

The role of agroforestry systems in improving farmlands and livelihoods in Agroecological highlands zones of Buberuka-Rwanda

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Introduction

Agroforestry systems are recognized as key factors to contribute to the farmlands and livelihoods improvement through soil protection and soil fertility that lead to the increase of income from agroforestry products and services for small-scale farmers in rural areas in Rwanda. However, soil degradation and infertility remain one of the underlying causes of low agricultural production in some areas of Rwanda, especially in high mountains regions. This study analyses different agroforestry systems adopted by farmers and highlights their effect on farmlands management and livelihoods improvement in the Agroecological highlands zones of Buberuka.

Methodology

- Agroecological highlands zones of Buberuka are located in Northern part of Rwanda and is generally dominated by small scale farming systems.
- Out of 1650 agroforestry farmers, 64 were selected as sample size. This sample technique was able to give us a global vision of the field realities. The farmers used as respondents in the study were selected randomly with their respective various farm sizes.
- A questionnaire consisting of structured items was designed, administered and conducted for the collection of primary data from the field.
- Qualitative and quantitative approaches were applied using the research techniques, use value matrix, free listing, priority ranking and preference-ranking to gather data sets.
- The data were entered and analyzed using the Statistics Package for Social Sciences (SPSS).

Results & Discussion

Agrosilvopastoral system (combination of trees, livestock and crops) occupy the first place with 71.8%. It is highly practiced by farmers because it plays many purposes of producing food and increasing soil fertility. Most agroforestry species used in this system are *Grevillea robusta*, *Calliandra*, *Alnus acuminata* and *Leuceana leucocephala*. For Agrisilviculture system (combination of crops and trees), 64% of agro forestry farmers used to mix big trees with some leguminous trees (*Leuceana leucocephala*, *Leuceana leucocephala*) for feeding their animals, mainly cattle in zero grazing system. Trees also act as windbreaks, preventing crop damage. In silvopastoral system (combination of livestock and trees), 18.7% of small agro forestry species are mainly used for fodder production to animals. During the study, the researchers found that beekeeping is applied by few farmers (7.8%). Therefore it seems logical, compatible, and pragmatic to accept the components as the basic criteria in the hierarchy of agro forestry classification (P.K. Ramachandran Nair, 1993).

Conclusion

The findings of this study confirmed that there are four (4) main different agroforestry systems applied in Agroecological highlands zones of Buberuka which are Agrisilvicultural system, agrosilvopastoral system, silvopastoral system and Agrohorticultural systems. Most of agroforestry species are intercropped with plants such as Leguminous (*calliandra* spp, *Leuceana leucocephala*), no Leguminous (*Alnus acuminata*, *Cedrella ser-ata*, *Grevillea robusta*) and fruit (*Avocado*, *Mangoes*, *Citrus*, *carca Papaya*). Agroforestry systems contribute to the farm land improvement for the population through soil protection and soil fertility. Agroforestry systems contribute to the livelihood improvement for the population of Agroecological highlands zones of Buberuka through crop and animal production improvement. Agroforestry trees products make increase of income generations, improvement of education, health, insurance, and assurance of food security.

Keywords: Agroforestry systems, Farm lands, Livelihoods, Agroecological highland zones