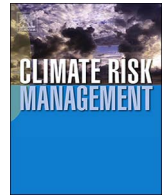




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Impacts of repetitive floods and satisfaction with flood relief efforts: A case study of the flood-prone districts in Thailand's Ayutthaya province

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ABSTRACT

This research investigates the impacts of the repetitive flooding on the inhabitants of the four flood-prone districts in Thailand's central province of Ayutthaya: *Pranakorn Si Ayutthaya*, *Sena*, *Bang Ban*, and *Pak Hai*. In addition, the residents' satisfaction levels with the flood relief efforts and operations of the local authorities were examined and analyzed. The research revealed that most local residents have adapted to co-exist with the repetitive floods, an example of which is the elevation of the houses a few meters above the ground where the living quarter is on the upper level. The findings also indicated that the repetitive flooding incurred substantial post-flood repair costs, in light of the low income-earning capabilities of the locals. However, the flood-recovery financial aids was incommensurate with the actual expenditures, contributing to the lowest average satisfaction score among the inhabitants with regard to the adequacy of the post-flood repair and restoration financial aid. Furthermore, the research identified the differences between districts on the satisfaction with the flood relief efforts. The disparity could be attributed to the extent of coordination and participation of the local residents and their local leaders in the flood-related measures.

1. Introduction

Ayutthaya province is situated in Thailand's low-lying central plains region and thus is inundated every rainy season (i.e. repetitive flooding). The severity and duration of flooding varies between districts, depending on the proximity to the main natural waterways. In addition, a rising trend of water availability during wet seasons contributes to the elevated frequency and intensity of floods (Shrestha, 2014). As an ancient capital of Thailand, the province of Ayutthaya has been listed by UNESCO as a cultural heritage city and widely promoted for tourism (Thanvisitthpon, 2016). Throughout the province, especially in the ancient city area, scatter the remains of ancient architectural structures which are largely protected against natural disasters (Makhoul, Navarro, Lee, & Abi-Youness, 2016).

As the province becomes more industrialized, the livelihoods of its people have changed from agriculture to employment in the industry sector (Thanvisitthpon, 2015). The industrialization of Ayutthaya also brought with it the urbanization of the flood plains and the land reclamation of the natural waterways that once served as the floodwater storage. However, the province's current flood-prevention measure is erecting the sandbag walls around the ancient city (i.e. the tourist magnet) and certain industrial estates, while allowing other less significant archaeological structures and agricultural lands to be flooded.

Specifically, this empirical research investigates the impacts of the repetitive flooding, particularly the financial impact

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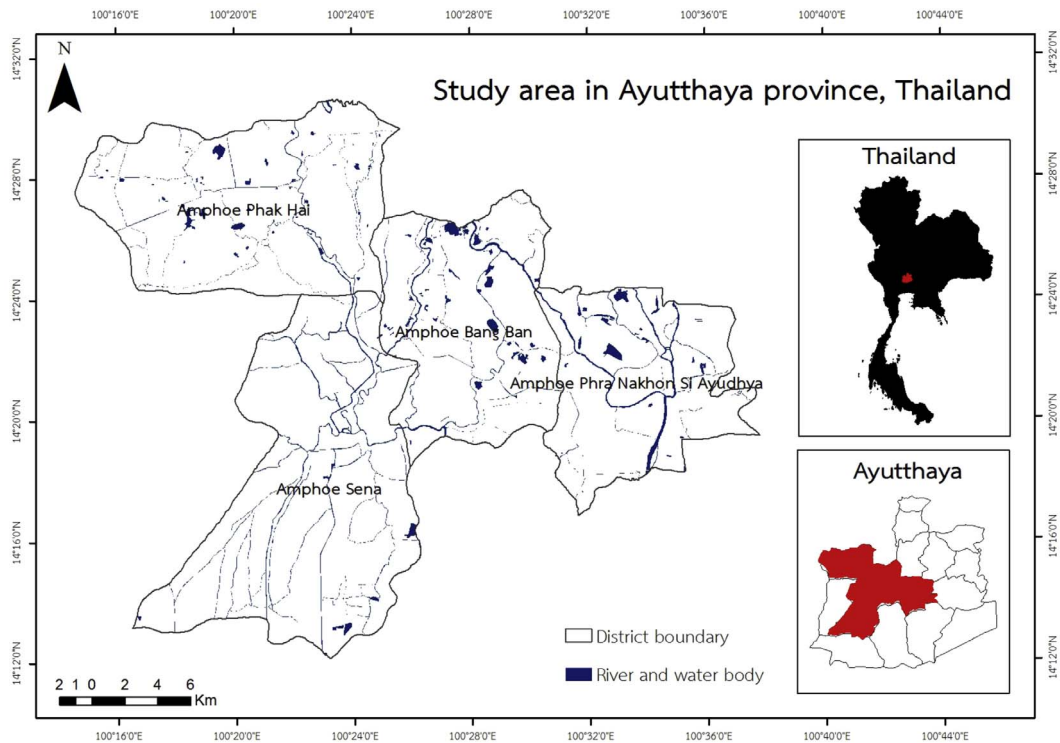


Fig. 1. The maps of Thailand, Ayutthaya province and the four districts under study.

attributable to the post-flood repair and restoration, on the residents of the four flood-prone districts in Ayutthaya province: *Pranakorn Si Ayutthaya*, *Sena*, *Bang Ban*, and *Pak Hai* districts. In addition, the local inhabitants' satisfaction levels with the local authorities' flood relief efforts and operations were determined using the weighted average index (WAI). The data were analyzed and the findings tabulated. Moreover, the recommendations to address the flood-related issues in the area were put forth.

2. Research methodology

2.1. Study area

The study area covered the four flood-prone districts of Thailand's Ayutthaya province: *Pranakorn Si Ayutthaya*, *Sena*, *Bang Ban*, and *Pak Hai*. The province of Ayutthaya is in the Central Plains of the country, 80 km north of the capital Bangkok. Ayutthaya province covers 2556 square kilometers and is situated on the flat river plain of the Chao Phraya river valley, rendering it an important rice growing area.

The province is divided into 16 districts, 209 sub-districts and 1328 villages. Since Ayutthaya was the ancient capital of the Kingdom of Siam (the former name of Thailand), the ruins of the ancient city now form the Ayutthaya Historical Park, an archaeological site that contains palaces, Buddhist temples, monasteries, and statues. Fig. 1 illustrates the maps of Thailand, Ayutthaya province and the four districts under study.

2.2. Research population and sample

According to the Ayutthaya Provincial Office (2016), the number of households in the districts of *Pranakorn Si Ayutthaya*, *Sena*, *Bang Ban*, and *Pak Hai* were 49,610; 21,693; 11,671; and 13,733, respectively. Following Yamane (1967), given $n = 1 + N(e)^2$, where n is the sample size, N is the population size (i.e. 96,653) and e is the sampling error (0.09), the total sample size was 490 households. For ease of comparison, the total sample size was rounded up to 500 households and then 125 households from each of the four districts were randomly sampled as the questionnaire respondents (Table 1). In the sampling process, the sampled households were at least 100 m apart to minimize the so-called *herd mentality* effect, where individuals' certain behaviors are influenced by their peers (i.e. neighbors), and to increase diversity of the samples in terms of the impacts of the flooding events.

2.3. Data collection and analysis

In the data collection, a questionnaire was used to gather the primary data from the participating households (i.e. 500). The data

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