1.1: Map of Indonesian Archipelago**

Source: <http://www.indo.com/neighbor/neighbor.html>



Indonesia is given with rainfall and has approximately 6 percent of the world's fresh water resources equivalent to 2.500 km<sup>3</sup> of annual renewable water resources. However, 60 percent of the rainfalls become run-off water due to inappropriate drainage systems (Shofiani, 2003). It is estimated that 60 percent of Indonesia's piped water supplies are derived from surface water sources, 25 percent from springs and only 15 percent from ground water (Lanti, 1996).

The internal renewable water resources are provided by surface water from 5.500 rivers. Ground water resources are limited and are mostly used for domestic, municipal and industrial purposes (Indonesia Water Supply Sector Policy Framework, 1997). The population of Indonesia in 2004 reached up to 215 million people with the rate of growth of 1.4 percent during 1999-2000 and the population of South Sulawesi Province 7.96 million people and 1.13 million are stay in Makassar (National Information Agency, 2002). At the end of 1994, only 36 percent of Indonesia's urban population of 67 million had access to piped water. Aiming to serve 62 percent at the end of 2008 may appear ambitious. It would however just reduce the un-served population from the 1994 level of 43 million to 40 million (Shofiani, 2003).

Makassar has known two types of seasons, wet and dry season. Dry season started during September – April and rain season during May – October. The amount of rainfall ranges between 2.500 mm to 3.500 mm (Montgomery, 2000). Water resources available at Makassar Municipality / Makassar water utility are supplied from Salo Maros, Jeneberang River and Salo Bantimurung. The biggest river is Jeneberang which flows to inlet and outlet of Bili-bili multipurpose dam (Montgomery, 2000).

## 1.2 History of Water Management in Eastern Indonesia

Traditional practices of water resources development in Indonesia have been regarded by the ancient generation of Indonesians as highly important. This have been supported by the strong evidence for agricultural and water utilizations. In fact, a number of experiences in traditional irrigated farming in Indonesia among others, **Subak** in Bali, **Keujreun Blang** in Aceh Special Province, **Tua Banda** in West Sumatra, **Raja Bondar** in Northern Sumatra, **Mitra Cai** in West Java, **Dharma Tirta** in Central Java, **Tudang Sipulung** in South Sulawesi, **Mantri Siring** in South Sumatra, **Ili-ili** in Lampung have concluded that the traditional practices and the supply of water resources development in the past have been sustainable, and also with application of environmentally friendly technologies (Ambler, 1991).

The most important Indonesian historic intrinsic feature is the home garden and its ability to withstand the natural forces of soil erosion. Several interacting factors are important. The almost closed canopy provides some protection, at least from intense rainfall and because the majority of the plants are less than a meter high, the raindrops falling through the canopy hit the soil surface at a rate considerably below their terminal velocity. The most important factor in preventing erosion is the protective layer of litter. Most home gardens have a heavy litter layer. The important of the tree canopy and the undergrowth lay not so much in their direct effect on erosion but in their capacity to provide continual replenishment of the litter. Nevertheless, erosion is probably somewhat higher than in the natural forest ecosystem. The home garden will be a viable alternative to mono-cropped field agriculture. It also is a highly valuable source of genetic diversity (Soemarwoto and Conway, 1992).

Institutions for Water Resources Development and Management (WRDM) in Indonesia originate from the Dutch colonial period and were established in 1945 within the Ministry of Public Works and Electric Power. There have been several changes in the WRDM organizations; the expansion has been gradual with change of policy as well as goals of the successive Master Plans. During the first 25 years of development, spanning across five Master Plans (PJPT-I, the first long term development plan, 1969-1993), policies was directed with the primary emphasis on the agricultural sector. During the next phase which begun in 1994 (PJPT-II, implementation; 1999 – 2020 is the second long term development plan), more emphasis are given to the conservation and preservation of the resources with optimisation of the utilisation of water. This is a step towards sustainable development and management of water resources. The intention is to adapt an ecosystem-based approach within river basins for sustainable water resources management in the whole country (Gunatilaka, 2004).

The history of water management in eastern Indonesia began in the 1970s, mostly in an attempt to replicate the experiences of water management in West of Indonesia started on water management to the local farmer irrigation. Rice is very importance for Indonesian diet. Subject to water availability for irrigation, paddy is cultivated in both wet and dry land as support to rice food stock area as well as main food for most inhabitants in Indonesia (Pasaribu, 2005).

The Government of the Republic of Indonesia intends to extend the existing River Basin Management (RBM) program of the Brantas River to other river systems, as well as Jeneberang River basin. Under WRDM in the Brantas basin there is a well establish institutional framework for functioning of RBM as well as an organized water resources management infrastructure (Sunaryo, 2000). Since the early 1990s, a real-time water quantity monitoring network and a Flood Forecasting and Warning System (FFWS) are operating in the Brantas basin. In Central Java, this extension concerns the development of an effective RBM organisation, establishment of WRDM infrastructures, the implementation of a monitoring network as well as water quality and water quantity as basic requirements. At the first stage, a basic RBM program is planned for the implementation in Jratunseluna and Garang-Bodri River Basin complex in Central Java (Gunatilaka, 2004).

### **1.3 Landslide Problems**

In 2004 a gigantic landslide occurred (called “longsor” in Indonesia language) in Mt. Bawakaraeng and changed the raw water quality input to Bili bili multipurpose dam drastically. The quality of raw water decreased to low quality and resulting to extreme of turbidity, reaches an amount of 219 000 nephelometric turbidity unit (NTU). Also a water treatment plant had difficulties during operation and maintenance. In 2001, Somba Opu water treatment plant produced the best quality, especially indicated in turbidity 5 NTU (CTI, 2001).

One of the national news, Kompas (2004) reported that there were several factors caused by the landslide: unrecorded earthquake, water level, erosion and change of physicality. Also the local news, Fajar reported that the landslide have been reached a volume erosion of sediment at volume 300 million m<sup>3</sup>. All upstream are covered with deposition of sludge and covering across 1 to 3 km in width, 30 km in length and 40 to 200 m in height. The impact of the landslide is not

finished but it started to begin. The un-stabilized soil materials of landslides were changing in physicality by rain intensity level and this condition gradually influenced the water quality input of Bili bili multi purpose dam.

The Japanese Erosion Journal (2004) reported that a gigantic landslide occurred on the Caldera wall of Mt. Bawakaraeng (2 874 m), located in the uppermost reach of the Jeneberang River in South Sulawesi, Indonesia, on March 26, 2004. The huge mass of debris yielded from the gigantic landslide of Mt Bawakaraeng traveled about 7 km down the upper reach of the Jeneberang River with 500 m to 800 m in width. Ten persons were killed and 22 others were unaccounted for in the accident. Twelve houses and one school were crushed or buried in the debris, and the damage was expected to run a cost of 2.214 million Rupiah or \$US 221.400. The volume of the slide mass caused by the gigantic landslide estimated at about 240 million cubic meters with a head width of 1.600 m, at height to 700 m to 800 m, and a thick of approximately 200 m. The debris deposit of volume 272 million cubic meters on the upper reach of Jeneberang River, and 160 million cubic meters deposited within the Caldera. The main cause of the landslide occurrence has still been unidentified. It was a 782 mm of cumulative rainfall during March 1 to 26 before the landslide, and any earthquakes were not recorded around the day of occurrence, March 26. During three months after the day of occurrence the rainfall gauge recorded a cumulative rainfall at 430 mm. However, there has been generated the V-shaped or U-shaped valley deepening with the size of 50m to 150m in width, 30m to 80m in depth because of these materials easily being eroded. The eroded sediment volume up to now is estimated to 14 million cubic meters by the site investigation. In next rainy season, there could be a great possibility of strong erosion and huge sediment transportation with debris flows. Researchers have recommended the implementation of urgent structural counter measures, such as excavation of riverbed, rising and construction of silt collection (Sabo) facilities, and non-structural counter measures, and for example the early warning system with also establishing of hazard map (Satoshi, 2005).

Fajar Local Newspaper (April 2004) informed that Gowa government of the Regency valued the loss material as a result of the landslides in the Bawakaraeng Mountain to 22 billion Rupiah or \$US 2.200.000. The value of losses have covered 270 hectares of people's plantation, equivalent to 10.08 billion Rupiah or \$US 1.008.000. The Regency leader assessed, the disaster losses such as 800 livestock, 12 house units, one primary school, 160 hectares rice cultivations and crop, 270 hectares of the plantations, 300.000 tree seeds, the village road along 3.000 meter, and a Mosque (Kompas, 2004).

The implications of the landslides have been influenced on the river basin by forming several small tributaries across new formation of land. Additionally the existing of water level is changed by landslides and it will be influence to the formation of land. The intensity of rain will be influenced to the quality of water in the river basin. Water crisis awareness is expanding, but most interest remains focused on water quantity issues (Lundvist, 1998).

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## CHAPTER: 2 METHODS

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### 2.1 Data Collection

In order to achieve the objectives, this research has relied on a combination of analyses and consultations / interviews. It is based on an inductive methodology to analyze the current situation by making observations and generalize the observations to develop the result. The implemented activities are as follows:

1. Collection of policies, regulations, reports, journals, literature, and other important documents.
2. Electronic interviews with representatives of different groups of Makassar and Gowa stakeholders, which were dependent by the Bili bili multi purpose dam during the period of May–June 2005, with a view towards ascertaining and comparing both their overall opinions on Public Corporate / private sector involvement and their specific opinions on issues risen during the course of the analysis. The qualitative research method was based on pre-structured, but necessarily un-standardized format of questionnaires with majority of open-ended questions. The questionnaires were adopted from Suleiman (2002), Shofiani (2003) and adjusted to the local and current situation.
3. Consumer surveys by addressing a standardized questionnaire of certain and definite questions adopted from Suleiman (Ibid) and adjusted to the local and current situation. Feedbacks of consumer questionnaire were collected during the period of May - June 2005. Respondents covered the part of Costumer Makassar and Gowa. Table 2.1 shows the total number of stakeholders representatives (respondents). Total of 10 people representing institutions were interviewed and classified into 3 groups. Interviews to the respondents are conducted to 80 samples of drinking water consumers in the Bontoala district.

Electronic interviews were conducted with various stakeholder groups, i.e. local government, water authorities, NGOs and associations. Interviews with the consumers were limited to addressing a standardized questionnaire. The interviews were seeking information related to new regulation and policy. Furthermore the interviews were also intended to examine the perceptions of each stakeholders group of Public Corporate / private sector involvement.

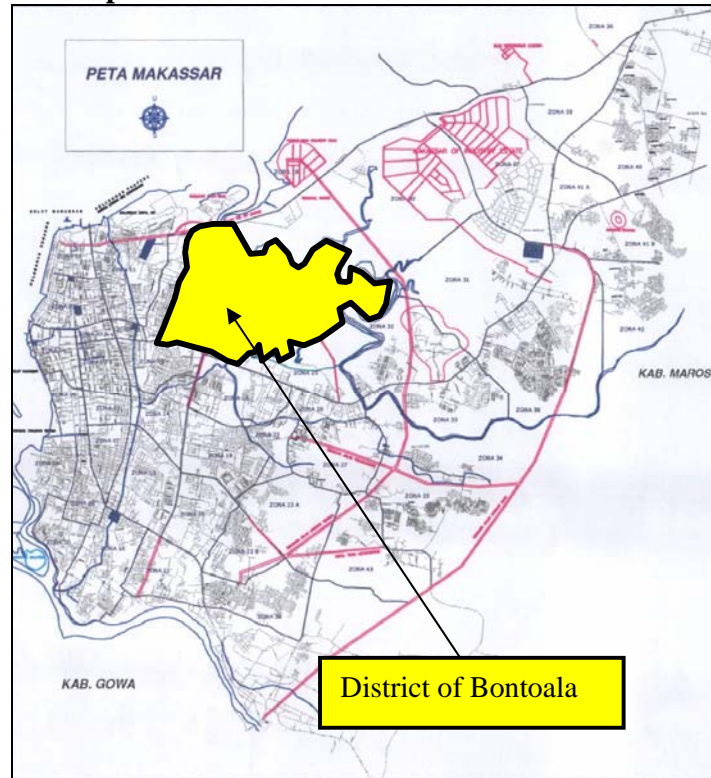
The study areas in the Bontoala district are serving 10.049 customers of 1.160.011 inhabitants of Makassar Municipality. Bontoala covers three service areas of zones: 12, 17 and 24 (Fig. 2.1) at the Central of Makassar City. Bontoala has an operation unit office serving those zones. The functions of this office as a customers care, services centre and payment points. The number of units varies, depending on the zone area and number of customers.

To conduct surveys according to Ferber (1980) include a method of gathering information from a number of individuals, as a sample, in order to learn something about the larger population from which the sample is drawn.

Referring to May (1997), probability or random samples are considered suitable for this survey due to its capacity to allow a statistical generalization from sample of population. However the

number of samples (customers) will be determined based on stratified random sample, where the existing number of households connected to the water supply system will be classified according to their characteristics, such as income, area, gender, type of housing, etc.

**Fig. 2.1: Map of Location of District Bontoala at Makassar City**



Source: Info PDAM Kota Makassar, June 2004: 19

Bell (1999) mentions that a consumer survey intends to obtain information which can be analyzed, patterns extracted and comparisons made. A sample should be taken from representative selection of the population and from that samples, the researcher will then be able to present the findings as being representative of the population as a whole. Great care was taken in this study to ensure that the sample of population is truly representative. Therefore, it is important to consider the characteristics of the total population to be represented (Shofiani, 2003).

The significant characteristics used were the proportion of respondents. It was based on a number of consumers, tariff category of consumer's group and the ratio of men and women observed. Table 2.1 shows the characteristics for selection of the representative respondents. The numbers of respondents observed were adjusted based on the ratio of consumers in the different unit office to the total number of consumers. Respondents were also stratified to the actual ratio of consumers according to tariff category. In the case consumers subscribed for piped water supply; they are categorized into different tariff groups. According to Statistics Makassar (2002), the sex ratio between male and female in Makassar is considered. Therefore the sex ratio of respondents is closely equal.

**Table 2.1: Actual number of Consumers and number of Respondents**

District	Zone	Consumers	%	Respondent
Bontoala	12	7.540	53.75	43
	17	1.370	25.00	20
	24	4.309	21,25	17
Total		10.049	100	80

Source: Info PDAM Kota Makassar, June 2005: 17

## 2.2 Data Analysis

Data analysis is the process of arranging a series of data, organizing it in a model, pattern and category so that the main themes of the interrelation of those themes and its implications can be discovered. Data that have been analyzed in this research are documentary evidences, interviews and questionnaires feedbacks.

The analysis of documentary evidences are used to supplement information obtained from interviews and questionnaires. Bell (1999) mentions that the analyses of the documents could be divided into external and internal criticism. External criticism aims to discover whether a document is both genuine and authentic. Internal criticism aims at analyzing the content of a document, including the analysis of the purpose of publishing the document, which produced the document, the circumstances when it was produced, and also particular political affiliation that might possibly influence the emphasis of the document.

Responses to verbal questions during interviews were written in separate sheets based on the types of issues. This will allow all items to be scanned in order to see whether there are any recurring themes (Bell, 1999). Raw data taken from interviews and questionnaires need to be recorded, analyzed and interpreted. A summary sheet in the form of a table is important to picture the trends of information gathered from the questionnaire feedback. Then, those sets of data can be analyzed quantitatively and qualitatively (Hasan, 2002). A quantitative analysis aims to present the result in figures and tables. A qualitative analysis will give some interpretation and description to the figures. Finally, a descriptive analysis is done to see the generalization of data based on the objectives of the study in order to conclude findings.

## 2.3 Data Limitations

Usually, the most significant data limitation of a research like this will be such as defensive attitude and limited information. Reluctance to provide relevant data has limited the information that was supposed to be collected. However, this has been handled by collecting supporting data from related institutions such as Ministry Public Works (Former Kimpraswil), PERPAMSI (Indonesian Association of Water Authorities) and Makassar Water Authorities (PDAM), regarding the water quality performance. The result of selected management problem was conducted by Project Cycle Management (PCM) workshop, which was reported by the Japan International Cooperation Agency (JICA). There is also some possibility that the interviewees responded based on their personal perceptions. Collecting supporting materials published by related institutions covered those limitations.

My personal inexperience in statistical calculation and analysis is another limitation in this research. However, the intention of consumers' survey is to investigate the actual level of service from the consumers' point of view. Their responses on the questionnaire are solely based on their own perceptions and expectations on the service delivery. My personal approach of addressing the respondent during the interviews makes it possible to extract the very basic problems on the water service according to the consumers' experiences.

Comparison of the surveyed information with the annual survey carried out by Makassar Water Authorities (PDAM) and PERPAMSI in previous years has been considered as a means to validate the data. Other means in validating the data is the triangulation method through reconfirmation of the consumers' problem with the representative of local customers association / YLKI.

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### CHAPTER 3: PRESENT CONDITIONS OF RIVER BASIN MANAGEMENT

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The main river basin in South Sulawesi Province is Jeneberang River with a catchment area covering 760 km<sup>2</sup>, originates from Mount Lompobatang (el. 2.874 m) running and pouring into Makassar Strait. Administratively it is divided into three part boundaries of basins, such as Gowa Regency 96.3 %, Takalar Regency 2.1 % and Makassar City 1.6 %. Jeneberang river basin is under tropical climate with high and constant air temperature. The total amount of annual rainfall based on the gauging at Kampili rainfall station is estimated at 2.730 mm (87 %) in a rainy season and 360 mm (13 %) in a dry season. Water pollution of human activities can be assessed by biochemical index such as high concentration of BOD (Biological Oxygen Demand), COD (Chemical Oxygen Demand) and SS (Suspended Solid) (JICA, 2004).

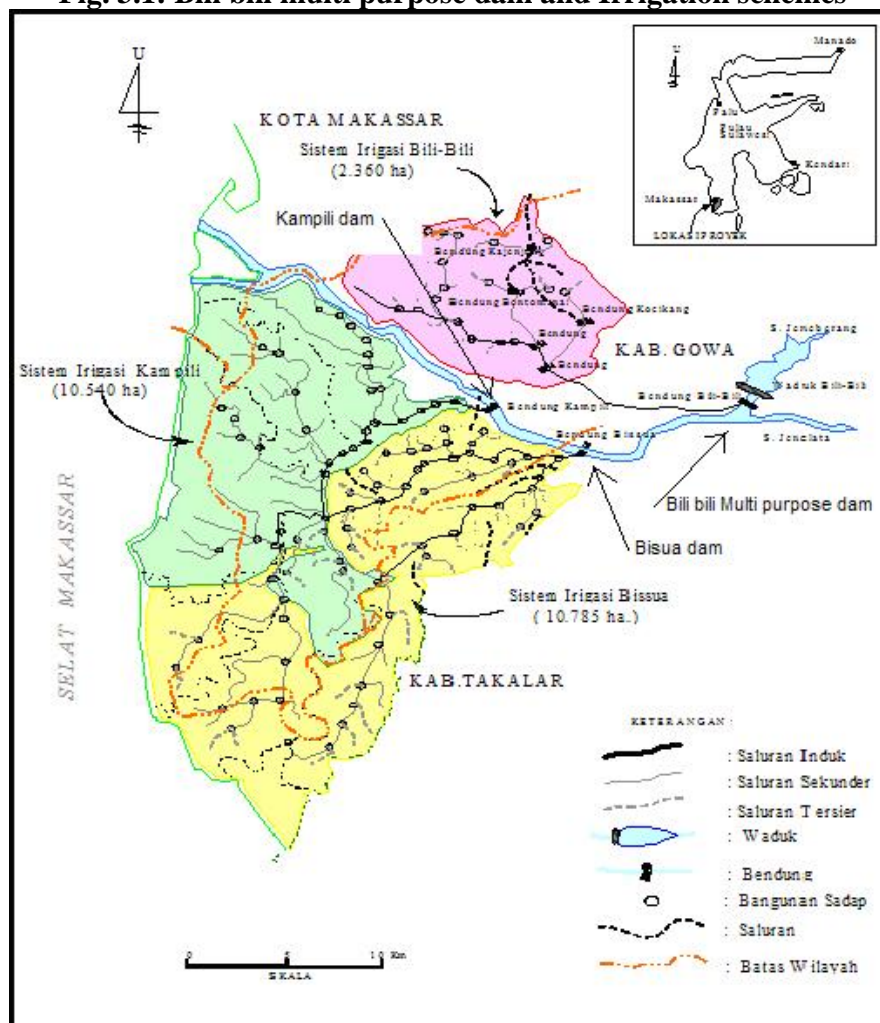
In order to reach the Millennium Development Goals (MDG), Government of Indonesia (GoI) set up a transformation of organizations from centralization to decentralization. Through decentralization policy both authorities and responsibilities for water resources management have been transferred from Central Government to Provincial-Regencies and Municipalities. In the new framework of irrigation management the irrigation assets and staffs have been transferred to Local Government. The irrigation reform under the new issuance of Water Resources Law No. 7/2004 is a replacement of Irrigation Law No 11/1974 that water resources are totally controlled by the minister in charge of the Central Government (Pasaribu, 2005).

The history records of regulation listed is based on legal and institution frameworks (Appendix D1 and D6) and connected with four main areas of legislation of water resources management in Indonesia: a) relating to control of water resources b) dealing with regional administration c) dealing with funding and taxation and d) dealing with the public corporation (JICA, 2004).

Jeneberang River Basin administratively is divided into several areas including Gowa area that occupies a substantial part of the river basin and the whole catchments of Bili bili multi purpose dam. White area in the up-right side of map below shows a location of Bili bili multi purpose dam. Each color is indicating each irrigation scheme: yellow, pink and green are indicating the boundary of **Bissua** scheme 10.785 ha, **Kampili** scheme 10.540 ha and 2.360 ha at **Bili bili** Irrigation scheme (Fig. 3.1). Currently, Jeneberang River Basin is operated and maintained by Jeneberang River Basin Development Project (JRBDP). JRBDP are working under Central Government of Indonesia.

In order to increase the national policy and economic development, a number of attempts have been made by the GoI (Government of Indonesia) since 1970s. The political commodities in Indonesia are rice productions. Interestingly, the GoI agreed for a foreign investment-JBIC (Japan Bank for International Cooperation) of 935 billion Rupiah or equivalent to \$US 93.5 million, including water resources, distribution, flood control facilities and watershed management (JICA, 2004).



**Fig. 3.1: Bili bili multi purpose dam and Irrigation schemes**

Source: JICA, 2004: 7-35.

### 3.1 Water Resources Agencies

There are three types of organizations concerning water resources: Central, Regional and Provincial government agencies, and foreign funded projects. In order to get better understanding what they have done, I will describe the water resources agencies in relation to the Jeneberang river basin management.

#### 3.1.1 Central Government Agencies

The Central Government has seven agencies supporting each river basin management in Indonesia. Institution with major support to river basin management is Directorate General of Water Resources (**DGWR**), acting and reporting to the Ministry of Public Works (former Ministry of Human Settlement and Regional Infrastructure or Kimpraswil). They are responsible for and supporting the Regional Governments through various Directorate General, such as

control of irrigation service fees under the Ministry of Home Affairs (MHA). The Ministry of Agriculture (MOA) is responsible for watershed and soil management in un-forested areas and supporting services to farmers using irrigation. The regional office of watershed management is reporting to Directorate General Land Rehabilitation and Social Forestry Affairs in Ministry of Forestry and Plantations (MFP). Ministry of State-Owned Enterprises (MSOE-BUMN), originally part of the Ministry of Finance, is responsible for all matters concerning the establishment, operation, performance and funding. Ministry of Finance (MOF) is managing the classification and evaluation program for tax of land and property (PBB/Pajak Bumi dan Bangunan), which is redistributed to the Regional Government and can be used for operation and maintenance of irrigation funding.

**Coordination Team** / Tim Koordinasi, re-established under presidential decree No 123/2001, should be provided on the top-level coordination of policies and strategies in water sector. This interim arrangement has evolved into National Water Resources Council of Ministers who is responsible for various aspects of Water Resources Management (WRM). This is a central agency related to policy formulation, guidelines, development, dissemination, regulation, and control and setting standards. Some agencies are supervising and supporting the farmers. Other agencies have the responsibility and acting to collect taxes.

### 3.1.2 Regional and Provincial Government Agencies

Here we can identify eight different agencies:

- (I) The Technical Implementing Unit (TIU) called Balai PSDA, who is responsible to the Provincial Water Resources Management Service (Dinas PSDA).
- (II) The **Coordination Committee for Water Resources** at Provincial level or Panitia Tata Pengaturan Air-PTPA.
- (III) The **Committee for River Basin Water Resources Management** (Panitia Tata Pengaturan Air-PTPA) which acts at Jeneberang river basin level.
- (IV) Kabupaten / Kota level, The Kabupaten or Kota (Water Resources Service)
- (V) **The Water User** or farmer level, responsible for operation and management of tertiary irrigation system, P3A (Water User Association) and higher level farmers.
- (VI) The Basin level management agencies either Provincial Technical Implementation Units (TIUs) or (Unit Pelaksana Teknik Dinas-UPTD).
- (VII) The BAPPEDA (**Regional Development Planning Agency**) is responsible of planning and development and
- (VIII) The BAPEDALDA (**Provincial Environmental Agency**) is responsible for controlling and managing of general environments. Both of the last two agencies are responsible to the Governor of South Sulawesi Province.

Both the Central and Regional agencies have the same task but in less scale than the provincial level, such as policy formulation, administration, development, dissemination and management of technical implementation, regulation and control. Some agencies acting as supervising and procurement agencies, in order to establish the new institutional structures and financing system, and serving as more effective platform in sustainable water governance that requires efficient, effective and sustainable water management for the prosperity.

Several agencies are conducted of monthly water quality monitoring system in all rivers including Jeneberang River: BAPPEDALDA (Provincial Environmental Agency), Dinas PSDA (Provincial Water Resources Management Service), and JRBDP. The location at Bili-bili Power generator is conducted by State Power Authority-PLN and the locations monitoring of Makassar and Gowa water authorities are located at their own water treatment plant (JICA, 2004).

The commitments to the water management with good governance (government, ministers, agencies and authorities) are necessary also as well as stronger budget allocation. Support and commitments from civil society, business leaders and opinion makers are needed. Based on economic analysis reviewed both by SIWI and WHO in relation to water development and management, showed that water resources management and feasible investments in hydraulic infrastructure such as dams, irrigation schemes and flood control works can be established (SIWI, 2004).

### **3.1.3 Foreign Funded Development Projects**

Foreign funded development projects in relation to River Basins are known as **Proyek Induk** (Proyek Induk Pengembangan Wilayah Sungai Jeneberang-PIPWS Jeneberang) or **JRBDP** / Jeneberang River Basin Development Project. They have published several studies: 2 Master Plans for river basin development completed in 2002, 5 Feasibility Studies for smaller dams completed in 2001 and detail design of 120 embung (small reservoirs). They planned and built water construction facilities: 48 small reservoir (called embung), a multi purpose dam completed in 1999, a rubber dam at Jeneberang river completed in 1997, a longstorage dam completed in 1993, a regional pond and a set of Pampang major drainage channel completed in 2001, major drainage channel of Kota Makassar completed in 1993, 4 sabo dams and 4 sand pockets (sabo/sand pocket are water construction for catch silt and sand) completed in 2001, raw water transmission main (RWTM) supplied from Bili bili multi purpose dam to Somba Opu water treatment plant, a Flood Control Infrastructure completed in 1993, and environment improvement around Bili bili multi purpose dam such as green belt and arboretum (JICA, 2004).

### **3.2 Present Condition of Water Supply Sector**

2 of every 10 people on earth are lacking access to safe water supply, and 4 of 10 people are lacking access to basic sanitation services; 90 % of 5.000 people who are dying by diarrhoea disease everyday are children not older than 5 years of age. Many women and girls spend hours (often 4–6 hours) everyday fetching and ferrying water, which effectively preclude girls from obtaining an education (SIWI, 2004).

The deputy of Conservation of the Environment at Ministry of the Environment, Mr. Sudariyono, stated that the potential for water resources in Indonesia reached 15 000 cubic meter per capita each year. The number is higher than the potential in general world supplies that only reached 8.000 cubic meter per capita each year. FAO (Food and Agriculture Organisation) categorized Indonesia as the country with level of 33 of 147 countries surveyed. Actually, the figure of water allowance accessibility is only 40 percent, according to Sudariyono, which leads to a decline of the water potential in many areas. Decline in potential water was triggered not only by denudation and pollution but also many areas arrested water caused by changing function of

forestry. This condition is a worst crisis; precisely it happened in various areas, especially the Java and Bali Island that experienced serious environmental damages. It also happened in the West Nusa Tenggara Province (NTB), South Sulawesi Province (Tempointeraktif, 2005).

### 3.2.1 Large Dependence on Non Treated Water Sources: Service Area Problems

According to company profile (June 2005) the water supply service area of Makassar Water Authority covers 55.2 % of households in the service area of Makassar Municipality. In other words, a lot of people in the service area still rely on groundwater from shallow wells. Gowa water authority also has services coverage less than 50 % due to wide coverage areas. Another more than 50 % are supported by shallow wells. In 2003 Gowa Water Authority bought bulk drinking water from Makassar Water Authority of 184.350 m<sup>3</sup>. The average tariff was 1.881 Rupiah/m<sup>3</sup> or 0,19 /m<sup>3</sup>. Data recorded is manually without computerization. The Makassar and Gowa water authorities are taking their raw water directly and indirectly from Jeneberang River for water municipality and industrial purposes. Another industrial purpose is the Sugar factory in Takalar Regency / PTPN IV (JICA, 2004).

### 3.2.2 Existing Water Supply System

Water Treatment Plants in Makassar and Gowa Water Authorities are listed below:

**Table 3.1: Existing Water Treatment Plants of Makassar and Gowa Water Authorities**

Name of WTP	Source	WTP Capacities (l/s)	Year of Start
<b>MAKASSAR</b>			
1. Ratulangi	Jeneberang River	50	1924
2. Panaikang	Maros River	1.000	1977
3. Antang	Maros River	90	1985
4. Maccini Sombala	Jeneberang River	200	1994
5. Somba Opu	Jeneberang River/Dam	1.000	2001
<b>GOWA</b>			
1. Pandang pandang	Jeneberang River	200	NA
2. Tompo Balang	Jeneberang River	40	NA
3. Bajeng	Jeneberang River	20	NA
4. Borong Loe	Jeneberang River	20	NA
5. Malino	Spring	15	NA

Source: JICA, 2004: 8-11

The largest water user in this river basin is Makassar Water Authorities which are serving water to most part of Makassar City. The currently total of water production at about 2.340 l/sec of the existing water treatment plants owned by Municipality, the water sources of 1.250 l/sec or about 53 % rely on the Jeneberang River throughout a year (JICA, 2004).

The Bili bili multi purpose dam has an existing storage capacity of 305.0 million cubic meters for water supply allocation, providing to 23.690 ha of agricultures or equivalent to 327 million cubic meters, with river maintenance flow of 1.000 m<sup>3</sup>/s, and for municipal water supply of 107.3 million cubic meters or 3.4 m<sup>3</sup>/s. The raw water of transmission main with capacity of 3.3

m<sup>3</sup>/s completed in 1999. The existing Somba Opu water treatment plant is located in Sungguminasa (Gowa Regency). However, the capacity of the plant is limited to 1.1 m<sup>3</sup>/s. The Makassar water demand in 2020 is projected to total amount of 195.9 million cubic meters or 36 % of the existing Bili bili multi purpose dam of 305.0 million cubic meters. Based on the projected and existing storage of capacity described, this amount of total allocation of the existing storage capacity of water is under control or safety (CTI, 2001). The continuity of raw water supplied by Makassar Water Authority is discharged from both sources of Bili bili multi purpose dam and Jeneberang River.

The two water resources of Makassar Municipality and Gowa Regency, Jeneberang River and Lekopancing Weir are resources with water quality problems. On the other hand, service area of Gowa Water Authority is fully dependent on the water resources of the Jeneberang River basin. The local Agency of Planning was informed that Jeneberang was being extracted since last year to the Paper factories in Gowa Regency and the Sugar factory in Takalar Regency. The water pumped to the Sugar factory at about 500 l/sec for use of processing in factory as well as irrigation for field in the plantation (JICA, 2004). The present water use of the Jeneberang River is shown in Fig. 3.2 below.

### **3.2.3 Taxes Paid by Water Authorities to the Central and Local Government**

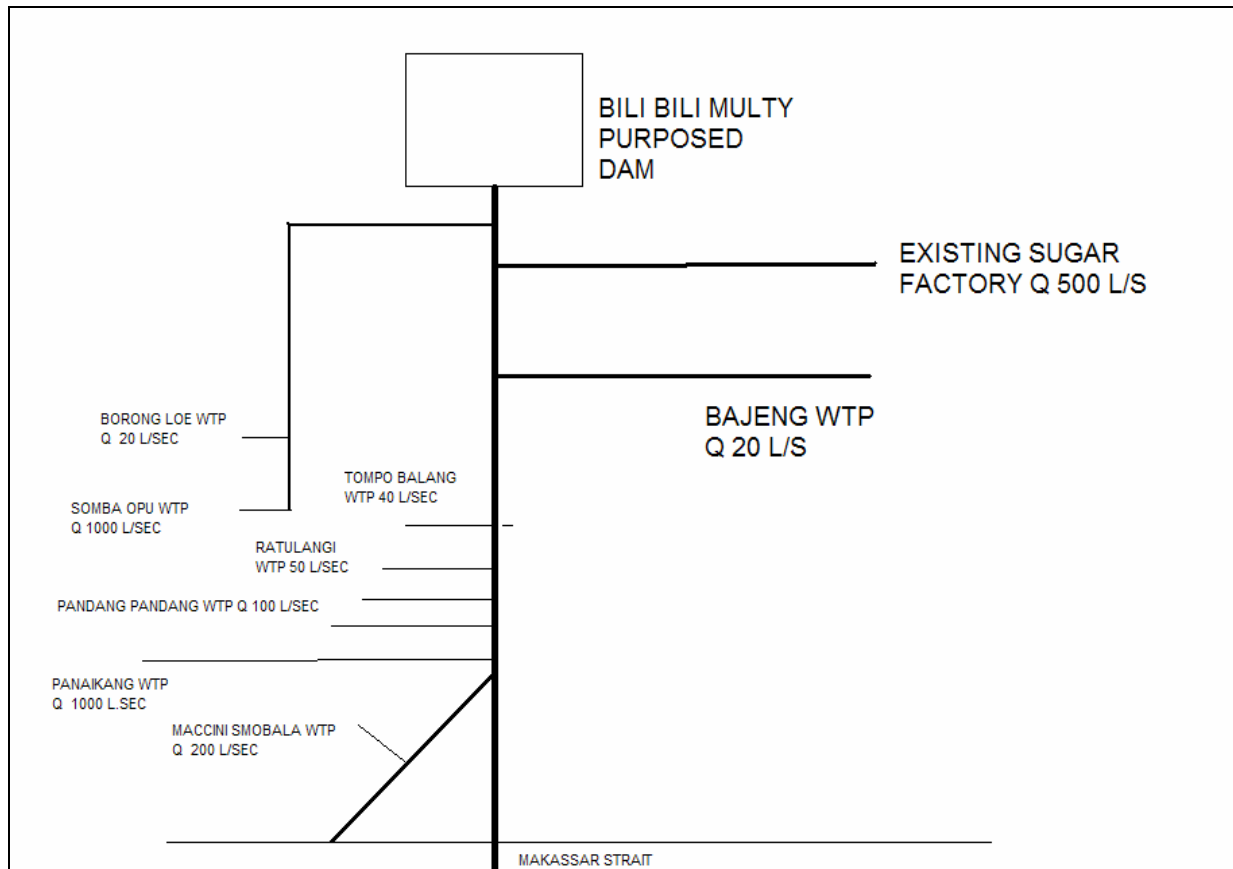
Based on the rule of autonomy, the total amount of water used for all activities should be paid to the Central and Local governments. Both Makassar and Gowa Water Authorities of taxes have been paid annually to the Provincial government of South Sulawesi the amount of 10 Rupiah / m<sup>3</sup> for year 2003 or \$US 0,001 /m<sup>3</sup>, based on the Provincial Regulation No 3 /2002 (regarding Underground and Surface Water Use Tax and Government Regulation No 65/2001). On the other hand Gowa Water Authority has received a financial assistance from Central and Local governments through supply of distribution pipes (JICA, 2004).

### **3.2.4 General Tendency of Water Consumption**

The water service ratios in surrounding regencies such as Gowa and Takalar Regency are smaller than Makassar City. The number of household served by Water Authorities and annual water production in 2000 in each Water Authorities (PDAM) are summarized in Table 3.2. JICA projected in 1985 the water demand in the Makassar service area for 2005 to a total of 326.000 m<sup>3</sup>/day or 3.780 liter/s, which consist of 72 % of domestic water demand and 28 % of non domestic water demand. The total of municipal water demand in the service areas both Makassar and Gowa Water Authorities in 2020 are projected to be 164 million cubic meters for water (5,215 liter/s) and 25.6 million cubic meters for water (810 liter/s) (JICA, 2004).

### **3.2.5 Operation and Maintenance of Water Supply Production Facilities**

Bili bili multi purpose dam is providing services such as flood control and water supply to agricultural and domestic users. Power generation will be available in 2005. Those facilities provide an opportunity to improve livelihoods, increase incomes and reduce vulnerability.

**Fig. 3.2: Water use at Jeneberang River**

Source: JICA, 2004: 8-28

**Table 3.2: Area Coverage, Number of households Served and Annual production  
In 2000**

		City /	Regencies	
	Unit	Makassar	Gowa	Takalar
<b>(1) Area Coverage</b>				
Service Area	km2	175.0	79.5	55.5
Area coverage ratio	%	100	4.2	9.8
<b>(2) Service Coverage in Household Number (Hh)</b>				
Total number of Hh	Nos	237.085	2.315	919
Number served	Nos	30.7	2.2	1.9
Service Coverage ratio	%	175.0	79.5	55.5
<b>(3) Annual Water Production</b>				
	1000 m3/year	16.239	348	68
Percapita consumption	l/day	120	86	42

Source: CTI, 2001: 8-14

Water canals, drainage and irrigation are also part of an infrastructure stock that water management and services rely on. It is obvious that water storage and hydropower infrastructure benefits on economic growth and poverty alleviation. The existing facilities on the Jeneberang River are built and operated mainly for the main flood reason. From its beginning of colonialism era, Makassar has been prone to flooding due to its unfavorably low location on the coast of the Makassar Sea and the habitat of Jeneberang River. It is situated within the river basin of several rivers, transporting large amounts of water during the rainy season. The problem is aggravated by the rapid urbanization along with severe water extraction, leading to steady sinking of the ground water level. As the past colonial and postcolonial anti-flooding measures were often strongly lacking behind the rapid growth of the city – parts of them being implemented when the city population and built area were extended already two to three times – comprehensive water and urbanization planning should be aimed for.

The existing of water intake facilities on the Jeneberang River are operated and maintained by the owners of water treatment plants (Makassar and Gowa Water Authorities and the Sugar factory in Takalar Regency) with an exception of raw water transmission main and chambers (RWTM) owned by the JRBDP. The intake facilities of RWTM across 17 km of a single concrete pipeline, with the range of diameter 1,650 – 1,500 mm and supplied water from Bili bili multi purpose dam to Somba Opu Water Treatment Plant (JICA, 2004).

### **3.2.6 Environment Law and Environmental Impact Assessment (EIA)**

Poor people in particular are directly dependent on the ecosystem goods and services for their livelihood. SIWI (2005) reported that in Uganda the use of inland water resources is worth almost \$US 300 million a year in terms of forest catchments protection services.

The root of regulation on Indonesian environmental policy is the Law No. 4 1982. It is concerning to the main rule of national environmental management. It is stated that the management of environment should be based on the principle of sustaining harmonized, and balanced environmental capability in such a way as to support the process of sustainable development for the purpose of increasing human welfare. This law acts as an “umbrella provision”, so that at the operational level it should be complemented by a set of environmental legislation, both at national and provincial levels.

One important peripheral aspect of this law is Government Regulation No. 51, 1993, concerning Environment Impact Assessment (EIA), which is basically the operational step of Law No. 4, 1982, which states that all planned activities which are considered to have a significant negative impact on the environment are obliged to be complemented with EIA documents.

As mentioned earlier EIA is compulsory for planned activity which might affect the environment significantly. This implies that not all planned agricultural activities should be accompanied by EIA documents. Instead of EIA documents, the plan of activities which are considered not to have a significant impact on the environment or which can avoid such an impact by the use of available technology, should have Environmental Management Effort (Upaya Pengelolaan Lingkungan-UKL) and Environmental Monitoring Effort (Upaya Pemantauan Lingkungan -

UPL) documents. EIA or UKL and UPL documents must be completed before building construction and land clearing etc.

Therefore, the study of EIA has to be conducted after the principal and location approval are issued by the government and must be finished before physical construction is initiated. The documents of EIA or UKL and UPL are required to obtain a permanent business license. To control the quality of the EIA documents and compliance with the reference made by the government, EIA commissions have been established in each Technical Department /Ministry (Selintung, 2000).

The main task of the commission is to evaluate and to give formal approval of the documents. For agricultural investment at the national level, a National EIA Committee, chaired by the Director-General of the Agency for Agribusiness, undertakes the evaluation of EIA documents. UKL and UPL documents are not evaluated by the EIA Commission, but are directly evaluated by the technically related institution responsible for the activities being planned, such as the Directorate-General for Food Crops, Estate Crops, etc. The EIA suggested that the project and resettlement areas needed protection and improvement, and so required some environmental work to be done. Bili bili multi purpose dam construction began in June 1992 and scheduled to be completed by the end of 1998, but was actually finished one year earlier, October 1997. The reservoir began filling and reached an elevation of +59.0 m by November 27, 1997. Appropriate technical information was used when to decide to build the dam and to design the structure. In order to cut costs, the geologic information for the foundation of the dam was collected only every 500 m instead of the planned every 100 m (Ibid).

The EIA was not used to decide on which site to choose and it was done after the Construction documents were completed. The EIA failed to mention a number of problems that developed after the dam was completely finished. For instance, after the river flow was reduced in the downstream sections, saltwater intruded further into the river and it rendered two drinking water intakes which were unusable. It has been necessary to build a sand pocket and rubber dam to control salt water intrusion. Sand mining continued below the dam, but the reduced sediment flow has caused the river bed elevation to decline and threaten the Sungguminasa Bridge. Jenelata River that joins the Jeneberang just below the dam is the only source of sediment to replenish the sand mining. The EIA also failed to adequately measure the sediment flow from the upper reaches of the river into the reservoir. New calculations done in 1994 put the sediment load at 1.794 m<sup>3</sup>/ km<sup>2</sup> /year, essentially doubling the sediment flow calculated when the dam was being designed. This means that the reservoir has a life of only 25 years, not 50. However, in order to overcome the sediment problems, eleven sand pocket dams and four Sabo dams are being built upstream. The EIA also looked at the social and economic impact of the dam and projected the need for resettlement of several villages, and construction of a section of the major road to Malino. One of the resettlements was not at all successful and the village disbanded. The other at Liner C is built, but the market area appears unused, and the spacing of the houses makes it look less like a village than other settlements in the area (Ibid).

CTI Monthly Monitoring Report in 2001 reported that the negative impacts related to the Bili bili multipurpose dam construction work are the turbidity of water, dust and noise. The condition of Sabo Dam and Sand Pocket (water infrastructures to collect and catch sand and silt) indicated no



serious erosions occurring in upper Jeneberang river basin while Sabo and Sand Pocket were constructed. The sedimentation into the reservoir should be carefully controlled. The level of turbidity and color are below the standard requirements. Turbidity is detected with value of ranging from 4.33 to 11.67 mg/l ( $< 25$  NTU). The Water color level measured ranging from 18.33 to 48.33 TCU (standard requirements is 50 TCU) (CTI, 2001). In contradiction, a survey and also a film documented after the landslides, showed that the sedimentation were a case of emergency. The problems are not only agriculture damages of highly polluted suspended solid but also problems with water treatment facilities and Bili bili multi purpose dam (Ageng, 2005). Monthly Monitoring report (2001) of water quality monitoring activities was carried out in upper and lower areas of the dam. Upstream areas conducted with 5 different of locations point of rivers: Terong River: 2 points, Jonggoa River: 1 point, Sand Pocket No 4: 1 point and Mangempang River: 1 point. Downstream samples were taken at 4 different locations (points) at outlet of the dam: 2 points and at Kampili Weir: 2 points. The water quality at Bili bili multi purpose dam in 2001 also recorded the amount of Nitrogen total (N-T), Nitrogen ammonia (N-NH<sub>3</sub>), Nitrogen-nitrite (N-NO<sub>2</sub>), Phosphor: Nitrogen total: 0.123-0.134, Nitrogen ammonia: 0.027 – 0.032, Nitrogen-nitrite: 0,026- 0.030, Phosphor: 0,023-0.032 (mg/l). All values are in accordance with those national standard requirements (N-NH<sub>3</sub>  $< 0.5$ , N-NO<sub>2</sub>  $< 1$ , N-NO<sub>3</sub>  $< 10$  (mg/l) except no water quality standard for Phosphor (CTI, 2001).

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## CHAPTER 4: HUMAN RESOURCES REVIEW IN WATER UTILITIES

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One of the important implications for Human Resources (HR) is globalization. Globalization impacts on HR in various ways. Thus compared to the past, enterprises will need to update much more regularly the mix-skills of their employees, responding to the opportunities or threats created by globalization and rapid technological changes. The changes of attitudes, knowledge and skills of the workforce of the corporate culture of water enterprises and its support will determine the quality of the human resources, also processes behind its products as well as services. This is the main reason why human resources are connected to water utilities. In this chapter, I will describe the requirements of HR in order to establish a Public Corporate in the Jeneberang river basin.

As a starting point I will discuss human resources in relation to capacity building, capacity of irrigated farmers, the Millennium Development Goals, Human Development Index and indicators.

All traditional practices of historical water resources in Indonesia, such as **Tudang Sipulung** in South Sulawesi, was acted and supported by supervisors responsible to controlling and managing the water resources. They were responsible to open and close the water gate daily in the rice fields for changing water rotation to the farmers. Some of them were acting to facilitate to water users when a water problem occurred which lead deliberation (Musyawarah) among both farmers and customers.

Church (1999) reported that the Dutch introduced Western education in order to provide the skilled labor needed by the expanding colonial economy. The best schools were used by the Dutch as the medium of instruction, graduation from which led to better paid administrative jobs or the possibility of entering a University in the Netherlands, or the medical and law schools in the colony. Entries to these schools for Indonesians were very difficult and those few on scholarships were restricted to children of the indigenous elites or government officials. It was easier to get a modicum of education in schools where the medium of instruction was the vernacular language.

### 4.1 Capacity Building

Indonesian National Planning Agency (BAPPENAS) defined that capacity is ability of individual and organization or a system to perform functions and meet objectives effectively and efficiently. Water quality, in certain watersheds, has deteriorated drastically from in-stream and off-stream pollutants. Some water storage reservoirs in cities have reached *eutrophication* condition. Even in the countryside, where population clusters are often concentrated along canals and streams, water of appropriate quality for domestic use is becoming increasingly scarce. Improved and more focused government, private and public sector participation and commitment are needed to ensure environmentally responsible management of water quality (Bappenas, 2005).

Process of decentralization has been more successful than many people expected. Responsibility for some 2.2 million central civil servants is reassigned to the regions, along with control over 16,000 service facilities. All of this happened without any major breakdown in services. Nevertheless there have been a number of problems. One of the most critical has been the unclear distribution of functions between the central government and the regions. There have also been staffing issues: both provinces and districts have found that they have had to absorb more government workers than they could immediately make use of and as a result they have had to spend more than they would have wanted on routine expenditures and less on service delivery. Meanwhile there is still a shortage of qualified staff: many of the officials now in place are there more because of influence peddling than because of merits (BPS, 2004).

Alaerts (1998) promotes that the important element of capacity building are: the creation of an enabling environment with appropriate policy and legal frameworks, human resource development and the strengthening of managerial systems; institutional development, including community participation. It is necessary to increase human capacity at the same time as projects are implemented if the full benefits are to be realized. Indeed, there are many programs in the water sector, which are now primarily focused on developing human resources rather than physical infrastructure.

#### **4.2 Capacity of Irrigated Farmers**

Water quality has declined rapidly in the past ten years due to massive industrialization, urbanization and a lack of legislated institutional capacity to control or remedy water pollution. Water quality in certain watersheds, has deteriorated drastically from in-stream and off-stream pollutants. Some water storage reservoirs have reached a condition of eutrophication. Even in the countryside, where population clusters are often concentrated along canals and streams, water of appropriate quality for domestic use is becoming increasingly scarce. Improved and more focused government, private and public sector participation and commitments are needed to ensure environmentally responsible management of water quality. Strengthen the capacities on local levels (farmers, water user groups, governmental agencies and advisors), particularly for rain fed agriculture and its contribution (SIWI, 2004).

#### **4.3 Millennium Development Goals (MDG)**

Nowadays, many agencies concerning the water resources in eastern Indonesia have been established in order to reach the goals. Most of the organizations receive new tasks as well as regional autonomy. The key success of the regional performance is depending on how they will avoid confusing among agencies. Therefore the awareness plan to clear regulations and directives is necessary. They have responsibility not only to provide water to farmers by irrigation but also to reach the MDG commitments. In order to achieve the MDG, governments and local agencies, including private corporations should have good cooperation among them. Cooperation is a challenge to organization performances in general and business organization in particular, it is needed in continued organization learning through strategic human resource management (Hamzah, 2001).

The Central Governments are trying to meet the global challenges of reaching the Millennium Development Goals. The Millennium Development Goals report in 2005 noted that the proportion of population using safe sources of drinking water in the developing world raised from 71 per cent in 1990 to 79 per cent in 2002. The most impressive gains were made in Southern Asia. This jump was fuelled primarily by increased coverage in India, home to over 1 billion people. The good news gains in all regions since 1990 is counterbalanced by the fact that 1.1 billion people were still using water from unimproved sources in 2002. In sub-Saharan Africa, where 42 per cent of the population is still un-served, the obstacles to progress, which include conflict, political instability and low priority assigned to investments in water and sanitation, are especially daunting given high population growth rates.

To achieve the MDG in Indonesia with a growing population that will continue to drive the increasing demands for resources, including water and related services will not be easy. The MDG are important but difficult objectives. The goals are also realistic and concrete but still go only half way towards ending absolute poverty. When they are achieved not only poverty alleviation and inadequate supply of water, but also sanitation and poor water resources management will remain major issues.

Indonesian MDG results (1995- 2002) show that the water coverage in rural and urban areas reached the percentages of 68.5 to 91.4. This MDG data (Table 4.1) was given by an employee of Ministry Public Works to the author during electronic discussion at Yahooogroup / AMPL (Air Minum dan Penyehatan Lingkungan).

Table 4.1: Indonesian results of water coverage for the Millennium Development Goals

Item	1995	1996	1997	1998	1999	2000	2001	2002
Urban	87.3	89.1	90.8	90.8	91.7	90.1	90.6	91.4
Rural	57.4	61.5	65.7	67.3	67.7	68.7	67.0	68.5
Total	67.7	71.4	75.0	76.4	77.1	78.2	77.2	78.7

Note: Susenas: Social Economic Surveys

Source: Susenas and Unicef, 2004 in Yahooogroup / AMPL.

The Indonesia MDG report highlights the need for more attention to certain areas. The quality of basic education needs to be addressed, while children need to complete the required nine years of basic education. The country has been successful in eradicating extreme poverty and is on track for achieving its MDG target for poverty, but the poorest and most vulnerable groups need more attention (UNICEF, 2003). During the economic crisis in Indonesia, started in mid 1997, the magnitude of the poverty rate increased by 164 percent from its lowest point in mid 1997 and to its highest point near the end 1998. Afterwards, the reduction in poverty incidence seemed to be fairly widespread across the regions including Sulawesi Selatan Province (Sumarto, 2005).

In 2004, the National Human Development Report of Indonesia indicated that the basic human development fund amount to 50 trillion Rupiah or \$US 5.9 billion per year (Bappenas, 2004). Poedjastanto (2004) expressed and estimated the fund attainment of Indonesia MDG in drinking water area equal to 45 trillion Rupiah or \$US 4.500 million. The investment above is including 5 trillion Rupiah for drinking water (Air Minum No 108, 2004).

#### 4.4 Human Development Index and Indicators

Indonesian National Human Development Report (BPS, 2004), reported that Indonesia's progress in human development has undoubtedly been very impressive but should not be a cause for complacency. A number of concerns need to be kept in mind in formulating policies for the future. First, there are millions of people living just above the poverty line who remain vulnerable. Second, Indonesia's achievements should be placed in the regional context. In literacy, health and access to media, Indonesia lags behind other second-tier newly industrializing Southeast Asian countries. Also another indicator, the political economic risk consultation (PERC) surveys, reported that Indonesia is listed in level 12th of the 12 countries, or staying one level under Vietnam (Media Indonesia, 2005).

The Third International Mathematics and Science Studies, showed that the Indonesian primary school student occupied level 34 for Mathematics from 38 countries in Asia, Australia and Africa. The level of educational personal, a number of high school students with 88.4% did not continue to university, and 34.4% of the graduated from primary high school, did not continue to high school. The IEA study (International Association for the Evaluation of Educational Achievement) in East Asia, showed that reading skills of the IV grade student of the primary school was stay in the lowered level. In general the score of the test reading for the student of primary school: 75.5 (Hong Kong), 74.0 (Singapore), 65.1 (Thailand), 52.6 (the Philippines), and 51.7 (Indonesia) (Media Indonesia, June 2005).

The Central Government has an education budget which for 2004 was 21.8 trillion Rupiah or \$US 21.800 million. Of this 14.3 trillion Rupiah or \$US 14.300 million are for primary and junior secondary education. So the total spending on primary and junior secondary education, central and regional, comes to 33 trillion Rupiah or \$US 3.300 million. To fulfil the right to basic education would thus require an increase from 33 trillion Rupiah or \$US 3.300 million to 58 trillion Rupiah or \$US 5.800 million. The overall cost in real terms is likely to come down, since in the early years will reflect additional construction costs for secondary schools. Moreover, the birth rates fall so the number of children will decline. However in broad terms this is the kind of investment that would be needed (BPS, 2004).

This may seem a dramatic requirement but in fact Indonesia's Constitution, amended in 2002, already commits the country to spending more than this. Article 31 (4) says: "The states shall prioritize the budget for education to a minimum of 20 % of the State Budget and of the Regional Budgets to fulfil the needs of implementation of National Education". In 2002, when the proportion was 13.2% this would imply an increase from 47.8 trillion Rupiah or \$US 4.780 million to 72.5 trillion Rupiah or \$US 72.500 million, which, though it includes upper-secondary and tertiary education, should also easily cover the needs for improved basic education (BPS, 2004).

#### 4.5 Nature of Water

Water is a fundamental component of life. Most activities in society depend more or less on water. Humans depend on clean water but pollute it during use, without considering the consequences. The transfer of industrial models in temperate climate, with plenty of dilution

water available in the rivers, to tropical and subtropical regions with a long dry season and very low capacity has been a major mistake (Falkenmark, 2005).

River Basin Administration, Analysis and Management (RBA) in the Netherlands (2001) reported that the problems in river basin management are often much larger outside of Europe than inside. About 20% of the world population do not have access to safe and affordable drinking water. More than 800 million people - 15% of the world population – are chronically undernourished. Many valuable wetlands have disappeared, and many rivers are heavily polluted. Moreover, due to population growth, per capita water availability is projected to fall by a quarter by 2025. Some three to four billion people - nearly half the world population – will live in water-stressed countries. The international character of many of the world's freshwater resources complicates solving the present water crisis. It is often heard that the next war will not be about oil, but about water (RBA, 2001).

Plant growth by its nature consumes a tremendous amount of water. In the process of producing 1 kilogram of grain, between 500 to 4000 liters of water are converted into water vapour - depending on the productivity of water. To produce 1 kilogram of grain-fed beef, it is something more on the order of 10,000 liters. Based on these numbers, each of us “eats” between 2,000 to 5,000 liters of water a day—depending on our diet. Compared to the 2 to 5 liters we drink per day, or the 40 to 400 liters we use for hygiene and sanitation, agriculture dominates humanity's water needs. The MDG seem an almost impossible challenge. It will also be made considerably more difficult by the 2.5 billion additional mouths to feed expected by 2025 (Water and MDG-SIWI, 2005).

#### **4.6 Water Utility as Urban Infrastructure**

In the 1970s, Makassar City stayed close with flooding. Gusli (2001) reported that annual flooding was connected with a number of rice productivity. The farmers with difficulties of productivity influence the regional poverty alleviation effort. The key word is willingness to operate and the ability to maintain water systems. Lost of production was associated with the damage to the first transplanted seedlings. The communities that were given training, both technical and administrative, in operation and maintenance, were collectively able to maintain their systems.

Global Water Partnership defined Effective Water Governance as: a process which promotes the co-ordinated development and management of water, land and related resources, in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital eco-systems (GWP, 2000).

A JICA study of capacity development of a river basin in South Sulawesi has selected indicators related to human development in 2001 such as: life expectancy 12.7 % ratio of improvement, average schooling period 21.4 % ratio of improvement, literacy ratio 6.7 % ratio of improvement. The budgeting for human resources development has been allocated in South Sulawesi, Makassar and Gowa for human resources development in year 2004 which are shown below:

**Table 4.2: Training Center for Water and Sanitation in Eastern Indonesia**

Item	Note
Lembaga Administrasi Negara/LAN	for Administration
Training Centre at Bekasi and Makassar	for Water and Sanitation
Pusdiklat Ministry Public Works	for General Public Works
PERPAMSI	for National level
Water Authorities	for Local and regional level
YPTD / Academic	for Water specialization
YPP- Academic/ Ministry Public Works	for Sanitary and Civil Engineer
Private Universities	for Sanitary and Civil Engineer

Source: Ageng, 2005: 9

The structures of organization type of Water Authorities in Indonesia were guided by the Ministry of Human Affairs standard, and the structure was chosen base on the amount of the customers. The total number of staff of Gowa Water Authority office is 68 persons. The staffs are engaged in operation and maintenance of water treatment plant and water distribution facilities, logistic matters and water tariff collection.

#### **4.7 Human Resources Development in Water Utilities**

In order to anticipate increased public demand on drinking water service, a drinking water service association called PERPAMSI feels it is necessary to develop the human resources in drinking water management through a structured education and training program, regular and sustainable, by establishing an educational foundation in Jakarta known as Tirta Dharma Educational Foundation (Yayasan Pendidikan Tirta Dharma-YPTD). Formal education will be held at an activity unit, while other education and training programs may be held in other towns or regions in accordance with conditions and needs. In accordance with Tirta Dharma Educational Foundation Business Plan 2000-2004, a five years work program is planned in priority scales based on the needs for human resources development and improved institutional capacity. Formal education covering diploma program, advanced educational program and remote learning with training certification of training, skill and management (certification and non-certification) and training for seminar instructors, workshops, exchange of information, innovation development, work contest, research and development and provision of scholarship (Perpamsi, 2005).

#### **4.8 Rate of Salary as Enforcements**

Said, an Indonesian researcher of Hasanuddin University, has been interested in the subject of Empowerment of Human Resources of Civil Servant (Aparatur Negara in Indonesia). He conducted a study in South Sulawesi and East Java during March to October 1999, with 318 respondents. The research focused on the recruitment system, development, establishment, payment of wages, and supervising system of civil servants, analyzed from the personnel law point of view, concerning the government regulation. He stated that the recruitment system is not appropriate to the aspect of quality, because both selection processes and information for applicants are not objective and transparent. In addition, the development system has not met the recruitment of each civil servant. Besides, the establishment is less professionally enforced, even

it's often regarded to hamper civil servants to occupy a certain position. The findings also indicated that salary is still under the standard of living and supervision run by the leader gives no effect to decrease corruption, collusion and nepotism enforcement (Said, 2001).

Paoletto (2001) stated that capacity building could be defined as enhancing the ability of individuals, groups and organizations to mobilize and develop resources, skills and commitments needed to accomplish shared goals. The ultimate goal in considering inter-linkages and capacity building therefore is sustainability. It is a goal that needs to be shared, and there are needs to be committed for its achievement. Cooperation is an obvious element. Capacity building is about people. They have severe problems in coordinating information and activities. Often, there are real disincentives not to effectively coordinate. After attending professional development courses, government officials can and do get promoted without fully implementing learnt skills on the job or for training others.

Many problems on capacity building occur. Terminology of capacity building components is a problem. The communication between stakeholders and government at local levels are generally inadequate. Local people are often insufficiently involved in the development of national policies; however, there are cultural factors involved here that need to be considered in any capacity building program. Government has full responsibility to provide safe water to their citizens. But currently, municipalities have failed to adequately provide water services and sanitation, increasing the risks of water borne diseases, water scarcity, and crop failure. Lack of conservation strategies and improved management should be protected and ensured to the long-term viability of watersheds and water resources (Earth Day Declaration on Water, 2003).

Currently, reservoir storage capacity in South Sulawesi, particularly on Makassar, has low capacity and does little to smooth out seasonal and inter-annual variations of flows on the river systems, except for the Bili bili multi purpose dam on the Jeneberang River. Securing additional surface water availability is still possible through the creation of a long storage reservoir on rivers close to Makassar Strait. The potential storage sites are limited and their development often creates environmental and resettlement problems.

#### **4.9 Human Resources in River Basin Management: Solving the Problems**

“Integrated water resource management is a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (GWP, 2000: 34).

Riita (2005) stated that the human resources strategy should consist of four items: (1) It needs to maintain and renew a well-trained, experienced core group of water resources professionals who can prepare and supervise projects and maintain a high-level policy dialogue, including strategy and economic and sector work. Sector staffs continue to specialize in their sector, but need to improve their knowledge about the linkages to other water sectors in order to make good policy and investment decisions. (2) A specific career stream needs to be spelled out for core water resources management staff in order to attract, maintain and develop the needed talent and skills. (3) A training program is being developed, in a partnership between the Water Resources



Management Group, for core water resources staff. It will include drill-downs in water resources legislation and institutions with practical applications; water resources economics; groundwater, drought and flood management; water and environment issues; and a base course to provide staff working mainly in water-related sectors with a more integrated water resources management perspective. (4) Knowledge management activities.

Decentralization of political and administrative power, combined with a civil service reform, are increasingly prevalent components of health sector reform. The wider implications of decentralization for human resources development, are however, poorly researched and inadequately understood. Organizational structures, roles, and responsibilities may become inappropriate, conflict with each other, and be disputed or poorly communicated. The viability of developing health services and human resources in a coordinated manner may be in jeopardy because of deteriorating databases, reduced planning capacity, inequitable or inappropriate staff allocation, or decentralization-induced difficulties in career development. (Ibid) (For Local level institutions with different tasks and responsibilities see Appendix D1).

World Bank (1998) developed a Human Resources Strategy for water resources by an extensive survey of staff working on water resources. The result showed that 80 percent would consider having water resources, if a family affiliation was an available option. Renewal of experienced staff is a major challenge, with half of staff (the most experienced half) due for retirement in the next 10 years. About 15 percent of the 169 survey respondents spend up to 100 percent of their time on water resources management activities, and half spend up to 25 percent. This implies that water resources management training and knowledge management need to be made available to a wide variety of staff, not only those who work full time on water resources management issues. Surveys results reveal that the overwhelming majority of staffs are interested in training in both water resources management and knowledge management. Needs are greatest for legal, institutional (river basin management, international waters) and financial and economic expertise.

**Table 4.3: Regional Government agencies responsible for manage water resources in South Sulawesi-Eastern Indonesia**

Agencies	Level	Number of Staff
Dinas PSDA	Provincial	165
All UPTDs Provincial	Provincial	467
BAPPEDA	Provincial	4
BAPEDALDA	Provincial	5
Balai PSDA Jeneberang	Kabupaten/Kota	23
Dinas PSDA	Kabupaten Gowa	30
Dinas Cipta Karya	Kota Makassar	57
BAPPEDA	Kota Makassar	4
BAPEDALDA	Kota Makassar	5

Note: Mostly are employees of States / Pegawai Negeri Sipil

Source: JICA, 2004: page 5-1

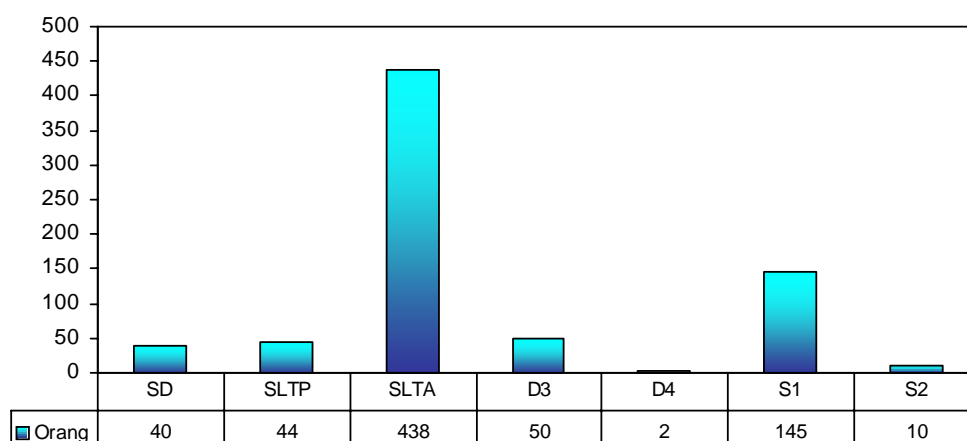
#### 4.10 Human Resources in Makassar and Gowa Water Authorities

About 732 staff personal are employed in the Makassar Water Authority (Perusahaan Daerah Air Minum – PDAM) that provide piped water supply in “Maminasata”, the region surrounding Makassar City such as Makassar Municipality, Gowa and Takalar Regency. Human resources play an important part in efficient services delivery in this sector.

Quantitatively, the water sector suffers from overstaffing. The traditional indicator of productivity in the water sector staff per thousand connections for water utilities in Makassar is 7.1. Even water enterprises in metropolitan cities such as Medan, Bandung, and Surabaya, have average a little over six staff per 1,000 connections. Qualitatively also the picture is somewhat discouraging. The vast majority of staff has only high school or lower level educational qualifications. There are limited qualified sanitary engineers working in the sector. At least 4 sanitary engineer for the biggest water enterprises in eastern Indonesia, which has 180.000 customers; the situation is in fact even worse. The level of education both in Makassar and Gowa water authorities are dominated by high school covered 40 % and 55 % (Fig. 4.1 and Table 4.4).

Local governments influence Water Authorities staff selections, especially at the director and manager level; and have established selection criteria, e.g., qualifications and experiences. Further, about 3 % of Water Authorities staffs are still civil servants. Even more important, it is understood that almost all Water Authorities staff at director level are civil servants, while about 2 % of managerial and supervisory staff are civil servants. These civil servants can be transferred in and out of Water Authorities. Uncertainty of tenure at senior levels hampers the creation of a strong water sector identity in the work force (Ageng, 2005).

**Fig. 4.1: Distribution of Education at Makassar Water Authority**



SD: Basic School; SLTP: Junior high; SLTA: High School;  
D3/D4: Diploma in 3/4 years; S1: Graduated; S2: Post Graduated  
Source: Info PDAM Kota Makassar, June 2005: 31

Human Resources Development support includes capacity building in environmental assessment; environmental education outside the formal secondary curriculum; extension support in key areas such as integrated pest management; action-based learning systems based around pilot projects; regional training and study tours. The numbers of pipe connections in service area of Gowa Water Authorities are 8.275 (JICA, 2004). The staffs are engaged in operation and maintenance of WTP and water distribution facilities, logistic matters, and water tariff collection. The capacity development of staff is usually done through training in Water Authorities in Makassar. The organization of both Makassar and Gowa Water Authorities refer to the Law Ministry of Human Affairs No 7 1998 regarding Management of Water Authorities (PDAM).

**Table 4.4: Human Resources of Gowa Water Authority**

Below High Scholl	33
High Scholl	40
Bachelor's	15
Master's Degree	2
Total	90

Source: Ageng, 2005

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## CHAPTER 5: FINDINGS AND RESULTS OF INTERVIEWS

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### 5.1 Introduction

Both JRBDP and Water Authorities have their own methods in order to increase ability of human resources for staffs and employees by in-house training and external courses. Most of them are trained at the Public Works Department's training centre and Indonesian association for water authorities (Perpamsi) at Makassar and Jakarta or abroad when the fund is available. The Central Government provides an advanced training and series of workshops. The training is connected to administration and technical staffs and top managers. One workshop was entitled Project Cycle Management and Project Design Matrix that will be described below.

The results of the workshops by JICA in 2004 are showed and used as findings that the one core problem in human resources in JRBDP is lack in management skills. How does a core problem occur? And who are the stakeholders involved? What kinds of methods are used? I will try to learn briefly how this method is used as part of a participatory learning of the institutions involved. In next sub chapter, I will describe with a series of interview results related to turbidity, problem in operation maintenance and important aspects for examples establishing a public corporation, privatization and the financial ability of the Local Governments.

### 5.2 Findings and Workshops Results

The findings perceptions of the stakeholder and the results of workshops will be described separately in this chapter. The perceptions and expectations of the customers will be discussed thoroughly in chapter 6 and 7. The perceptions and expectations results were conducted by workshops, e-mails and interviews. The results of workshops in this chapter are containing results from **PCM (Project Cycle Management)** and **PDM (Project Design Matrix)** which were conducted by JICA experts in seven different workshops during 5–25 February 2004 (Table 5.1). These workshops have been held to get ideas among central, regional and local agencies (as stakeholders) in order to evaluate Jeneberang River Basin Development Project (JRBDP). Those results are used as prediction for the establishment of a Public Corporate. This method was conducted separately for an analysis stage and planning stage, the method used is a participatory planning method among stakeholders (JICA, 2004). The charts of causes-effects are shown in Appendix E2, which describe the actual problems on water utilities and river basin management. The results of the PCM workshops are shown completely in Table 5.2 to 5.9; and results of PDM which are related to human resources development issues are available in Table 5.10 and Appendix E3.

### 5.3 Method of Project Cycle Management (PCM)

PCM is a method of managing the entire cycle of a development project from planning, and implementation to evaluation, by means of a project format called PDM (Project Design Matrix).

The complete steps of this method are visualized in Appendix E4. The issues of discussion rose among stakeholders in general, specific and free issues are conducted with help and facilitating facilitators. The process starts by asking sets of questioners provided by facilitators and active workshops, continued by answering and writing keywords using big fonts on cards and clinking those cards on the board. One facilitator helps a person when she or he chose columns available where he or she could decide clinking the cards. Active participants will be an advantage or benefited to the results during workshops. The PCM comprises: Participatory Planning (PP) and Monitoring and Evaluation (M&E). Participatory planning is the target of analysis and planning stage, which consist of:

**Firstly, An analysis of stage:** (Stakeholders Analysis, Problem analysis, Objectives Analysis and Project Selection) and **Secondly, A planning stage:** (Project Selection, Project Design Matrix (PDM), Plan of Operation (PO)) Result of PCM of analysis Stage.

These methods are conducted in order to integrate participant perceptions. People who are motivated to co-operate and are enthusiastic can often make a poor system work well. Conversely, a well designed system may falter if the participants are determined not to work with each other (OECD, 1989). Series of workshops, dates and participants are listed in Table 5.1.

**Table 5.1: Project Cycle Management (PCM) workshops for Analysis Stage**

Date	Topic	Participants
February 5	Jeneberang River Basin Management (general issue)	JRBDP
February 10	Jeneberang River Basin Management (general issue)	Regional committee member
February 12	Operation and Management Facilities	JRBDP, Dinas PSDA, Balai PSDA
February 17	Human Resources management	JRBDP, Dinas PSDA, Balai PSDA
February 18	Financial management	JRBDP, Dinas PSDA, Balai PSDA
February 19	Institutions and Legal Issues	JRBDP, Dinas PSDA, Balai PSDA
February 25	New business	JRBDP, Dinas PSDA, Balai PSDA

Source: JICA, 2004: 11-2

#### **5.4 Results of Project Cycle Management (PCM)**

The findings of important results were conducted by the Project Cycle Management (PCM workshop) held by participatory of stakeholders. The related discussions are concerning Jeneberang River basin management and the establishment of Public Corporation (Perum). The general result shown in Table 5.3 of PCM Workshops done by Regional Committee, indicated that shown coordination among related organizations for river basin management is lacking and also a direct causes: 1) Management skill is lacking; 2) Communication of understanding of importance of water management is lacking; 3) Skill staff in water management is lacking; 4)

Alternative funding source is limited 5) Human resources are lacking and 6) Difficulties in finding a qualified staff (JICA, 2004).

1. General issues and PCM results concerning the Jeneberang river basin management (JRBDP) are shown in Table 5.2 – Table 5.8:

**Table 5.2: Results 1 of General Issues**

Stakeholder Analysis	Stakeholders of the Jeneberang river basin management are grouped into 1) Regulation (decision making) 2) Water users <b>3) Operator (directly responsible)</b> 4) Operator (supporting group) 5) Watcher 6) Fund sources 7) Security.
Core Problem	No maintenance for existing facilities.
Direct causes	Mechanical equipment is limited, coordination among Institutions is not smooth, and some plans are not accurate.
Participants	JRBDP group.

Note: Bold letters represent target group; Source: JICA, 2004: 11-3

**Table 5.3: Results 2 of General Issues**

Stakeholder Analysis	Stakeholders of the Jeneberang river basin management are grouped into 1) Regulation maker 2) Water users <b>3) Operator (service provider)</b> 4) Policy maker 5) Observer 6) Support service provider.
Core Problem	Coordination among relate organization for river basin management is lacking.
Direct causes	Management skill is lacking, communication of understanding of importance of water management is lacking, skilled staff in water management is lacking and alternative funding source is limited.
Participants	JRBDP, Dinas (WRM service, Infrastructure service), Balai PSDA, BAPPEDA, BAPENAS, Regencies, Power-PLN, Water Authorities.

Note: Bold letters represent target group; Source: JICA, 2004: 11-4

**Table 5.4: Results 3 of General Issues**

Stakeholder Analysis	Stakeholders of the Jeneberang river basin management are grouped into 1) Supporting group 2) Regulator 3) Monitoring group 4) Management group 5) Water user group (indirect beneficiaries) 6) Water user group (direct beneficiaries).
Core Problem	Human resources are lacking (difficult to find qualified staff).
Direct causes	Manual/criteria of management does not exist, quality of human resources is lacking, quality of human resources are low, initial fund is limited.
Participants	JRBDP, Dinas (WRM /Water resources Management) service, Infrastructure service) PSDA, Balai PSDA, BAPPEDA, BAPPENAS, PLN (Power) and Water Authorities.

Source: JICA, 2004: 11-4

The outline of Workshops issues are shown in the Table 5.5 to Table 5.8:

## 2. Facility of Operation and Maintenance issues:

**Table 5.5: Result of Operation and Maintenance Issues**

Core Problem	Decision of management staff is not proper.
Direct causes	Skill of management staff is low, monitoring data is not accurate.
Project Selection	- Human resources improvement approach. - Reporting system improvement approach.
Participants	JRBDP, Dinas PSDA, Balai PSDA.

Source: JICA, 2004: 11-5

## 3. Human Resources Management issues:

**Table 5.6: Result of Human Resources Issues**

Core Problem	Skill is lacking (management skill).
Direct causes	Personnel system (promotion) is not systematic, number of skilled staff is not enough.
Project Selection	- Organization structure improvement approach. - Capacity development approach.
Participants	Administration section of JRBDP, Dinas PSDA, Balai PSDA.

Source: JICA, 2004: 11-6

The core problem of General issues concerning the Jeneberang river basin management (JRBDP) is lacking of management skill which is caused by a number of skilled management staff and inefficient promotion. Lack of utilization of experienced staff was identified as caused related to the core problem. This core problem and answered cards put on together on a board by root systematic and problem or solving suggested as causes-effects chart. The causes-effects chart (Appendix E2) are a set of cards which setting and fostering by causes-effects and clinking together in order to get better understanding among the results of participants. Results of the core problem in Human Resources Issues are used in order to rising the activities of a project (Appendix E3).

## 4. Financial management Issues:

**Table 5.7: Result of Financial Management**

Core Problem	Revenue and cost are not balanced.
Direct causes	Revenue is not enough, financial management process is slow.
Project Selection	- Fund raising and empowerment approach. - Financial information system improvement approach. - Human resources development approach.
Participants	Administration and financial section of JRBDP, Dinas PSDA, Balai PSDA.

Source: JICA, 2004: 11-7

The core problems on financial management are: 1) The revenue of service and the cost of maintenance and operational are not balanced 2) The revenue is not enough and 3) The financial management process is low.

#### 5. Institutional and legal Issues:

**Table 5.8: Result of Institutional and Legal Issues**

Core Problem	Job is not properly executed.
Direct causes	Staff assignment is not suitable (assignment, recruitment), organization and job description is not clear, regulations are not clear.
Project Selection	<ul style="list-style-type: none"> <li>- Human resources management approach.</li> <li>- Dissemination of laws and regulation approach.</li> </ul>
Participants	Administration and legal section of JRBDP, Dinas PSDA, Balai PSDA.

Source: JICA, 2004: 11-8

Additional result of the PCM workshops showed that one of the core problems are in Operation and Maintenance (O&M). The core problem is the decision of management or staff isn't proper (they have difficulties on deciding when a problem occurs).

The PCM result of Operation and Maintenance (O&M) of infrastructure components in capacity development program is **“necessary to have monitoring and operation of O&M facilities and reporting system improvement project”** (JICA, 2004:11-8). The unmanaged regularly of Operation and Maintenance (O&M) work results cases of damage or deterioration of facilities and JICA have identified several damages:

- a) Sand pocket dam No.4 and Sabo dam No.4 damaged by exceptionally high rainfall in January 2002
- b) Right bank abutment of ground silt damaged in December 2003
- c) Second gate from the right bank of Rubber Dam, which burst in January 2004
- d) Long storage, which water hyacinth spread everywhere in the dry season
- e) Drainage channel, which is clogged by sediment deposit and solid wastes accumulated at the channel and
- f) Telemetry gauging and monitoring equipment damaged due to lack of spare parts as well as other incidental troubles.

Several damages above are resulting in significant escalation operation and maintenance costs of the water resources infrastructures. Sedimentation on the lower Jeneberang River has been threatening water provision in South Sulawesi as well as water agriculture, flood control, fishing and tourism purposes. Raw water transmission main (RWTM) is operated and maintained in accordance with manual, which was prepared by JRBDP. The water users are very independent by JRBDP. Operation and maintenance of RWTM will be done by JRBDP staff regularly. The equipment of RWTM are properly operated and maintained with the O&M manual. According to the staff of JRBDP, the main problems are usually related to insufficient budget for repairing



them. Regular inspection and maintenance work is now made only for the three major facilities of Bili-bili dam, Pampang pumping station, and Rubber Dam, where O&M staffs are regularly assigned. Different institutions and participants involved in the workshops are listed below.

### 5.5 Results of Sub-projects Groups PDM (Project Design Matrix)

JICA experts and staffs of JRBDP have been formulated a PDM (Project Design Matrix) based on the PCM workshops. The results will be used as a project required to institutional capacity development of establishing a Public Corporate. The workshops were conducted in two consecutive days (3-4 March 2004). A project list is selected from the discussions among stakeholders as shown below and it was reviewed and regrouped to cover **four aspects** of the capacity development program such as:

1) Operation and Maintenance infrastructure 2) Organization operation management 3) Financial management and 4) Human resources development. The four aspects have been selected and applied to each component on the following number of sub-project of capacity development program. These resulted in several PDMs called PDM 1 to PDM 6 and were fostering to be prepared for each **sub-project** number 1, 2, 3 and 4 below:

**1) Operation and Maintenance (O&M) infrastructure:**

PDM 1 Monitoring and operation of facilities, O&M and Reporting system.

**2) Organization operation management:**

PDM 2 Organization strengthening project.

**3) Financial management:**

PDM 3 Fund raising (new business) and empowerment project.

PDM 4 Financial information system improvement project.

**4) Human resources development.**

PDM 5 Management skill strengthening project (Appendix E3).

PDM 6 Personnel management system improvement project.

Based on the results above experts have made the conclusion that the **sub-project** listed PDM above held with overall goals, was set as **“Sustainable river basin management is achieved”**. This goal will be used as a questioner to groups of PDM participants and it will be presented in a set of columns containing a narrative summary; objectives and means of verification and important assumptions. The results of PDM issues used as a sample of PDM results are illustrated in Table 5.10.

A series of the interview results were conducted and formulated during field surveys related raw water tariff, institutional and legal framework, water problem, water regulation, operation maintenance, turbidity, privatization and financial issues.

### 5.6 Raw Water Tariff in Public Corporate

In field surveys and interviews with Mrs. Rina Agustin Indriani, Chief of Sub Directorate of Rural Water under the Ministry of Public Works, show that a team of tariff has been establish in order to evaluate the rates of water tariff. The tariff of raw water used for water utilities and

industrial purpose in a sustainable manner. The amount of raw water tariff is depending on reasonable economic accounting. Public Corporate as local or state corporate will receive a reasonable

**Table 5.9: Stakeholders Participants List**

Workshops	Groups
PCM Participants	JRBDP Dinas (WRM service, Infrastructure service) Balai PSDA BAPPEDA BAPENAS Regencies Power-PLN Water Authorities
Workshops	Groups
PDM Participants	JRBDP Dinas (WRM service, Infrastructure service) Balai PSDA BAPPEDA BAPENAS Regencies Power-PLN Water Authorities Administration section of JRBDP Dinas PSDA Balai PSDA
Workshops	Group
Financial management Issues Participants	Financial section of : JRBDP Dinas PSDA Balai PSDA
Institutional and legal issues Participants	Administration section of JRBDP Dinas PSDA Balai PSDA
Institutional and legal issues Participants	Administration section of JRBDP Dinas PSDA and Balai PSDA

Source: JICA, 2004: 11-2

limited social service and emergency purpose: rehabilitation of a dike and flood early warning system. The minutes meeting of one of Public Corporate in Java Island (PJT 1), showed that some reasons in relation to the condition of budgeting of Public Corporate are limited contribution of users and government impact to level operation and management. The contributions of users are payment of tariff. The increasing of tariff is not in balance with budget for operation and maintenance. The condition will become difficult as damaged catchments areas are increasing from erosion and sedimentation. Un-controlled sand mining is one of slope and

dike damage problems. Another impact is pollution and eutrofication by increasing nutrient (nitrogen and phosphor).

**Table 5.10: Six Results of PDM (Project Design Matrix)**

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PDM of Capacity Development Program

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Narrative Summary

Overall goals: Sustainable river basin management

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Project Purpose: The operation and management capability of the corporation is improved, with outputs:

1. Management staff make proper decision on Operation and Maintenance of facilities (O&M of infrastructure).
  2. Jobs are properly executed (Staff follow job description) (Organization operation management).
  3. Income sources are available (Financial management).
  4. Financial management is conducted efficiently (Financial management).
  5. Management staff are concerned for execution of work (Human resources development).
  6. Appropriate staff are assigned to cover all task required (responsible) by the Public Corporation (human resources development).
- 

Source: JICA, 2004:11-10

Every payment for using water and water resources does not represent the price of water or water resources, but is compensating for service of its management and development in order to ensure continuous availability. This isn't profitable. The cost of operation and maintenance and the construction of river infrastructure for public welfare and safety shall be borne by government or state owned corporation (Public Corporate). Generic government of regulation on Public Corporation for water resources is intended to be used as legal basis for establishing further river basin corporation (Jeneberang river basin) as soon as government regulation becomes effective (JICA, 2004).

## 5.7 Institutional and Legal Framework

The framework is a decision supporting tools to the best estimating of what decision makers have to learn from environmental as well as managers and policymaker's decisions. For example the EU Water Framework Directive is cooperation among others, the European Parliament, relevant authorities, and experts from science and economy (Lundberg, 2005). Scale of water pollution is large. If not dealt with, the pollution of the world's water resources will have a dramatic impact on the livelihoods of the world population even during this century (Simonovic, 2001).

The progress of decentralization in Indonesia to date and problems encountered both to the legal framework and the implementation in the regions are the most important factors. The Indonesian Government will not step back from what has been achieved so far, but will also not let shortcomings of the legal framework of decentralization impede the effective implementation of

regional autonomy. The principal changes of autonomy are illustrated in Table 5.11. The revision of the decentralization laws does not intend to re-centralize government functions and the financing system, but aims to clarify and improve the regulations (CGI, 2003). The historical law governed the management, development and conservation of water resources. Field survey and interviews with Mr. Bambang Hargono, chief of JRBDP, showed that the Central Government delegates functions to its agencies at the Central or Regional level to the specified corporate, and it may be required to share management cost.

The law No 7 / 2004 on Water Resources was described in responsibilities and cross sector / cross regional coordination of central, provincial, district and village government for river basin and across their boundaries. This law finally was approved after three years consideration. The main additions or amendments to the earlier Law 11/1974 which cater for new (or enhanced) paradigm such as regional autonomy, decentralization state revenue sharing and an intergovernmental coordination framework headed by a national Water Resources Council. Additionally, this law will accommodating the stakeholders participation on water resources policy-making, private sector improvement in water resources development and management, and empowerment of beneficiaries, especially farmers (JICA, 2004). The key issues arise from the conversion of both forest areas and coastal wetlands into agricultural lands, and also due to uncontrolled logging during the last three decades. Water resources policy issues in the most islands have been mainly concerned with the sustainability of the newly constructed irrigation schemes. Soil erosion and high fluctuation of river flows between the rainy and dry seasons have been hampering the effectiveness and sustainability of those schemes.

The Project's organization structures, described in chapter 1, has a total present staffing of about 206 including the General Project Manager, of which about 86 are civil servants and 120 are non civil servants. There are guidelines and manuals provided by Ministerial Decree 110 / KPTS/D/2002 which list main task for three subproject groups responsible for planning, technical and administrative services, but there are no job description for individual managers and employees.

The actors and representatives of the government involved to facilitate an establish Public Corporate were from Ministry of KIMPRASWIL (sub-directorate of urban clean water), BAPPENAS and BAPEKIN. Ministry of KIMPRASWIL, previously known as the Ministry of Public-Works, responsible for the improvement of capacity building for the Local Governments in the provision of urban and regional infrastructures, including urban settlements and its infrastructure in the framework of a regional autonomy. BAPPENAS is responsible to establish development plans and policies at national level. Those policies and plans are then to be ratified by the related sectors. BAPEKIN is responsible in building constructions, investments and standardization matters in congruence with the prevailing policies and regulations (JICA, 2004).

Perum Jasa Tirta 1 (PJT 1) was established in 1990, by the government regulation No. 5 / 1990. The main objective is to manage operation and maintenance of the facilities in the Brantas river basin at Java Island. Cost for operation and maintenance activities will be collected by PJT 1 from the beneficiaries. For the time being, the main source of funds will be from sales of electricity, drinking water and industries. There is no obligation for farmers to pay water charges, although more than 80 percent of water in the Brantas River is for irrigation purposes. The

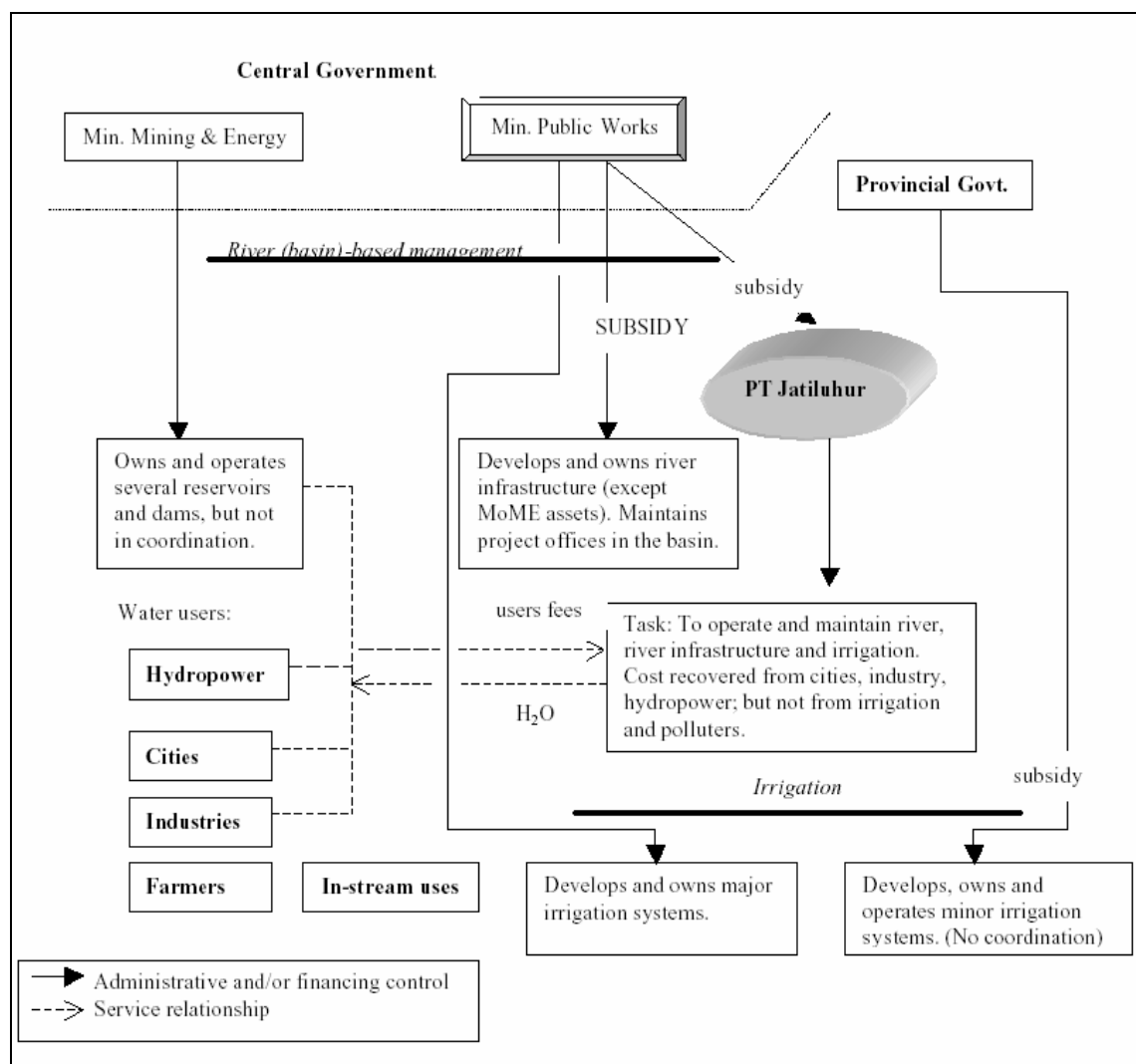
government now is introducing a pilot project of Irrigation Service Fee in several provinces around Indonesia. The purpose of the pilot project is to show the farmers the importance of adequate budget to support the operation and maintenance of irrigation facilities (Usman R., 2005).

Referring to the histories of Public Corporate at East and West Java (PJT1 and PJT 2), the beginning of a process is facilitated by Ministry of KIMPRASWIL. BAPPENAS will be involved in the formulation of policies concerning transparent and competitive private investments, protection of the public and private rights. The prediction, for the case of South Sulawesi, the Public Corporate initiative came from the government at both central and local levels. The process kept going on considering the experiences in Public Corporate in Indonesia such as PJT1 and PJT2. Also some guidelines are available to be used in order to decrease some difficulties (JICA, 2004).

Both PJT1 and PJT 2 are the organizations of river basin management in Indonesia which being supervised by the Ministry of Public Works and the Ministry of Finance. The Provincial Governor is less involved in the board of management. The above situation pertains to approximately the period 1980-2000. The basin organization (Fig. 5.1) was working effectively under administrative and financial control of the central Ministry of Public Works. The organization “leased” the infrastructure and operated and maintained it. These costs were recovered from cities (water supply), industries and hydropower. For irrigation, a major water user, farmers were officially supposed not to pay fees (in reality they paid unofficial fees). Overall, the water management was strongly centralized. The sector reform of 1999-2002 devolved more authority and finance to Local Government levels, increased farmer organization in water user associations which are to pay for water abstraction, introduces water pollution charges, and start to recognize in stream uses. It starts setting up stakeholder supervision of the management organizations. With regional autonomy emphasized, the basin organizations are likely to develop over time as concessionaires, investing in infrastructure. A complication remains with the autonomous status of the hydropower dams, quite uncoordinated with overall basin management (Alaerts, 2003).

## **5.8 Water Problems**

Generally water problems occur at many places in the world. In India, the core problem is the problem of poverty. Many poor people carry water from sources to their house to get drinking water. Also the education component needs to be strengthened (Devadas, 1984). Water is now the number one food production limiting factor in many parts of both Asia and Sub-Saharan Africa. For millions of people the desperation for water is real (SIWI, 2005). The water problem is now increasing, water pollution threatening the economic development of megacities, small islands and shared transnational river basins (Falkenmark, 2005). Causes to eutrophication are a combination of several sources. Changes in climate and temperature influence fluctuations and variations in salinity, which are due to the amount of freshwater input from rivers and marine. The anthropogenic and indirect loads are derived either directly or indirectly. The expansive uses

**Fig. 5.1: Integrated Water Management at Basin Level**

(Source: Alaerts, 2003: 20)

**Table 5.11: Principal Local Autonomy Changes:**

• Water function	:	from: Social to: Socioeconomic
• Government function	:	from: Provider to: Enabler
• Administration govt.	:	from: Central to: Provincial govt. to: Regencies
• Service	:	from: Bureaucratic, normative to: Professional, responsive, neutral
• Public participation	:	from: Limited, submissive to: High, critical, vocal proactive.

Source: JICA, 2004. Page: 5-8

of artificial fertilizers during the last 50 years have increased the deposition of severe airborne nitrogen. The physical or chemical disturbance in the concentrations of nutrient will increase the turbidity of water (Lundberg, 2005). Water quality can change over time and over different geographic regions. Water quality is a highly dynamic and complex problem (Davidson, 2005). In addition, the river pollution situation is particularly serious in the developing world, especially in densely populated areas with vibrant industrial activities (Falkenmark, 2005).

Field interviews during survey have been conducted with staffs and managers from JRBDP and Makassar Water Authority that show they are preparing a program related to increase quality of water and proposing budget for technical measures. Engineers are starting to plan and design risk measures related to water quality in Jeneberang river basin by long surveys. JRBDP staffs and JICA experts rented a military helicopter and made a flight survey to the top of Bawakaraeng Mountain. They saw how landslides had changed surface of land and affected water quality. Another important case was damaged houses by landslides (Fajar, 2005). The two key processes are involved by which pollutants reach the water in the landscape: water as leaching agent and water as a transport agent (Falkenmark, 2000).

The multiple roles as a result of rapid growing population rate such as pressure and intensity of economic activities throughout Indonesia, land-related issues of efficiency, sustainability and equity have become increasingly important. In wet season the river flows with high rates concentration of sedimentation due to excessive erosion on the upstream watershed. Field survey and interview was conducted with Mr. B. Chatib a retired professor from Institut Teknologi Bandung. He annotated that the very fast of sedimentation rates on reservoirs and lakes were making the lifetimes of reservoirs shorter than lifetime planned.

The Government of Indonesia is fully aware of the need to manage its water resources on an integrated river basin. Many of the aquifers for instance in Java and many cities are rapidly growing by urban centers, the water have already suffered from over-extraction, resulting in salt-water intrusion and ground subsidence in many coastal urban areas. The groundwater aquifers are also polluted by human wastes and with increasing evidence of industrial waste as well. Nowadays, both quality and quantity of water problems are occurring at water treatment plants owned by both Makassar and Gowa Water Authorities. Problems are indicated by the rainy time in Mt. Bawakaraeng with influences to the Bili bili multi purpose dam. In several weeks after rainy days in areas of gigantic landslides, the raw water quality changes became of bad quality.

A discussion during field survey with Mr. Arifuddin in Makassar Water Authorities (Research and Development Dept.) showed that the low quality indicated by the highest turbidity at 2000 (NTU-Turbidity scale). The water runoff containing suspended solid indicated with high turbidity and color of red soil and accumulated at Sabo (sand or silt trap) entering to the Bili-bili multi purpose dam. Both of Makassar and Gowa water treatment plants processing high turbidity of raw water. Additionally, planning for new proposed coagulant and financial budgeting have been consider to control the quality of water production. The discussion with Water Authorities staffs concludes that to use raw water at extremely low quality is uneconomic (Ageng, 2005).

River basin should be planned and protected in order to improve the quality of water in river basin. Smithson (2001) reported that the Huai pollution incident in China in 1994 was discharge

of significant quantities to river basin. Straws of pulp factories, paper mills and tanneries were responsible. The pollution affected cooling water sources, causing power stations to malfunction with major impact on local power network. Fisheries resources were also destroyed and agriculture and industrial damage were widespread. Municipal water supply was affected, resulting in poorer quality and inadequate quantities of water for people in downstream cities. Direct economic damage was estimated at \$US 120 million. Holmberg (1996), concerning the societal metabolism and the production of services to the human sphere, stated in the 4th principal of socio-ecology for a sustainable society, that the use of resources must be efficient and just with respect to meeting human needs.

Makassar is divided into 2 (two) system of water productions such as the southern and eastern water system. The southern system served by 2 (two) WTP such as Panaikang and Antang, which water is supplied by Lekopancing weir along 29 km opened channel. The eastern water system supplied to 3 (three) WTP such as Somba Opu, Ratulangi and Maccini Sombala by raw water transmission main (RWTM) from Bili-bili multi purpose dam and downstream of Jeneberang River (JICA, 2004). The southern water system has the same water problem concerning both quality and quantity. The quantity problem has been increased during dry season and it will occur by high amount of turbidity in rainy seasons. The southern system was very much dependent on only one water resource.

Unaccounted for Water (UFW) is water problems caused by directly leakages on the pipes, unregular network monitoring, and illegal pumping of the piped water or caused by indirectly of falsely computerized or bad water recording. UFW is also considered that the commercial loss such as error metering and illegal connection accounts for higher portion of water loss, repair and maintenance of inaccurate meters and improved tariff collection system through training of concerned staff in order to reduce the commercial loss. The generic problem with both water authorities is high of ratio of water losses (unaccounted for water) at about 51 % number of UFW to Water Authority in Makassar. Gowa Water Authority has less than 50 % of UFW. Tragically, even though at the countryside where population clusters are concentrated along of open channel. This condition influences the amount of high unaccounted for water (UFW), which spill over by left and right side of the Lekopancing weir along 29 km opened channel (Ageng, 2005).

## **5. 9 Operation & Maintenance (O&M) Problems**

Swedenergy (former Swedish Power Association) presented a guideline in 1997 called RIDAS. The guidelines are not enforced by law but each dam project has to be scrutinizing by the Water Right Courts. Dam owners shall design, construct, operate and maintain dams so that the risk of serious consequences of dam breach will be eliminated as much as possible, the risk of damage to dams and operations disturbances will be kept at the lowest reasonable level. Also provide action plans to minimize in case damage to a dam and quality assurance (Mill, 2001). Dixon (2000) reported on survey's results indicating that 25% of hydroelectric reservoirs in US have some form of sedimentation problems. Half of owners and operator reporting reservoir sedimentation problems noted that technical guidelines on sedimentation management would be useful.



There are several opinions on Public Corporate involvement which are formulated during and after due survey. The operation and maintenance are the most important activity in order to prolong the longer life of the water infrastructure. The O&M manual, which is written in Indonesian, have been prepared for all of the above water resources development facilities and currently used for the actual O&M work. However, the manuals have never been revised in accordance with updated basin condition, such as updated water requirement and the updated land use in the floodplain areas. Moreover, some specifications described in the manuals are too general and indefinite (JICA, 2004).

JRBDP designed and planned simple and clear job descriptions for each staff or employee, which are placed in order to complete the procedures. The instructions are placed such as machine operating instruction. Sometime training is launched at Makassar or Jakarta by special trainers. Water Authorities in Makassar, Gowa Water Authority and the Sugar factory operate the existing intake facilities on the Jeneberang River in Takalar Regency with exception of intake facilities for raw water transmission main (RWTM) from Bili bili multi purpose dam to Somba Opu WTP. Nowadays, the operation and maintenance of Bili-bili multipurpose dam and water infrastructures are independently handled by the JRBDP (Appendix D5). The water recorded separately when discharge to RWTM and receiving at Somba Opu WTP.

The amount of water recorded will be paid by the user as revenues to run the operation and management. JICA expected that after establishing the Jeneberang Public Corporation, the water extracted from Jeneberang River was monitored both by Water Authorities and the Sugar factory. The result of tax payment by users will return to the municipality or regency by another financial aid related to the water (JICA, 2004).

However, operation and maintenance is not regularly undertaken for other facilities, such as the Sand Pocket dams / Sabo dams, the drainage channels and other river structures, which require inspection and maintenance work to be carried out over a wide area. As a result, damage and / or deterioration of facilities occur without major rehabilitation work. The O&M and problems encountered will be designed and planned to establish a Public Corporate with complexes of water infrastructure support (ADB, 2004).

The Bili bili multi purpose dam project is funded by Japan Bank for International Cooperation (JBIC) as main foreign funded development project in JRBDP. JRBDP was establish by Directorate General Water Resources Development (DGWRD) decree in 1986 and after several changes were reorganized according to the latest DGWRD Decree No. 110/KPTS/D/2002. JRBDP objectives under DGWR Decree are: to increase water supply and mitigate flooding; to improve efficiency and productivity of water resource utilization; to motivate the community to develop and distribute water resources.

The Bili-bili multi purpose dam was completed in 1997 with a reservoir capacity of 375 million m<sup>3</sup> for use in Kota Makassar and surrounding areas. Another purpose of this project is flood control, irrigation system which serves an area of 2.360 ha and hydropower plan of State Power Authority-PLN rated at 16.6 MW and with an annual output of 77 GWh. The project is still under construction and expected to be completed in November 2005. The completed project, which is described in Appendix D5, is still being operated and maintained by JRBDP staff.

JRBDP had the responsibility of Bili bili multi purpose dam until August 2004 when handed over to GOI (Government of Indonesia) (JICA, 2004).

### 5.10 Turbidity

Although sometimes farmers use the word for landslide (longsor) when talking about normal erosion, they are also aware of big parts of soil mass moving and sliding down at once from steep slopes. These landslides are caused when the soil stability is low and the impact of heavy rainfall, excessive runoff water or massive floods makes the soil move, especially when it is not anchored by vegetation. Pollutants can accumulate in soils and sediments for later release when geochemical conditions change for some reasons (Falkenmark, 2005). The huge amount and force of the river water during floods can cause whole parts of land on the riversides to slide into the river. The sediments are no longer spread in fields but have filled the lakes and block the river channels as well (Varis, 2005). Landslide occurrence on the riversides can block the river flow and hence cause the riverbed position to change. If the soil cover is absent, long dry periods can produce cracking of hard soils, which enhances the occurrence of landslides during subsequent rain showers. The vegetation indeed plays a very important role in reducing the landslide hazard, not only by reducing impact of rainfall and runoff water, but also by withholding the soil from being carried away. The roots anchor the topsoil and its cover tightly to the substratum, essential for landslide prevention on steep slopes. In this way riverside vegetation of trees, bamboo, shrubs and bushes or grass can reduce the occurrence of landslides when the river floods (Purwanto, 1999).

The most widely recognised water quality problem is high turbidity. Water is turbid if it contains suspended soil particles. Farmers say it contains soil, mud or organic matter. Water becomes turbid during and after rain events because rainfall causes erosion to take place, causing the runoff water to be turbid. Hence all processes and actions influencing erosion also have an impact on runoff water turbidity. A decreased soil cover, the absence of sufficient roots and leaf litter – characteristic for a land use transition from forest to coffee gardens – enlarges the impact of raindrops on the soil, causes easier dissolving of soil particles and increases the amount and velocity of water runoff if the field slope is steep, all leading to a higher water turbidity. On the other hand, the effect of erosion on water turbidity is diminished by soil sedimentation and filtering of runoff water. Runoff on soils with a hard consistency gives less turbid water than runoff on loose structured soils, although the amount of runoff water on the former is higher because of impeded infiltration. Flooding causes a higher turbidity of river water, because of increased erosion from riverbanks and inundated paddy rice fields. Garbage and dirt from the village, washed away and carried along by the rivers during heavy rainstorms contributes to higher water turbidity as well (Ibid).

Lawton (2001) reported that Los Vaqueros dam in California-US had improved water quality and addressed environmental concern. The Los Vaqueros projects are remotely controlled and monitored from the Operation Central which is located 19 km northeast of the reservoir. Grossman (2000) noted that extreme weather conditions have accelerated soil erosion in Gallito Ciego dam at northern Peru. Bathimetric investigations are under way to establish the extent of accumulated gravel, sand and clay inside the reservoir. The dam is in danger of being rendered useless due to the process of sedimentation. The dam interrupts the river's natural process of

sediment transportation and deposition. Peruvian authorities are implementing a plan to clean out the sediments accumulating in the reservoir.

The important impact of a gigantic landslide, which occurred in Indonesia in 2004, produced mass of debris to the catchments area. The volume of the slide mass estimated had deposit on the upper reach of Jeneberang River. The trend were recorded by a researcher in the university of Hasanuddin who reported about increased of chemicals used in order to treat raw water from Bili bili multi purpose dam. It was reported that the concentration of sludge, which was tested in laboratory, indicated that the amount of turbidity in raw water increased during March 2001 and December 2002 (Fig. 5.2 and Fig. 5.3). The increasing of turbidity has been influenced to the number uses of coagulant air such as Aluminium Sulphate and Poly Aluminium Chloride (JICA, 2004).

As mentioned in chapter 1 the gigantic landslide occurred on March 26, 2004. The huge mass debris of yielded Mt Bawakaraeng was travel across 7 km down the upper reach of the Jeneberang River with 500 m to 800 m in width. The result showed that high turbidity occurred during 4 months and was continuing until the end of 2004 (Appendix D9). All sample of outlet WTP were tested at Somba Opu WTP water laboratory. The total amount of Aluminium Chloride ( $Al_2SO_4$ ) as coagulant used in Somba Opu WTP increased as the total volume of sludge and turbidity of water tested increased.

### 5.11 Water Regulations

The difficulties involved in reversing the worldwide water pollution are related to bureaucracy barriers in terms of time delays (Falkenmark, 2005). Lundberg (2005) noted that to provide reasonable legislations and restrictions as well as methods for adequate administration the assignment of management for researchers to measure relevant indicators are essential.

The Indonesian Government has formalized a pattern of irrigation organizations (in 1982 through the Government Regulation No 23 and the Presidential degree No 2/1984; through the Government regulation No 14 under the frame of the Irrigation Law No 11/1974). This policy was designed to improve the irrigation management toward the management of irrigation. The Irrigation Management Transfer (IMT) program is supposed to be well implemented in the context of privatization. The program is designed to stimulate the farmer capabilities in water management and to reduce Government expenses related to the increasing cost of operation and management. Following the legal frameworks and policies for Central and Regional level above, the GoI being facilitated by a Presidential Instruction (on 26 April 1999) in order to improve the Irrigation Management at the local level. Continuously, the District-level institutions and farmers participation will reduce management by WUA (farmer-managed irrigation systems) on Irrigation Management Policy reform (Pasaribu, 2005).

The Perum Jasa Tirta Jeneberang (PJT Jeneberang) will be formed as a branch of Perum Jasa Tirta 1 (PJT 1). This approach being consider as replication to establishing a new institution without new additional barriers. At least four regulation arranging management of water resource in Indonesia: 1) Arrangement of Water resources 2) Local Governance 3) Financial and Taxes of Water resources and 4) Public Corporate. The arrangements of Water resources are clustering by

National Level and Local Governance. A set of complex of water regulations are required for establishing a Public Corporate (Perum Jasa Tirta Jeneberang).

**Fig. 5.2: Correlation on Turbidity with concentration Alum and volume sludge during 2001 - 2002 at Somba Opu WTP.**

Source: [http://www.pascaunhas.net/jurnal\\_pdf/sci\\_2\\_1/marv.pdf](http://www.pascaunhas.net/jurnal_pdf/sci_2_1/marv.pdf)

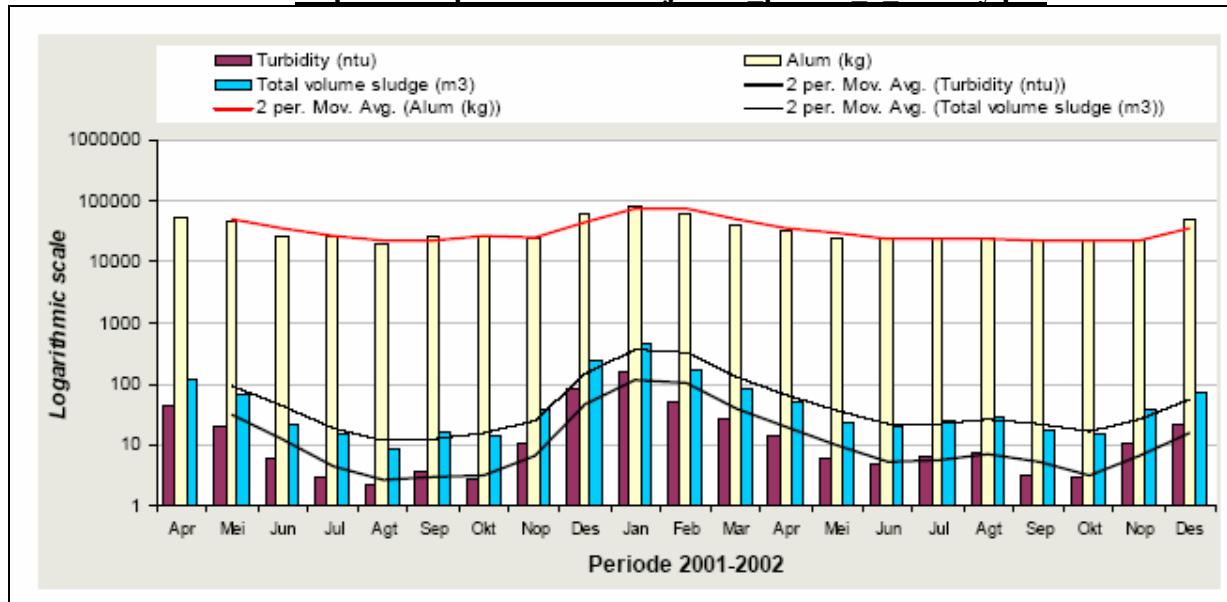
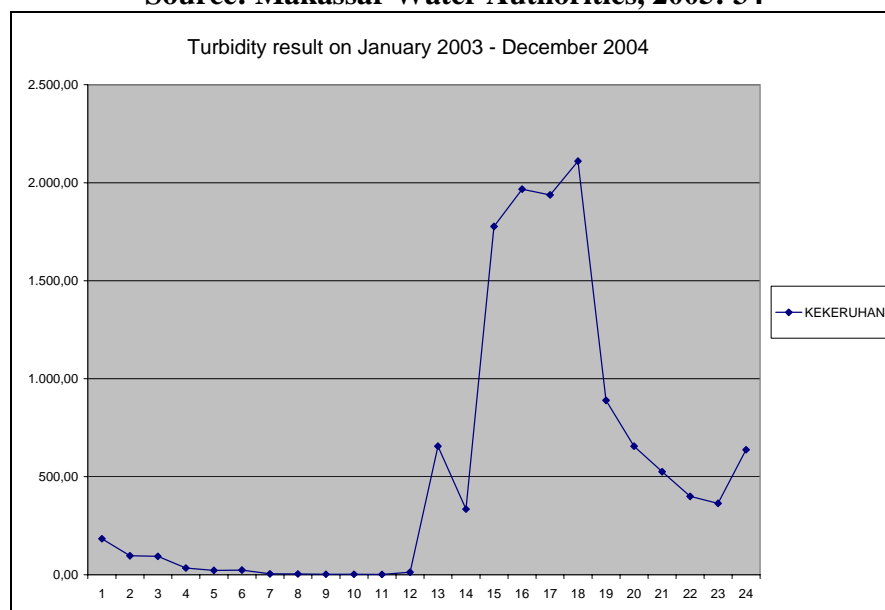


Figure 5.3 below shows that the amount of turbidity result increased drastically in February 2004 and continued to maximum level in June 2004, or 3 months after the landslides.

**Fig. 5.3: Turbidity Result on January 2003 to December 2004**

Source: Makassar Water Authorities, 2005: 34



These regulations are described and estimated for the establishment of PJT Jeneberang, and will require at least 7 (seven) Regulations on the National Level: 1 (one) of the Decision of President (Keppres), 1 (one) of the Regulations of Government and 5 (five) of the Ministry decrees. On the Local Governance, the requirements of the Regional Level of regulations are specified by 4 (four), the Regulations of Province, 8 (eight) decisions of the Governor, 2 (two) decisions of the Head of Dinas and some decisions of the Cooperation and Agreements with both the Regencies and Municipality. Especially, the Law will be designed to be consulted with the stakeholders and agreed to be socialized among public. The complete of water regulation concerning River Basin Management in eastern Indonesia are described in Appendix D6.

There have been two studies carried out in 2003 and in 2004: 1) Study of empowerment Plan for Regional Water Resources Development and Management System by JICA, 2004 and 2) Study of Water Resources Management by Corporatization and process the establishment of Perum Jasa Tirta in Jeneberang River Basin in corporation with LPM-UNHAS, 2003.

### **5.12 Privatization or a Public Corporate?**

Falkenmark (2005) stated that a set of global scenarios suggest that the world may be facing severe health effects from persistent pollutants some four decades from now. Jeneberang River Basin Development Project (JRBDP) is an organization responsible among others for operation and maintenance of all water resources infrastructures in the Jeneberang River Basin. In order to provide professional services to the water users, the organization requires adequate fund for the operation and maintenance as well as service cost, which for the moment is provided by the Central Government. The fund, which can be stated as government subsidy is never adequate. In order to overcome this problem, the Government decided to establish a Public Corporation (JICA, 2005).

Paragraph 33 of Indonesia constitution stipulates that land, water and embodied assets are controlled by the state and should be used to the utmost welfare of society (Pasaribu, 2005). The establishment of a state owned enterprise or a Public Corporate is very much necessary for its important contribution to the irrigation purpose. The Public Corporation will be authorized to collect money from the Water Users Associations (WUA) (Fig. 5.1). The potential users will be the water supply sector and the hydropower generation. From the flood control sector it is still too complicated to formulize the tariffs and collection system. From the irrigation sector collection of money is prohibited by law, since farmers are responsible to maintain the infrastructures themselves. Besides, the efforts for pursuing legal recognition from the Government, in this case from Central Government and the President of Indonesia, the establishment of a Public Corporation will strengthen the management of the institution. So far the Jeneberang Public Corporation has not yet been established.

Japan, as the biggest donor to Indonesia, stated for major reform that the private sector recognized the delicate challenge of balancing labor demands with Indonesia's international competitiveness. This makes it all the more important for the Government to consult with all affected parties concerning labor laws and implementing regulations to avoid ambiguity. They expressed concern that the volume of implementing regulations did not provide sufficient time for tripartite discussions (CGI, 2003). Fajar News (9 August, 2005) reported that Japan

International Cooperation Agency (JICA) suggested and proposed to Makassar Water Authority to become privatized. Various driving forces of privatization can be classified into five categories: societal, commercial, financial, ideological and pragmatic pressure (Gleick et al., 2002). In the United Kingdom and Europe, privatization were ideologically driven at first, but are increasingly characterized as commercial and pragmatic (Beecher, 1997). Societal is the belief that privatization can help satisfy unmet basic needs; commercial is the belief that the more business the better; financial is the belief that the private sector can mobilize capital faster and cheaper than the public sector; ideological is the belief that smaller government is better and pragmatic is the belief that competent, efficient water system operations require private participation (Ibid).

Privatization in the United States was initially pragmatic, but is now strongly ideological. Water privatization is strongly favored by libertarian and free market policy institutes. Privatization efforts in the developing world can primarily be described as financial and pragmatic, though some argue that the social benefits are significant (Global Water Partnership, 2000). Privatization of urban infrastructure and public services has become a global trend and is now happening in every corner of the continents, from the north of America to the south of Africa, from the developed countries to the third world countries. By the end of 2000, at least 93 countries had partially privatized water or wastewater services (Brubaker, 2001).

The privatization efforts in Canada and the United States have moved rather slowly (Gleick et al., 2002), but private water companies are not a new concept in the United States (ICIJ, 2003). In the United States municipal services were already provided by private organizations in the early 1980s (Ibid). Today public utilities serve 81 percent of the American population and private companies own about 70 percent of American drinking water systems (ICIJ, 2003). Privatization efforts in Canada has created a controversy, because commodity water is subject to provisions of the North American Free Trade Agreement (NAFTA), forcing municipalities to open up management or even ownership of public waterworks to private corporations (ICIJ, 2003). In South America, many public water systems have failed to provide universal coverage and to reduce the water losses that can be more than 50 percent. In Buenos Aires and Mexico City, the governments have contracting the rights to operate the water system. Chile has even moved further by combining the granting of a concession with private ownership of water resources (Ibid). It is believed that privatization could improve the economic situation (ICIJ, 2003). In Europe, the trend to move water to private hands started in 19th century in some countries and the process of privatization is far advanced (Gleick et al., 2002). France is well known as the birthplace of privatization of the moment were private companies control 80 percent.

### **5.13 Financial Issues**

Indonesian urban development projects received from the World Bank close to \$US 2 billion in 1974-1997. Assistance was provided for urban and village infrastructures, sanitation, clean water, drainage, solid waste management, traffic management and small business of microcredits. Weaknesses in the financial sector and the lack of good governance in corporate and other sectors were now fully exposed and this caused the massive pull-out of capital (Kurnya, 2001).

The difficulties involved in reversing the worldwide water pollution are related to technical, social and financial circumstances (Falkenmark, 2005). The financial resources of Provincial and Local Government are The Internal Revenue Allotment (IRA) from the Central Government and the local revenue that consist of local taxes and other miscellaneous fees and incomes. The past trend of local revenue in all surrounding regencies (Makassar, Gowa, Maros, Takalar, Jeneponto and South Sulawesi Province) decreased slightly before the economic crisis in 1996, and more than 70 % of regional revenue relies on the IRA. The trend of the existing financial condition on local and regional revenues is scarce, indicated that the Local Governments in Regencies need further years to achieve their revenues by recovery from the economic crisis (CTI, 2001). The financial condition will be influenced to the financial capacity of Local Government at Total 250 billion Rupiah (Ibid).

The projected loan up to 2010 will be possible to fund water resources by local taxes and fees. The Japan Bank for International Cooperation (JBIC) foreign investments during 1995 to 2000 were 976 billion Rupiah or \$US 97.600.000 as shown in Table 5.12. This investments cost was much larger than the aforesaid possible fund of the Provincial and Regional Governments which was 250 million Rupiah or \$US 25.000.000 (CTI, 2001).

**Table 5.12: Actual Investment of Major Water Resources**

Name of Project	Annual Budget Allocated in 2001 (million Rupiah)	Annual Budget Allocated in 2001 (\$US)	Cumulative Investment 1995-2000 (million Rupiah)	Cumulative Investment 1995-2000 (million \$US)
Bili bili multi purpose dam	47.386	4.738.600	689.108	68.010.800
Bili bili Irrigation Project	9.700	970.000	287.255	28.725.500
Total	57.086	5.708.600	976.363	97.636.300

Sources: CTI, 2001: 7-9.

The Asian Development Bank approved \$US 1.5 billion loan in 1998 to Indonesia for supporting policy reforms such as promotion of good governance in the financial sector, improving competition, revamping of the anti-corruption law, modernization of the public sector, and institutional strengthening of the national audit agency or BPKP (ADB, 2000:14).

The result of PCM during JICA workshops on financial management showed that revenue and cost during operation are not balanced. JICA in 2004 recommended an implementation capacity development programs. 27 programs are planned at totally 200 million Rupiah or \$US 20.000. The responsibility of institutions both of JRBDP and Jeneberang Public Corporate should be provided a soft loan by Central Government (JICA, 2004).

The operation and maintenance cost projected by JRBDP amount to 2.1 to 2.6 billion Rupiah or \$US 260.000. This budget could be within the project budget of Provincial Government but far less than total projected budget of the City / Regency Government. Also the budget composition should be part of the budget of the Provincial and Regency Government. In decentralization

context, however the budget could be transferred to the Regencies Government. The appropriate inter-regency coordination will be indispensable to share the budgeting for operation and maintenance of large scale water development such as Bili bili multi purpose dam in particular (CTI, 2001).

The costs and benefits of achieving the Millennium Development Goals for developing countries will need to expand their domestic resource mobilization to finance MDG-based poverty reduction strategies by drawing on government revenues, household contributions, and private sector investment to the greatest extent possible. External financing of public interventions will be required on the order of 10–20 percent of GNP. Meanwhile, middle-income countries will be able to finance essentially all investments of the Goals without resorting to external finance, unless excessive debt burdens constrain them (UN Millennium Project, 2005).

#### **5.14 Financial Aid for Poor people**

The electronic interviews with Risyana Sukarma of the World Bank Office in Jakarta, informed that the World Bank now is drawing up aid to the capital areas of Jakarta. This aid form was proposed to improve service to poor people in urban areas with passing approach of OBA (Output-Based Aid). In fact the idea is to overcome the problem of service of drinking water to poor societies, in a system where there is involvement of cooperation with private sector. Generally, private sector operators do not give services to very poor people that will not profit for. With existence of fund of OBA in the form of subsidy, private sector operators will give service extension to societies which unable fund (a kind of pre-financing). The results will be projected by effective fund which have been released with changes of OBA system. The total fund for Indonesian expansion of Water Services in low income areas in Jakarta is allocated to \$US 273.00 and will be started at the end of 2005 (Ageng, 2005).



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## CHAPTER 6: STAKEHOLDERS PERCEPTION AND ARISING PROBLEMS

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Referring to the Law Water Resources No 7, 2004 the terminology of **enter passing** (pengusahaan) of water resources is an effort to exploiting water resources for the purpose or to support business activities. The meaning of enter passing (pengusahaan) is not the same with a privatization. A private, union or anyone could be involved and conducted in an implementation of raw water system provider. Tragically, when the Central Government started to implement this law by decentralization efforts, financial and budgeting for **management** (pengelolaan) should be financed by the Local Governments, also the maintenance budget should be responsible by a state or local own enterprise. In the exception, the Central Government (the State) and Local Government (Province or Municipality) could give help to a local state government in order to reach social services and in case of emergency. The state enterprise (BUMN) or local own enterprise (BUMD) are another name for Public Corporate which are own by the State.

### 6.1 Central and Local Government Problems

Water pollution problems have been exacerbated by enormous governance problem, dominated by horizontal and vertical administrative fragmentation. Within the legal framework, there is no accountability for pollution mismanagement by an upstream administration to the neighboring downstream one (Falkenmark, 2005).

The government of Indonesia has initiated the radical and decisive political reforms after failing the economic crisis in 1997 and political crisis in 1998. The basic concept of reform policy is oriented to democratization and transparency of politics leading to decentralization of governance and regional autonomy. This reform policy created a dynamic change in the authorities and / or roles of the Central, Provincial and Local Government of city / regency. The new law of Central and Regional Government has limited tasks and functions, but several agencies are conducted water quality monitoring in all rivers as described in chapter 1 (JICA, 2004). A proactive approach to water quality management involves minimization of the flow of harmful substances from land to water, as well as anticipating and monitoring the economic and social impacts of improving water quality (Falkenmark, 2005). Better monitoring of MDG progress will follow once the commitment of making that progress is secured (SIWI, 2005).

The government facilitates to set up an institutional plan of Public Corporate by law and regulation stipulated on regional autonomy (Appendix D6). At least 4 (four) number of government regulations are not consistent with current policy before set up the regional autonomy. Generally, the regulations are connected with funds, operational and maintenance, payment, delegated authority from Central to Provincial government. Additionally, 3 (three) number of government regulation are not consistent with current policy after set up the regional

autonomy. The law and regulation are connected with the budgetary demarcation between the Central and Regional Government and defining the areas of authorities given to the Central, Provincial and Local Government of city / regency.

National and Provincial level organizations, which are described in chapter 1, are to be the key agencies to deal with overall water resources development and management including water supply development, flood management, river front management and improvement as amenity space. The existing regulations and decrees are delineated with several issues which are identified as administrative and coordination line among existing organization.

Water resources policies on national level were supported by water resources management framework and reform program. The future issues of authorities should be matched with the concept of the regional autonomy. The difficulties in providing the increased budget for operation and maintenance of water resources infrastructure will be dominated to current human resources problem. A sustainability operation and maintenance of water resources will be required for adequate capacity of human resources.

JICA survey on relevant agencies in 2001 showed that over 600 staff in total is now engaged in operation and maintenance of irrigation facilities (Fig. 6.1) and JRBDP office takes the second largest (34%) of human resources next to the Regency Government.

In case that aforesaid autonomous of irrigation facilities is established, around 300 staff in Dinas / Sub Dinas Pengairan of Regency Government in the study area can be concentrated to the water resources management work other than operation and maintenance (O&M) of irrigation facilities (secondary and tertiary canal). These human resources can be considered as potential human resources for basin management and surpass the existing basin level of human resources in number. If we consider staff of Regency Government as human resources for management of Jeneberang River basin, the existing human resources for basin management is composed as 57 % from Regency governments, 34 % from JRBDP Office, 9 % from Provincial government respectively (Fig. 6 1).

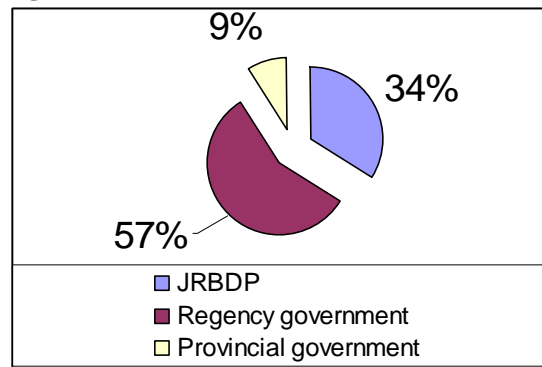
Table 6.1: Distribution of Human Resources available for Water Resources Sector

	Manager Class	Chief Class	Staff	Total
Provincial Level	10	27	174	211
Basin Level	6	31	152	189
Regency Level	6	36	283	325
Total	22	94	609	725

Sources: CTI, 2001: 7-6

## 6.2 Makassar Water Authority (PDAM) Becoming a Big Customer

Makassar Water Authority is the only one drinking water provider for the inhabitants in Makassar City of South Sulawesi Province. As a stakeholder that used raw water and paid tax to local and central government, the most significant impact occurs when they received raw water in bad quality. Normally, every one who pays for water should be guaranteed a good quality.

**Fig. 6.1: Human Resources for River Basin**

Source: CTI, 2001: 7-6

In order to supervise the implementation of functions, facilitate a conflict resolution between water parties, adjust tariff, and coordinate with other public institutions, and to monitor the performance of private sector in the provision of water to customers, Water Authorities decided that the establishment of a regulatory body is necessary. The regulatory body should functions to balance the interest of private and public sectors. The private sector is basically interested in the generation of profit while the public sector more considers service delivery at affordable prices.

### 6.3 Gowa Water Authority (PDAM)

Bili bili multi purpose dam is located in Gowa Regency. After the dam completed in 2000, Gowa Water Authority received water by using an intake located at least 20 km from Bili bili multi purpose dam at downstream of Jeneberang River. Many problems that occurred to Gowa Water Authority were the same problems which occurred to Water Authority in Makassar. The raw water quality at Jeneberang River changed to a low quality which is indicated by the highest turbidity. Another problem was related to more social services and inefficient management with high ratio of water losses (UFW-unaccounted for water). Gowa Water Authority has less than 50 % of UFW. The big problems are error reading meter, illegal connection, repairing and maintaining inaccurate meters and low tariff.

### 6.4 Non Governmental Organizations (NGOs)

The water community must take a much stronger part in the debate to counterpart the current resources illiteracy (Falkenmark, 2005). NGOs have a keys role in translating scientific result and promoting information for general public (Lundberg, 2005). Population and economic collapses projected to happen in a few decades if it continues along the same path without major policy shifts (Falkenmark, 2005).

Interviews were conducted in this research to: Wahana Lingkungan Hidup Indonesia (WALHI) and Indonesia Consumers Association (YLKI). WALHI was established in 1980 in response to environmental problems and insecurity of natural resources management, as the result of unsustainable development processes. WALHI's involvement in the water sector is mainly on

the issues of water provision, authorization, liberalization and commercialization of water. YLKI was established to monitor the quality of marketed goods and services.

The absence of regulation on consumer protection motivated YLKI to participate in the action to make the consumer aware of their rights and obligations to receive quality water. Some issues raised by the NGOs were as follows:

- Water is a public good and access to water is a human right. The idea of Public Corporate has put an economic value on water.
- Profit and Non Profit orientation.
- The tariff stipulated based on the classifications of consumers (cross subsidy), where the low-income community pays less than the high-income people. As a Public Corporate is not profit oriented, therefore the service is basically intended to serve not only to the profitable groups but also to farmers and access to poor people.
- In term of human resources, Gowa and Makassar Water Authorities faced some problems of overstaffing and competency.
- PERPAMSI actively educates Gowa and Makassar's Water Authorities employees.
- The dissemination of information is very important to increase the people's awareness on water supply provision (Shofiani, 2003).

## **6.5 Indonesian Water Supply Association (PERPAMSI)**

In field survey and interviews with Mrs. Sukmayeni, as Human Resources Development Chief of Perpamsi, explained that the association as an umbrella organization of the municipal waterworks in Indonesia plays an important role in increasing human resources in water utilities, they also facilitating and coordinating activities of donors, government investors with Water Authorities and also in motivating Water Authorities to increase staff knowledge, skills and careers. This association is favor with the policy of the Public Corporate in terms of professionalism. She had no objection to establish the Public Corporate in South Sulawesi Province (Ageng, 2005).

Staff of organization is also mediating all stakeholders by providing some information, i.e. regularly publish magazines and journals to socialize the latest issues on water and program campaigns, i.e. efficient water usage, discussion forums, trainings and seminars, and the empowerment of women.

Abdul Gani, a member of Benchmarking Team at Perpamsi, informed that the Water Authorities in Indonesia has three performances, excellence, good and poor performance. In several Water Authorities, they applied ISO (International Standard Organization) for operational the water treatment plan. Moreover, the Water Authorities who have good performances are applied and committed to implement a preparation of Quality Assurances. Mostly, the poor performances are connected with inefficient corporation and low motivation employees and enhance proper documentation records. In general, the Water Authorities are considering good communications between customers and increasing the quality level and service to the customers (Ageng, 2005).

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## CHAPTER 7: FINDINGS AND RESULTS OF THE CUSTOMERS QUESTIONNAIRES

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The perceptions and expectations of customers on the establishment of the public corporation were assessed by conducting a customer survey. The total feedbacks from the respondents were collected in the three zones of Makassar Water Authority. The questionnaire was separated into two sections: the general information and the questions (Appendix C). The general results of the customer survey recognized their standard of living as well as occupations, incomes and customers categories. The information will be used as the bases in assessing their responses on the main questions. The questions listed (Appendix C) were raised in order to identify their perception on the water services delivery. The customer experiences on the delivered water services are essential as an input for the Central or Local Government Institution and JRBDP, which are preparing to become a Public Corporate (Perum Jasa Tirta Jeneberang). This institution will be acting as the change agent and improving the regional water services based on the perceptions.

### 7.1 General Overview of the Customers

Fig. 7.1 to Fig. 7.12 show the general information of the customers: distribution of customers based on numbers, sex, water tariff, satisfaction, income and problems with water such as turbidity, color and odor. The information shows collected not only their perceptions of establishing a Public Corporate and available resource, but also their satisfactions. The categories of customers are described in Table 7.1.

The Makassar Water Authority profile (June 2005) shows that the total numbers of customers of Makassar Water Authority up to end of June 2005 were 14,215 customers. 7 percent are commercial subscribers and 93 percent are non-commercial. The areas cover half of Makassar Municipality and a small area of East Makassar Municipality. Distribution of sex in the Bontoala District is shown in Fig 7.1.

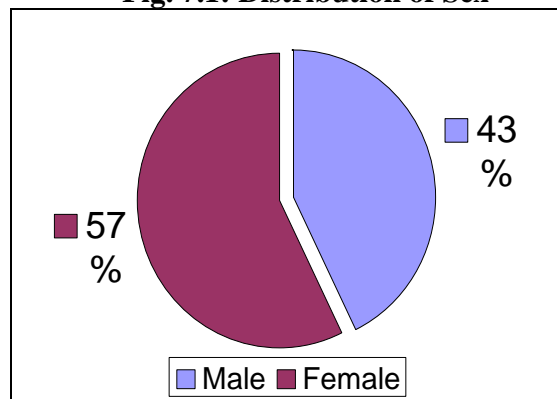
According to the statistics of Makassar (2002), the employment status is divided into 4 categories: employee, self-employed, employer and family worker. In this research, some categories are added due to more classified status came up during the interviews, such as state employee, private worker, retired and non permanent job. The group category is represented by the origin number which is written on the company profile. The respondents are not represented in all groups.

The category with the largest access to distributed water is Rumah Tangga B dominated by low and middle income households (Fig. 7.2). The Group with highest consumption of water is Industri B, covered large scale workshops, large trading, sky scrapers buildings, factories, amusement parks. More than 37 percent of the customers do not perceive any improvements in water service (Fig. 7.13). However, the level acceptances of the water services are considered

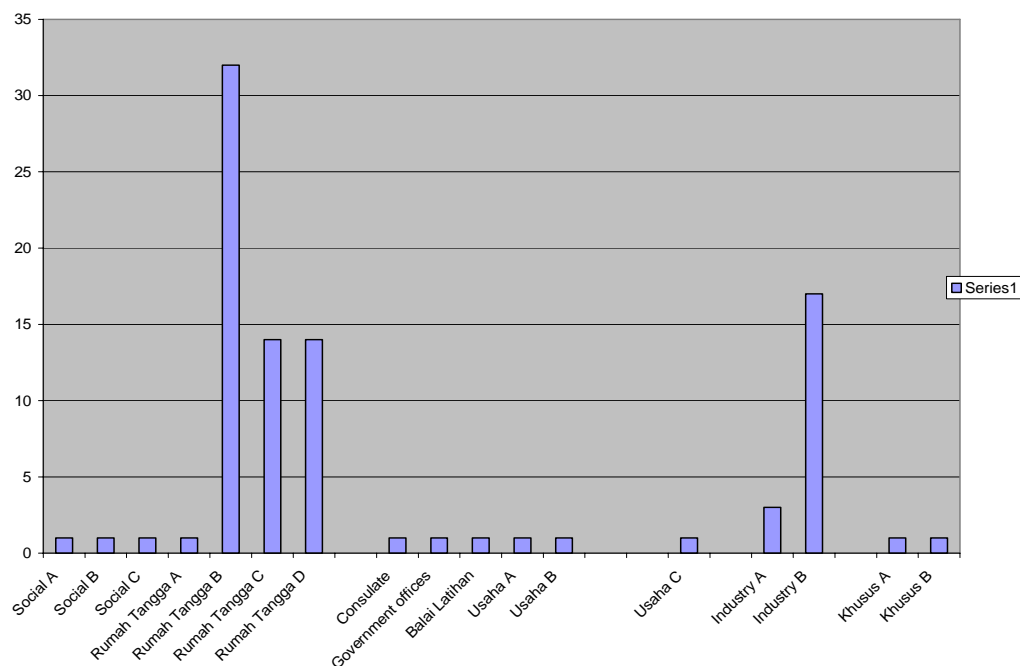
high. It is showed that 50 percent of the respondents are satisfied with the water services (Fig. 7.3).

The water tanks were distributed by the water company to anticipate the lack of water in some areas. Usually the water vendor pay water from the water tank or public hydrant and sell it to the customers with higher price. Table 7.2 describes all the issues in drinking water provision.

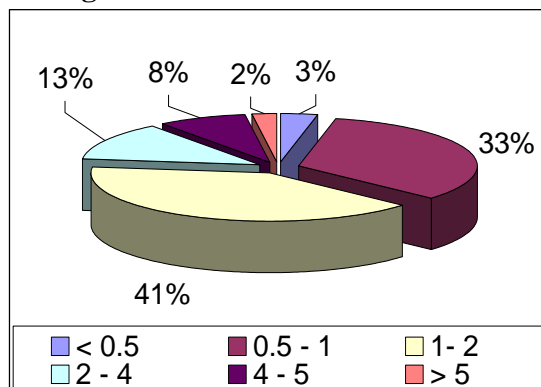
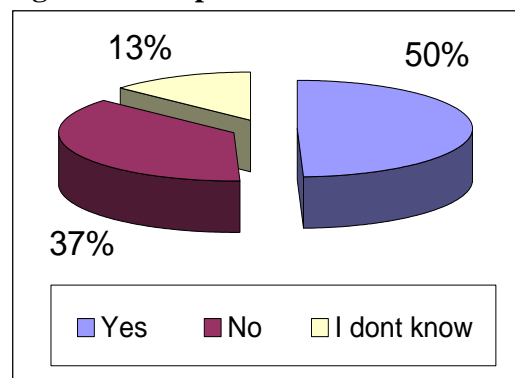
**Fig. 7.1: Distribution of Sex**



**Fig. 7.2: Distribution of Water Tariff**



The monthly income distribution are varied from less than 500.000 Rupiah or \$US 50 to more than 5 millions Rupiah or \$US 500 (Fig. 7.3 and 7.5). More than 3 percent of the customers have a salary less than the minimum wage, 8 percent of the customers have a salary between 4 million to 5 million Rupiah. 41 percent have a salary between 1 millions Rupiah to 2 millions Rupiah or \$US 200, and only 2 percent of the customers have a salary more than 5 millions Rupiah or \$US 500.

**Fig. 7.3: Distribution of Income****Fig. 7.4: Perception with Water Services****Table 7.1: Descriptions of Customers Groups**

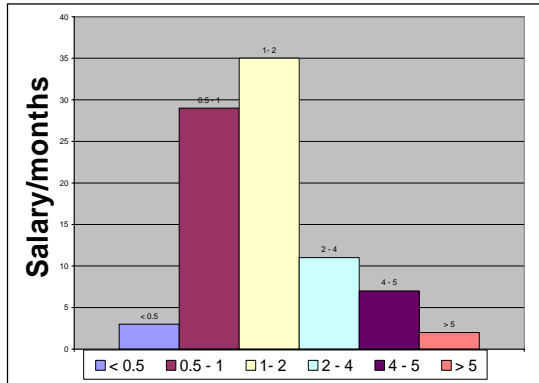
No.	Categories	Remarks
IA	Social A	: social institutions, orphanages
IB	Social B	: religious facilities and public hydrant, public hospitals
IC	Social C	: very poor households, water storage and tanks
IIA	Rumah Tangga A	: low and middle incomes households
IIB	Rumah Tangga B	: upper-middle income households
IIC	Rumah Tangga C	: middle-income flats, kiosk, small workshops
IID	Rumah Tangga D	: non-commercial bodies, small-scale business, small domestic business
IIE	Consulate	: foreign representatives
IIF	Instansi Pemerintah	: government offices
IIG	Balai Latihan	: training centres
IIIA	Usaha A	: upper-middle income households
IIIB	Usaha B	: government offices, foreign representatives, private commercial bodies, school, training centers, military facilities, medium class workshops, barbershop, tailor, small restaurants
IIIC	Usaha C	: private hospitals and laboratories, clinics, law offices, small hotels, small industries
IVA	Industry A	: stars hotels, beauty saloons, night clubs, banks
IVB	Industry B	: large scale workshops, large trading, sky scrapers buildings, factories, amusement parks
VA	Khusus A	: big factories
VA	Khusus B	: amusement parks and ports

Source: Ageng, 2005

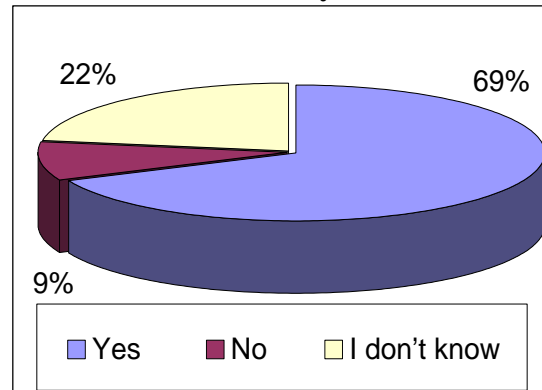
Most customers in Makassar are working as employees in some private companies or are self employed by creating a job of their own, or working in small scale business, such as operating a small cafe or restaurant, barbershop, and laundry, renting some parts of their home, or selling home-made cookies and meals. However, the customers working as private workers as labors /

porters at traditional markets and ports, or as drivers of *becaks* (rickshaw) and *ojeks*-motorcycle for public transportation, according to the field discussions during survey, mostly they must allocate more than 20 % of their monthly income for drinking water.

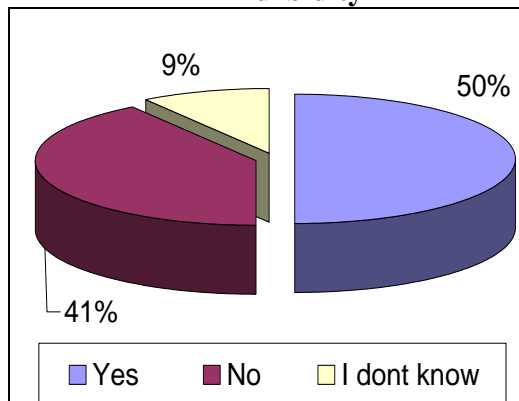
**Fig. 7.5: Distribution of Customers Income**



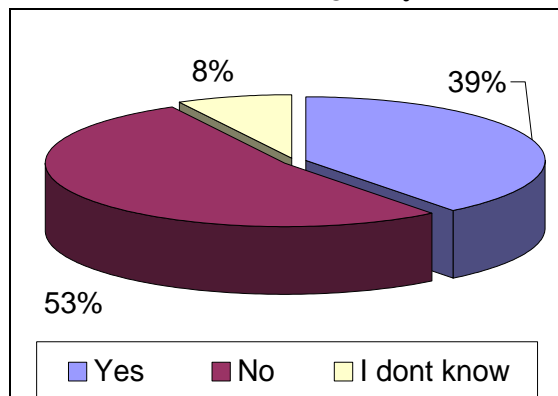
**Fig. 7.6: Problems in Makassar Water Authority**



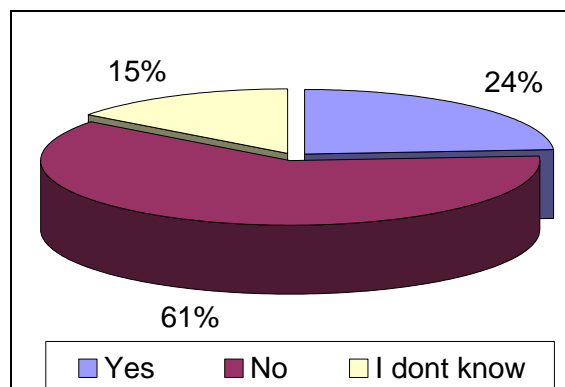
**Fig. 7.7: Customer Problem with Turbidity**



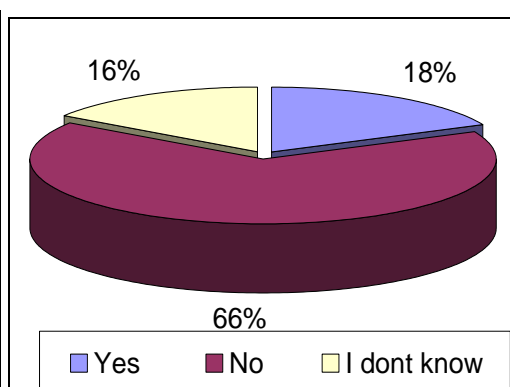
**Fig. 7.8: Customer Problem with Water Quality**



**Fig. 7.9: Customer Problem with Color**



**Fig. 7.10: Customer Problem with Odor**



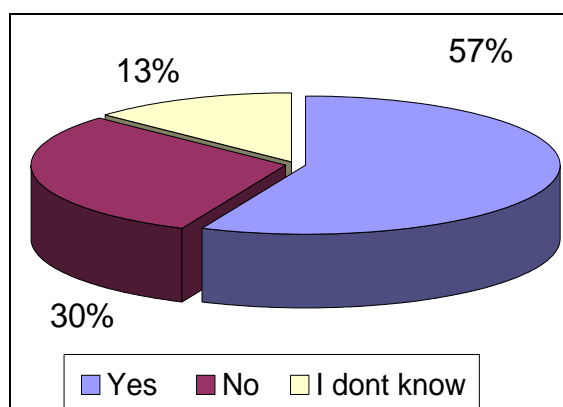


Customers experience their own resources. These customers have to use water for drinking and household activities, such as bottled water and ground water or well, as shown with more than 50 percent of the respondents (Fig. 7.12). They are reluctant to use the piped water as the source of drinking water due to the possibility of bacterial contamination. The usage of piped water is restricted for household activities, such as cleaning, washing and bathing.

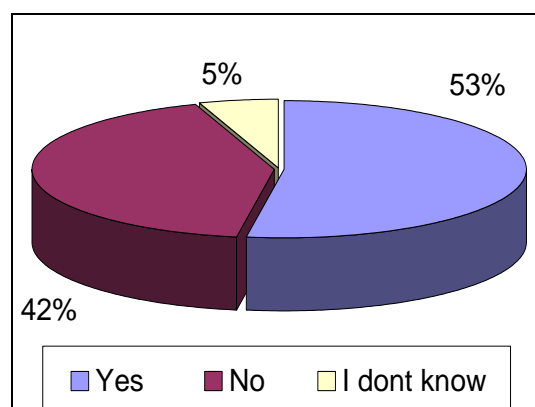
## 7.2 Questionnaire Responding

Fig. 7.1 to Fig. 7.13 show the responses of the customers to the questionnaires and illustrates the customer's experiences and expectation of the water services. Detailed information on the customer's response to the questions is outlined in Appendix C3.

**Fig. 7.11: Customer Perceptions with Public Corporate**



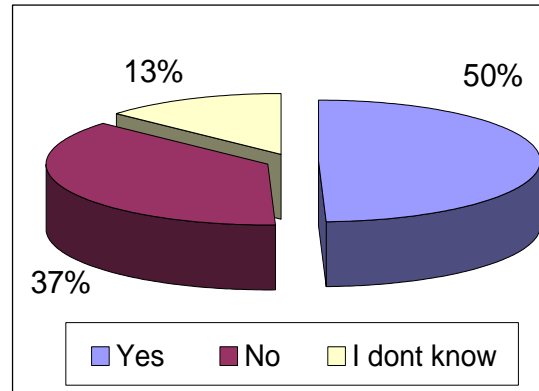
**Fig. 7.12: Additional Source of Drinking Water**



Most of the customers do not understand that a Public Corporate will be established for management of their water resources. They just think that the water company is still run as an existing water authority (PDAM) with Local Government. The customers feel that they got water and they do not feel a problem with water provisions, they have no other option for the source of drinking water. It is shown that 50 percent of those asked were satisfied (Fig. 7.4 and Fig. 7.13). Controversy, 69 percent of the respondents feel problems with Makassar Water Authorities services (Fig. 7.6). Half of the customers feel improvements in water service provision during the last five years (Fig. 7.13).

39 percent of the respondents have problems with water quality, as well as color and odor (Fig. 7.8). A small group of customers, 9 percent of the respondents, answered that Makassar water supply was without problems, and 22 percent of customers don't know about that. The problems on quality of water are turbidity, color and odor. 50 percent of the respondents had problems with water quality and 41 percent of the respondents feel no problem with quality (Fig. 7.7). Turbidity is the main problem in water quality. 50 percent of the respondents have problem with turbidity. The color and odor problems are lower than the turbidity problems. 18 percent considered odor problems and 24 percent color problem (Fig. 7.9 and Fig 7.10).

**Fig. 7.13: Improvements in Water Service Provision during the Last Five Years**



Pictures of customer's homes and river basin infrastructures are shown in Appendix D8. These pictures cover: Upper-middle Income Households (1, 2 and 3); Middle Income Households (4, 5 and 6); pictures of water infrastructures (10, 11, 12, 13, 14 and 15) and water treatment facilities (16, 17, 18 and 19).

**Table 7.2: Major Issues in Drinking Water Provision:**

Main issues and problems

1. Water quality (Turbidity, Color and Odor)
2. Water quantity
3. Water continuity
4. Water service should be improved if the price is increased
5. Technical (Leaks on the pipes)

Source: Shofiani, 2003: 40

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## CHAPTER 8: DISCUSSIONS AND ANALYSIS

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The Local Government required a sustainable and autonomous water resources development and management. It means that the self financing of operation and maintenance of water resources are important and in line with the national policy and regional autonomy. In order to achieve autonomous water resources development and management in Indonesia, the autonomous concepts of “bottom up approach” as well as the official planning are indispensable. The concept is empowerment of public participation. One of public participation was carried out with the PCM and the PDM workshops (Chapter 5).

The discussion will be focused on the existing Public Corporate as well as PJT 1 and PJT 2 at Jatiluhur and Brantas river basin. The complete overview of Public Corporate will be available in Appendix D2, D3 and D4. The analysis will be shown with overall problems in human resources development in Jeneberang River Basin Development Project (JRBDP).

### 8.1 Existing Public Corporate in West and East Java Island

Alaerts (2003) tried to review the existing Public Corporate in Indonesia. The Board management of Jatiluhur Public Corporate is under control and managed only by the supervisor's (Ministry of Public Works), and has no formal link with the Provincial Government. Paragraph 33 of the Indonesian constitutions stipulates that land, water and embodied assets belong to and are controlled by the state, these assets should be used to the utmost welfare of society. One important factor must be to develop a capacity program in order to achieve this constitution. The communication ability among institutions is one key success. In fact, a problem will be raised to un-capable people when trying to solve a problem related to demarcation of border area of Regency or Municipality in one Provincial territory.

### 8.2 Policy, Legislations and Regulations

Since access to safe water is a human right, the Central and Local Government are obligated to protect everybody's right to water. To fulfill their obligation, the governments must take appropriate legislative and other measures to prevent violations of the right to water (Sofiani, 2003). The absence of an integrated regulatory framework is a main problem in setting up the basis for private sector participation in Indonesia. The prevailing regulation on water resource is the Law 11/1974 and the water resource management Law No 7 on Water Resources 2004. The development of this law is part of reformation of regulation framework of water resources called WATSAL (Water Sector Adjustment Loan). One of the major problems with establishing a Public Corporate was that the Local Government was relatively inexperienced in establishing such a process. So, the Central Government will guide enough skilled. Contrary, the decentralization efforts raise dilemmatic issues; these efforts lead more elected people on trial, especially occurred in one Province at Sumatera Island. The decentralization made an example when a distribution of the corruption flows to a Local Government with their own jargon “Once independence to independence once”.

One problem in sustainable Public Corporate is the availability of the regulation for setting up the water tariff. The Law No 19 2003 on State owned Enterprise expected that a Public Corporate make profits as well as provide public benefits. There is no mention of a payment to the National Development Fund (currently at 55 % of “profit”). In a transformation of decentralization effort, the Central Government is trying to get an approach by establishing a Public Corporate as well as being “coordinator” for managing water resources (Ageng, 2005).

### **8.3 Effective Local Water Governance**

The planning of regulations on Regional, Provincial and Local level will follow the New Law of Water Resources No 7/ 2004. The unclear responsibility on the new law / legislation in the beginning is being permitted. To anticipate the overlapping of responsibility in more than one institution, a joint responsibility of multi-institutions should be established. A major goal to its autonomy is to reduce government cost for operation and maintenance. So, the Central Government will be providing assistances to accomplish new “institutions” in many areas as well as to create and strengthened their own institution to manage water resources.

The regulation of the Regulatory Water Body should be established as an independent body, but according to the discussion with some representatives of the stakeholders, the Body has not been established yet. The preparation for this institution should be facilitated by the Central and Local Government as well.

According to Shofiani (2003), the World Bank contributed in proposing a new alternate function of an independent regulatory body: to exercise powers and functions. This means that a Public Corporate should no longer have a role in the monitoring and enforcement of regulatory responsibilities that would be transferred to the Local Government. The regulatory body should also be given the power to set the final water tariffs to the customers and approve the investment plan of the private company or concessionaire.

Local Government is conducting changes of policy in micro and local level, for example policy concerning irrigation and forming of data network. The difficulties and barriers in changing policy will occur in areas such as communication skills and inadequate objectives. Additionally, the local level failures occur in defining a substantial message and translate it into familiar terms for both farmers and local institutions.

### **8.4 Water Utilities in Regional Areas**

The Government Report of Indonesia, at the 3rd World Water Forum, February 2003 in Kyoto Japan, expressed that 80 % of the Indonesian population do not have access to clean water. The GoI needs to fulfill the water rights of people. In reaching the goals of developing infrastructure of water, those resources need more funding. An efficient management of water and cooperation among water utilities are necessary.

In Canada a joint responsibility of regional government have been formed (OECD, 1989). National and Provincial Legislation will be needed to achieve this option. Small water enterprises or authorities should be one of Regional Corporation. Merger between water

authorities is one option in order to get an efficient management of water authorities. Nowadays, it is both requested and established that a private corporate should be based on appropriate expense of water prices. A private corporate always specify water tariff on full-cost recovery to maximize profit. These principles are opposing against people's rights of water, particularly at poor people and farmers.

### **8.5 Jatiluhur Public Corporate as a Facilitator: Solving Problems**

Based on a discussion, in September 2005 at the Indonesian Embassy in Stockholm, with Azis Jaya, an economist at Cornell University in New York, it emerged that the macro economic condition of Indonesia is one major problem. The Local Government barriers both in the decentralization process and the national political conditions should be prioritized. In many water authorities, the increasing institutional capability occur when power, function and fund are given from Central to Local Governments.

The establishment of state owned enterprise to manage the river is very much necessary because of its support to commercial and non commercial services by PSO (Public Service Obligation-Kewajiban Pelayanan Umum) (PJT2, 2005). Budgeting for staff's education is one problem, but cooperation between local universities or institutions will decrease the amount of education budget.

The establishment of Jatiluhur (PJT-2) as a Public Corporate river basin in Indonesia started in 1980s (Appendix D4). As a state owned corporate, PJT-2 is properly designed as it is mandated to operate and maintain the river, its infrastructure and the associated irrigation area (240.000 ha). It is presumed to recover costs from user fees. However, the model is not performing or at least under-performing, because the authority is not allowed to set or negotiate tariffs, and in effect the main users, i.e., the country's capital water works and the power sector, negotiate directly with the Ministry and manage to pay tariffs that are less than half the minimum true cost (Alaerts, 2003).

A Public Corporate isn't a privatization. The two existing Public Corporate were established with objectives: 1) to improve the quality and efficiency of river basin operation and management after construction of major basin infrastructure 2) to relieve the financial burden on central and local government by recovering operation and management cost and in time, investment costs as well 3) to satisfy the community's need for better services and more involvement in river basin management.

### **8.6 Set-up a Water Tariff**

The drinking and raw water tariff will be described in order to get a broader view for establishing regulation and laws within the following. The drinking water tariff is the charges levied to customers for customer services, including volumetric charges, fixed charges and meter charges. What the customers pay for water is based on a progressive tariff with cross subsidies between the high and low-income people. Thus the block tariff system is adopted in accordance with a progressive structure. The lowest tariff block is 10 m<sup>3</sup> by assuming the average needs of water per person per day to 60 liters. But for the case of Makassar city, the assumptions are far below

the daily average use for water, because these do not include several other use of water. Advanced technology, i.e. big cars, electrical equipments, dishwashing machines, shower and bath requires more water for daily use. It was estimated that the average consumption of water in Makassar by 2005 would be 100-150 l/p/d (Montgomery, 2000).

Another reason for setting up the raw water tariff is to guaranty the quality, quantity and continuity of raw water. A new regulation of drinking water and solid waste has been made up by the Government, which assure a good management and quality of the environment. Government regulations will become one of the most important actions for legal implementation of Public Service Obligation (PSO-Kewajiban Pelayanan) and also for establishing a Public Corporate. The PSO is an obligation for a Public Corporate. It was given the authority to carry out business activities of management and utilization of water resources and also other business activities related to water. They are functioning as public services, which include providing basic needs and also other duties given by the government, such as using the rivers and managing irrigation. Other tasks include providing information, recommendations, tuitions and counselling. Water service to the community, in my opinion, is the major function not financial benefits.

The activity has taken place without direct support by the Central Government. The tariff applications are expenses for service management of water resources. The electrical tariff of the State Power Company (PT. PLN) has been specified (control of tariff) by the Government, which caused the Public Corporate to make a cutting cost strategy that resulted in degradation function of irrigation infrastructures.

Tariff is one major indicator for good public services. The existing services could be improved proportional with the amount tariff to a quality services. Good management of river basins is determined by good human resource quality. The top management should pay attention to increasing human resources. In autonomous eras, the management of environment will be determined by awareness of the organizers. The law will become a primary factor in the effort of protecting the existing infrastructures.

When a tariff adjustment is proposed by Public Corporate it should be submitted to the Regulatory Body for review. However, the authority of setting up the tariff will be on supervising of the Governor of Provincial Government and the Regional House of Representatives and / or City Council. In order to evaluate the proposed tariff, the Water Tariff Committee was set up by the Provincial Government, because the level of tariff should be in accordance with the affordability of the customers. OECD (1989) reported that the cost benefit analysis may be used to appraise all types of management measures: new tariff policies, regulation, laws and educational initiatives or a combination of these four measures.

### **8.7 Analysis of the Core Problem of Human Resources**

The analysis of human resources, recorded in a table will show the reasons why skill of JRBDP staff is lacking (Appendix E1). However, to deal with the reasons given in the other boxes in the matrix, other measures have to be taken as well. In service training or job training, activities have to be combined with other measures, for instance formal education for technicians.

A central question in this thesis is: to what extent will the current impacts affect the potential future of the region in addressing water challenges? Accountability of a water provider is one important key as well as a Public Corporate. It should be considered as a vehicle when problems occur with insufficiency of the existing water facilities and demand of water purposes. The dependency on treated water resources and lack of environmental assessments show that water knowledge is immediately necessary.

The potential future will be dominated by capacity building in teaching and learning skills. The capacity building should be continued with a number of programs available, concerning water resources management, with targets such as specialists, technicians, decision-makers and generalists with an updated curriculum of water management. In fact, the generalists thus occupy the 'middle-ground' in integrated water resources development and management. They should first of all have a global understanding of central concepts of the different disciplines involved, including not only engineering, hydrology, hydrogeology, chemistry etc., but also ecology, resource economics, law and management science (Appendix D7). Lack of collaboration between organizations addressing water resources research inter- and multi-disciplinary approaches are necessary and should be fulfilled by more cooperation and partnership in a research program. The people who are involved in establishing a Public Corporate will: 1) consist of teams of professionals trained in an appropriate mix of disciplines relevant to water resources 2) be able to facilitate meaningful information exchange and communication among staff, and between staff, stakeholders and policy-makers. The latter two requirements can be partly addressed by investments in human resources through a designed capacity building program.

### **8.8 Perceptions and Expectations of Customers**

The customer's awareness and knowledge of the water problems depend on their level of education. Basically this could be reflected by the income earned monthly. If they have better level of education, they would have better income since the opportunity to get an appropriate job is higher. This assumption becomes the basic thinking in analyzing the perceptions and the expectations of customers, such as the awareness issue of establishing a Public Corporate, their expectations of the level of services in water provision, the problems and what they want and what should be improved in the provision of water.

Nearly half of the respondents are not well inform that a Public Corporate will be established. Half of them thought that the water supply is still operated by a public authority or the Government and half of them do not even know who operates the water supply system. The lack of knowledge of households is caused by the inadequate access of information (newspaper, television and radio), the inability to learn the current situation due to a low education level and the tendency to digest information that is dominated by some basic thinking, e.g. how to get some money for living, how to get some food to eat, how to get better job, how to put their children to school, how to pay the bills, etc.

In terms of water quality, there are still some problems occurring as the quality does not comply with the drinking water standard. Therefore, the customers still have to boil the water before they drink it. Additional cost of the water means that customers have to pay more for buying the

ceramic filters, paying for the electricity to boil the water, or pay for the bottled water. Almost one third of the customers connected to the network consume bottled water when drinking water from the tap is not available.

From a customers' view, there has been improvements in the water service provision but it is confirmed that half of the customers are not satisfied with the services. Even worst, for the very poor people, they must receive the service as it is since they have no other option for the source of drinking water.



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## CHAPTER 9: CONCLUSSIONS AND RECOMMENDATIONS

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### 9.1 Conclusions

The results of the research have lead to the following conclusions:

- To meet the MDGs, the approach is also particularly appropriate for supporting Indonesia's process of decentralization: at the local level there can be a much more dynamic interaction between providers of services and water users. The Central Government can mandate a minimum service standard and the achievement of these standards can be monitored directly at the local level.
- Indonesian economic crisis, financial difficulties and service level of water are the motives for the Central Government to eliminate the costly centralized system currently carried out. Therefore, the concept will bring water as close as possible to the beneficiaries through regional autonomy.
- The establishment of a Public Corporate is proved to give more access of water to the farmers and other water customers. This establishment is a concept introduced to treat water according to good economic principles and implementation as part of water resources management history as well as Perum Jasa Tirta (PJT) 1 and 2 in Indonesia. The nature of water as a fundamental basic need reflects access to water as a human right.
- Accountability of water resources development as well as a Public Corporate should be consider as a vehicle when problems occur with insufficiency of the existing water facilities and big demand of water purposes. Most of the areas have large dependence on untreated water sources and the requirement of clean water as the key issue in water resources development and management is immediately necessary.
- Nearly half of the respondents are not well informed that a Public Corporate will be established. Half of them thought that the water supply is still operated by a public authority or government and half of them do not even know who operates the water supply system.

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## 9.2 Recommendations

According to the assessment of stakeholder perspective in establishing a Public Corporate, the following recommendations are given:

- Public participation, consultation and empowerment are tools for working on lack of policies and institutions. Public participation might have allowed water to be allocated to comprehensive uses through a democratic process, considered fair and equitable for all the stakeholders.
- More efforts should be made in order to avoid disturbances among stakeholders.
- Water provision capacity building should be continued with a number of programs available concerning water resources management. Specialists, generalists, technicians and decision-makers should collaborate in developing water management curricula.
- Collaboration between organizations addressing water resources research and management are necessary. Research in water resources implies inter and multi disciplinary approaches, but also more cooperation and partnership in a research programs. Water related activities of intergovernmental organizations should cooperate and be coordinated with the program of nongovernmental organizations. Considerable efforts have been made to create environmentally, economically and socially sustainable institutions for water resources research and management.
- In order to comply with the global water concern, it is necessary for the Government of Indonesia to establish an appropriate regulatory framework to avoid its negative influences on the local economy along with the establishment of a public institution. The institutional capacity building is critical to enforce the regulations.
- BAPPENAS as an institution at the national level has to play an active role in adjusting the international policy of privatization to the local condition. The establishment of an independent regulatory body is crucial to ensure the provision of efficient water supply to diminish domination by certain party or parties.
- It is still the responsibility of the government to subsidize and to provide adequate access to increase the role of PERPAMSI in building the competence of Water Authorities (PDAM). Government should subsidize the water service for the poor, or the public corporate and private company should be strictly regulated to include urban poor in the service. The classification of the consumer groups is based on the housing conditions. Improvements of the water production and water losses are critical since the collected revenue is based only on the volume of water sold.
- The implementation of urgent structural counter measures to the Bili bili multi purpose dam, such as excavation of riverbed, rising and construction of silt collection (Sabo) facilities, and non-structural counter measures, for example the early warning systems and establishing of a hazard map are needed.
- Monitoring activities are costly. A low cost monitoring water resources database could be established on a Website.

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## Appendixes

### Appendix A: Drinking Water and Clean Water Standard

PARAMETER	UNIT	MAXIMUM CONCENTRATION/LEVEL ALLOWED	
		Drinking Water Standard*	Clean Water Standard**
<b>A. Physic:</b>			
1. Odour	-	No Odour	No Odour
2. Total Dissolved Solid	mg/l	1 000	1 500
3. Turbidity	NTU scale	5	25
4. Taste	-	No Taste	No Taste
5. Temperature	°C	Air temperature + 3 °C	Air temperature + 3 °C
6. Colour	TCU scale	15	50
<b>B. Chemical:</b>			
<b>a. Inorganic</b>			
1. Mercury	mg/l	0.001	0.001
2. Aluminium	mg/l	0.2	-
3. Arsenic	mg/l	0.05	0.05
4. Barium	mg/l	1.0	-
5. Iron	mg/l	0.3	1.0
6. Fluoride	mg/l	1.5	1.5
7. Cadmium	mg/l	0.005	0.005
8. Hardness (CaCO3)	mg/l	500	500
9. Chloride	mg/l	250	600
10. Cr +6	mg/l	0.05	0.05
11. Manganese	mg/l	0.1	0.5
12. Sodium	mg/l	200	-
13. Nitrate, as N	mg/l	10	10
14. Nitrite, as N	mg/l	1.0	1.0
15. Argentums	mg/l	0.05	-
16. pH		6.5 - 8.5	6.5 - 9.0
17. Selenium	mg/l	0.01	0.01
18. Zinc	mg/l	5.0	15
19. Cyanide	mg/l	0.1	0.1
20. Sulphate	mg/l	400	400
21. Sulphide	mg/l	0.05	-
22. Cooper	mg/l	1.0	-
23. Lead	mg/l	0.05	0.05
<b>b. Organic</b>			
1. Aldrin and Dieldrin	mg/l	0.0007	0.0007
2. Benzene	mg/l	0.01	0.01
3. Benzo (a) pyrene	mg/l	0.00001	0.0007
4. Chlordane (total isomer)	mg/l	0.0003	0.007
5. Chloroform	mg/l	0.03	0.03
6. 2,4 D	mg/l	0.10	0.1
7. DDT	mg/l	0.03	0.03
8. Detergent	mg/l	0.05	0.05
9. 1,2-Dikloretan	mg/l	0.01	0.01
10. 1,1 Di-chloro-ethane	mg/l	0.0003	0.0003
11. Heptachlor and Hepachlorepoide	mg/l	0.003	0.003
12. Heksachlorobenzene	mg/l	0.00001	0.00001
13. Gamma-HCH	mg/l	0.004	0.004
14. Metoxiklor	mg/l	0.03	0.10
15. Pentachlorophenol	mg/l	0.01	0.01
16. Pesticide total	mg/l	0.10	0.10
17. 2,4,6-trichlorophenol	mg/l	0.01	-
18. Organic Compound (KMnO4)	mg/l	10	-

\* PERMENKES No. 416/Men Kes/Per/IX/1990 Regarding Standard Quality of Drinking Water

\*\* PERMENKES No. 416/Men Kes/Per/IX/1990 Regarding Standard Quality of Clean Water

**Appendix B: Interviews and Meetings**

Date	Institutions	Address
15, 16,17 August 2005	Ministry of Public Works	Jl. Pattimura 10 Kebayoran Baru Jakarta Selatan
22, 23, 24 August 2005	Jeneberang River Basin Development Project	Jl. Emmy Saelan Makassar
25, 26, 27 August 2005	Indonesian Association Water Authorities (Perpamsi)	Jl. Penjernihan Pejompongan Jakarta
29, 31 August and 3 September 2005	Makassar and Gowa Water Authorities	Jl. Dr. Ratulangi No 3 and Jl. Poros Sungguminasa Malino Makassar
1 September 2005	Japan international Cooperation Agency (JICA)	Jl. Emmy Saelan Makassar
1 September 2005	Yayasan Lembaga Konsumen Sul-Sel Makassar	Jl. Mesjid Raya Makassar
1 September 2005	Wahana Lingkungan Hidup	Jl. Tegal Parang Utara No. 14 Jakarta 12790
12 Agustus 2005	Perum Jasa Tirta I	Komplek Kopro Banjir 18
13 Agustus 2005	Perum Jasa Tirta II	Jl. H. Agus Salim 59 Malang
30 September 2005	Bappedalda Kota Makassar	Jl. Hati Mulia No 7 Makassar

## Appendix C: Questionnaires and Results

## Appendix C1: Questionnaires for Customers

Section 1					
Information		Response			
Name					
Place of Living (District)					
Sex		Male			
Occupation		Female			
		< 0.5			
Income or Salary/month/household (in million rupiah)		0.5 - 1			
		1- 2			
		2 - 4			
		4 - 5			
		> 5			
Number of persons/household		people			
Tariff Group		Group I			
		Group IIA			
		Group IIB			
		Group IIC			
		Group IID			
		Group IIIA			
		Group IIIB			
		Group IVA			
		Group IVB			
Section 2					
Question					
1.	Customers think that water supply in Makassar has problem	Yes			
		No			
		I don't know			
2.	How much you pay water per month?	> 5000			
		> 10000			
		> 20000			
		> 50000			
3.	The water price rise the last 5 years? is it acceptable ?	Yes			
		No			
		I don't know			
4.	Any problem with the water quality?	Yes			
		No			
		I don't know			
	Turbidity	Yes			
		No			
		I don't know			
	Odour	Yes			
		No			
		I don't know			
	Colour	Yes			
		No			
		I don't know			
5.	Customers have any other sources of drinking water If yes, what sources	Yes			
		No			
		I don't know			
6.	Customers perceive any improvement in the water service provision since the last 5	Yes			
		No			
		I don't know			
7.	Customers feels satisfied with the water service provision?	Yes			
		No			
		I don't know			
8.	Customers agreed the raw water will be manage by a Public Corporate	Yes			
		No			
		I don't know			
Other Comments:					

## Appendix C2: Questionnaires for Government

(Public Works /KIMPRASWIL & Local Water Authorities and Water Association/PERPAMSI)

### 1. Public Corporate Process

- i. Who was taken the initiative in manage the water resources by Public Corporate?
- ii. Was it proposed on a free choice?
- iii. What are the main objectives of management by Public Corporate?
- iv. What is the role of the donor agencies? (i.e. JBIC, the World Bank and ADB)
- v. What was the role of your institution during establish process?
- vi. Who were involved in the establishment process?
- vii. Was the public involved in the decision-making process? How?
- viii. What is the type of Public Corporate ?
- ix. Was there any opposition from other stakeholders regarding the decision to establish Public Corporate?

### 2. Management and Organization

- i. What is the role of your institution now?
- ii. Who owns the water service now? (multinational, regional state agencies, municipalities or other parties)
- iii. How ownerships and responsibilities are distributed among different institutions? (infrastructure and network, capital investment, financing, regulation, setting of tariffs, operation and maintenance of the system, maintaining quality of services standards, billing and collections)
- iv. Who is responsible in monitoring the Public Corporate operator?
- v. What are the consequences if operator could not fulfill?
- vi. Is there any possibility of withdrawing the operating license?
- vii. Who provide indicators for the quality of the service?

### 3. Financial and Investment

- i. What is the charging method applied? (meter system, block tariffs, price cap, etc.)
- iii. Is there any regulatory protection for consumers due to the implementation of market pricing?
- v. Was there any increase on water tariff before the establishment Public Corporate?
- vi. Was the public involved in setting up the tariffs? What was the public perception about that?
- viii. Are the tariffs the same for all users? Do you consider people with special needs or low income?
- ix. Is there any subsidized rates system for the poor?
- x. All people have the basic right of access to clean water and sanitation at an affordable price. How the pricing structure is designed? What kind of basis? Who collect the billing? How to enforce people to pay?
- xi. To who are water tariffs to be paid after billing and for which purposes are the tariffs spent?
- xii. Are there any financial incentives to reduce water consumption?

### 4. Operation and Distribution

- i. Can the operator stop distributing water to consumers? Under which conditions? What are the rules and practices?
- ii. Does the operator provide extra service to customers? (information about water tariff, water saving, electronic payment)
- iii. What is the most important information that should be disseminated to consumers?
- iv. Is there a general obligation of transparency (concerning price, administration and information provision)

### 5. Regulation and Policy

- i. What was the initial policy concerning regulation of Public Corporate?
- ii. Is there any regulation for improving quality of water that has a long term effect?
- iii. What are the rules, guidelines or regulatory framework to ensure that private sector will protect the ecosystem?
- iv. Is there any regulation for managing the water demand among competing users? (agriculture, mining, households, industry, etc)

### 6. Others

- What do you think was behind any improvement achieved in the provision of the water service if any?
- Do you think that the public sector was not able to do the same advancement if it has the loan?
- Were there any improvements or success in the water service in Indonesia ?
- Were there any specific obstacles that intervene the good performance of the water company?
- Do you think that other municipal waterworks should be a Public Corporate?

**Appendix C3: Results and Feedback from customers**

Sex	Male				60
Occupation	Female				20
Income or Salary/month/household (in million rupiah)	< 0.5				3
	0.5 - 1				29
	1 - 2				35
Number of persons/household Tariff Group	2 - 4				11
	4 - 5				7
	> 5				2
	people				0
	Group I				0
	Group IIA				0
	Group IIB				32
	Group IIC				0
	Group IID				14
	Group IIIA				0
	Group IIIB				0
	Group IVA				3
	Group IVB				17
1.	Customers think that water supply in Makassar has problem		Yes		52
			No		7
			I don't know		17
					6
2.	How much you pay water per month?		>5000		14
			>10000		22
			>20000		26
			>50000		0
3.	The water price rise the last 5 years? is it acceptable ?		Yes		38
			No		6
			I dont know		35
4.	Any problem with the water quality?		Yes		37
			No		30
			I dont know		7
	Turbidity		Yes		30
			No		40
			I dont know		6
	Odour		Yes		14
			No		51
			I dont know		12
	Colour		Yes		18
			No		46
			I dont know		11
5.	Customers have any other sources of drinking water If yes, what sources		Yes		40
			No		32
			I dont know		4
6.	Customers perceive any improvement in the water service provision since the last 5 year		Yes		15
			No		25
			I dont know		37
7.	Customers feels satisfied with the water service profision?		Yes		37
			No		28
			I dont know		10
8.	Customers agreed the raw water will be manage by a Public Corporate		Yes		43
			No		23
			I dont know		10

## Appendix D: Institutional Framework of River Basin Management

### Appendix D1: Institutional Framework for River Basin Management

Institution	Responsibility
Technical Implementing Unit (TIU), Bali PSDA.	To the provincial Water Resources Management Service (Dinas PSDA). There is no description of specific main activities in governor decree (JICA, 2004).
The provincial water resources coordination Committee (Panitia Tata Pengaturan Air-PTPA).	Responsible for assistance the governor to plan and regulate water utilization and quality in several river basins.
Jeneberang river basin level, The river basin water resources management Committee (Panitia Tata Pengaturan Air-PTPA).	Regency leader or Mayor and head of relevant office, member of PTPA which is responsible for implementing and regulating river basin management.
Kabupaten / Kota level, The Kabupaten or Kota Water Resources Services.	Responsible for All regional operation and maintenance of rivers and irrigation infrastructure as instructed and supervised by provincial authorities. Dinas PSDA Kabupaten in level Kabupaten such as Gowa, Takalar and level Kota (Dinas Cipta Karya Kota Makassar is included).
Farmer level, for operation and management of quarterly and tertiary irrigation system, P3A (Perkumpulan Petani Pemakai Air/ Farmer Water Group Users) and higher level farmer groupings.	Responsible for operation and maintenance of quarterly and tertiary canals.
Basin level management agencies are either provincial technical implementation units (TIUs) or (Unit Pelaksana Teknik Dinas-UPTD).	Responsible for operation and maintenance of primary, secondary and tertiary canals.
BAPPEDA is responsible mainly in Planning and development, over all objectives area such as coordinate, facilitate, set up and generate synergy: Provincial government, the private sector, society, Kabupaten and Kota. BAPEDALDA South Sulawesi Provinces.	Responsible for management of environment such as water and pollution. Responsible to the governor over all objectives area such as improve environmental problem awareness and measure to resolve these. To improve: cooperation among institutions in studying and solving environmental problem, monitoring environmental damage and water resource pollution.

Source: JICA, 2004



## **Appendix D2: Short Review of River Basin Management in Indonesia**

### ***Review of River Basin Management in Indonesia***

Two Public Corporations (Perum Jasa Tirta Corporations/ PJT1 and PJT2) were established with three objectives: 1) To improve the quality and efficiency of river basin operation and management after construction of major basin infrastructure 2) To relieve the financial burden on central and local government by recovering operation and management costs as well as investment cost in time 3) To satisfy the community's need for better service and more involvement in river basin management.

The overall theme was and still is: "One basin, one integrated plan, one integrated management" The objectives have been partially achieved to date.

PJT2, the first river basin management corporation in Indonesia, was established in 1970 by Government Regulation No 20/1970 as a wholly state owned corporation (BUMN), known as Perum Otorita Jatiluhur (POJ). The remit was to operate and manage selected rivers, the associated river infrastructure and all irrigation facilities in the Citarum river basin, the most developed in the country which covers two provinces – West Java and Jakarta.

Following the example of PJT 2 (then POJ) in the Citarum river basin, GOI issued Government Regulation No 5 /1990 to establish the first Jasa Tirta Public Corporation in the Brantas river basin, also as a Perum and BUMN. The main objective was stated to be operation and maintenance of water resources infrastructure in the Brantas Basin. In 1999, by Government Regulation No 93/1999, the PJT Corporation became PJT 1 as it was the first PJT although not the RBMC. In addition, PJT 2 manages 296,000 ha of irrigation (for which it receives no revenue) and its hydropower plant at the Jatiluhur Dam. Both corporations manage a series of non water operations, in order to generate revenue to supplement inadequate water resources income.

The Bengawan Solo River Basin was incorporated into PJT 1 as a Directorate reporting to the President Director by Presidential Decree No 129/2000. The river basin is an additional working area for PJT 1 which began operation in 2002. Operation and maintenance is carried out under the technical guidance of PJT 1 Brantas for rivers and related infrastructures as managed assets. The Bengawan Solo Directorate (as in the case of Brantas River Basin) does not manage the Wonogiri Hydropower Plant (PLTA) or irrigation operation and maintenance but only provides raw water.

### **Overview of River Basin Management of PJT 1 and PJT 2**

Both of PJT1 and PJT 2 currently undertake the comprehensive river basin management. However, the major concerns of PJT 1 and PJT 2 are thought to be oriented to different aspects of river basin management. The principal concern of PJT 2 is to increase the efficiency and effectiveness of the existing production infrastructures for hydropower generation and irrigation. On the other hand, PJT 1 has an important role for raw water supply as well as control of the negative impact of flood and water pollution. Thus, the principal scope of river basin management by PJT 1 is deemed to be more comprehensive river basin management. The major issues for river basin management in Jeneberang river basin would be placed on raw water supply rather than management of hydropower generation and irrigation. From this point of view, the actual guidelines, procedures and/or manuals used for river basin management by PJT 1 will serve more as a reference for management by the water corporation in Jeneberang river basin.

### **Appendix D3: Indonesia Brantas River Basin Authority**

#### ***Present condition of PJT 1***

*From Usman, R. (2005): Integrated Water Resources Management: Lessons from Brantas River Basin in Indonesia Jasa Tirta I Public Corporation Malang, East Java, Indonesia. pp. 294-295.*

The following is a summary of the main features of PJT 1 at present.

#### **Beneficiaries' contribution for operation and maintenance**

Beneficiaries' contribution in 1999 reached 27 billion Rupiah (US\$ 4 million). Even though this does not cover normal operation and maintenance budget requirements, it lead to following results:

- Increasing regional revenue as the result of orderliness in water allocation and tariff determination in Brantas river basin;
- Cost burden from government budget allocation for Brantas river basin could be minimized and allocated to other basins.

#### **Improvement of water resources infrastructure functions**

Improvement of operation and maintenance has resulted in improved functioning of water resources infrastructure, which directly contributes to management improvement.

#### **Company performance in 1991–1999**

The company's audit up to the fiscal year 1999 is considered excellent, proving satisfactory results from application of the cost recovery principle.

#### **Public/Private and community participation in water resources management**

Water resources management operated by PJT 1 makes it possible for public as well as private sectors to participate in water resources development and management in the basin.

#### **ISO 9001 certification**

Certification of ISO 9001 for Design, Operation and Maintenance of Water Resources Infrastructures in the Brantas river basin issued by SGS International Certification Services, has proven professional water resources management practices by PJT 1.

#### **General view of the corporation**

- The Brantas river basin has been a valuable natural resource for many years. It was essential for food production; to support national economic development, water is considered as a strategic commodity.
- The development of the Brantas river basin has been carried out since 1961 as an integrated development through a series of Master Plans with the basic concept of one river, one plan, one management. The benefits of development include flood control, food production, drinking water, industrial water, electricity production.
- In order to overcome the post construction problems, the Government of Indonesia established the state-owned corporation PJT 1 in May 12, 1990.

- The management of water resources in the Brantas river basin is carried out as an integrated management operated by PJT 1. The scope of activities of PJT 1 are: water quantity management, water quality management, maintenance of water resources infrastructure. PJT 1 implemented Quality Assurance System ISO-9001, issued by Yarsley International Certification Services Limited, London, No. Q.9755 in May 12, 1997.
- To operate these activities, PJT 1 collaborate with related agencies, such as: East Java Provincial Water Resources Committee (Panitia Tata Pengaturan Air) for water allocation, Commission for Environmental Pollution Control and Abatement (KPPLH) for pollution control.
- The funding for operation and maintenance of water resources in the Brantas river basin mainly comes from the contributions of beneficiaries: State Electric Power Company, Regional Drinking Water Supply Company and Industries.
- In the future, PJT 1 will be extended to cover other rivers in Indonesia.

**Management problems**

- The formula to compute the unit water rate is not established yet. This is needed, from the point of view that water revenue should be reliable and stable for the long-term sustainability of the corporation.
- The operation and maintenance contribution from beneficiaries excludes depreciation. In the future it may be necessary to establish a water rate formula including depreciation and other factors.
- Up to now farmers do not pay operation and maintenance contribution. Most of the irrigation water users still keep the old perception that the charge for water used is included in the tax they pay.
- Due to lack of awareness, water taken by the farmers is not efficient utility. Some farmers take more water than their actual needs. As a result, farmers downstream face water shortage problems in the dry season.
- River water quality has seriously deteriorated throughout all the Brantas River. The reason is untreated wastewater from industry, domestic users, agriculture and livestock breeding which has been drained into the river.
- At present, the upstream area of the basin has been considerably devastated and existing reservoirs have suffered from sedimentation.

#### **Appendix D4: Indonesia Jatiluhur River Basin Authority**

*From Alaerts, G. (2003): Integrated Water Management at River Basin Level An Institutional Development Focus on River Basin Organizations. Water Week 2003: pp 19-20*

The Indonesian Jatiluhur Basin Authority (PJT 2) was established in 1980s. At face value this authority that was established as a public, nationally owned corporation was properly designed as it was mandated to operate and maintain the river, its infrastructure and the (large) associated irrigation area (240.000 ha). It is presumed to recover costs from user fees. However, the model is not performing or at least under-performing, because of the following reasons:

- (i) the Board in effect comprises only the supervisory Ministry of Public Works, and has no formal link with the provincial government in which jurisdiction of the whole basin lies, nor with any other Ministry;
- (ii) the authority is not allowed to set or negotiate tariffs, and in effect the main users, i.e., the country's capital water works and the power sector, negotiate directly with the Ministry and manage to pay tariffs that are less than half the minimum true cost;
- (iii) the authority is barred from recovering costs from irrigation, and the Ministry's subsidy to compensate for this is chronically inadequate;
- (iv) large pieces of infrastructure remain under full control of the Ministry of Mining and Energy for power generation, and there is little coordination; and
- (v) the "own" supervisory Ministry of Public Works (after 2000, of Settlement and Regional Infrastructure) still maintains construction "project" offices that also remain involved in part of the maintenance. In contrast, the Brantas River Basin Corporation, which is situated in a province away from the country's capital, enjoys more managerial autonomy in its tariff negotiations, and does not carry the burden of maintaining large irrigation areas. In conclusion, the Jatiluhur Authority has the task to achieve a balanced financial management, but its corporate design and the ensuing political interference effect prevent it from doing so.

## Appendix D5: Water Infrastructures Supports

### Flood Control Works of Makassar City:

- Normalization of canal and improvement of river and dike across 11 km length;
- Slope protection 4.7 km;
- Installation of Crib 16 unit;
- Installation of Jetty 1 unit;
- Long storage 4 km length and 3.800.000 m<sup>3</sup> capacity.

### Bili-Bili Multipurpose Dam

The Bili-Bili Multipurpose Dam construction was finished entirely in 1999. The height of the Dam is 73.000 m; length 18.00 m, extent of catchments area is 384,4 km<sup>2</sup>, the inundation area is 18,5 km<sup>2</sup>. The elevation of the top point is + 91.80 m; elevation of river bed is + 33.00 m; volume of total capacity is 375 million m<sup>3</sup>; effective volume is 346 million m<sup>3</sup>. The main function of this dam is flood control with Q of 50 years return period at the area 5200 ha, irrigation water: 24600 ha, for raw water supply: 3300 l/ sec; electric power: 20.4 MW and for some other intangible benefit, such as tourism, fisheries, livestock, and sports.

### Jeneberang Rubber Dam

The dam was constructed in 1996 – 1997. Technical data : length, 330 m; left river bank 100 m, right river bank, 14 m ; spillway length 216 m, comprises 5 spans; spillway height; 2 m, top of dam elevation + 1.80 m; apron elevation + 2.20 m, flood water level elevation + 3.70 m, flood discharge Q 50 = 2.300 m<sup>3</sup>/sec. The main function of this dam is to prevent the river bed degradation of Jeneberang river and sea water intrusion, for protection of raw water supply and provision of city flushing.

### Jeneberang Long Storage Dam

Built started in 1992 and finished in 1993. The length of the storage is 4 km, 200 m width; the capacity including the upstream part is about 3.8 million m<sup>3</sup>; the bottom elevation + 1.00 m; the elevation of mean sea level, + 1.80 m. The main function of the storage is for Maccini Water Treatment Plant 700 l/sec and city flushing at volume 1.5 m<sup>3</sup> /sec.

### Regulation Pond and Pampang Major Drainage Channel

Regulation Pond Pampang and Makassar Major Drainage Channels were constructed in the years 1997-2001. Capacity of the pond is 1.000.000 m<sup>3</sup>, length of spillway is 150 m and 4.30 m high, a generator of 600 KVAA for pumping is installed; pumping capacity 3 x 2 m<sup>3</sup>/sec. Pond surface area is about 38.9 ha with the variation of depth between 2.80 m to 3.50 m. The Pampang Major Drainage Channel is 16.1 km long, having 8 bridges, 3 culvert boxes, 2 water supply pipe bridges. The main function of this pond and its drainage channels is flood control of the eastern part of Makassar city.

### Major Drainage of Makassar City

The channel system consists of Panampu, Sinrijala and Jongaya Channels. The system was constructed in the years 1989 – 1993. The main function is flood control at the middle part of the Makassar City.

### Raw Water Transmission Main (RWTM)

Raw Water Transmission Main (RWTM) is a main transmission pipe for raw water from Bili-Bili Dam to WTP – Somba Opu. It was constructed in the years 1996. The raw water discharge capacity through pipe at volume 3.300 l/sec. At the first stage, water discharge transmitted to water treatment plant (WTP) Somba Opu with volume 1.10 l/sec (at current maximum capacity of the WTP). The next stage will be planned at volume 2.20 l/sec. The pipe is of pressured concrete pipe with diameter 1.50 and 1.65 m.

### Sediment Control Structure

Sabo Dams and Sand Pockets were constructed in 1998 to 2001. Three Sabo Dams and 5 Sand Pockets were located at the up stream of Bili bili multi purpose dam. Its main function is for controlling sediment flow to the Bili bili multi purpose dam or reservoirs. However, they stabilize soil and water at the catchments by reducing erosion rate.

### Jeneberang River Flood Control Infrastructure

Flood control mitigation infrastructure of Jeneberang River comprises dykes, gabions, and cribs along 11 km stretch of the river. They were constructed in 1988 and completed in the year 1993. The main function of this system is for flood mitigation of down stream part of Jeneberang River.

### Environment Improvement (Green Belt and Arboretum):

For the purpose of water resources conservation, environmental conservation and also to maintain the sustainability of the Bili Bili multi purpose dam, a reforestation and arboretum is conducted by planting of various kinds of trees and interested fruits in the area at about 750 ha in the periphery of the Bili Bili Reservoir.

Source: ADB, 2000: 5-6

**Appendix D6: Regulations Concerning River Basin Management in Indonesia**

No	Titles	Remarks
	<b>a. Control of water resources</b>	
1	Presidential Decree number 64/1972	On authorities and management of geothermal steam ground water and hot spring water. The Ministry of Mining is administrative responsibility for ground water.
2	Law No 11 of 1974 Regarding water resources.	The reliance on central government control using de-concentration and co-administration principles; Omission of water rights regulation; and inconsistency With local Autonomy legislation
3	Law No 7 on Water Resources 2004,	New paradigm such as regional autonomy, decentralization and state revenue sharing, an intergovernmental coordination framework headed by a National Water Resources Council, stakeholders participation In water resources policy making, private sector involvement In water resources development and management, and Empowerment of farmer beneficiaries.
4	Government Regulation No 22 of 1982	Regulation of water management which formed be developed and be managed on river basin.
5	Government Regulation No 35 of 1991	On how to manage the rivers.
6	Ministerial Regulation No 63/PRT/1993	On river boundaries which purpose of a river border line and joint management method.
7	Ministerial Decree No 1451K/10/MEM/2000	Ministry of Energy & Natural Resources which provides Technical guidance on the arrangement of government tasks in ground water sector and confirms the Authorities in controlling sources of ground water.
8	Government Regulation No 77/2001	On irrigation. Which stipulates the transfer of authorities Management from Local government to water user associations as legal entities, using the principle of “one irrigation one management”.
9	Government Regulation No 82 of 2001	Management of water quality and control of water pollution.
10	Ministerial Decrees from Kimpraswil /Public works No 529/KPTS/M/2001 Minister of Home Affairs (No. 50/2001)	On 1) The transfer of authorities for management of Irrigation to water users association. 2) The empowerment of water user associations, respectively.

(Continued)

	<b><u>b. Regional Administration</u></b>	
11	Law No 22 of 1999	On Regional Administration. Regional Authority covers the Authority in all areas of government. The Authorities of the provinces as autonomous region shall in field of administration which crosses Regency (Kabupaten) and Kota boundaries and Others special fields.
12	Law No 25 of 1999	On Financial proportion between Central and Regional Administration.
13	Government Regulation No 25	On Autonomy and Decentralization. Central government authorities and regional authorities as autonomous region and authority of Regency and Municipalities. Addition legislation will be required as well as extensive training and development for those in local government
14	Government Regulation No 8 of 2003	On the Organizational Structure of Regional Government.
	<b><u>c. Water Resources Funding and Taxation</u></b>	
15	Government Regulation No. 6 of 1981	On The Fee for Water Resources Infrastructure. It stipulates the Contributions for operation and maintenance.
16	Law No 18 of 1997	On Regional Taxes and "Retribution"
17	Law No 34 of 2000	Amendment to Law No 18 of 1997
18	Government Regulation No 65 of 2001	On Regional Taxation
19	Residential Decree no 42 of 2002	On implementation of Budget Guidelines for Central Government Resources and Expenditure
20	Law No.17 of 2003	On State Finance
	<b><u>d. Public Corporation</u></b>	
21	Government Regulation No. 13 of 1998	Regarding Public Corporation (Perum)
22	Law No 19 of 2003	Regarding Stated owned Enterprises. Draft Government Regulation Regarding Public Corporation for Water Resources Management.

Source: JICA, 2004: 5-1 - 5-12

## Appendix D7: The Development of a Collaborative Master Degree

### The Master Degree Program in Integrated Water Resources Management

The characteristics of the Master degree are:

- it is a **general** Master degree program, not limited to engineering graduates, and offers a broad spectrum of courses relevant to Integrated Water Resources Management;
- it is a **modular** program, whereby students can gradually build up their portfolio of course modules; it is therefore a flexible program, with multi-entry and multi-exit (i.e. Course Certificates, Post Graduate Diploma and Master Degree);
- it is a **regional** program,
- an international academic committee will ensure academic quality and facilitate a process of regular **peer review**.

The degree program consists of a taught part and a dissertation part. The taught part is made up of 11 course modules. Each course module will be taught on a full-time basis during a period of 3 weeks. At the end of each course module an exam is given. Prospective participants have therefore a number of options:

- participants may wish to follow individual course modules; for each course module that is successfully completed and the exam passed a 'Module Certificate' will be issued. If the exam is not passed a 'Certificate of Attendance' will be issued;

The taught part consists of a core with 6 compulsory modules; a specialized program with 3 prescribed course modules; and an elective part, with 2 elective course modules. The core modules are compulsory and include:

- Principles of Integrated Water Resources Management
- Principles of Hydrology
- Socio-Economics of Water & Environmental Resources
- Principles of Aquatic Ecology and Environmental Management
- Policies, Laws and Institutions
- Project

After having followed the core modules, students choose between the following specialized programs:

- A. Water resources management
- B. Water and environment
- C. Hydrology
- D. Water and land
- E. Water for people

Each specialized program prescribes three course modules that have to be followed. The student will in addition choose 2 course modules out of the remaining pool of available modules. There are no restrictions as to which two elective modules to choose.

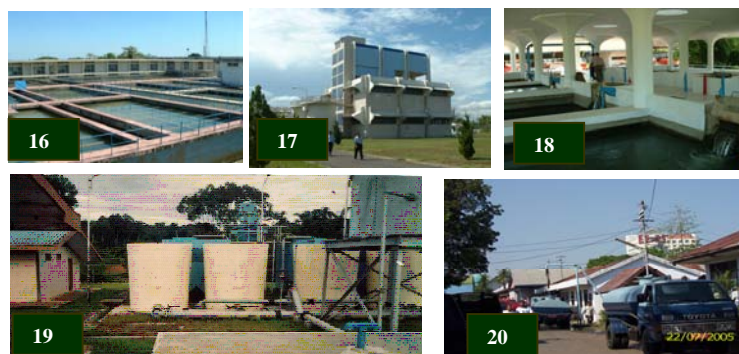
For those participants who do not have English as their first or second language, a preparatory module is offered entitled 'English for Water Managers'. This course will combine conventional English lessons with regular lessons in subjects such as Math, Geography, History, Science, Biology etc.

### Source: The development of a collaborative Master Degree

Programme in Integrated Water Resources Management in Southern and eastern Africa. *E. Alaphia Wright et.al.*  
International Conference on Engineering Education August 6 – 10, 2001 Oslo, Norway.



**Appendix D8: Pictures**  
**Housing Condition, Water Infrastructures and Different types of Water Treatment in Water Authorities**



**Appendix D8: Pictures**  
(Continues from page 91)  
**Jeneberang River Basin and Makassar City**  
**Bird eyes view on Bili bili multi purpose dam and**



**Appendix D9: Turbidity in Makassar Water Authority 2003 – 2004**

NO	Months	IPA I RATULANGI		IPA II PANAİKANG		IPA III ANTANG		IPA IV MACCINI SOMBALA		IPA V SOMBA OPU	
		DEBIT	Turbidity	DEBIT	Turbidity	DEBIT	Turbidity	DEBIT	Turbidity	DEBIT	Turbidity
		(M3)	(NTU)	(M3)	(NTU)	(M3)	(NTU)	(M3)	(NTU)	(M3)	(NTU)
1	2	3	4	5	6	7	8	9	10	11	12
1	JAN, 2003	173.256,70	36,06	2.760.538,60	112	94.571,25	39,5	228.449,00	34,7	3.080.160,00	184
2	FEBRUARI	174.592,60	39,5	2.906.571,40	137	81.995,00	80,7	229.613,00	37,3	3.076.100,00	97
3	MARET	156.968,00	42	2.646.635,70	60,9	86.820,00	79,5	210.861,00	47,3	2.661.120,00	93,5
4	APRIL	183.251,02	35,8	2.860.840,80	88	96.183,28	36	223.683,00	21,9	2.940.720,00	34,1
5	MEI	172.005,66	17,4	2.807.836,60	80,1	92.024,96	16,9	213.828,00	39,9	2.851.200,00	22,3
6	JUNI	182.141,09	14,2	2.933.668,50	63,9	96.215,72	28,4	223.300,00	18,5	2.999.560,00	24
7	JULI	174.904,56	13,2	2.929.956,70	32,5	92.673,72	28,6	214.591,00	17,4	2.902.800,00	4,89
8	AGUSTUS	178.490,38	34,8	2.912.718,60	47,9	96.280,44	19	222.988,00	20,1	3.012.440,00	3,83
9	SEPTEMBER	187.242,64	5,87	2.897.929,20	28,9	96.150,94	3,9	226.749,00	19,7	3.199.200,00	2,05
10	OKTOBER	143.313,51	18,6	2.719.265,90	39,8	91.820,89	27,4	224.648,00	18,9	3.096.000,00	2,25
11	NOPEMBER	170.795,49	30,1	2.794.898,70	47,5	95.383,61	65,6	237.967,00	18,4	3.199.200,00	1,9
12	DESEMBER	155.834,03	132	3.142.396,00	102	91.032,39	143	232.718,00	247	3.199.200,00	12,4
1	JAN, 2004	178.271,06	184	3.081.797,80	44,7	224.654	26,2	198.168	210	2.880.000	656
2	FEBRUARI	178.271,06	157	3.263.059,90	127	241.403	97,4	200.331	195	2.860.000	335
3	MARET	163.690,50	781	3.089.287,10	323	228.495	99,3	139.095	900	2.708.600	1.777,00
4	APRIL	166.726,80	627	3.373.695,40	112	241.983	57,6	201.555	1.335	2.627.400	1.967,00
5	MEI	145.194,80	857	3.107.709,70	59,5	261.684	27	178.348	756	2.458.300	1.938,00
6	JUNI	161.550,32	2.240,00	3.525.362,40	49,5	262.163	17,3	162.187	1.070	2.650.300	2.110,00
7	JULI	149.880,08	317	3.166.543,30	147	267.451	19,5	214.924	216	2.986.203	890
8	AGUSTUS	159.039,63	298	2.745.341,80	138	271.288	36,3	257.765	179	3.199.200	656
9	SEPTEMBER	161.854,66	411	1.938.226,20	246	258.163	15,8	271.449	203	3.199.200	526
10	OKTOBER	161.027,90	346	1.374.638,90	232	247.992	21,9	291.754	159	3.096.000	400
11	NOPEMBER	172.952,10	358	1.024.607,50	287	252.998	15,8	316.297	177	3.199.200	364
12	DESEMBER	156.624,00	447	2.338.062,60	130	242.208	26,8	296.058	244	3.096.000	638
Total		4.007.878,59	7.442,53	66.341.589,30	2.736,20	4.111.634,20	1.029,40	5.417.326,10	6.185,10	71.178.103,00	12.739,22
Avg before landslides			55,73		69,25		53,24		72,78		105,23
avg after landslides			668,2		172,4		33,73		523,9		1.126,60
Source: Makassar Profile, (2005) : 35						= After Landslides					

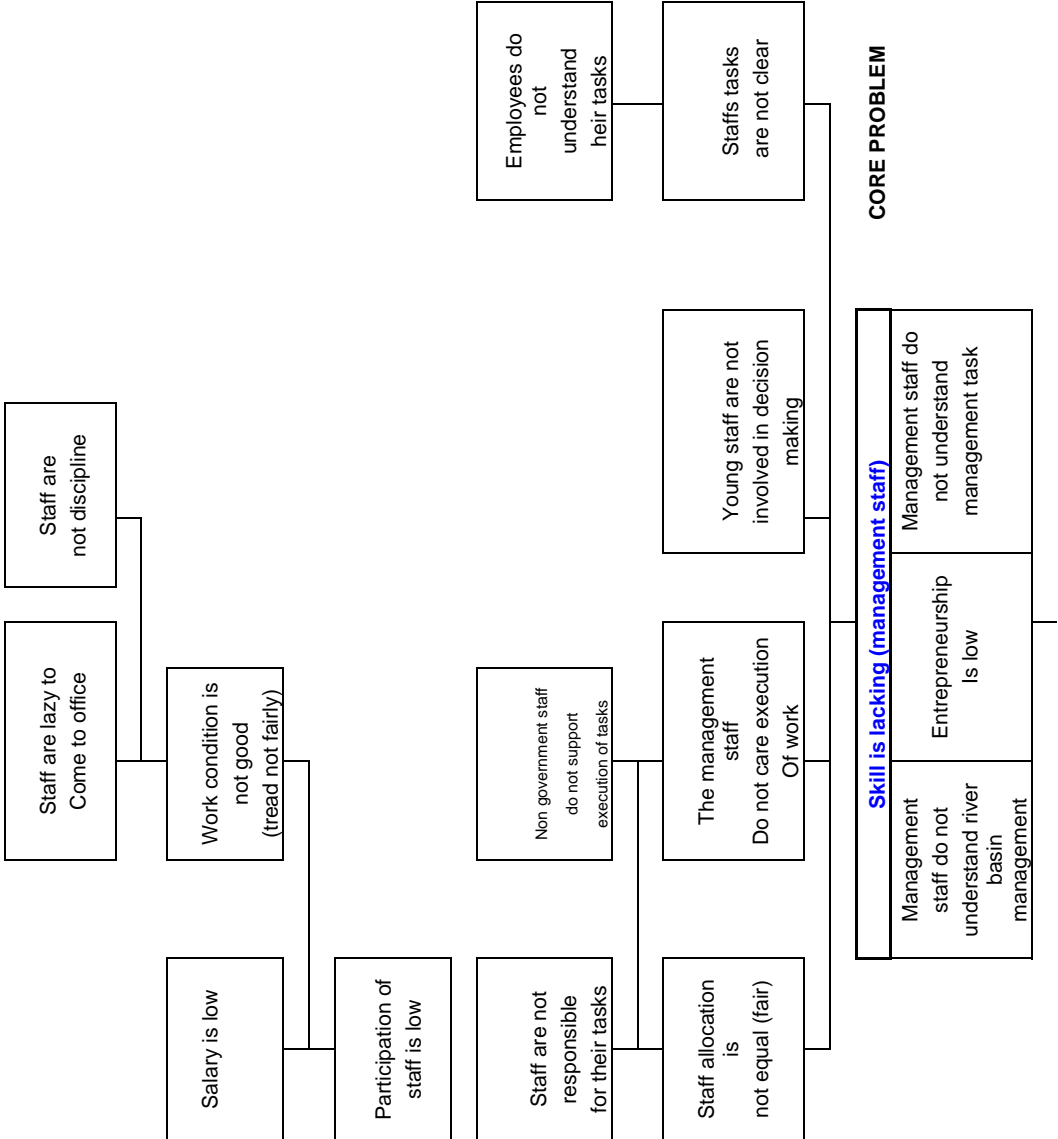
### Appendix E: Human Resources Analysis and Results

#### Appendix E1: Overall Problem in Human Resources: Skilled Staff is Lacking

	Reasons why staff skill of JRBDP is lacking		
	Don't know what to do (lack of knowledge)	Don't want to do it, or not allowed to do it	External limitations (money or material)
Individual level	<ul style="list-style-type: none"> <li>- Lack of knowledge about operation and maintenance.</li> <li>- Lack of knowledge about administration and financial management.</li> </ul>	<ul style="list-style-type: none"> <li>- No clear responsibility or lack of job description.</li> <li>- Believe that the problem will be solved by time line.</li> <li>- Low motivated to take a risk.</li> <li>- Don't want to ask a question what he or she don't know.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of tools, for operate and maintenance.</li> <li>- The wrong equipment.</li> </ul>
Organizational level	<ul style="list-style-type: none"> <li>- There is no perspective of human resources development.</li> <li>- Insufficient program in capacity building for employee/staff.</li> </ul>	<ul style="list-style-type: none"> <li>- No sites for implementation and piloting</li> <li>- No input to all system and guidelines are developed.</li> <li>- No integration learning across all projects.</li> </ul>	<ul style="list-style-type: none"> <li>- Lack of resources for improving the condition of the lock-ups. (Examples: awareness to produce clear regulation).</li> </ul>
The institutional framework	<ul style="list-style-type: none"> <li>- Insufficient framework of coordination for donor programs.</li> </ul>	<ul style="list-style-type: none"> <li>- No support and co-ordination for implementation.</li> <li>- Local authorities, local government and ministries have no line directive or co-ordination to JRBDP.</li> </ul>	<ul style="list-style-type: none"> <li>- Differences time for budget availability.</li> <li>- Other authorities do not fulfil their obligation.</li> </ul>

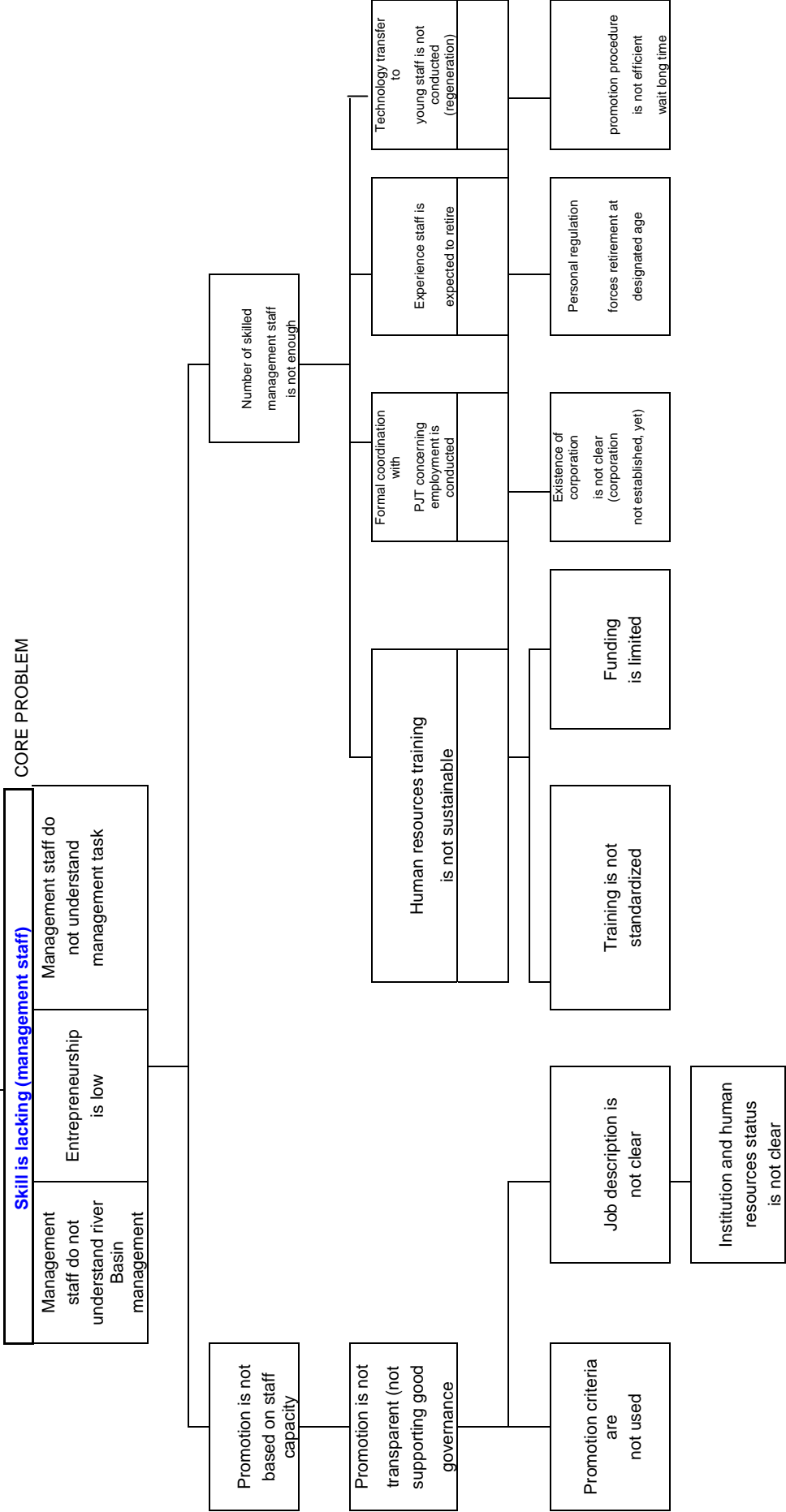
Source: Ageng, 2005.

Appendix E2: Causes-Effects of Human Resource Development (Source: JICA, 2004: 11-30)





Appendix E2: Causes-Effects of Human Resource Development (Continues from page 95)

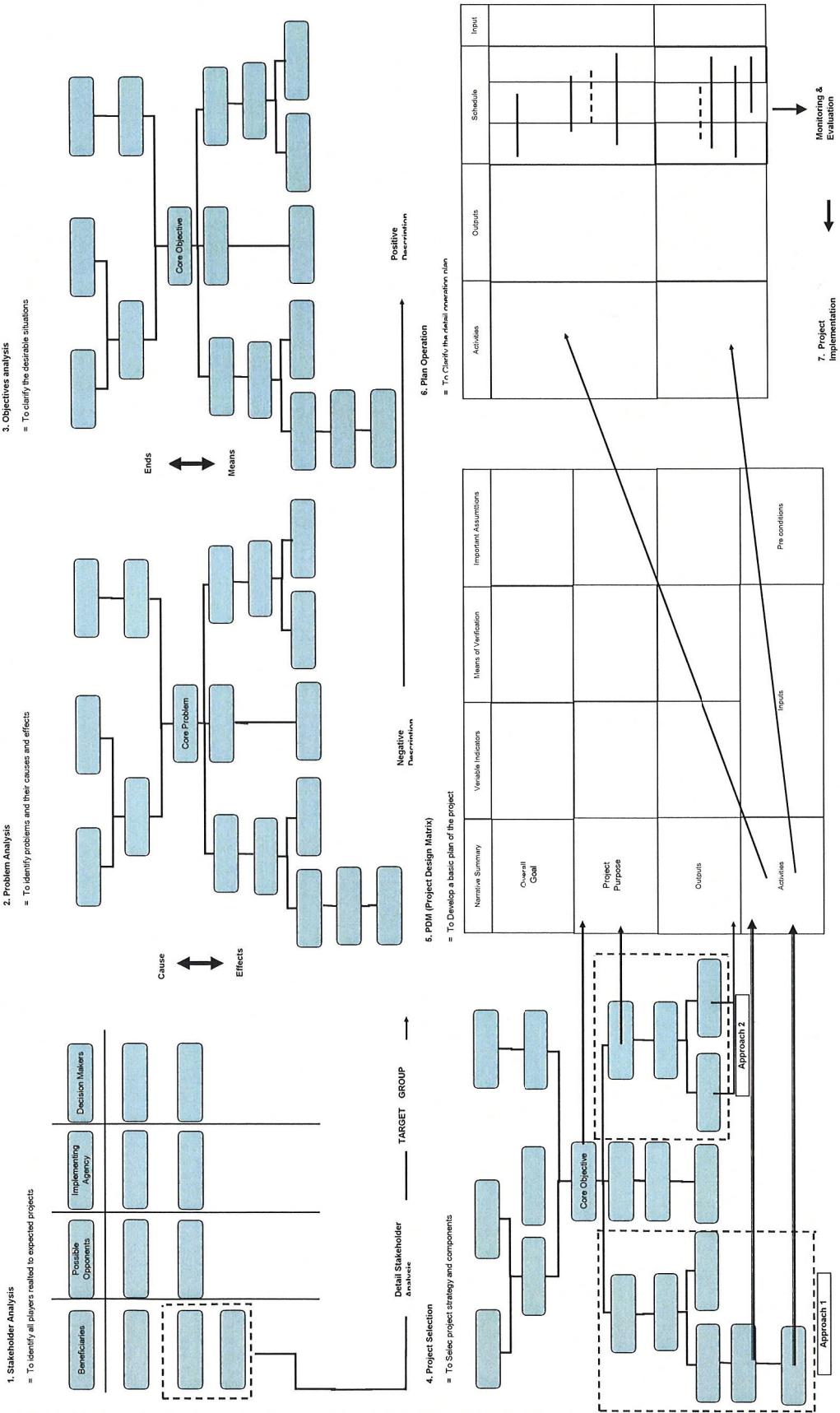


### Appendix E3: Project Design Matrix

<b>Project Design Matrix (PDM)</b>		<b>Project name: Management skill</b>		<b>Strengthening project (HRD)</b>		<b>Target group: Staff of Corporation</b>
<b>Narrative Summary</b>		<b>Objective Verification Indicators</b>		<b>Means of Verification</b>		<b>Important Assumption</b>
<b>Overall Goal:</b> Sustainable river basin management is achieved by improve in operation and management capacity of Public Corporate		-quality water is available to beneficiaries - operation cost is covered by revenues - negative impact to environment is zero - no complaint from public		- operation record, operation manual, operation plan, letter, financial statement - media, newspaper		- Public Corporation keep existing - Autonomy regulation does not change
<b>Project Purpose:</b> Management staff are concerned for execution of work		Job executed and job description match		Job description, organizational structure, required number of management staff, personnel data		- Socio economic conditions do not change drastically - Natural conditions do not change drastically
<b>Outputs:</b> <ol style="list-style-type: none"> <li>1. Formal coordination with PJPT is conducted</li> <li>2. Management staff acquire management skills</li> <li>3. Number of experienced senior staff is available</li> <li>4. Young staff management skills</li> </ol>		<ol style="list-style-type: none"> <li>1. agreement is prepared, number of meeting</li> <li>2. number of training provided</li> <li>3. number of senior staff recruited, change in regulation</li> <li>4. number of training provided</li> </ol>		<ol style="list-style-type: none"> <li>1. agreement, minutes of meeting</li> <li>2. training record, personnel data</li> <li>3. recruitment record, change in regulation, personnel data</li> <li>4. training record, personnel data</li> </ol>		- Management staff stay at assigned position
<b>Activities:</b> <ol style="list-style-type: none"> <li>1-1 Establish committee for coordination of PJT 1 and Jeneberang Public Corporation</li> <li>1-1Prepare management skill training plan and record</li> <li>2-2 Produce training material for management training (management, entrepreneurship, river basin management</li> <li>2-3 Provide management skills development training</li> <li>3-1 Regulations on personnel rule are reviewed</li> <li>3-2 Provide criteria for recruitment of senior staff</li> <li>4-1 produce training material for management skills for young staff</li> <li>4-2 Provide management training to young staff</li> </ol>		<b>Inputs:</b> Man power  Human resources development expert  Equipment/ supply Training material (text)				- PJT 1 supports operation of the Public Corporation Pre conditions <ul style="list-style-type: none"> <li>- Preparatory committee for establishment of Public Corporation starts functioning</li> <li>- Framework of the Public Corporation is prepared</li> <li>- Initial staff assignment is fixed</li> </ul>

Source: JICA, 2001: 11-15

Appendix E4: Complete Steps of Participatory Planning



Appendix E4: Complete Steps of Participatory Planning





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