



agriculture & environmental affairs

Department:
Agriculture
& Environmental Affairs
PROVINCE OF KWAZULU-NATAL

USING FERTILIZER IN KWAZULU-NATAL

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Introduction

Plant roots take up water and nutrients from the soil. We all know that it is very important that plants get enough water; we also need to make sure that there are enough nutrients in our soils to allow the plants to grow well. Fertilizers can be used to supply these nutrients. Both organic and inorganic fertilizers may be used.

Types of fertilizers

The most common organic fertilizers are animal manures and composted (rotting) plant material. In addition to supplying plant nutrients, organic fertilizers improve the movement of water and air into soils, and make the soil easier to till.

Inorganic fertilizers are chemicals sold in bags. Common examples are fertilizer mixtures (such as 2:3:2 and 2:3:4), urea, limestone ammonium nitrate (LAN), superphosphate (supers), diammonium phosphate (DAP), mono-ammonium phosphate (MAP) and potassium chloride (KCI).

The most important plant nutrients are N (nitrogen), P (phosphorus) and K (potassium).

- Organic fertilizers contain N, P and K in small quantities.
- Fertilizer mixtures contain N, P and K in fairly large quantities.
- Other fertilizers contain one or two of the nutrients:
 - Urea and LAN contain N
 - Supers contains P
 - KCI contains K
 - DAP and MAP contain P and N

Phosphorus (P) and Potassium (K)

The amount of P and K fertilizer needed for a good crop depends on how much P and K is already in the soil. Soils can be tested at Cedara to find out how much P and K needs to be added as fertilizer.

Most KwaZulu-Natal soils are very deficient in P, and large amounts of P fertilizer are often necessary for satisfactory yields (Figure 1). For example, many fields require 40 to 60 kg of P/ha; this is equivalent to a recommendation of four to six bags of DAP per hectare (four to six 500mL oil tins of DAP for a 10 m x 10 m plot).

Levels of K in the soils of KwaZulu-Natal vary from very low to very high. At Makatini, and in the Tugela valley, there is often enough K in the soil for good crop growth. In areas with higher rainfall, soil K levels are often very low, especially where crops have been grown for many years without K fertilizer. For example, some fields may need as much as eight bags of KCI per hectare (seven 500 mL tins per 10 m x 10 m plot).



The effect of P fertilizer (right-hand side) on cabbage growth on a KwaZulu-Natal soil.

P and K are both important for crops. If the soils are deficient in these nutrients, and none is applied, the crop will be poor. It is important to remember that fertilizer that has no P (such as LAN) will not improve a crop if there is little P in the soil. If P and K fertilizers are applied this year, but it does not rain, and the crop does not grow, the fertilizer remains in the soil and will be useful for the next year's crop. However, more P fertilizer will need to be added when the next crop is planted because the soil holds tightly onto the P, making it difficult for the plants to use.

Nitrogen (N)

The amount of N fertilizer needed depends on the type of crop, the type of soil, and the expected yield.

- In most soils in KwaZulu-Natal that are not sandy, very little N is needed to produce a reasonable maize crop (4 t/ha).
- Crops on sandy soils need more N than those on clayey soils.
- Some crops (such as soyabeans and cowpeas) produce their own N and do not need N fertilizer; they also leave N in the soil for the following crop to use.

If there is little P or K in the soil, or the soil is acid, N fertilizer will not improve the crop.

However, if soil P and K are adequate, and acidity not excessive, and lands are well tended, a good crop may be possible, and N fertilizer will often help improve the crop. Very good maize yields (7 t/ha) require 120-160 kg N/ha (8-10 oil tins of LAN for a 10 m x 10 m plot).

What fertilizer to use

If organic fertilizers (manures) are available close to where crops are being grown, they are often cheaper to use than inorganic fertilizers. However, if fertilizer needs to be transported some distance to the fields, inorganic fertilizer is often cheaper to use, because smaller quantities are needed to get the same crop improvement.

Some farmers use both organic and inorganic fertilizers; the inorganic fertilizers are used to ensure that the crop gets the correct **balance** of nutrients. Other farmers use more than one type of inorganic fertilizer if there is no fertilizer mixture with the right balance of nutrients for their soil.

Some inorganic fertilizers used often are:

- MAP or DAP - if no K is needed. These supply P and some N.
- 2:3:2 - if some K is needed as well as P and N.
- 2:3:4 - if more K is needed as well as P and N.
- DAP together with KCI - if a lot of K is needed.
- Supers (superphosphate) - can also be used to supply P, but is more expensive than DAP for a particular amount of P; it is also more bulky to transport.
- LAN or Urea - these are used if more N is needed - they can be applied when the crop is already growing (but they should be used when the crop is still fairly small).

The amount of fertilizer the farmer needs depends on how much of each of the nutrients is already in the soil; to before spending a lot of money on fertilizer, it is usually worthwhile sending soil samples to a laboratory that can supply a fertilizer recommendation. The recommendation will provide information regarding which fertilizer to buy, and how much to use.

Further Information

More details on fertilizer use can be found in the production guidelines for the different crops, and in the Soil Fertility Course notes. Contact the Fertilizer Advisory Service at Cedara: (033) 3559 455.