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Contribution of different Farming Systems to Soil and Ecological Health in Trans Nzoia County, Kenya

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Introduction

Current agricultural practices in developing countries are dominated by the use of inorganic fertilizers causing land degradation. Others include inappropriate tillage practices that destroy the soil structure and cropping practices that contribute to reduced crop diversity (Pagliai *et al.*, 2004). The low soil fertility is majorly contributed by agricultural intensification particularly in developing countries due to the ever-increasing food demand for the rising population (Rezig *et al.*, 2012). Nutrients can be partially returned through organic inputs which are essential for organic matter accumulation and farming systems sustainability (Omenda *et al.*, 2019). As such, there is an urgent need to transition to more sustainable means of food production. Organic agriculture can play an important role in solving present and future challenges in food systems while also promoting the ecological health of such systems (Rahmann *et al.*, 2017). In Kenya, smallholder farmers have adopted organic farming practices as a result, farm practices such as agroforestry, use of organic soil amendments, biological pest control and cropping systems such as crop rotation and intercropping have been widely adopted. Organic Manure improves soil physical properties and chemical properties such as pH and nutrient availability. Additionally, it stimulates microbial activity, serving as food for microbes and hence enhancing soil health (Lindahl and Tunlid, 2015). Cropping systems adopted by farmers also have lasting impacts on ecological health of a farm system. Intercropping and crop rotation, on the other hand, have been shown to result in benefits that foster ecosystem health (Thierfelder, 2012). This study, therefore, sought to establish the extent with which such farm practices are utilised by farmers in Trans Nzoia county and hence their contribution to ecological health.

Methodology

A simple random sample was used to select 71 farmers for interview in Trans Nzoia County using semi-structured questionnaires. Ecological factors included were land preparation, agroforestry practices, soil fertility management, soil and water conservation. Soil samples from a depth 0- 30cm were collected from each farm visited from the main crop in a zigzag manner and thoroughly mixed to achieve a composite sample. Samples were analyzed for pH, Total organic carbon, total nitrogen and available phosphorus as described by Okalebo 1993. Data collected was analysed using SPSS version 21. A data normality test was undertaken while Frequencies and percentages were tabulated using Microsoft excel.

Results & Discussion

66% of farmers practiced organic farming while 34% are conventional farming. The cropping systems included monocropping, crop rotation and intercropping. The soil pH from organic farms were slightly higher than from conventional farms. Nutrient content of soils from organic farms was significantly higher than that from conventional. While the average nitrogen (%), K (Cmol/ kg and P (ppm) of organic soils were also higher than conventional farms.

Conclusion

Organic farming system is the most preferred in Trans nzoia county. The average pH and soil nutrients of the soils obtained from organic farms, were slightly higher than that of soils from conventional farms, an indicator of improved ecological health.