



Excessive lime application can reduce the availability of essential nutrients mainly phosphorus & micronutrients.

Continuous application of dolomite can also hinder the uptake of potassium and vice versa. Therefore it is recommended that both soil and liming material be analyzed in the soil testing laboratories of the Coffee Board to be advised on the pH, nutrient status of soil, purity of liming material and the quantity of lime to be applied to the field.

Application of lime to the soils is mainly based on quantum of rainfall received i.e.,

- Regions receives more than 120 inch rainfall - 2 years once &
- Regions receives less than 120 inch rainfall - 3 years once

The quantity of lime/ dolomite to be applied is based on the pH of the soil. Highly acidic soils require more of the lime and vice versa.

The table below indicates the soil pH and the corresponding quantity of lime to be applied.

Quantity of lime/dolomite to be applied

SL No.	Soil pH	Quantity of lime (ton /ac)
1	<4.5	2.0*
2	4.6 - 5.0	1.5*
3	5.1 - 5.5	1.0
4	5.6 - 6.0	0.5
5	>6.1	Nil

If the recommendations is above 1.5 ton / acre and 2 ton / acre, suggested to apply the liming materials in 2 equal splits in two years.

Neutralizing value for common liming material

Minimum required Neutralizing value (% NV)	>80	>80
Neutralizing value (% NV)	100	109
MgCO ₃ (%)	--	15
CaCO ₃ (%)	80	65
Liming material	Agricultural lime (Calcium carbonate)	Dolomitic lime (Calcium and magnesium carbonate)

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SOIL ACIDITY AND ITS MANAGEMENT



Soil acidity is a condition in which the soil pH is lower than a neutral pH (less than 7). Soil pH is a measure of the hydrogen (H^+) ion concentration expressed as the negative common logarithm of H^+ concentration.

Measurement of Soil Acidity

- Soil acidity is determined using the pH scale which ranges from 0 to 14.
- A pH value less than 6.5 indicates an acidic reaction while a pH between 6.5 -7.5 is neutral and above 7.5 is alkaline.
- For optimal coffee plant growth the soil pH should be about 6.2.

Source of Soil Acidity

Several factors are responsible for the origin of acid soils. Climate, hydrologic cycle vegetation, parental rocks, human interference and other factors play important roles in the origin and development of acid soils. Generally acid soils occur in the regions where the rainfall is regular and very heavy. The following factors are responsible for the development of acid soils:

- a. Leaching of soluble bases (Ca & Mg) due to heavy rainfall.
- b. Continuous use of acid forming (Ammonical) fertilizers
- c. Climate
- d. Parental rocks
- e. topography
- f. Decomposition of Organic Residues

Soil acidity has several adverse effects:

- ❖ Increase the toxicity of aluminum, iron and manganese.
- ❖ Reduced the availability of essential nutrients like nitrogen, phosphorus, potassium, calcium, magnesium, zinc and boron.

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- ❖ Decreased activity of beneficial microorganisms in soil
- ❖ Enhanced activity of harmful microorganisms specifically fungi which cause root and other diseases.

Amelioration of soil acidity

- Correcting soil acidity using liming material is an essential soil management practice regularly undertaken in coffee plantation to maintain soil fertility and productivity.
- Soil acidity can be corrected by applying liming material such as Agricultural lime (calcium carbonate), Dolomite (calcium & magnesium carbonate), Slaked lime or Hydrated Lime (calcium hydroxide) and Burnt Lime (calcium oxide).
- Agricultural lime and Dolomitic lime are the most commonly used liming material in coffee plantations.
- Burnt lime and slaked lime, despite their higher effectiveness and faster action in neutralizing soil acidity compared to agricultural or dolomitic lime, are not commonly recommended for coffee soils as they are caustic in action and can harm the delicate feeder roots of coffee plants, and adversely affect soil micro-flora and fauna.

Determination of purity of liming material

- The purity of liming material (or) its effectiveness to neutralize soil acidity is expressed in terms of calcium carbonate equivalent (CCE) (or) neutralization value (% NV) of the material.
- The purity (or) neutralization value of any liming material is calculated considering the neutralizing value of pure calcium carbonate as 100%.
- A liming material with a neutralizing value above 80% is generally considered good.
- The particle size of the liming material is determined using a sieve test and should be such that 80% of the material should pass through 60 mesh sieve.

Choice of right liming material

- Depends on several factors such as cost per unit of neutralizing value, purity and fineness.
- Liming material should have a purity of at least 80% calcium carbonate equivalence (% NV) to be effective.
- To achieve an efficient and quick response the material should be finely powdered so that they come into contact with the soil particles upon application.

Note: Some by-products of paper mills and cement factories also contain high amounts of calcium and are generally suitable for use as soil amendments when dry. However, their suitability should be confirmed through laboratory analysis and the impurities such as sodium expressed as sodium oxide should not exceed 1% as it adversely affect soil structure.

Time of lime application

Lime application in coffee plantations can be carried out from **November to May** in the South-West monsoon area, while **November to March** is ideal for the North-East monsoon area.

Method of lime application

- The calcium and magnesium present in the liming material are released to neutralize the soil acidity when there is sufficient moisture (60% WHC) in the soil.
- It is essential to broadcast Agricultural lime / Dolomite uniformly on the field including the basin of the plants (area of fertilizer application) which is usually more acidic than the other areas.
- The broadcasted Agricultural lime / Dolomite mixed thoroughly into the soil to facilitate faster reaction.

Quantity of Lime application

It is important to note that indiscriminate use of lime in higher quantities can be as detrimental as not correcting soil acidity.

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