Available online at www.sciencedirect.com

ScienceDirect

Procedia - Social and Behavioral Sciences 227 (2016) 424 – 429

Procedia
Social and Behavioral Sciences

CITIES 2015 International Conference, Intelligent Planning Towards Smart Cities, CITIES 2015, 3-4 November 2015, Surabaya, Indonesia

A Comparative Study of Climate Change Mitigation and Adaptation on Flood Management Between Ayutthaya City (Thailand) and Samarinda City (Indonesia)

Achmad Ghozali[a]*, Ariyaningsih[a], Riyan Benny Sukmara[b], Belinda Ulfa Aulia[c]

[a]*Urban and Regional Planning Department,* [b]*Civil Engineering Department, Kalimantan Institute of Technology, Balikpapan, Indonesia*
[c]*Urban and Regional Planning Department, Sepuluh Nopember Institute of Technology, Surabaya, Indonesia*

Abstract

Increased population and urban growth have made converting open spaces that can cause flooding. Thailand and Indonesia are two of the most prone areas to various types of disaster but especially to floods. However, the climate change is the significance factor impact to floods risk. The climate change makes direct and indirect effects to floods. In addition, adaptation and mitigation to climate change are an important aspect to reduce and prevent the impact of floods. This paper tries to explore flood management in Ayutthaya, Thailand and Samarinda, Indonesia. Primary and secondary data are used in this paper. This objective of this paper is done by using qualitative analysis. This paper shows that the flood risk on both cities has same characteristics and indicates that the role of government of Ayutthaya also stronger than Samarinda. The comparison shows that flood management especially on adaptation is main challenges for Indonesia government that will require further plan to establish how manage water, and increase adaptive capacity for reduce the flood damage. This paper provides us to understand the important of climate change adaptation in real cases. As flood hazard, we learn about the impact of big flood causing to damage loss in many sectors, and we also learn to assess the risk by assess vulnerability and adaptive capacity.

Peer-review under responsibility of the organizing committee of CITIES 2015

Keywords: adaptation to flood risk, climate change adaptation, flood management, flood risk.

* Corresponding author. Tel.: +62-0542-8530801; fax: +62-0542-8530800.
E-mail address: ghozali@itk.ac.id

Peer-review under responsibility of the organizing committee of CITIES 2015
doi:10.1016/j.sbspro.2016.06.096

1. Introduction

According to ESCAP (2015), the economic impact and loss of life from floods has been greatest in the Asia-Paci fic region during the last 30 years, especially in 2010 – 2011. In 2010, 178 million people were affected by floods and the total losses from floods since 1998 to 2010 were more than $40 billion. As a result, the cost of floods damag e trend to increase very years. The climate change is the significance factor impact to floods risk. The clim-ate chan ge makes direct and indirect effects to floods. Observed and projected patterns of climate change can have an amplif ying effect on existing flood risk, for example by (Jha, et all, 2012) : (a) the raising of sea level cause to increase flo od damage in coastal areas, and (b) the change of rainfall patterns effect to the level of flood from the river trend to i ncrease.Adaptation to climate change is an essential complement to reduction and prevention the impact of floods. T he adaptation measures available for the management of one common risk: that of flooding. These options include th e more traditional highly engineered, or structural, measures that reduce the probability of a flood, but also non-stru ctural measures, which reduce vulnerability. Nonetheless, the good management and adaptation on flooding depends on the context of location, areas, and the characteristic of floods, different contexts also have the different ways to management.

2. Methods

Objective of this study is to compare the climate change adaptation on flood management between Indonesia and Thailand. To achieve the objective, qualitative analysis has been used. For this paper, two cases were chosen: Ayutt haya city, Thailand and Samarinda City, Indonesia. This paper will be reviewed flooding and compared the context ofclimate change adaptation, co-benefit from adaptation, and evaluation between Ayutthaya city, Thailand and Sama rinda (Indonesia).

Primary and secondary data are used in this paper. The primary data is the data from field visit in Ayutthaya Mu nicipality on November 13, 2013. This data includes flood hazard, flood management, and environmental managem ent in Ayutthaya city and Samarinda City. The Master Plan for Water Resource Management (Thailand), Local Gov ernment Medium-term Development Plan and City Spatial Plan of Samarinda is the secondary data used.

3. Result and Discussions

Ayutthaya was listed in the World Heritage historical site by UNESCO in which located in lower basin of the C hao Phraya River (Sukhsri, 2011). The characteristics of these rivers are generally gently sloped river with gradientst hat flow down from Northern mountain system. From its geographic characteristics affected many flood experiences in the past, especially a massive flood in 2011 hit the Chao Phraya River from August to December due to high seas onal rainfall, which was 143% of the average rainy season during 1982-2002. The Ayutthaya province had experien ced many floods in the past, and floods maybe occur again in the future. The important issue is people who are in flo od risk area; they cannot avoid with flood disaster. Located at the end of the line of the irrigation systems, during 19 70s and 1980s, Ayutthaya suffered water shortage during deficient years and flooding in the years of excess rainfall.

In 2011, flood is coming to Ayutthaya City from October to November and the level of flood was 3 meters. Bef ore the flood coming from the north, the local government of Ayutthaya City prepared the plan to protect the city by built the earthen dyke around the city, its height was 3 meters. However, they prepared themselves before flood com ing, it still come into the city. After flood coming, total damage cost was 400 – 500 million baht (only the loss of in frastructures), 6,000 households were affected, and 2 people were dead (DENFP, 2012).

In another case, Samarinda city, the capital city of East Borneo, located in downstream of Mahakam River has a complex urban disaster history. It is recorded that six natural disasters happen in Samarinda. In addition, flooding a nd forest fires are the highest frequency of disaster (Rofiq, 2014). Biophysics characteristic is vulnerable from erosio n, sedimentation, and floods. These vulnerabilities are supported by types of soil are relatively sensitive to erosion, d omination undulating to hilly, high rainfall and river network dominance pattern (drainage network).

Floods in Samarinda is happen annually. Length, height and spacious flood that have varied, based on informati on obtained by Sodik (2015), the duration of the flooding that occurred ranged between 3 –10 hours with the water l evel between 0,3–1,5 m, while the area of inundation The contained Lempake area, with an area of inundation to ± 2 00 ha.