

# Institutional Model in Management of Drainage System



Henny Pratiwi Adi, Slamet Imam Wahyudi

**Abstract:** Flood is a regular problem in Semarang. The causes of flooding include changes in land use, intensity and high rainfall and erosion and sedimentation in the river channel. Development efforts for flood control has been conducted, such as the development and optimization of drainage systems. Maintenance and operation of the drainage system supported by the good institutional capacity is expected to handle the problem of flooding. Therefore, the right institutional model is necessary in the management of the drainage system of Semarang. The research data were obtained through a variety of literature as well as interviews with the parties related to the management of drainage in Semarang. There was three institutional model of drainage system management implemented in Semarang were institutional model of government-based, institutional model of community-based, and institutional model of stakeholders-based. There were 24 respondents from government, municipality, entrepreneurs and communities who have assessed the institutional model of drainage system management. Each institutional model analyzed in the five aspects of drainage management, namely technical, institutional, legal, financial and community participation. The results of the study showed that the most appropriate institutional model for managing the drainage system in Semarang is institutional model of stakeholders-based. This institutional model has the advantage such as drainage system maintenance can be handled more quickly, the legal regulations issued by the government and financing sources drainage system can come from any source, such as the central government, municipalities, grants, and also from non-governmental.

**Keywords:** Drainage System, Institutional Model, Management

## I. INTRODUCTION

Semarang is a city located in coastal areas. Drainage problems in cities coast is generally more complicated than the problems of urban drainage in general. Drainage issues especially coastal town, is not a simple thing. Many factors influence and consideration in the planning, among others, an increase in discharge, narrowing and silting of channels, reclamation, land subsidence, liquid and solid waste (garbage) and Tide [1]. The current drainage system 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. Poor drainage system causes waterlogging and flooding in various places so the environment becomes dirty and slovenly, become mosquito breeding and the source of the disease. These conditions not only lowers the quality of the environment and public health, but can also interfere with the activities of transport, economy and others [2].

Semarang is a city that is always flooded with a considerable impact on the socio-economic life of society. In order to avoid the impact of widespread flooding, The Government of Semarang City has sought to make the handling of the flood in Semarang [1]. One of the efforts is to implement polder drainage systems. Drainage system that has been built need an institutional management to perform the functions of maintenance and operations. Increased institutional capacity and quality of human resources in the management of drainage is one of the strategies that need to be done in the management of drainage [3].

There are three institutional models that implemented in drainage system management of Semarang, namely institutional model based on government, institutional model based on community, and institutional model based stakeholder. This research was conducted to describe the problem in drainage management system in Semarang and also to obtain the appropriate institutional management model. Each of this institutional model analyzed in the five aspects of drainage management, namely technical aspects, institutional, regulatory, cost and community participation.

## II. MATERIAL AND METHODS

### A. Drainage Management Aspects

Drainage problem solving requires the improvement of responsible institutional capacity in the drainage field. Increased institutional capacity includes the field of Planning & coordination; operation and maintenance; implementation and control. Institutional formation in the drainage system should be based on drainage management aspects such as institutions, regulations, financing, community participation, and operational techniques as illustrated in the following figure:

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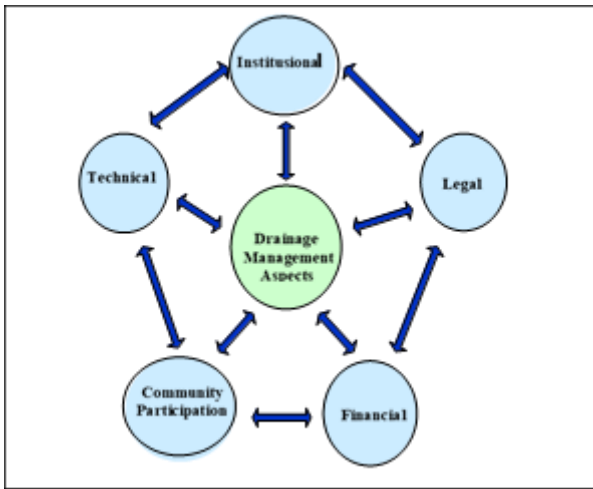


Fig. 1. Drainage Management Aspects

In this research, the three institutional models that implemented in drainage system management of Semarang analyzed and comparing in the five aspects of drainage management, namely technical aspects, institutional, regulatory, cost and community participation.

**B. Organizational Structure of Institutional Model**

There are three (3) types of institutional models applied in the management of drainage in Semarang: institutional model of government-based, institutional model of community-based, and institutional model of stakeholders-based, each institutional model has a different organizational structure. The organizational structure describes the parties involved as well as their coordination lines.

**C. Comparison of Institutional Model in Drainage System Management**

This research method consisted of a literature study, field visits, organized discussions, surveys and interviews are performed. The interviews involved parties related to the management of drainage in Semarang, including the government. In depth interviews to respondent aims to obtain input on the implementation of three institutional models in the management of drainage systems, respondent were also asked to provide an assessment of the most appropriate institutional model to be applied in Semarang. There are 24 respondents who have assessed the institutional model of drainage system management. The composition of respondents are central government (3 persons), Semarang municipality (3 persons), entrepreneurs (3 persons), communities (15 persons).

**III. RESULT AND DISCUSSION**

**A. Drainage Management Problem in Semarang**

Drainage management in Semarang is still not optimal, it can be seen from many areas are still flooded. Here are the results of analysis of Semarang drainage management issues in terms of 5 drainage management aspects, namely: technical, institutional, legal, financial and community participation.

**a) Technical Aspect**

Drainage management in Semarang was still under construction. Some drainage network of primary, complementary buildings and infrastructure facilities are still in the implementation of development activities.

**b) Institutional Aspect**

Drainage management in Semarang on institutional aspects of less than optimal, because it is handled by the department with a number of personnel were very inadequate. Personnel quality who specialize in the management of the water system, still less competent. The educational level largely equivalent undergraduate degree, whose understanding in water management problem is still lack. Personnel placement pattern in which the bureaucrats will periodically occur mutation also become a problem, because the replacement personnel have to adapt, so it takes time and a different level of understanding.

**c) Legal Aspect**

Regulation drainage management in Semarang still refers to the regulation mayor and the mayor's decree. Current conditions with drainage management issues are increasingly complex, regulation-level operational basis mayor and the mayor's decree is still less binding, especially from the legal and political aspects. Drainage management is handled only by the government (public and private not involved), and the model of reward and punishment has not been applied.

**d) Financial Aspect**

In handling the drainage management in Semarang, budget constraints are also a major problem. Budgetary resources from the government are not enough to deal with drainage problems. Therefore, financing the drainage management should not only come from the government, the concept of the drainage fee needs to be applied so that the obligation in financing not only from government funds, but also of employers and society.

**e) Community participation**

Community participation is significant importance in the success of the development. Likewise in the management of drainage in the city, community involvement right from the beginning to the end is needed [8]. Currently, drainage management is still handled by the government, from the planning, implementation, operations and maintenance, as well as a good evaluation of the network of primary, secondary and tertiary. However, the management of drainage have not shown optimal results. Community involvement in all phases on drainage management is important to apply. Therefore, the community has the responsibility and awareness of the importance of managing the drainage system properly.

**B. Organizational Structure of Institutional Model**

**a) Institutional Model of Government-based**

In this model, as the executor is the Regional Technical Implementation Unit (RITU).

RITU an organizational unit that is independent performing technical tasks of operational and technical support tasks from their parent organizations. The operational technical task is the duty to carry out technical activities that are directly related to public services, while supporting technical task is the duty to carry out technical activities in principle, in order to facilitate the task of its parent organization.

Figure 2 shows a model of organizational structure refers to the Regional Implementation Technical Unit (RITU).

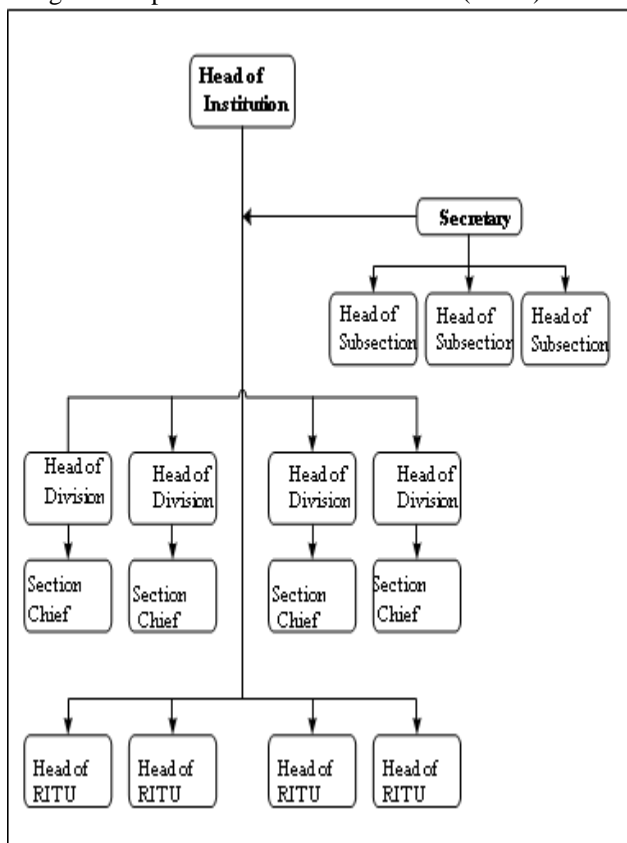


Fig. 2. Organizational Structure of Institutional Model of Government-based

**b) Institutional Model of Community-based**

In this institutional model, the form of organization is the Non-Governmental Group (NGG). NGG is a form of organization that relies on community participation. Community empowerment is considered very strategic as input in achieving the independence of the community. The approach taken in this institutional model is to empower communities to manage infrastructure environment.

Based development, NGG activity has diverse roles in the implementation process of development, especially how NGG cooperating with the government. There are at least three roles that can be performed by NGG in assisting the management of the infrastructure, which is a pioneer in the model of community-based management, as a facilitator and catalyst to facilitate and accelerate the process of cooperation with and among various other development actors, as well as agents of advocacy on public policy in favor on society. Figure 3 shows a model of organizational structure in the form of Non-Governmental Group (NGG).

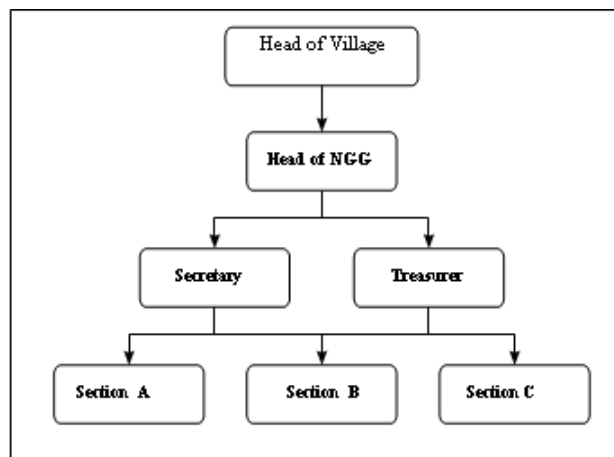


Fig. 3. Organizational Structure of Institutional Model of Community-based

**c) Institutional Model of Stakeholders-based**

Institutional model based on stakeholders is a form of incorporation of the organizational structure RITU and NGG. In the structure of this organization, many parties could be involved, such as government, entrepreneurs, professionals, communities and employers. Figure 4 shows a chart of the organizational structure refer to stakeholders.

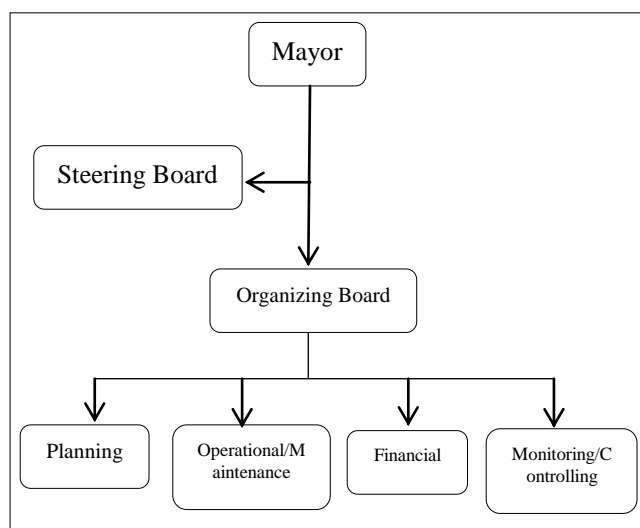


Fig. 4. Organizational Structure of Institutional Model of Stakeholders-based

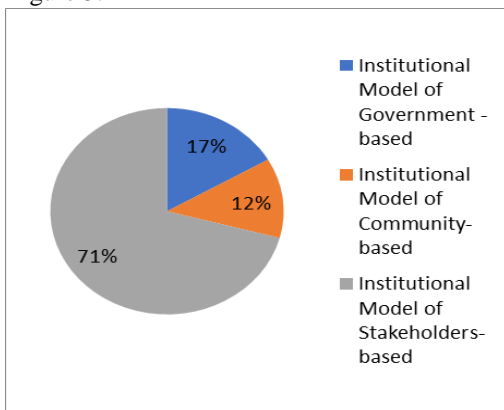
**C. Comparison of Institutional Model Based Government, Community and Stakeholders**

There are three (3) types of institutional models applied in the management of drainage in Semarang are institutional model of government-based, institutional model of community-based, and institutional model of stakeholders-based. The result of comparison of institutional models that analyzed in the drainage management aspects can be seen in Table 1.

**Table 1. Comparison of Institutional Model Based Government, Community and Stakeholders**

Aspect	Institutional Model of Government-based	Institutional Model of Community-based	Institutional Model of Stakeholders-based
<b>Technical</b>	There is a limited number of personel, so as not optimal technical operations	All operations are taken care of by the community itself	Technically operations to perform all operations can be handled more quickly because it consists of personel who are reliable and professional
<b>Intitution</b>	Board consists of government employees where frequent mutation / rolling servants, so that handling is less than the maximum if incompetent personel in the field	All handled by the communities institutions	Institutional members consist of governments, civil society, experts and businessmen
<b>Legal</b>	The legality of the legal form of the Decree of the relevant department. The process of institutional formation is faster because it is still in the office environment, but the rules are only binding in the relevant department.	The legality of the law was limited to the village level so that the legal force level with the regulations issued by the village	Legality level legal regulations issued by the city / county can even be to the Regional Regulation.
<b>Financial</b>	Financing only comes from government	Financing is only sourced from the communities only.	Sources of funding can be sourced from anywhere such government budget, grants, and also from non-governmental
<b>Communit y Participati on</b>	Community is not involved in the management of the drainage system.	Community without the help of other elements fully involved in the management of the drainage system.	Communities and other elements can participate in the management of drainage

The result of respondent assessment to the institutional model of drainage system management in Semarang, can be seen in figure 5.



**Fig. 5. Organizational Structure of Institutional Model of Stakeholders-based**

Based on the assessment of respondent, the institutional model sequence in the management of drainage systems suitable for Semarang is institutional model of stakeholder-based (71%), institutional model of

government-based (17%) and institutional model of community-based (12%). Assessment of respondents is given by considering the advantages and disadvantages of each institutional model. Institutional model of stakeholders-based is the most appropriate institutional model to be implemented in the management of drainage system management in Semarang.

Institutional model of stakeholders-based has the advantage in the technical aspects such as to conduct drainage system maintenance can be handled more quickly because it consists of personnel who are reliable and professional. The advantage in institutional aspect, the member in this institutional model involved many persons such as government, civil society, experts and businesspersons. The advantage in the legal aspects, all regulations related with this institutional model, issued by the city government. It is mean the regulation has a strong impact to be implemented. The advantages of the financing aspects, financing of the drainage system can be sourced from anywhere such as central government, municipalities, grants, and also from non-governmental. The advantages in aspects of community participation, along with the other elements, the community can play an active role in the management of the drainage system

**IV. CONCLUSIONS**

Following conclusions are described from this research study:

- a. There are three institutional models in the management of drainage, has been applied to the drainage system in Semarang, that are institutional model of government-based, institutional model of community-based and institutional model of stakeholders-based.
- b. Based on the management problem analyzed of the drainage system management in Semarang and assessment of respondent, the most appropriate institutional model is institutional model of stakeholders-based.

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