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Characterizing the Diversity of Smallholder Farmers for Informed Agricultural Interventions: An Application of Multivariate Analyses in Kapchorwa District, Uganda

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Abstract

Typologies have been used as tools for dealing with farming system heterogeneity. This is achieved by classifying farms into groups that have common characteristics, that is to say farm types which can support the implementation of a more tailored approach to agricultural development. This study explored patterns of farmer diversity through the classification of 446 smallholder farm households in four sub-counties of Kapchorwa District, Eastern Uganda. Based on the data collected in 2016, the typology was constructed using the multivariate statistical techniques of principal component analysis and cluster analysis. Furthermore, the study constructed an agricultural diversity index to classify farm households by their level of diversity. The index utilised variables including number of crops grown by the household, livestock owned/reared (measured in tropical livestock units), number of fruit trees owned, level of intensification and level of pest management. The Cobb-Douglas production function was used to determine the weights of the different variables used to construct the index. Results indicate that the agricultural diversity index ranged between 0 and 1. Farmers in the lower altitude belt had lower levels of agricultural diversity compared to their counterparts in the mid and upper altitude belts. Overall, the majority of the farmers had medium levels of agricultural diversity between 0.4 to 0.7 as indicated by the diversity index. The study concludes that there is need for a differentiated farm planning and extension intervention than generalising planning across the entire district and the extension system must precisely target agricultural inputs, different cropping practices, market development and market information for identified farm types.

Keywords: Agricultural diversity, agricultural diversity index, cluster analysis, Cobb-Douglas production function, farm heterogeneity, farm typology, principal component analysis

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