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Characterisation and Spatial Distribution of Shade Trees and Bananas in Arabica Coffee Systems of Eastern Uganda

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Abstract

Coffee plays an important role for the Ugandan economy and is mainly cultivated by smallholder farmers. Yields are generally only 30 % of potential yields for the region and one of the reasons is that local farmers are often not able to provide the inputs that are required to achieve high yields. Moreover, Arabica production in Uganda is increasingly going to be negatively affected by climatic changes. Especially lower altitudes will suffer from reduced rainfall and increased temperature, and might become marginally suitable for Arabica coffee.

The present study aimed to (1) characterise the plots of smallholder Arabica coffee farmers in Eastern Uganda with regard to the spatial distribution and canopy extension of shade trees and bananas (*Musa* spp.), and (2) to assess their influence on coffee yield and vigour, in order to give recommendations to farmers regarding climate change adaptation strategies.

Smallholder coffee plots in the Mount Elgon region of Eastern Uganda were monitored at three altitudinal levels (1000–1400, 1400–1800, 1800–2200 m asl). A detailed mapping of the plots was conducted with GPS technology, which allowed to create maps showing the location of shade trees, bananas and coffee. The maps further give information about the canopy spread and DBH of shade trees, as well as the leaf area of bananas. In addition coffee trees assigned to three shade categories were rated for their vigour, and productivity data previously obtained on the same plots was included in the analysis. We then examined the influence of tree and banana distribution, species diversity and canopy characteristics on the vigour and production of coffee.

Our results point to a high variability in the design of coffee systems in the region, and help to disentangle differences in coffee performance between and within plots. Our study allows a more detailed understanding of the main effects of shade trees and bananas on coffee production and of the conditions under which shade is most beneficial.

Keywords: Climate change, coffee, shade, spatial distribution, Uganda

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