Soil Fertility

Why is soil so important?

Soil supplies nutrient water and air to support plant growth

Soils is made up of both living and non living material

The most important nutrients the plant gets from the soil are

Nitrogen (N) Phosphorus (P) & Potassium (K)

- Nitrogen (N) promotes photosynthesis which provides a dark green leafy colour to plants
- Phosphorus (P) encourages flower and seed formation & promotes root development
- Potassium (K) important in the formation of chlorophyll which is essential for photosynthesis to occur

Why is soil fertility so important?

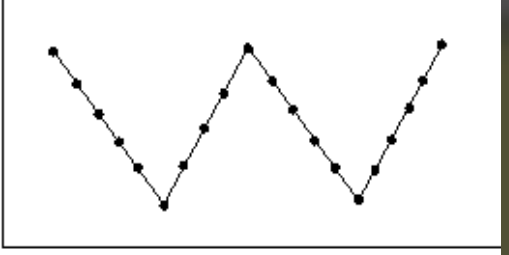
- Without fertile soil we would have no plants.
- Without plants we would have no food.
- And without food, there is no us, since we need food to survive.

Plant nutrients found in fertile soil include:

Macronutrients. Plants need these nutrients in large portions. They include nitrogen, phosphorous, and potassium and often appear in fertilizers that have the label N-P-K.

Secondary macronutrients. These nutrients include calcium, magnesium, and sulphur.

Micronutrients. Plants need these nutrients in smaller servings. Some micronutrients include boron, copper, iron, chlorine, molybdenum, manganese and zinc.



Sampling using a W shaped path is most convenient

How to test the fertility of your soil

- Using a soil corer sample depth of 100 mm (4”), take a minimum of 20 soil cores per area to create a representative of the sample area
- Soil sample by walking in a W shaped pattern across the sampling area
- Take a soil sample every 2 to 4 ha. (5-10 acres)
- Avoid any unusual spots such as old fences, ditches, drinking troughs, dung or urine patches or where fertiliser / manures or lime has been heaped or spilled in the past.
- Do not sample a field until 3 to 6 months after the last application of P and K and 2 years where lime was applied.

What soil sample results mean

Soil pH

Optimum pH for grass and cereals vary – Grassland pH is 6.3 & Cereals pH is 6.5

- Soil pH lower than optimum, has nutrients leaching from the soil. To prevent leeching a buffer is required – generally with the addition of lime.

- Soils with low or high pH will reduce the release of macro-nutrients available for plant use (N, P, K and S) this will have a negative impact on yield, regardless of grass or a cereal crop.

- Lime is a cost effective soil conditioner and is in effect a fertiliser as it can unlock major soil nutrients. Autumn and Winter are the ideal time to spread lime. Spreading lime during this period avoids the interaction with urea and cattle slurry therefore reduces potential issues with N loss.

Phosphorus (P)

Table 1. Soil P and K Index system and corresponding soil test range (ppm)

P Index		
Index 1	Very low	0-3ppm
Index 2	Low	3.1-5ppm
Index 3	Target	5.1-8ppm
Index 4	Sufficient/ High	>8.1ppm

Phosphorus (P) plays a central role in energy regulation of all organisms. The behaviour of this nutrient is opposite to that of N, being tightly bound to the soil particles and is largely unavailable to plants. Total P reserves must be monitored especially in dairy systems as cows invest a lot of P into milk production. Soil P is measured using the Morgan's Index and an Index 3 is recommended. Below this level, P-reserves can become exhausted.

Potassium (K)

Table 1. Soil P and K Index system and corresponding soil test range (ppm)

K Index		
Index 1	Very low	0-50 ppm
Index 2	Low	51-100 ppm
Index 3	Target	101-150 ppm
Index 4	Sufficient/ High	>151ppm

Potassium (K) is the third macro-nutrient required for plant growth. The behaviour lies between that of N and P. The main effect of K deficiency is reflected in a change in the botanical composition of grass swards changing from productive to unproductive species.