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## The impact of agroforestry systems on the reduction of forest fires. A case study in the tropical Andes of Cochabamba, Bolivia

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### Abstract

Forest fires represent one of the major threats to biodiversity conservation; a considerable number of these events are strongly related to agricultural expansion, especially in developing countries. In many rural communities from the Bolivian tropical Andes, forest and grassland fires have been a recurring problem for the last decades. Many of these fires are caused by local farmers, attempting to open land for agriculture and cattle farming by a widespread practice called “supervised fires”, but often, due to environmental conditions like high wind speed, steep slopes, and dryness (this practice is common during the dry season), they lose control of it. Local fire reports and interviews with rural farmers state that both frequency and intensity of fires have been reduced in recent years in areas where agroforestry systems have been introduced as a new way of agricultural production. Remote sensing tools, such as the normalized burn ratio index, the MODIS/Terra+Aqua burned area monthly L3 global 500 m SIN grid, and the Hansen global forest cover change v 1.9 database were used to corroborate such information. The results show a reduction pattern in the extension of burnt areas since the implementation of these systems, showing their positive impact in terms of environmental conservation, with special attention on *Polylepis* spp. forests, a threatened native genus that is currently displaying a good conservation status in the study area. Besides the environmental aspect, these agroforestry systems represent an attractive economic alternative for rural farmers, as they diversify their production, and reduce the dependency on agrochemical products. Moreover, this paradigm change implies one step further towards sustainable development and climate resilience.

**Keywords:** Agroforestry systems, conservation, forest fires, remote sensing