

Sustainability – Agriculture’s “Holy Grail”

Everyone talks about it and many farmers work hard to achieve it, but what is “Sustainability” and is it real or just a dream?

In spite of everything, it may surprise you to learn that there are people who saw this coming some time ago and devoted themselves to finding solutions. Perhaps more importantly, there are growing numbers of farmers who have been able to use the results of the work done by these few researchers to remarkable effect. So not only is the light at the end of the tunnel still on – it is shining very brightly indeed!

One man who has been working to improve agricultural sustainability since the early 1960s is Ted Mikhail of SWEF Laboratories in Melbourne.

From his early work with saline soils, irrigation and drainage (first in Egypt and then Australia), to his research into “Cation Balancing” of soils and advanced plant nutrition, Ted has never lost his passion to develop agricultural systems that could be sustainably applied, even in such fragile environments as the semi-arid regions of Australia.

Now after more than 40 years, his research continues. Still based on his concept of ‘Balance’ and a belief that soil is the foundation of everything in agriculture, he is now extending his efforts into the ‘final frontier’ of agricultural management – soil biology.

Ted’s vision is that there are three basic components of sustainable agriculture – plant nutrition, soil chemistry (as this affects the physical nature of the soil, rather than just the nutrients it contains) and soil biology. Each of these things needs to be managed in a balanced way and then balanced with each other if true sustainability is to be achieved.

“I believe in treating the soil like a living thing,” Ted says. “For example, for people it is important to have good strong bones and for this they need Calcium, Magnesium, Sodium and Phosphorus – in the right proportions. In a similar way, strong, healthy soil needs Calcium, Magnesium, Sodium, Potassium and Hydrogen – in the right proportions.”

Contrary to the view of critics who attempt to measure the benefits of things like the Calcium-Magnesium ratio in terms of plant nutrition, it is in fact the effect of such proportions on the Physical Character of the soil that is important. By optimising the various components of soil physics, the cation balance provides an environment conducive to proper functioning of the soil, which in turn facilitates better crop and pasture nutrition.

Of course, plant nutrition is also important, but in contrast to the usual system of using the soil as a nutrient sponge for plants – filling it up to ‘Luxury’ levels with a few major elements, squeezing it dry and filling it up again – Ted has developed a system of advanced plant nutrition that adjusts the levels of all essential nutrients in the soil to a point where they are sufficient to provide the needs of a specific Land Use only through the period of its growing season. This system has proved successful in maintaining high levels of productivity at generally lower soil fertility levels, with little or no build up or decline in fertility over many years.

“With a good skeleton, people can grow strong muscles that require carbohydrates, protein and fat in proper proportion, so too with the plants, the main nutrients are N, P, K, but not too much!” Ted says. “And also like healthy people who need a certain amount of minerals and vitamins, plants must have the right balance of Trace Elements for good productivity.”

Of course, the underlying contention that supports this approach is that (given a suitable balance of available nutrients in the soil) plants actively seek out and take up what they need, rather than just soaking up whatever is offered. To do this they rely also upon inter-relationships within the complex biological community of the soil. For this to function effectively, there needs to be a proper balance between each of the component organisms. Until recently, however, there has been little reliable information on what that balance should be or how it can be managed effectively.

The validity of Ted’s vision has been confirmed several times over the years, with the successes achieved through application of his soil balance and plant nutrition principles. Now it has been confirmed yet again with results from recent soil biology research showing that cation-balanced soils do indeed show a consistent and predictable balance in proportions of their component soil organisms.