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Does Commercialisation Affect Tree Species Richness and Diversity in Urban and Peri-urban Gardens of Niamey, Niger?

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Abstract

Homegarden-like systems are regarded as sustainable based on their high diversity of annual and perennial plants. This makes them also suitable for *in situ* conservation of plant genetic resources (PGR). Commercialisation of gardens is often related to increasing dominance of annual vegetables at the expense of trees, thus, threatening their agrobiodiversity. However, little is known about consequences of such transformation processes on tree species richness and diversity in an urban/peri-urban setting. Focussing for the first time on a Sahelian, West African city, this study aimed to answer the following questions: (i) Do commercial vegetable gardens have a lower tree species richness and diversity than subsistence gardens?; and (ii) Which garden type harbours high tree species richness and diversity and is, thus, more suitable for PGR conservation?

In 51 urban and peri-urban gardens randomly selected in 10 districts of Niamey, Niger, diversity parameters of all trees (also including shrubs and vines) were assessed. Socio-economic household data were gathered through individual interviews of the gardeners. In the surveyed gardens, a total of 63 tree species were grown. Almost 60% of these species were of exotic origin; abundances were mostly low, and 29 species were each found in one garden only. On average, 5.8 tree species (including 1.8 indigenous ones) were grown per garden (range 0–42). Highly commercial vegetable gardens (57% of the sample) did not harbour less tree species than semi-commercial or subsistence ones. Multivariate regression analysis revealed the positive influence of garden and household sizes and portion of annual cash crops on tree species richness. Cluster analysis based on species abundances resulted in four garden types, significantly differing in mean species richness, density and diversity indices. High richness and abundance of tree species were found in clusters grouping urban, large gardens of male gardeners that cultivated large numbers of annual cash crops.

In conclusion, commercialisation did not threaten tree species richness in urban and periurban gardens of Niamey. The value of both commercial and subsistence gardens for *in situ* conservation of tree species, however, may be questionable due to low species abundance and frequency of occurrence, particularly of indigenous tree species.

Keywords: Abundance, cluster analysis, *in situ* conservation, multivariate regression analysis, plant genetic resources, species richness