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Maximizing the benefits of push-pull technology with pigeon pea integration

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Abstract

Constrained crop production in smallholder systems in Africa is highly associated with poor soil fertility, agricultural pests and the ravages of climate change. The poor soil fertility is a consequence of continuous cropping, poor biomass production and extractive agriculture. A promising strategy for mitigating these constraints is crop diversification with resilient varieties. A needs assessment with 10 focus group discussions and key informant interviews was conducted in Western Kenya to identify promising crops and cropping systems for further intensification of push-pull technology, poly-cropping system that comprises of cereals (e.g., maize) intercropped with a repellent plant (*Desmodium*) and a trap plant (Napier grass or *Brachiaria*) on the border.

Legume integration with pigeon pea was ranked best because of the potential of the crop to provide firewood, fodder, edible grain, and income; and to do well under dryland conditions. Field experiments were established up in Kisumu, Siaya and Vihiga counties in western Kenya to determine the effect of integrating pigeon pea in push-pull. Crop yield and growth of pigeon pea was monitored for four seasons in four treatments established in 2021: (1) push-pull: maize+*desmodium*+*brachiaria*, (2) intensified push-pull: push-pull+pigeonpea, (3) maize+pigeon pea, and (4) maize monocrop). Maize stover and grain yield were not significantly different across the treatments and sites, suggesting that integration of pigeon pea did not affect the main crop. However, variations were noted in the seasons. Push-pull+pigeon pea performed best for stover yield in Siaya and in season 3; and push-pull plots with pigeon pea had higher maize grain yield in season 3. The growth of pigeon pea varied across treatments with push-pull+pigeon pea performing better than maize+pigeon pea. Fresh leaf and twig weight (sources of fodder and fuelwood) were the same in both treatments. We conclude that that intensification of push-pull with pigeon pea maximises the performance of push-pull technology.

Keywords: Biomass, firewood, fodder, grain legume