



ADVANCES IN FOREST FIRE RESEARCH 2018

EDITED BY

DOMINGOS XAVIER VIEGAS
ADAI/CEIF, UNIVERSITY OF COIMBRA, PORTUGAL

Evaluation of wildfire danger in the Peruvian Andes: First step for its reduction and adaptation

Maria I. Manta^{1*}; Roberto Kometter²; Alexis Navia¹

¹*Universidad Nacional Agraria La Molina. Avenida La Universidad S/N, Apartado 12-056, Lima, Peru, ORCID 0000-0002-4467-9778 {mmanta@lamolina.edu.pe*, 20081514@lamolina.edu.pe}*

²*Helvetas Swiss Intercooperation. Av. Ricardo Palma 857, Miraflores – Lima, Peru, {roberto.kometter@helvetas.org}*

Abstract

Recent events of extreme wildfires are occurring in different parts of the world. In Peru, climate of fire has also occurred and has caused material and environmental services losses. The population and the ecosystems from the Peruvian Andes have been directly affected by the fire and a greater reduction in the water supply could affect 95% of the Peruvian population. Taking into account that there are limitations to estimate the fire danger index and aware the population about wildfire occurrences, here wildfire statistics were used to analyze its spatial and temporal trends from 1973 to 2014 and map fire danger for the Peruvian Andes. Wildfires are spread in all departments of the Peruvian highlands (18) and their fire season length has increased from 4 to 12 months in a year: August, September and October are months with the highest occurrence of wildfire, currently. Four departments of the Southern Andes have a very high fire danger class; while two departments of the Northern Andes have a high fire danger class. In these six departments, the total area burned in 42 years has been 201278 ha (93% of the total burned area). The ecosystems most affected by the fire were grassland (the Puna, the Páramo and Peatlands), natural forests (Dry Forest in Inter-Andean valleys, Dry Mountain Forest and Tropical Montane Cloud forests) and the Andean shrubs. If the government organizations do not prioritize the implementation of strategies to reduce and adapt to wildfires and its occurrence continues, the severity of the fire could intensify on the Andean natural vegetation and its role in climate and hydrological cycle regulation may change dramatically, affecting the socioeconomic development and the welfare of the population.

Keywords: Fire danger map, spatial and temporal distribution, material and environmental losses, disasters, Peru

1. Introduction

It is well known the role that weather plays in the occurrence of wildfires because it determines the ease of ignition, propagation rates and severity (Benson, et al., 2009, Fujioka et al., 2008). Övergaard et al. (2007) and FAO (2007) complement that wildfires are usually caused by man accidentally or on purpose all over the world, where fire is widely used for land use change, to improve grazing, and to remove cropping residues and other wastes. However, the magnitude of these fires is related to weather conditions, and exacerbated by drought, high air temperatures and wind. Likewise, extreme weather/climatic conditions that occur over a period of time will affect the moisture content of the fuels and therefore the activity of wildfires.

The knowledge of meteorology constitutes the foundation for the development of fire danger weather indices (FDWI). Fire managers around the world use a variety of systems to track and predict fire danger and fire behaviour, at spatial scales that span from local to global extents, and temporal scales ranging from minutes to seasons (Fujioka, et al., 2008).

In all scenarios the representative concentration pathways of greenhouse gas emissions, a warmer climate is predicted by the end of the century; the magnitude of daily maximum temperatures will increase in the near future, and the frequency of this increase will occur every year, instead of 2 to 3 years as calculated in previous studies (IPCC, 2014). Higher temperatures have already been