

Rapid Flood Damage Assessment of Population and Crops Using Remotely Sensed Data

Authors : Urooj Saeed, Sajid Rashid Ahmad, Iqra Khalid, Sahar Mirza, Imtiaz Younas

Abstract : Pakistan, a flood-prone country, has experienced worst floods in the recent past which have caused extensive damage to the urban and rural areas by loss of lives, damage to infrastructure and agricultural fields. Poor flood management system in the country has projected the risks of damages as the increasing frequency and magnitude of floods are felt as a consequence of climate change; affecting national economy directly or indirectly. To combat the needs of flood emergency, this paper focuses on remotely sensed data based approach for rapid mapping and monitoring of flood extent and its damages so that fast dissemination of information can be done, from local to national level. In this research study, spatial extent of the flooding caused by heavy rains of 2014 has been mapped by using space borne data to assess the crop damages and affected population in sixteen districts of Punjab. For this purpose, moderate resolution imaging spectroradiometer (MODIS) was used to daily mark the flood extent by using Normalised Difference Water Index (NDWI). The highest flood value data was integrated with the LandScan 2014, 1km x 1km grid based population, to calculate the affected population in flood hazard zone. It was estimated that the floods covered an area of 16,870 square kilometers, with 3.0 million population affected. Moreover, to assess the flood damages, Object Based Image Analysis (OBIA) aided with spectral signatures was applied on Landsat image to attain the thematic layers of healthy (0.54 million acre) and damaged crops (0.43 million acre). The study yields that the population of Jhang district (28% of 2.5 million population) was affected the most. Whereas, in terms of crops, Jhang and Muzafargarh are the 'highest damaged' ranked district of floods 2014 in Punjab. This study was completed within 24 hours of the peak flood time, and proves to be an effective methodology for rapid assessment of damages due to flood hazard

Keywords : flood hazard, space borne data, object based image analysis, rapid damage assessment

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020