



N BUDGETING TO MEET YIELD POTENTIAL - N Banks



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INTRODUCTION

Decision support systems for making N decisions

The decision support system, Nitrogen (N) Banks, offers another option for growers to estimate yield potential.

The N banking method, doesn't match seasonal yield potential, but aims to maintain a base level of fertility using N fertiliser and is considered a more 'passive' approach. The calculation is based the predication that yield has a strong relationship with annual average rainfall.

As part of the GRDC RiseWi\$e project, BCG has been testing N Banks in a network of N management trials to establish risk and reward profiles of the system.

Review during the growing season and after harvest

There are many reasons why a crop might not reach its yield potential, such as time of sowing, frost, heat and moisture stress. As the season progresses, climate outlooks generally become more reliable. Consider reviewing your yield potential throughout the growing season and especially prior to applying urea. A review after harvest, to consider any discrepancies between actual and estimated yields, is useful to identify areas for improvement in subsequent years.

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STEP 1. Determine your optimal N Bank target

This is dependent on your average annual rainfall:

$$\text{N Banks target} = ((\text{average annual rainfall} \times 0.72) - 125)$$

STEP 2. Measure soil mineral N (NO₃ and NH₄) to 1m depth

Taken from soil test results at the start of the year or using the Ridge equation: Soil mineralised N(kg/ha) = Growing season rainfall (mm) x organic carbon (%) from your soil test or an estimate x 0.15.

STEP 3. Determine N fertiliser requirement (kg/ha)

$$\text{N fertiliser requirement} = \text{N banks target} - \text{soil mineral N}$$

STEP 4. Follow your strategy

This means applying the same amount of N year-in, year-out.

Considerations:

- There may be circumstances, such as drought or economically unviable conditions (such as high urea prices), where it is unreasonable to apply the prescribed N rate.
- This doesn't hold up in areas where there is more summer rainfall (NSW) so growers may consider other tools such as Harries et. al (2022) or Yield Prophet®.

Example: A property with annual average rainfall of 300mm and 40kg N/ha soil mineral N.

$$\begin{aligned}\text{N Banks target} &= ((300 \times 0.72) - 125) \\ &= 91 \text{ kg/ha}\end{aligned}$$

$$\begin{aligned}\text{N fertiliser requirement} &= 91 - 40 \\ &= 51 \text{ kg N/ha} \\ \text{OR} &= 110 \text{ kg N/ha urea (51 divided by 0.46)}\end{aligned}$$

Reference Harries M et al. (2022) *Crop & Pasture Science*, **73**(10), 1097–1117.

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