



COTTON
AUSTRALIA



**2025 National Bioenergy
Feedstock Strategy:
discussion paper**

Jennifer Brown, 30/10/25

The National Bioenergy Feedstock Strategy: discussion paper

Submission prepared by Jennifer Brown

Contents

1. Introduction	3
2. Recommendations	3
3. Submission response	4
4. Conclusion.....	7



ABOUT COTTON AUSTRALIA

Cotton Australia is the peak body for Australia's cotton growers, representing up to 1,500 cotton farms mainly in New South Wales and Queensland but also in the Northern Territory and Western Australia. Cotton Australia works with growers and stakeholders to ensure the Australian cotton industry remains viable.

Cotton Australia supports the Australian cotton industry to be globally competitive, sustainable and valued by the community. It drives the industry's strategic direction, retains a strong focus on research and development, promotes strength of the industry, manages sustainability reporting and implements policy objectives.

1. Introduction

Cotton Australia welcomes the opportunity to provide this brief submission to the Department of Agriculture, Fishery and Forestry, regarding the *National Bioenergy Feedstock Strategy: discussion paper*.

In doing so we are limiting our response to these two questions

- *Is sufficient feedstock data available to support the development of the strategy and inform investment in new bioenergy industries?*
- *Which feedstocks, or mix of feedstocks, should be prioritised for immediate deployment, and which require further research and development across the short, medium, and long term?*

Source: <https://haveyoursay.agriculture.gov.au/national-bioenergy-feedstock-strategy>

2. Recommendations

Cotton Australia recommends that

- cotton seed oil be included in the list of bioenergy feedstocks; and
- further research is undertaken to update the 2014 self-sufficiency-claim considering there have been changes in cotton planting tactics and picking machinery since that time, plus, both yields and area planting have increased.
- the Department pursue the development of the bioenergy feedstock strategy in concert with the National Food Security Strategy.

3. Submission response

From the Australian cotton industry's perspective the calorific content of cotton seed oil warrants its inclusion on the list of feedstocks, and to a lesser extent, cotton seed stalks should be considered.

A 2014 Cotton Research and Development Corporation funded study¹ considered alternative sources of energy for the Australian cotton industry. It reported measuring cotton seed oil density at 0.88g/cm³ while the calorific value of the fuel was 37270kJ/kg.

Furthermore, it referred to a 2007 study by Isci and Demirer² of cotton stalks, cotton seed hull and cotton oil cake, which using anaerobic digestion produced, in 23 days from 1g of each, respectively 65, 86 and 78ml of methane.

The report by Sandell et al³ also found that the total cotton seed oil production from a 'medium' cotton production area (that is, 141million litres or the equivalent of 116 million litres of diesel) would enable the cotton industry to be self-sufficient in such biofuel.

In 2014 the industry's medium yield generated 9.7 bales/ha with the total area put into production being 300,000 hectares. The Australian cotton crop now generates much higher yields, in fact the medium yield is now greater than 11 bales/ha. See the table below for the yields and planted area for the last five years. Being an annual crop, this table also demonstrates that the area planted will depend on the climatic season, water availability input costs and the global price for cotton lint.

Increased yields and areas planted in the last 5 years

Year	Irrigated	Dryland	Total ha planted
2024-25	12.3	2.9	480,000 [^]
2023-24	12.0	3.7	509,000
2022-23	11.4	3.4	584,000
2021-22	11.6	4.9	569,000
2020-21	11.3	4.6	301,000

[^]Cotton harvest for 2024-25 is on track to be over 5 million bales

¹ Sandell G.R., Hopf J., Chen G., Yusaf T., (2014). 'The Feasibility and Development of Alternative Energy Sources for Cotton.' National Centre for Engineering in Agriculture, Publication 1004527/1, USQ, Toowoomba. See https://www.insidecotton.com/sites/default/files/article-files/NEC1201_1_Final_Report.pdf

² Isci, A. and G. N. Demirer (2007). "Biogas production potential from cotton wastes." Renewable Energy 32(5): 750-757.

³ Sandell et. al. 2014, p59: "Total CSO production is 141 million litres for a median cotton production area, which equates to 116 million litres of diesel once differences in calorific value and combustion efficiency are accounted for. This exceeds the required 82 million litres of diesel for the same scenario, which means that the cotton industry could be self-sufficient in CSO biofuel."

Cotton Australia recommends that:

- cotton seed oil be included in the list of bioenergy feedstocks.
- further research is undertaken to update the 2014 self-sufficiency-claim considering there have been changes in cotton planting tactics and picking machinery since that time, plus, both yields and area planting having increased.
- the Department pursuing the development of the bioenergy feedstock strategy in concert with the National Food Security Strategy.

Modelling assumptions used in Sandell et. al. 2014 as listed in Tables 14 & 15

Table 14. Modelling assumptions.

Yield			
average yield	9.7	bales/Ha	Cotton Australia (2014b)
average lint yield	2.2	t/Ha	Calculated
average seed per bale	250	Kg/bale	Assumed
average seed yield	2.43	t/Ha	Calculated
bale weight	227	kg	Industry standard
average farm size	467	Ha	Cotton Australia (2014b)

Table 15. Total Australian cotton production.

		Upper	Median	Lower	source
Area	Ha	600,000	330,000	100,000	Cotton Australia (2014b)
Yield	10 ⁶ bales	5.8	3.2	1.0	Cotton Australia (2014b)
lint	10 ⁶ tonnes	1.3	0.7	0.2	Bale weight =227 kg
seed	10 ⁶ tonnes	1.5	0.8	0.2	Table 14

International cottonseed oil studies

From a rudimentary desktop study of abstracts, Cotton Australia notes that there are a number of internationally published studies concerning biodiesel from cotton seed oil that are available to further inform this updated research. An example list follows:

Density of cottonseed oil and biodiesel

NMC Talavera-Prieto, AGM Ferreira... - Journal of Chemical & ..., 2018 - ACS Publications

Optimization of biodiesel production from refined cotton seed oil and its characterization

DO Onukwuli, LN Emembolu, CN Ude... - Egyptian Journal of ..., 2017 - Elsevier

Cotton seed oil: A feasible oil source for biodiesel production

T Eevera, K Pazhanichamy - Energy Sources, Part A: Recovery ..., 2013 - Taylor & Francis

Biocatalytic production of biodiesel from cottonseed oil: standardization of process parameters and comparison of fuel characteristics

S Chattopadhyay, A Karemore, S Das, A Deysarkar... - Applied Energy, 2011 - Elsevier

Evaluation of biodiesel obtained from cottonseed oil

U Rashid, F Anwar, G Knothe - Fuel Processing Technology, 2009 - Elsevier

Biodiesel from cotton seed oil and its effect on engine performance and exhaust emissions

MN Nabi, MM Rahman, MS Akhter - Applied thermal engineering, 2009 - Elsevier

Studies on cottonseed oil biodiesel prepared in non-catalytic SCF conditions

A Demirbas - Bioresource Technology, 2008 - Elsevier

4. Conclusion

In Cotton Australia's view, it is imperative that feedstock production remains complementary to food and fibre production. We therefore wholly support the Department's statement - that to develop this bioenergy feedstock strategy, "the ongoing sustainability and social license for these developing supply chains" needs to be ensured.

Cotton Australia therefore recommends the Department pursue the development of the bioenergy feedstock strategy in concert with the National Food Security Strategy.

If you would like to discuss any part of this submission please contact Jennifer Brown, Policy Officer, Cotton Australia, email: jenniferb@cotton.org.au or ph: 02 9669 5222.



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