



## **Understanding and Improving Fertilizer efficiency in sugar cane – The role of lime, gypsum and silicon Part 1 – A general overview**

*Compiled by Andrew Beckerling and PJ Fryer – Profert (The Intelligent Choice)*

### ***Introduction***

This first article on liming will simply give an overview of all the aspects one has to think about when liming the soil. This will then lead on to the other articles that will explain each aspect that is discussed in this article. I think it needs to be emphasised that acidity control in soil dominates our thinking in KZN when we consider liming. This is because soil acidity is the primary reason and most important limiting factor in KZN that can be controlled with liming. It must be remembered that it is not the only reason or impact of liming and as Profert we believe there is an urgent need to have a more balanced approach towards the overall thinking with regards to liming. When one considers liming one should look at the farming system that is to be achieved and as sugar cane production diversifies due to the need for crop rotation, and reduced chemical intervention, liming management will have to address the system rather than just the key crop of sugar cane. It is Profert's belief that as we improve the efficiency of our farming systems more sophisticated and detailed approaches need to be adopted with the liming programs.

### **So what are all the potential benefits of applying liming products to the soil**

#### ***Acidity, pH and aluminium toxicity control***

Lime and gypsum are commonly used to control acidity and aluminium toxicity. The present SASRI recommendation is based on a carefully calculated amount required for optimum cane growth and this amount should be applied over time as a minimum requirement. If this is not done, fertilizer efficiency and growth will be reduced. Soil monitoring should also be used to confirm the impact of the liming program on this aspect in the soil.

#### ***Calcium, Magnesium and silicon nutrition***

Different liming sources have different chemical compositions. They can have calcium, magnesium, sulphur, silicon and sometimes phosphorous and some trace elements, especially if they are sourced from industry, which is going to become more and more prevalent. If treated correctly some of these nutrients can become available for the plant and can be included in the nutrient program.

#### ***Important trace element and other nutrient interactions***

Liming and especially over liming on some soils can result in some trace elements and other nutrients like phosphorous and silicon, being locked up and becoming unavailable to the plant. There are ways to make sure this does not happen and so the practical management of liming application is important.

#### ***Biological stimulation***



Liming the soil can have a significant impact on the short term (1-2 years) biological activity in the soil especially if there is adequate organic matter and trash. This can help improve nitrogen and other nutrients status in the plant, like silicon uptake in the plant.

#### ***Internal soil erosion control and soil compaction reduction***

Adding various calcium products to the soil can reduce the negative impacts of especially sodium on the soil structure. Some new thinking suggests that more regular applications of small amounts of highly active calcium sources can improve soil aeration and water infiltration of some soils, especially where the clay is of insignificant value in terms of soil structural properties. This is especially relevant in irrigated areas where water quality is poor.

#### ***Sodium/Magnesium displacement in soils***

Lime and primarily gypsum can be used to remove excessive sodium and magnesium salts from the soil profile if the drainage has been rectified. This is an important management tool in the poorly drained irrigated areas of KZN.

#### **Conclusion**

In conclusion one can see that liming isn't just about soil acidity and aluminium and we need to know what the problem is and how can liming help improve the overall growing conditions for the crop.