

## **Assessment of Forest Fire: A Case Study of Almora District**

Summary of the abstract of the Ph.D. Thesis submitted by  
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Every year, fire destroys millions of hectares of forest around the world and create a lot of problems in all dynamic aspects of human life through economic, environmental, and social disturbances. This situation has been identified in Almora District of Uttarakhand state which lies in Kumaon Himalayan region in India. In this study, quantitative and qualitative **method** of statics, kernel density, GIZ score, GI\* hotspot, frequency ratio method, prediction rate of responsible factors, **susceptibility index** in the form of static forest fire susceptibility index, dynamic forest fire susceptibility index and developed-infrastructure susceptibility index on the basis of **14 parameters** (topographical parameters such as slope angle, slope aspect, curvature, and Topographical Ruggedness Index (TRI) and meteorological and biotic parameters such as Land surface Temperature (LST), Rainfall, Enhanced Vegetation Index (EVI), Soil Moisture Index (SMI), Topographical Wetness Index (TWI) and lastly, anthropogenic parameters such as distance from drainage, road, settlement and from fire station) and Different Normalized Burn Index (dNBR), Supervised Classification and Forest Canopy Density Method have been applied to assessment of forest fire.

From the temporal study, forest fires have increased considerably during the study period (2001-2018), and peaked in 2012 and 2016. From the spatial distribution study, northern and some parts of southern Almora are prone to forest fires incessantly. The results summary of “Observed General G analysis” which was 0.019 being higher than 0.00 that refer to a positive high clustered pattern. The z-score was 49.79, greater than 2.58, and the p-value was 0.00 therefore, proposition of complete spatial randomness (null hypothesis) was rejected which shows hotspot of forest fire

within the study area. According to static, dynamic and developed susceptibility zonation map, the dynamic map represents more susceptible followed by developed and static. Therefore, dynamic map has a significant role in Almora susceptibility zonation map. The very low and low susceptibility class has been categorized as, accounting for 42.74 percent of the total area susceptible to forest fires. The burned pixels demonstrate the presence of this 26.74 percent of the pixel size of moderate forest fire susceptibility class. The high and very high susceptibility zones, which are represented by accounting for 30.80 percent of the total area susceptible to forest fires in the district. Almora district comprises of 3139 sq. km area, of which the burned area in 2016, has been identified as 137.55 sq. km area, according to Difference Normalized Burn Index (dNBR). Similarly, VDF area is 397.35 sq. km which represents 12.65 percent of the district while 46.82 sq. km represents burn area in this class which is equal to 34.05 percent. MDF area is 853.53 sq. km which is equal to 27.19 percent area of the district while 47.34 sq. km is burn area in this class which equal to 34.43 percent. OF area is 790.11 sq. km which represents 25.16 percent of the district while 26.14 sq. km is burn area in OF class which is equal to 19.01 percent. Non-Forest area is 1098.54 sq. km which represents 34.99 percent of the district. Out of this 17.2 sq. km is burn area in Non-Forest class which is equal to 12.51 percent. All these results give valuable insights to the policy makers in relation to urban planning, land development, and can help in the mitigation of future forest fires.