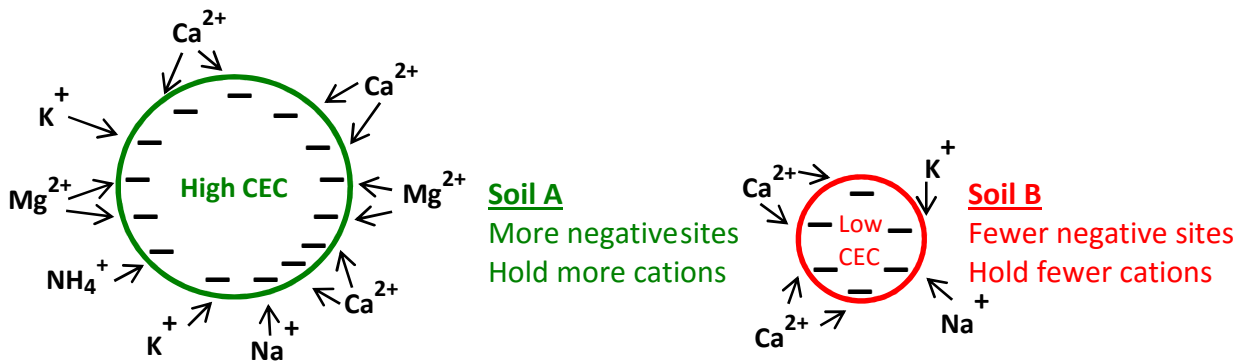


## CATION EXCHANGE CAPACITY (CEC)

This soil parameter estimates the ability of a soil to hold cations (positively charged atoms and molecules) on exchangeable sites, and thus prevent them from being leached through the soil profile. CEC is an important indicator of soil fertility i.e. a soil with a higher CEC will generally be more fertile than a soil with a lower CEC. Why? Because there are more sites available to store plant available cation nutrients.



The negatively charged sites which hold cations are derived primarily from the amount and type of clay minerals and organic matter present in the soil. Iron and aluminium minerals and oxides also contribute to the CEC, but to a much lesser extent.

Plants obtain most of the cation nutrients they require from the soil via their root system. Therefore, the greater the availability of these nutrients in the soil, the easier it is for the plant to grow.

The main cations held on the CEC system are calcium, magnesium, potassium, sodium, nitrogen (in the form of the ammonium ion), aluminium, iron and many of the trace elements.

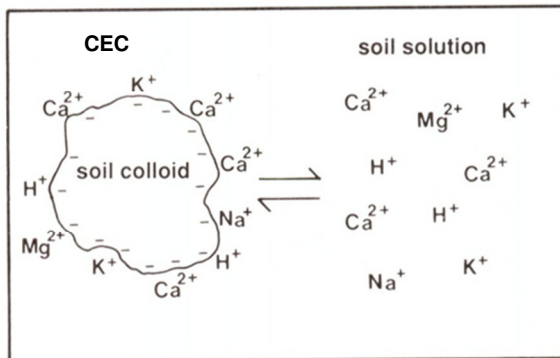
### Interpretation of Cation Exchange Capacity in terms of soil description

CEC (me/100mg)	Soil Description
5-12	Sandy or low in organic matter
<b>12-25</b>	<b>Average - silty or clay soils with low to medium organic matter levels</b>
25-40	High fertility silt or clay soils with medium to high organic matter levels
>40	Clay soils with high organic matter levels or peat soils

As a general rule, CEC is a rather stable soil property – it doesn't change much in the short term. However, it can be altered in the medium-long term, particularly if the levels of organic matter are altered. Excessive and ongoing cultivation/cropping generally lowers organic matter levels. Conversely, levels tend to increase when land use is returned to pasture.

CEC comprises a stable component and a variable charge component. The CEC of humus (organic matter that has been well decomposed) can vary from 100 - 300 me/100g, but is generally higher when the soil pH is higher. This is because the variable charge CEC component is higher when soil pH is higher. Raising the pH also increases the CEC of clay particles but to a much lesser extent.

Raising pH and increasing the humus level and quality are realistically the only two significant and practical means of increasing a soil's CEC.



Cation nutrients held on the CEC system are in equilibrium with other nutrients dissolved in the soil solution.

As a plant takes up nutrients from soil solution through its roots, other nutrients held on the CEC system can replace them.

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