

NITROGEN AND SUGARCANE: CHANGING THE CONVERSATION TO RISK OF YIELD LOSS IF FERTILISER RATES ARE REDUCED

By

PJ THORBURN¹, L MCMILLAN¹, J BIGGS¹, Y EVERINGHAM², AJ WEBSTER³

¹CSIRO Agriculture and Food, Brisbane. ²James Cook University, Townsville.

³CSIRO Agriculture and Food, Cairns.

Peter.Thorburn@csiro.au

OPTIMISING NITROGEN (N) fertiliser management provides both financial and environmental benefits to sugarcane farmers and society. The traditional approach to optimising N management looks at the marginal gains coming from increasing application rates: that is, asking ‘how many additional tonnes of cane will I get from applying this amount more N fertiliser?’

The variability between soils, crop management, and year-to-year climate variability means the answer to this question is convoluted and difficult to interpret. So, we provide the answer to another question: ‘what is the risk of losing yield if I reduce N fertiliser by a certain amount?’

Casting the problem in a risk framework is more consistent with the way farmers run their businesses—being aware of the risks they face and implementing strategies to manage them.

We have developed a methodology for quantifying risk of yield loss for a wide range of soils in the wet tropics.

The approach starts with two components: (1) the ‘baseline’ amount of N (e.g. historical application rates), and (2) the reduction being considered. Obviously a smaller reduction in N fertiliser poses a lower risk than a larger one (e.g. reductions 10 v 50 kg/ha, Figure 1). But even a large reduction in N may pose only a small risk if the baseline amount of N is high. The pattern of losses is also affected by soil type, climate (thus location) and management factors, notably harvest date.

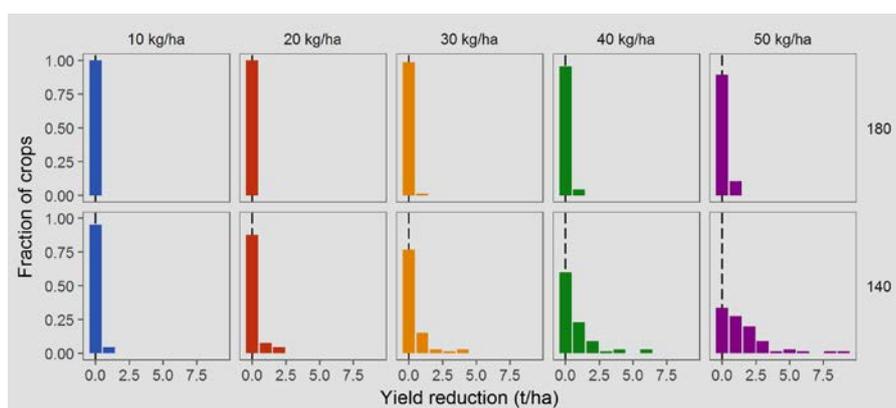


Fig. 1—Risk of losing yield when nitrogen fertiliser rate is reduced by different amounts (10, 20, etc. kg/ha) from a baseline rate of 180 kg/ha (top row) or 140 kg/ha (bottom row) for a heavy textured soil in Tully. Risk is expressed as the fraction of crops losing a certain yield (e.g. 1, 2, etc. t/ha) over 60 years. Note there can be no lost yield (i.e. yield loss of 0 t/ha). Greater N reductions increases the proportion of crops losing yield, more so for the lower baseline N rate.

Our future work will (1) validate this approach and (2) explore how farmers and others in the sugarcane industry can incorporate the approach into decision making and risk management.

One possible path to managing risk may be the establishment of an insurance product for sugarcane farmers.