

The salient findings of the technology are as follows :

1. Liming alone @2-4 q/ha in furrows increased yields of different crops by 14-52% over farmer's practice.
2. The recommended application of fertilizers (100%NPK) enhanced yields of crops by 15-99% over farmer's practice.
3. The conjunctive use of Lime and fertilizers improved yields of crops further 49-189% over farmer's practice.
4. The mean benefit : cost ratio of 2.5 varied from 1.4-4.3 with conjunctive use of fertilizers and Lime.
5. The adoption of technology raised the productivity of acid soils regions by 1 tonne per ha per year.

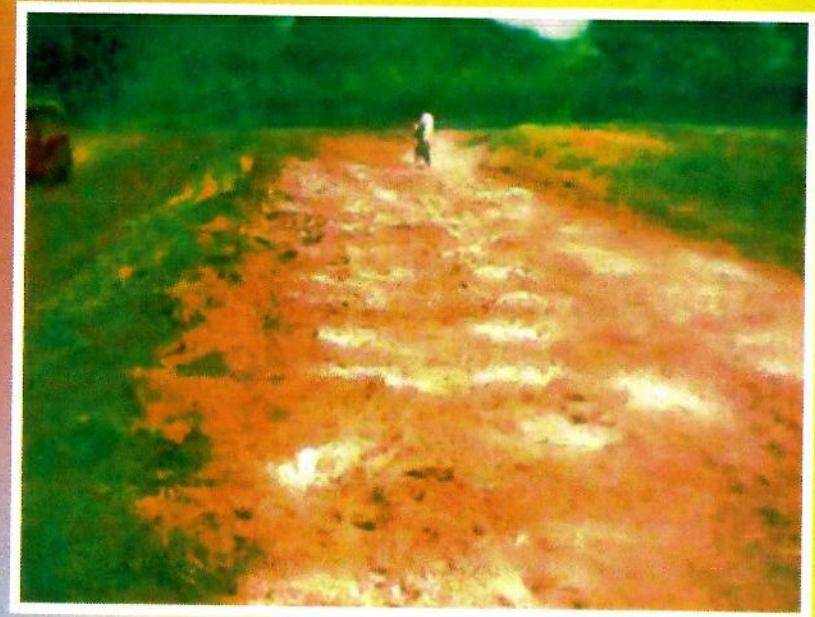
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# ACID SOIL MANAGEMENT TO IMPROVE SOIL HEALTH



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The acid soils occur primarily in high rainfall, hilly/ mountainous and coastal regions. The soils are under different land uses for growing of food crops, horticulture and plantation crops and forest etc. The highly leached soils are generally poor in fertility and water holding capacity. A substantial area with pH value less than 5.5 is more problematic with severe deficiencies of phosphorus, calcium, magnesium and molybdenum and toxicities of aluminium and iron. The average productivity of 1 tonne/ha of the soil is very low. The poor soil resource is one of the main factors of poverty and backwardness in the acid soil regions. The addition of lime to these soils neutralizes soil acidity and creates favourable environment for microbial activity, nutrients release and their availability to plants. In our country about 90 million ha of acid soils are found, which constituting over 1/4th of total geographical area of the country. About half of the area is under cultivation and rest under forestry and other uses. About 25 million ha of cultivated lands with pH value less than 5.5 are critically degraded with very poor physical, chemical and biological characteristics.

In NEH region the states having large area under degraded acidic soils are Arunachal Pradesh, Assam, Manipur, Nagaland, Mizoram and Meghalaya. The acidic soils occupy about 1.19 million ha moderately acidic (pH 4.5-5.5), 1.05 million ha slightly acidic (pH 5.5 -6.5) and total 2.24 million ha in Meghalaya state of India. The availability of Liming materials in NEH region is around 14.0 million tonnes in the form of Lime stone and cost per tonne is Rs 1000.

**Production constraints:** Acid soils have poor supply of calcium, magnesium and more concentrations of iron and aluminium. The soils therefore suffer due to deficiencies of phosphorus, calcium, magnesium, molybdenum and boron and toxicities of aluminium and iron. The soils have low organic carbon and available nitrogen. The fertilizer use is also limited in the NE States in general and Meghalaya in particular. The soils are prone to soil erosion due to their occurrence; generally on hilly terrains. The crop production therefore suffers due to poor availability of nutrients, toxicities of aluminium and iron, poor biological activity of soils and frequent moisture stress in NE India.

**Crop response to Liming and fertilization:** Based on past studies on Liming, the crops have been grouped into 3 categories:

1. **High response group:** Cotton, Arhar, Soybean.
2. **Medium response group:** Gram, Lentil, Groundnut, Maize, Sorghum, Wheat, Pea.
3. **Low response group:** Paddy, Barley and Minor millets.

The technology has demonstrated the potential benefits of liming and adequate fertilizer use in increasing yields of a variety of crops under different acid regions of the country.

**Soil management:** The two prolong strategy of liming acid soil to neutralize soil acidity and adding fertilizers to ensure adequate supply of nutrients to crops holds great promise to enhance productivity of acid soils.

The earlier approach of liming of acid soils based on time requirement 2-4 tonnes/ha and broadcast methods of application have proved to be uneconomical and least popular with the farmers. Therefore the application of Lime @1/10th of Lime requirement in furrows (500kg/ha) along with the fertilizers to the contrary were economical and acceptable to the farmers.

**Relative response of different crops of Liming :** The Lime @2-4 q/ha or minimum of 500kg/ha was applied in furrows along with fertilizers at the time of sowing of crops. Liming alone increased the yields of different crops from about 14-52 % over farmer's practice. The increased was marked in West Bengal on Wheat 52% and Mustard 35%, in Orissa on Groundnut 45% and Arhar 43%, in Jharkhand on Arhar 34%, Maize 26% and in Kerala on Blackgram 26%.

The recommended application of fertilizers (100% NPK) increased yield by 15-99% over farmer's practice at different places. The fairly good response to fertilizers application was still not adequate in acid soil regions of the country. The Liming with recommended fertilizers (100% NPK+ Lime) further increased yields of crops. The increases under conjunctive use of fertilizers and Lime were 49-189% over farmer's practice on different crops.