

FOREST FIRE RISK ASSESSMENT AND MANAGEMENT USING GEOSPATIAL TECHNOLOGIES

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ABSTRACT

Fire is a natural element present in all ecosystems and influencing many of its functions. The negative impacts include air and water pollution, loss of biodiversity, land degradation, desertification, soil erosion, impairment of human health and safety as well as loss of human life, forest flora and fauna throughout the world every year. Occurrences of forest fires and Ignition factors will be collected from various sources to construct from various sources to construct a GIS database, and then, validate the proposed model. The map will be done using ArcGIS 10.5 software to generate the maps of use and occupation, slope and aspect. Then use MCDM (Multi Criteria Decision Making) methodology in conjunction with fuzzy logic, in a participatory decision making framework to rank and prioritize the causative factors of fire risk in the study area. The study focuses on mapping of forest fire risk in the study area using GIS and remote sensing and then developing a forest fire management system based on topographic and meteorological factors. This mapping will serve as a tool for establishing public power as well as control measures in the areas of high susceptibility.

Keywords: *Forest fire mapping, GIS, Remote sensing, ArcGIS, Fuzzy logic, MCDM*

INTRODUCTION

Forests are an important part of human ecosystem. As per the present record, the world's total forest area is just over 3,999 million hectares (Global Forest Resources Assessment 2015). India has an estimated forest area of 7,08,273 sq. km that covers 21.54% of the total geographic area of the country. After taking into account the changes observed during two assessment periods i.e. ISFR 2015 (updated) and ISFR 2017, there has being an increase of 6,778 sq. km forest cover at the national level. Kerala state has contributed to an increase of 1,043 sq. km. As per the latest investigation done by FSI, about 36% of country's forests are prone to fires and of this; over 10% are severe fire prone areas. Forest fire can cause loss of ecosystem, depletion of wildlife, deforestation, global warming, and adverse health impacts (R.S.Ajin, 2016). The causes of forest fires can be divided into two broad categories. The first one is the '*Environmental*', which are beyond control and the second, '*Human related*',