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Challenges in integrating disaster risk reduction into the built environment – The Vietnam context

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Abstract

For decades, Vietnam has been recognized as one of the countries most vulnerable to the impact of climate change and its associated phenomena, including natural disasters and extreme weather events (NDEWEs). The increasing pattern of NDEWEs witnessed over recent times underlines the importance of disaster risk management and disaster risk reduction (DRR) in Vietnam. The Vietnamese built environment, which plays a crucial part in the national economy and facilitates the functions of the entire society, is one that is directly exposed and susceptible to disasters. Nonetheless, the achievements of the Vietnamese built environment in integrating DRR has, due to various problems, remained somewhat limited and research on NDEWEs specific to the country's built environment is currently nebulous and sporadic. This paper presents an investigation into the progress and shortcomings in integrating DRR into the construction and maintenance of the built environment in Vietnam. The investigation is based on a comprehensive review of legislative documents and related literature which was conducted as part of a wider research which aims to establish a framework that employs various instruments and strategies to integrate DRR more effectively into the built environment in Vietnam. The challenges identified by the study include lack of capacity and coordination at the national level; gaps in legal frameworks and lack of guidance for implementation; complex institutional arrangements; incompatibility of building codes and lack of enforcement; lack of qualified human resources; and inadequate understanding among the general public. These findings are of special importance to further research into developing a complete collection of measures to overcome the existing challenges in the application of DRR in the built environment and urban infrastructure.

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1. Introduction

Climate change is one of the major challenges faced by countries worldwide. Recent years have witnessed a noticeable increase in both frequency and intensity of climate change phenomena. Due to specific geographical features that involve a narrow coastal strip territory located in tropical monsoon area, a coastline of 3,440 km and two vast low-lying deltas, Vietnam is prone to a wide range of natural hazards and has been identified as a hotspot for future climate impacts and vulnerability to natural disasters and extreme weather events (NDEWEs) [1, 2]. The most prevalent in Vietnam are storms and floods, which account for 49% and 37% of all events respectively. The impacts of NDEWEs upon different sectors of the economy are so detrimental that the annual loss is recorded as 1-1.5% of GDP [3]. Thus, disaster risk management and disaster risk reduction (DRR) have become a priority issue for Vietnam. The built environment facilitates the functions of society [4] and is directly exposed and most susceptible to natural hazards [5, 6]. Annual average figures for 2005-2015 show a total of 649 NDEWEs resulting in 469,256 destroyed and 174,653 damaged houses [7]. In the 2 months of 2016 saw 317,000 residential properties collapsed in 5 devastating floods, with a total loss of US\$ 1.7 billion [8]. Most civil infrastructure in Vietnam has been conventionally designed and constructed in a way that is inadequate to withstand NDEWEs. Water drainage systems in two major cities of Vietnam - Hanoi and Ho Chi Minh are almost paralyzed during heavy rains, which normally result in serious flooding [9], and the Vietnamese transport system suffers up to US\$ 100 million loss per annum due to floods and landslides [10]. The impact of NDEWEs can be reduced, and a more resilience created, by wholesale adoption of DRR [11, 12]. This includes a combination of systematic development and application of strategies, policies and practices to prevent or mitigate the adverse effects of natural hazards [13]. Over the last ten years, Vietnam has achieved a noticeable progress in integrating DRR into national and provincial socio-economic development planning framework. However, the Vietnamese built environment's achievements have remained limited. This study investigates the integration of DRR into the construction and development of the built environment in Vietnam. The study is of special importance to all public and private sector stakeholders in recognizing and implementing DRR in their practices that contribute to the construction and maintenance of the built environment in Vietnam.

Following a brief exploration of the history and adoption of DRR (including the legal documentation and organizational structure in support of disaster management), an extensive literature review was made of Vietnamese legal documents, academic databases, professional reports, and conference proceedings using keywords (in English and Vietnamese) such as: built environment, construction industry, disaster, resilience, disaster management, disaster risk management, disaster risk reduction, mitigation, prevention, response, and recovery. With an intention to obtain the most precise reflection to the current status of DRR, the majority of selected literature material has the age not exceeding ten years. Noticeably, this includes the most recent building regulations and land use planning laws, which are conventionally used as tools to improve the resilience of the built environment to NDEWEs. The challenges in adopting DRR, its efficacy and residual problems are discussed. Finally, a direction for future work is proposed.

2. Disaster risk reduction in national disaster management

2.1. Legislation in support of disaster risk reduction: Lack of focus on the built environment

The built environment in Vietnam has a history of accommodating various means of preparing for and actively responding to NDEWEs. This is confirmed by the existence of extensive sea walls and dikes across many regions, reflecting people's awareness on the country's fragility to riverine and coastal floods, typhoons and other tropical storms [14, 15]. Laws and regulations pertaining to DRR in Vietnam have been delivered via numerous instruments which receive updates on regular basis. Before May 2014, there was no stand-alone law on NDEWEs in Vietnam. The majority of laws and regulations dealt with only floods and storms, while other hazards were addressed separately. The legal framework regarding to floods and storms was initiated in 1946 following the establishment of the Central Dyke Protection Committee - the forerunner of the present Central Committee for Flood and Storm Control (CCFSC) [16]. The framework consisted of the Ordinance on Prevention and Control of Floods and Storms of 1993 [17], the decree of 1996 for its implementation [18], the 1996 Decision on the Establishment of the CCFSC [19], and the Amendments to the Ordinance in 2000. Despite the inclusion of DRR, the framework had shown greater focus on defining functions and responsibilities of different agencies for disaster response. In fact, the disaster prevention and

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