Flood Risk Management and Community Empowerment

Challenges on the Local Waste Management in the Philippines

Abstract:

This paper aims to investigate the possible flood risk management by focusing on the waste management. Floods are natural and inevitable. However, some floods are extreme and others are not extreme. We aim to minimize their risk to the people, industry and infrastructure.

There are so many measurements to reduce the flood risk such as contraction of dikes and protection of river banks, however, we focus on the community reactions since it is the most effective way to reduce the risks. We have developed the awareness programs for communities in flood prone areas, in collaboration with local governments.

The impact of the flood are heavily depend upon the floating dangerous matters such as woods and solid wastes. And the quality of flood water is another main cause of damages. Historically, flood was a part of their life and it was not so dangerous since the water was gone within a few days. And flood water quality was not so harmful, then people were just able to wait until it was gone.

However, we found that the rapid urbanization around Lake Laguna brought rapid change of land use. The mass consumption life style changed the contents of waste of the community.

Appraisal of the whole situation with reference to the present progress of the waste management and community empowerment is attempted so that a better cost-effective strategies for waste management be evolved in future.

JEL Classification: R58

Key Words：Economic resilience, Floods, Waste Management, Community empowerment, Web based monitoring system,

1. Introduction

1.1 Back ground and Research questions

This paper aims to investigate the possible flood risk management by focusing on the waste management. Floods are natural and inevitable, and large cities like Metro Manila can't be protected from all flooding. However, some floods are extreme and others are not extreme. We aim to minimize their risk to people, property, industry and infrastructure by empowering community capacity. There are so many measurements to reduce the flood risk such as construction of dikes, protection of river banks and rehabilitation of river system, however, we focus on the community awareness since it is the most effective way to reduce the food risks to the community itself. We are developing the supporting education system and awareness programs for communities in flood prone areas, in collaboration with local government units (LGUs), Laguna Lake Development Authority (LLDA) and University of the Philippines Los Baños (UPLB). The flood prone area lacks flood prevention infrastructure. Furthermore, residents are economically vulnerable to flood as they have limited options for relocation, improvement of their housing, or insurance methods. Although the community had an evacuation plan in the event of typhoon, the absence of reliable property security systems prevented the community from mobilizing quickly enough to avoid injuries and loss of valuable assets. Prior to the intervention, residents would rely on the word-of-mouth to determine if river levels were high enough to warrant evacuation. And the community people receive frequent warnings from the government authority and they were insensible to the warnings.

1.2 Progress and Research questions

The impact of the flood are heavily depend upon the floating dangerous matter such as woods and solid wastes. And the quality of flood water is another course of damages of the floods. The flood waste risks we observed in the Philippines are related to the risk of Tsunami in terms of secondary risks caused by floating matters. "Metro Manila's dump sites are dangerous, exposed, and generate potentially toxic liquids called "leachate." As these toxins flow along the surface and seep into the earth, they risk poisoning the surface and groundwater that are used for drinking, aquatic life, and the environment." (ADB 2004) And now, the urbanization are all around the Lake Laguna. We identified the following facts via a series of discussions;

i) Flood is a part of their life.
ii) Before the industrialization, flood water was clean and it was not so dangerous.
iii) Flood brings solid wastes, foul-smelling and the diseases.
iv) The water color of the flood was changed in case of typhoon.
v) In case of evacuation, people cannot leave their house because of their property.

In the Philippines, some of river basins where flood control works have been implemented is increasing year by year. However, they had serious damages caused by flood disasters every

year, especially in rapidly developing areas.

II. Strong needs of Flood Mitigation and the Community Empowerment

2.1 Organizations and Responsibility

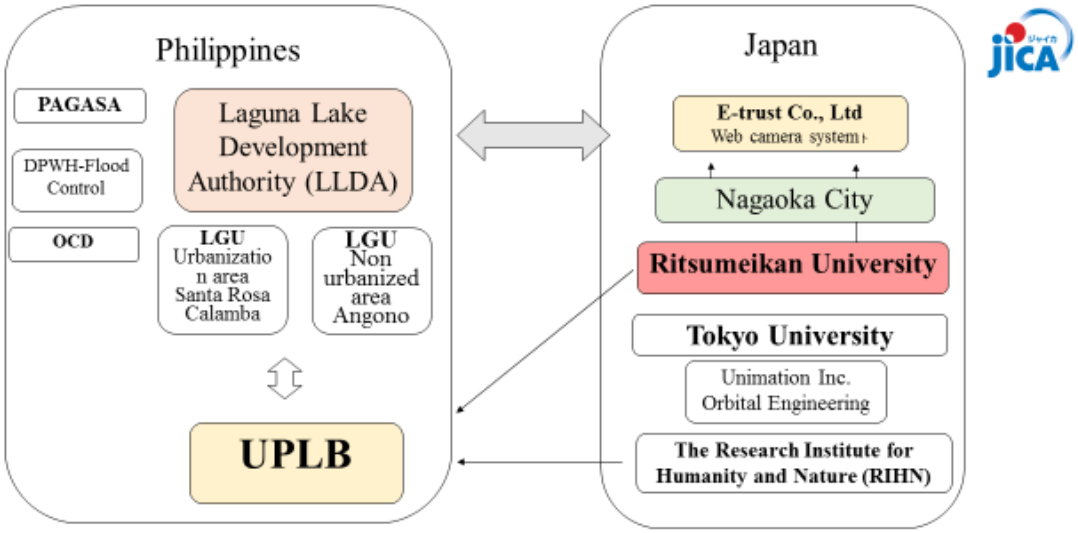
The National Risk Reduction and Management Council (NDRRMC) was mandated by virtue of the Republic Act 10121 (The Philippine Disaster Act of 2010), which enacted the creation of localized Risk Reduction and Management Offices (RRMO) to design risk reduction plans and management strategies. And finally Local Government Unit (LGU) became the final responsible organization. But it has very limited experiences and in confusion.

2.2 What is FACE project?

To share Japanese experiences to the Philippines, a Japanese specialist team launched so called, Flood Awareness and Community Empowerment (FACE) project from October 2013 to September 2016. Up to the end of August 2015, we installed four web-based monitoring camera devices in Angono, SantaRosa and Calamba city. In the initial stage, it was used for early warning system. However, it identified strong needs of community empowerment.

2.3 Organization of the project

The team members come from E-trust Co., Ltd , Ritsumeikan University, Tokyo University, Uni-mation Co., Ltd., Orbital Engineering Co., Ltd. And we have also advisers from the Nagaoka City government, and we are closely working with our partners in the Philippines. (See Figure-1)



JICA Partnership Program

2.4 Advantages and Uniqueness of FACE project

Our system is easy to install and easy to understand the present situation of the river system by introducing simple web camera and water revel detector. It has solar panel system, free from electrical cable and radio communication system. (See Photo-1,2.)

The objective of the project in the initial stage was to mitigate flood damage in the selected core areas in Lake Laguna basin in the Philippines by implementing simple web camera warning system and human development program against flood, thereby contributing to the sustainable and stable economic development in the target areas.

After the survey and the collected information from the web camera in the target cities, we have convinced that the waste management can play an important role in disaster prevention, mitigation and preparedness. This study will contribute to the awareness and knowledge of regional risk management in dealing with their concerns on safety industrial operation. Our studies identified risky floating matters including woods, furniture, dust bins and housing materials.

2.5 Methodology

We conducted our study by looking at available secondary data, and have ensured the credibility of our study by evaluating various sources regarding the information required in order to answer our research questions. And we have identified many flood related ODA projects in the Philippines including World Bank, ADB and JICA. Those targets were mainly infrastructure including dike and drainage system. We reviewed those challenges and findings. As we have installed web based camera along the river system in Angono, SantaRosa and Calamba, we have conducted several interview survey in those target area.

III. Literature review

In this study, we will focus on the very limited scope on the flood problem. The scope of the flood control Master Plan (M/P) usually explains the flood control policy, strategy, target flood magnitude and main works, etc. by the river system. It is not easy to prepare master plan for small projects such as the community based flood mitigation project. Master Plan for flood control shall include Project area, Strategy of flood control, Basin-wide rainfall-runoff model, Diagram of design discharge, Main works, Typical cross section of the river, Typical structure design (i.e., embankment/revetment, etc.), and Location map of main works. [KK] In this study, we conducted our surveys with focusing on the community based and waste management since the risk of the flood, especially man-made risks can be mitigated by the community empowerment.

3.1 Impact of solid wastes

In this chapter, we will examine the lessons learned from the waste management and flood.

"A material becomes waste when it is discarded without expecting to be compensated for its inherent value. These wastes may pose a potential hazard to the human health or the environment (soil, air, water) when improperly treated, stored, transported or disposed off or managed." (Virendra Misra, and S.D. Pandey 2004)

Solid waste originates from a variety of sources, with material types that include electronics, plastics, metals, glass, human fecal matter, and hazardous materials that may be toxic, corrosive, radioactive, flammable, or infectious. Solid waste disposal systems are often logistically complicated and costly, including an operational chain of collection, transfer, and disposal. Capital costs of technologically advanced treatment, such as anaerobic digestion or incineration, can be prohibitively high. (Tchobanoglous and Kreith 2002).

And the economic impacts of the flood were widely recognized nowadays including bad waste management and contaminated water. According to the World Bank, in the Philippines, "Overall, the study estimates that poor sanitation leads to economic costs in the order of US$1.4 billion or PhP 77.8 billion per year. This is equivalent to about 1.5% of GDP in 2005 and translates into per capita losses of US$16.8 or PhP 923.7 per year. [5]

3.2 Waste management and the role of the community

The Research Institute for Humanity and Nature (RIHN) has several research projects in the Philippines. Under the project called, "Managing Environmental Risks to Food and Health Security in Asian Watersheds", RIHN has identified close relationship between flood and waste management. One of the major findings was the upstream open garbage disposal problem. It could be sources of pollutants, indicating the close linkage of environmental degradation and food-health security. And, a community-based social action research program, called the "Yaman ng Lawa" Program (Blessings of the Lake, in Tagalog), was established in 2012 in order to assess how stakeholder participation improves fishery and water resource management, waste control, and public health. This project indicated the importance of both community involvement and flood risk management. Community involvement and information transparency is crucial for the continuation of the project. Continuous dialogue with the affected communities is expected to occur directly and indirectly while the project is implemented.

3.3 Household Hazardous Waste

Household hazardous wastes (HHW) originate from households. HHW is categorically excluded from the present regulation. In the Philippines, there are no specific regulations for HHW. These wastes are typically concerned about the proper purchase, use, handling, and disposal of products that contain hazardous constituents.

According to "The Waste Management Handbook" [1], we can summarize the main hazardous household waste sources and types as follows:

(i) Repair and Remodeling wastes, (ii) Cleaning Agent wastes, (iii) Pesticide wastes, (v)

Automotive maintenance wastes, (v) Hobby and recreation wastes, (vi) Other household wastes including: ammunition, asbestos, fireworks, and any other household wastes identified as moderate-risk waste.

The hand book is for advanced countries such as USA and UK. For the Philippines, we have identified the potential risks of (i) Repair and Remodeling wastes, and (iv) Automotive waste. The former is because of rapid construction works and the latter is from the old automotive. And we have also identified potential debris in case of the flood. A pile of construction materials, commodities and garbage dump can be the most dangerous debris. And those risks can be controlled by community's capacity building.

3.4 Daily influence on the firm operations

Many of the firms in flood-prone areas of Metro Manila and the surrounding area experienced a temporary halt of operations, especially during intensive rain. The three main reasons were shortage of electricity/power outage, insufficient numbers of people reporting to work. And the most important reason for employees' absence from work was the unavailability of transport to the factory, related to flood.

IV. Conclusions and further studies

4.Conclusions

In case of flood, the good management of the waste is able to reduce economic damages and loss of property and even life. But it is not perfect still needs some improvement to activate people's awareness to the waste. All the donors are trying to introduce new sophisticated technologies to improve flood mitigation system, especially early warning system. However, it takes much costs and is unable to reduce consecutive risks such as environmental and sanitary problems. Using good waste management systems to trigger community actions is the one of the practical key to flood disaster management. Nowadays, the speed of the floods are increasing because of the rapid urbanization. No matter how advanced technology becomes, the guiding principle is that people should take the initiative to understand the potential risks of the flood on their own. Disaster risk communication must be practiced regularly, so that people are able to better understand the possible potential risks.

Selected References

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