HIGHLIGHTS#3

4Rs adoption increases yields and profits in Western Kenya

THE CHALLENGE:

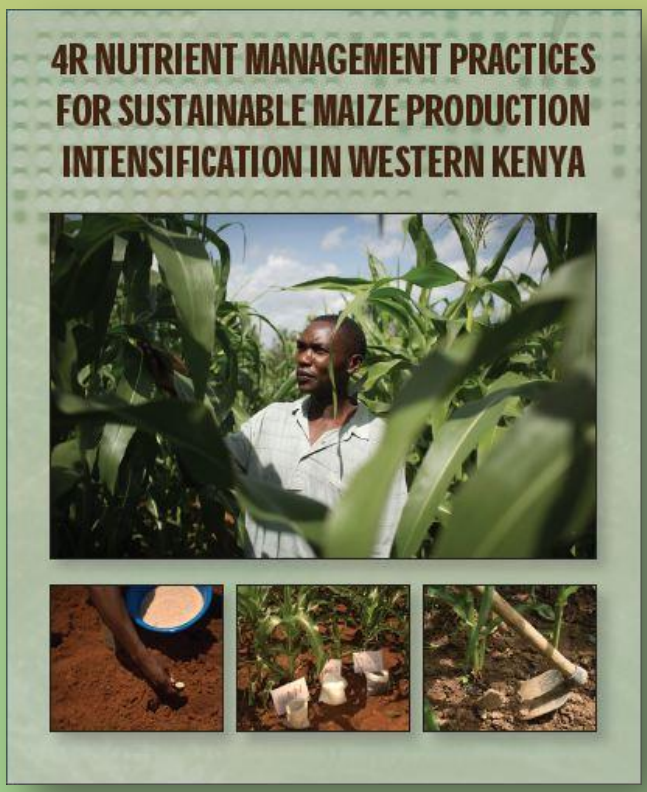
Fertilizer use in smallholder farming systems in sub-Saharan Africa (SSA) is characterized by low agronomic and economic returns in the form of low crop yields and profits. This affects farmers in the region who predominantly rely on agriculture as a livelihood source. The low agronomic and economic returns to fertilizer use are usually related to:

- Low inherent soil fertility
- Inappropriate fertilizer recommendations
- Poor fertilizer management
- Poor agronomic practices
- High variability in soil fertility across farms

For sustainable intensification of crop productivity in SSA, there is need to support farmers to manage fertilizer and other nutrient sources available to them efficiently. This would ensure that crops are provided with the correct and adequate nutrients under variable soil fertility conditions, resulting in improved yields and profits.

Low soil fertility affects crop productivity in W Kenya

Poor agronomy reduces yields and profits in W Kenya



Simplified 4R booklets were used in 4R knowledge dissemination

4Rs FOR CROP PRODUCTIVITY INTENSIFICATION IN WESTERN KENYA

The 4R Nutrient Stewardship Framework developed by the fertilizer industry aims to provide the context for efficient nutrient management focusing on four central components: applying the right fertilizer source, at the right rate, at the right time in the growing season, and in the right place. To disseminate 4R practices in SSA, the IPNI SSA Program has in the past four years implemented a project that used field and ICT-based approaches to develop and promote 4R practices that help smallholder farmers in Western Kenya to intensify crop production in a sustainable manner. This has been achieved through:

- Diagnosis of nutrients limiting yield
- Establishment of on-farm 4R learning centers
- Development and translation of 4R extension materials
- Field based training of farmers and extension agents
- Dissemination of 4R knowledge through print and electronic media

To assess the impact of the adoption of 4R components on farmer's yields and profits, seasonal assessment of yield under farmer's practice in the pilot farmer's fields was conducted, and a monitoring and evaluation survey conducted in the fourth year of the project.

BENEFITS OF 4R PRACTICES ADOPTION

Pilot farmers who adopted components of 4R nutrient stewardship were able to increase their maize yields from an average of 2.4 t ha^{-1} in the first cropping season prior to 4Rs adoption, to an average of 4.6 t ha^{-1} in the fifth cropping season (Fig 1). Farmers related the increase in yields to:

- Changes from incomplete to complete fertilizer types
- Increase in amounts of fertilizers applied
- Change from one basal application to split application of nitrogen fertilizers
- Effective weeding of farms prior to top-dressing with nitrogen fertilizers
- Planting crops at the recommended spacing and density

To assess the impact of 4Rs adoption on farmer's profits, a cost benefit analysis using value cost ratio (VCR) was conducted across six cropping season. Results indicated that the 4R practice was more profitable than the current recommended practice in all seasons.

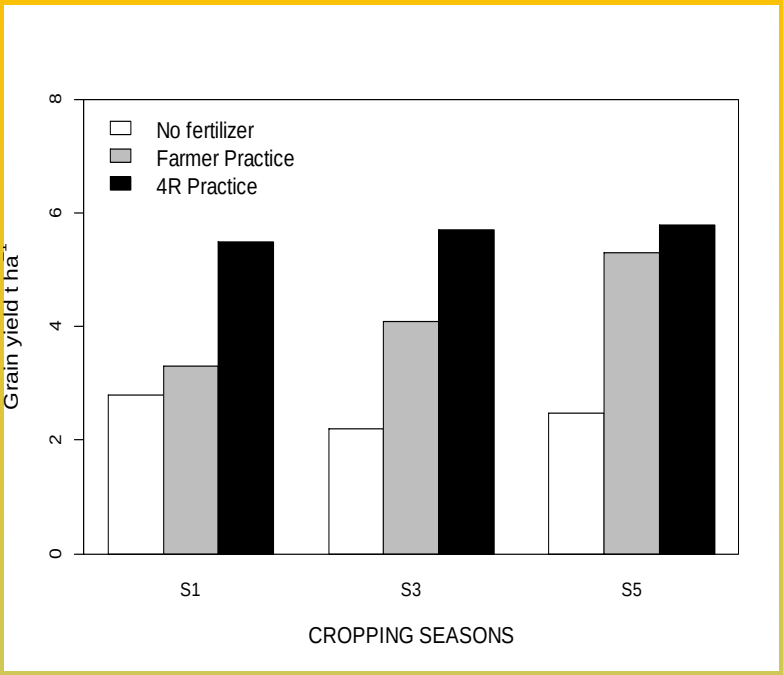


Figure 1. *Average maize grain yield under: No fertilizer use, Common farmer practice, and 4R practice.*

Field based training of extension agents and farmers was an integral part of 4R knowledge dissemination

Highlights is a bi-monthly series with topics on 4R Nutrient Stewardship SSA

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