Tropentag, September 9-11, 2020, virtual conference

"Food and nutrition security and its resilience to global crises"

Productivity and Profitability of Two-wheel Tractor Direct Seeded Systems on Smallholder Farms of Ethiopia

Walter Mupangwa[1], Rabe Yahaya[2], Ephrem Tadesse[3], Siyabusa Mkuhlani[4]

[1] *Cimmyt, Sustainable Intensification, Ethiopia*
[2] *CIMMYT, Sustainable Intensification, Ethiopia*
[3] *Cimmyt, Sustainable Intensification,*
[4] *University of Cape Town, South Africa, Climate Analyses Group, South*

Abstract

Maize (*Zea mays* L.) and wheat (*Triticum aestivum* L.) yields have remained lower than the maximum potential in different parts of the Ethiopian highlands. Additionally, smallholder maize and wheat production systems are characterised by high drudgery amongst other constraints. On-farm trials were run for two growing seasons in the sub-humid and semi-arid highlands of Ethiopia. Each farm had paired plots, one for the conventional Maresha practice and another for two-wheel tractor (2 WT) direct seeded no-till (NT) treatment. Experimental plots measured 30 m × 10 m and each farmer was a replicate in each growing season. Crop yields and gross margins were measured. The NT treatment had 1 212–1 351 kg ha^{-1} more maize grain compared with the conventional practice. Across seasons, the NT treatment had 1 276 kg ha^{-1} more grain than the conventional practice. The NT treatment had 341–722 kg ha^{-1} more wheat grain than the conventional practice. Across seasons, the NT treatment had 561 kg ha^{-1} more grain than the conventional practice. Similarly, the NT treatment had higher wheat grain yield than conventional practice regardless of soil type used. Under clay-loam and vertisol, NT had 549 and 844 kg ha^{-1} more wheat grain than conventional practice, respectively. In the maize system, the NT treatment generated US$358–385 ha^{-1} more than the conventional practice. In the wheat system, NT treatment generated US$230–453 ha^{-1} more compared with the conventional practice. The no-till direct seeding powered by 2 WT is a more productive and profitable cropping system for the maize and wheat production regions of Ethiopia.

Keywords: Agro-ecology, gross margin, maize, no-till, wheat

Contact Address: Walter Mupangwa, Cimmyt, Sustainable Intensification, ILRI Campus, +263 Addis Ababa, Ethiopia, e-mail: w.mupangwa@cgiar.org