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Farmers’ and academia’s views”

The potential of integrated soil fertility management for closing the yield gap in Ethiopia

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Abstract

The dominant farming systems across the Ethiopian highlands includes cereals, notably wheat, maize, teff, sorghum and barley with faba bean being a widely grown legume. Key constraints limiting yields are soil degradation and low soil fertility. The Integrated Soil Fertility Management (ISFM+) Project has collected and analysed data from hundreds of farmer-managed demonstration plots over a 5-year period. These compare farmers’ practices (control) with demonstrations using at least three ISFM practices. They included the use of agricultural lime on acidic soils, improved seed, organic fertiliser, rhizobia on legumes, green manure and some inorganic fertiliser. The yields of 1,878 one-year short-term demonstrations, maintained for one season and 103 long-term demonstrations, maintained for five years were measured. The results were used to evaluate the effect of ISFM on grain yields.

The mean yield across the short-term control plots was 2.88 tonnes ha⁻¹ while the ISFM plots yielded 4.81 tonnes ha⁻¹, a yield increase of 67%. Continuous use of ISFM for five consecutive years increased yields by 154%.

Soil acidity had a significant negative impact on control yields, while lime used in the demonstration plots alleviated these effects. It was found that almost all plots would benefit from liming especially in the long-term as acidification increased across the control plots. Comparing control yields to the national average showed no marked discrepancies while ISFM yields were considerably (69%) higher.

With increasing mineral fertiliser prices and a need for more sustainable farming systems, ISFM can play a key role in agroecological transformation, in alleviating food insecurity, increasing farmers’ income and reducing food imports. The 3.5 million hectares of acidic soils in Ethiopia could be made highly productive by applying lime and ISFM practices. Scaling up will however require significant private and public investment to ensure access to lime, fertiliser, rhizobia and improved seed. A system of private agrodealers supplying inputs to farmers seems the most likely option to achieve this. Hence the environment for private sector sales of agricultural inputs needs to be improved.

Keywords: Ethiopian highlands, integrated soil fertility management, lime, soil acidity, yields