

Effects of Cacao Agroforestry and Landscape Composition on Farm Biodiversity and Household Dietary Diversity

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Abstract : Land-use conversion from tropical forests to cash crop production in the form of monocultures has drastic consequences for biodiversity. Meanwhile, high dependence on cash crop production is often associated with a decrease in other food crop production, thereby affecting household dietary diversity. Additionally, deforestation rates have been found to reduce households' dietary diversity, as forests often offer various food sources. Agroforestry systems are seen as a potential solution to improve local biodiversity as well as provide a range of provisioning ecosystem services, such as timber and other food crops. While a number of studies have analyzed the effects of agroforestry on biodiversity, as well as household livelihood indicators, little is understood between potential trade-offs or synergies between the two. This interdisciplinary study aims to fill this gap by assessing cacao agroforestry's role in enhancing local bird diversity, as well as farm household dietary diversity. Additionally, we will take a landscape perspective and investigate in what ways the landscape composition, such as the proximity to forests and forest patches, are able to contribute to the local bird diversity, as well as households' dietary diversity. Our study will take place in two agro-ecological zones in Ghana, based on household surveys of 500 cacao farm households. Using a subsample of 120 cacao plots, we will assess the degree of shade tree diversity and density using drone flights and a computer vision tree detection algorithm. Bird density and diversity will be assessed using sound recordings that will be kept in the cacao plots for 24 hours. Landscape compositions will be assessed via remote sensing images. The results of our study are of high importance as they will allow us to understand the effects of agroforestry and landscape composition in improving simultaneous ecosystem services.

Keywords : agroforestry, biodiversity, landscape composition, nutrition

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