

Analysis of Drainage System Management in The Netherlands, France and Indonesia

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Abstract - The drainage system is one of the most important urban infrastructure. Management quality of a city is reflected in the drainage system quality of the city. To ensure the sustainability of the drainage system, we need a system of drainage management that involves all stakeholders, including the people who reside in it. This study was conducted to determine the organization of the management of the drainage system in the Netherlands, France and Indonesia. Data collected through interviews with the parties related to the management of the drainage system in Indonesia as well as from the literature. There are three models of organization in the drainage system management which is organizations model of government-based, organization model of community-based and organization model of stakeholders-based. In general, the drainage system management in France and the Netherlands is organization model of stakeholders-based, whereas in Indonesia using organizations model of government-based and community-based. Organizations of drainage system management has a very important role, and therefore must involve competent personnel and supported by regulation and sufficient authority. Increased community participation and partnerships between government, private and community must be continued, particularly in terms of maintenance and management of the construction of drainage infrastructure and facilities that have been built.

Keywords: organization model, management, drainage system

1. Introduction

Drainage is a term for technical measures handling excess water caused by rain, seepage, excess irrigation water, and wastewater of households, by flowing, drain, discard, absorb, as well as other businesses, with the ultimate goal to restore or improve function region. In general, the drainage system is a series of waterworks which serves to reduce and / or remove excess water from an area (Tanudjaya, 2008). Source main cause drainage problems is the growth of the population. Urbanization taking place in almost all major cities in Indonesia may increase the burden of urban areas are becoming more severe. Increasing the number of residents is always followed by an increase in urban infrastructure such as housing, transportation, clean water, education infrastructure, and others. In addition, the increase in population is always followed by an increase in waste, both liquid and solid waste (garbage). The need for land for settlement and economic activity will increase so that the change in land use that lead to increased runoff and flood peak discharge (Muttaqin, 2007).

Currently, drainage systems has become one of the most important urban infrastructure. Management quality of a city is reflected in the quality of the drainage system in the city. The drainage system is not good cause waterlogging in various places so the environment becomes dirty and slovenly, become mosquito breeding and the source of the disease, which in turn not only lowers the quality of the environment and public health, but can also interfere with the activities of transport, economy and others (Tanudjaya, 2008).

To ensure the sustainability of the drainage system, we need a system of drainage management that involves all stakeholders, including the people who reside in it. The purpose of all the steps in the management of drainage is the creation of a condition that is ideal drainage management implementation, synergistic, unified and harmonious. This study was conducted to compare the drainage management systems in the Netherlands, France and Indonesia.

2. Literatur Review

2.1 Basic Principle of Drainage

Drainage can be interpreted as an attempt to control the quality of groundwater in relation to salinity. Functionally, difficult to separate clearly between drainage and flood control systems. Puddle incurred in connection with the flow in the drainage channel due to local rain hampered go into the trunk and / or to the river, often called flooding. Distinguishing inundation due to overflowing rivers with inundation due to local rainfall is less smoothly flowing river, often had difficulty (Suripin, 2004)

Along with the growth of urban population very rapidly in Indonesia, increasing drainage problems also generally exceed the capacity of the provision of infrastructure and urban facilities. As a result, the problem of flooding or inundation is increasing as well.

In general, the handling of the drainage system in many cities in Indonesia still partial, so it does not solve the problems of flooding and inundation thoroughly. Management of urban drainage should be carried out thoroughly, referring to SIDLACOM start of stage Survey, Investigation, Design, Land Acquisition, Construction, Operation and Maintenance, and supported with an increase in institutional, financing and community participation. Improved understanding of the drainage system to the parties involved in both implementers and the public needs to be done on an ongoing basis. Drainage system for the handling of the problems can be carried out continuously as well as possible (Harahap, 2014).

2.2 Urban Drainage System

Urban Drainage system is a drainage system within the administrative area of the city and urban areas. The system in the form of a drainage network that serves to control or draining excess surface water in the settlement area which comes from local rain, so it does not interfere with the public and can provide benefits to human activities. Based on the division of management authority and service functions for the urban drainage system using the term as follows :

a. **Minor Urban Drainage**

Minor urban drainage is a network of drainage systems that serve a certain city areas such as residential complexes, commercial areas, offices and industrial estates, markets and tourist areas. This system serves an area of approximately 10 hectares. Management of the local drainage system is the responsibility of the community, the developer or agency in each region (see Figure 1 and 2).

b. **Major Urban Drainage**

Major urban drainage is a network system drainage structurally composed of the primary channels that accommodate the flow of secondary channels. Secondary channels to accommodate the flow of the tertiary channels. Tertiary channels to accommodate the flow of Flow Regions respectively. Local drainage network can directly stream flow channel to the primary, secondary and tertiary (see Figure 1 and 2).

c. Flood Control

Flood control is an attempt to control runoff in rivers and other bodies of water in order not to overflow and inundate limpas or urban areas. Flood control is the responsibility of the provincial government or the central government. Construction or building water on flood control systems such as :

- Embankment
- Building
- Gate
- Flood Channel Way

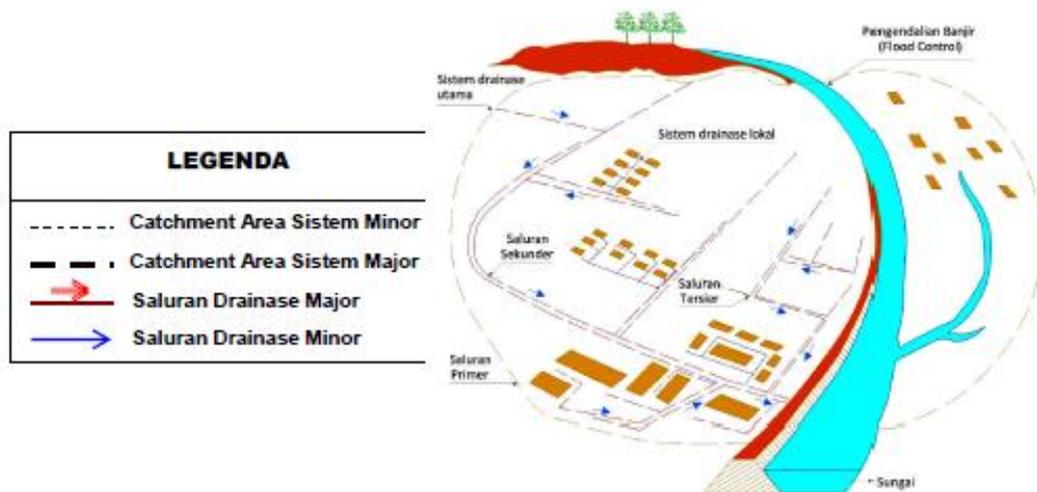


Figure 1. General Lay-out of Urban Drainage System

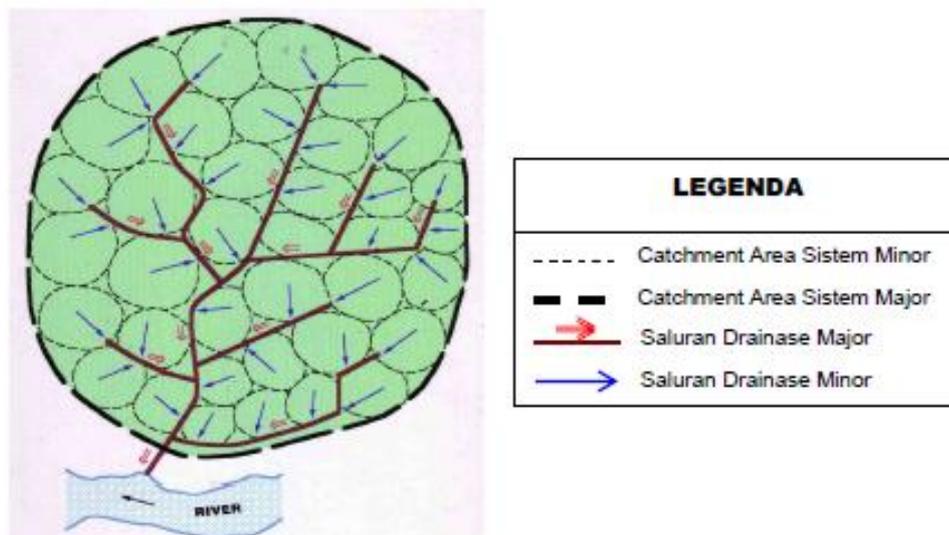


Figure 2. Schematic lay-out from minor and mayor in urban drainage system

2.3 Organization in Drainage System Management

Development agency or institution is a perspective of social change is planned and constructed. Development agency regarding innovations which implies a qualitative change in the norms, the patterns of behavior, in personal relationships, and relationships

of the group, in a new perception of the goals and methods. Institution building is not associated with the repetition of patterns that already exist, with marginal deviations from past practices, or with slight improvements in efficiency alone. The dominant central theme in the development of the agency or institution is innovation.

The purpose of all the steps in the management of drainage is the creation of a condition that is ideal drainage management implementation, synergistic, unified and harmonious. Which is expected to create synergy in the context of regions, sectors and generations, that's the essence of which is contained in the management of drainage, including drainage system applied in the management of Semarang. An understanding of this objective, both philosophically and empirically to be able to animate every step of activities of any organizations, groups, and individuals included in the group of stakeholders. If these prerequisites be met, then surely all hope of hanging will be accomplished more effectively and efficiently.

3. Research Methodology

This research is a comparative study of the drainage system management in France, the Netherlands and Indonesia. The data were obtained through interviews with the parties related to the management of the drainage system as well as from the literature. Elements are analyzed on the management system in France and the Netherlands, is a model of the organization as well as the duties and functions of the organization. While the management of the drainage system in Indonesia will be compared to the drainage management system in Semarang and Jakarta based on drainage management aspects, namely institutional, regulation, financing, community participation and technical operations.

4. Result and Discussion

Good drainage system management requires an organization that is capable of running the management function. Each country has a different organizational models depending on the needs in each region. Basically there are three (3) types of organization models in the the drainage system management, namely organization model of government based, organization model of community based and organization model of stakeholders based. Here are three institutions in the management of the drainage system in France, the Netherlands and Indonesia.

4.1 Organization Model of Drainage System Management in France

Organizational management of the drainage system in France is a management organization La Briere. This management model based stakeholders. This organization consists of a kind of assembly, the governing body and the executive board. Assembly is representative of the area (commune) and users (farmers, ranchers, touristique). Organization systematically of Parc Naturelle de La Briere can see in figure 3. Such organizations include, among others :

1. Infrastructure and Environment (*Environnement et Amenagement*)
2. Spacial Architecture (*Architecture Urbanisme*)
3. Management of Green Space (*Entretien Espaces Verts*)
4. Management of Tourism and Cultural (*Tourisme et Culturelle*)

Figure 3 shows the organizational structure of the management of drainage in La Briere France.

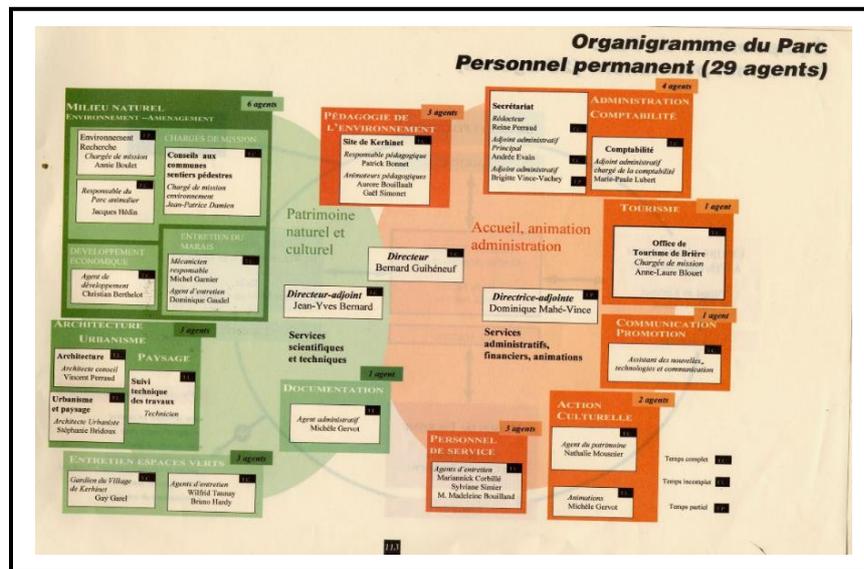


Figure 3. Organizational Management of La Briere Areal
 Source : Anne L Breton et al., 2008

Organizations that manage water elevation is part of the infrastructure and environmental management. This organization in the execution of their duties depends on the decision of Commune (village), each of which has a representative. Systematic organization decided to regulate water can be seen in Figure 4. below.

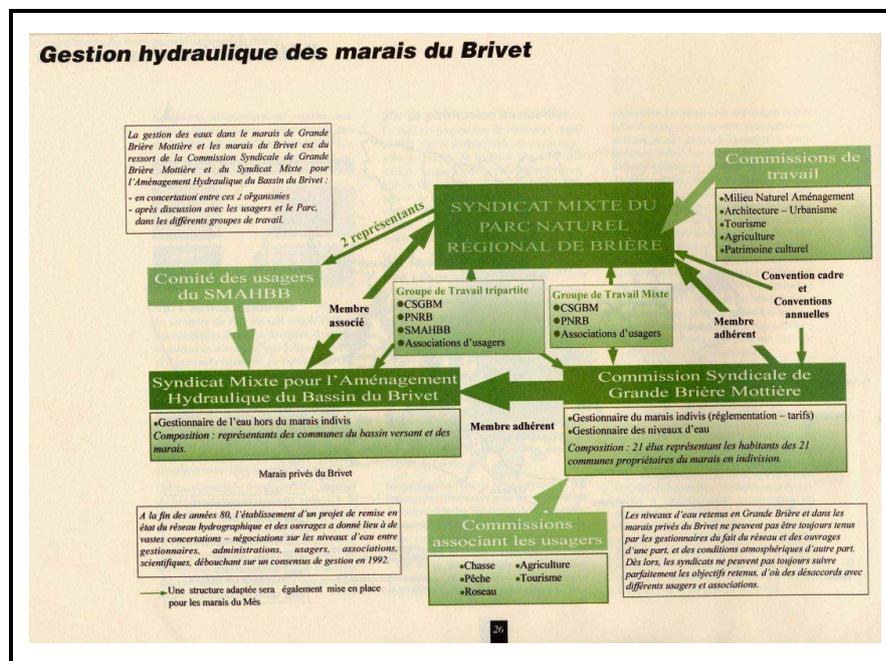


Figure 4. Organization that Manage La Briere
 Source : Anne L Breton et al., 2008

Organization In deciding management policies, each stakeholder has a representative that hydraulic work commission, commission users (agriculture, aquaculture, tourist, hunting), managers working committee. Also there is a commission scientifique. Decisions of the whole meeting became the basis of the implementation of the commission's working committee. Meeting in one of the working committee called scientifique.

4.2 Model of Drainage System Management in The Netherlands

Organization of water management in the Netherlands has a high position. The management water board has a position that is equivalent to the Municipality (mayor). Model management organizations drainage system in the Netherlands is a model-based organization stakeholders. Position of the management body of water is shown as Figure 5 below.

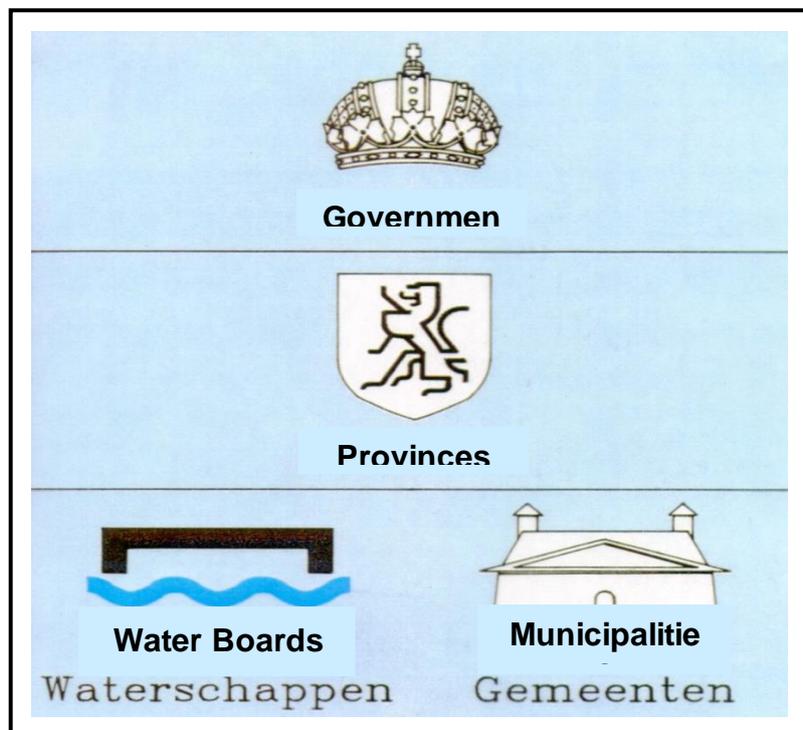


Figure 5. Water Management Organization in The Netherlands
Sources : Johan Helmer, 2010

The task of the management body of water in Rotterdam are :

1. Operations and maintenance
2. Permits and enforcement enforcement
3. Inspection supervision
4. Testing and Monitoring
5. Preparation on climate change
6. Integrating spatial planning
7. payment / water tax

Sources of funding can be sourced from many sources. Along with other elements of society participate in the management. Technical operational planning, maintenance operations, to control handled by the Management Board. The organization in charge of water management in the Netherlands can be seen in Figure 6 below.

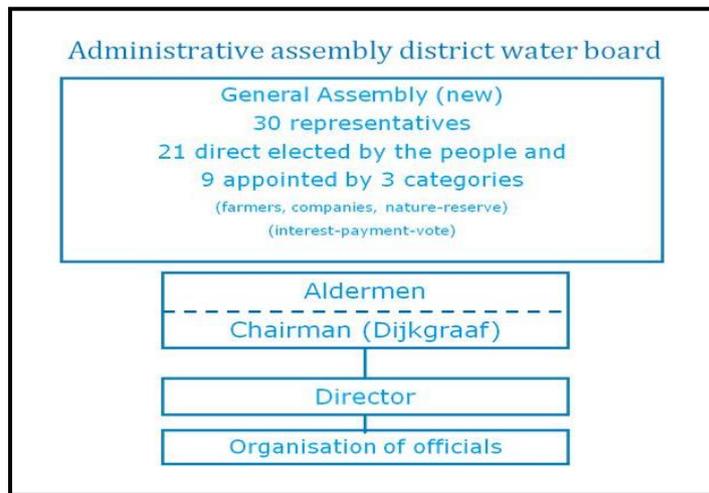


Figure 6. Organization Responsible Water Management in the Netherlands
Sumber : Johan Helmer, 2010

4.3 Organization Model of Drainage System Management in Indonesia

In general, the management forms the drainage system in Indonesia there are two (2) types, namely the management of government based and management of community based.

Drainage system management of government based is implemented by the government during water resource management board, while drainage system management of community based is implemented by Self-Help Groups (SHGs). In Semarang, drainage system management of government based example is the management of the Old Town drainage sub-systems and drainage system management of Simpang Lima sub-systems. While the drainage management example is the community-based management of land drainage in the region of Tanah Mas. Here can be seen the sample table drainage management systems in Semarang and Jakarta.

Table 1. Drainage Management System in Semarang and Jakarta

No	Location	Drainage Management Aspect				
		Institution	Regulation	Financing	Community Participation	Technical operations
SEMARANG						
1	Tawang Drainage System	Government based, implemented by water resources management board	Decree of Head of Water Resources Management Board	Government only	There is no community participation	Technical operations with pump system and door and flowed into the retention pond
2	Tanah Mas Drainage System	Self-help Groups	-	Financed by contributions from the public and government assistance	Fully engaged community	Pump system and door and flowed into the river
JAKARTA						
1	Plui Drainage System	Government based	Decree of Related Board	Government only	There is no participation community	Technical operations are handled by person in board

5. Conclusion

Based on the description above, it can be concluded :

- a. There are three models of organization in the management of drainage system, which is organizations model of government based, organization model of community based and organization model of stakeholders based. In general, the management of the drainage system in France and the Netherlands is a organization model of stakeholders based, whereas in Indonesia using organizations model of government based and community based.
- b. Organization of drainage system management has a very important role, and therefore must involve personnel who are competent and supported by regulation and sufficient authority.

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