Flood Hazard: A QGIS Plugin for Assessing Flood Consequences

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ABSTRACT

Flash floods cause substantial harm to the social and economic aspects of the affected countries. This is a significant problem in urban areas where drainage systems are inadequate and unable to withstand severe flooding. Understanding the specific regions that are susceptible to flooding is essential to implement strategies aimed at mitigating the risk. Detecting floods in ungauged basins is challenging. The current work aims to establish a practical method for identifying and mapping floodplain areas. We can use several tools, including the FLO-2D integration tool, Flood Risk tool, Geomorphic Flood Area plugin, and Quantum Geographical Information System (QGIS) with Hydrologic Engineering Centre River Analysis System (HEC-RAS) to efficiently and cost-effectively detect flood hazard zones. The QGIS tool, the Geomorphic Flood Index (GFI), is the most valuable tool for identifying flood-prone areas in cases where the areas are extensive and lack sufficient data. This tool offers high data analysis and cost calculation precision while using few resources.

1. INTRODUCTION

Floods are intricate phenomena, with variations in frequency and nature of occurrence. A flood is the result of a significant increase in the volume of water in rivers and streams, causing the water to exceed the boundaries of their natural and man-made banks (Rostvedt et al. 1972). India experiences significant flooding from monsoons, which are a widespread hazard around the world (Domeneghetti et al. 2015). Floods can originate from a variety of sources, typically caused by multiple influential elements in the valley and offshore regions. The impact they have on the ecosystem is determined by the size and frequency of the floods. The United Nations (UN) defines a flood as a significant disruption that causes economic, societal, material, and

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