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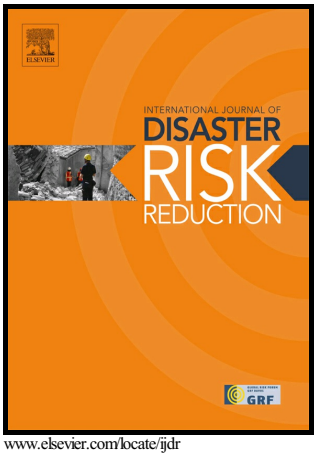

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Towards understanding vulnerability: investigating disruptions in cropping schedules in irrigated rice fields in West Java

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Abstract

Unsafe conditions may increase the vulnerability of farmers natural hazards and reduce the capacity of farmers to prevent or recover from disaster impacts. This study aimed to investigate disruptions in cropping schedules to understand unsafe conditions that contribute to vulnerability in irrigated fields served by Ir. Djuanda (Jatiluhur) reservoir in West Java. Firstly, the deviation of ongoing cropping schedules from the official cropping calendar was evaluated using the time-series Enhanced Vegetation Index (EVI) derived from MODerate-resolution Imaging Spectroradiometer (MODIS) imageries. Secondly, reasons for disruptions in cropping schedules were explored using an in-depth interview with farmers, extension officers, and water managers and analyzed using a qualitative content analysis. Thirdly, the progression from potential causes to consequences of the disruption was identified using a Bow-Tie analysis. Unsafe conditions were identified using the result of the Bow-Tie analysis. Finally, several ways to reduce vulnerability were suggested. This study has successfully showed that cropping schedules deviate from the official cropping calendar in the study area. Reasons for disruptions in cropping schedules include economic motives, weather variabilities, geographic locations, coping strategies, farmers' interactions, and agricultural infrastructures. The Bow-Tie analysis has visualized the progression from potential causes, disruptions in cropping schedules, to potential disaster impacts. Unsafe conditions have been identified, categorized into the dangerous locations, unsustainable farming activities, unsuitable coping strategies, fragile infrastructures, and inaccurate perceptions, have been pinpointed. Addressing unsafe conditions is likely to able to reduce vulnerability in irrigated rice fields.

Keywords: unsafe conditions; MODIS; cropping schedules; cropping pattern; irrigated rice fields; West Java

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1. Introduction

The vulnerability of farmers to natural hazards (hereafter referred to as vulnerability) may partly be explained by unsafe conditions (Wisner et al., 2003), such as unsustainable farming practices (Best 1988) or low cooperation among agricultural stakeholders (Bahta et al., 2016). Vulnerability refers to the characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard (UNISDR 2009). According to the Pressure and Release (PAR) model (Figure 1), the origin of unsafe conditions may be traced back to the dynamic pressures and root causes of vulnerability (Wisner et al. 2003). Unsafe conditions are the specific forms in which the vulnerability of people is expressed in space and time in conjunction with natural hazards (Wisner et al. 2003). Unsafe conditions may reduce the capacity of farmers to prevent, mitigate, or recover from natural hazard impacts (Adger 2006). However, identifying unsafe conditions is not

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