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## Climatic Changes in the Mid-Hills of Nepal: A Study on Smallholder Farmers’ Perception and Reactions

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### Abstract

Climate and weather conditions in the mid-hills of Nepal have always been changing and local farmers have continuously adapted to such change. However, in recent decades these changes accelerated. The awareness of increased climate variability constitutes a prerequisite for adequate adaptation measures in the cropping systems. Hence, this study examined how farmers perceive climatic changes and whether their perceptions are confirmed by 35 years of records from two weather stations. Furthermore, farmers’ reactions and - if any - targeted adaptations to perceived changes were investigated in order to assess their resilience to extreme weather events and ongoing climate change.

To this end, 60 formal semi-structured interviews were conducted with individual farmers in Kaule, a village situated in the Himalayan mid-hills, 25 km northwest of Kathmandu, Nepal. Half of the interviewees are members of a local non-governmental organisation (NGO) focusing on agro-forestry. It was examined whether the time of residency in Kaule, education level, income sources and membership in the NGO had an influence on the perception of and the reaction to weather changes.

Farmers were generally well aware of changes in the local weather and their perceptions reflected the weather station records. Time series analysis proved a significant increase in both mean annual minimum and maximum temperatures. Absolute amounts of annual rainfall appeared to be stable with an average 2699 mm in 1981 – 1985 and an average 2679 mm in 2011 – 2015. Analysis in R found a decreasing, though non-significant trend. However, in accordance with farmers’ perception, the annual distribution of rainfall did change, with longer dry periods during winter. While NGO members were primarily concerned about decreasing rainfall, non-members mostly mentioned abnormal weather patterns. The majority of farmers (59 %) did not implement targeted measures in response to weather changes; however, some farmers, especially members of the NGO, actively responded by delaying planting (27 %) or irrigating with spring, river, rain or domestic water (13 %). Promising adaptation measures suggested by the farmers were the storage of water in tanks and the reuse of domestic water for irrigation as well as the planting of trees and the protection of forests.

**Keywords:** Climatic changes, Nepal, perception, reaction, smallholder farmers