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“Push and Pull” in Combatting Fall Army Worm and Witchweed (Striga)

"Push-Pull" is a technique used for pest control, like the Fall Army Worm. Push-pull uses plants that have physical characteristics capable of attracting or repelling such pests.

The Fall Army Worm is a growing threat to Mozambique, having arrived from Latin America in recent years. The Fall Army Worm is difficult to control through pesticides. The use of pesticides has been a problem for the environment and human health.

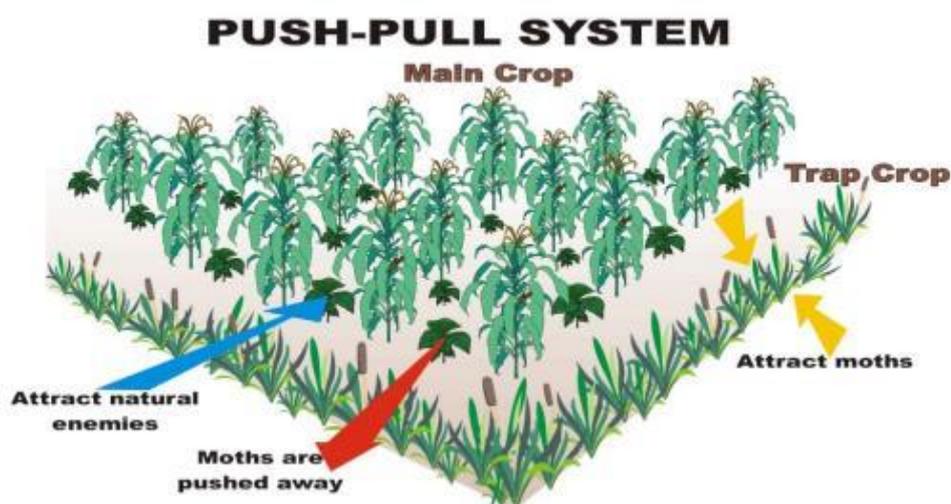


Striga is a parasitic weed that is occurring in machambas continuously cultivated from maize or sorghum and with degraded soils of low fertility. Each striga plant has the capacity to produce 20,000 seeds and the seeds can be kept alive in the soil for up to 15 years. *Striga* seeds only germinate with the presence of maize or sorghum and this weed sucks the sap of the maize plant through parasitism on the roots.



RAMA-BC in Mozambique promotes legume intercropping such as lablab, Pigeon pea, jack bean and cowpeas in their Model Family Farms in order to increase fertility and soil health in intensive cultivation. The use of legumes in the "push-pull" approach also significantly reduces the incidence of striga as well as reducing the Fall Army Worm (Johnnie van den Berg, lecture in Chimoio Feb 2018).

Striga, Fall Army Worm and soil infertility are major threats to maize productivity in sub-Saharan Africa that can be mitigated through this integrated approach to soil and pest management

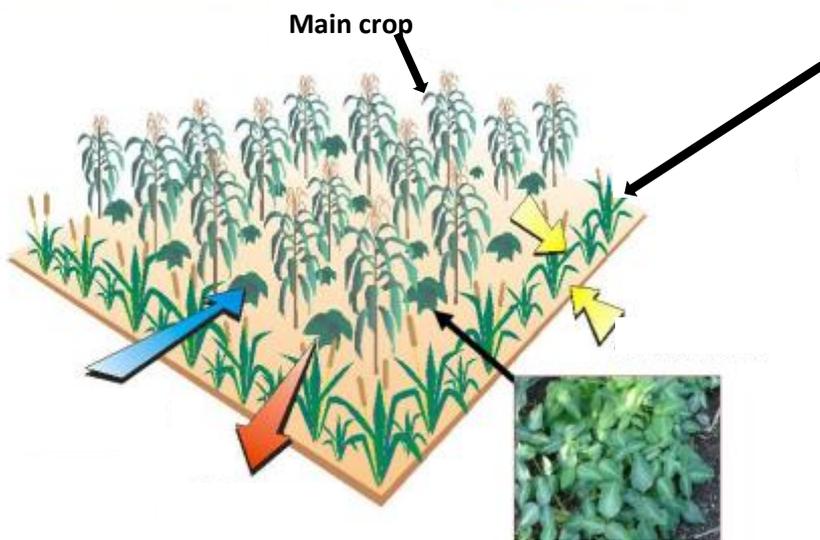


To attract pests' predators, attractive crops to predators are planted and intercropped with cash crops. One can also plant crops that repel insect pests.

The "Push-Pull" technique in the control of the Fall Army Worm uses both methods at the same time. It uses both attracting and repellent crops. The technique is based on intercropping leguminous crops such as

jack bean, lablab, pigeon pea (repellent) between maize lines and planting elephant, Napier or Bana grass (attractive) around the field. Legume crops such as jackbean, lablab, and pigeon pea repel moths as they try to lay eggs on maize (host plants) and also attract predatory insects. The elephant grass, in turn, attracts the moths, and secretes a liquid that glues the larvae and keep it fixed to the plant until it dies by hunger. In addition to repelling and controlling pests, legume crops fix soil nitrogen, cover the soil, prevent the loss of moisture and the appearance of weeds, whilst providing human food and forage for livestock. Elephant grass can also be used as forage for cattle and prevents erosion.

Push-Pull (Elements) system



Elephant grass around the main crop



Intercropping between leguminous crops such as Canavalia, Lablab and pigeon peas

Khan et al. (2010) *J. Exp. Bot.* 61: 4185



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FALL ARMYWORM-FREE WITH PIGEON PEA

Nélia Francisco prunes her intercropped pigeon peas to improve soil and control Fall Armyworm



Nélia’s maize plot with cowpea and pruned previous season’s pigeon pea, without any sign of FAW infestation

Nélia Francisco is a farmer trainer supporting the RAMA-BC project (Resilient Agricultural and Markets Activity – Beira Corridor). She lives in Honde Administrative post in Barué district, Manica province. Through field days and daily administration of her Model Family Farm (MFF), Nélia is training and leading 30 fellow farmers on RAMA-BC-supported new agricultural technologies and practices. Like other MFFs and demonstration plots supported by RAMA-BC, Nélia’s plot is centrally located in the community to make it strategically accessible for neighbors to see how adoption of new practices will impact results.

Like her neighbors, Nélia grows maize. This year, with support from RAMA-BC, she intercropped her maize fields with pigeon peas and lablabs. Doing so has many benefits, including replenishing nitrogen in the soil. “I am impressed as I am seeing how the plants are growing in the plots with pigeon pea and lablab (Hyacinth bean); it’s different to last season, which followed traditional (monoculture) practice,” says Nélia.

Farmers in Barué intercrop maize with pigeon pea already, albeit at a density too low to impact soil fertility or cover. They also plough their field every year and destroy the previous season’s pigeon pea plants, replanting them each season to follow the maize. Given pigeon pea’s capacity to sprout when cut back and in this way get a head start in

repelling early onset pests like Fall Armyworm, the project advised Nélia to carry over her pigeon pea to the next season and prune back stems to about 50cm above the ground.



Pruned and re-sprouted pigeon pea

“I planted the maize, one seed per hole, at a spacing of 90cm between the pigeon pea lines and 30cm within the row, the pigeon pea was spaced at 90x50cm,” says Nélia.

Maize was planted between the pruned pigeon pea on the 29-30 November, followed by cowpea between the maize plants on the 2-3 December and on the 4-5 December.

“One month after the maize planting, I began to see signs of Fall Armyworm (FAW) in the plots where I had not pruned the pigeon pea. This is because the smaller pigeon pea plants have less of a repelling effect on FAW. In the plots where pruning took place, where the pigeon pea is at the height of my waist, the maize was not affected by FAW.”

For farmers like Nélia, by only slightly tweaking current cultural practices (doing minimum tillage, increasing pigeon pea density, pruning instead of replanting pigeon pea), they can gradually increase soil fertility and health, whilst reducing FAW infestation. Nélia is one of 107 farmer trainers managing RAMA-BC demonstration plots, where over 3,200 farmers are engaging with improved practices and technologies.



Neighboring maize, cowpea and pigeon pea all simultaneously planted this season with visible FAW infestation