

BESSH-16**Community Based Flood Disaster Education Model to Improve People's Awareness to Flood in Banjir Kanal Barat, Semarang Indonesia**Dewi Liesnoor Setyowati^{1*}, Maman Rachman²^{1, 2} Semarang State University, Indonesia

Abstract

People behavior on littering in the river cause blocking waterflow that can caused flooding. People awareness to flood in the Cabean Village are low, so that in every rainy season this area always flooded. This study aimed to identify community efforts to cope with flooding and develop an appropriate education module for flood. People already know the cause of the flooding but unwilling to take action to prevent flooding. Social approach is an effective way to change the lack of awareness and preparedness to the flood. The development of educational models of flood disaster is used as an effort to increase community awareness to flood. Elements of community preparedness, in the research are: attitudes and actions, public policy, preparedness planning, infrastructure. State of the community preparedness to cope with floods are not limited to the action of the community during floods, but also encompasses preventive measures and recovery actions. The model flood disaster education are socialized through Karang Taruna group, and can be applied to other communities in flood-prone areas, so that can increase to flood awareness. Flood disaster preparedness modules can be used as a medium of education for the community.

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Keywords— Disaster Education, Flood Preparedness, Disaster Module

Introduction

Flood is a natural phenomenon that caused by overflow of water in the drainage system that can cause inundation and some negative impacts and loses. It is difficult to both community and government to overcome with these losses. According to Kodoatie (2010: 56) the flood is caused by various factors both physical factors (such as catchment area, duration and intensity of rainfall, topography, and the capacity of the drainage) as well as the factor derived from human such as over exploitation due to the rapid population growth. This resulted in the increasing of basic and non-staple needs, infrastructure, as well as land use change.

Recently, the number of floods events in the Semarang City has been increasing and becomes a serious problem need to be solved. One of them was happen in Banjir Kanal Barat (West Channel). Banjir Kanal Barat is one of the Extension of Kaligarang River which located under Simongan bridge and disembogue to Java Sea with approximately 5.3 km long. Banjir Kanal Barat was built as one of the main drainage system in the Semarang City.

Cabean Village is one of the flood prone area in Semarang City. This area will be flooded in every rainy season. This condition is caused by some cause such as: a) poor drainage system, 2) poor garbage management in the one of the traditional market called "Karangayu", 3) people's behaviour to throw the garbage in the river or water channel. the existence of the bad behaviour on waste and water management in Semarang City, it is important to do an intensive approach to change the people perception and behaviour as well as increase people awareness to the environment. It is become more important because Semarang is one of the big city in Indonesia with a high number of population which become more vulnerable to disaster. As one of the effort to increase community resilience, the Government of Semarang City did some normalisation of Banjir Kanal Barat by clean the river body from the sedimentation. But, this action was only non-permanent effort as long as the community behaviour to throw garbage in the river still exist.

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One effort that can be implemented to bring awareness and change people behavior to be more pay attention to the disaster risk is through education, both in formal education through school education and non-formal education through the community (Findayani, 2015). In case of formal education in the school, teacher can teach a clean and healthy lifestyle to the student, do some clean-up activities, and teach students to dispose the waste in the garbage-basket. On the other hand, non-formal education through the community can be done by do some activity such as socialization, “Kerja Bakti” (volunteer clean activity), and community emergency saving. Both this education can increase community resilience to disaster especially flood disaster.

Education is one of the process based businesses are conscious purpose, whose activities are directed to achieving that goal. (Setyowati, et al.,2012). Definition of education according to the Undang Undang Sistem Pendidikan Nasional (National Education System Law) No. 20 Year 2003 is conscious and deliberate effort to create an atmosphere of learning and the learning process so that people are actively developing the potential for him to have the power of spiritual, religious, self-control, personality, intelligence, noble morality and skills needed him, society, nation and state, With education expected, people will know everything that can lead to the success and increase the quality of life. Therefore, education should be directed at developing basic learning skills. This expectation cannot be realized so that hinder the achievement of other goals, such as: basic learning contents, responsibility, cognizance, and efficacy.

Based on the background, the objectives to be achieved in this study are: 1) assess the preparedness of community in the Cabean Village to cope with flood disaster; 2) develop modules on community flood preparedness; 3) study the feasibility of flood disaster preparedness modules on society.

Literature Review

Community knowledge about the flood disaster response has some indicators: wide flood, flood control planning, actions which caused catastrophic flooding, flood disaster management in both categories Rahman, et al (2009). Frequent flooding in the city of Semarang is caused due to heavy rains, high tides (rob), and clogged drainage. The impact of flooding: break the transport system, road damage, and create slum areas (Jonkman SN and Vrijling JK.. 2009). There are some people behavior caused flooding such as littering, cutting down the trees, occupies the area along the river, building on disaster-prone areas, as well as the burning bush or plant. In fact, the behavior of the public response to the floods themselves are very low. The community seems like just let go, pretending not to know and adaptive, in the face of the floods that occurred (Rachman, et al., 2009).

The concept of community disaster preparedness is not fixated on the elements of preparedness, but also includes efforts to develop knowledge in innovative ways to achieve the acculturation of safety, security, and resistance to its entire population against disasters. Based on this, formulated the concept of Community Disaster Preparedness has two main elements: a safe environment and community preparedness (Setyowati, 2013; Suharini et al., 2014). Parameter of preparedness consists of four elements: (1) the attitudes and actions, (2) public policy, (3) the preparedness planning, (4) infrastructure (Setyowati et al., 2012).

Flood disaster response is a sprightly attitude, reflective and active related to the floods. This attitude is manifested in the daily life of a continuously, intact and coherent. This attitude not only survive within a certain period. Flood disaster response learning modules is one way to convey the steps, and attitudes that must be owned by an individual to cope and anticipate the flood. With the development of this method is expected to change the habits of life to be more sprites and responsive to the flood. So that the prevention can be done as soon as possible and the number of losses can be minimized.

Kobayashi (2010) argue that there are four main pillars to do flood prevention: (1) technology for the prevention of floods, (2) increase community awareness for disaster prevention, (3) development of human resources in the field of education, (4) communalization of the government's flood prevention efforts. The results of this study strengthens early researchers thought that it is important to improve community preparedness to flood.

Being prepared for a major disaster is the most effective way to minimize the damage suffered by the affected population. Preparedness is also associated with successful evacuations during a disaster. Moreover, given that people in community interact and exchange information, living in a community with high average level of education is beneficial in improving preparedness levels. The examine how disaster preparedness varies by education at individual, household, and community levels, and how education interacts with other characteristics in shaping preparedness behavior (Muttarak and Pothisiri, 2012; Setyowati, 2012).

Research Methodology

This research is a Research & Development (R & D) research, a model developed by Borg and Gall (1993). This research seeks to produce a component in the system of education (public education). The model is divided into three main stages: preliminary study, product development, and product research. Preliminary study in this research used a qualitative approach, in order to conform the needs and problems. Preliminary study results are used for product development. Furthermore, product development will produced a flood disaster preparedness guidance module.

The research subjects are all citizens in RT 1,2,3,4, and 5 RW I Cabean Village District of West Semarang, Semarang City. Determination of research subjects is using cluster random sampling or random sample groups. This sampling technique selected for the study based on the data that these areas are frequently flooded.

Result

Banjir Kanal Barat Semarang has been built made from permanent material, with high river embankment beyond the road. But the condition of the river flow is very worrying. Many found piles of garbage along the river, such as plastics and food wrappers. At some point, sedimentation found piles of waste material as well as piles of soil erosion process results. Water does not flows easily.

Most of the house building in the Cabean Village was made from permanent material. Some of the community effort to increase the building resilience are raising the foundation and floor.

"The efforts that I do to reduce the risk of flooding by raising the foundation of the house. My house would not be inundated during floods "(Interview with Mrs. Hesti, 2014). "Raising the foundation of the building following the course of the elevation of the road is the most practical way to reduce flood risk in my opinion" (interview with Mr. Davis, 2014). "The foundation of my house tinggikan that my house is not flooded by the time of the flood" (interview with Mrs. Neni, 2014)."

Drainage and sanitary conditions in the study area is very poor. This is because many people who cover trenches and sanitary around the house. This condition is more narrow the space for water so that the water was so stagnant and blocked. Drainage conditions further exacerbated by piles of garbage in it. This further makes the sewers cannot function properly. The flow of household wastewater becomes unable to flow.



Figure 1: The shallowing of the drainage on the Cabean Village

In addition, the silting of the drainage system in the Cabean Village was overlooked by the community. The conditions (Figure 1) is one of the things that caused flooding. some waste and Material are accumulating in the drainage thus blocking the flow of the water.

Community Preparedness to Cope with Flood Disaster

Elements of community preparedness of research are: 1) attitudes and actions, 2) public policy, 3) preparedness planning, 4) infrastructure. State of the community preparedness to cope with floods are not limited to the action of the community during floods, but also encompasses preventive measures and recovery actions. The results showed that the knowledge of community to cope with floods have been very good. The community know exactly what causes the flooding in their area. People also took action on flood prevention through several businesses including raising floor and supporting the development of water bodies in order to restrict the flow of water overflow when it

rains. However, the knowledge of people about the causes of flooding and simply on their own knowledge. Less preventive measures undertaken, occur attitude ignorance. Flooding continues to be a disaster subscription and become frequent in neighborhood residents when it rains. Results of the study confirmed the statement of RW 1 Cabean Village said:

"The efforts that I have done to prevent and reduce the risk of flooding is elevating the building foundation of my house so that when the flood happened my house is not flooded" (interview with Mrs Hesti, 2014). "I did attempt to prevent the risk of flooding is to built the higher floors of the house, and thus when the flood happened to me and the family did not have to evacuate to the evacuation center because the floods happen for a while" (Interview with Mr. Sulistiyono, 2014)."

During the study, it can be seen that people let the trash accumulate along the river. No attempt is made by the residents to clean it up. Even tough based on an interview, people know very well that one of the causes of flooding in their neighborhoods are the piles of garbage in the river. It seems that people are assume that the obligation to clean up the garbage is the job of janitor. So that citizens are indifferent to the garbage piling up in the river. Selfishness and less responsive to the cleanliness of the environment has become an attitude that is considered normal and as if not to be a burden for them. Even the trash left to accumulate in the drainage close and adjacent to their house.

On the other hand, even though people have learned that trash blockage in the flow of the river around the "Karangayu" traditional market is one of the main cause of flooding, but efforts to minimize the risk of flood such as clean the river village have not been implemented. This shows that community preparedness to cope with floods is lower than the element of the attitudes and actions.

The fact carried out by almost the majority of people living in the resesrch area. People do not have responsibility for the waste management (Findayani, 2015; Suharini et al., 2014). According to them garbage piling up is the duty of the janitor of the city. People's awareness towards environmental cleanliness must be turned on. Community paradigm about the waste must be in alignment. Environment including cleanliness garbage hygiene is the responsibility and duty of all the community member, not only the janitor.

Related to the policy, there are no fixed rules are made and enforced in society. Activities such as a cleaning environment is done jointly or not in the agenda of mutual cooperation. Kerja Bakti (Environmental clean communal work activities) conducted towards the commemoration of Indonesia's independence day, because there is competition environmental hygiene.Regulation on the prohibition of taking out the trash already there, but has not been implemented because there is no enforcement. They made arbitrarily in terms of waste disposal. The attitude of discipline and ignorance of most people is a factor causing environmental damage.

Environmental policy must be enforced with strict sanctions (Jonkman and Vrijling, 2009). It is yet to be implemented. Leaving garbage strewn in gutters, rivers, and even deliberately throw garbage into rivers or sewers become commonplace. This may be one reason the public has no concern for the environment. Because, basically, that consciousness can arise because of the fear of punishment.

"There are no scheduled activities so I and other citizens choose to stay at home" (Interview with Mr. Gwee, 2014). "Kelurahannya officers just take it easy so yes I became involved chill in the face of environmental hygiene problems and flooding. Yet all the existing officers "(Results Interview with Ms. Neni, 2014)."

There are no Public Policies has been applied in the community. SOPs and documents used as reference preparedness like early warning document has not been structured in a systematic and coherent. Prevention and preparedness measures so that citizens become unfocused and follow the subjectivity of each individual and do not pay attention and care about the cleanliness of the water from the gutter trash. It supposed to reduce the attitude of indifference to the rules applied in the neighborhood residents, by running such as the system of penalties for any of its citizens who do not care about the cleanliness of their environment.

This happens because of a lack of socialization and also because of the flood is regarded as commonplace. For Preparedness, there is no procedural set in a SOP, it just a habit or adaptation course. The availability of facilities and infrastructure based on observations in the Cabean Village is very few. Flooding often occurs in these areas, but the water pump as the infrastructure of the fastest can be used to reduce the pool water is also not yet available. Likewise, the availability of facilities and other infrastructure. Preparedness of citizens related to the availability of infrastructure is still very minimal. Completeness of facilities and infrastructure in the Village Cabean just gong or a microphone. Other existing facilities and can only be used to provide early warning of flooding. Infrastructure for flood risk prevention measurres are not yet available.

Based on the problems triggered floods as has been mentioned above, both of the indicators of attitude and action, public policy, preparedness planning, as well as facilities and infrastructure, the most important thing is knowledge and action of the people to care about the environment. The flood disaster can be minimized and the frequency can be reduced risk when they wanted to do self-reflection and would be open to criticism and suggestions. One of the way is to change the people perception to flood. Flood is not only disaster that can be occurred because of God, but it can be occurred when the community awareness to keep the environmental clean is low. And it is important to share information and knowledge about flood to the community especially in Cabean Village to make himself more resilience. Thus, the preparation and development of products in the form of modules preparedness is one of the most appropriate measures to realize the goals.

Flood Preparedness Module Development

Flood Preparedness Module was develop based on local needs (Muttarak and Pothisiri, 2012; Findayani, 2015). The initial step in preparing the module was to collect and identify the problems caused flooding. As for the problems that the dominant cause of flooding and can be identified in the study area as follows.

Table 1:
Cause Factors of Flooding in Banjir Kanal Barat

No	Cause Factors	Problems	
		Physic	Social
1	The Lack of public awareness about the cleanliness of the river		√
2	People's habits of littering.		√
3	There is no scheduled Kerja Bakti created by the village administration		√
4	The lack of infrastructures such as water pumps	√	
5	The backlog of waste materials under Karangayum market channel that cause clogged waterways	√	

Source: Result of the research, 2014.

Community's behavior to keep the environmental clean is very poor (Findayani, 2015). Social factors of society is the main obstacle in maintaining the cleanliness of the river. Habits of society in preserving the river is still low. The problems that cause flooding in the study area used as a base data in the development of community preparedness modules to cope with floods that can facilitate the dissemination to the public, applicable and change in people's attitude toward the phenomenon of flooding. Here is shown the community activities on flood preparedness

Table 2:
Community activity to cope with Flood in the Cabean Village

No	Activity	Description on activity
1	Prior-Action	<ul style="list-style-type: none"> ▪ Concern for environmental cleanliness is low. ▪ Unstructured environment clean Activity. ▪ Littering ▪ Availability of trash has not been evenly distributed on each of the houses. ▪ The lack of number of facilities and infrastructure in anticipation of floods. ▪ SOPs for flood prevention is not yet available.
2	Action	<ul style="list-style-type: none"> ▪ Module socialization ▪ Environmental cleanliness: river, drainage system ▪ Waste Management: organic and anorganic waste.
3	Post-Action	<ul style="list-style-type: none"> ▪ Establishment of scheduled Kerja Bakti ▪ The habit of littering citizens to be reduced. ▪ Facilities and infrastructure to cope with flood are provided by each resident in each home. ▪ Availability of trash on each of the houses.

Source: Result of the research, 2014

Flood disaster response learning module is expected to be a solution to the problems of flooding in the Semarang City, especially in the Banjir Kanal Barat. Flood disaster has become a familiar and always in faced by the community in Cabean Village so that responsiveness to flooding in order to prevent flooding should be owned by all community member.

Discussion & Conclusion

The community preparedness to cope with floods are still low. Community's behavior to keep the environmental clean is very poor. It is difficult to change people behavior in case of waste and drainage management. As an effort,

people in the Cabean Village do some building adaptation to cope with flood disaster such as raising the foundation and floor-level. A preparedness Module Proven effective in changing the construction of the citizens thought about flood preparedness manifested in the activities of a clean environment and clean rivers as well as the procurement of waste disposal sites in the Cabean Village.

Community Preparedness module to cope with flooding can be disseminated to the public through Karang Taruna activists, in order to increase public awareness. Flood disaster preparedness modules can be used as a medium of education for the community. These Community Preparedness Module to cope with flood disaster can be applied to other communities.

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