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MAINTAINING ACCESS TO EU BIODIESEL MARKET FOR AUSTRALIAN CANOLA

June 2025

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ACRONYMS

AASF	Australian Agricultural Sustainability Framework
ABS	Australian Bureau of Statistics
AOF	Australian Oilseeds Federation
AEGIC	Australian Export Grains Innovation Centre
AusLCI	Australian Life Cycle Inventory Database Initiative
BCR	Benefit-Cost Ratio
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CBA	Cost Benefit Assessment
CBH	Co-operative Bulk Handling
DAFF	Department of Agriculture, Fisheries and Forestry
DBFZ	Deutsches Biomasseforschungszentrum
DFAT	Department of Foreign Affairs and Trade (Australian Government)
DG ENER	Directorate-General for Energy (European Commission department)
EC	European Commission
EU	European Union
GHG	Greenhouse Gases
GM	Genetically Modified
GmbH	Gesellschaft mit beschränkter Haftung; a suffix used to denote private limited company in Germany
GRDC	Grains Research and Development Corporation
ISCC	International Sustainability & Carbon Certification
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
NIR	National Inventory Report
Non-GM	Non-Genetically Modified
NPV	Net Present Value
NRF	National Reconstruction Fund
RED	Renewable Energy Directive
SGS	SGS Germany GmbH
TBL	Triple Bottom Line

1 EXECUTIVE SUMMARY

1.1 Critical Importance of EU Market Access for Australian Canola

The European Union (EU) remains Australia's largest and most lucrative export destination for canola, accounting for 70–80% of annual exports and A$4.5 billion in farm-gate value in FY2024. EU buyers consistently pay price premiums—A$10–20/t for ISCC-certified and A$20–40/t for non-GM seed—making uninterrupted access essential for the prosperity of Australian canola growers, exporters, and regional communities.

1.2 Industry Challenge: RED II Compliance and Market Risk

EU biofuels market access is contingent on achieving progressively stricter greenhouse gas (GHG) savings thresholds under the EU Renewable Energy Directive II (RED II). Although the requirement to demonstrate eligibility falls on EU biofuel producers, they depend on access to an approved, up-to-date Life Cycle Assessment (LCA) for the feedstock - including Australian canola every five years that specifies its greenhouse gas emissions values. Without an approved or timely Country Report, Australian canola would face a conservative default emissions factor, resulting in lost premiums and a significant threat to billions in export revenue.

1.3 CSIRO's Response - Maintaining non-interrupted trade

CSIRO led the initial 2017 Country Report, securing Australia's market position for EU canola exports for FY2018-FY2022. In 2023, CSIRO coordinated and delivered the updated 2023 Country Report, in partnership with Lifecycles, Department of Agriculture, Fisheries and Forestry (DAFF), and external reviewers. This report was approved by the European Commission (EC) in September 2023, ensuring Australia's continued access to the EU biofuels market through to 2028.

Over the five-year approval period, Australian canola exports to the EU are estimated at roughly A$20–25 billion, including base sales and related sustainability premiums. This success was enabled by CSIRO and its partners' long-term investment in building LCA capability, its reputation for scientific credibility, and deep collaboration with DAFF, Lifecycles, and independent reviewers. External stakeholders emphasised the importance of trust in CSIRO's brand and the technical rigour of report, which underpinned regulatory acceptance.

> Jo Grainger, Minister-Counsellor (Agriculture), Australian Embassy, Brussels (at the time of the 2023 Country Report), noted:
> *"Scientific rigour was really important—the EU expected a high-quality product and tested us accordingly. I was really pleased with the way CSIRO very professionally handled those responses, answering every question and demonstrating that we had done a rigorous job."*

1.4 How Stakeholder Actions Convert to Approval and Benefit

Australia's continued access to the EU canola market is the result of coordinated system-wide action. Farmers implement sustainable practices and participate in certification; exporters maintain certified supply chains; CSIRO, with Lifecycles, delivers the technical submission using available data, including ABS and ABARES supplied farm surveys; DAFF and CSIRO funded the effort; DAFF manages regulatory engagement; and certification bodies audit compliance. This collaboration enabled the EC's approval.

1.5 Impact Evaluation

Approach

- **Scope**: Assessment of Country Report benefits
- **Analytical lenses:** Both incremental (2023 Country Report only) and cumulative (both 2017 and 2023 Country Reports)
- **Investment: Incremental analysis considers** $156,000 invested by DAFF and CSIRO to support the 2023 update; cumulative analysis includes entire historical investment since 2012
- **Mixed methods:** Cost–benefit analysis (BCR/NPV) benchmarked against a conservative 12-month counterfactual delay scenario and qualitative assessment
- **The Counterfactual:** What If CSIRO Had Not Acted?

  The evaluation benchmarked CSIRO's contribution against a realistic 12-month delay scenario, that could have occurred in case another organisation had undertaken the effort. While the official EU approval was delayed due to the EU's internal review timelines, stakeholders noted that without CSIRO's prior experience, existing LCA models, and established relationships, the preparation of a credible submission by another organisation and its approval may itself have taken significantly longer. In such a case, Australia would likely have faced a prolonged period without approved emission values—forcing canola exports into lower-value markets, eroding premiums, and introducing commercial uncertainty.
- **Evidence:** Desktop research, stakeholder interviews, and expert validation. The report has been reviewed by CSIRO and external stakeholders listed on title page of report.
- Evaluation uses Impact Pathway framework and is based on CSIRO's Impact Evaluation Guide 2024 refresh.

Key Results

Cost Benefit Analysis results

Analysis Scope	Costs Included	Benefit Period	Investment (AUD mil, PV FY2025$)	Net Present Value (AUD $ mil, PV FY2025)	Benefit Cost Ratio
2023 Country Report-Incremental (FY2024-FY2028)	FY2022 direct costs only	FY2024–FY2028	0.22	31.1	143
	With deadweight loss		0.26	*31.04*	*118.8*
2017 and 2023 Country Reports-Cumulative (FY2012–FY2028)	All costs since FY2012 incl.	FY2018–FY2028	7.71	68.8	9.9
	With deadweight loss		9.25	*67.3*	*8.3*

The above presents the estimated BCR and NPV attributable to the Country Reports, which were jointly delivered by CSIRO in close collaboration with Lifecycles. Results remain strongly positive even under conservative assumptions and after a 20% deadweight loss adjustment.

Credibility of CSIRO as Australia's National Science Agency

Jo Grainger, noted:
"CSIRO has brand recognition and a reputation as Australia's national science agency that lent weight and trust to our market-access dossier."

A CBH representative commented:
"If you think about it, science is CSIRO's strong point—and much of what's required in this process is the science around greenhouse gas emissions. So, it makes sense for Australia's preeminent science body to lead that work. And inherently, because people trust what comes out of CSIRO, we're all benefiting from that reputation."

Qualitative Impacts

Beyond economic gains, the 2023 Country Report delivers national value across environmental, social, and institutional domains. It verified GHG savings under EU rules, encouraged adoption of lower-emission practices on farms, and helped maintain rural incomes. The process strengthened digital reporting across the sector, deepened public–private-government collaboration, and reinforced Australia's "clean-green" credentials in global food and biofuel markets.[1] It also built national readiness for future market expectations of sustainable practices affecting other export commodities.

1.6 Conclusions

CSIRO's 2023 Country Report was a strategically significant, technically sound intervention that preserved Australia's access to a high-value, sustainability-driven export market. The evaluation confirms that the benefits—economic, environmental, and reputational—far outweigh the public investment. Stakeholder interviews affirm CSIRO's central role in securing these outcomes. With RED II approval extending to 2030, and similar sustainability rules emerging elsewhere, the report remains a practical baseline for similar prospective needs. Tracking of benefits is recommended to support any future renewal post-2028 and demonstrate continued return on public investment.

Data Sources:
CSIRO R&D team, ABARES, ABS, structured stakeholder interviews, and public datasets.

[1] https://www.graincentral.com/news/canola-growers-reminded-to-complete-iscc-forms

2 CONTEXT & PURPOSE

2.1 Background – Canola access to EU markets

Canola is Australia's flagship oilseed export: the nation shipped ≈ 6 million t of seed in FY2024, more than any other oilseed, and farm-gate sales alone were valued at A$4.5 billion.[2]
The European Union (EU) is the cornerstone buyer, typically absorbing well over half of those exports (typically 70 – 80%), paying two distinct premiums:[3]

- An International Sustainability & Carbon Certification (ISCC) sustainability premium (avg. A$10–20/t) for EU's Renewable Energy Directive II (RED II)[4] compliance, applied irrespective of GM status.
- A non-GM premium (avg. A$20–40/t) for genetically non-modified seed, preferred for its flexibility in biodiesel production and livestock feed. ISCC is typically required to access the EU market segments where this premium is realised.

Together, these premiums demonstrate Australia's competitive edge in the EU biodiesel market (though both are volatile and require strict adherence with traceability and sustainability standards). A substantial portion of Australia's canola exports to the EU is utilised in the biodiesel sector.[5]

To capture that value, Australian bulk handlers segregate non-GM ("CAN") and GM ("CAG") grades. Market reports show EU crushers paying an extra A$20-40/t for CAN seed on long-run averages, with Western Australian data putting the uplift at A$44.71/t since 2010 — a premium worth more than A$540 million to growers over these years.[6] Industry analyses during late-2024 even recorded spot spreads above A$100/t when EU rapeseed supplies tightened, indicating consumer preference.[7] [8]

Maintaining smooth, premium-priced access to the EU is therefore critical to Australia's canola economy; any failure to fulfill core market-access achievement such as timely RED II submissions, GHG performance thresholds or reporting accuracy—could erode market preference and jeopardise billions in annual export revenue from this high-volume market.

2.2 Industry Challenge and CSIRO's Response

Industry Challenge — staying ahead of a moving GHG savings target

The EU RED makes biofuel feedstocks eligible for the transport-energy market only if their life-cycle greenhouse-gas (GHG) savings exceed a mandatory tightening threshold: originally 35% in 2010, then 50% from 2017, and now 65% for any biofuel plant commissioned after 1 January 2021.[9,10] To retain uninterrupted access, each exporting country must submit a crop- and country-specific GHG life-cycle assessment (LCA) at least every five years. If no current LCA is recognised, EU buyers must apply a conservative default emission factor—which is unlikely to meet the 65% savings threshold.

[2] https://www.graincentral.com/markets/australia-details-yr-to-sep-canola-exports-of-6-13mt
[3] https://www.dfat.gov.au/sites/default/files/graingrowers-eufta-supplementary-submission.pdf
[4] formally Directive (EU) 2018/2001
[5] A detailed breakdown of the percentage of Australian canola exports to the EU that are specifically used for biodiesel production versus other applications is not available.
[6] Industry mulls home-grown alternative to ISCC for exports - Grain Central
[7] Are farmers getting screwed over on GM canola spread? - Episode 3
[8] These figures reflect the non-GM premium. While ISCC-linked premiums are also required for EU access, data on their standalone contribution is limited.
[9] https://onlinelibrary.wiley.com/doi/abs/10.1111/gcbb.12036
[10] "Life-cycle greenhouse-gas (GHG) savings" is a percentage that tells regulators how much cleaner a biofuel is than ordinary fossil diesel after every step in its supply chain has been counted.

For Australia, failure to update its Country Report in line with RED II (Directive (EU) 2018/2001)[11] would have triggered automatic reversion to the default, putting billions in annual exports at risk and reducing access to valuable non-GM premiums and high-volume exports to the EU biodiesel market.[12]

CSIRO's Response — Maintaining non-interrupted trade

- **Australia's 2017 (first) submission**: CSIRO with project partners led the compilation of the inaugural 2017 Country report - *Greenhouse gas emissions from the cultivation of canola oilseed in Australia*, quantifying cradle-to-farm-gate emissions across major growing regions. In 2017, the European Commission (EC) accepted the figures under RED I (Directive 2009/28/EC), giving exporters approved state-specific GHG values and preserving biodiesel market and premium access through to 2022.
- **Australia's 2023 update**: As the five-year approval period concluded, CSIRO in collaboration with Lifecycles updated all underlying data—fertiliser rates, yields, freight distances and the rise of dual-purpose systems—then coordinated industry, government and third-party review for the delivery of updated report ***Greenhouse gas emissions from the cultivation of canola oilseed in Australia*** referred to as 2023 Country Report in this review. Lodged via DFAT, the dossier led to Implementing Decision (EU) 2023/1760 on 11 September 2023. That decision approved new state-specific emission factors demonstrating lifecycle GHG savings above RED II's 65% threshold (applicable to fuels supplied from 1 January 2021), thereby validating Australia's approved GHG values and securing EU biodiesel market access through the end of 2028.[13] Over the five-year approval period, Australian canola exports to the EU are estimated at roughly A$20–25 billion, including base sales and related sustainability premiums.

[11] Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (recast)
[12] Renewable Energy Directive
[13] Greenhouse credentials of Australia's canola industry recognised by the European Commission - CSIRO

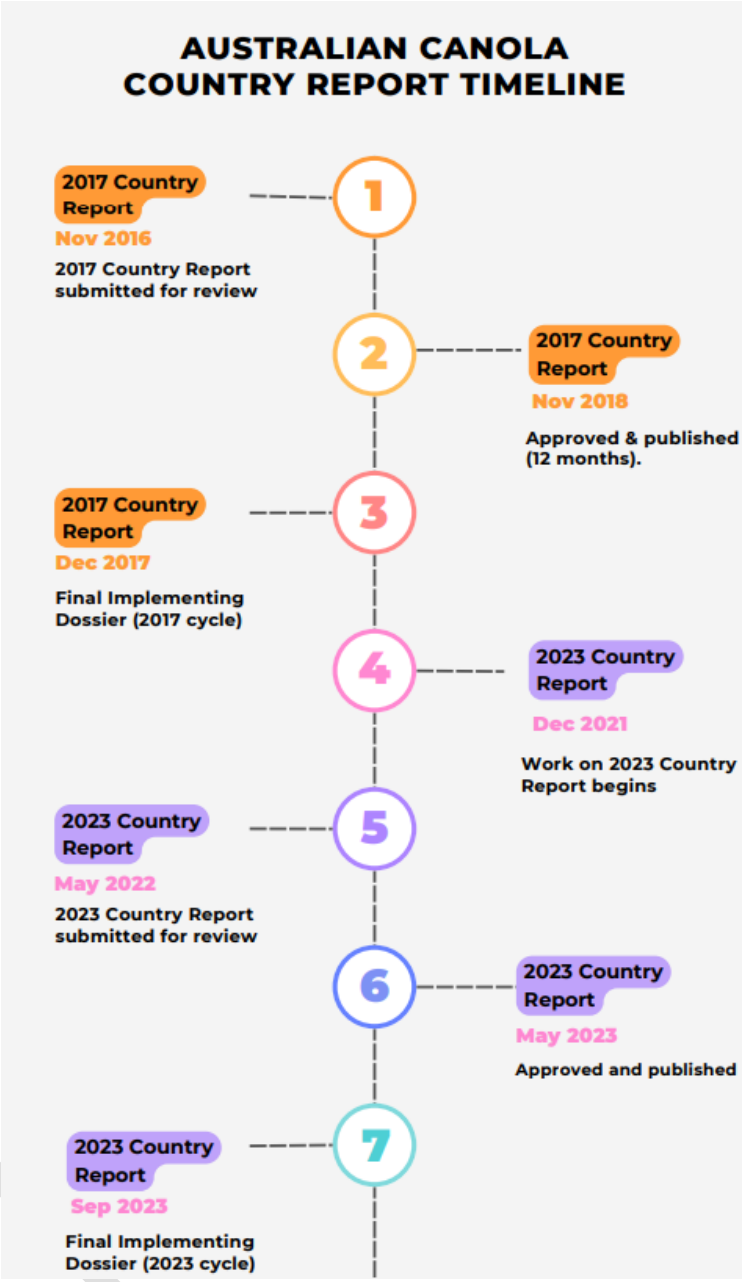

Figure 1: Australian Canola Country Report Timeline

Box 1: RED II's Role in Securing EU Biodiesel Market Access for Australian Canola

The EU's RED II allows fuel blenders to count a bio-feedstock toward their renewable-energy quota only when the fuel's full seed-to-wheel emissions are at least 65% lower than diesel (threshold for biofuel plants commissioned on or after 1 January 2021). For Australian growers to maintain uninterrupted access to this market and its premiums, two conditions must be met.

- First, the EU Directorate-General for Energy (DG ENER) must accept a crop- and state-specific life-cycle assessment. CSIRO fulfilled this requirement when its updated report on GHG emissions from the cultivation of canola oilseed in Australia was adopted on 11 September 2023 as Implementing Decision (EU) 2023/1760, locking in state-specific emission factors through to the end of 2028.

- Second, individual farmers must hold current ISCC certification. Thousands of growers satisfy this each season by lodging digital self-assessments via platforms such as LoadNet or NGR.

When both the state-level LCA and farm-level ISCC certificates are in place, exporters capture two distinct premiums: an ISCC/RED II greenhouse-gas savings premium of roughly A$10-20 per tonne, and a non-GM premium of about A$20-40 per tonne. Together these incentives underpin billions of dollars in annual canola sales to the EU.

Had Australia failed to file a timely update—or if the new calculations had exceeded the EU default—buyers would have been forced to apply RED II's conservative default factor. Experts interviewed for this review note that, while some seed may still have moved, Australian canola would have lost its "sustainable feedstock" status, making it far less attractive and eroding both premiums. Even a partial loss of EU demand could have jeopardised a material share of Australia's A$4-5 billion/annum canola export trade, while also inflicting reputational damage.

It is also important to note that while Australian canola exported to the EU is predominantly used for biodiesel production, a portion is also utilised for livestock feed and food products. The EU's RED II specifically applies to feedstocks used in biofuels, setting strict sustainability and GHG savings criteria. However, due to the complexities of supply chain logistics and the need for flexibility in allocating product after arrival in the EU, the RED II certification is typically applied to all canola exports to the region, regardless of their ultimate end use. **For clarity, all references to the "EU market" in this report refer to the EU biodiesel market, as this is where RED II achievement and associated premiums apply.**

2.3 Purpose & Scope of this Impact Assessment

This impact assessment estimates the expected triple bottom line (TBL) impacts (economic, environmental and social value) of CSIRO's 2023 Country Report—the dataset that underpins Australia's approved state-specific GHG values with EU RED II for the 2023-2028 export window. As a publicly funded agency, CSIRO is obliged to show stakeholders how the Australian Government's investment in this updated 2023 Country Report is projected to realise real-world benefits. The review therefore sets out a concise, evidence-based impact thesis that maps the causal pathway from investments in the *Greenhouse Gas Emissions from the Cultivation of Canola Oilseed in Australia* (2023 report) through to uninterrupted EU biodiesel market access, realised price premiums, and broader triple-bottom-line (TBL) benefits.

This study updates the impact assessment originally completed in FY2019 for CSIRO's inaugural 2017 Country Report. Drawing on the best available data, it estimates the benefit–cost ratio (BCR) and net present value (NPV), while also providing a qualitative assessment of direct and indirect potential benefits where quantification is not possible. Given the uncertainty around key variables—such as attribution shares, export volumes under a delayed scenario, and realised premium levels—the results should be considered indicative. Data limitations and assumptions are noted in relevant sections to guide appropriate interpretation of the findings.

Developed to stand alone or to sit alongside other CSIRO Agriculture & Food evaluations, the report supports accountability, communication and continuous learning. Target audiences include all levels of Australian government, the Department of Agriculture, Fisheries and Forestry (DAFF), the Department of Foreign Affairs and Trade (DFAT), the Grains Research and Development Corporation (GRDC), the Australian Oilseeds Federation (AOF), the Australian Export Grains Innovation Centre (AEGIC), canola growers, universities, CSIRO leadership, Co-operative Bulk Handling (CBH) group and interested members of the public.

2.4 Alignment with Broader Agendas

While the immediate goal of the 2023 Country Report was to maintain access to the EU biodiesel market, the work also aligns with wider national and institutional priorities across sustainability, trade, and agricultural development. Its relevance to key Australian and CSIRO strategic agendas is noted below.

Strategic agenda	How the 2023 Canola Country Report contributes
UN Sustainable Development Goals	SDG 7 – Affordable & Clean Energy: certified low-carbon feedstock for EU biodiesel. SDG 13 – Climate Action: independently-verified life-cycle accounting of crop emissions.
The CSIRO Book	Alignment to the following CSIRO research areas and ambitions: Research Area "Energy and Minerals" • Ambition: Decarbonised industry, exports and transportation (decarbonisation occurring in Europe but GHG is a global issue). Research Area "Food and Fibre" • Ambition: Agricultural land stewardship (demonstrating sustainability) • Ambition: Thriving farm businesses (supporting profitable agricultural businesses by selling into a profitable export market)
Australian Agricultural Sustainability Framework (AASF)	Provides a concrete exemplar of a market-access-driven sustainability assessment, raising awareness of the need for robust data ecosystems, indicator frameworks and transparent national reporting under the AASF. [14]
Trusted Agrifood Exports mission	Provided a practical exemplar of a market-access-driven sustainability assessment, informing some early thinking within the Trusted Agrifood Exports mission and DAFF.[15]
National Reconstruction Fund (NRF)	Aligns indirectly with NRF priorities on sustainable agriculture and low-emissions technology. While value-add occurs offshore, Australia's role in supplying certified low-GHG feedstock supports global decarbonisation and sustainability-linked trade.
Paris Agreement	While not contributing to Australia's domestic emissions targets, the provision of low-GHG feedstock supports global decarbonisation goals consistent with the Paris Agreement.

[14] https://aasf.org.au/
[15] At the time 2023 Country Report was done, there was strong alignment to Trusted Agrifood Exports Mission, CSIRO has since shifted its strategic focus away from this area.

3 ASSESSMENT APPROACH

3.1 Scope and framing

This impact review has two lenses.

- **Incremental lens (2023 update)**: Assesses the additional value generated by the updated 2023 Country Report alone.
- **Cumulative lens (2017 + 2023 updates)**: Examines the combined value from foundational investments and both the 2017 and 2023 Country Reports.

3.2 Impact-pathway logic and evidence lines

This evaluation follows CSIRO's impact-pathway framework, mapping a causal sequence from inputs → activities → outputs → outcomes → impacts (Section 4.2). To explore and support this sequence, the review draws on three complementary information sources:

Evidence stream	Purpose	Main sources
Desktop review	Establish baseline data, context and counterfactual	CSIRO's 2019 impact report, reports and information shared by the R&D team, industry media, EU regulatory updates. All references are noted in Appendix B.
Structured interviews	Analyse adoption pathways, practical uses and perceived risks	CSIRO team Jo Grainger (DAFF)—then Minister-Counsellor (Agriculture) in Brussels Toby Wright, Trevor Lucas and Jane Wardle- CBH
Expert review	Verify technical accuracy and fill data gaps	Internal CSIRO Agriculture & Food R&D and Impact leads and external specialists (listed on the title page) reviewed this impact report to ensure factual accuracy and technical soundness

3.3 Analytical methods

- **Cost–benefit analysis (CBA).** Where data allow, economic gains are estimated against counterfactual scenarios (See 7.3). Results are expressed as BCR and NPV for both incremental and cumulative windows (Section 8).
- **Qualitative synthesis.** Economic, environmental and social impacts that are not readily monetisable—such as reduced risk and uncertainty, enhanced international credibility, and regional economic resilience—are thematically summarised based on information from structured interviews (CSIRO and external stakeholders) and available documentation (Section 9).
- **Sensitivity testing and attribution.** Key assumed parameters such as discount rates, base price differentials (EU vs Asian markets), CSIRO Attribution are varied to illustrate the upper and lower bounds of benefit estimates. Attribution to CSIRO is assessed by asking what outcomes would likely not have occurred had CSIRO not produced the Country Reports.

3.4 Data, assumptions and confidence rating

This assessment draws on data provided by the CSIRO R&D team, ABARES, Australian Bureau of Statistics (ABS) datasets, stakeholder interviews, and publicly available sources. Where direct data were unavailable, conservative assumptions were applied and reviewed by domain experts. Key limitations include uncertainty around premium estimates, attribution levels, and supply–demand responses in the event of a delayed Country Report. A formal confidence rating is provided in the Conclusion, based on the quality of data, degree of triangulation, and materiality of assumptions.

3.5 Report Structure

This report presents a structured impact assessment of CSIRO's 2023 Country Report and its role in maintaining Australia's access to the EU biodiesel market.

- Sections 1–3 establish the context, purpose, and assessment approach, including scope, logic model, and data sources.
- Section 4 outlines the impact pathway, detailing the progression from inputs to outcomes/impacts.
- Sections 5 and 6 highlight the development and adoption phases, identifying key stakeholders, outputs, and early Outcomes.
- Sections 7 and 8 present the background and results of the quantitative impact assessment, including the cost–benefit analysis, counterfactual scenarios, benefit attribution, and sensitivity analysis.
- Section 9 provides a qualitative assessment of broader economic, environmental, and social impacts.
- Section 10 summarises key risks to inform future refresh cycles or similar R&D initiatives.
- Section 11 presents conclusions, followed by Appendices A and B, which contains supporting data on Australian canola exports to the EU and References.

The structure covers all key sections outlined in CSIRO's Impact Evaluation Guide 2024 and uses both quantitative and qualitative methods to support a well-rounded evaluation.

4 IMPACT PATHWAY

4.1 Progression from R&D to Impact

The impact pathway framework in Section 4.2 highlights how CSIRO's 2023 Country Report translates research investment into national benefit through a five-stage progression.[16] It begins with the inputs—regulation (*the need*), the resources, partnerships, technical expertise, tools and data that underpin the analysis—and moves into the activities of modelling, peer review and formal submission. Those efforts produce the outputs - an updated 2023 Country Report, which then generates outcomes such as EC approval, undisrupted trade and sustained market confidence. Finally, these outcomes accumulate into long-term impacts such as preserved export revenues, demonstrable emissions savings in the EU fuel mix, regional stability and enhanced reputation for Australia. Sections 5 and 6 investigate these Developmental (Inputs, Activities and Outputs) and Adoption (Outcomes and Impacts) phases in detail, linking each stage to the economic, environmental and social benefits documented later in this impact report.

[16] The impact pathway focuses on the 2023 Country Report ONLY.

4.2 Impact Pathway

Enablers | Innovators | Scalers | Benefits

FY2022-FY2024 | FY2022-FY2024 | FY2024-FY2028 ⟹

INPUTS
What we invest

Background IP
LCA expertise built since 2012

2017 Country Report resources
- LCA expertise and tools built under 2017 Country Report initiative

Investment & Resourcing
- Financial support from DAFF and CSIRO

CSIRO Capabilities
- Multidisciplinary teams and QA systems
- Brand recognition and trust
- Expertise in delivering complex scientific projects at national and international scales, in collaboration with industry and regulatory partners.

Partner Contributions
- Technical input from Lifecycles
- Review support from SGS and Prof Richard Eckard
- DFAT liaison support with DG-ENER EU
- GRDC, AOF, AEGIC: stakeholder support, outreach, review and rollout

Infrastructure & Tools
- Custom Excel-based LCA tool (2017), adapted for 2022–23
- CSIRO computing and delivery platforms
- Government databases such as National Greenhouse Accounts (NGA) Factors and farming statistics

ACTIVITIES
What we do

Funding & Project Setup
- Defined project scope, milestones and partner roles

Research & Development Activities
- Updated a life cycle model using new agronomic and emissions data with Lifecycles
- Incorporated dual-purpose canola and revised fertiliser assumptions
- Adapted and reused the Excel-based LCA tool developed in 2017
- Oversaw quality assurance and technical consistency of the report
- Integrated feedback from SGS and Prof Richard Eckard as internal reviewers

Stakeholder Consultation & Engagement
- Coordinated with AOF, AEGIC, and grain exporters for feedback
- Conducted targeted consultations with DFAT, industry groups, and technical advisors

Regulatory Liaison & Submission
- Worked closely with DFAT to submit the dossier to EU authorities
- Responded to formal queries and clarifications from the DG-ENER
- Final adjustments based on discussions with reviewers

Post-Submission Support
- Monitored EU approval process through to Implementing Decision 2023/1760
- Supported communication to industry on the implications of the newly approved state-specific GHG values and adoption steps

OUTPUTS
Our deliverables

Regulatory Deliverables
- Final 2023 Country Report and annexes submitted and approved under EU RED II
- Full dossier including EU responses, technical annexes, and documentation trail

Addendums

GHG Data & Analytical Tools
- Updated 2023 Australia-specific GHG emission dataset for canola
- Refined RED II-aligned Excel-based calculator, incorporating dual-purpose system parameters and fertilizer assumptions
- Internal modelling documentation for reproducibility and future updates

Technical Communications
- Summary briefs prepared for DAFF, AOF, DFAT, and CSIRO leadership
- Peer-review feedback integrated (SGS and Prof. Eckard)

Media & Publications
- Keynote presentation at the international canola conference on market access processes in Sep 2022
- Coverage in Grain Central and other ag-industry media highlighting EU acceptance and trade implications
- Internal and external impact summaries (e.g. CSIRO impact assessment report in development)
- Talking points and media support for industry partners (e.g. AOF press quotes)

OUTCOMES
The uptake, adoption, or consumption of our work

i) CSIRO (R&D)
- Enabled continued EU biodiesel market eligibility for Australian canola through 2028 via accepted 2023 Country report
- Reinforced CSIRO's role as the trusted partner for market-driven sustainability efforts by showcasing its crop-LCA expertise

ii) Lifecycles (Technical Partner)
- Strengthened role as leading agricultural LCA service provider
- Expanded technical capabilities and AusLCI database, strengthening future service delivery
- Positioned for future LCA collaborations, subject to demand and funding

iii) DAFF
- Secured recognition of Australia's low-emissions credentials for EU biodiesel market access
- Maintained stable export environment through ongoing market access
- Use of report to benchmark Australia's sustainability credentials against other countries.

iv) SGS Germany (Technical Reviewer)
- Enhanced reputation as trusted independent sustainability reviewer

v) Prof. Richard Eckard (Technical Reviewer)
- Reinforced leadership in agricultural carbon accounting and sustainability

vi) DFAT
- Minimised export disruption risks
- Improved regulatory submission processes for future renewals

vii) DG-ENER
- Access to updated, country-specific GHG data for regulatory continuity under RED II.
- Procedural learnings that may inform future LCA submissions/regulatory engagements

viii) Certification Bodies (ISCC, CORSIA)
- Enabled implementation of new GHG factors in certification protocols.
- Potential to increase ISCC-certified canola volumes with strong uptake

ix) Bulk Handlers & Exporters (CBH, GrainCorp, Viterra)
- Maintained EU supply capability and price premium eligibility
- Enhanced readiness for evolving emissions related documentation

x) Canola Growers
- Preserved premium market access; financial benefit depends on premium uptake
- Incurred short-term compliance costs to reduce long-term market-access risks
- Secured continuity of approved GHG factors even during geopolitical disruptions
- Embedded compulsory annual ISCC self-assessment and declaration, supporting biodiesel market access and reporting culture

PROSPECTIVE IMPACTS
Benefits to the economy, environment, and society

Economic
- National Economic Performance
- Securing and protecting existing markets
- Reduced risk and uncertainty
- Trade and competitiveness
- Improved insight into international sustainability requirements

Environmental
- Verified global GHG savings
- Incentivised farm-level efficiency

Social
- Regional income stability & crop diversity
- Reinforced sustainability awareness across the canola industry, with practices supporting certification and reporting
- Strengthened science–industry and government collaboration
- Australia's enhanced "clean-green" reputation

Figure 2: 2023 Canola Country Report - Impact Pathway

5 DEVELOPMENT PHASE – INPUTS, ACTIVITIES AND OUTPUTS

The Development Phase laid the groundwork for Australia's 2023 Country Report by assembling the right resources, carrying out life-cycle modelling for Australian canola, and producing the official submission report for Directorate-General for Energy (DG-ENER; EC department). Its significance lies in transforming raw agronomic and logistics data and technical expertise into approved state-specific GHG values that underpin access to EU Biodiesel market through to 2028.

Information source: CSIRO, publicly available reports

5.1 Inputs and Activities

Resources applied and activities delivered

CSIRO's 2023 Country Report was supported by a $156,000 AUD investment in FY2022, jointly funded by DAFF ($145,000) and CSIRO ($11,000). This funded CSIRO staff time and project activities, sub-contractor payments and was complemented by CSIRO's in-house technical expertise and background IP from earlier LCA research, including the 2017 Canola Country Report. Lifecycles, continuing its role from the 2017 Country Report, acted as lead technical partner, bringing specialised experience and continuity. The Excel-based LCA tool—originally developed in 2017—was updated primarily by Lifecycles in 2022 under CSIRO's oversight. CSIRO leveraged this prior work and maintained longstanding partnerships with Lifecycles and DFAT to enable effective coordination with international stakeholders and reviewers. Independent technical review was provided by SGS Germany GmbH (SGS) and Professor Richard Eckard (Prof Eckard) to reinforce the robustness and regulatory alignment of the 2023 Country Report. Infrastructure inputs included CSIRO's computing resources and project delivery systems, essential for complex modelling and data management. Additional project support came from the GRDC, the AOF and the AEGIC, on steering committee reflecting broad stakeholder commitment.

Crucially, CSIRO used Australia's National Greenhouse Accounts Factors — derived from the National Inventory Report (NIR) and updated annually — to ensure the assessment adequately reflects Australian conditions and met international credibility standards.[17]

During project setup, CSIRO identified resource needs and secured funding—coordinated by AOF and supported by DAFF. Governance arrangements and clear roles were established across contributing organisations to formalise project scope and milestones. CSIRO and Lifecycles updated the life cycle modelling with current agronomic, fertiliser, and market data, including new modelling of dual-purpose canola systems and revised fertiliser assumptions. The adapted Excel-based LCA tool incorporated these changes under internal quality assurance to ensure technical integrity. Stakeholder engagement was continuous, involving steering committee meetings and bilateral briefings with GRDC, AOF, AEGIC, DAFF, and major grain exporters to validate inputs. Feedback from technical reviews by SGS and Prof. Eckard informed refinements in the submitted report. In collaboration with DAFF, CSIRO compiled and submitted the full dossier—including the LCA report, annexes, and responses—to the EC in May 2022. The EC commissioned its review in late 2022, and CSIRO then undertook an intensive refinement of the calculations and reporting based on their feedback in early 2023, before submitting the final report in May 2023. The final approval was communicated by July/August 2023 with the official decision published in Sep 2023

Stakeholders involved: DAFF, CSIRO, Lifecycles, SGS, Professor Richard Eckard, DFAT, AOF, AEGIC, GRDC.

[17] National Greenhouse Accounts Factors: 2024 - DCCEEW

Jo Grainger, Minister-Counsellor (Agriculture), Australian Embassy, Brussels at the time of the 2023 Country Report, in interview for this impact assessment noted:

"Scientific rigour was really important—the EU expected a high-quality product and tested us accordingly. I was really pleased with the way CSIRO very professionally handled those responses, answering every question and demonstrating that we had done a rigorous job."

5.2 Outputs

The research solutions, services, and/or capacities that result from the completion of planned activities within the initiative are defined as Outputs

The primary output from this work was the 2023 Country Report ***"Greenhouse gas emissions from the cultivation of canola oilseed in Australia"***.

Secondary outputs included an updated national GHG dataset for Australian canola (2023 baseline) and a refined Excel-based RED II-aligned emissions calculator—originally developed for the 2017 submission but adapted to incorporate new production system parameters. Internal documentation was also prepared to support transparency, reproducibility, and future updates.

CSIRO's Dr Maartje Sevenster also presented on these market-access processes at the International Canola Conference in Sydney in late 2022, and industry publications such as Grain Central highlighted the EU approval's trade and sustainability implications. Additionally, the project also informed other media coverage and impact reviews.

Stakeholders involved: CSIRO project lead, DAFF, EC DG-ENER reviewers, AOF, AEGIC, Grain Central.

The key output of the Development Phase was the 2023 Country Report - *Greenhouse Gas Emissions from the Cultivation of Canola Oilseed in Australia*. Section 6 outlines the short- to medium-term outcomes for key stakeholder groups resulting from the report's acceptance by the EC.

6 ADOPTION & DIFFUSION PHASE

Once CSIRO's 2023 Country Report gained formal EU approval, industry and government partners mobilised to embed the new emission factors into every step of the supply chain. This Section traces how that approval translated into concrete short- and medium-term outcomes—grouped by stakeholder role—and sets the stage for assessing the longer-term economic, environmental and social impacts discussed in Sections 7-9.

6.1 Outcomes

Outcomes are the short- to medium-term changes triggered by the approval of CSIRO's 2023 Country report. While the foundational roles of key stakeholders have been outlined in the Inputs section, the endorsement by the European Commission (EC) activated a set of follow-on responses across the system. Table 1 below groups stakeholders by their role in developing the report and implementing the approved decision, followed by outcomes specific to key groups:

Table 1: 2023 Canola Country Report – Foundational and Broader Stakeholders & their Roles

Foundational Stakeholders Key actors who integrate the report into market- access systems	Broader Stakeholders Use the approved figures in commercial and on-farm decision-making
CSIRO *(Technical Analysis)* Developed, validated and submitted the 2023 Country Report **Lifecycles** Lead technical partner **DAFF** Provided direct funding and administrative support **SGS and Dr Richard Eckard** Delivered independent technical review, ensuring robustness and regulatory alignment	**Industry bodies (AOF, AEGIC, GRDC)** *(Guidance and support)* Updated guidance materials, provided webinars and field days; supported grower adoption and digital self-assessment
DAFF (Brussels) *(Liaison)* Acted as administrative liaison. Submitted and negotiated CSIRO's report with DG-ENER **EC DG-ENER** *(Regulatory Authority)* Formally approved the updated LCA, publishing new GHG factors for Australian canola through to 2028.	
Certification bodies (International Sustainability and Carbon Certification -EU, ISCC-PLUS, CORSIA) *(Assessment)* Updated audit protocols; began issuing certificates referencing the 2023 emission factors for qualifying consignments	**End-buyers & traders (ADM, Bunge, Cargill, etc.)** *(Market signals)* Specified ISCC certification and the 2023 GHG dataset in new purchase agreements for the EU and similar regulated markets; increased confidence in the integrity of Australia's canola supply chain
Bulk handlers & exporters (CBH, GrainCorp, Viterra) *(Commercial Adoption)* Integrated the approved GHG values into export contracts and logistics; offered access to ISCC-linked price premiums (typically A$20/t, market-dependent) as	**Financial stakeholders (investors, banks)** *(Financial enablement)* Early steps toward offering sustainability-linked finance or preferential loan terms for certified growers and handlers.

well as non-GM premiums; maintained EU market share and access status	
Canola Growers *(On-farm adoption)* Completed ISCC self-assessments and self-declaration (via LoadNet/NGR); adopted required record-keeping	

6.1.1 Foundational Stakeholders and Outcomes

i) CSIRO (Research & Development)

- Enabled Australia's continued attractiveness for EU canola exports through to 2028 by delivering 2023 Country Report that achieved EU acceptance.
- Building on its prior LCA expertise, CSIRO's involvement in the 2023 Country Report deepened its institutional capability in navigating complex regulatory assessments, stakeholder coordination, and market-access-oriented sustainability reporting. This hands-on experience is expected to inform future CSIRO programs and strengthen Australia's readiness for emerging sustainability standards across other commodities.
- Reinforced CSIRO's role as the trusted partner for market-driven sustainability efforts by showcasing its crop-LCA expertise—work that directly informs "market requirements" assessments under initiatives like the Trusted Agrifood Exports mission.
- Example metrics for tracking Outcomes: Number of subsequent LCA requests/projects attributed to this work.

ii) Lifecycles (Technical Partner)

- Solidified position as a leading provider of Australian agricultural LCA services.[18]
- Expanded technical capabilities by integrating new data sources and methodologies, enriching the Australian Life Cycle Inventory (AusLCI) database.[19]
- Positioned for future collaborations in agricultural LCA projects, contingent upon stakeholder demand and funding availability.
- Example metrics for tracking Outcomes: Number of new LCA projects secured post-2023; growth in AusLCI database entries related to canola.

iii) Department of Agriculture, Fisheries and Forestry (DAFF)

- Maintained market access, contributing to a stable export environment by securing timely EU approval, reducing export disruption risk.
- Use of the report and its findings in international advocacy and competitor analysis, demonstrating Australia's sustainability credentials.
- Use of report for ABARES competitor analysis and internal departmental briefings, leveraging the data to benchmark Australia's sustainability credentials against other countries.

[18] LCAgMetrics announced to uplift the Australian farm-to-retail agriculture industry

[19] Australian National Life Cycle Inventory Database , developed **by CSIRO** in collaboration with Lifecycles and other partners, represents a major initiative to provide and maintain a national, publicly accessible database of environmental information on a wide range of Australian products and services, covering a range of life cycle stages.

- Improved cross-agency coordination, deepening institutional experience to benefit future work.
- Example metrics for tracking Outcomes: Number of market access achievements related to canola; volume and value of canola exports to the EU; time required for future dossier approvals compared to past cycles.

iv) SGS Germany GmbH (Independent Technical Reviewer)

- Enhanced reputation as a trusted entity in providing independent technical reviews for sustainability assessments in the agricultural sector.
- Example metrics for tracking Outcomes: Feedback from stakeholders on the robustness of the review process, new business (related to this work).

v) Professor Richard Eckard (Independent Technical Reviewer)

- Strengthened position as a leading expert in agricultural carbon accounting and sustainability, influencing policy and industry practices.[20]
- Example metrics for tracking Outcomes: Number of publications citing the 2023 LCA; invitations to speak at industry conferences and workshops; Advisory Roles (related to this work).

vi) European Commission - Directorate-General for Energy

- Access to updated, country-specific GHG data for regulatory continuity under RED II.
- Procedural learnings from the 2023 review process may inform future LCA submissions and regulatory engagement strategies.
- Example metrics for tracking Outcomes: Frequency of clarifications or issues in future submissions.

vii) Certification bodies (ISCC-EU, ISCC-PLUS, CORSIA)

- Updated audit protocols to incorporate 2023 GHG factors, requiring growers to complete dual documentation (Self-Assessment + Self-Declaration) for certification.
- Potential for increased volume of ISCC-certified Australian canola if grower and handler uptake remain strong.
- Example metrics for tracking Outcomes: % of export volume certified under new factors.

viii) Bulk handlers & exporters (CBH, GrainCorp, Viterra)

- Retained ability to supply the EU biodiesel market and offer sustainability-linked price premiums where supported by market conditions.
- Continued sales into EU supported throughput across storage, handling and port assets.
- Increased readiness to respond to evolving buyer needs on emissions documentation
- Example metrics for tracking Outcomes: EU export volumes and proportion of certified contracts post-2023

ix) Canola Growers

- Preserved access to premium EU biodiesel market, with financial benefit dependent on premium availability and certification uptake.

[20] In a landscape of climate change, what is the issue with soil carbon? - Beef Central

- Incurred short-term compliance costs —such as agronomic adjustments, data collection, consulting fees, and certification audits—to reduce longer-term financial and market access risks.
- The on-time decision preserved existing rotations and regional income streams; a lapse in approval would have forced many growers to drop canola.
- Agronomic tweaks adopted for canola also lift sustainability credentials of wheat, barley and other crops on mixed farms.
- Annual ISCC Self-Assessment and Self-Declaration (via CBH LoadNet or NGR) to access EU premiums and maintain market eligibility
- Example metrics for tracking Outcomes: % of growers submitting ISCC declarations; share of certified hectares.

6.1.2 Performance Metrics

To maintain transparency and build the case for the 2028 LCA renewal, some example metrics have been suggested in the above section. These examples are not formal measurement indicators but may serve to:

- Demonstrate accountability via clearly documented implementation activities (e.g., audit throughput, declaration submissions).
- Evidence impacts through quantifiable shifts in commercial practices (e.g., contract amendments, premium payments).
- Strengthen funding proposals by presenting hard data on economic returns and verified emissions savings.

Future evaluations may refine or expand this list as more data become available and reporting needs evolve.

6.2 Impacts

Box 2: Overall impact = Direct impact + Sector level impact

Direct impact: Σ (benefits generated through directly working with customers and partners)

Sector level impact: Σ (benefits generated through raising industry's benchmark understanding and awareness, and sparking new innovations)

The 2023 Country Report, led by CSIRO with partner support, delivers impacts through both direct and enabling pathways. Direct impacts include continued access to the EU's high-volume, premium market—preserving export revenues and sustainability-linked premiums (ISCC and non-GM). Indirect impacts include improved visibility into Australia's GHG profile for canola, support for market-access infrastructure (e.g. digital self-assessment platforms), and early steps toward adoption of lower-emission agronomic practices. A snapshot of high likelihood economic, social and environmental impacts is given in Figure 2.

Any estimated benefits—whether realised or prospective—are attributable to the collective contributions of CSIRO and its project partners. It is important to emphasise that the 2023 Country Report does not, by itself, reduce emissions. Rather, it serves as a technical accounting exercise that quantifies the current greenhouse gas profile of Australian canola based on prevailing production practices.

The significance of this work lies in its ability to credibly demonstrate adherence to the EU's RED II achievement. If the report had failed to demonstrate sufficient life-cycle greenhouse gas (GHG) savings, its

value would have been negligible—highlighting that the benefit is contingent on both the actual emissions performance of Australian canola and the credibility of the methodology. The report acts as a regulatory enabler, supporting undisrupted market access and providing the evidence base required for certification bodies and downstream users to validate sustainability claims.

While developed specifically for Australian canola, the underlying methods and stakeholder coordination offer indicative guidance for future assessments of other commodities. However, direct application of the tool or dataset beyond canola would not be appropriate because of its highly bespoke nature.

The following sections assess these effects using both quantitative (Section 7 and 8) and qualitative (Section 9) approaches, providing a structured evidence base for evaluation of the value of 2023 Country Report.

7 ECONOMIC IMPACT EVALUATION

This section outlines the CBA framework that underpins quantitative assessment of impacts. It specifies the methodology, defines the scope, establishes the project and counterfactual scenarios and gives attribution estimates —providing the essential model for the detailed economic calculations in Section 8.

7.1 CBA Scope and Perspective

This Cost–Benefit Analysis (CBA) assesses the value of Australia's approved 2023 Canola Country Report through two complementary lenses – Incremental and Cumulative.

The analysis adopts a national perspective, accounting for direct public and in-kind investments by DAFF, CSIRO, DFAT, and other stakeholders. Quantified benefits primarily reflect avoided export losses and retained market premiums, while unquantified social, environmental, and reputational impacts are acknowledged qualitatively.

See Table 4 and 5 for cost and benefit timelines corresponding to each analytical frame.

7.2 CBA Cases and Methodology

This CBA measures both the incremental and cumulative net economic benefits of the Country Reports by contrasting two principal cases:

Case	Description
Project Case	CSIRO's on-time LCA updates: **Incremental Analysis**: Assesses only the 2023 Country Report. Approved in September 2023, maintained market access FY2024-FY2028. **Cumulative Analysis**: Includes the broader program of investment starting FY2012, incorporating the development of LCA capability and both the 2017 and 2023 Country Reports; , maintained market access FY2018- FY2028.
Base Case	**No CSIRO-led refresh, leading to a delay scenario:** • 2023 Country Report submitted late → default emission factor → reduced demand and partial loss of premiums (incremental lens). • Similar consequences for 2017 delay (cumulative). Other probable scenarios discussed in Section 7.3

Benefits are quantified as the present-value difference between the **Project Case** and the **Base Case**. All benefits are attributed to *With and Without CSIRO's intervention scenarios* by reference to the counterfactual scenario (Section 7.3) and the attribution rules (Section 7.4), which isolate the effects of Country Report's – timely and technically rigorous submission.

We estimate:

i) Benefit Cost Ratio (BCR), calculated as:

$$BCR = PV(B_t)/PV(C_t)$$

Where

$PV(B_t)$ *is the present value of the benefits at time t*

$PV(C_t)$ *is the present value of the costs at time t*

ii) Net Present Value (NPV), calculated as:

$$NPV = PV(B_t) - PV(C_t)$$

All figures are in real FY2025 AUD, inflated via CPI, and discounted at 7% real.

7.3 Counterfactual Analysis

Box 3: CSIRO's Role and Strategic Value

In delivering the 2023 Country Report, CSIRO's unique value lies in its ability to integrate scientific credibility, regulatory alignment, and sector coordination. While other domestic organisations may possess technical LCA capabilities for this work, none combine CSIRO's:

- Pre-existing RED I-aligned canola models and national GHG dataset (from the 2017 cycle),
- Proven experience with EC review and approval processes,
- Established relationships with DFAT and key regulators,
- Access to internal agronomic expertise and life cycle infrastructure,
- Institutional trust held by both Australian stakeholders and EU authorities.

These elements significantly reduced risk, shortened approval timelines, and increased confidence in regulatory acceptance. In the absence of this integrated capability, *another provider* would likely face delays, rework, and fragmented stakeholder engagement—jeopardising uninterrupted trade continuity during the transition period.

External validation of CSIRO's irreplaceable role.

Interviewed stakeholders emphasised that no other Australian organisation could have delivered the update with comparable speed, technical rigour or certainty.

Jo Grainger—then Minister-Counsellor (Agriculture) in Brussels—recalled that *"scientific rigour was really important…the EU tested us hard, and CSIRO answered every question professionally, demonstrating a rigorous job."*

CBH's marketing lead added that – "*CSIRO badge is "a trust element" underpinning billions of dollars in EU sales*."

Both warned that hiring a substitute provider may have likely caused months of re-work and delay, creating a costly market-access gap.

To demonstrate the value of CSIRO's 2023 Country Report, we benchmark it against two realistic counterfactual scenarios. In both counterfactuals, Australian growers face a market access gap that forces them into lower-value markets, incurring revenue losses, added costs and heightened uncertainty.

Table 2. Counterfactual Scenarios

Scenario	Rationale	Expected Outcomes
CF1: Alternate provider, delayed	A non-CSIRO agency or consultancy produces the Country Report but considering lack of CSIRO's pre-built tools, expertise, data, partnerships etc and RED II track record—approval is assumed to be delayed by 12 months. An alternate provider's Country Report eventually secures EC approval, but only after a 12-month review. During the FY2024 season, we conservatively assume 50% of Australian canola exports shift to lower-price markets, partially losing non-GM and ISCC uplifts. Although full EU volumes and premiums resume ~FY2025 (as per the assumed 12-month delay), growers endure a year of reduced returns, added transaction costs and persistent market uncertainty until final certification	- **Exports:** Full EU volumes resume only in the 2024–25 season; significant loss during the delay - **Premiums:** Partially forfeited for one year, then reinstated - **GHG credits:** Claimable only after approval - **Alternate markets:** Temporary rerouting at lower margins, lower volumes and non-premium Asian markets with added transaction costs - **Uncertainty:** One year of market instability as producers and buyers await certification
CF2: No 2023 Country Report	No updated national LCA submitted; industry cannot deliver a Country Report. With no updated country report, EU refiners revert to the conservative default emission factor. Australian canola loses competitiveness, driving a notable reduction in EU sales. Growers must scramble to sell into domestic crush or Asian feed channels—typically at 10-20 % lower base prices and without non-GM or sustainability premiums—while also bearing additional logistics, contracting and price-volatility risks.	- **Exports:** Decline and risk of market exclusion as EU buyers apply default factors - **Premiums:** Loss of all non-GM and ISCC premiums - **GHG credits:** None claimable - **Alternate markets:** Pivot to domestic/Asian buyers at lower volumes and prices with no-premiums and extra logistics costs - **Uncertainty:** Spot-price volatility and negotiation burdens - **Grower confidence:** Reduced incentive to plant canola - **Supply chain effects**: Negative effects on producers, freight, bulk handlers, exporters, and traders

Box 4: Counterfactual scenarios—Explanation and rationale

As stated in Table 2 above, the CBA considers two realistic scenarios (CF1 and CF2) of what might have occurred had the 2023 Country Report not been delivered on time or failed to demonstrate RED II GHG savings thresholds. CF1 represents a moderate, temporary market disruption, while CF2 reflects a more severe structural outcome involving potential loss of Australia's primary canola export market. In reality, this would significantly reduce grower incentives to plant canola, with the EU being the main destination. Although plausible, CF2 is difficult to quantify. It would substantially increase the estimated economic impacts, inflating both the BCR and NPV. **To ensure analytical rigour and conservatism, the quantitative modelling uses CF1 (ONLY) as the benchmark.**

A third scenario—where the report is completed but Australian canola GHG emissions found to have increased considerably and thus be an unattractive feedstock for biofuel facilities having to meet RED II's strictest GHG-saving threshold—was considered but excluded from the analysis. Under RED II regulations, any approved country-specific emission factor must be applied by fuel suppliers. In practice, the Australian Government would not have lodged a report showing higher emissions than the conservative default provided in RED II, making this scenario functionally identical to CF2 in terms of market outcomes (loss of preferential access, premiums, and GHG credit eligibility). Including this third scenario would have resulted in conceptual duplication without materially altering the evaluation results and would have shifted the focus away from assessing the Country Report's value towards questioning Australia's underlying production practices—an issue beyond the scope of this review.

Additional Notes

- Lower Australian Canola Base Prices in Alternate Markets

  ABS trade data for 2023–24 shows that, outside the EU, Japan was by far Australia's largest canola buyer (1.33 Mt), followed by the UAE (0.77 Mt), Pakistan (0.66 Mt) and Bangladesh (0.22 Mt).[21] These non-EU destinations typically price canola against global benchmarks such as ICE Canadian futures, rather than the higher Euronext Paris (MATIF) rapeseed levels paid by EU refiners for non-GM seed under RED II sustainability rules.[22]

  In late 2023–24, EU-bound non-GM canola fetched around A$700/t (Free On Board (FOB)), compared with approximately A$600/t into Asia—a spread of roughly 15% (≈A$100/t). Historical price series confirm this is not a one-off: across 2019–24, MATIF rapeseed has traded consistently 8–20% above ICE canola futures, reflecting Europe's tighter supply and biodiesel demand. Freight, currency and global supply-demand shifts can widen or narrow this gap, but multi-year data demonstrate that diverting Australian canola from its premium EU market to Asian outlets routinely incurs a significant double-digit discount in base price.

- EU premium for Australian canola

  As highlighted earlier, Australian canola typically attracts two distinct uplifts in the EU market -ISCC linked and non-GM. These premiums are market dependent. The non-GM uplift tends to widen when EU rapeseed supply is tight or Canadian GM supply is less competitive, and narrows when EU or Ukrainian harvests increase. For example, premiums spiked in early 2022 following the Russia–Ukraine supply shock but dropped significantly by late FY2024 as EU production rebounded.

- Counterfactuals for 2017 Country Report

  Comparable counterfactual scenarios also apply to the 2017 Country Report and are consistent with the 2019 Impact Assessment approach.

7.4 CSIRO's Attribution

The attribution analysis aims to reasonably isolate a reasonable share of net economic benefits from demonstrating GHG savings performance above RED thresholds that can be credited to the Country Reports, recognising that the realisation of these benefits depends on multiple contributors and enabling conditions.

Experts interviewed for this review emphasised that the majority of economic value arising from uninterrupted EU market access is generated at the farm level. Producers and exporters must meet strict on-farm certification needs and maintain high production standards; without this compliance, no technical report could demonstrate the required GHG savings. As such, an estimated 70% of value is attributed to producers, including their participation in sustainable production and certification.

The *2023 Country Report* was a collaborative effort between CSIRO and Lifecycles and served as a mandatory technical input into the RED II approval process. The combined LCA work—including data processing, modelling, documentation, and submission—was a necessary component. As previously mentioned, the realisation of associated benefits depended on the actual emissions performance of Australian canola; consequently, the Country Report is estimated to account for approximately 20% of the overall benefits. CSIRO led the delivery of this work, holding overall responsibility and accountability. While Lifecycles was

[21] Australia details yr to Sep canola exports of 6.13Mt - Grain Central
[22] Why the GM discount? - Mecardo

contracted to perform much of the detailed technical analysis, CSIRO provided technical oversight, coordinated stakeholder engagement, managed delivery timelines, and acted as the primary liaison with the key stakeholders. While the full 20 % is attributed to the joint deliverable, CSIRO's standalone share is estimated at roughly 10 %.

The remaining benefit (approximately 10%) reflects the contribution of other system enablers, such funding agencies, certification bodies, liaison functions etc.

This allocation reflects the integrated and collaborative nature of compliance, linking farm-level practices, technical submissions, and continued market access. Attribution estimates were validated through industry feedback and provide a transparent basis for evaluating CSIRO's contribution within the broader set of realised benefits, see Table 3.

Table 3: Key Stakeholder Attribution Estimates

Attribution Entity	Attribution Share (FY2023–28)
Farm-level actions (e.g. ISCC compliance, sustainable practices)	70%
2023 Country Report (CSIRO and Lifecycles)	20%
Other system enablers (e.g. funding agencies, certification bodies, liaison functions)	10%

8 QUANTITATIVE ASSESSMENT OF IMPACTS

This section presents a CBA of CSIRO's Country Reports, using both incremental and cumulative approaches. It benchmarks benefits against CF1: a 12-month delay in EU approval. The analysis quantifies benefits from:

(i) preserved EU market access, and
(ii) retained ISCC and non-GM premiums.

Results and sensitivity tests are provided in Sections 8.1–8.3.

8.1 Cost Benefit Analysis

This section estimates the economic value of CSIRO's Country Reports through both incremental and cumulative CBA. While core scope and framing have been introduced in Chapter 7 earlier, some foundational elements are repeated here to support transparent interpretation of results.

These analyses consider preserved export access, retained price premiums, and R&D cost outlays, while acknowledging that uncertainties—such as volume, price, attribution, geopolitical factors, and supply–demand effects in the event of a delayed report—make these estimates indicative rather than predictive. Section 8.3 provides sensitivity analysis to explore the impact of these variables.

Costs

Table 4 provides investment streams and timelines for the analyses

Table 4. Cost Streams and Timelines for Incremental and Cumulative Analyses

Investment Stream	Description	Timeline	Included In	Value (AUD, PV FY2025$)	Source	Notes
Foundational LCA capability investment and 2017 Country Report development	1) **Capability Building**: Early investment in LCA data, tools, partnerships 2012–2016	FY2012–FY2016	Cumulative only	$7,708,812	2019 Impact Assessment	Invested by several partners such as CSIRO, NSWDPI, GRDC, AEGIC etc
	2) **2017 Country Report**: Development, modelling and RED I submission	FY2017–FY2018				

2023 Country Report	R&D, stakeholder coordination, peer review, submission	FY2022–FY2023	Both	$219,623	CSIRO R&D Team	Invested by DAFF and CSIRO
Adoption Costs	Compliance/adoption costs borne by growers or handlers	Not specified	Excluded	N/A	—	Assumed constant across scenarios

Key Assumptions and Notes

1. CSIRO is assumed to incur lower incremental R&D and coordination costs due to its prior work on the 2017 report, pre-existing models, and established stakeholder relationships. An alternate provider would likely face higher costs and longer timelines.
2. All CSIRO-specific project and coordination expenditures are assumed to occur prior to formal EC approval, with negligible carry-over into the post-approval period.
3. Adoption costs—such as audits, certification, and system updates incurred by growers and exporters—are excluded from both analyses as they are assumed to be non-incremental to CSIRO's involvement and constant across provider scenarios.
4. All cost values are expressed in present value terms (FY2025 AUD), adjusted using the Consumer Price Index (CPI), and discounted at a standard rate of 7%, in line with CSIRO's Impact Evaluation Guide (2024).
5. Benefit window: Benefits are aligned with EU Implementing Decisions:
   - Decision 2016/2125 (for FY2018–FY2022)
   - Decision 2023/1760 (for FY2024–FY2028)

Box 5: Foundational Investments and Enabling Investments for LCA Capability (FY2012–FY2016)

Between FY2012 and FY2016, CSIRO and partners invested $2.9 million AUD (nominal) to establish an agricultural LCA capability and supporting life cycle inventory (LCI) datasets. This initiative was led by Dr. Sandra Eady (then CSIRO) in collaboration with Tim Grant of Life Cycle Strategies (now Lifecycles), who developed the Australian Life Cycle Inventory (AusLCI) database. The multi-year program aimed to build national agricultural LCI capacity in anticipation of sectoral demand for robust LCA data and tools. It involved a collaborative partnership among CSIRO, the AOF, the AEGIC, the GRDC, and multiple subcontracting partners.

The first - 2017 Country Report was directly enabled by this foundational investment, drawing on the newly developed LCI datasets and modelling tools. The second – 2023 Country Report similarly relied on this core capability, as well as the methods and infrastructure developed through the 2017 review. Both reports represent applied outputs of the LCA platform, which provided the technical underpinnings for Australia's RED II approval and associated canola export benefits.

Although the incremental cost of producing the 2023 review was modest, its delivery was only possible due to the foundational investment in capability and tools. This historical investment remains central to understanding the program's value proposition and delivery efficiency.

As noted in Section 6.1.1(x), canola growers also incur foundational on-farm costs—including agronomic adjustments, data collection, consulting fees, and certification audits—in order to realise these export benefits. While these costs are expected to be material, no estimates were available for inclusion in this analysis.

Additionally, as noted in Section 5.1, this work was heavily reliant on data such as Australia's National Greenhouse Accounts Factors — derived from NIR—a critical infrastructure asset maintained by DCCEEW, ABS and ABARES supplied farm surveys etc. The development and upkeep of the NIR entail substantial public investment and provided essential GHG baselines that underpinned the technical credibility of the Country Reports.

These foundational and enabling investments—though outside the scope of this incremental analysis—form the technical and institutional base upon which the 2017 and 2023 Country Reports were built and are essential for interpreting the long-term return on public investment.

Benefits

Table 5 summarises the key economic benefits of CSIRO's 2017 and 2023 Country Reports, specifically the preserved value of EU market access and retained price premiums for Australian canola. The analysis adopts a deliberately conservative modelling approach. Based on stakeholder feedback, it is plausible that a delayed or non-compliant report could have jeopardised a large share of EU-bound exports; however, this assessment assumes only 50% of volumes would have been diverted. In those cases, canola is modelled to sell into lower-value Asian markets at a 15% price discount, relative to EU FOB prices. The sustainability premium—estimated at A$20/t — is also conservative, representing a blended figure across ISCC and non-GM certification, generally estimated between $20/t - $60/t. Together, these inputs ensure the benefit estimates are directionally robust without overstating the value of Country Reports led by CSIRO.

Table 5: CSIRO Country Reports – Benefits Estimates

Benefit stream	Description and Approach	Value (AUD mil, PV FY2025$)		Source of Data
		Incremental (FY2024-2028)	Cumulative (FY2018-2028)	
i) **Overall Benefits – B1** **Preserved EU base Revenue and High - Volume Market Access** Australia ships ~2 Mt/yr of non-GM canola to the EU.	**Increment vs. CF1 (12-month delay):** Avoids the 12-month EU market shortfall in exports. Key benefits estimated as: $B1CF1_{FYi}$ = (Canola exports to EU_{FYi}) × 0.5 x 0.15 × (Average FOB Price to EU_{FYi}) Where - **$B1CF1_{FYi}$ =** Incremental benefit (AUD $) from preserving the higher EU base price under the Project Case versus CF1 (LCA not yet approved) - **FYi** = Financial Year i, where i is 2018 and 2024 - **Canola exports to EU_{FYi}**= Tonnes of Australian canola exported to the EU in FY *i* (see Appendix A) - **Average FOB Price to EU_{FYi}**= Average price of canola exported to the EU in FY *I* (see Appendix A) - **0.50 =** Assumed share of EU exports impacted by failure to meet RED I and II thresholds. - **0.15 =** Assumed 15 % base-price advantage for EU sales over alternative Asian markets	131.8	253	- ABARES reported Australian Canola exports to EU quantity & values used - Estimates (validated by reviewers) where official data unavailable for assessment - ISCC certification premium - Non-GM Aus Canola Premium - Export values reported by ABARES and ABS are composite prices that typically include both base prices and any premiums in a single figure - The overall premium is estimated as $20/t for the entire assessment period - See Additional Notes, in Section 7.3 - See Key assumptions/data interpretation section below - See Appendix A
ii) **Overall Benefits – B2** **Retained Australian Canola Price Premiums (non-GM and ISCC alignment)**	**Increment vs. CF1 (12-month delay):** Prevents forfeiture of EU sustainability premiums during the one-year approval delay. Key benefits estimated as: $B2CF1_{FYi}$ = (Canola exports to EU_{FYi}) × 0.5 x 20 Where - **$B2CF1_{FYi}$ =** Incremental benefit (A $) in Financial Year *i* from retained price premium under the Project Case versus CF1 (LCA not yet approved) for the assessment cases - **FYi** = Financial Year i, where i is 2018 and 2024 - **Canola exports to EU_{FYi}**= Tonnes of Australian canola exported to the EU in FY *i* (see Appendix A) - **$20/t =** Assumed an overall (i.e. for non-GM as well as ISCC certified) $20/t premium advantage for Australian Canola for EU sales over alternative Asian markets	24.7	54.1	

Benefit stream	Description and Approach	Value (AUD mil, PV FY2025$)		Source of Data
		Incremental (FY2024-2028)	Cumulative (FY2018-2028)	
iii) CSIRO led Country Report Attribution	Attribution reflects the share of total benefits linked to the Country Reports, not solely to CSIRO: o 2017 Country Report Attribution: 30% o 2023 Country Report Attribution: 20%	-	-	- The 2017 attribution is based on the 2019 Impact Assessment but has been adjusted downwards considering stakeholder feedback. - The 2023 attribution is also informed by stakeholder consultation (see Section 7.4) and reflects the collective contributions of CSIRO and ecosystem partners in realisation of these benefits
Overall Benefits (AUD mil, PV FY2025$)	Total economic gains from preserved EU access and retained premiums (no gap), attributable to all key stakeholders under the Project Case.	156.5	307.3	
Country Report Attributable Benefits (AUD mil, PV FY2025$)	Portion of total benefits attributed to the Country Reports	31.3	76.5	
CSIRO's attributable benefits (AUD mil, PV FY2025$)	Share of Country Report benefits attributed to CSIRO's leadership and delivery role (estimated at 50%).	15.65	38	

Assumptions (Benefits) and data interpretation

1. Only 50% of EU-bound exports are considered at risk without timely approval of the 2023 report, despite stakeholder evidence suggesting a potentially higher risk.

2. Asian market prices are conservatively estimated at 85% of EU values, reflecting typical discounts in lower-value, non-premium destinations lacking sustainability-linked price uplifts.

3. Interpreting ABS average prices – EU vs non-EU

ABS FOB averages occasionally show higher prices for non-EU destinations than for the EU, even though EU crushers pay a non-GM/ISCC uplift (≈ A$25–50 t in tight markets).

- Timing & parcel size: EU contracts are usually locked in at harvest, when prices are seasonally lowest, and shipped in large panamax lots that attract volume discounts. Non-EU cargoes are often sold later—after global prices rebound—or in smaller, higher-cost parcels (e.g. container lots into Japan or the UAE), lifting the recorded per-tonne value.[23]
- Currency & basis effects: EU deals are priced "MATIF ± basis" in EUR; AUD movements or futures declines between contract and customs clearance can lower the AUD-denominated FOB value, while non-EU sales priced off ICE/CBOT in USD may show the opposite effect.
- Market scale: The EU typically absorbs 40–70 % of total Australian canola exports. Even if its average FOB price appears a few dollars lower in some years, the ability to clear large tonnages early—at predictable prices and with sustainability premiums—remains highly favourable for Australian growers.

A higher non-EU average in ABS data therefore reflects shipment timing and parcel mix, not a hidden premium in Asia; retaining EU access is still critical to volume and revenue stability.

4. Export volume outlook for future years

- Blend-cap headroom: Under RED II, each EU member state caps crop-based biofuels at 7% of total transport fuel consumption. Australia's canola exports have not collectively filled this cap across key EU markets, so there is room for further export growth to EU countries that have not yet reached their individual limits—at least until 2028.[24]
- Short-term stability or modest increase: Based on expert interview feedback, exports are expected to remain steady or grow modestly over the next five years, barring significant policy or market shocks.

Box 6: Use of Canola for Biofuels expected to decline in future

- EU food-crop concerns: The European Union (EU) has implemented a cap on crop-based biofuels, limiting their contribution to 7% of transport fuels. This policy reflects growing concerns about the sustainability of using food crops, such as canola, for biofuel production.
- Longer-term risk: While immediate declines in canola-based biofuel exports are not expected, there is a potential risk that, within the next 10 years, stricter sustainability rules could render canola out-of-scope for biofuel use in the EU. This scenario would necessitate Australian producers to seek alternative markets or adapt to new regulatory frameworks.

[23] Note: ABS average FOB prices reflect the total value of actual export transactions, and therefore include any applicable premiums (e.g. for non-GM or ISCC-certified canola) when realised.
[24] https://grdc.com.au/resources-and-publications/grdc-update-papers/tab-content/grdc-update-papers/2025/03/do-multi-purpose-biofuel-crops-have-a-place-in-australian-farming-systems

8.2 Results

The results of the cost–benefit analysis (CBA) are presented in two distinct ways: as **Incremental Results** and **Cumulative Results**.

Incremental Results (Second Review Only)

The incremental analysis evaluates only the additional costs incurred in conducting the 2023 Country Report against the benefits anticipated from FY2024–FY2028. This analysis deliberately excludes earlier expenditures, aligning with standard economic practice that treats previously incurred costs as sunk. Given that the team leveraged existing LCA capabilities developed during prior investments, incremental costs for the second review were relatively low. Consequently, the BCR and net present value NPV for this scenario reflect the highly efficient utilisation of existing assets—specifically, previously established LCA expertise. **This approach provides an understanding of the marginal value added by the 2023 Country Report alone.**

Cumulative Results (Overall Program)

The cumulative analysis offers a comprehensive evaluation covering the investments made during the entire program duration (FY2012–FY2028). As previously noted, it integrates all relevant costs, including the LCA capability development and, costs from the two Country Reports. The benefits from both cycles between FY2018–FY2028 are accounted for. Naturally, the cumulative BCR is lower than the incremental results due to the substantial upfront costs**. However, the cumulative analysis clearly demonstrates that the total investment in building and repeatedly utilising LCA expertise generated overall net economic value. This broader view highlights benefits associated with investment across the entire LCA program.**

Table 6: CSIRO Country Reports – CBA Results

Analysis Scope	Costs Included	Benefit Period	Investment (AUD mil, PV FY2025$)	NPV (AUD mil, PV FY2025$)	BCR
Incremental: 2023 Country Report (ONLY)	Incremental 2023 Country Report costs only	FY2024–FY2028	0.22	31.08	143
	With deadweight loss (20%)		0.26	31.04	118.8
Cumulative (Overall): 2017 and 2023 Country Reports	All costs: FY2012–FY2016 (capacity building), 2017 Country Report and 2023 Country Report costs	FY2018–FY2028 benefits (both reviews)	7.71	9.93	68.82
	With deadweight loss (20%)		9.25	8.3	67.3

Additional Notes

- A 20% deadweight loss adjustment has been applied to reflect the economic cost of raising public funds through government taxation.
- CSIRO is attributed 100% of the cost outlay, even though its direct attribution to the Country Report benefits is estimated at 50%. This approach is used because (1) subcontractor payment data are not separately available, and (2) full cost attribution to CSIRO provides a conservative estimate of its BCR and NPV. CSIRO's BCR and NPV are estimated at 71 and 15.4 respectively for Incremental analysis.
- A more severe counterfactual scenario—in which no updated Country Report is submitted, resulting in possible exclusion from the EU market—is qualitatively acknowledged but not quantitatively modelled. If included, it would substantially increase the estimated BCR and NPV, further underscoring the critical importance of the intervention.

8.3 Sensitivity Analysis

Like all cost–benefit analyses, this evaluation relies on a series of assumptions, each introducing some level of uncertainty. Sensitivity testing has been conducted to assess which variables materially influence the results. Key parameters tested include the real discount rate, EU price premiums, export volumes under a delayed report scenario, and the attribution share assigned to the Country Reports. Broader geopolitical or market-access shocks—such as regulatory changes or war-related supply disruptions—could also affect outcomes significantly; however, these are not readily quantifiable and are therefore excluded from this model.

The analysis examines low and high scenarios for each key parameter and compares these against the Project Case (see Table 6), with results summarised in Table 8.

Table 7: CSIRO 2023 Canola Country Report initiative – CBA Sensitivity Analysis results (FY2024 - FY2028)

Parameter	Variation	Project Case Assumption	NPV – Incremental (AUD mil, PV FY2025)		BCR – Incremental		NPV – Cumulative (AUD mil, PV FY2025)		BCR – Cumulative	
			Low	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*
1. Discount Rate	5% / 10%	7%	31.09	31.06	151	131	65.2	74.7	11	8.5
2. EU Premiums (A$/t)	10 / 30	20	29	33.55	131	154	61.9	76	9	10.8

Parameter	Variation	Project Case Assumption	NPV – Incremental (AUD mil, PV FY2025)		BCR – Incremental		NPV – Cumulative (AUD mil, PV FY2025)		BCR – Cumulative	
			Low	*High*	*Low*	*High*	*Low*	*High*	*Low*	*High*
3. EU export vol (%) under delayed report scenario	PC-10% / PC+10%	50%	32.07	30.09	147	138	71.6	66.1	10.3	9.6
4. Country Report Attribution	PC-5% / PC+5%	30% and 20%	23	39	107	178	53	84	7.9	11.9

Among the tested variables, attribution and EU premiums have the largest impact on estimated economic benefits. This suggests that the realised benefit to CSIRO—and to Australia—is particularly sensitive to how value is shared across actors and how premiums materialise in market contracts.

8.4 Limitations

While the CBA offers indicative estimates of economic value, several limitations apply:

- Assumption-based inputs: Key parameters (e.g. 50 % volume impact, A$ 20/t premium) rely on expert judgement and limited data, introducing uncertainty.
- Intangible benefits not monetised: Social, reputational, and environmental outcomes are acknowledged but not valued in dollar terms.
- Fixed pricing assumptions: Uniform application of premiums and price differentials across markets may not reflect real-world volatility.
- Attribution estimates approximate: Percentage shares for CSIRO, Lifecycles and other enablers are based on stakeholder feedback and serve as broad indicators rather than precise measurements.
- No risk sensitivity modelling: Policy shocks, trade disruptions, or demand shifts are not explicitly modelled.
- Broader spillovers omitted: Effects on related sectors (e.g. logistics, finance) fall outside the scope of this analysis

9 QUALITATIVE IMPACTS

The renewal of Australian canola's EU market approval is expected to generate value that extends well beyond immediate trade outcomes. Drawing on inputs from CSIRO's R&D team, external stakeholders and verified public data, the section below offers a qualitative assessment of the key economic, environmental and social impacts linked to CSIRO's role in developing and securing approval of the 2023 Country Report. CSIRO's work was one critical element within a broader, multi-stakeholder effort—the full benefits will be realised only through continued, coordinated action by growers, bulk-handlers, exporters, certifiers and government agencies.

Impact	Why it matters for Australia
Economic	
Undisrupted access to a strategic, high-volume market	Discussions with external stakeholders such as CBH highlighted that maintaining Australian canola's access to the EU market is critical especially given the lack of comparable alternative markets. Stakeholders emphasised that this outcome relies on coordinated action from government, growers, certifying bodies like CBH, marketers, and scientists—no single group can secure access alone. Ongoing RED II recognition preserves the EU as the primary market for up to 70% of Australia's canola exports, preventing diversion to lower-value markets and is expected to continue to underpin investment in canola and associated storage, crushing and port infrastructure.[25]
Reduced policy risk & lower financing costs	By showing regulators and financiers that Australia can reliably deliver approved state-specific GHG values (much lower than the last 2017 Country Report), may *eventually* support sustainability-linked finance.
Enhanced credibility in international negotiations	CSIRO's 2023 Country Report is now regularly cited by DAFF and industry bodies as concrete proof that Australia can satisfy stringent, science-based sustainability rules, lowering perceived policy risk for the canola industry. Because RED II is the only mandatory sustainability standard Australia must meet (most others are voluntary or commercially driven) the 2023 Country Report has become the exemplar for market-access-driven assessments and also informed initiatives such as Trusted Agrifood Exports mission. Jo Grainger during interview for this review, mentioned *"2023 Country Report serves as the go-to evidence base for Australia's "credible sustainability claims" in trade negotiations."* EU approval also strengthens Australia's positive image for non-GM, low-carbon grain in other significant markets (e.g. Japan, South Korea)

[25] Australia exports 676,739t canola in May - Grain Central

	Finally, insights gained from the EU process help Australian regulators anticipate and plan for potential similar requirements in the future trade agreements.[26]
Established LCA framework and international readiness	Through its delivery of the 2017 and 2023 Country Reports, CSIRO has developed a rigorous, audited national framework for converting on-farm data into regulatory submissions—helping secure approved GHG values under RED II. This experience not only strengthens Australia's internal readiness for future crop LCAs but also improves its capacity to navigate evolving international sustainability standards. While the current tool is tailored to canola, the broader knowledge, data infrastructure and governance model can reduce costs and timelines for future commodity assessments under similar schemes.[27]
Spillover Value to Other Crops through Farm-Level Certification	The ISCC certification process required for canola exports to the EU also covers the entire farm, benefitting growers who produce other crops (such as wheat, barley, lupins, and oats). This farm-wide certification means that if new markets or buyers begin to require sustainability credentials for these other grains, the certified growers are already well positioned to participate. In addition, the experience and benchmarks established unlock incremental value for a range of commodities.
Environmental	
Verified global GHG savings	By undercutting the EU default factor, CSIRO's Country Reports are expected to secure notable legally recognised savings in EU biodiesel mandates (Strategic climate role). While this supports Australia's contribution to global abatement goals, the increased canola production is expected to have slightly raised Australia's domestic GHG emissions.[28] This highlights the need to account for both global and local scenarios when evaluating net climate impact.
Incentivised farm-level efficiency and grower awareness	The 2023 Country Report quantified on-farm emissions hotspots—especially fertilizer inputs and the contrast between single- and dual-purpose rotations —thereby elevating awareness of the "value of low-GHG" practices among growers. By spotlighting these opportunities, CSIRO's work is expected to incentivise growers to adopt lower-carbon practices—such as integrating grazing into canola rotations and refining nutrient management—by converting those emissions reductions into tangible market advantages under the EU's updated regulations. These practices also have potential to bring co-benefits (e.g., improved soil health and reduced runoff), creating an important indirect pathway for on-ground practice change.
Social	

[26] CBH interview
[27] CSIRO's methodology, data pipelines and DFAT-LCA workflow piloted for canola are now referenced in talks on barley, pulses and future Ag sustainability frameworks (per CSIRO R&D team).
[28] CSIRO R&D team

Regional income stability & crop diversity	By maintaining undisrupted export access to the EU, Australia's canola sector continues to benefit from demand certainty and price premiums—safeguarding regional income and supporting crop diversity, especially in WA, SA, and NSW. As an indication of the scale of these benefits, non-GM premiums paid to WA growers alone have exceeded A$500 million since 2010 (cumulative, Grain Central). Preserving this market outlet sustains rural livelihoods, supports local agronomy and logistics jobs, and helps maintain the agronomic advantages of canola in crop rotations.
Reinforced sustainability awareness across the canola industry, with practices supporting certification and reporting	The CSIRO report's reliance on reliable, auditable data helped guide the Sustainable Grain Australia's ISCC self-assessment platform. Thousands of growers now complete annual digital declarations—instilling farm-level record-keeping, raising awareness of emissions drivers, and embedding a mindset of incremental sustainability improvements across the industry.[29]
Strengthened science–industry-government collaboration	Delivering the 2017 and 2023 canola Country Reports brought together key partners such as CSIRO, Lifecycles, SGS, DFAT, exporter and grower bodies, certifiers, government bodies and EU auditors in a demanding five-year cycle. Repeating that process has deepened trust, clarified roles and forged durable cross-sector networks and institutional memory. It also exemplifies how public–private R&D partnerships (CSIRO and Lifecycles) can efficiently meet stringent sustainability and market-access achievement, equipping Australia to respond more swiftly and consistently to the rising wave of similar climate-driven challenges.
Australia's enhanced "clean-green" reputation	Formal EU acceptance of CSIRO's low-GHG dataset has become a public proof point of Australia's ability to meet stringent sustainability rules. This bolsters consumer and buyer confidence—not just in canola but across the broader agricultural sector—by reinforcing Australia's "clean-green" reputation in global food and biofuel markets. Jo Grainger mentioned *"CSIRO's report proved that Australian canola growers are world leading sustainable producers."* Had Australia failed to secure approval in 2023, Australian agriculture could have suffered reputational setbacks; successful and timely renewal not only preserves the brand but also forestalls any negative media attention or buyer scepticism that might have arisen from a perceived loss of competitive edge.

These qualitative findings show how the Country Reports deliver national value across trade, sustainability and rural resilience. The next section will identify key risks that could limit these benefits —providing a basis for continuous improvement for the benefit of similar future research initiatives.

[29] https://sustainablegrain.com.au/growers/grower_self_assessment/

10 IMPACT RISKS

In this section, we identify some key obstacles that could prevent the 2023 Country Report from realising its projected benefits in the remainder of its approval window.

Impact Risks

A. Risks to 2023 Country Report realising its intended value

- EU biofuel policy shift: If the EU tightens sustainability criteria or accelerates its move away from crop-based biofuels before 2028, Australia's low-GHG canola factor could lose its value—undermining export premiums and market share despite the 2023 approval. However, because Europe remains reliant on canola under RED II (especially given ongoing supply shortages post-Ukraine), a complete policy reversal within this five-year window is unlikely.
- Market and geopolitical supply shocks (including weather-related crop losses): A sudden surge of Ukrainian rapeseed exports, a bumper Canadian harvest or a large new producer entering Europe—combined with any dip in food crop-based biodiesel demand—could flood the market and erode the non-GM, low-carbon premium for Australian canola. Conversely, severe weather in Australia (e.g., drought or flooding) could sharply reduce domestic canola volumes, missing the opportunity to capitalise on the approved factor. In either scenario, oversupply or underproduction would squeeze prices and weaken the benefits from the approval. The likelihood of this risk is expected to be low-medium.
- Grower ISCC-declaration lapses: The *growing canola to realising benefits - chain* depends on annual farmer self-assessments. Widespread or repeated declaration errors could lead to suspended credits. The likelihood of this risk is expected to be medium. Likelihood: Medium
- Negative domestic environmental narrative: Expanding canola acreage is expected to raise Australia's own emissions, since canola is relatively GHG-intensive compared to other Australian grains. As climate-change pressures intensify, this trade-off could become a focal point —undercutting production and associated benefits. However, the likelihood of this occurring within this assessment period is low.

These identified impact risks underpin Section 11's concluding synthesis for this impact assessment.

11 CONCLUSIONS

CSIRO's 2023 Country Report was a strategically significant intervention that protected Australia's access to a high-value EU market as RED II rules tightened. This evaluation uses a mixed-methods approach—combining cost–benefit analysis under conservative assumptions with qualitative evidence—to estimate benefits. The CBA, conducted under both incremental (BCR = 143; NPV = A$31 million) and cumulative lenses (BCR = 9.9; NPV = A$68.8 million), shows that realised and prospective gains—lower market-access risk, stronger reputation, farm-level efficiency signals, regional economic stability, and deeper science–industry collaboration—clearly exceed the investment costs in the 2017 and 2023 Country Reports and CSIRO's LCA capability building since 2012. External stakeholder interviews confirm that CSIRO's role was both essential and rigorously executed.

However, the report's value depends on the supply chain maintaining low-emission practices: the LCA confirms Australian canola's GHG performance but does not itself reduce emissions. Preparing the 2023 update immersed CSIRO in every regulatory checkpoint, equipping it with unique insights for future assessments. Although removal of the country-report requirement has been discussed, RED II continues to mandate updates through 2030. As such, the 2023 report remains a practical baseline for any renewal (post-2028) and a reference for other crops that may fall under similar rules.

CSIRO's sustained investment in LCA capability since 2012 has significantly strengthened Australia's readiness. Given uncertainties in attribution, supply-demand dynamics, and geopolitical factors, the confidence in this evaluation's results is rated as medium. Ongoing tracking of key quantitative and qualitative benefits is recommended to support future refresh cycles and demonstrate continued return on public investment.

APPENDIX A AUSTRALIAN CANOLA EXPORTS TO THE EU MARKET

Actuals and projections for the Impact assessment period

Table A1: Data on Australian Canola Exports to EU

Aus Canola Oilseeds Exports	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023	FY2024	FY2025	FY2026	FY2027	FY2028
Overall (tonnes)[30]	2,252,000	1,569,000	1,717,000	2,916,795	5,015,738	5,670,134	6,201,402	4,838,006	4,700,000	4,800,000	6,000,000
To Europe (tonnes)[31]	1,576,400	1,098,300	1,201,900	2,455,759	3,268,601	3,192,895	2,412,874	3,049,562	2,914,000	2,976,000	3,720,000
Average export Price to EU ($/t)[32]	550	595	650	661	1,111	951	711	793	818	774	795
Total export earnings (nominal, in mil $, with premiums)	$898	$675	$805	$1,672	$3,696	$3,100	$1,763	$2,479	$2,4441	$2,362	$3,032

[30] ABARES reported and projected overall Australian Canola exports to quantity & values used

[31] For FY2018-FY2025 ABARES reported and projected Australian Canola exports to EU quantity & values used. For FY2026 – FY2028 Canola exports to EU are estimated as 60% of the overall Australian Canola exports

[32] For FY2018-FY2025 ABARES reported and projected average Australian Canola exports price to EU used. For FY2026 – FY2028 the price is projected using the arithmetic average of the export prices from the three preceding fiscal years.

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