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INTERNATIONAL CONFERENCE

(Hydraulics, Water Resources & Coastal Engineering)

Silver Jubilee Year

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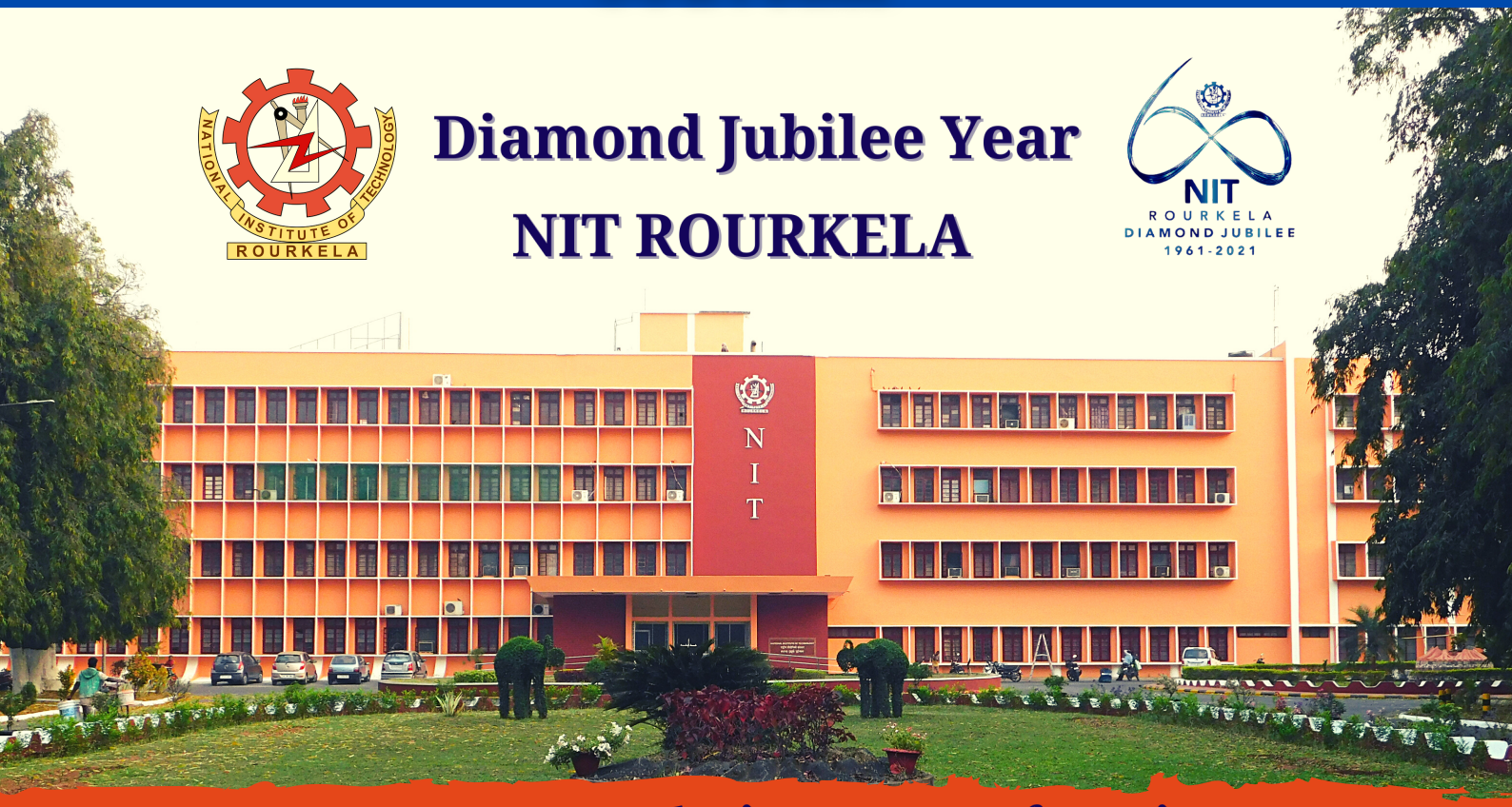

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Department of Civil Engineering,
National Institute of Technology Rourkela
Odisha, India

In Association with

Indian Society for Hydraulics, Pune

Paper ID – 319

Block level Livelihood Vulnerability Index of a Himalayan district in Upper Ganga Basin

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Abstract

Managing climate change induced vulnerability is a challenge in the Himalayan region. The policy interventions are often not targeted due to lack of assessment and prioritization of vulnerable areas of a district/state. The intervention measures already available in the Uttarakhand Himalaya are limited due to want of huge investment and unfavorable terrain. Vulnerability must be understood as a set of socioeconomic conditions that are identifiable in relation to climate change which include natural disaster, demography, water, health, livelihood, social network, food. Combination of these factors at varying level of dominance is driving the vulnerability of a region. Therefore, identifying and grading the key factors influencing the regions vulnerability can of great help in strategizing targeted adaptive measures. The dynamic nature of climate change vulnerability depends upon both biophysical and social processes. We undertook the study at three blocks in the Rudraprayag district in the Upper Ganga Basin (UGB) using the IPCC's Livelihood Vulnerability Index (LVI) approach. LVI assess the quantum of adaptive capacity, sensitivity and exposure of a region. The LVI ranges from -1 to +1 representing low to high vulnerability. To assess the vulnerability in terms of exposure, sensitivity, and adaptive capacity, 7 major indicators and 25 sub-indicators have been considered in the study. The information for the 25 sub-indicators were drawn from questionnaire-based field survey conducted in three blocks viz. Augustmuni, Jakholi, and Ukhimath comprising of 39 villages and 128 households. The LVI values stand at 0.07, -0.18, and -0.21 for Jakholi, Ukhimath, and Augustmuni blocks respectively. The LVI values indicated that Jakholi block is highly vulnerable followed by Ukhimath and Augustmuni blocks. It has also been noted that Jakholi block is highly exposed (0.58) to climate change variability coupled with lower adaptive capacity (0.42). The exposure and adaptive capacity of Agustmuni block stands at 0.23 and 0.69. Ukhimath block although indicated a higher adaptive capacity (0.82). The sensitivity of the three blocks is more or less same. It is recommended that any adaptive measures initiated in the district should be prioritized to Jakholi block followed by Ukhimath and Augustmuni.

Keywords: *Livelihood Vulnerability Index; Upper Ganga Basin; Prioritization; Climate adaptation*

Paper ID – 355

Insight into the key model parameters of Pore Network affecting SWRC simulation

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Abstract

Efficient management and simulations of many near-surfaces hydrological processes such as groundwater recharge, runoff, infiltration, irrigation, optimal water use in agricultural operations, and contaminant transport in the vadose zone require reliable and well-engineered estimates of the unsaturated soil hydraulic properties. Most significant being the soil water retention curve which relates capillary pressure (matric suction) and fluid saturation, and the unsaturated soil hydraulic conductivity function. SWRC is one of the fundamental characteristics of unsaturated soils and many basic properties of unsaturated soils such as volume change behavior, coefficient of permeability, and shear strength are closely related to it. The experimental determination of SWRC