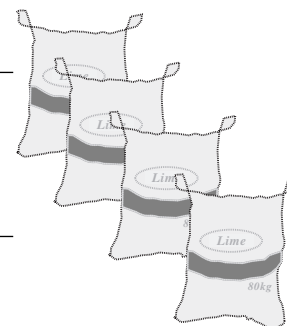


Application of lime

The amount of lime applied, depends on the pH, texture and cation exchange capacity or basic saturation of the soil. The more acid the soil, the more lime it requires. Clayey soil and soil with a high organic matter content must also be limed.

The following quantities of agricultural lime are required to increase the pH of the various soil types:

Soil texture	From pH 4,5–5,5 t/ha	From pH 5,5–6,5 t/ha
Sand and sandy loam	0,5	0,75
Sandy loam	1,0	1,5
Loam	1,5	2,0
Silt loam	2,5	3,0
Clay loam	3,0	4,0



These quantities must only be used as a guideline.

How often must lime be applied and when?

About once every 3–4 years on average in the case of heavy soils. The optimum effect of lime application on these soils only becomes apparent 2–3 years after application.

Test the pH again after 3 years to decide whether more lime is required. Smaller quantities of lime applied more often will eliminate the risk of too much lime in sandy soil.

Lime can be applied at any time of the year, but preferably immediately before ploughing. In contrast to fertiliser, lime reacts slowly in the soil, which is why it should be applied at least 6–8 weeks before planting or sowing.

The action of lime

This is a chemical process that can only take place when moisture is present in the soil. Effectiveness depends on how well the lime has been mixed with the soil and how fine the lime is. Agricultural lime and dolomitic lime contain fine as well as coarse particles. The fine material reacts quickly while the coarser particles have a long-term effect. The coarse particles should not be larger than 2 mm. The effect of agricultural lime or dolomitic lime usually only becomes apparent 6–8 weeks after application. Thereafter it builds up and reaches a peak after about 2 years.



Differences between agricultural lime and dolomitic lime

- Agricultural lime is calcium carbonate (CaCO_3), while dolomitic lime is a compound of about equal quantities of calcium and magnesium carbonate ($\text{CaCO}_3 + \text{MgCO}_3$). Dolomitic lime should be used on acid soils where magnesium deficiencies also occur.
- Dolomitic lime is slightly less soluble than agricultural lime, but its neutralising effect is about 10 % more effective, with the result that the quantity applied can be reduced by 10 % to achieve similar results.

BEWARE OF APPLYING TOO MUCH LIME!

If soils are too alkaline, nutrients such as iron, manganese, zinc and phosphorus become inaccessible to crops.

Ploughing in or tilling with disk plough

Thorough mixing to ploughing depth is essential. Ploughing in is therefore preferable. Lime worked in using a disk plough is often better utilised in the first year.

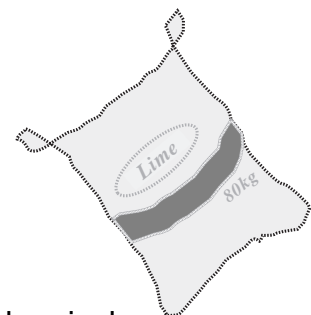
What type of lime to use

- In crop production, agricultural and dolomitic lime are normally used.
- Slaked lime or building lime is usually more economical but it is caustic and hygroscopic (absorbs moisture), which makes handling unpleasant and could delay germination. These two types are concentrated and smaller quantities can be applied.
- Apply dolomitic lime to soil with a magnesium deficiency, in other cases use agricultural lime.
- Agricultural lime with a minimum carbonate content of 80 % should be used.

Remember:

Lime that is kept out of doors does not spoil.

Finely ground lime should be absorbed more readily than coarse lime.



Can lime be mixed with fertiliser?

- If too much lime is mixed with fertiliser containing ammonia, a chemical reaction will take place that could cause a loss of ammonia. If dolomitic lime is used, this problem is usually eliminated.
- If lime and water-soluble phosphates are mixed, the phosphates become less accessible. In this case it is better to use dolomitic lime. The mixture should preferably be applied within a day or two, otherwise it tends to harden.

- On acid soil the mixing of lime and fertiliser is only a temporary measure. The real solution is to work the lime in thoroughly over the whole ploughed layer of the soil.

NB: *Lime can be applied at any time after fertiliser treatment.
Remember to plough immediately afterwards.*

Alternatives for lime application

- Use a basic form of phosphate.
- Use nitrogen which does not acidify the soil easily.
- Plant acid-tolerant crops.
- Place the lime in a band together with the fertiliser at planting time.



Advantages of liming

- Neutralises acid soil and rectifies the pH so that the highest yield can be obtained.
- Enhances the availability of phosphates and ensures that water-soluble phosphates are available to crops.
- Prevents molybdenum deficiency.
- Promotes the action of earthworms and nitrogen-fixing bacteria as well as the rotting of organic material that releases nitrogen, phosphorus, sulphur and micro-elements.
- Improves the action of fertiliser.
- It is economical.
- Prevents the build-up of toxic levels of aluminium and manganese.
- Rectifies calcium and magnesium deficiencies.
- Improves the structure of heavy soils.

For further information consult the Fertilizer Society of South Africa
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