MAXIMISING GROSS MARGINS LOWERS N EXPORTS FROM CROPLAND IN SOUTH-EASTERN AUSTRALIA

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ABSTRACT

Nitrogen exports from high-rainfall cropping in south-eastern Australia are an important issue. This study has simulated the economic and environmental performance of three types of wheat sown into soils with three initial N contents and using ten different fertiliser management strategies. APSIM was used to model crop yields for which gross margins were estimated. A Bayesian Network was used to estimate N export potential. Within the confines of the assumptions used in these simulations, it is clear that for the study region, where farmers optimise their gross margins they are simultaneously optimising their environmental performance. Importantly where farmers aim to optimise gross margins they achieve better environmental outcomes than if they simply aimed to maximise crop yield.

Comparing the gross margins and N export potential, it would appear that for low N soils more than 10 kg N/ha is needed at sowing. For soils with medium to high N, short and medium season wheat varieties appear to need only 10 kg N/ha at sowing and additional N fertiliser can be applied later in the season to optimise gross margins taking into account the yield potential of the crop and seasonal conditions. An apparent demand by long season wheat for more than 10 kg N/ha early in the season may necessitate provision of additional N at sowing on medium and high N soils. This study also suggests that flexible cropping systems that maximise crop potential with minimum sowing N maximise both economic and environmental performance.