

Land & Water fact sheet

Sustainable nutrient management

What is it?

Managing nutrients in a sustainable cropping system aims to maintain the productive capacity of the soil, with no detrimental effects on the environment. Soil types, irrigation practices, crop nutrient removal, application methods and local environmental conditions are some of the factors involved in nutrient management.

Why change?

The old style practices of only applying an N P K fertiliser mix have long been discarded because of the long term negative impacts on soil health, and diminishing crop production figures when applying such a limited mix. There are more than 80 elements in the soil that make it healthy. By only concentrating on a few, we are upsetting the natural balance of minerals in the upper layer of soil.

How does it help me?

As with any business investment it is desirable to put in the least amount of energy, for the maximum output. If a grower knows the nutrient status in a soil at the beginning of a crop cycle, then you only need to apply a mixture of the elements that are missing. This approach to crop production reduces the risk of nutrient loss from the crop root zone, maximises production outputs, and ultimately the grower's triple bottom line.

Applying nutrients without first monitoring where the deficits are may change the balance of the soil environment, away from an optimum level. Over application of nutrients can lead to an over abundance of particular elements that may have

already been present in reasonable quantities in the soil.

You can increase your profit margin and your soil's health, by analysing what nutrients the soil are lacking and only applying what is needed for your particular crop.

In-crop nutrient monitoring as a management tool, allows the farmer to conform to the crops short term nutrient needs, while using environmentally sustainable practices.

New approaches

Rotational cropping, the use of micro nutrients (incorporating some of the other 80 elements), use of natural fertilisers made from crushed rock such as dolomite and most importantly measuring the quantities of minerals we are adding to the soil, are proving in the long term to be more sustainable and at the same time more cost effective.

These new approaches that incorporate a range of ideas are combating some of the old problems of salinity, sodicity and soil acidity.

Nutrient programs

Essentially plants are an edible, living form of nutrients. A soil test conducted at the beginning of a crop cycle analyses the opening nutrient status of the soil. For most commercial crops an approximate nutrient program can be advised



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following a soil test. This allows growers to prepare a nutrient budget where the volume and blend of nutrients and timing of application can be arranged.

Soil testing

To maximise the results of a soil test and to provide the best recommendation for the subsequent crop, the physical, chemical and biological properties of a soil, cropping history, irrigation method and water quality are all used to give the most accurate nutrient recommendation.

In-crop nutrient monitoring

In-crop nutrient monitoring is becoming a popular method of adjusting the fertiliser program, especially in higher value crops, where nutrients are applied on a regular basis throughout the growing season. The common forms of in-crop nutrient monitoring tools include sap and dry tissue analysis.

Commercial field crops are free to battle against the elements. Weather, pests and disease pressure and crop fruit load will fluctuate during the crop cycle. Therefore crop moisture and nutrient requirements will generally change in response. If the conditions in a field crop were the same as in a controlled environment, an off the shelf nutrient recipe would be suitable. However, this is rarely the case.

Protecting the environment

Nutrients are used to enhance the immediate environment where they are applied. However, if lost from the site of application, they can have a significant impact on the environment around them. Ensuring optimum methods of application are employed, timing the application of particular nutrients and managing the uptake of nutrients once applied, will maximise the benefits to the crop and reduce the risk of environmental impacts.

Nutrient loss

Loss of nutrients from the crop root zone may occur via a number of methods, including water, wind and volatilisation. Too much irrigation can leach nutrients beyond the crop root zone. Where ground cover is low, strong winds and overland water flows can carry nutrient laden soil particles away. Some forms of fertiliser, when left exposed on the soil surface, may volatilise and be lost into the atmosphere.

To find out more about Farm Management Systems contact Growcom on 07 3620 3863 or visit www.growcom.com.au/knowledgeplant

References

Malcolm Frick – personal comments

Queensland Department of Natural Resources, Mines and Water (Rural Water Use Efficiency Initiative) www.nrw.qld.gov.au/rwue

Australian Government Department of the Environment and Heritage www.environment.gov.au

Condamine Alliance www.condaminealliance.com.au

Natural Heritage Trust web site www.nht.gov.au



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