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## Quantify the Impact of Climate Change on Mesoamerican Coffee Farmers Livelihoods and Develop Community-based Adaptation Strategies

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### Abstract

According to the fourth Intergovernmental Panel on Climate Change (IPCC) report is Mesoamerica one of the regions that will suffer severe impacts from a progressively changing climate. Coffee production is the mainstay of thousands of families and the major contributor to the agricultural GDP of these countries. As a result of climate change, traditional coffee growing regions will decrease drastically. A significant number of farmers will not be able to produce coffee in the future anymore; others will be producing coffee in marginal areas and be confronted with decreased coffee quality and increased pest and disease pressure.

Using the A2a emission scenario (business as usual) and twenty downscaled Global Circulation Models (GCM) in combination with Maxent, a general-purpose method for making predictions or inferences from incomplete information, and the crop-niche suitability model Ecocrop, we map the change in suitability of coffee in Mesoamerica and the change in suitability of the most important diversification crops for coffee farmers. Combining the spatial modelling with participatory impact assessment approaches we appraise the vulnerability of coffee farmers livelihoods and quantify the impact of the changing climate on socio-economic indicators. Finally we develop community based adaptation strategies according to the level of vulnerability and the capacity of communities to adapt to climate change.

The analysis shows that the vulnerability to climate change varies a great deal depending on the geographical location, natural resource management practices, education, level of community development and diversity of household income. We propose concrete adaptation strategies for different vulnerability profiles and draw general applicable conclusion to inform policy makers at regional and national level.

**Keywords:** Adaptation strategies, climate change, coffee, vulnerability