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SOIL TESTING: A TOOL FOR RURAL DEVELOPMENT

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Soil infertility is the most widespread and serious agronomic problem facing small-scale farmers in communal areas, both in KwaZulu-Natal and throughout the rest of Africa. The late Nobel laureate, Dr Norman Borlaug, when speaking about food production in Sub-Saharan Africa, said "But, no matter what the variations in the agricultural system, the most common limiting factor is that plant nutrients are limiting crop production." Intelligent use of lime and fertilizers (both organic and inorganic) is, therefore, essential for improved crop and vegetable production by our farmers.



Figure 1: A rural household showing soil fertility problems in the maize grown.

Surveys in KwaZulu-Natal show that phosphorus (P) is deficient on most small farms and soil acidity and nitrogen (N) and potassium (K) deficiency are frequently problems. Nutrient removals in produce often exceed nutrient inputs in these farming systems; this is also evident throughout the rest of Africa. Because these soil fertility constraints can limit yields to well below 50% of their potential levels, reliable advice on the correction of those limitations is essential if the potential of rural areas is to be realised.

The Fertilizer Advisory Service of the KwaZulu-Natal Department of Agriculture is a useful tool utilised by a wide variety of advisers as they strive to optimise the returns on (often very limited) inputs made by the farmer.



Figure 2: A scientist from the KwaZulu-Natal Department of Agriculture checks on cabbages growing in phosphorus-deficient soil. All the cabbages were planted at the same time, but those in the foreground received phosphorus fertilizer. Nutrient-deficient soils like this are common in KwaZulu-Natal soils and rational use of fertilizers and lime is necessary for profitable crop production.

The Fertilizer Advisory Service based at Cedara analysed about 23 500 samples submitted by farmers in 2008, including over 3000 samples from small-scale farmers in the emerging sector. For each sample, 11 analyses were performed and lime and nutrient recommendations were given. In many cases this included different fertilizer options that could be used to supply the recommended nutrients. Although widely used, scientists and advisers in KwaZulu-Natal agree that there is potential for greater use of soil testing in rural development. There are many constraints to rural development, both socio-economic and agronomic, but where farmers are committed to increased production, the use of fertilizers offers good opportunities for greater profitability if they are correctly selected and applied.



Figure 3: Soil acidity has severely affected the growth of the maize on the left, whereas, on the right, applications of lime were used to correct the problem. Soil acidity severely limits cropping potential in many of the high-rainfall (and therefore high-potential) areas within KwaZulu-Natal.

The cost of fertilizers and lime often appears prohibitive to poor farmers, but their judicious use is highly profitable and usually essential for successful crop production. The Department's Fertilizer Advisory Service can be used to select the inputs that will render the best returns and the availability of fertilizers which are reasonably priced (relative to many other developing countries) must be regarded as a huge advantage in the field of rural development.



Figure 5: Application of potassium fertilizer to the soils on the right has dramatically improved dry-bean production on this potassium-deficient soil. Potassium deficiencies often occur where soils have been cropped repeatedly without attention to the replacement of nutrients removed by the crops.

Further Information

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