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Socio-Economic Impact of Organic Matter Management on Smallholder Crop Farmers in the Rwenzori Region, Uganda

DEOUS MARY EKYALIGONZA, BERNHARD FREYER, JUERGEN FRIEDEL

University of Natural Resources and Life Sciences Vienna (BOKU), Dept. of Sustainable Agricultural Systems, Austria

Abstract

To react on ongoing decrease of yields and farm economy, the aim of this study is to test farming system specific best soil fertility and cropping practices, their economic performance, and farmers potential to adapt. Two activities serve for fulfilling this objective: to analyse the impact of cropping systems with application of forage legumes, grain legumes, alley crop leaves and farmyard manure on biomass and yield improvement; to understand the conditions enabling farmers to adopt the cropping systems. An experiment (randomised complete Block Design) was conducted in Rwenzori region of Uganda with five treatments running for two seasons: short rains (SR; March-June 2018) and long rains (LR; August-December 2018). The treatments included T1: SR: maize; LR: maize with DAP (18-46-0) at a rate of 50 kg ha⁻¹ (N: 9 kg ha⁻¹; P: 23 kg ha⁻¹); T2: SR: cowpea (*Vigna unguiculata*); LR: maize. T3: SR: cowpea + farmyard manure (2.5 t ha⁻¹; FYM); LR: maize and *Mucuna pruriens*. T4: SR: cowpea and *Faidherbia albida*; LR: maize and *M. pruriens*. T5: SR: cowpea and *F. albida* + FYM; LR: maize and *M. pruriens*. Grain weight and total biomass were significantly higher in T1, T3, T4 and T5 in the LR and T1 in the SR. The highest average input costs (114.29 US\$ ha⁻¹) were observed in T4 and T5 in the SR although the costs reduced by 50.28 % in the LR. The average input price for T1 increased by 67 % in the LR. In the SR, T3 and T5 involved the highest average labour costs of 400 US\$ ha⁻¹ and 414.29 US\$ ha⁻¹, respectively, which reduced by 10.7 % and 10.4 %, respectively, in the LR. The highest average revenue was observed in T2 (1924.72 US\$ ha⁻¹) and T3 (1687.25 US\$ ha⁻¹) in LR although the highest average grain revenue of 83.4 % and 78.4 % was observed in T3 and T5, respectively. T3 and T5 also increased the average gross margin by 111.1 % and 172.8 %, respectively, in the LR. Farmers mentioned that T3 and T5 could be adopted since they can increase yield and in the meantime reduce the costs in comparison to T1 with the fertiliser treatment.

Keywords: Alley crops, biomass, crop yield, cropping systems, farmyard manure, legumes, organic matter management, Rwenzori region, smallholder farmer, socio-economic, Uganda