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FLOOD DISASTER PREVENTIVE MEASURES USING GIS AND MULTICRITERIA TECHNIQUE IN THE WATER SHEDS AREA OF AMBASAMUTHIRAM TOWN

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Abstract

In this fast technically developing world it is being difficult to avoid disasters from occurring despite the scientific reasoning and technical supports. Recent events have showed the selfish and irresponsible human activities for longlasting floods in India Ambasamuthiram Town, Tirunelveli District, Tamilnadu, India. Terrain characteristics of the land and meteorological and topographical properties of the region are the major natural factors for flood. Sometimes the flood may not necessarily be caused by the above factors. The recent flood in Ambasamuthiram was totally unexpected and not triggered by the above all factors. Sometimes floods occur due to small size watershed which results to over flow of water inland. Temporarily used backwater effects in sewer lines and use of local drainage channels and creation of unsanitary conditions may cause flooding. Ambasamuthiram flood was basically claimed to occur due to improper drainage system and its usage and underlying geological strata which was found to be landfill over the ponds and lakes. Therefore, Ambasamuthiram town, being affected by flood and hence analysis flood was chosen for studying the flood disaster. For the analysis of potentially affected areas Geographical Information System (GIS) integrated with Multicriteria Decision Analysis (MCDA) were employed to resolve the problem. Ranking and displaying the potentially risky areas the spatial Multicriteria analysis was used. The analytical hierarchy process method was used to compute the priority weighs of each criterion. Using Analytical hierarchy processes (AHP), the percentage derived from the factors were the Rainfall 70%, drainage network 30%, and slope of the river basin 20% and soil type 15%. At the end of the study, a map of flood risk areas was generated and its conditions were studied with a view to assist for decision makers on the major consequences posed by the disaster. The description of topographic features and drainage characteristics of both watersheds was being carried out by the morphometric analysis. These watersheds are part of Western Ghats, which is an ecologically major sensitive region. The drainage areas of Papanasam and Manimuthar watersheds are 164 km2 and 210 km2 respectively. The drainage areas of Papanasam and Manimuthar have shown the patterns of dendritic to sub-dendritic drainage system. The Papanasam and Manimuthar watersheds have the slope varied from 0° to 59° and 0° to 55° respectively. Moreover, the slope variation of the watersheds were chiefly limited by the local geology and surrounded erosion cycles. Each watershed was classified as a fifth-order drainage basin. The stream order of the basin was predominantly controlled by both the physiographic and structural mature geomorphic stage. The development of stream segments is affected by the heavy rainfall and local lithology of the watershed conditions in Papanasam and Manimuthar.

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