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Diversity and use of trees for food security in smallholder farming systems of Uganda

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Abstract

Food production in Uganda has often been realised at the expense of forests and other biodiverse ecosystems. Yet, wild foods from forests and trees can be an essential micronutrient source, especially for poor smallholder farmers. With the ever-increasing population, integrating trees into farming systems offers a potential win-win solution to support dietary quality and the natural environment. Trees in agricultural systems improve soil health, regulate microclimates, enhance carbon sequestration and improve biodiversity at multiple scales. However, combining different tree species may also affect the level at which food security and nutrition are attained. This study assessed smallholder farmers' typology and tree species diversity for food security and nutrition. A cross-sectional survey of 277 randomly selected smallholder farmers who participated in the ACIAR-funded Trees for Food Security project was conducted. For each selected farmer, data on agroforestry technology used, number of trees and tree species diversity were collected at plot level using a tree inventory form. Focus group discussions were used to generate information on the linkage of tree diversity to food security and nutrition. Hierarchical cluster analysis was performed to determine smallholder farmer typologies and tree species diversity indices were computed and analysed for each typology. Two main groups of smallholder farmers could be distinguished: subsistence and pre-commercial. The tree species were distributed differently in the two identified groups. The tree species diversity was higher in subsistence farms than in pre-commercial farms. Across the predominantly used agroforestry technologies, tree species diversity was highest in intercropping, followed by boundary planting and woodlot. Subsistence farms showed a higher affinity to fruit tree species because they contribute directly to food security and nutrition. In contrast, pre-commercial farms were mostly dominated by trees of commercial value, such as Eucalyptus, mainly grown in woodlots. Therefore, we stress the critical role of smallholder farming systems in conserving on-farm diversity in the fragile eastern highlands of Uganda. The pre-commercial farms may sell tree products to buffer their income and enhance access to food. However, tree species diversity for enhancing farming systems' resilience in the face of climate change was high in subsistence farming households.

Keywords: Agroforestry technology, climate change, food security, nutrition, subsistence farms