



# Perceptions and adaptation behavior of farmers to climate change in the upper Brahmaputra Valley, India

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## Abstract

To better understand how farmers perceive and adapt to climate change, climate trends and a survey of farmer attitudes and behavior in the upper Brahmaputra valley zone (UBVZ) of India were analyzed. Rainfall and temperature trends were estimated in combination with the results from a detailed questionnaire of 384 farmers across 20 villages in rainfed areas of the UBVZ. From 1971 to 2007, the annual mean temperature in the UBVZ increased by 0.15 °C/decade while summer rainfall decreased markedly. Logistic regression was used for modeling the perceptions and adaptation behavior of farmers. Farmers perceptions of climate change tended to closely match those estimated from the climate data, but farmers with better access to water resources, credit, and those with higher family income, higher production, and larger farm sizes had more options to adapt and were more likely to adopt techniques to cope with climate change and variability. Factors such as age, education level, and family size of respondents were less likely to impact farmers' decisions to adapt to climate change.

**Keywords** Climate trends · Logistic regression · Mann–Kendall test · Theil–Sen's slope · Assam

## 1 Introduction

Globally, the past three decades have been consistently warmer on the Earth's surface than any post-1850 decade. The period 1983–2012 was most likely the warmest 30-year interval in the Northern Hemisphere during the past 1400 years (IPCC, 2013). The pan-Indian annual mean surface air temperature during the last century indicates a substantial increase of 0.51 °C/100 yrs during 1901–2007 (Kothawale et al., 2010), with a warming of 0.21 °C/10 yrs during the 1971–2007 period. Changes in climate tend to cause widespread impacts on natural and anthropogenic systems across continents and oceans, signifying their susceptibility to changing climate (IPCC, 2014). Amidst various anthropogenic

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