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NSW GOVERNMENT Department of Primary Industries

# Emissions Reduction Fund:

## Fertiliser use efficiency in the irrigated cotton method (and opportunities to participate)

**Janine Powell (NSW DPI), Jon Welsh (CottonInfo) and Fiona Scott (NSW DPI)**

**Overview:**
Developed closely with the Australian cotton industry, this method is used to credit emission reductions achieved by improving the efficiency of synthetic fertiliser use in irrigated cotton.

Nitrous oxide (gas emitted from nitrogen fertilisers) has 310 times the global warming potential of carbon dioxide. The key focus of the method is improved Nitrogen Fertiliser Use Efficiency (NFUE).

$$NFUE = \frac{(lint\ yield)}{(applied\ nitrogen\ (N)\ fertiliser)}$$

Improvements to NFUE can be achieved by increasing yield from the existing rates of N fertiliser or maintaining yield from reduced rates of N fertiliser.

**Management actions:**
The method provides the flexibility to select a broad range of new management actions (for an individual farm) that will achieve emission reductions from a baseline scenario. 'New actions' must not have been used in the past six years and must be consistent with relevant myBMP standards (www.mybmp.com.au).

Examples of new management actions may include:
- modifying the synthetic fertiliser application rate, method or timing,
- modifying the type of synthetic fertiliser applied that results in increased N available to plant and/or reduces N losses from the soil.

Emission reductions are to be estimated and reported using the Irrigated Cotton Calculator (a tool developed by the Department of Environment to be used in conjunction with the Method: www.environment.gov.au/climate-change/emissions-reduction-fund/methods/cotton).

**Industry case study:**
Farmers growing cotton already try to minimise costs and maximise the use of resources, so the scope of new NFUE gains that could be achieved by participating in the scheme are not large. Initial cotton industry modelling (Welsh, Powell et al. 2015) of the viability of an avoided emissions project under the irrigated cotton Emission Reduction Fund (ERF) method found significant economies of scale are required to offset high transactional and audit costs.

A potential aggregation of ten 'average' farms in the Lower Namoi with an 80kg/ha reduction in N application (no yield decrease) resulted in a negative project return at the baseline Australian Carbon Credit Unit (ACCU) price of $10 (the actual costs paid in the most recent ERF auctions were $13.95 and $12.25 per tonne of abatement respectively). This was due to high transaction costs, with auditing being the predominant cost. Within the modelling, ten 'average' farms only just achieved the minimum bid size required for a project of 2,000t of $CO_2e$ abatement per annum.

**Aggregation:**
Aggregation is the process of bringing multiple sources of carbon abatement together. Whilst aggregation is promoted, auditing is required for each landholder within the project; this suggests economies of scale may only be achieved by the largest of cotton farms. Competing projects in other industries (eg. landfill and waste, energy and manufacturing), which enjoy larger economies of scale and with the ability to mitigate higher volumes of $CO_2e$ are more likely to be successful at auction with a lower ACCU price.

The modelled results highlight that farmers applying N fertiliser at optimal levels can reduce the carbon footprint of their cotton crop and achieve economic benefits (and co-benefits to the environment from reduced greenhouse gas emissions) at a crop enterprise level irrespective of ERF participation.

**Further information:**
- A further fact sheet, produced by the Department of the Environment, is available at: www.environment.gov.au/system/files/resources/063e5591-1c3e-4c6d-8dd9-6a8effa5474d/files/erf-fs-irrigated-cotton.pdf
- The full methodology is available at: www.legislation.gov.au/Details/F2015L00584

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