

Impact of Soil Fertility Improvement Strategies on Annual Crop Cultivation in Mid Country Homegarden Systems in Aluthgama Village, Nawalapitiya, Sri Lanka

W. G. C. Wekumbura^{a*}, A. J. Mohotti^b and E. Frossard^c

^a*Department of Export Agriculture, Sabaragamuwa University of Sri Lanka, P.O. Box 02, Belihuloya 70140, Sri Lanka.*

^b*Department of Crop Science, University of Peradeniya, Peradeniya, Sri Lanka.*

^c*Institute of Agricultural Sciences, ETH – Zurich, Switzerland.*

*Correspondence: chanwe20@gmail.com

The homegarden systems developed and nurtured by farmers through generations of innovation and experiment are often cited as the epitome of sustainability. The main objective of this study was to assess the impact of some different kinds of inputs on soil fertility and productivity improvement of homegardens. The study was further elaborated by addressing how to maintain crop diversity and cultivation of cash crops which affected the management of homegardens and vice versa in the Aluthgama village, Nawalapitiya, Sri Lanka, during 2014-2016. Eight homegardens, four each from the 'improved' and 'non-improved' categories were selected. Annual crops (i.e. *Phaseolus vulgaris* L. and *Capsicum annum* L.) were cultivated with treatments: No fertilizer, chemical fertilizers as recommended, only compost (4 MTha⁻¹), only green manure (4 MYha⁻¹), ½ the recommended amount of chemical fertilizer with (2 MTha⁻¹) compost and (2 MTha⁻¹) green manure. Crop growth and yield, and soil chemical and physical parameters were analyzed before and after each crop. In addition, crop species diversity was evaluated in 53 homegardens belonging to the two categories, and prospects and issues of homegardening and associated tea cultivation were recorded taking 100 homegardens into consideration. Data were analyzed using SAS and SPSS statistical software.

The results of the total leaf area, dry weights and yield of both crops indicated that the treatments containing the artificial fertilizer and compost or green manure were giving comparable values as the artificial fertilizer alone, which were superior than other treatments. Based on the agro biodiversity, the homegardens in the area could be separated in to two clusters (Shannon Weiner Index 2.43 and 2.32, Simpson's index 0.92 and 0.88 in cluster 1 and 2 respectively) and cluster 1 superior in more species diversity. Most homegarden owners in the studied area cultivated tea in a mixed cropping system. More attention was given by the farmers to the tea lands compared to the homegardens, which had negative impacts on management of the homegardens. The study emphasizes proper management of soil fertility, biodiversity and appropriate crop cultivation as the key components of the development of homegardens. Promotion and development of tea associated homegardens can be a strong foundation and conspicuous method to secure food and income amongst smallholder farmers in the mid country.

Keywords: Agro-Biodiversity, Homegarden, Soil fertility, Tea