frontier economics

Socio-economic benefits of private land conservation

A report for the Biodiversity Conservation Trust | 8 April 2022

Disclaimer

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1 Introduction

1.1 Background and context

The *Biodiversity Conservation Act 2016* (NSW) (the Act) established the BCT as a statutory not-for-profit body tasked with partnering with landholders to protect and enhance biodiversity.

The BCT delivers most of the NSW Government's investment in private land conservation via its Conservation Management Program, and a small proportion under the Conservation Partners Program. Under these programs, the BCT uses a range of delivery mechanisms to encourage and support landholders to participate in private land conservation, including fixed price offers, conservation tenders, voluntary applications, grants, co-investment partnerships and a revolving fund. Box 1 provides a summary of outcomes associated with private land conservation.

Box 1: Private land conservation outcomes

As at March 2022, 340 landholders have signed or plan to sign a conservation agreement with the BCT, creating conservation areas across 194,400 hectares. The BCT is investing more than $158.3 million to support these agreements (82% of which are for in-perpetuity agreements). These agreements are contributing toward the protection of 107 threatened species and 16 ecological communities.

Landowners with funded agreements are typically being paid between $5 and $421 per hectare per annum to manage these conservation areas – supporting the Strategy target of diversifying income streams to improve the financial sustainability of participating landholders relative to similar local businesses.

Conservation tenders have focused on a series of regions including the Northern Tablelands, Murray-Riverina, Central Tablelands, Port Macquarie region, Monaro Grasslands, North West Plains, South West Slopes, Lachlan Corridor, Lismore/Ballina region and Central West Rivers.

Source: BCT website and disclosures

1.1.1 The BCT's investment is guided by strategic targets

To guide the BCT's work in private land conservation, the NSW Government has set out priority investment areas, investment principles, and targets in its Biodiversity Conservation Investment Strategy (the Strategy) 2018. The BCT is responsible for delivering the Strategy and reporting on outcomes under the Strategy.

The Strategy sets two targets on income diversification and financial sustainability for landholders and communities:

- By 2023, diversified incomes streams will improve the financial sustainability of participating landholders relative to similar local businesses.

- By 2038, diversified income and investment streams will improve the financial sustainability of regional and rural communities.

We understand that the Strategy is currently being reviewed. In this context, our analysis sets up a framework to measure income diversification and broader socio-economic benefits which is flexible to future strategy and policy changes.

1.1.2 Private land conservation and income diversification

The NSW Government has committed more than $350 million over the five years from 2019-20 to fund the BCT to deliver private land conservation programs, and to $70 million per annum ongoing (escalated with inflation) subject to performance reviews. Box 2 describes the three agreements offered by the BCT.

Box 2: The BCT offers three different agreements

Biodiversity Stewardship Agreements are in-perpetuity agreements and are registered on the property title. These sites generate 'biodiversity credits' which can be sold to offset the impacts of approved developments elsewhere. Landholders receive ongoing annual management payments and a potential profit from credit sales once the credits are sold.

Conservation Agreements are registered on the property title and may be either in-perpetuity or for a fixed-term. In some areas of the State, conservation agreements may attract annual management payments, providing an alternative income stream for landholders. Elsewhere, one-off grants will be available for direct costs of management actions such as fencing or weed control.

Wildlife Refuge Agreements are an entry-level agreement for interested landholders wishing to protect biodiversity on their land. Wildlife refuges are in-perpetuity agreements that can be revoked by the landholder at any time.

Source: Biodiversity Conservation Trust < https://www.bct.nsw.gov.au/frequently-asked-questions#Q4>

The BCT delivers most of its investment via its Conservation Management Program, and a small proportion under the Conservation Partnerships Program.

Landholders who enter into conservation agreements under the BCT's Conservation Management Program receive annual conservation management payments for the term of the agreement. This additional revenue stream is to conserve and manage native vegetation and biodiversity on their land and to diversify their income. Under each conservation agreement, the landholder has a management plan which specifies the activities that need to be undertaken. As at September 2019, around 70 per cent of properties with funded conservation agreements have a primary purpose of agricultural production.

1.2 Project scope and objective

In this context, BCT retained Frontier Economics to develop a framework to enable the BCT to measure and report on the socio-economic benefits of private land conservation. The aim of the framework is to:

- Assist BCT to understand how conservation agreements contribute toward diversified income streams (at a regional and a landholder level), and therefore report against its current strategic objectives.
- Inform consideration of the indirect and flow-on economic impacts of conservation agreements to the regional community.

This framework is documented in this report and accompanying Excel model. The model has been developed to:

- Enable BCT to periodically update inputs and produce outputs, as required.
- Provide flexibility around future policy changes, including for example income associated with Carbon + Biodiversity agreements.

The BCT's Biodiversity Stewardship Agreements are outside of the scope of this engagement. Grants provided to landholders with Wildlife Refuge Agreements and for third party agreements (mostly Land for Wildlife) are included in the analysis. Grants are maximum of $2000 per year for these types of agreements.

1.3 Structure of this report

This draft report sets out our modelling methodology and results for discussion and feedback. The remainder of this report is set out as follows:

- Section 2 outlines our modelling methodology. It presents our approach, including how we have measured income diversification, our data sources, and how the final model is flexible to the addition of future landholder income streams.
- Section 3 presents our modelling results for landholder income diversification and broader socio-economic benefits related to the BCT's conservation agreements.

The Excel model is the key deliverable to this engagement and should be read in conjunction with this report. Additional detail on the modelling results is provided in Appendix A.

2 Modelling methodology

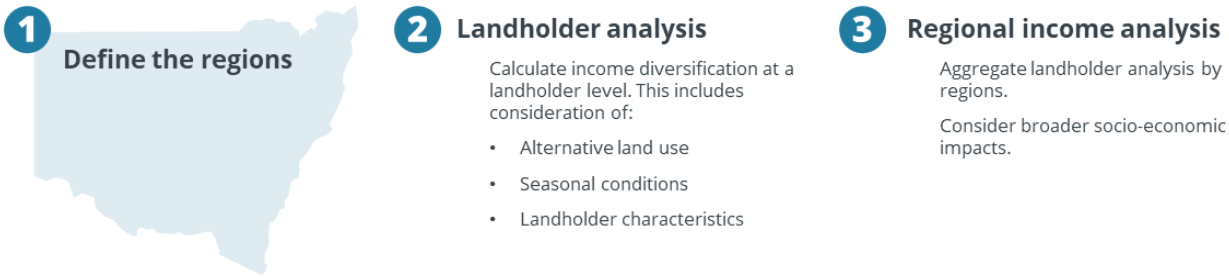
This section sets out the modelling methodology for income diversification.

2.1 Methodology

The modelling methodology is designed to enable BCT to understand how conservation agreements contribute toward diversified income streams, at a land holder and regional level. This will support reporting against two targets set out in the BCIS focussing on income stream diversification and consequent financial sustainability for landholders and communities.

The model provides an assessment of agricultural production and conservation agreement income, at the landholder and regional level for a representative point in time. The model is designed with functionality to run scenarios on seasonal conditions and landholder characteristics. A broad overview on how income stream diversification has been considered and quantified is presented in **Figure 1**.

Figure 1: Methodology to assess income stream diversification



Source: Frontier Economics

We have analysed the broader socio-economic benefits of conservation agreements through the *NSW Treasury Employment Calculator* and an assessment of conservation agreement income flows. This is discussed in more detail in Section 3.2.

A key feature of our model methodology is that it can be amended over time to take account of improvements in data inputs, changes such as a revised Strategy and increased focus on co-benefits through conservation agreements such as carbon sequestration.

2.2 Measuring income stream diversification

We have defined income stream diversification as the additional source of conservation-based income to existing farm-based income streams.

The main reason to adopt this definition relates to risk management. In particular, how landholders can manage income risk through entering conservation agreements and receiving annual conservation management payments for the term of the agreement.

Based on discussions with BCT, the model allows the comparison of many farm-based income streams as a netted off income stream. That is, the model does not explicitly consider how landholders currently adopt strategies to manage farm-based income risk, such as yield and

price risk, through, for example, crop and livestock diversification strategies and land management practices.

The change to farm income as a result of entering a conservation agreement will depend on:

- The income earned through participation in the BCT's Conservation Management Program**:** The BCT uses a range of delivery mechanisms to encourage and support landholders to participate in land conservation.[1] BCT provided payments under its conservation agreements, at a LGA level, on an annual basis for the life of the agreement. We have made assumptions regarding the costs of managing land under conservation agreements in collaboration with BCT.[2]
- The forgone income (opportunity costs) from the alternative use of land for agricultural production: Based on discussions with BCT, we have assumed that there is no loss of production from entering into a conservation agreement – that is, the conservation agreements are protecting biodiversity and not displacing a production area.

Utilising these assumptions, we have modelled income stream diversification through:

- An absolute value of conservation agreement income streams and their simple correlation to farm-based income streams (a lower correlation suggests diversification benefits).
- A comparison of the volatility in landholder income streams with and without conservation agreements (relatively lower volatility suggests diversification benefits).

[1] Including fixed price offers, conservation tenders, voluntary applications, grants, co-investment partnerships and a revolving fund

[2] Under each conservation agreement, the landholder has a management plan which specifies the activities that need to be undertaken.

2.2.1 Inputs

This analysis has employed data provided by BCT and from publicly available sources, as summarised in **Table 1** below. The model contains data over the lifetime of the conservation agreement. Links to each data source are contained in the model, to facilitate updates.

Table 1: Data sources

Data type	Description
BCT confidential data	This data included a detailed breakdown of 167 conservation agreements and 420 grants across the BCT regions. Key features of this data included: • Funded conservation agreements data: ID number, annual payments data (for the lifetime of the agreement), BCT region, LGA, and property size. • Grants data: BCT Region, and grant amount (for 3 years) • Regional concordance: BCT regions, LLS, local councils, and biodiversity regions.
Publicly available data	In developing the model, we sourced data to complement the data BCT provided us. This was primarily around the production inputs, including: • Average DSE/ha for regions across NSW • Gross Margin/ DSE • Gross Margin/ Hectare These inputs were predominantly informed by data sources from the NSW DPI on Dry Sheep Equivalent (DSEs) which we used to compare sheep enterprises.[3] The variability of a farms income and profitability was informed by ABARES and their review of the financial performance of livestock farms.[4]

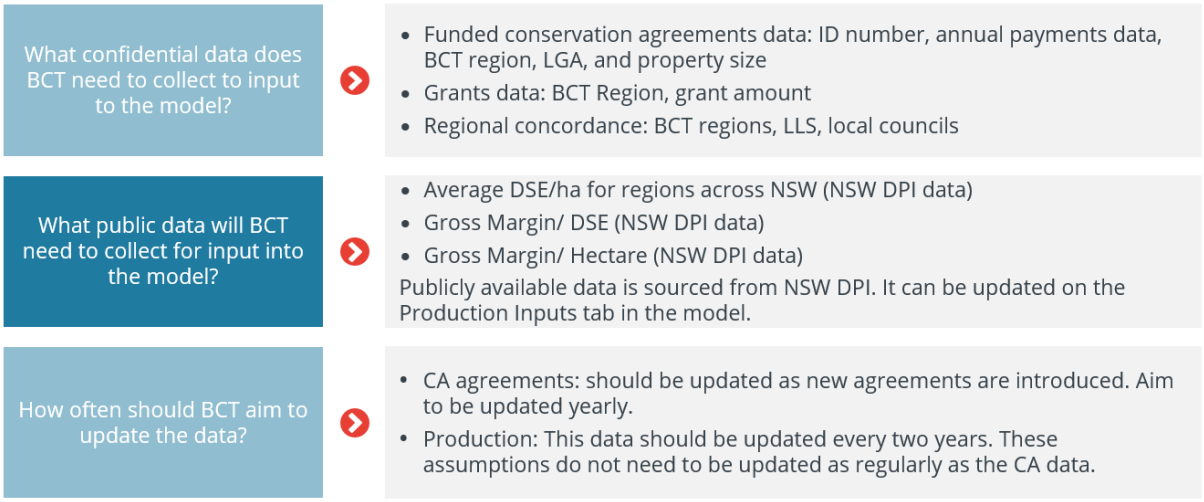
Source: BCT and Frontier Economics

[3] NSW Department of Primary Industries, Using DSEs and carrying capacities to compare sheep enterprises, available at: https://www.dpi.nsw.gov.au/agriculture/budgets/livestock/sheep-gross-margins-october-2015/background/dse

[4] ABARES (2021), Financial performance of livestock farms, 2018-19 to 2020-21, available at: https://www.awe.gov.au/abares/research-topics/surveys/livestock#improved-financial-performance-in-202021

In collaboration with BCT we have identified three key questions to guide the ongoing maintenance the model, summarised in **Figure 2** below.

Figure 2: Maintaining the model dataset



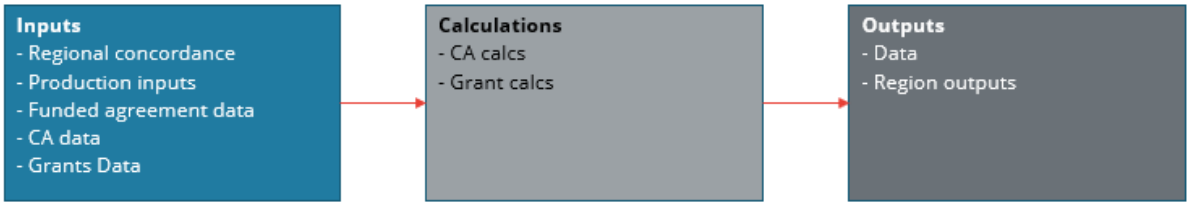
Source: Frontier Economics

We also considered additional data that could improve future reporting, this is included in **Table 9** in section 3.3 of this report.

2.2.2 Model design and calculations

Using our methodology, we built a model that calculates the inputs listed in Section 2.2.1 and generates outputs designed to inform the degree of income diversification benefits provided by conservation agreements, at a landholder and regional level. The design and structure of the model is shown in **Figure 3**.

Figure 3: Model methodology



Source: Frontier Economics

As shown in **Figure 3**, the model is designed in 3 key sections – inputs, calculations, and outputs.[5]

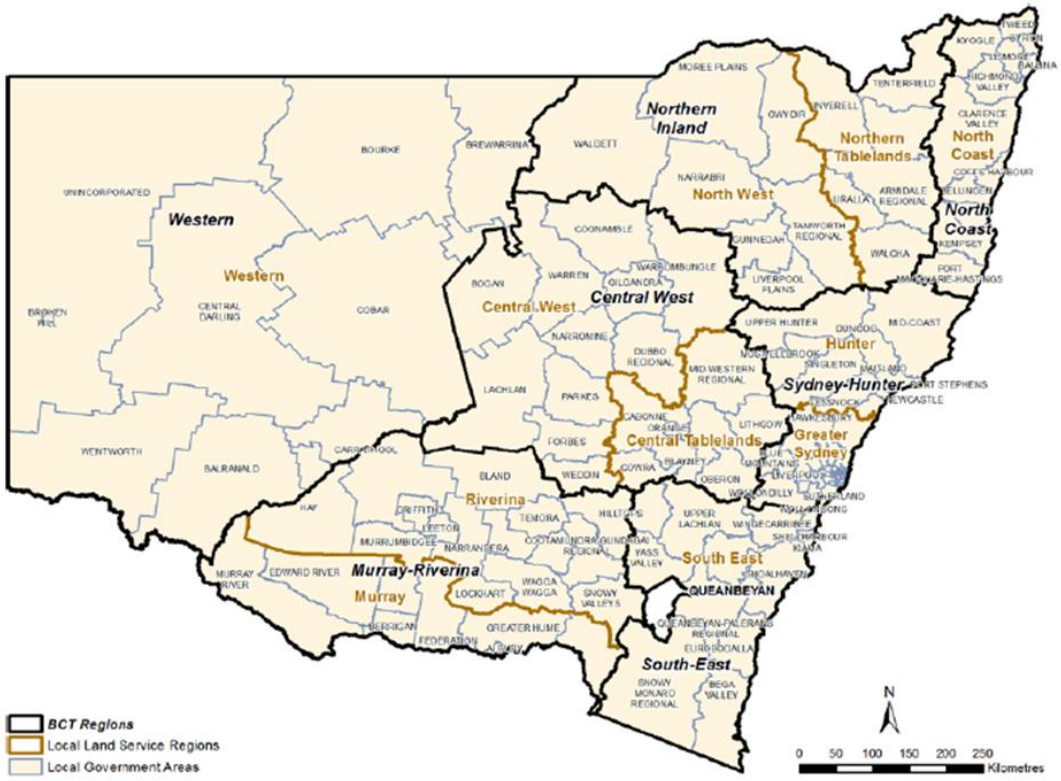
[5] We have developed an accessible model user guide that is contained within the model.

The inputs include the data provided by BCT and publicly available data (as per Section 2.2.1). Features of the inputs section include:

- **Regions**: there is functionality to aggregate regions. We have modelled the 7 BCT regions (**Figure 4**) as aggregation of the 11 Natural Resource Management (NRM) regions. NRM regions either directly align with BCT regions, or the BCT region covers two NRM regions — such as Murray-Riverina which covers the Murray and Riverina NRM regions; Central West which covers the Central West and Central Tablelands NRMS regions; Northern Inland which covers the North West and Northern Tablelands NRM regions; and Sydney-Hunter covers the Hunter and Great Sydney NRM regions. We have also used bio regions to assist in determining the productivity of land. We have defined 13 bio regions in the model.
- **Landholder analysis**: Conservation agreement data was provided on a landholder level meaning income diversification could be modelled on a regional level by aggregating landholder analysis. The conservation agreement data was provided on a yearly basis for the life of the agreement.[6]
- **Agricultural returns:** We looked a historic patterns gross value, production, and land use at the bio region level to understand representative agricultural returns for landholders. Based on discussions with BCT, we have assumed that other farm income is sourced from sheep grazing, which is calculated based on bioregions which more accurately align to production patterns compared to BCT or NRM regions. We used an average DSE per hectare for each bioregion and multiplied this by a Gross Margin per DSE assumption to calculate a Gross Margin per hectare. This and property data provided by BCT was used to calculate gross margin at a landholder level.

[6] We used a 6% discount rate to convert the time series into a representative annualised payment for the first 15 years. Note that the results are not sensitive to the choice of the discount rate as the conservation agreements give a relative steady stream of payments through time. Note also that the discount rate can be easily revised in the model.

Figure 4: Map of BCT regions



Note: NRM regions align with the Local Land Service Regions in the above map.

The calculations section in the model involved calculating the change in income from entering a conservation agreement. Features of this section include:

- A calculation of gross margin for each landholder based on agricultural returns. Additionally, we looked at this profit in good and bad conditions.[7]
- A calculation of conservation agreement income for each landholder.
- A calculation of conservation agreement income as a percentage of the gross margin of agricultural returns in average, good and bad conditions.
- A comparison of agricultural income in average, good and bad years with and without conservation agreements.
- An aggregation of the conservation agreements data based on NRM region to indicate the total value of conservation agreement income going to each region.
- An aggregation of the grants data based on BCT region to indicate the total value of grants going to each region.
- An aggregation of the essential payments data based on BCT region to indicate the total value of essential payments going to each region.

The outputs of the model are discussed in Section 2.2.3, and the results of these calculations are discussed in Section 3.

[7] Based on historic information and discussions with BCT, we have assumed that a good year gross farm income is 30% greater than an average year, and a bad year gross farm income is 30% less than an average year.

Box 3: Comparing gross margin per hectare for different farm types

A representative agricultural return to a land holder is difficult to quantify due to the highly variable nature of farming within a region and across regions in NSW.

We have assumed a representative return can be calculating using grazing (sheep) as a proxy, which can be readily applied to the bio regions. The return on grazing (sheep) was calculated using DSE to return a GM/ha for each bioregion in NSW. A bioregion with 8 DSE was assumed to return a GM/ha of $415.

The GM/ha of beef enterprises varies depending on pasture, age, weight, and geographical area in NSW. For example, Inland Weaners return a GM/ha of $129.78, costal weaners (improved pasture) return $205.14, and growing out steers (240-460kg) return $412.04.[8]

In comparison, the SA Government Department of Primary Industries and Regions published gross margin estimates for crops for 2021.[9] An average estimate of key crops gross margins include:

- Wheat: $491/ha
- Malt Barley: $345/ha
- Canola – Conventional: $316/ha
- Milling Oats: $382/ha

Discussions with BCT have highlighted that conservation agreements are largely adopted on remnant vegetation. Both cropping and grazing farms have remnant vegetation. Using cropping as an indicative return is difficult to apply across NSW due to the variability of crops grown and not all NSW regions are suitable for growing crops. Sheep grazing is more readily applied to due to the versatility of the farming practice.

The farms agricultural returns determine the income diversification benefits from entering into a conservation agreement. If we assumed the agricultural returns was determined by a high value crop the income diversification benefits would not be as great as a lower value crop or grazing land use. This would be because the conservation agreement makes up a smaller percentage of farm income.

Additionally, data published by DAWE shows that in 2018-19 55% of NSW farms were beef cattle and sheep farms, with 12.4% of farms being grain-sheep or grain-beef cattle farming. Other grain growing represented 7.8% of NSW farms.[10] This indicates the prevalence of grazing farms across NSW.

[8] NSW DPI (2019), Summary of gross margins for NSW beef enterprises, available at: https://www.agric.wa.gov.au/sites/gateway/files/Profitability%20of%20Sheep.pdf <accessed 5/04/2022>

[9] Government of SA Department of Primary Industries and Regions (2021), 20921 Farm Gross Margin and Enterprise Planning Guide, p.10, available at: https://www.pir.sa.gov.au/__data/assets/pdf_file/0005/385304/PIRSA_Gross_Margin_Guide_2021.pdf <accessed 5/04/2022>

[10] ABARES (2020), About my region – New South Wales, available at: https://www.awe.gov.au/abares/research-topics/aboutmyregion/nsw#references <accessed 5/04/2022>

2.2.3 Outputs

Utilising the assumptions agreed with BCT and input data, we have modelled income stream diversification through:

- An absolute value of conservation agreement income streams and its simple correlation to farm-based income streams
- A comparison of the volatility in landholder income streams with and without conservation agreements.

The results of these outputs are discussed in Section 3.

2.3 Measuring broader socio-economic benefits

In addition to modelling income diversification the model has the capability to measure the broader socio-economic benefits of private land conservation. To model the socio-economic benefits the model assumes BCT grant income is primarily spent on contractors, and this results in additional employment. This additional employment is calculated using the *NSW Treasury Employment Calculator*.

3 Results

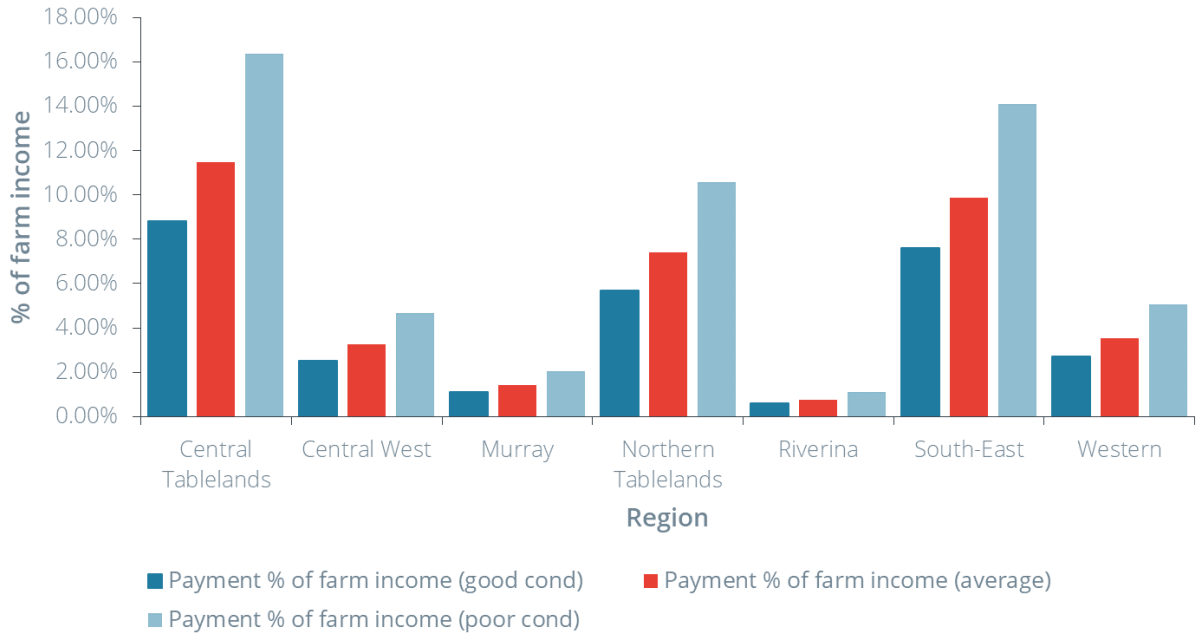
This section presents the results of the model. We consider in turn the implications for income diversification (Section 3.1) and broader socio-economic benefits (Section 3.2), before outlining next steps (Section 3.3).

3.1 Regional returns and income diversification

Conservation agreements were found to provide participants with diversification benefits through smoothing the expected volatility of farm income. This is a result of conservation agreement payments being relatively constant across seasonal conditions, in contrast to farming-based income streams on the remainder of the farm/landholdings or any actual foregone earnings from agricultural production which would be positively correlated with those remaining farming-based income streams.

As shown in **Figure 5**, all regions (where conservation agreements are available) benefit from income diversification as a result of entering into a conservation agreement. **Figure 5** shows the percentage of farm income that is sourced from conservation agreements. It is evident that under poor conditions, the conservation agreement income contributes a greater percentage to farm income, and under good conditions this percentage is decreased. This highlights that a conservation agreement creates a form of fixed income in an environment where income is highly susceptible to seasonal conditions.

Figure 5: Conservation agreement income as a percentage of total farm income



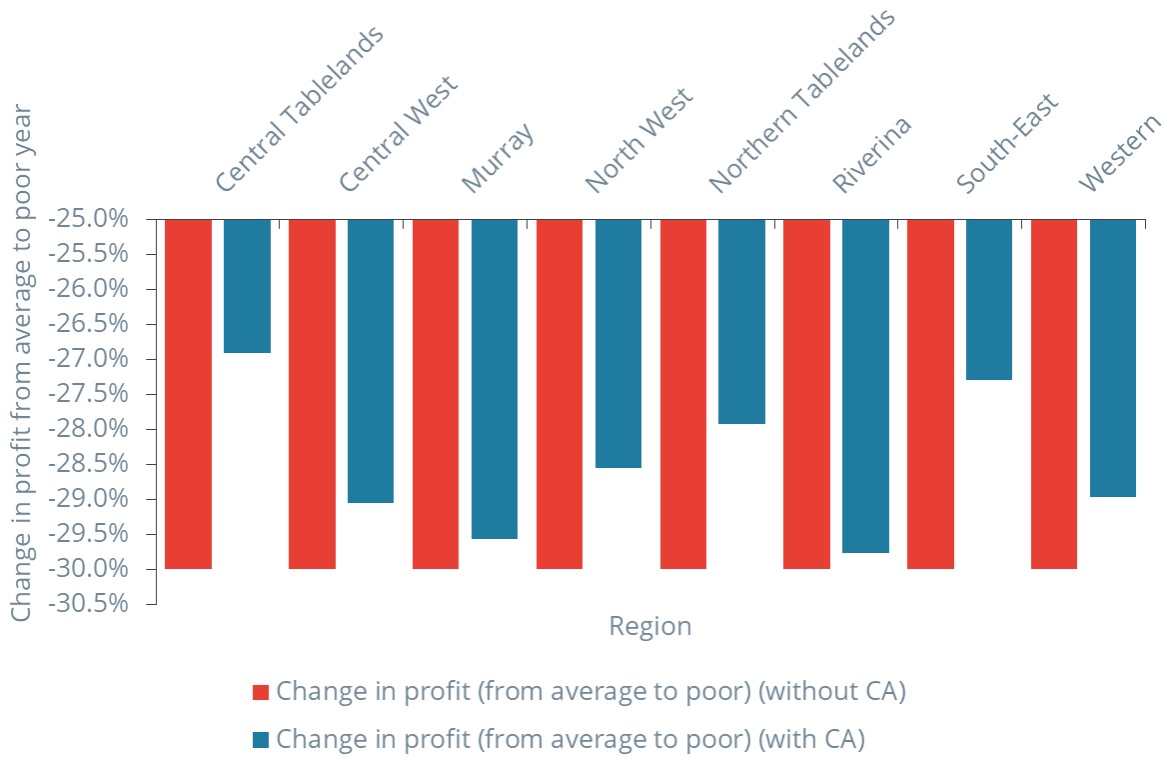
Source: Frontier Economics

Note: North Coast landholders are not included in the above analysis because based on discussions with BCT landholders in this region are not primary producers

Figure 6 shows the change in farm profit from an average to poor year. Without a conservation agreement, we have assumed a farms profit can vary by 30%. With a conservation agreement, this variance is reduced (see **Figure 6**) as the fixed income source stabilises the seasonal variability. The reduction in income variation from conservation agreements varies depending on the size of the payments, but could be up to 3.1% in the Central Tablelands.

The relationship between **Figure 5** and **Figure 6** shows that the higher contribution of the agreement to farm income the greater the diversification benefits through smoothing the expected volatility of farm income.

Figure 6: Change in farm profit from average to poor year



Source: Frontier Economics analysis of BCT data

The CA agreements are issued as either fixed price offers or tenders. Out of the total 167 CAs, 39 are Fixed Price Offers, and the remaining 128 are tenders. While the reduction in income variation from tenders and fixed price offers varies depending on the size of payments, the tenders offer greater diversification benefits than fixed price offers on a weighted average basis. Diversification benefits or reduction in income volatility for tenders could be up to 4% and fixed price offers could be up to 2% in the Central Tablelands. Discussions with BCT indicated that some of the landholder payments may be negotiated payments for upfront/essential works such as fencing or weed/pest management. For example, a number of CAs were observed to have higher payments in the initial years of the agreement. The model includes three rules that can be used to separate these values:

1. Where the minimum observed landholder payment (for the agreement) serves as the comparison, and any payments above this amount in the first three years are considered

payments for upfront/essential works. We expected this would underestimate landholder payments, and overestimate payments for upfront works.

2. Similar to above, but the maximum payment observed after the initial 3 years (i.e. year 4 onwards) is used as the comparison point — payments above this level in the first three years are considered payments for upfront/essential works.
3. Where the maximum observed landholder payment (in any year) serves as the comparison — therefore no payments are considered payments for upfront/essential works (and this corresponds to the above analysis based on raw data).

These rules are demonstrated in **Figure 7**, showing the assumed payments to landholders (LH) and contractors (Con) under each rule for two example CAs. In should be noted that there are many CAs where payments are flat or increasing over time, and therefore all of the rules provide the same result — that all payments are retained by landholders.

Figure 7: Example application of the rules to assign high payments in years 1–3

Source: Frontier Economics; BCT model

If either the first or second rule is applied, there is a reduction in estimated landholder payments. This means that there would be a reduced income diversification effect from the CA payments (see **Table 2**).

Table 2: Income diversification (given treatment of higher payments in years 1–3)

LLS / NRM	Change in profit (from average to poor) (without CA)	Rule 1: Change in profit (from av. to poor) (with CA)	Rule 2: Change in profit (from av. to poor) (with CA)	Rule 3: Change in profit (from av. to poor) (with CA)
Central Tablelands	-30.0%	-27.4%	-27.2%	-26.9%
Central West	-30.0%	-29.3%	-29.1%	-29.1%
Greater Sydney	-	-	-	-
Hunter	-	-	-	-
Murray	-30.0%	-29.7%	-29.6%	-29.6%
North Coast	-	0.0%	0.0%	0.0%
North West	-30.0%	-28.9%	-28.6%	-28.6%
Northern Tablelands	-30.0%	-28.4%	-28.1%	-27.9%
Riverina	-30.0%	-29.8%	-29.8%	-29.8%
South-East	-30.0%	-27.7%	-27.5%	-27.3%
Western	-30.0%	-29.2%	-29.1%	-29.0%

Source: Frontier Economics

Similarly, discussion with BCT staff identified some ongoing payments are given to contractors to do activities such as build fences and weed management. This is incorporated into the model as an assumed proportion of annual payments to landholder that are in fact for contractor payments. For example, if 10% is assumed to be passed through as payments to contractors, then only 90% is retained by landholders to assist via income diversification.

Table 3: Income diversification (given passthrough of landholder payments to contractors)

LLS / NRM	Change in profit (from average to poor) (without CA)	20% to contactors: Change in profit (from av. to poor) (with CA)	10% to contactors: Change in profit (from av. to poor) (with CA)	0% to contactors: Change in profit (from av. to poor) (with CA)
Central Tablelands	-30.0%	-27.5%	-27.2%	-26.9%
Central West	-30.0%	-29.2%	-29.1%	-29.1%
Greater Sydney	-	-	-	-
Hunter	-	-	-	-
Murray	-30.0%	-29.7%	-29.6%	-29.6%
North Coast	-	0.0%	0.0%	0.0%
North West	-30.0%	-28.8%	-28.7%	-28.6%
Northern Tablelands	-30.0%	-28.3%	-28.1%	-27.9%
Riverina	-30.0%	-29.8%	-29.8%	-29.8%
South-East	-30.0%	-27.8%	-27.5%	-27.3%
Western	-30.0%	-29.2%	-29.1%	-29.0%

Source: Frontier Economics

The impact of these data handling assumptions on estimated contractor payments and flow through socio-economic impacts are considered in the discussion below.

3.2 Broader socio-economic benefits

Insights from the NSW Treasury Employment Calculator

The NSW Treasury Employment Calculator has been used to provide an insight of the potential magnitude of flow through impacts of the BCT expenditure — in particular, the funding for which contractors are generally used.

Contractors are generally engaged to deliver essential works associated with Conservation Agreements. Advice has been received from BCT staff that the majority of work based on grants funding has been done by contractors (variety of local operators and larger companies).

Table 4: Funding types, by BCT region

BCT region	Av. Annual Direct payments of CAs	Essential Funding from CAs	Av. Annual Funding from Grants
Western	$925,601	$1,461,841	$30,984
Northern Inland	$1,439,573	$23,619	$92,178
North Coast	$232,730	$-	$1,097,829
Sydney-Hunter	$-	$-	$361,403
Central West	$1,576,722	$293,800	$85,550
South-East	$1,388,600	$-	$309,824
Murray-Riverina	$1,354,807	$180,968	$78,476
Total	**$6,918,032**	**$1,960,228**	**$2,056,243**

The BCT program aligns with the description of 'program' in the calculator — BCT funding involves many projects of the same type in different locations. This means that employment directly in the contractor work and also in flow through of this activity is considered.

Although it is expected that most contractor work would be considered to occur in the 'Ag support services' industry, the table below suggests 5 industries that may be relevant depending on the conservation activity required.

Table 5: Selected industry multipliers and FTE per $10m

Industry	Initial Effect Multiplier (FTE/$m)	Production-induced Effect (First-round + Industrial Support) (FTE/$m)	Jobs supported per $10m activity (FTE)
[Payments to Landholder]	x0	x0	0
Agriculture, Forestry and Fishing Support Services	x1.58	x2.61	41.9
Other Fabricated Metal Product manufacturing	x2.58	x2.25	48.3
Construction Services	x1.87	x2.73	46.0
Accommodation	x4.07	x1.91	59.8
Food and Beverage Services	x5.98	x1.97	79.5

Source: NSW Treasury analysis based on ABS 5209.0, 5246.0, TPP09-7 and TRP09-3.

Using the total funding information from **Table 4** and the multiplier for Agricultural support services from **Table 5**, this suggests flow on employment impacts (**Table 6**):

- BCT Essential funding is estimated to support in the order of 10 jobs (annual FTE) in the Ag Services Industry
- Annual BCT Grant funding is estimated to support in the order of 10 jobs (annual FTE) in the Ag Services Industry

This can be interpreted as BCT funding supporting in the order of 10 jobs via essential funding to establish CA sites, and an ongoing 10 jobs via grant funding, nationally. This is in addition to the impacts of payments to landholder under Conservation Agreements.

Table 6: Estimate jobs supported by BCT

Across all BCT regions	Av. Annual Direct payments of CAs	Once-off Essential Funding from CAs	Av. Annual Funding from Grants
Total NPV ($m)	$6,918,032	$1,960,228	$2,056,243
Jobs supported (in addition to landholder support)	-	8.2 (once-off)	8.6 (annual)

Source: BCT model

Employment estimates produced by the calculator refer to jobs supported across Australia and cannot be attributed to any specific location.[11] However, given the substantial use of local contractors, it would be expected that a significant amount of employment activity may be in regional areas. For example, 46% of CMP respondents spent more than 50% of their payments on local contract labour to deliver conservation management actions, and 39% of CMP respondents spent more than 50% of payments locally, or regionally, on material or equipment to deliver management plan actions. (BCT Landholder and Program Participant Surveys: Full Report, 2021). These employment effects may be only one of the many flow on benefits associated with BCT funding in the regions of NSW (see **Box 4**).

[11] This is because the multipliers used are derived using National Accounts data from the ABS.

Box 4: Potential flow on benefits associated with BCT funding

In addition to flow through effects of economic activity funded by BCT, there may also be benefits related to the economic benefits of improved environmental condition in the region. For example, although not able to be quantified as part of this project, Heagney et al (2019) identified three potential pathways through which increases and improvements in environmentally protected areas might benefit local communities, namely:

- the improved local housing value
- local business stimulus
- increased local funding pathways

Further to this, Power and Alison (2010) find positive impacts to regional primary production from the protection and improvement of regulation and support of ecosystem services in conservation areas.

Source: Heagney et al (2019), The economic value of tourism and recreation across a large protected area network; Power, Alison G. (2010) Ecosystem services and agriculture: tradeoffs and synergies, https://doi.org/10.1098/rstb.2010.0143.

As was presented in section 3.1, the results can be revisited with adjustments to the data given:

- recorded landholder payments may be negotiated payments for upfront/essential works such as fencing or weed/pest management
- some proportion of annual payments to landholder that are in fact for contractor payments

Table 7 sets out the comparison of funding and flow on employment impacts based on the three proposed rules for allocating high payments in the initial three years of CAs. In our view, the 'rule 2' approach is defensible — it is based on the maximum payment observed after the initial 3 years (i.e. year 4 onwards), and payments above this level in the first three years are considered payments for upfront/essential works.

Table 7: Estimate jobs supported by BCT (raw data and implying payments)

Across all BCT regions	Av. Annual Direct payments of CAs	Once-off Upfront/ Essential Funding from CAs	Av. Annual Funding from Grants
Rule 1			
Total NPV ($m)	$5,478,905	$17,436,768	$2,056,243
Jobs supported (in addition to landholder support)	-	73.1 (once-off)	8.6 (annual)
Rule 2			
Total NPV ($m)	**$6,387,914**	**$7,529,061**	**$2,056,243**
Jobs supported (in addition to landholder support)	**-**	**31.5 (once-off)**	**8.6 (annual)**
Rule 3 – same as raw			
Total NPV ($m)	$6,918,032	$1,960,228	$2,056,243
Jobs supported (in addition to landholder support)	-	8.2 (once-off)	8.6 (annual)

Source: BCT model

If it is deemed appropriate to assume that a proportion of ongoing landholder payments flow through to contractors, then this increases the estimated jobs supported by BCT funding — because contractor activity is associated within multipliers and additional jobs supported, as compared to landholder payments which are not considered to support employment.

Table 8: Estimate jobs supported by BCT (given a proportion of CA payments to contractors)

Across all BCT regions	Av. Annual Direct payments of CAs	Once-off Upfront/ Essential Funding from CAs	Assumed Av. Annual $ to contractors from CAs	Av. Annual Funding from Grants
20% passthrough of landholder payments to contractors				
Total NPV ($m)	$5,534,426	$1,960,228	$1,383,606	$2,056,243
Jobs supported (in addition to landholder support)	-	8.2 (once-off)	14.4 (annual)	
10% passthrough of landholder payments to contractors				
Total NPV ($m)	$6,226,229	$1,960,228	$691,803	$2,056,243
Jobs supported (in addition to landholder support)	-	8.2 (once-off)	11.5 (annual)	
0% passthrough of landholder payments to contractors – same as raw				
Total NPV ($m)	$6,918,032	$1,960,228		$2,056,243
Jobs supported (in addition to landholder support)	-	8.2 (once-off)	8.6 (annual)	

Source: BCT model

3.3 Next steps

This report and accompanying model provide quantification of how conservation agreements contribute toward diversified income streams at a regional and a landholder level, it has also informed consideration of the indirect and flow-on impacts of conservation agreements to the regional community using the *NSW Treasury Employment Calculator*.

We understand that the Strategy is currently being reviewed, and this analysis provides a useful tool to inform the selection of suitable indicators for BCT to report on and, potentially, develop medium term socio-economic targets.

While outside the scope of this analysis, we note that given a primary objective of improving environmental outcomes, the associated socio-economic benefits of the funding model can be demonstrated by case studies and the model developed in this engagement. Conceptually, it is not appropriate to target a modelled estimate of income diversification or jobs supported, rather these are demonstrable co-benefits. All else equal, BCT's Strategy may benefit in having regard to income diversification benefits between regions, i.e., in the case of equivalent environmental

impact decisions could be informed by the regions in which income diversification could be most beneficial.

The model is designed to be amended over time to take account of the potential for improved data inputs, changes such as a revised strategic goals and increased focus on co-benefits such as carbon sequestration. Frontier Economics has also considered the potential for future areas of focus or additional data which BCT could consider to improve future analysis and reporting. Our suggestions are contained in **Table 9**, below.

Table 9: Suggestions for further refinement

Topic	Rationale
Data collection and management	Data could be stored to streamline future analysis and reduce the probability of errors introduced through data handling. This could include centralising appropriate data (e.g., delineation between projects signed and in pipeline) in accessible software. In particular, payment data could be consolidated that collects these items: ID, CMA term, conservation payments, and yearly CMA payments.
Inference of essential payment	Currently the treatment of essential payments is driven by assumptions in the stream of payment data. Better information around essential payments will allow a better understanding of the benefits they give. This could include the magnitude of essential payments for tenders which means the model does not need to infer it.
Amount spent by landholders on contractors	It is expected that there are income diversification benefits for contractors, however it is unknown precisely how much of the CA is spent on contractors.
Granularity around farm income	We have used grazing as it is the best available base assumption and we have calculated a representative return by bio-region. The model can be readily updated for different values for bio-regions. Further detailed information about farm production could allow this assumption to be refined. This could include land use information to guide the selection of assumptions in the mode (e.g. crops and livestock information).
Incorporation of future Conservation Agreements	The model has been developed to allow for an easy addition of new income streams. This allows BCT to continue to update the modelling and analysis as they issue new agreements.
Biodiversity outcomes under the CAs as a unitised measure	Providing a sense of biodiversity outcomes alongside landholder income diversification and other benefits would allow for transparency on the fundamental economics behind the conservation agreements.
Refining broader socio-economic impacts	Modelled broader socio-economic benefits are based on best available information. There may be scope to identify a more tangible measure of community benefit which can be interpreted as a co-benefit.

Source: Frontier Economics

A Results tables

Table 10: Direct impacts on landholders

LLS/ NRM	No. of CAs*	Total payments to landholders ($)	Payment % of farm income (average)	Payment % of farm income (good condition)	Payment % of farm income (poor condition)	Max % of farm income (average)	Change in profit (from average to poor) (without CA)	Change in profit (from average to poor) (with CA)	Max change (with CA)
Central Tablelands	-	563,007	11.46%	8.81%	16.37%	32.39%	-30.0%	-26.9%	-22.7%
Central West	-	1,013,715	3.25%	2.50%	4.65%	51.37%	-30.0%	-29.1%	-19.8%
Murray	-	1,060,679	1.43%	1.10%	2.05%	40.17%	-30.0%	-29.6%	-21.4%
North Coast	-	232,730	-	-	-	0.00%	-	0.0%	0.0%
North West	-	1,007,029	5.03%	3.87%	7.19%	17.55%	-30.0%	-28.6%	-25.5%
Northern Tablelands	-	432,544	7.42%	5.70%	10.59%	65.16%	-30.0%	-27.9%	-18.2%
Riverina	-	294,127	0.77%	0.59%	1.10%	10.68%	-30.0%	-29.8%	-27.1%
South-East	-	1,388,600	9.88%	7.60%	14.12%	59.35%	-30.0%	-27.3%	-18.8%
Western	-	925,601	3.54%	2.73%	5.06%	17.02%	-30.0%	-29.0%	-25.6%

*Note: *Number of agreements removed for privacy reasons*

Source: Frontier Economics analysis of BCT data

Table 11: Flow through impacts on regions

BCT region	Direct payments of CAs (S)	Number of Cas with essential payments*	Essential $ from CAs	Av. Annual $ from Grants	Area from CAs (ha)	Area from Grants (ha)
Western	$925,601	-	$1,461,841	$30,984	108583	39336
Northern Inland	$1,439,573	-	$23,619	$92,178	23676	5562
North Coast	$232,730	-	$0	$1,097,829	255	5582
Sydney-Hunter	$0	-	$0	$361,403	0	3927
Central West	$1,576,722	-	$293,800	$85,550	18713	1837
South-East	$1,388,600	-	$0	$309,824	7229	5966
Murray-Riverina	$1,354,807	-	$180,968	$78,476	32434	1761

*Note: * Number of agreements removed for privacy reasons*

Source: Frontier Economics analysis of BCT data

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