**Rice Crop Loss and Damage Estimation Due to Flood Using Remote Sensing Imageries**

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***ABSTRACT***

South Asia is predominantly an agrarian society. Agriculture is the main source of livelihood for the majority of the population; with rice being a major staple crop that accounts for more than 25% of the region’s agricultural contribution. The main rice growing season (June to October) is particularly vulnerable to monsoon rainfall-induced flooding damage. Accurate and transparent methods are crucial to assess rice crop damage and support mitigation and disaster response strategies in the country. This study developed a framework for rapid pre- and post-event crop status assessment using optical and microwave remote sensing images and estimate the actual loss based on its timing and intensity. The framework combines Sentinel 2 A/B images with Sentinel 1 SAR images to map rice areas, identify areas at risk, and quantify crop loss due to flooding. The crop status at the moment of flooding is estimated through time series analysis of rice phenology. The inundation area map and its temporal dynamics were developed using Sentinel 1 SAR images during the flooding and post-transplantation months. Statistical analysis was performed on the time-series pre- and post-flooding status of the rice crop to estimate rice yield loss and, finally, automate the method used in the region for yield loss estimation due to flooding in rice-growing areas.

**Keywords:** agriculture, disaster, loss and damage estimation, rice