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## What Is Planted Is Not Eaten — Using Production Diversity to Link Agrobiodiversity and Dietary Diversity

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### Abstract

Agrobiodiversity and diversified production on smallholder farms influences household dietary diversity. However, empirical evidence to support this assumption is limited. Conventional biodiversity indicators (i.e. species richness (SR), Simpson diversity (SD)) use only species counts. They include neither information on the quantity and quality, nor other factors affecting production. Our objective is to develop an indicator, i.e. production diversity (PD), measuring the role of diversity in crop production for human nutrition. We hypothesise that PD (i) shows a clear relationship between agrobiodiversity and dietary diversity of farming households; and (ii) includes the impact of abiotic and biotic factors such as erratic rainfall and low soil fertility on productivity.

Data was collected from 72 farming households in Teso South, Kenya during the 2016 long rain season (LRS) and the 2016/17 short rain season (SRS), including total crop lists and their corresponding yields (kg). Qualitative 24h-recalls, were done with the primary caregiver in the household, and used to calculate the individual dietary diversity score (IDDS). SR (sum of all species) and SD (number and abundance of species) were calculated using the crop lists. PD was calculated by summing yields from the crop list into 10 food groups, and using the formula for SD, calculating diversity of food groups. All indicators were compared using polynomial regression models.

PD and SR were higher in the LRS (mean PD = 0.55, StanDev= 0.2; mean SR= 10, StanDev= 4.4), than in the SRS (mean PD= 0.38, StanDev= 0.25; mean SR= 8, StanDev= 3.3). In the LRS, PD and IDDS showed a significant positive correlation ( $R^2 = 0.19$ ;  $p = 0.002$ ), but not in the SRS ( $R^2 = 0.09$ ;  $p = 0.052$ ). In contrast, no significant results or trends were found using SR or SD. Therefore, when total food production is high (LRS), household consumption of self-produced foods is also high, whereas when production is low (SRS), the use of self-produced food decreases. Only at times of high productivity does agrobiodiversity affect IDD. The results show, that production diversity is more capable of revealing the role of agrobiodiversity for dietary diversity, by including factors affecting crop productivity, than conventional biodiversity indicators.

**Keywords:** Agriculture, biodiversity, Crop Production, Dietary diversity, Kenya, Production Diversity

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