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A Farming Systems Analysis in Ethiopia's Wheat Belt: Challenges and Perspectives for more Sustainable Agricultural Systems

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Abstract

Ethiopia is challenged to increase food security, reduce poverty and environmental degradation. About 54 % of the total wheat is produced in Ethiopia's wheat belt, mostly by smallholder farmers (SHF). Increased mono-cropping results in surging weed, wheat rust and insect damages. The aim is to enhance the understanding of SHF-systems in the region and to identify challenges/perspectives for more sustainable agricultural systems.

In total 593 randomly sampled smallholder farms were analysed using descriptive and statistical analysis. A focus group discussion and literature review served to clarify and complement these data.

The results display following averages: farm size 1.7 ha, 6.3 household members, wheat yield 2.27 t ha^{-1}, 1.3 t for own use. Most farms are mixed with 90 % of farmers owning one ox or more. An increasing number of oxen positively correlates with increasing yield as it probably allows for timelier field operations. Best yield results are achieved by farmers that (partly) use tractor ploughing. About 60 % of farmers mention insects, wheat rust and other pests and diseases as their main challenge in wheat production followed by a "shortage of inputs" and "lack of rainfall". 74 % apply herbicides and 85 % fungicides/insecticides in wheat. Soil fertility problems was only mentioned by two farmers, though this issue might aggravate in time as soil erosion and insufficient organic matter management due to non-return of dung, stubble grazing, and deficient crop rotation management are widespread. Farmers with regular crop rotation (always changing crop and $\leq$25 % of wheat) showed 28 % higher yields compared to farmers with some crop rotation ($\geq$50 % of wheat). 38 % of farmers apply regular, 56 % some and 6 % no rotation. In average farmers dedicated 58 % of land to wheat, 15 % to malt barley and 9 % to faba beans. The less land farmers have, the more wheat they grow. Shrinking farm sizes, agronomic and market challenges – among others – for (legume-) crops such as faba bean appear to hinder increased percentages of legumes in the crop rotation. Crop rotations in general indicate negative humus balances, high weed pressure and high risk of soil borne diseases and thus partly explain the relative low yield performance.

Keywords: Crop rotations, Ethiopia, farming systems, food security, productivity, sustainability, wheat

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