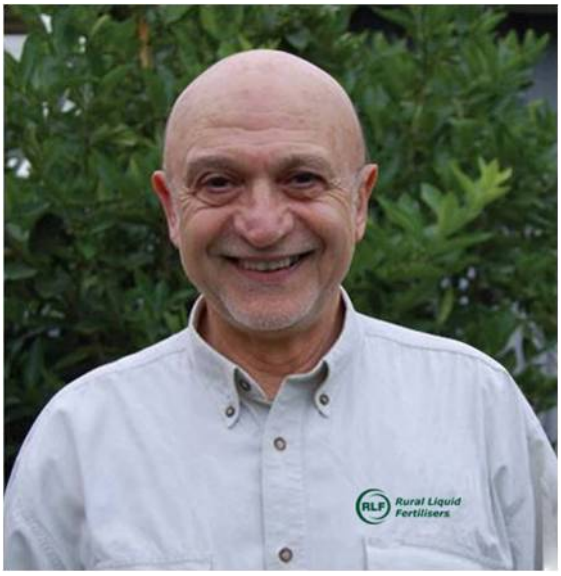
TOO LITTLE, TOO MUCH

This Insight is about the **'Ask the Doctor'** inquiry of **Mr. Greg Kaynes – RLF's Area Sales Manager (NNSW / SQLD)** about the optimal % of organic matter in soil.

By Dr. Hooshang Nassery Ph.D



'Ask the Doctor'

"Dear Hooshang, what is the optimal % of organic matter in soil? There are a significant number of graziers in the New England applying various manures at the recommendation of local agronomists. What are some of the hazards with too little / too much organic matter as a % in the soil?

Mr. Greg Kaynes
RLF's Area Sales Manager
(NNSW/ SQLD)

'Ask the Doctor' answer from Dr. Hooshang Nassery

Soil organic matter under crop and pasture vary depending on the type of cultivation, rainfall/productivity. It is generally found that after some 10 years in pasture or no till cropping, the level of organic matter stabilises around 3 to 3.5% (organic carbon of 1.5 to 1.7%). Most of the benefits of organic matter in soil is achieved at this level, in other words the annual input and breakdown of organic matter comes naturally to a balance and steady state conditions that is most sustainable in that ecosystem. Thus animal manure benefits are most prevalent when the level of organic carbon in soil is less than 1.5%. While additional organic matter either as imported animal manure or as trash left in soil (as in high productive zones such as Queensland sugar cane country), may have limited benefits, it could also have harmful effects on breakdown (mineralisation) of organic matter and steady state balance of soil and crop. For example excessive organic matter in high rainfall can induce anaerobic conditions (oxygen escaping from soil) inhibiting the activity and survival of mineralising bacteria that break down the organic matter. The shortage of oxygen could also reduce root growth as well while increasing the loss of nutrients from the roots. This could be further accentuated by toxicity of ammonium ions that accumulate in soil due to slow rate of nitrification resulting from lack of oxygen. Too much organic matter in some soils is also known to cause copper deficiency in crop and animal since organic soils can tie up copper. Phosphorus tie up in organic matter can be as high as 50% of the soil phosphorus, if organic matter is to increase without mineralisation, this pool of phosphorus would not be available for plant and could only be released if other conditions for soil mineralisation become optimum. In peaty soils of high rainfall zones for example lack of oxygen cause rising of organic matter and phosphate fixation in organic matter with little release of phosphorus unless soil in disturbed strongly or is burnt. This situation is very common in tropical forests where natural forest is replaced with oil palms.