REGIONAL AUSTRALIA INSTITUTE

SOCIO-ECONOMIC IMPACT ASSESSMENT FRAMEWORK

JANUARY 2025

ABOUT THE REGIONAL AUSTRALIA INSTITUTE

The Regional Australia Institute (RAI) is the nation's first and only independent think-tank dedicated to empowering Australia's regions. We are a not-for-profit organisation that undertakes research to inform, educate and activate our rural and regional communities.

The RAI celebrates 14 years in 2025. We are proud of the vast array of research, data, and detailed insights the RAI has provided into many of the significant issues and challenges facing regional Australia. The work of the Institute is made possible through research partnerships with federal, state and territory governments, the national Regions Rising event series, regional consultancy projects, membership, and philanthropic funding.

In 2022, the RAI launched the *Regionalisation Ambition 2032 - A Framework to Rebalance the Nation*. The Ambition is a 10-year plan for regional Australia that seeks balanced growth across our nation's regional towns and cities. It outlines key targets, actions and benefits that will contribute to building prosperous regional communities, and a stronger Australia.

The RAI exists so that decision-makers at all levels of government, not-for-profits, industry, and community have the information they need to ensure the best outcomes for regional Australia. By replacing myths and stereotypes with facts and knowledge, the RAI seeks to build a more inclusive, unified and prosperous future for all Australians.

DISCLAIMER

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Further information can be found at: www.regionalaustralia.org.au and www.rebalancethenation.com.au

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1 INTRODUCTION

The Regional Australia Institute was engaged by the Grains Research and Development Corporation (GRDC) and Cotton Research and Development Corporation (CRDC) to develop an understanding of the social impacts of GRDC and CRDC research in regional communities and subsequently develop a framework for assessing the socio-economic impacts of their agricultural research, development and extension projects in regional communities.

The framework provides a standardised structure which can be adapted to cover multiple types of agricultural innovations, including new technologies, practices, policies and business models. The framework is designed for assessing the socio-economic impacts of agricultural innovations beyond the farm-gate. The assessment framework is designed to complement agricultural production and first order economic benefit analysis by assessing broader societal impacts such as community resilience, socio-economic equality, and workforce skills and availability.

As the GRDC and CRDC lead investment in grains and cotton research, development and extension (RD&E) in Australia, it is important to understand where the institute is driving positive change and delivering the greatest impacts for both growers and regional and rural communities. The GRDC's Performance and Impact Framework identifies three broad areas of assessment: GRDC's investment level impact, on-farm adoption and impact, and cumulative impacts aggregated at a grains sector level. Whilst this is necessary to monitor the economic impact of GRDC investment and RD&E activities, there are many social impacts (direct or spillover), that can be additionally considered to further evaluation the contributions of GRDC and CRDC. The socio-economic impacts can be incorporated into this framework or operate as a standalone framework.

In the Strategic RD&E Plan 2023-28, CRDC states that their RD&E investments aim to boost environmental, social, and economic benefits for cotton growers, the cotton industry, regional communities and the broader Australian public. This underscores the importance to design a socio-economic impact assessment framework to monitor, evaluate and communicate the broad and diverse impact of agricultural RD&E investment.

The framework detailed within this document has been constructed using a combination of sources:

- literature on Australian and international socio-economic assessment frameworks[1]
- information provided by the GRDC and CRDC, such as the GRDC Performance Impact Framework
- information gained from RAI-facilitated workshops in July 2023
- fieldwork in three case study regions to understand the socio-economic impacts of GRDC and CRDC research in each community.

The RAI conducted fieldwork in the three GRDC growing regions: Eyre Peninsula (Southern), Goondiwindi (Northern) and Dalwallinu (Western) to gain a deeper understanding of the socio-economic impacts of GRDC and CRDC research that is playing a significant role in supporting innovation in agriculture. Agricultural innovations clearly have extensive impacts on local communities, beyond the immediate effects on the

[1] See, for example, Maughan C. 2012. *Monitoring and evaluating social impacts in Australia*. CRC-REP Working Paper CW003. Ninti One Limited, Alice Springs. On international frameworks, see Vanclay, F., Esteves, A. M., Aucamp, I., & Franks, D. 2015. *Social Impact Assessment: Guidance for assessing and managing the social impacts of projects*.

agriculture industry and related sectors. These impacts were noted as being relatively consistent across all fieldwork regions, though the extent of impact was unique to each region. Notable observed impacts included: shifting from on-farm labour to off-farm technical expertise, an improved ability to mitigate environmental pressures (particularly water scarcity), high capital cost and barriers to entry, and decreasing use of local suppliers in favour of specialised distributors. More complex, multi-directional relationships were also observed with housing and labour markets. See the appendix for further details of these findings.

A socio-economic impact assessment (SEIA) is a tool for evaluating the potential impacts of a set of proposed or existing changes and predicting stakeholder responses. Socio-economic impact assessments can be used to identify vulnerable groups and inequalities, incorporate local voices and assess impacts on local economies and communities. Various frameworks exist for SEIA, with a notable example in the agriculture sector being the Socio-Economic Impact Assessment Toolkit developed by the Australian Government Department of Agriculture, Fisheries and Forestry. Key to a successful SEIA is selecting appropriate indicators, with best practice centring on indicators that cover industry characteristics, community impacts, workforce impacts, and Indigenous impacts.

Well-designed and conducted SEIAs can provide significant benefits by informing and enhancing decision making and improving the long-term sustainability of research and development innovation through improved community outcomes.

WHEN TO USE THIS FRAMEWORK

This framework has been designed for flexible use cases and can be employed at either the beginning or final stages of innovation. At the start of the innovation process, this framework could be incorporated into a feasibility assessment, or investment decision, to project the potential socio-economic impacts of the innovation. It could also be utilised as part of a monitoring and evaluation exercise after an innovation has been adopted to capture its impacts.

This framework could also be used to guide stakeholder engagement throughout the innovation process, allowing users to more easily identify and work with affected stakeholders to manage the impacts of agricultural innovation.

2 AGRICULTURAL RESEARCH SOCIO-ECONOMIC IMPACT ASSESSMENT FRAMEWORK

The framework details the process and suggested indicators for assessing the regional socio-economic impacts of agricultural research, development and extension activities. There are five steps:

1. **Identify impactful agricultural innovations**. Identify and categorise agricultural innovations that are of interest and with sufficient levels of scale/adoption necessary to accurately assess.
2. **Understand the geographic, social and economic contexts**. Assess the geographical, social, economic, and environmental contexts within which innovation and adoption occurs.
3. **Map key stakeholders in the regional ecosystem**. Define the region for assessment and identify the stakeholders and the role they play within the region's economy and community.
4. **Assess the socio-economic impacts**. Assess the socio-economic impacts of innovation using indicators which draw upon a combination of quantitative and qualitative methods.
5. **Adjust RD&E investment policy.** Take account of impact assessments when setting RD&E investment policy for agriculture innovations.

Potential indicators for use in this framework are detailed under step 4 and categorised according to the dimensions of the impacts. Users will need to consider the extent to which a measured change in an indicator can be reasonably attributed to a specific agricultural innovation, given the vast and interconnected nature of the socio-economic ecosystem and the impact of other factors. Indicators should ideally not be used in isolation, but rather to support findings from fieldwork consultations and desktop analysis.

Figure 1 Agricultural Innovation Socio-economic Impact Assessment Framework

Step 1: Identify Impactful Agricultural Innovations and Define the Scope of the Analysis

The first step is to define the boundaries of the assessment and document what is already known about the innovation(s). It should identify any other assessments that have been made of the impact of the innovation(s) (such as direct impacts on farm productivity) and how the socio-economic impact assessment will complement that work.

The user should document key aspects of the innovation to assist in defining the scope. This process is technology agnostic and includes new technologies, practices, policies, or business models. Research questions which could guide this activity include:

- What are the agricultural innovations that are of interest?
- Why are these innovations important?
- Where, and how widely, have the innovations been adopted? Or, how do the types and rates of adoption of agricultural innovations vary across different regions and farm characteristics?
- Which regions will become part of the assessment?
- What are the key areas of the industry to which agricultural innovations contribute?
- What are the primary factors behind the adoption and to what extent do these factors differ by type of innovation?
- What time period will the assessment consider? Will it be future focussed, or a backward-looking evaluation of previous innovations?

The systematic identification and categorisation agricultural innovations can assist in organising large scale assessments. Agricultural innovations can be categorised according to themes, such as productivity enhancement, resource efficiency improvement, on-farm management, or decision-making empowerment.

EXAMPLE

The table below outlines the innovation themes identified in a joint workshop with the GRDC and CRDC in 2023. Participants in the workshop identified important innovations which should be included in the assessment. Three fieldwork regions were selected, one to represent each of the growing regions (Northern, Southern and Western), to ascertain the extent of impacts and determine how these impacts differ by region. This national approach may be unnecessarily wide if specific innovations are chosen – for example, cotton, where users will want to exclusively focus on cotton growing regions.

Table 1 Agricultural Innovation Categories

Workshop themes identified	Sub-themes
Productivity enhancement	• Breeding • Mechanical/agricultural technology • Pest management • Disease management • Labour
Resource interactions	• Water • Spray drift/wind • Pest management • Ag tech/labour • Soil (no till)

Workshop themes identified	Sub-themes
Collaboration	• Research collaboration • Knowledge sharing (extension)/peer-to-peer review • Funding collaboration • Risk management
Research demand	• Canola • Industry confidence • Research-innovation lifecycle • Grower led research engagement
On-farm management	• Decision making • Knowledge information system • Agribusiness service sector • Education

Step 2: Understanding the Context of Innovation and its Adoption

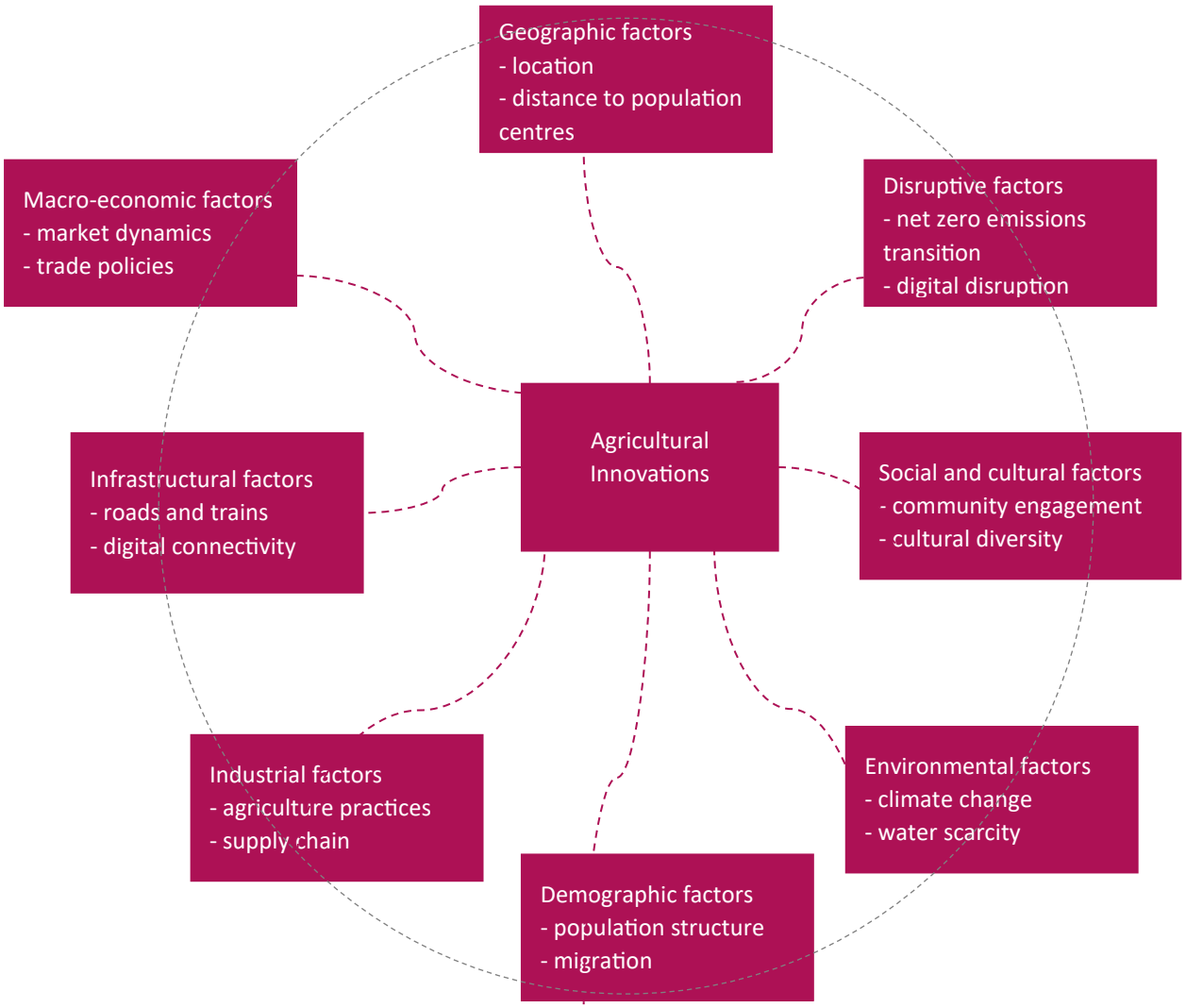
Step 2 involves understanding the wider economic, social and environmental context in which the innovation exists. This step will assist in evaluating the differential impacts of innovation: as the same innovation will likely have different impacts or outcomes in different regions and contexts.

Whilst the impacts on farming output and productivity might be easier to directly attribute to an innovation, socio-economic impacts are more complex and multi-directional, thus more difficult to attribute. An out-of-context assessment would lead to an erroneous assessment or oversimply the impacts and lead to suboptimal decision-making. A comprehensive understanding of context requires consideration of any or all of the following dimensions:

- **Environmental**: such as climate change, water scarcity, or biosecurity concerns
- **Geographic**: region location, distance to major population centres, and natural features of the landscape
- **Macro-economic**: including market dynamics (both international and domestic), trade policies, and national/state/local agricultural strategies
- **Demographic**: population, gender and age structure, migration, and labour force participation
- **Industrial**: both agriculture and agriculture adjacent industries as well as industries in the broader economy
- **Infrastructure**: both physical infrastructure (such the road and rail network, digital connectivity, power) and community services (such as education, health, childcare)
- **Social fabric and culture**: such as the prevalence of volunteering, community engagement, cultural diversity, as well as social cohesion and dynamics, wellbeing and resilience
- **"Disruptive"**: factors beyond 'business as usual' such as the net zero emissions transition, or emergence of artificial intelligence.

The ever-changing context within which innovation occurs in a region needs to be well understood as it plays a crucial role in determining the extent of its impacts. Notably, many of these relationships are multidirectional. For example, a reduced local labour supply might cause growers to adopt innovations which reduce the demand for on-farm labour. This in turn will reduce local job opportunities causing residents to relocate, further reducing the supply of local labour and creating a feedback loop in the local market. In this instance, it is not necessary to conduct a full labour market analysis; basic knowledge of the broad labour trends is sufficient.

Figure 2 Socio-economic Contexts of Agricultural Innovations

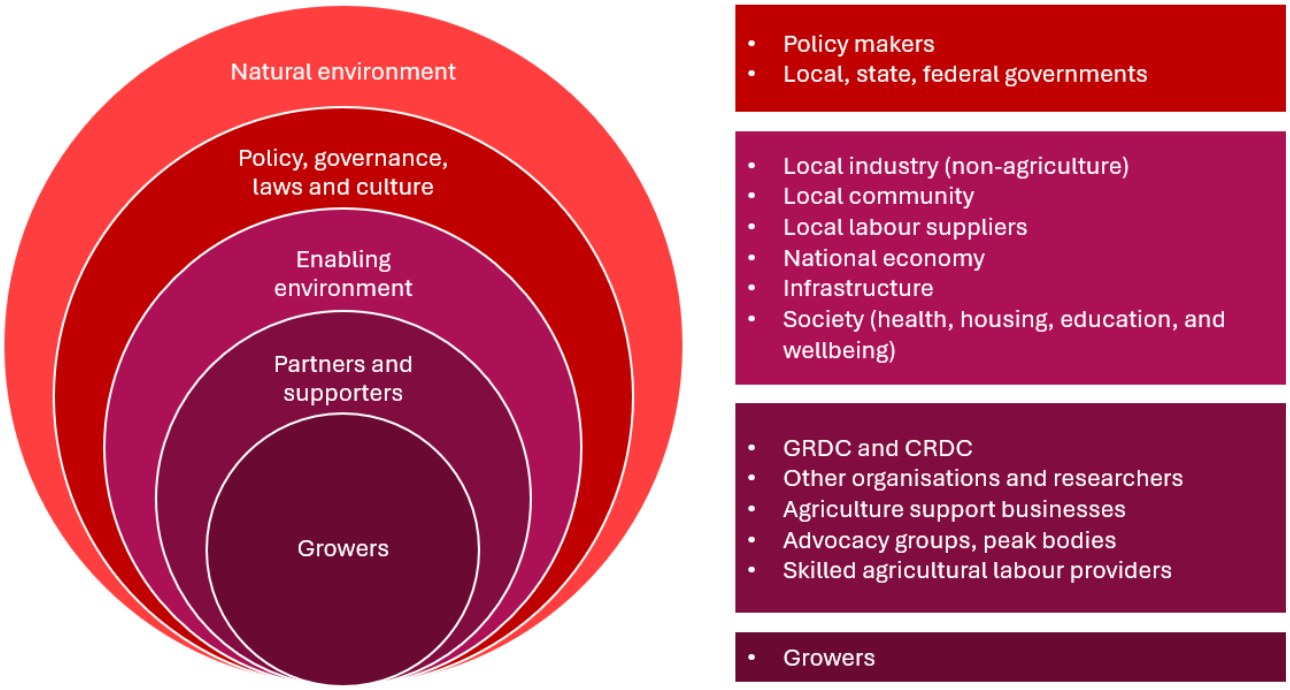


Step 3: Map Key Stakeholders Within the Ecosystem and Determine the Extent of the Assessment

In this step, the user maps out the environment in which agricultural innovations are developed to understand the key stakeholders and their role within the ecosystem. It includes identifying primary and secondary stakeholders and their roles, interests, relationships and power dynamics, as well as assessing financing, knowledge-sharing platforms and logistical networks. It traces the journey from innovation development to field implementation.

The following figure shows the different 'layers' of a grower-centric model of the agricultural innovation ecosystem. It provides guidance as to which stakeholders are likely most impacted and a starting point for organising stakeholder consultations.

Figure 3 Stakeholders in the Agricultural Innovation Ecosystem[2]



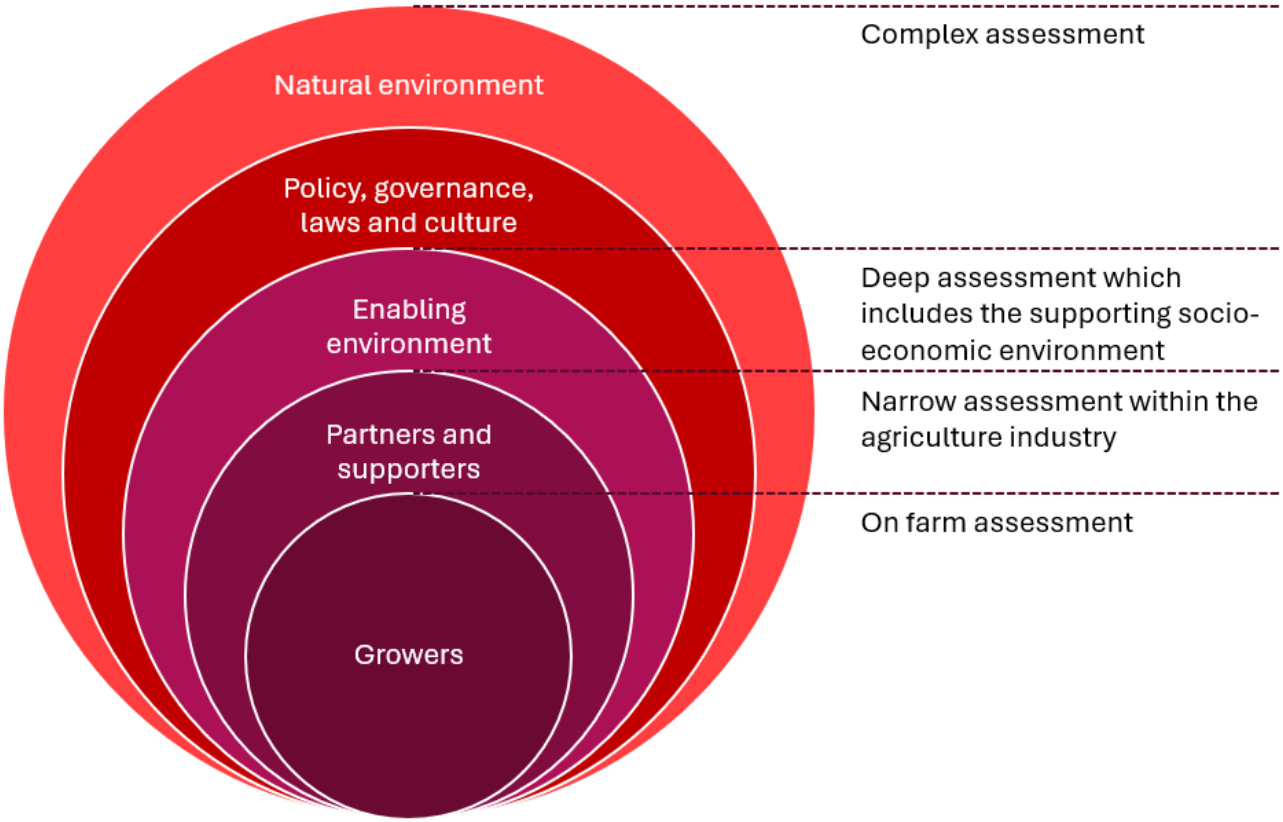
At this stage, the user should determine the extent of the assessment and category of stakeholder to be included. The following figure provides a guide to the possible assessment depths:

- **On-farm assessment**. Stakeholders limited to growers. This will not capture the broader-socio-economic impacts beyond the growers' operations. This is covered under existing GRDC and CRDC assessment frameworks. *For example, this assessment would focus on the impacts of an innovation on a grower's productivity.*

[2] RAI analysis

- **Narrow assessment**. Stakeholders extended to include all immediate parties within the growers' value chain. This includes agricultural support businesses and advisors, agricultural labour, peak bodies and advocacy groups, and research organisations. This is the minimum level of what could be considered a socio-economic impact assessment. *For example, this assessment would consider the impact of innovation-led changes in the grower's business inputs and suppliers of those inputs.*
- **Deep assessment**. Stakeholders extended to include local businesses outside the agricultural value chain, local communities, local labour suppliers, and community infrastructure. This is the suggested extent of an assessment to capture the broader impacts of an innovation. *For example, this assessment would consider the impact of innovation-led changes in the grower's business and its supply chains, as well as impacts on broader socio-economic components throughout regional communities.*
- **Complex assessment**. This is a complex assessment which aims to capture national economic, social and environmental impacts of an innovation. For most innovations, this would level of assessment would be unnecessary. The assessment would be very complex, with the impacts of innovation typically too small to accurately attribute and measure. *For example, this assessment might consider the impact on the national economy from innovation-led impacts across at an industry level.*

Figure 4 Stakeholders in the Agricultural Innovation Ecosystem[3]



[3] RAI analysis

EXAMPLE

As an example of this process, the RAI conducted workshops with GRDC and CRDC to understand the agricultural innovations considered most important by the two organisations. High level stakeholder mapping and exploration was then conducted to determine key stakeholders which may provide high value consultations. The categories of stakeholders identified for consultation were: growers, agribusinesses, local non-agriculture businesses, local councils, local agricultural research institutes, and community members. Consultations were not extended to include national bodies. This is an example of a deep assessment.

Step 4: Assess the Socio-Economic Impacts

Step 4 of the socio-economic impact assessment utilises a range of indicators (see Chapter 3) to assess the wider impacts of an innovation on local businesses and local communities.

Before utilising the indicators and quantifying the impacts, it is necessary to determine:

- Which impact assessment methodology to use
- Which indicators of impact to use
- The timeframe for the assessment
- The mix of direct impacts within the agricultural supply chain and indirect impacts on industries outside the agricultural supply chain
- Attribution of impacts

2.1.1 AGRICULTURAL AND NON-AGRICULTURAL IMPACTS

Both the direct impacts on agriculture and agriculture adjacent industries, as well as the indirect impacts on broader society must be incorporated into the assessment framework. Impacts on agriculture are typically more immediate, tangible, and direct. Impacts on the latter are often seen as spillover effects which go beyond the farmgate to impact social, economic, and environmental systems. Both have impacts at the local community level, as well as regional and even nation-wide impacts.

The aspects of impact directly related to agriculture include:

- **Farming practices**: shifts in the commodity mix, adoption of new crops, machinery and practices (such as no till farming), and changes in farm sizes
- **Resource management**: alterations in water usage, fertiliser and chemicals application, or energy consumption
- **Agricultural employment**: shifts in employment patterns, labour requirements, or skill needs
- **Outputs and productivity**: changes in the outputs and resource efficiency
- **Risk mitiga**tion: changes in resilience to both climate change and market instability
- **Financial outcomes**: changes in costs, capital investment, revenue and profits
- **Farm ownership**: shifts in the farm ownership and the proportions of family farms and corporate farms
- **Livelihoods and lifestyle**: impacts on financial stability, risk levels, and long-term sustainability, changes in the leisure time of growers, and willingness to and confidence in taking up farming
- **Decision making and autonomy**: changes in the decision-making capacity of growers and their self-sufficiency and control

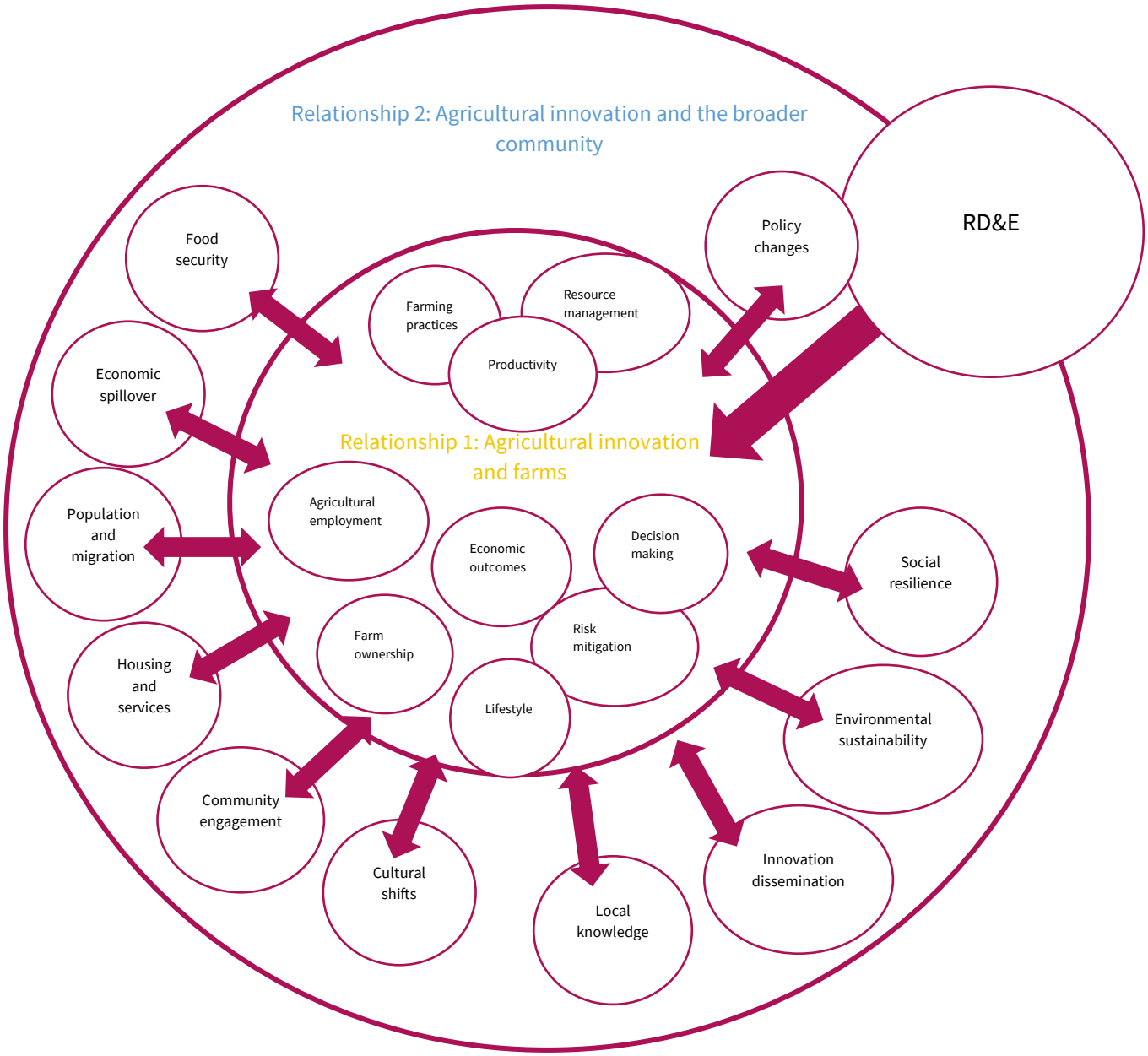
The impacts of agricultural innovations on the broader community and society include those generated thorough changes in agricultural activities, as well as from the innovation activity itself (such as extension

activities creating economic value in local communities through conferences and workshops). The assessment aspects concerning impacts with an indirect relationship to agricultural innovation include:

- **Food security and diversity**: impacts on both international and domestic agricultural commodity prices and food supply
- **Economic spillover**: impacts on local business growth and job creation from changes in both agricultural activities and innovation and extension activities
- **Population and migration**: impacts on the local population, including immigration and immigration of both long-term residents and temporary workers, as well as concerns such as the retention of young people in a region
- **Infrastructure development and concerns**: impacts on the development and pressures of infrastructure, including road, rail, storage facilities, power, water and communications
- **Housing and community services**: impacts on the supply and demand of housing and health, education, childcare and aged care services
- **Community engagement**: impacts on community activity and engagement and social cohesion
- **Cultural shifts**: impacts on local customs and culture due to changes in farming methods and practices
- **Local knowledge**: impacts on the accumulation or loss of local knowledge
- **Innovation dissemination**: impacts on the dissemination of innovations and technologies beyond the agricultural sector, as well as the cultivation of local innovation culture
- **Environmental sustainability**: impacts on biosecurity, soil health, water security and greenhouse gas emissions
- **Policy and institutional changes**: influences on the regulatory environment and policy support or reforms that affect either agriculture or broader society
- **Disruptive and emerging opportunities and challenges**: such as those related to the transition to net zero emissions or digital disruption
- **Social resilience**: impacts on local preparedness and adaptiveness to various kinds of disruption.

It is important to note that these dimensions will not have the same magnitude of impact or relevance in the different regions throughout Australia. This is true of both on-farm and the broader socio-economic dimensions of impact. For example, water security, and the impact of agricultural innovations on it, was a significant concern on the Eyre Peninsula compared to other regions along the east coast. Therefore, the dimensions to be included in the assessment must be considered under the local contexts and weighted accordingly.

Figure 5 Overview of Agricultural Innovation Socio-Economic Impacts



2.1.2 TIMEFRAME OF INNOVATIONS AND IMPACTS

When assessing the socio-economic impacts of agricultural innovations, the timeframe of both the innovations and their associated impacts must be taken into consideration. Excluding the high-profile 'disruptive' innovations, most innovations are not entirely 'new things' emerging out of nowhere but rather part of a long-term ongoing development – such as the mechanisation and automation of agricultural equipment dating back well over a century. These advancements build upon existing practices, technologies, and knowledge systems, reflecting a continuum of refinement and adaptation. Understanding this continuity is essential because the socio-economic impacts of these innovations are frequently intertwined with the historical, cultural, and institutional contexts in which they evolve.

Their impacts, whether economic (such as increased yields or reduced input usage), social (such as labour demand or community resilience), or environmental (such as reduced resource use or biodiversity conservation), will also manifest over different timeframes. Short-term impacts might include immediate changes in productivity or income, while long-term impacts could involve shifts in market dynamics, land use patterns, or rural socio-economic structures. Additionally, innovations may have delayed effects, such as gradual improvements in soil health or the unintended consequences of cultural shifts.

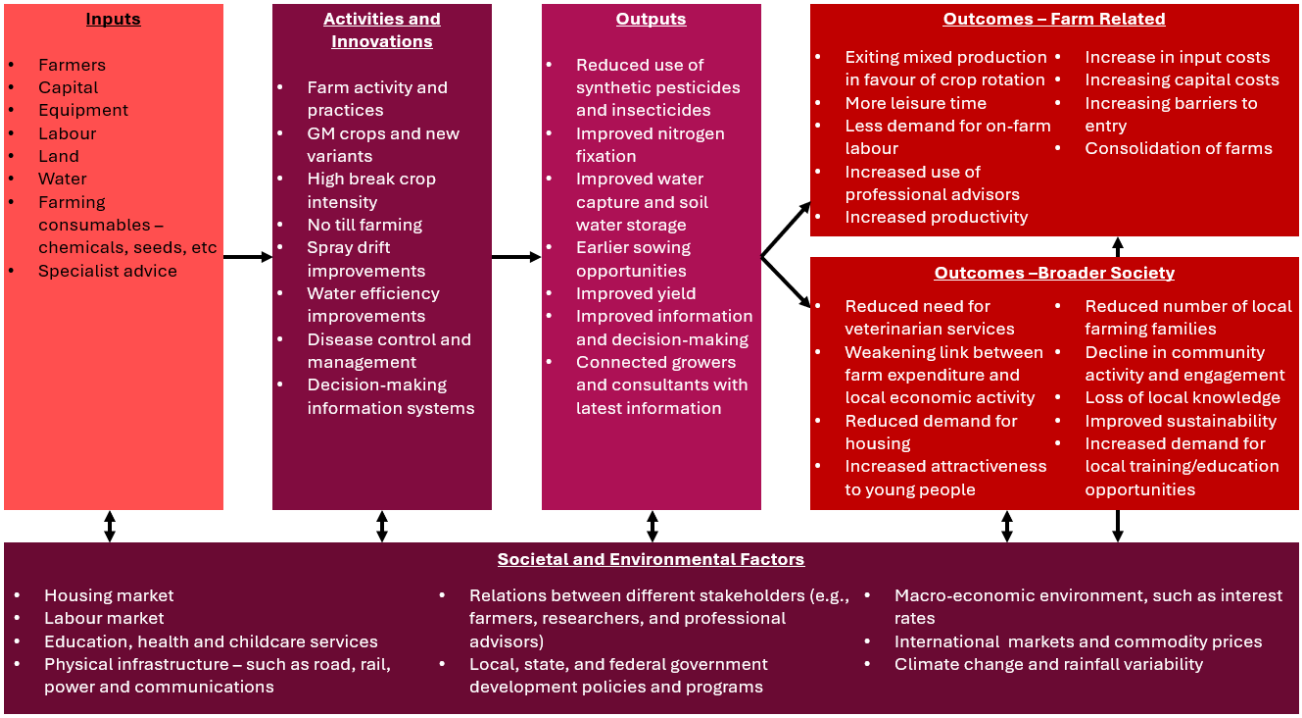
The adoption process often depends on the socio-economic conditions of growers, such as farm size and access to resources and infrastructure, which can further influence the timeframe of observed impacts. For example, there can be a five-to-10-year lag for the cost of new technology to reduce to a point where smaller-scale growers can adopt the technology. By contextualising innovations within their historical trajectory and recognising the gradual accumulation of their effects, policymakers, researchers, and stakeholders can better design strategies that align with the long-term goals of sustainable and inclusive agricultural development.

2.1.3 ATTRIBUTION OF IMPACTS

Due to the multi-directionality and complexity of the socio-economic impacts of agricultural innovations, it is critical to understand the influence mechanisms that shape how these innovations ripple through farms, communities, markets and policy frameworks.

A wide variety of factors can affect how quickly adoption takes place, who benefits, and what intended or unintended consequences may arise. These outcomes can differ across regions, farm sizes, socioeconomic groups, and timeframes, making it difficult to isolate and attribute impacts to a specific innovation. Without careful study and contextual analysis, practitioners risk oversimplifying, or erroneously attributing, the impacts of agricultural innovations. This knowledge also enables stakeholders to anticipate secondary impacts, identify which groups might be most vulnerable or most likely to benefit, and formulate strategies that promote inclusive growth.

Figure 6 Influence Mechanisms of Agricultural Innovation Socio-economic Impacts



2.1.4 INDICATORS OF IMPACTS

Indicators have been categorised as either 'direct' or 'indirect' based on whether the impacts are directly related to growers and agricultural support industries or whether they impact the broader community. It is important to note that there have been a wide variety of impacts identified, both short and long-term, and not all of the impacts can be easily quantified - particularly concerning complex and long-term impacts. For example, how to measure impacts on the quality of decision-making capacity of growers following the introduction of new technologies, or the social capital built among neighbours who share agricultural machinery and knowledge. These aspects, whilst critically important, are difficult to measure, particularly if desiring clean quantitative data. Instead, such measures require a nuanced approach that captures context, perceptions, and lived experiences. This demonstrates the importance of combining quantitative and qualitative analyses to understanding the socio-economic impacts.

A set of indicators can be selected and used for different assessment purposes, measuring the varying dimensions of the socio-economic impacts. Section 3 of this document provides a list of relevant potential indicators and data sources. For example, the indicators regarding farm numbers, size and ownership can be used to track the consolidation of farms over time. Farmer's willingness and confidence to operate is influenced by farm productivity and profitability, as well as the lifestyle on and off the farm, which are further related to the development of new crop variants and other innovations. For instance, the availability of leisure time, as well as the adoption of advanced agricultural technologies (such as AI and big data), can increase young people's participation in the farm work. Many of these more complex elements may need to be self-assessed by growers.

Indicators such as the supply and demand of agricultural products can be used to measure the impacts on food security. The changes in farming practices caused by the adoption of innovations can lead to changes in local business and employment opportunities, including the emergence of new value-adding and other emerging industry. Moreover, whether there are enough employment opportunities is related to the growth

or decline of population, which further influences the provision of, as well as the demand on, various kinds of services (such as education, childcare, aged care). Likewise, agricultural and non-agricultural industries have been increasingly negatively impacted by infrastructure and housing.[4] Therefore, indicators on businesses, employment, population, housing, infrastructure, and services are useful to tracking the impacts of agricultural innovations on the broader community and society.

Given that agriculture is the dominant industry in many regions throughout Australia, its prosperity is not only important to regional economic prosperity but also to the social dynamics and community resilience. Community wellbeing, inclusion and equity, and social resilience are important indicators to be monitored. The previous milestone reports of this project have observed that these are significantly influenced by the community engagement of growers and the agricultural sector. The Regional Wellbeing Survey conducted by the University of Canberra annually provides an important data source for measuring these aspects.

Beyond a moment in time measurement, the assessment should ideally measure changes in the indicators over time. However, due to the influence of complex socio-economic factors, it is difficult to directly attribute these changes or determine the extent to which they are caused by agricultural innovations. Qualitative research (such as fieldwork and interviews) is not only useful in identifying the social impacts, but critical in testing and verifying the findings from the qualitative analysis.

INDICATOR WEIGHT AND AGGREGATION

Assigning weights to indicators is crucial to accurately reflecting the relative importance of the factors these indicators measure. The assignment of weights to indicators is a complex process, and typically involves the following steps:

1. Identifying indicators of interest and understanding their limitations and availability
2. Consulting with key stakeholders to understand their priorities and perspectives
3. Assign weights through expert judgement, such as through the Delphi Method.

If seeking aggregation of the indicators into a single index, then the following steps are also needed. However given the complex nature of socio-economic impacts, such aggregation is not recommended. This will oversimplify the assessment and possibly lead to important components innovation impact being masked or lost.

4. Normalisation of indicators to ensure compatibility, such as converting different units of measurement to a common scale
5. Aggregate the indicators to produce a composite score

Ideally, this exercise should take existing GRDC and CRDC assessment frameworks into account and should not be conducted in isolation.

[4] NSW Growers Association. *Project 2c – Infrastructure, Utilities and Housing*. Available at: https://www.nswgrowers.org.au/common/Uploaded%20files/NSWFA/DAIRY_NSWF_project.pdf.

2.1.5 RELEVANT METHODOLOGIES

Quantitative and qualitative methods should ideally be combined in order to effectively assess the socio-economic contexts and impacts of agricultural innovations. These two types of assessment methods support each other: while quantitative analysis generates basic understanding of both the trends of the agriculture sector and the studied regions, the qualitative information furthers this understanding by providing greater context, as well as testing and validating often large survey based quantitative data on smaller regions. Likewise, qualitative research can be used to initially generate stories about the changes brought by agricultural innovations in a local context, with subsequent quantitative research to test and verify the findings or stories.

The data sources of quantitative metrics are concentrated in a handful of high-profile data providers, including the Australian Bureau of Statistics, Australian Bureau of Agricultural and Resource Economics and Sciences, Australian Disaster Resilience Index, Australian Digital Inclusion Index, Regional Wellbeing Survey, and the Regional Australia Institute Regionalisation Ambition Progress Reports.

Qualitative data is collected through fieldwork, interviews, workshops and focus-group discussions, as well as literature review and policy reviews. This data is typically more time-consuming to collect which equates to a higher cost. There are many methods and approaches to analysing and identifying the socio-economic impacts of agricultural innovations, useful methods have been included in Appendix II.

Step 5: Use Impact Assessment to Guide RD&E Investment Considerations

As indicated by the GRDC RD&E Plan 2023-28 and CRDC Strategic RD&E Plan 2023-28, the primary objective of GRDC and CRDC is to foster agricultural innovations that boost the productivity, profitability, and sustainability of Australian growers, benefiting both the industry and the broader community. Assessing socio-economic impacts is critical to understanding where RD&E investments are driving positive change and whether they align with industry and community needs and the RD&E plans of the two organisations.

The socio-economic impact assessment framework can support three important aspects of RD&E investment evaluation and management:

- **Ensure Participatory Approaches:** Engage growers, industries and local communities in the decision-making process to ensure that innovations meet their needs and priorities. Participatory approaches help build trust and social license for agricultural innovations.
- **Enhance Community Resilience:** Develop innovations that strengthen the capacity of growers and communities to adapt to and recover from environmental, economic, and social shocks. This involves promoting diversification of income sources, enhancing local capacities, and cultivating local innovation culture.
- **Monitor and Evaluate Impact:** Implement robust monitoring and evaluation frameworks to assess the long-term impacts of agricultural innovations. This helps in making informed adjustments to investments and practices, ensuring continuous improvement and alignment with the RD&E plans.

The socio-economic impact assessment will inform decisions on when, where and how to invest in innovation initiatives. It is important to understand how the impacts of agricultural innovations on growers are influenced by the socio-economic conditions and in turn generate spillover effects on the broader community and society.

3 SUGGESTED INDICATORS FOR THE SOCIO-ECONOMIC IMPACTS OF AGRICULTURE INNOVATION ASSESSMENT FRAMEWORK

This section proposes a set of indicators to assess the socio-economic impacts of agricultural innovations.

- In relation to the impacts on growers, the indicators include farm number, size and ownership, farm productivity, cost, and profitability, growers' willingness to operate, decision-making capacity and resilience to uncertainty, as well as the participation of women and young people.
- Regarding the impacts on the broader community, indicators include food security, businesses and employment, population and migration, housing, infrastructure, and services, as well as on community resilience and environmental sustainability.

Dimension	Indicator	Potential Source
Direct (grower focussed)		
Farm number	*Estimated number of farms*	Australian Bureau of Agricultural and Resource Economics and Sciences
Farm size	*Total operation or cropping area per farm*	Australian Bureau of Agricultural and Resource Economics and Sciences
	Numbers/proportions of farms of different sizes	Australian Bureau of Agricultural and Resource Economics and Sciences
Farm ownership	*Numbers/proportions of family and corporate farms*	Australian Bureau of Agricultural and Resource Economics and Sciences
Commodity mixes	*Proportions of agricultural products (e.g., by gross value)*	Australian Bureau of Agricultural and Resource Economics and Sciences
	Numbers/proportions of cropping, mixed, and other farms	Australian Bureau of Agricultural and Resource Economics and Sciences
Farm productivity	*Average output per hectare*	Australian Bureau of Agricultural and Resource Economics and Sciences
	Average output per worker	Australian Bureau of Agricultural and Resource Economics and Sciences
Inputs and costs	*Fertiliser, pesticide, and other chemicals costs*	Australian Bureau of Agricultural and Resource Economics and Sciences

	Machinery costs	Australian Bureau of Agricultural and Resource Economics and Sciences
	Average labour used per hectare; wages for hired labour	Australian Bureau of Agricultural and Resource Economics and Sciences
	Advisory service fees	Australian Bureau of Agricultural and Resource Economics and Sciences
	Accounting, finance, and insurance services fees	Australian Bureau of Agricultural and Resource Economics and Sciences
	Other services fees	Australian Bureau of Agricultural and Resource Economics and Sciences
Income and profitability	*Prices of agricultural products (domestic and international)*	Australian Bureau of Agricultural and Resource Economics and Sciences
	Sales and exports of agricultural products (amounts and values)	Australian Bureau of Agricultural and Resource Economics and Sciences
	Total family income (farm and nonfarm)	Australian Bureau of Agricultural and Resource Economics and Sciences
	Farm business profit	Australian Bureau of Agricultural and Resource Economics and Sciences
Youth and women participation	*Numbers/proportions young and women owner mangers and farm workers*	Australian Bureau of Agricultural and Resource Economics and Sciences
Leisure time and lifestyle	*Hours worked on farm by owner managers*	Australian Bureau of Agricultural and Resource Economics and Sciences
Willingness to operate	*Growers' business confidence*	Self-assessment
Decision-making capacity	*Growers' decision-making capacity*	Self-assessment
Agricultural resilience	*Resilience and adaptiveness to climate change and market instability*	Self-assessment
Indirect (broader society)		
Food security	*Supply and prices of agricultural products*	Australian Bureau of Agricultural and Resource Economics and Sciences

Business and employment	*Numbers/proportions of agricultural, supply chain and other businesses (e.g., retail, accommodation and hospitality) and employment*	Australian Bureau of Statistics
Value-adding industry	*Number and output of local value-adding businesses*	Local councils (subject to availability)
Population and migration	*Number of population and families*	Australian Bureau of Statistics
	Age and gender structure of population	Australian Bureau of Statistics
	Net migration of population	Australian Bureau of Statistics
Infrastructure	*Access to roads, trains, ports, and airports*	Regional Wellbeing Survey
	Mobile and internet coverage	National Telecommunications Survey Australian Digital Inclusion Index
	Stability and prices of power supply	Australian Energy Market Operator
Housing	*Number of building approvals*	Australian Bureau of Statistics
	Volume and median price of dwelling sales	CoreLogic or similar property data providers
	Rental vacancy	CoreLogic or similar property data providers
Services	*Numbers and places of local registered education, health, childcare, aged care, and other services*	Department of Education National Health Workforce Dataset Australian Children's Education & Care Quality Authority Department of Social Services Australian Institute of Health & Welfare
Innovation and entrepreneurship	*Innovation and entrepreneurship index*	AURIN Quantifying Regional Innovation project
Community engagement	*Get involved in the community index*	Regional Wellbeing Survey
	Sense of belonging index	Regional Wellbeing Survey
Social equity and inclusion	*Equity and inclusion index*	Regional Wellbeing Survey

Community wellbeing	*Community wellbeing index*	Regional Wellbeing Survey
Environmental sustainability	*Biodiversity index*	Australian Threatened Species Index
	Water supply and security	Local councils, subject to availability
	Activities and performance of Circular Economy	Local councils, subject to availability
Social resilience	*Community resilience index*	Australian Disaster Resilience Index
Emerging opportunities and challenges	*Development and performance of Smart Agriculture*	Local councils

APPENDIX I: AUSTRALIAN SOCIO-ECONOMIC IMPACT FRAMEWORKS

A socio-economic impact assessment (SEIA) is an important tool for understanding the potential range of impacts a proposed (or existing) change may have as well as predicting how affected stakeholders are likely to respond if the change is implemented. There are many existing frameworks for measuring and assessing socio-economic impacts both domestically and abroad. One notable example is the Socio-Economic Impact Assessment Toolkit developed by Australian Government Department of Agriculture, Fisheries and Forestry, which identifies four key steps of the assessment:

- scoping an impact assessment – to establish the goals and boundaries of the assessment
- profiling the current context and identifying who is likely to be impacted
- assessing direct socio-economic impacts
- assessing indirect socio-economic impacts.

Although it focuses on the impacts of Marine Protected Areas in Australia, this toolkit shares a common structure with many other socio-economic impact assessment frameworks.

The department also has a Social Assessment Handbook for assessing the social sustainability of fisheries in Australia. Here 'social assessment' refers to the scoping and profiling stages of a typical social impact assessment, that is, the analysing of current and historical social conditions of communities closely connected with fisheries. However, the Handbook also covers a range of other factors of social assessment:

- identifying stakeholders dependent on fishing activities
- analysing quality of life and social resilience of fishing communities
- identifying how fishing contributes to the broader community
- identifying values, attitudes and beliefs associated with fishing.

The handbook summarises different data collection methods, including quantitative and qualitative data from both primary and secondary sources. Other social assessment or socio-economic impact assessment reports published by the department also provide useful guidance for evaluating the impacts of agricultural activities.

Although it utilises a combination of quantitative and qualitative analyses, the framework emphasises the importance of listening to the voice of rural and regional communities. The community voice does not only provide a better understanding of local contexts but of understanding what matters most for local communities.

A common theme across these frameworks is the emphasis on understanding the socio-economic conditions – current, historical as well as future – of the communities where changes occur. This is equally important for assessing the socio-economic impacts of agriculture innovations as the adoption of these innovations and their impacts are largely dependent on the 'environmental' or 'ecosystemic' factors, or the local, socio-economic conditions.

Beyond the basic structure and initial framing, the most important aspect of the framework is the selection of indicators for both the socio-economic conditions and socio-economic impacts. There is already a substantial body of research detailing these indicators: a key example is the Socioeconomic Indicators for Natural Resource Management by the Australian Bureau of Agricultural and Resource Economics. While this report focuses on the attributes of sustainable farming practices and the characteristics of farm family households that are related to the adoption of sustainable farming, the Recommended Indicators for

Monitoring Social and Economic Impacts of Forestry over Time in Australia includes four categories of indicators which provides useful guidance:

- industry characteristics and structure
- impacts of the industry on the broader community
- impacts of the industry on its workforce
- impacts of the industry on Indigenous people.

It takes account of not only industry-related variables but other factors affecting the broader community. The industry-related variables include direct employment, proportion of land utilised, estimated volume and value of production, self-rated health and wellbeing of workers. Other indirect variables include population, unemployment rate, median household income, attachment to place, total area of land owned by Indigenous people.

Many state and territory governments also provide guidelines for socio-economic impact assessment. For example, the Queensland Government has a separate Social Impact Assessment (SIA) Guideline and Economic Impact Assessment (EIA) Guideline. While the EIA Guideline focuses on the costs and benefits of a project and the effects on local, regional and state economies, the SIA Guideline lists five key matters to be addressed: community and stakeholder engagement, workforce management, housing and accommodation, local business and industry procurement, and health and community well-being. The table below lists the guidelines for economic and/or social impact assessment by state and territory governments:

State/Territory	Guidelines for Economic and/or Social Impact Assessment
New South Wales	*Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* *Social Impact Assessment Guideline*
Victoria	*Regulatory Impact Statements and Legislative Impact Assessments Guidance* *Guidance on Undertaking Economic Assessment*
Queensland	*Social Impact Assessment Guideline* *Economic Impact Assessment Guideline*
South Australia	*Impact Analysis Guide* *Evaluation Guidelines Handbook* *Better Regulation Handbook* *Guide for Applicants and Assessment Requirements Library – Impact Assessed Development* *Social Impact Framework and Assessment Tool* *Community Impact Assessment Guidelines – Liquor and Gambling*
Western Australia	*Regulatory Impact Assessment Guidance*
Northern Territory	*Guidelines for the Preparation of An Economic and Social Impact Assessment*

Australian Capital Territory	*Economic Impact Assessment – Capital Framework*

There are also many international resources to draw on such as the Guidance for Assessing and Managing the Social Impacts of Projects by the International Association for Impact Assessment. It does not only clearly identify the phases and tasks of social impact assessment but also its values and principles. For example, it defines social impacts as 'everything that affect people', including people's way of life, culture, community, political systems, environment, health and wellbeing, personal and property rights, and fears and aspirations.

APPENDIX II: RELEVANT QUALITATIVE RESEARCH METHODS

Qualitative data is collected through fieldwork, interviews, workshops and focus-group discussions, as well as literature review and policy reviews.

There are many methods and approaches to analysing and identifying the socio-economic impacts of agricultural innovations, useful methods include Program Logic (PL), Theory of Change (TOC), Social Accounting and Auditing (SAA), Social Return on Investment (SROI), and Most Significant Change (MSC).[5]

Program logic, also known as logic models or the logic approach, is a type of outcomes framework that employs diagrams or matrices to outline the sequence of steps within a program, which progress from low-level activities or inputs to high-level outcomes. This approach was utilised as part of the regional analysis of Dalwallinu, Goondiwindi and the Eyre Peninsula.

Like Program Logic, **Theory of Change** is an outcomes framework that utilises diagrams to map out the steps involved in a program. However, a Theory of Change utilises backwards mapping to help decision makers to think backward from the goal to the intermediate and then early-term changes. This can be a useful approach is targeting an ideal future state.

Social Accounting and Auditing is a framework that involves an external, quality-assured audit process collecting information about the activities an organisation carries out and examining whether an organisation's claims are credible in relation to social and environmental outputs.

Social Return on Investment is a method to understand how certain activities or programs can generate value along a continuum, spanning from purely economic at one end, through socio-economic in the middle, through to social value. It uses monetary terms to estimate the value, be it economic, socio-economic or social. A key tenant of SROI is that social value leads to cost savings for governments through reduced public expenditure and increases revenue from additional tax contributions.

Finally, **Most Significant Change** is a form of participatory evaluation which involves gathering change stories from individuals involved in programs or activities and systematically selecting the most significant of these stories by selected panels. It is a suitable tool for organisations seeking to understand the impact of an intervention on people's lives through their own voices. This methodology was also utilised throughout earlier phases of this project.

[5] Maughan C. 2012. *Monitoring and evaluating social impacts in Australia*. CRC-REP Working Paper CW003. Ninti One Limited, Alice Springs.

APPENDIX III: RAI RESEARCH REPORT: SOCIAL IMPACT OF GRDC AND CRDC RESEARCH IN REGIONAL AUSTRALIA

The RAI undertook socio-economic impact assessment of research-led innovation for GRDC and CRDC and submitted a final report *Social Impact of GRDC and CRDC Research in Regional Australia* in 2024. The executive summary is included below.

Executive Summary

The Regional Australia Institute was engaged by the GRDC and CRDC to develop an understanding of the social impacts of GRDC and CRDC research in regional communities. In understanding the impacts, the RAI is to develop a draft framework for measuring the social impact of agricultural research in Australia. This report summarises the findings from an extensive literature review and three fieldwork regions: Northern (Goondiwindi, Queensland), Southern (Eyre Peninsula, South Australia) and Western (Dalwallinu, Western Australia).

GRDC and CRDC research supports on farm innovation that lifts the productivity and global competitiveness of Australia's agriculture sector. Australia's exports of agriculture, fisheries and forestry (AFF) products reached a record high of $80.4 billion in 2022–23, a 17% increase on the previous year. Wheat, canola, cotton, barley and lentils were among the top ten export commodities.

Fieldwork findings were categorised into two broad relationships: those with a direct and strong relationship with agricultural innovation, and those with an indirect relationship. Fieldwork across three sites was combined with a literature review to validate these two relationships and identify any complementary or contradictory impacts of agricultural research.

The research clearly shows that agricultural innovations have extensive impacts on local communities. The GRDC and CRDC are playing a significant role in developing new research and innovations that enable farming improvement. These innovations were seen across all three fieldwork regions, though the extent of impact was unique to each region. Direct effects within the agriculture sector include changes in farming practices and commodity mix, shifts in land ownership, a reduction in on-farm labour in favour of capital equipment, on-farm technical skills and off-farm advice, decreased local procurement, and significant increases in farm productivity and industry resilience, with an improved ability to mitigate environmental pressures.

Facing a range of economic, environmental, and social pressures, growers are turning to innovative practices like automated machinery, new crop varieties, no-till farming, dry seeding, and other more efficient water, chemical, pest, and disease management. The adoption of new innovations has also shifted the commodity mix, with many growers moving away from mixed crops-livestock production to crop rotation, reducing the need for direct on-farm labour.

However, the decrease in on-farm labour is often offset by a rise in high-skilled off-farm labour, such as professional advisers. Participants noted that the technical and digital transition in farming practices has been a double-edged sword. Growers are becoming more dependent on specialist inputs and professional advisors, which affects their self-sufficiency and level of direct control. The high costs of new capital purchases, specialist advice, and the minimum farm viability size all limit growers' ability to adopt new technology. This is believed to contribute to wealth and income inequality among growers, as larger and

more capitalised farms are better able to overcome these constraints. The high barriers to entry in farming make it difficult for non-farming families to enter the industry, reportedly leading to a stable or declining pool of farming families. This shift has altered the proportions of corporate and family farms in some regions. In all study regions, corporate farm ownership was seen as the main factor behind the decline in community activity and social participation, as well as a reduction in community resilience.

It was also observed that because specialist advice and equipment are often sourced from outside the region, farm expenditure doesn't always benefit the local economy. Consequently, this spending doesn't necessarily translate into tangible economic and community benefits. There appears to be a weakening connection between farm inputs (including labour) and local provision, which in turn weakens the link between farm inputs and local economic and social activity.

Automation and specialisation in cropping are also enhancing growers' lifestyles; the use of advanced technologies is particularly attractive to younger generations looking to take over the family farm or enter farming for the first time. Many growers interviewed mentioned their limited capacity to learn new high-tech skills and are expecting the next generation to more fully embrace these technologies.

Recent agricultural innovations have significantly enhanced regional economic resilience to weather conditions. Growers in the Eyre Peninsula reported that 2024 was one of the driest years on record, yet most were still able to produce a crop. This success led to economic expenditure within the local community that would have been absent in previous low-rainfall years. Innovations in moisture retention are directly and positively impacting economic prosperity and stability.

Beyond the immediate effects on the agriculture industry and related sectors, regions have reported a wide range of impacts partially stemming from on-farm innovation. These factors have complex, multi-directional relationships with on-farm innovation. For instance, a housing shortage makes it difficult to accommodate local workers, leading to insufficient on-farm labour. This forces growers to innovate and substitute labour with capital and advanced practices. This may create a feedback loop, where fewer employment opportunities lead to fewer people moving to the regions for work. Factors in this category include a decline in community engagement, young people leaving the region for educational opportunities, housing shortages and high costs, poor digital connectivity, inadequate transport infrastructure, and distance from major population centres.

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