

Tidal Flood Handling through Community Participation in Drainage Management System (A case study of the first water board in Indonesia)

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Abstract: Floods always occur in some cities located in coastal areas of Indonesia, including in Kemijen area of Semarang city. This study aimed to analyze the technical, institutional and community participation aspects in the management of drainage system and the influence of BPP SIMA (the first water board in Indonesia) in handling of tidal flood. Primary data in this study were obtained through observation and interviews, while secondary data obtained through the study of documents and literature review. Research results showed that technical aspects of drainage management in Kemijen Semarang, still in refinement. Some of the complementary buildings of primary drainage network are still in development. In the institutional aspect, drainage management is still less than optimal because it is handled by department with a number of personnel were very inadequate. Community participation in flood management is still in the form of measures which have not been fully coordinated with the region, such as raising floor of house, access roads and pumping water elevation. BPP SIMA as water board that is responsible for providing information, training and socialization to the community in the management of drainage, is still not optimal in forming a caring community environment.

Keywords: drainage, management, community participation

1. Introduction

Semarang is a city located in the coastal zone. In general, the drainage in the city located on the coast is more complicated than in other urban drainage problems. Land subsidence that occurred in the coastal city may result of tidal flood. Kemijen Village is an area in Semarang city, which is always flooded because of the tide. Currently, Kemijen Village become a pilot project in the handling of the floods through construction of polder system. Development of community participation in flood management is also conducted in Kemijen, through the establishment of institutions by name BPP SIMA (Polder Banger Water Board). The water board is supported by the organization of the Dutch Water Board [1].

Community participation is defined as a process of public involvement in a series of conscious and real development process starting from the planning (policy formulation) to the level of control (monitoring and evaluation) development program. Handling tidal flood is not only done by the government alone but also by other actors such as private parties and community [1]. Handling tidal flood in Kemijen Village, made through an invitation to develop a culture of healthy living, self-help in the improvement of infrastructure by way of co-financing, and participates in the management of infrastructure and flood mitigation.

This study aims to analyze the development of community participation through BPP SIMA water board, in handling tidal flood in Kemijen. Results are expected through the exploration of flood management with community participation in Kemijen, will get lesson learned that can be used as an institutional model based on community participation in flood management in other areas with similar problems.

2. Literature Review

2.1 Drainage problems in the Coastal Zone

Most cities in Indonesia are in the coastal zone. Drainage problems in the coastal city, is not a simple matter. 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 the tide [2]. Land subsidence in many coastal town triggered flooding more severe flooding. Land subsidence is caused mainly by excessive extraction of ground, which resulted in some parts of the city are the same height and even below sea level tide. As a result, gravity drainage system will be disrupted, even cannot work without the help of pumps. Even in some places can cause permanent flooding from tidal commonly known as tidal flood. Currently, the drainage is often overlooked and not considered important work; whereas, urban drainage

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work is a complicated job and requires a considerable cost [3].

2.2 Institutional Management of Drainage Systems

Institutional development is a perspective of social change is planned and fostered. Development agencies regarding innovations which implies a qualitative change in norms, in patterns of behavior, in relationships of individual and group relationships, in a new perception about their own goals and means. Development agencies are not related to repeat the patterns that already exist, with marginal deviations from the practices of the past, or by improvements in efficiency slightly. The main theme is dominant in the development of the agency or institution is innovation. In general, the development of institutions taking social innovation which aims, imposed by elites, oriented changes and working through formal organizations. The development objective is to build institutions organizations viable and effective build supports and completeness of the environment. This support allows innovation to take root, gaining support, is normative and thus institutionalized in society [1].

2.3 Community Participation

Community participation is the involvement of community members in development include activities in the planning and execution of program implementation or development projects undertaken in local communities. The terms of community involvement in the implementation of the development is often also referred to the participation or generally have a sense as a business sustainability, which allows the public to get involved in development, either actively or passively [4].

In connection with this, the role of the community in the implementation of spatial planning is very important and needs to be taken into consideration in the process of spatial planning, both in the process of planning, utilization, and control, space utilization to minimize conflicts between interested parties. Therefore, the government should facilitate the delivery of community aspirations for spatial planning can be carried out effectively and efficiently [5].

2.4 Factors Affecting of Community Participation

There are two factors that affect community participation are internal factors and external factors [6]. Internal factors affecting participation is derived from the group itself, the individual or the group members and the unity of the group itself. Theoretically, the behavior of individuals closely linked or determined more by the sociological characteristics such as education, occupation, income, gender and age [7]. In addition, one of the prerequisites for obtaining participation in a program of development is the availability of information for those participating. Knowledge and understanding of the program is to enlarge community participation. These external factors can be interpreted as stakeholders, i.e. all

interested parties and have an influence on this program. Stakeholders are those who have a significant influence or a position critical to program success. Stakeholders have a significant influence, dotted effect contrary to what authority or power of such influence [8].

2.5 Participation in Planning

In the traditional planning approach, the central government set priorities and development agendas often irrelevant to the needs of society. This approach is often ignore the social, cultural and local community environments. According to Abiyoso [4], approach to development planning should be open and involve the community so that planners and communities can combine approaches from top to bottom and from bottom to top; therefore, many demands to meet the needs of the importance of community participation in the development planning process. Participatory planning should create a mechanism to improve the quality and opportunities of local people in their participation, in formulating and implementing policy. Abiyoso [4] found the planning stage consists of identifying things and conditions in general, identification of community needs, identifying goals and objectives to be achieved, identify resources, work plans and financing.

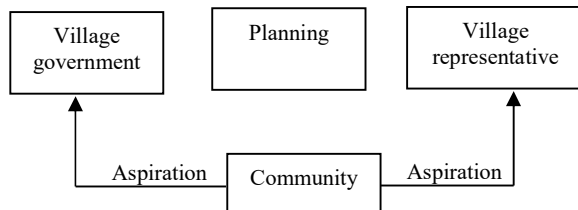


Fig. 1 Model of Participatory Planning [4]

3. Research Method

This study uses qualitative descriptive method through a case study approach strategy. Primary data in this study were obtained through observation and in-depth interviews to stake holders and the communities in the study area, while secondary data obtained through the study of documents and literature review.

4. Result and Discussion

4.1 Scope of Study Area

The scope of study area was Kemijen Village, East Subdistrict of Semarang. The boundaries of Mijen Village are as follows;

- North : Tanjung Emas Village
- East : Tambakrejo Village
- South : Rejomulyo Village, Mlatiharjo Village and Mlatibaru Village
- West : Tanjung Emas Village

The disaster that struck in Kemijen village is a tidal flood of Java Sea that routinely occur every day after at 04.00 pm and low tide when at 01.00 am. The results of

interviews with residents, when the rainy season arrived then the situation worsened, floods soak the entire area of Kemijen Village for several days. Sometimes residents must be evacuated in higher areas. Location of tidal flood risk in study area as shown in figure 2.

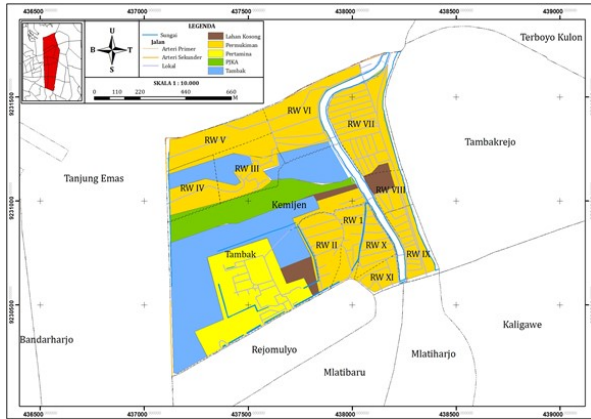


Fig. 2: Tidal Flood Risk Location in Study Area

Land use in Kemijen Village are housing area, industrial activities, ponds, government land, empty land and river basin, can be seen in Figure 3.

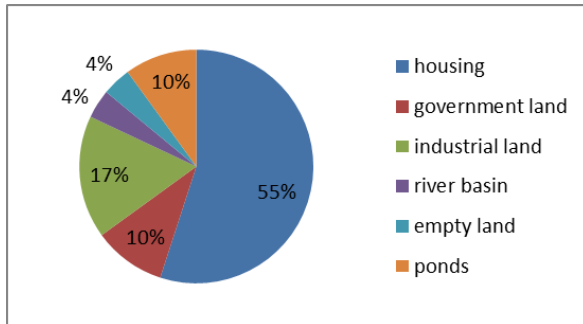


Fig. 3: Land use in Kemijen

4.2 Flooding Problems in Kemijen Village

Floods occurred in Kemijen Village occur due to continuous rainfall resulting in storm water runoff can not be accommodated inundate the surrounding regions. The cause of runoff rainwater not absorbed is not smooth waterways because clogged by garbage or water channels experiencing soil sedimentation, thereby reducing the performance of the channel. Floods occurred in Kemijen still occur even though most of the Kemijen area already elevated access road.

Tidal flood is a regular phenomenon that occurs due to the presence of sea water into Kemijen area. Flooding due to rain or due to rising seas has caused loss to the Kemijen community. This loss is felt by the community, especially those who are not able to raise the floor or repair their house become the better house.



Fig. 4. Tidal Flood condition in Kemijen Village

4.3 Community Participation of Kemijen Village in the Management of Drainage

Community participation can be divided into several types. Mikkelsen [5] distinguished four types of participation. The first is the participation in decision making, secondly is participation in the implementation. Thirdly is participation in decision utilization, and fourth is participation in the evaluation. Implementation of community participation is an advanced program of the plan that has been agreed in advance, either with regard to the planning, implementation, and purpose.



Fig. 5: Community participation in the repair of roads damaged by floods

Distribution of forms of public participation in Kemijen according to Mikkelsen (2011) [5] included in the third participation form that participation in decision utilization. Steps taken by the public is a helpful part to handle floods that occur every year.

According to Erman [6], community participation in Kemijen including participation is in the form of spontaneity. Based on observations, Kemijen citizens have a sense of community for trying to deal with flooding. One form of participation is through activities led by community leaders in community service, which is regularly held once a week in the form of cleaning the sewers or drains clogged garbage. The forms of community participation Kemijen can be explained in the following table.

Table 1: Community Participation to handle tidal Flood in Kemijen Village

No	Activities	Implementation Spesification
1	House Floor exaltation and Housing Development	Less comprehensive and lack of coordination in handling regional tidal flood.
2	Personal water pump	Less comprehensive and lack of coordination in handling the tidal flood in terms of areal
3	The elevation roads in settlements	Less comprehensive and lack of coordination in handling the tidal flood in terms of areal
4	Cooperation in environmental management by cleaning the drains of garbage and sedimentation	Still there are people who throw garbage in the river
5	The contribution of community for pumping, both the procurement, maintenance and operations	<ul style="list-style-type: none"> • Constrained problem inability communities' contributions • Pumps become less well maintained and ultimately broken • Lack of Coordination communities in flood management

Based on the implementation of community participation, can be seen is the lack of coordination among the public against the handling of the flood and the lack of clear planning of the area contained in Kemijen. People prefer to handle the flood individually through the elevation of each dwelling and it is carried out continuously because of land subsidence that occurs every year is quite high. Elevation of the road environment can be pursued public lacking resolve the flood problem in the region and less effective. Management activities to improve the quality of the environment are considered less synergy with the community.

For people who do not have the financial ability to repair their house, in the end resigned to flood conditions

that occur throughout the year. Society remained living in Kemijen area because there is no place to go. Meanwhile, the government did not immediately operate Banger System because many unresolved problems, such as land acquisition for the polder and lack of cost to build and operate the polder. Model of community participation in Kemijen area can seen in Fig. 6.

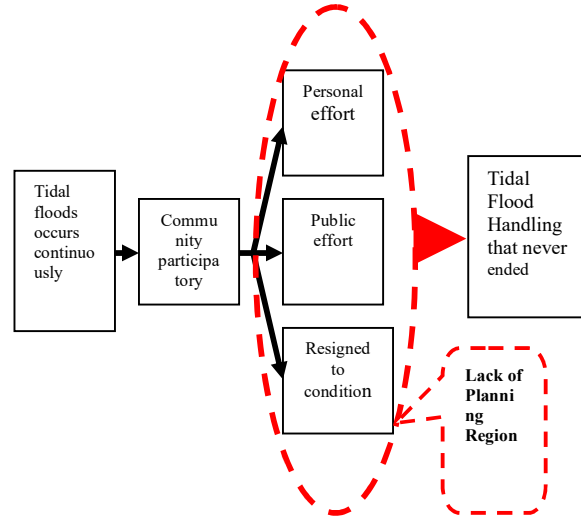


Fig. 6: Model of Community Participation in Kemijen Village

4.4 Role of BPPB SIMA Water Board in the Management of Drainage

In 2001, a Memorandum of Understanding (MoU) signed between the Government of Indonesia and the Government of The Netherlands to assess the implementation of the Dutch Polder system as one of the sustainable solutions that can be applied to solve the problem of flooding in many coastal cities in Indonesia. Polder system includes not only the construction of flood resistant buildings, but also the establishment of the Organization Polder. Banger Pilot Project is a form of cooperation Government to Government between the Government of Indonesia in this regard the Government of Semarang and the Netherlands Government to establish an integrated system Banger between technical, institutional, and operations and maintenance [7].

In 2010 the first water board to manage water in Semarang is established with the support of the Dutch Water Board named BPP SIMA Water Board. This organization, established through a decree of the Mayor to protect the densely populated area around Banger, Kemijen against flooding. BPP SIMA will operate and maintain the facilities for the protection and management of water such as pumping stations, dams, dikes and retention basins. Region Banger in Kemijen, Semarang city was selected as pilot sites for the implementation of an integrated system of polders between technical aspects and institutional aspects. Banger area has an area of 543 hectares and is inhabited by 84,000 people.

BPP SIMA provides socialization and training related to the management of the environment to be able to cultivate a clean life, trash-managed and comfortable environment and safe from the flood later. During this time the garbage is very disturbing the flow of water in waterways and clog water pumps. Through activities initiated by BPP SIMA is expected to form a caring community environment and building water infrastructure to alleviate the flood problems. Daily Executor will be recruited in the 3 months before the start of the operation and maintenance phase. Pump operator will get on the job training in the Netherlands and Semarang with trainers from HHSK. Currently the community is expecting a polder system is able to walk and function as a step polder system according to some experts considered effective for the alleviation of the flood.

The role of institutions can support the performance, financing, and public participation in the management of polder system. Institutional BPP SIMA which is directly responsible to the mayor is the key to the process of preparation to the implementation Polder system. Banger supported by funding from the provincial government, municipal government, cooperation with companies around the polder, until the dues that does not burden the local community. It is also inseparable from the support of local institutions to encourage citizens to participate the establishment of Kemijen free from the flood; yet, the coordination among agencies is still not so optimal in accordance with the need for better communication in the unity of mind to deal with the disaster.

5. Conclusion

Tidal flood in Kemijen caused by several things starting with the governance system of drains is not optimal, land subsidence area, and frequent natural phenomenon that is the rising tide sea to the mainland. Currently, flood performed by Kemijen's communities, was not good coordinated and lack of clarity of the direction of the planning area. Can be seen from the form of community participation in addressing tidal floods with a raising floor and build their homes, raising the residential environment both from government assistance and self-help. In addition the pumping effort is not optimal due to hit the cost of maintenance and operation.

BPP SIMA very important role as a local organization as well as a forum for community participation established by the government of experts from universities, entrepreneurs, private and indigenous community of Kemijen. Non-technical efforts made BPPB SIMA for this is still less than optimal due to the lack of coordination and continuous communication of the technical efforts have been partially implemented with both communities and other relevant parties. Their financing polder system imposed by society needs to be studied more deeply so as not to burden the Kemijen Village. The financing should be eliminated and the government can finance the polder system, through cooperation with various parties.

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