

# Flood vulnerability assessment in the light of rice cultivation characteristics in Mekong River flood plain in Cambodia

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**Abstract** More than 2 million hectares of the lower Mekong River flood plain (Cambodian Plain), which extends from southern Cambodia to the border with Vietnam, is cultivated with rice; and more than 60 % of the population in the flood plain are farmers involved in rice cultivation. Rice production in this area is seriously affected by floods almost every year; on the other hand, the farmers need floodwater for their crop fields. Therefore, the farming in this area is about coping with floods, and flood countermeasures should be carefully planned based on good understanding of the livelihood of the farmers. Thus, this study aimed to identify flood-vulnerable rice-growing communities in the Mekong River flood plain in Cambodia. In this research, we proposed a useful methodology to make flood inundation maps by conducting a simple analysis by combining satellite-based digital elevation model (DEM) and river water level data based on the flood characteristics in this area. Then, rice-crop vulnerability maps were derived from previous maps and results from other past researches using the geographical information system (GIS). Comparison among those maps was also conducted to find out the relationship between DEM and people's lifestyles in this area. This simple, inexpensive methodology was proven useful to understand major crop

damage and vulnerability in relation to floods in this area, based on flood characteristics in the Cambodian flood plain. Because the method is a GIS-based approach, it can deliver more accurate results when provided with more accurate data.

**Keywords** Inundation map · Crop damage · GIS · Hydro-metrological data · Rice cropping

## Introduction

Studies on vulnerabilities related to natural hazards have been conducted by many researchers (Wisener et al. 2004; Clark et al. 1998; Stephen and Dowing 2001). Recently several studies have been conducted in terms of flood vulnerability indices (Taspell 2011; Kienberger 2011). The identification of flood vulnerability has been a major concern of the Mekong River Commission (MRC). The currently ongoing project of the Flood Management and Mitigation Program (FMMP) of MRC started in January 2005 with the following five key components: (1) establishment of a regional flood center; (2) structural measures and flood proofing; (3) mediation of transboundary flood issues; (4) flood emergency management strengthening; and (5) land management. Although components 2 and 5 address issues related to flood vulnerability, these studies did not identify specific localities where flood vulnerability is high. They have mainly analyzed relative damage curves and other characteristics such as flooding probability, maximum depth, dates of completion of draining, and flood chronologies and duration (MRC 2010; Plinston 2007). Therefore, this study aimed to elucidate a method for identifying flood-vulnerable rice-growing communities in the Mekong River flood plain in Cambodia through ground

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