

Water Resources Regulation on Several Region in Citarum River Basin, Indonesia

Herman Idrus, CES; Anton Mardiyono, ST.M.Tech.; Andrijanto, Ir.MT.

Jasa Tirta II Public Corporation - Indonesia

Abstract

Citarum River Basin is located in West Java Province, covering service area on two provincial administrative, i.e. West Java and DKI Jakarta Province. There are 9 (nine) rivers traversing the plain from South to North, Citarum is the biggest one and connected with 4 (four) rivers to the West by West Tarum Canal and 4 (four) other rivers to the East by East Tarum Canal, formed an integrated hydrological boundary named Citarum River Basin. The total area of the basin is about 12,000 km² covering 11 administrative Districts. The average flow of water in the basin is about 12.95 billion m³ per year. Integrated Water Resources Development in North plain of West Java Province, Java Island of Indonesian archipelago has been commenced since 1957 when Ir. H. Djuanda, the Late Prime Minister of Indonesia declared the implementation of Jatiluhur Multipurpose Project. The main aim of the project is to enhance the rice production as national staple food by constructing dam across Citarum River with the impounding capacity of 3 billion m³ and irrigation system for 240,000 ha of paddy field two crops per year. Hydroelectric power plant is also installed in the dam with the capacity of 150 MW. As well, the project was also intended to meet DMI requirement, flood control, tourism, and fish farming. In line with the strongly growing of population, the DMI demand also increased significantly. Regarding to the shift of paradigm in the last decade the Government of Indonesia extended decentralization of power and responsibility to District Governments based on the Law No.22 of the year 1999 and then revised by law No. 32 of the year 2004. The Districts is among other responsible for managing natural resources in their own administrative boundaries. Since the source of water in the basin come from many other districts that have been integrated with Citarum River as the main source and distributed to all districts in the basin, even across the provincial administrative boundary discharge to Jakarta, then conflict reveals, who should responsible for managing the water resources in the basin. While based on the Law No. 7 of the year 2004 regarding Water Resources, irrigation is guaranteed by Government inclusive in water requirement for daily life. Water business is prohibited in this regime, but users of water should pay for water utilization services, except for irrigation services. Concerning a Citarum River is strategic river, this matter generate the polemic and misunderstand between two province in the case of water tax.

Establishment of National and Local Water Council should be addressed immediately. The council has authorization to arrange water rights and allocating water among competing uses and users, as well as setting priorities for water entitlement during times of shortage, and functions efficiently and effectively with multi-stakeholder representation. The Policy and strategy of National and Local Water Resources Management in Citarum River Basin, that provided by the council, should be implemented properly through the references that formulated as water resources management pattern.

Keywords: *water resources, river basin, regulation, tax and water resources policy, strategy and pattern.*

INTRODUCTION

After the Proclamation of Independence (1945) the Government of the Republic of Indonesia extended the program of self-supporting national staple food of rice and poverty alleviation. Indonesian archipelago is located in tropic zone with two seasons every year that are rainy or wet season (October to March) and dry season (April to September). In that moment the population of the Country is about 60 million and more than half of them are living in Java Island. Java is very fertile island with many active volcanoes. Average annual precipitation depth is 3,000 mm normally 70% falls during wet season and 30% falls during dry season. Relative humidity is about 80% and the daily temperature is 25°C in the low land and 18°C in the mountainous area.

Large-scale water resources development had been done in the North plain of West Java Province during the Dutch Colonial. One of them is Walahar Irrigation System (built in 1925) for 80,000 ha of paddy field by constructing gated weir across Citarum River in Karawang District about 60 km from its estuary. The other one is Salamdarma Irrigation System (1930) for 37,000 ha of paddy field by constructing weir across Cipunegara River in Subang District about 40 km from its estuary. The systems separate each other and rely on run-off water in the rivers that is why the cropping intensity is only achieved up to 130%. It is mean that not all area in the systems could be irrigated during dry season and often happen the farmers fighting each other for water.

In 1956 Ir. H. Djuanda, the Late Prime Minister of Indonesia declared the commencement of Jatiluhur Multipurpose Project. The main aim of the project is to enhance the rice production to achieved self-supporting national staple food. The project comprised with two major activities. The first one is to construct rock-fill type dam across Citarum River and reservoir behind the dam with impounding capacity of 3.0 billion m³, besides hydroelectric power plant with the install capacity of 150 MW as well. The second is to develop technically irrigation system over the area of 240,000 ha of paddy field in the north plain of West Java Province connected to Walahar and Salamdarma irrigation systems for two crops per year as an integrated technically irrigation area. As well, the project was also intended to meet DMI requirement, flood control, tourism, and fish farming. The project has been finished in 1967, since then the dam, the reservoir and the power plant were named Ir. H. Djuanda dedicated to the Prime Minister who declared the commencement of the project while the **irrigation system** were named Jatiluhur Irrigation . The system consist of 9 (nine) rivers traversing the area from mountainous range in the South to the North and terminated in Java Sea. Citarum River is the biggest one connected with 4 (four) rivers to the West and 4 (four) other rivers to the East by man-made canals namely West Tarum Canal (WTC) and East Tarum Canal (ETC) respectively, formed a unit hydrological boundary of Citarum integrated river basin (**Figure 1**).

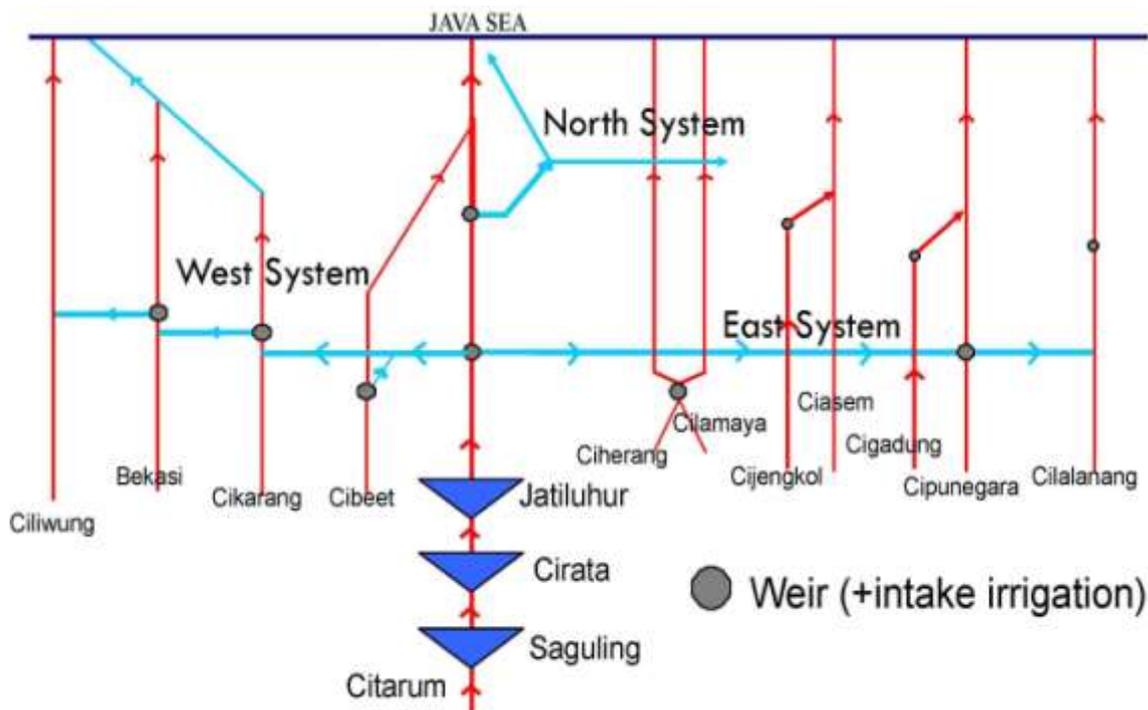


Figure 1: Citarum Water Resources Configuration

The benefits reveal upon the completion of the project, among other: (1) flood occurs during rainy season that inundated 20,000 ha of fertile land in the plain could be minimized, (2) people have the opportunity to cultivate paddy in technically irrigated area of 240,000 ha two crops per year, (3) raw water available for domestics, municipalities and industries especially for Jakarta the Capital City of Indonesia, (4) hydropower plant with the installed capacity of 150 MW, (5) fresh water as well as brackish water fisheries development in coastal area, and (6) beautiful scenery surrounding the reservoir for tourism and water sport. 6. Since the initial stage it was planned that the benefit of the water resources development will be for two provinces, west Java Province and DKI Jakarta Province. Irrigation water supply is fully for West Java Province. Meanwhile the majority of water supply beneficiaries, industries and sanitation, are in DKI Jakarta. It should be noted that 80% of PAM JAYA raw water is supplied from the Citarum River Basin. Further no water is available for maintenance of the drainages in DKI Jakarta during dry season except for the water from the Citarum Basin.

In 1970 the Government established Jatiluhur Authority Public Corporation with task and responsibility to maintain sustainability of water resources in the basin and extends operation and maintenance of water resources infrastructures and the hydroelectric power plant. Besides, the entity has to collect contribution from the beneficiaries of water services for running the operation and maintenance of the system. Empowerment of autonomies is necessary to realize a sound water resources management that secures the benefits of various stakeholders at present and in future. Certain mandates of the central government in water resources management were transferred to local governments and enterprises in 1990s. Thus Jatiluhur Authority was demolished. The established PJT II succeeded the operational activity of Jatiluhur System. Later, two other dams were built in Citarum River upstream of Ir. H. Djuanda dam namely Saguling (1984) and Cirata (1988). The main aim of the dams is for power generation with the install capacity of Saguling and Cirata are 700 MW and 1,000 MW respectively. The dams were constructed by The State Electric Company and recently operation and maintenance extended to Indonesia Power Company and PJB Company respectively, they are the subsidiary of the State Electricity Company.

WATER RESOURCES POTENTIAL

Citarum River basin is covering an area of about 12,000 km² with the average annual flow of 12.95 billion m³, out of which 6.0 billion m³ flows in Citarum River and 6.95 billion m³ flows in the other rivers in the basin. By employing water resources infrastructures in basin the water that could be regulated is about 7.65 billion m³ per annum and the rest is wasted flows to the sea (**Figure 2**). The utilization of water by far is goes to irrigation of 6.0 billion m³ equal to 88%, and to domestics, municipalities, and industries of 800 million m³ equal to 12% .

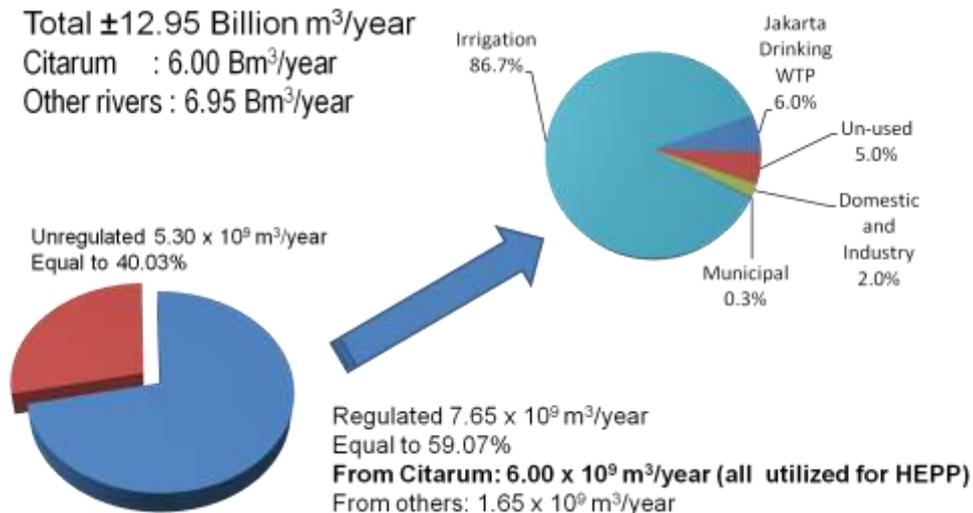


Figure 2: Citarum Water Resources Potential

Parallel to the national economic development the water requirement especially for DMI is increasing accordingly. It is predicted that the regulated water in the basin is only able to cope with the demands up to the year of 2015. There for measures have to be taken to fulfill the demands of water beyond 2015 by constructing prospective dams in the basin. Besides, improving efficiency on water utilization especially water for irrigation which is almost 90% of the total utilization of water in the basin.

THE ESTABLISHMENT OF JASA TIRTA II PUBLIC CORPORATION.

Inline with the establishment of Government Regulation No.94 of 1999 the name of Jatiluhur Authority Public Corporation was changed to Jasa Tirta II Public Corporation (PJT II). At the same time the tasks and responsibilities of PJT II were amended to,

- Extend operation and maintenance of water resources infrastructures and hydro electric power plant;
- Carry on business related to water, water sources, and electric power;
- Carry out Citarum River Basin water resources management, among other focusing on conservation, development, utilization of water and water sources;
- Rehabilitate the hydro electric power plant.

The aims of PJT II establishment are providing services for public utilization of water and water source with adequate quality to fulfill the basic need of people, and conducting specific tasks to be given by the government in the river basin management, including providing information, recommendation, extension and guidance. The objective of PJT II is to contribute to the development of the national economy with the role sharing in implementing national development program in the sectors of water, water sources and electric power generation.

The visions of PJT II is well presented in its manifestation of a high quality corporation in water and water sources management for extending largest services in providing water for multi

purpose and contribution to national food sufficiency. To realize the vision PJT II has missions as follows:

- Raw water supply to drinking water, electric power generation, agricultures, industries, harbor, flushing of drainages and other requirements;
- Hydro electric power generation and supply;
- Tourism development and effective land utilization;
- To maintain food sufficiency through supply water to agriculture and to control flood with the effort of sustainable environmental preventions through the provisions of information, recommendation and guidance;
- To maximize the company's profits and to foster the benefits based on business principle assuring the state owned asset and public service sustainability.

LEGAL ASPECT AND INSTITUTIONAL ARRANGEMENT: THE SHIFT OF PARADIGM

Water resources management in Indonesia has gradually changed from time to time, as a response to the challenge to its related problems. The first water regulation in Indonesia had been established during the Dutch period with the enactment of Algemeen Water Reglement in 1936. This law was only renewed in 1974 when the Government of Indonesia enacted Law No. 11 Year 1974 on Water Resources (Pengairan). After implemented for thirty years, this law once again renewed with the enactment of Law No. 7 Year 2004 on Water Resources (Sumber Daya Air). The changes from the previous water law was made, not only on the use of terminology "sumber daya air" instead of "pengairan," but also substantially a lot of improvement have been made as a response to the hard challenge of water resources problems in Indonesia. The Water Resources Law 2004 is further implemented in some Government Regulations (GR), such as GR No. 20 Year 2006 on Irrigation, and GR No. 42 Year 2008 on Water Resources Management, and GR No 43 year 2008 on Ground Water.

As mentioned in Article 2 of the Law No. 7 Year 2004, water resources management in Indonesia should be based on the basic principles of conservation, balance, public benefit, integration, harmony, autonomy, transparency, and accountability. The concept of Integrated Water Resources Management has been clearly stated in the Law No. 4/2004 on Water Resources. Article 3 of the Law stated that: "Water resources should be managed comprehensively, integrated, and environment insight with a goal to realize a sustainable benefit of the water resources for the welfare of the society."

Parallel to the national economic development in the last decade there are shift of paradigms in the country. The national policy shifted from top-down approach to the combination of bottom-up and top-down approaches, mean for preparation of rules and regulation, public consultations should be considered. The government policy on development shifted from as provider to as enabler, means that the government gives the opportunity for private sector to develop water sector while the government provide rule and regulation accordingly. Besides, the government tasks and responsibilities shifted from centralization to decentralization with autonomy given to District Government except five national policy, those are: monetary, security and defense, religious, foreign affair, and education. The decentralization is based on Law No. 32 of the year 2004 and the implementation is based on Government Regulation No. 25 of the year 2000. It is included the responsibility on national natural resources.

PRESENT INSTITUTIONAL CONDITION CONCERNING WATER RESOURCES MANAGEMENT IN THE BASIN

Recently, there are many agencies that are connected to the water resources management in Citarum River Basin, including : (1) Ministry of Forestry, (2) Ministry of Mining and Energy, (3) State Ministry of Environment, (4) Ministry of Home Affair, (5) Ministry of Public Work, (6)

Ministry of Agriculture, (7) Ministry of Trade, (8) Ministry of Industry, etc. **Table.1** summarizes the role sharing of tasks and responsibilities of the agencies concerned to water resources management.

Table.1. Responsibility of Each Sector concerned

| Description | Catchment Area | Water Quality | Water Quantity | River Environment | Flood & Drought | Infrastructures |
|----------------------|----------------|---------------|----------------|-------------------|-----------------|-----------------|
| MOHA/LOCAL G. | Y | Y | Y | Y | Y | N |
| M. Mining & Energy | Y | N | Y | Y | Y | Y |
| Ministry of Forestry | Y | N | Y | N | Y | N |
| Min. of Agriculture | Y | N | Y | N | Y | Y |
| Min. of Public Work | Y | Y | Y | Y | Y | Y |
| M. Environment | N | Y | Y | Y | Y | N |
| Min. Transportation | N | N | Y | N | N | N |
| Ministry of Industry | N | Y | Y | Y | N | N |
| Ministry of Health | N | Y | Y | Y | N | N |
| Bapedalda | N | Y | Y | Y | Y | N |
| Bappeda | Y | Y | Y | Y | Y | N |

Note : Y : yes , N : No

Based on Ministry of Public Work Regulation No. 11/A/PRT/M/2006 regarding Criteria and Declaration on River Basin, the river basin has been differentiated into 5 (five) types of river basin, i.e., (1) international river basin, (2) inter-province river basin, (3) strategic river basin, (4) inter-regency/city river basin and (5) within regency/city river basin. In managing water resources in the Citarum river basin, there are five types of river basin organization (RBOs), those are:

1. Public Corporate type RBO (Jasa Tirta II Public Corporation)
2. Central Government RBO (Balai Besar Wilayah Sungai Citarum)
3. Provincial Government RBO (Balai Pengelolaan Sumber Daya Air under Dinas Pengelolaan Sumber Daya Air of West Java Province), and
4. Regency/City Water Resources Service (Dinas PU/SDA in Kabupaten/Kota)

Table.2 summarizes the role sharing of tasks and responsibilities of the RBOs concerned to water resources management.

| No | Description | Operation | Maintenance (Minor) | Rehabilitation (Major) | Development | Monitoring | Planning |
|----|---|-----------|---------------------|------------------------|-------------|------------|----------|
| 1. | Central Government RBO (Balai Besar Wilayah Sungai Citarum) | N | Y | Y | Y | Y | Y |
| 2. | Jasa Tirta II Public Corporation (PJT II) | Y | Y | N | Y | Y | Y |
| 3. | Dinas Pengelolaan SDA Prov. Jawa Barat | Y | Y | N | Y | Y | Y |
| 4. | Dinas Pengairan Kabupaten | Y | N | N | N | N | N |

Note : Y : yes , N : No

PRESENT INSTITUTIONAL CONDITION: CHALLENGES AND ISSUES

Human Resource

RBO has task in development field and rehabilitation of water resources infrastructure, controlling and water services, and also monitoring and evaluation of water resources condition. Nevertheless the duty of controlling and services and also monitoring and evaluation of water resources condition still not sufficient, either from the institutional capacity or the quality of the personnel itself. Today, many staffs are placed in BBWS/BPSDA/RBO, but some of them do not have sufficient quality in doing their job. In addition, number of technical staffs is less than that of the nontechnical staffs. Consequently, the capacity of human resources of the RBOs should be developed through all kind of efforts directly or indirectly.

Financing and Funding

In order to support the sustainability of Water Resources management, a consistence and continuous funding support are required. Law No.7 Year 2004 mandating that funding source for water resources management can be derived from: (i) government budget; (ii) private budget; and (iii) Income from water resources management services.

Government budget which come from national budget or regional budget is prioritized to cover the expenses from management of things that are social matter, public welfare and security. Funding source from private in water resources field usually limited only on investment in development of water resource's infrastructure which are cost recovery, for example the development of HEPP, and development of drinking water supplying system

Funding source that come from water management services (BJP-SDA) according to Law No.7 Year 2004 may be charged to the commercial beneficiaries of water resources management service, for example, hydropower, industries, and plantation business. This BJP's imposition cannot be applied to individual water user for fulfilling daily needs which are taken directly from water source or water user for irrigation (people's farm). BJP's implementation must be based upon local regulation, and the pricing should be counted based on real necessity of water resources management. On the other hand BJPSDA's implementation is expected to be an instrument as an effort for saving water.

In case of WR management in Citarum River Basin, the funding sources majorly depend on the Government budget that covers the major rehabilitations and infrastructures development. Funding for routine maintenance and operation activities could be partially fulfilled by the private field and BJPSDA's schemes. These schemes are still insufficient to cover the ideal cost required for operation, maintenance and rehabilitation activities that equal to USD 35 million per year.

Water used for commercial such as industries and municipalities subject to be taxed by the Government, extended by Provincial Government based on the law No. 34 of the year 2000, but water for irrigation is free of charge, and up to present is considered as social service. Besides water for commercial subject to pay contribution for operation and maintenance budget of water resources infrastructures to Jasa Tirta II Public Corporation as the water service entity in the basin. So, water user for commercial subjects pay twice, either to pay for water taxes to the Provincial Government or water contribution to Jasa Tirta II.

Water contribution tariff is decided by the Government, by far is much lower then water tax. The user pays those contribution and tariff per m³ in monthly basis. Tax is a must for all citizen of the country to pay since contribution is depends on the ability to pay, so the water user prefer to pay tax at first and water contribution latter.

Unclear negotiation between West Java and DKI Jakarta Province about the surface water tax for domestic. Until now, DKI Jakarta Province is unwillingness to pay the tax.

Conflict of Interest

Condition of water availability is very limited compared to the water demand which is increasing steadily, causes conflict of interest among users. This situation becomes a threat in fulfilling basic needs of water. According to Law No.7 /2004 on Water Resources, minimum daily basic needs and people's farm should have higher priority compared to other users. Conflict of interest among water users could develop as conflict among different administrative territories, due to the implementation of decentralization regional autonomy

Economic value of water is increasing time to time due to increasing water demand for domestics, municipalities, and industries (DMI) but the social function of water could not be omitted. In the other hand the performance of water resources infrastructures are decreasing due to inadequate of operation and maintenance budget available. There are discrepancies between the water supply capability and water expectation, water user for commercial intend to pay higher cost for the success of their business. The conflict is revealed between the user of water for commercial and water for social service.

Coordination of Water Resources Management

Water resources management covers across sector and across area of interest which require cohesiveness of action to maintain sustainability of function and benefit of water resources. To accomplish that cohesiveness of action, it requires a mechanism of coordination to integrate interests of various sector, territory and stakeholders in water resources.

In case of Citarum River Basin, before Provincial Water Resources Council, water resources council-district/city and River Basin Committee for Coordination of Water Resources Management (TKPSDA) were established, tasks and function of coordination of water resources management at a province or regency/city level were performed by Committee of Water Management System (Panitia Tata Pengaturan Air or PTPA) or other coordination body.

Some times the activities that in line with WR management could not be performed optimally even the coordination among the RBOs already has been made. It is caused by the overlapping of tasks and responsibilities. Finally, it influenced the sustainability of function and benefit of water resources it self.

The water resources in the basin initially come from several Districts integrated with Citarum as the main resource and used also for the other Districts even across the Provincial Administrative Boundary discharged to Jakarta. The Districts feels that the water flows in their administrative boundary is under their responsibility.

PROSPECT AND FUTURE DIRECTION

According Law No.7 Year 2004, coordination of water resources management must be established at the national level (National Water Resources Council) and at the provincial level (Water Resources Council or other name). Establishment of coordination body of water resources management in district and river basin level are optional, depend on the local necessity of this coordination body.

Water resources management policies are formulated by considering the condition of the administrative region, such as population growth, economic, social and cultural activities, and water demand. These policies are formulated at the national, provincial, and district/city levels.

National water resources management policy should be considered gradually in formulating water resources management policy in provincial and district/city level.

This reference is formulated as water resources management pattern (POLA). The formulation of a water resources management pattern should be done openly and involving all stakeholders, because the resulted pattern will bind them.

Water resources management pattern is a framework in planning, implementing, monitoring, and evaluating activities in water resources conservation, utilization, and controlling the potential water hazard in a river basin. The formulation of a water resources management pattern should considered water resources management policy in the involved administrative region. Water resources management pattern should include the goal and consideration of water resources management, scenarios of the future condition of river region, water resources management strategies, and operational policies to implement those strategies.

Water resources management pattern is further elaborated in a water resources management plan. Water resources management plan is a master plan which becomes a basic reference in formulating programs and implementation of water resources conservation, utilization, and controlling potential water hazard by all involving sectors and administrative regions.

To support water resources management, the Government and local government take care of water resources information system in accordance with their authority. Water resources information system is an information network that spread out among government institutions, at the central and local level, should be managed integrally so that accurate information could be accessed by all stakeholders.

Financing is needed to support sustainable water resources management. Water users have an obligation to share the cost of water resources management. This cost of water resources management service is not a water price, but compensation of a partial cost of water resources management. An exemption of this obligation is provided to the water use for daily basic need and for the agricultural activities of the common people. The charge of water resources management service is intended as an instrument to encourage people in economizing their water use, and to increase their participation in maintaining water resources and related infrastructure.

Involvement of different government institutions, in term of hierarchy (central, provincial, and local government) and different sectors related to water resources (agriculture, municipality, industry, energy, transportation, finance, etc.) needs a clear role sharing among them in a decentralized perspective. General guidelines for such role sharing actually have been provided by Directorate General of Water Resources.

References:

1. Angoedi, Abdullah. *Nota Eksploitasi Waduk Jatiluhur*. 1960.
2. Blommestein, Prof. Dr. Ir. W. J. van. *Integrated Water Resources Development in Western Part of Java Island*. 1948.
3. BCEOM. *Jatiluhur Irrigation System Management*. 1990.
4. NEDECO, et. al. *Jatiluhur Water Resources Management Preparation Project*. 1998.
5. NIPPON KOEI, et al. *Integrated Citarum Water Resources Management Project*. 2006.
6. _____, Law No. 7 Year 2004 on Water Resources.
7. _____, Law No. 23 Year 2004 on District Government Autonomy.
8. _____, Government Regulations No. 20 Year 2006 on Irrigation.
9. _____, Government Regulations No. 42 Year 2008 on Water Resources Management,
10. _____, Government Regulations No. 42 Year 2008 on Water Resources