



Disaster Recovery and Resilience

Shared Inquiry Program 2020

August 2021

# REGIONS, WORK AND VULNERABILITY: REGIONAL SUPPLY CHAINS AND NATURAL DISASTERS

SIP.2020.1.5



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## PHOTOS

Sandy Horne, Shane Rounce

## AUTHORS

This document contains seven reports conducted by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an inter-disciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

## CONTACTS AND FURTHER INFORMATION

**Kim Houghton**

Regional Australia Institute

P. 02 6260 3733 E. [info@regionalaustralia.org.au](mailto:info@regionalaustralia.org.au)

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*Peter Fairbrother and Marcus Banks*

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### **Experiencing & addressing Bushfire events: Four Regions**

*Peter Fairbrother, Kate Farhall and Todd Denham (VIC: Barwon, Gippsland WA: South Coast, South West)*

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### **Regions and Natural Disasters: A Review**

*Kate Farhall and Peter Fairbrother (4 regions)*

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### **Value Chains & Networks: Questions for Regional Analysis**

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### **Next Steps: Methodological Toolboxes**

*Peter Fairbrother and Marcus Banks*

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains/Networks and Natural  
Disasters**

**Report 1:**

**Investigating the Impacts of Disaster Events in Regions: an  
Australian Study**

Peter Fairbrother and Marcus Banks

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Peter Fairbrother and Marcus Banks (2021) 'Investigating the Impacts of Disaster Events in Regions: An Australian Study', *Regions, Work and Vulnerability: Regional Supply Chains/Networks and Natural Disasters, Report 1*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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Disaster events have spatial impacts, environmentally, socially and economically. Such impacts often play out at a regional level, defined both territorially as well as in relational terms (Macleod and Jones, 2007). Territory refers to spatiality, while the relational dimension addresses their connectivity (Goodwin, 2012, p. 1182). The interaction between these dimensions produces regions whose spatial boundaries may be unclear (Massey, 2004, p. 3). Hence, a defining feature in analysis is to explain both 'the scalar and territorial dimensions of particular political practices' (Goodwin, 2012, p. 1189). Moreover, the scalar politics that surround regionally focused practices and policies may involve diverse actors each contributing to strategic regional economic and social agenda (MacKinnon, 2011). These themes will be explored by considering the ways regional governance arrangements can result in partial and incomplete approaches to such as disaster events.

The purpose of this report is to formulate a research design that enables an understanding of this analytical framework. This step requires a consideration of the makeup of regional economies, focusing on the value chains and networks in play. We suggest that this step enables us to begin to understand the opportunities for and barriers to policy initiatives in relation to disaster events. For policy makers and other stakeholders, this framework has significant practical benefits. One important task, for example, when planning in relation to regional economies is to identify the value-add nodes and the points of vulnerability along value chains and networks (Fairbrother and Denham, 2018). With this knowledge, it becomes possible to promote appropriate governance arrangements, facilitate the links and support to enhance the chains/networks and identify where intervention may be necessary in relation to disruptions and pressure points.

The objectives are three-fold:

1. To define and develop a framework for the analysis of economic activity that considers space and regions.
2. To outline the prospective value and supply connections within tourism and agriculture production systems.
3. To develop an applied and methodological toolkit that will enable the mapping, analysis and preparation for major disruptive events.

At stake—especially when a disaster occurs—is whether current understandings of key regional economic processes and social relationships are adequate to the task of clearly identifying and responding to both the dangers and opportunities that arise. In a social, economic, environmental and political landscape where change is the only constant, the planning resources and methods needed to capture how the real world is impacting upon the lives of those within a region are often found wanting.

## Research Focus and Conceptual Framework

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Equipping policymakers and researchers to better address these problems, our proposal applies a political economy and sociological appraisal of a regional economy. This approach is informed by an understanding that socio-economic forces and relations define and focus activity as both social and place based. Regional economies are viewed in terms of the overall complexity of these relations (totality) rather than simply in terms of the separate dimensions that make up the

economy (division). By applying this approach, a more detailed and integrated understanding of value chains and networks within and across regional economies opens. Drawing attention to the importance of the state in relation to regional economies allows us to consider, for instance, the tensions and possibilities that arise when disaster and other such events take place. After testing the application of this approach in four regions, we identify what is required to undertake a comprehensive analysis, including proposed solutions to current data limitations. The key outcome of this scoping, testing and trialling of a political economy approach to regional economic issues is to lay the foundation for a methodological toolbox. Designed to be a practical and updateable resource, the toolbox will provide a comprehensive framework for regional planners and researchers to analyse and respond to the changing economic and social dynamics in any spatial setting.

As raised above, the rationale for adopting this integrated approach is that current understandings often miss how major social, economic, environmental and political aspects of regional life interact with each other. Such omissions can result in major planning missteps. We need to better identify:

1. what we already know about regions and regional recovery processes
2. what we do not know, and
3. what we assume.

We then need to understand how these consciously or unconsciously shape policy in potentially problematic or limiting ways.

The examples below—drawn from the accompanying chapters in our proposal—illustrate how a political economy approach can identify problems that can undermine effective regional policy responses to both disasters and ‘normal’ economic periods, and alternative ways to address these issues.

#### **1. Bringing the social into economics, and the economic into social life.**

A political economy assessment of a region recognises, for instance, that the dynamics of labour markets cannot be reduced to the classical economic criteria of supply and demand, as is the case currently. Such a mechanical perspective fails to recognise how ‘the inextricably human aspect of the wage relation’ structures and differentiates labour markets (Saad-Filho, 2000: 212). Labour markets are situated within—and rely upon—people’s overall social, economic and cultural relationships. While increasingly connected to other markets (through regional, national and international value chains) each local labour market functions through a specific set of socio-economic relations that need to be sustained and reproduced.

Sustainable production over time (reproduction) necessarily extends well beyond the workplace requirement to replace worn out capital or workers. The workforce itself also needs to be trained, maintained and reproduced in ways that meet the changing needs of the workplace and people’s lives. The human benefits accruing from decent health, education and welfare systems are equally basic preconditions for a thriving regional economy.

Applying such an approach will identify the unique characteristics and spatiality of socio-economic relations clustered within and across each region. Which labour markets tend to be very locally clustered within a region? Which socio-economic relations extend

across a group of regions? Which are found to be more significantly conditioned by state, national or global socio-economic dynamics?

The point of this focus is that it is imperative that analysis not only considers the interrelationships that make up the economy in question, in this case a place-based economy defined geographically by a region, but *how* they interrelate. To do so, it is necessary to consider how production and reproduction relations continually constitute and disrupt the regional economy (and the value chains/networks within this space); otherwise the analysis is partial.

## 2. **Questioning who should govern what.**

We anticipate that scoping the spatiality of these value relations will challenge current approaches that inappropriately equate a political region (primarily Local Government Areas) as an economic region.

Our scoping study reinforces that State government and councils lack the capacity to formulate effective policy or enable investment and assurance in relation to the food and fibre value chains and tourism networks. The reason is that the data continuum does not have a whole of supply chain/network focus that enables interrogation of the specific arrangements that currently apply.

The ability for local and State governments to respond to an economic or social issue, and to plan in an agile manner, is often so severely curtailed that it brings into question whether governance, in any meaningful sense, occurs.

## 3. **Replacing piecemeal approaches with comprehensive analyses of value chains and networks.**

Current approaches to analysing production and consumption pathways in regional supply chains and networks is inadequate. A major gap in our understanding of regional economies is the linkages between producers and suppliers of intermediate inputs into production, and to what extent these links occur within a specified study region. While we may know, for instance, that there is a large milk processor within a region and a large number of dairy producers, that does not mean the local milk is only processed in region. As transport costs have declined (or freight has increased productivity) then the likelihood of inputs to production travelling further in their journey from raw materials to consumption has increased. As indicated by previous research on regional production systems, there are a range of different paths to consumption through and within a region.

The industry linkage data above can be enhanced through understanding the value added by each node in the chain of production. Without understanding the value added by industry within a region, as well as the supply chains and intermediate inputs to production, a true picture of the contribution to the regional economy cannot be established. A more critical analysis of production and consumption pathways requires a far more comprehensive identification of inputs and nodes.

Analysis of production pathways within a region's agricultural value chains and tourism networks would need to include:

- labour relations (intra-household, seasonal, kinship, wages and in-kind arrangements)

- economic unit relations (often households in agricultural production)
- various relationships supporting production:
  - financial services (banking, accounting, familial, community and state);
  - veterinary;
  - transport (primarily as inputs in regional tourism and outputs in agriculture);
  - business support services by private and state providers;
  - hospitality service relationships in cafes, restaurants, hotels and resorts;
  - tourism relationships (tour guides; other local economic units); marketing, and
- Political influence at regional, state and national levels

Similarly, analysing the scope, scale and complexity of consumption pathways includes identifying:

- Co-creation of consumer demand for potential and landed tourists with local networks and consumers
- Diversifying an agricultural commodity into separately marketed commodities
- Culturally linking consumption practices (which differ in local, national and global markets) with other commodities/services relevant to the consumer.
- Uneven power relations – retailers pressure processor margins and restrict effective consumer demand for other commodities produced

#### **4. Interrogating the policy hazards of disasters.**

Some researchers consider ‘natural disaster’ a misnomer—while the origin may be natural, the disaster only emerges through interaction with human populations. Drawing on the Australian Commonwealth government definition, Ulubasoglu (2020, p. 6) contends that “natural hazards only lead to ‘disaster’ if they intersect with an exposed and vulnerable society (interrupting these systems) and when the consequences exceed people’s capacity to cope”. McKenzie and Canterfeld (2018, p. 9) identify that the level of risk within a population, when it comes to natural disaster, “involves the interplay of hazard, exposure and vulnerability”.

From a political economy perspective, a viable understanding of a ‘risk’ (exposure to natural disaster, for instance) involves assessing how its social, economic and political elements interact. Underpinning current expectations of managing risk are two significant social and economic transformations that have occurred in the last three decades: the financialisation of daily life (Martin 2002), and the reallocation of risks from the state to the individual, household or charities. US political scientist Jacob Hacker (2006) calls this ‘the great risk shift’. As Banks and Bowman (2017) argue, both these transformational changes “have strengthened financial ‘drivers of vulnerability’ which add to the complexity of how low-income households manage risks and mitigate the hazards of poverty (Dayson, Vik & Aiden 2009, p. 4; Saunders & Wong 2012, p. 487).

When a disaster occurs, the challenge seen for policy actors is how to achieve recovery. At one level the policy difficulty is to determine what is the impact, where and on whom. How do economic, financial, social, psychological, health and environmental impacts intertwine?

Applying a political economy lens reframes and sharpens this policy focus. In a social, economic, environmental and political landscape where change is the only constant, the concept of 'recovery' must be more critically interrogated. Does 'recovering' to some pre-disaster period simply embed the risks that led to the disaster in the first place? Which financial and social risks are to be re-allocated back to the state to mitigate the impact of *both* disasters and 'normal' periods on individuals?

Is 'recovery' not only too narrowly conceived but also construed too negatively? If disruptive events are viewed as inevitable periods of the economic system's 'creative destruction' (Schumpeter 1992), what role do regional policy makers and others have in seizing the economic opportunities arising from disasters? Finally, how does the spatial misalignment between regional governance areas and cross-regional economic activities increase the risks to individuals and businesses experiencing a disaster?

To focus on these themes, we open up discussion about the variety of natural and environmental health disaster events. Given their importance to many parts of regional Australia, the project will focus on the agriculture and tourism sectors, two of the three major regional export sectors. The outcomes of the research will provide insights into the impact of major disruptions to production and markets, and thus policy guidance for the mitigation of such events.

Four specific questions provide the focus for the research and the development of the analytical framework:

- What are likely to be the prominent interconnections within regional production systems for the agriculture and tourism sectors?
- Are there 'pressure points' in the production systems?
- Are these points within or outside of the region and the supply chain?
- What are the impacts of and for regulation?

The project's unique analytical approach grounds the core connections and relationships constituting value chains into an overarching conceptual framework. For policy makers and other stakeholders, taking this integrated approach has significant practical benefits. The project will provide for the first time a single resource—a toolbox—to map, analyse and prepare for major disruptive events. By bringing together key concepts, methods and data, the toolbox is designed to guide and inform confident and effective interventions in the agricultural and tourism sectors on an ongoing basis, and when impacted by disaster.

## Methods

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The research team has developed a multi-method approach that combines both quantitative and qualitative elements, in order to ask targeted questions about regional workforces, economies and demography. The purpose of these quantitative and qualitative tools is twofold. Firstly, the tools work in concert to ascertain what data is currently available and thus what we can say with confidence regarding industry relationships and interdependencies within regional areas. This analysis draws on data produced by State Governments and the Australian Bureau of Statistics, alongside existing research and evaluations. Secondly, the conceptual and methodological tools

honed by the research team elucidate what we do *not* know already and what is *not* captured by existing data. This lays the groundwork for identifying the kinds of data that need to be captured and how, going forward.

By investigating four distinct regions (two each in two States) that have experienced natural disasters between 2011 and 2016, possible economic interdependencies may be made clear. For example, in a region with a prominent tourism sector, changes to employment as a result of a bushfire may indicate which local industries are dependent on tourism. Similar research will be undertaken for agricultural intensive regions. Where fire events have had substantial impact on production, changes in employment may also bring to light elements of the agricultural value chain.

The intention is to consider these effects on a range of scales, including local government areas, and the Australian Statistical Geography Standard (ASGS) SA2 and SA4 (Australian Bureau of Statistics 2018). Particular changes in the economic composition of a region, or specific effects on a particular sector, may only be visible at a certain scale. For example, aggregated statistics at the regional level can mask localised crises. For this reason, it is important to conduct data analyses across a range of scales.

## Research Stages

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### *A. Analytical Reviews*

The objective of the first stage of the research is to apply a political economy lens to critically assessing current conceptualisations of regional value chains and natural disasters. To inform the analysis, a review of the literature regarding the conceptualisation and methodology for analysing regional value chains and natural disasters will be undertaken. This will inform the development of an applied methodological framework.

The research questions of this phase of the research are:

1. How are regional value chains defined and explained?
2. What can be learnt about the impact of disaster on regional value chains from the bushfire literature?

Conventional methods from policy analysis and related disciplines will be used.

### *B. Regional Analysis: Four cases*

The objective of this phase of the research is to develop insights as to how the available data sources both mask and reveal the impacts of disaster events in regions and throughout regional economic systems. This will be done via an assessment of the changes in secondary source data across the period of a natural disaster (bushfire). This will include data from the 2011 and 2016 censuses, as well as relevant data published by state governments.

The overarching research question for this phase of the research is:

How does the geographic unit of analysis affect quantitative assessments of the impacts of bushfires on regional value chain systems?

The underlying research questions are:

1. Is there evidence of the impact of bushfire disasters in available socio-economic data?
2. At what scale(s) are the social and economic impacts of bushfires apparent in socio-economic data sets?
3. How are the different industry structures and production networks reflected in the observations of bushfire impacts?

Of the four study regions, two are located in Victoria and two in Western Australia. Victoria is the State most affected by fire in the long term and thus provides the most appropriate jurisdiction for the research, while Western Australia provides a distinct comparator for the results of the Victorian analyses. The regions for analysis are described below.

1. Wye River fires, 2015

Major fires in the Otway Ranges began on Christmas Day 2015, which destroyed 98 houses in the coastal village of Wye River, and a further 18 in nearby Separation Creek. The Great Ocean Road, a major tourist attraction in the region, was closed for 25 days as a result.

2. East Gippsland fires, 2014

Separate fires in the East Gippsland region ignited on the 16<sup>th</sup> of January 2014, burning more than 170,000 acres of land in total. The damage included the loss of 12 houses, sheds and outbuildings, large tracts of pasture and 1,100 head of livestock.

3. Esperance fires, 2015

Two fire complexes began in the Esperance region of WA in November 2015, burning over 300,000 hectares of land and resulting in four casualties. Along with residences and other buildings, 4,500 head of livestock died and more than 500,000 tonnes of grain were destroyed.

4. Northcliffe fires, 2015

The fires in and around Northcliffe in WA began in late January 2015 and burnt for 11 days, consuming over 95,000 hectares. Residents were evacuated, two homes and five other buildings were destroyed, and livestock perished.

The four study sites all experienced disasters between 2011 and 2016 (two census years), and include different mixes of tourism and agricultural activity within and around the impact zones. Therefore, they provide the opportunity for insights into the economic effects of devastating bushfires, as well as into the challenges regarding regional delineations.

## **Analytical Methods**

The analysis of the four regions will consider trends in the datasets at three geographic scales, to highlight how the observed impact varies over different geographic units of analysis. Three geographies will be used: the AGSG SA2 and SA4, and local government areas (LGAs), where:

- SA2s are “medium-sized general purpose areas ... to represent a community that interacts together socially and economically” (ABS 2016), and have an average population of approximately 10,000 people.
- SA4s are constructed from sets of SA2s, and “have been designed for the output of a variety of regional data ... (t)hese areas represent labour markets or groups of labour markets within each State and Territory” (ABS 2016). More accurately, SA4s are

constructed from SA3s, which are constructed from SA2s. The key point is that as the statistical geography hierarchy progresses from 1 through to 4, each area is a constructed from contiguous elements from the lower hierarchy.

- LGAs are administrative areas, generally reflecting spatial divisions based on historic elements, land use and environment (rivers for example). Within Victoria, major rationalisation of LGAs under the Kennett State Government in the 1990s means that they are of a scale between SA2 and SA4, but less likely to capture discrete communities or labour markets.

The AGSG was introduced in 2011, therefore analysis of trends spanning back to 2006 will only be undertaken at the LGA level. For the SA2s, trends will be compared to surrounding regions and within the SA4 in order to identify shifts in the data that may be attributable to the bushfire disaster.

Modes of analysis include:

- Descriptive statistics and cross-tabulations
- Chi-squared tests for independence (ie: are the variables significantly different)
- Shift share analyses to decompose changes into national, industry and regional effects.
- Regional input-output analysis.

Three categories of analysis are proposed for the intercensal period:

- Changes to the industrial structure of the regions
- Demographic changes to provide a baseline for growth within the regions
- Changes to employment and jobs as an indicator of the social impact of economic changes.

The Input-Output tables published by the Australian Bureau of Statistics will be used as a starting point for the framework of industry linkages, including the Tourism Satellite Account (ABS 2019).

### *C. Development of methodological toolbox*

We suggest that the way to respond to the data, research and policy challenges in designing three toolboxes: one for regional analysis, and two separate frameworks for agricultural value chains and tourism networks. The scoping, testing and trialling of a political economy approach to analyse the 4 study regions provides insight into:

1. Critically reviewing and reinterpreting what we already know about regions and regional recovery processes
2. Identifying what we do not know, and
3. Providing clearer evidence to challenge what we assume we know.

These insights help clarify what contents should be contained in a methodological toolbox. The challenges and opportunities for developing a methodological toolbox are illustrated via a review of the tourism sector.

### **Step 1 – Basic economic data**

- Quantitative.
  - Use Tourism Research Australia data to identify probable inter-industry value outputs. However, TRA survey data is not sufficiently reliable to develop input-output values at a regional level
  - Supplementing this data with ABS Regional series only partially resolves this issue
- Qualitative
  - SA2 level data is still lacking and will need to be supplemented with new, qualitative data.
  - Telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries.
  - Such a hybrid approach should be longitudinal to capture adjustment over time.

### **Step 2- integrating this data into the real world**

- Gathering basic economic data gathered through a hybrid approach will need to be supplemented with more concrete data.
- Understanding the social, political and cultural relationships impacting regional tourism sectors is essential for any comprehensive analysis.
- All three methods described below require extensive interviews with communities, businesses and governments.
  - Map and compare the internal characteristics of local and regional social, political, cultural and economic relationships with other regions
  - Network analysis focusing on tourism economy to compare the relative effect of these relationships on basic value flows within and across region – marketing; finance; hospitality services; tour guides; transport; construction etc.
  - Assess and compare the economic impact of regional governance and policy legacies and initiatives, focusing on its tourism sectors.
- Properly integrated, this qualitative data will enrich the basic tourism data with regional-specific drivers of – and barriers to – growing this industry.

Similar approaches can be taken to construct an agricultural value chain toolbox and the more general regional economy framework.

Designed to be a practical and updateable resource, the proposed toolboxes provide a comprehensive framework for regional planners and researchers as well as practitioners in the region to analyse and respond to the changing economic and social dynamics in any spatial setting.

## Work Packages and Researchers

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**Report 1**     *Investigating the Impacts of Disaster Events in Regions: an Australian Study*

Peter Fairbrother and Marcus Banks

**Report 2**     *Experiencing and addressing Bushfire events: Four Regions*

Peter Fairbrother, Kate Farhall and Todd Denham

**Report 3**     *Regions & Natural Disasters: A Review*

Kate Farhall and Peter Fairbrother

**Report 4**     *Value Chains and Networks: Questions for Regional Analysis*

Todd Denham and Peter Fairbrother

**Report 5**     *Understanding and Measuring Regional Economies: challenges and possibilities*

Marcus Banks and Peter Fairbrother

**Report 6**     *Measuring the Regional Effect of Disaster Events*

Phillip Toner, Peter Fairbrother and Marcus Banks

**Report 7**     *Next Steps: Methodological Toolboxes*

Peter Fairbrother, Marcus Banks and Phillip Toner

The Reports and the accompanying Briefing Reports may be read sequentially and/or as stand-alone statements.

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains and Natural Disasters**

**Report 2:**

**Experiencing and addressing Bushfire events: Four Regions**

Peter Fairbrother, Kate Farhall and Todd Denham

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Peter Fairbrother, Kate Farhall and Todd Denham (2021) 'Experiencing and addressing Bushfire events: Four Regions', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 2*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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One way of understanding bushfire events is to consider how they are experienced in localities where people live and work. This report lays the foundation for identifying what we know about bushfire impacts and recovery within a region, interrogating current understandings and standard policy approaches. Approaching the problem in this way enables us to pinpoint what we know and what we do not know about economic recovery from bushfire. Through a more comprehensive picture of bushfire recovery knowledge at the local level, we may be able to provide a more comprehensive understanding of what can and should be done to address disaster events.

Disaster events are experienced in various ways. These range from warnings and anticipation; preparation—depending on regularity, lead time, or knowledge of trajectory; to the event impact and recovery. In many cases governments, policymakers of various types and emergency services participate in preparation for such events and facilitate recovery. This engagement can range from comprehensive assistance both before and after disaster, to relatively *ad hoc* preparation and limited follow up and support. To explore and develop an understanding of the experience and impact of disaster events, we focus on four regions.

The report begins with an outline of the approach bringing together themes relating to regions and bushfire events. In Section Two we review the histories of fire and related policies in Victoria and Western Australia, the two States under study. Both States have formulated and adopted disaster recovery policies, noting that Victoria has a more comprehensive approach. In Section Three, we demonstrate how there is an intersection between place and sector, drawing attention to the socio-economic features of four selected regions (defined administratively), two in each State. We draw attention to the mix between agriculture and tourism the two selected sectors for study. These 'regions' are each subject to various recovery policies, reflecting the multi-scalar approaches in a federal polity. Finally, in Section Four we provide an assessment of the review, noting that policymakers are place bound in relation to the content and detail of policy, that each references the variabilities of experience from one region to another, and that specific events will shape the policy making approach, at all levels of decision-making. The outcome is that is not clear how we can measure and value impacts in ways that result in robust and rigorous policy measures in relation to the recovery from natural disaster events.

## An Approach to Place and Sector

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Ongoing debates exist regarding what is meant by 'regional'. These reflect the long-standing notion that regions are not defined by immutable borders that completely capture the political, economic, social and community relationships of their constituents. Paasi and Metzger (2017) focus on regions as a result of relationships, while Massey (2005, p. 11) considers regions as relational, and "always in process, as never a closed system". These conceptualisations, along with the paradigmatic shifts in understanding contemporary society included in Castells' (1996, 2011) visions of flows and networks, have implications for regional analysis. In particular, regions are as much defined by the relationships to the outside as what is inside (as set out in Massey 2005). This 'outside' may include adjacent areas, yet as the frictions in telecommunications and data exchange diminish, 'outside' increasingly encompasses the national and global. Even though these conceptualisations of space and regions indicate that regional boundaries are porous and ill-suited to analyses of contemporary social and economic conditions, clear spatial

demarcations still define jurisdictions such as local government and are integral to qualitative analyses of regions.

Within this context of ill-defined regions and the language used in defining them, of late there has been a spate of natural disasters in Australia that have particularly affected non-metropolitan regions. This includes drought over much of the eastern states, incidents of flooding, and a long-lasting and far-reaching fire season over the summer months of 2019-20. This has increased the concern for the state of regional areas affected, as well as their reconstruction, but also raises questions about how regions and regional are defined. These issues are evident in the spatial mismatches in efforts to mitigate the closure of power generators in the Latrobe Valley (Weller 2017) and the drought assistance provided to Moyne Council, which was not in drought at the time (Barbour 2019). A further example is the \$10 million in regional development funding granted to North Sydney Pool, decidedly situated in a metropolitan centre (Farrell 2020). Therefore, how regions are defined, and space is delineated, matters in how regions in need are identified, and restoration and development funding allocated.

The challenge for policy development is how to achieve recovery. In order to achieve effective recovery, it is first necessary to determine what is the impact of a disaster, where and on whom. Yet, generating a comprehensive understanding of disaster impacts is notoriously complex, and—as detailed in this report—requires having the right kind of data, which can be manipulated in the appropriate way so as to provide answers. To explore what these processes may involve we focus on four fire-prone regions in two States, Victoria and Western Australia. These four study sites all experienced disasters between 2014-15, and their economies are defined in large part by different mixes of tourism and agricultural activity within and around the impact zones. Therefore, they provide the opportunity for insights into the economic effects as well as the socio-political issues regarding regional delineations.

To address these themes, we bring together two strands of research: that associated with geographical analysis, and the disaster research on fires. The aim is to assess how the geography of categories available for analysis provides varied understandings of the temporal and spatial effects of major fires. Drawing on available data at different scales for regions that have experienced these events generates insights into how the social and economic impacts are (or are not) evident in the way that data is produced. Spatial delineations also affect the analysis of the data, shaping and limiting which findings are even possible. These spatial data issues are well known in economic geography, including agglomeration bias, the impact of scale on the analytical outcomes, and the modifiable unit area problem, which can be understood as the effect of the shape of the boundaries (Fotheringham et al. 2000; Isard et al. 2017). Briefly, the geographic size and shape of the regions—the geographic units of analysis—to be analysed will affect the outcomes and thus the policy prescriptions (Hudson 2007; Paasi & Metzger 2017). Prominent geographies used for sub-national and sub-state parts of Australia are local government area boundaries for funding purposes, and the ABS (2011) Australian Statistical Geography Standard (ASGS) for analytical purposes. However, it is not clear whether these spatial delineations provide an appropriate foundation for both understanding and applying resources in response to disasters. Therefore, this research analyses the impact of disasters on regions at a range of geographic and temporal scales to provide insights into these issues.

The approach is based on a scalar and sectoral comparison, which locates four comparable regions in terms of disaster and sector, tourism and agriculture. The comparison comprises four regions, two in Victoria and two from Western Australia. This approach allows the more general policy development at a national and provincial level to be specified in terms of place, via an

understanding of specific sectors which are crucial to the regional economies. The focus on the two sectors, draws attention to the differential experiences and impacts of disaster events at a regional level. This then lays the foundation for an investigation of what we know and what we do not know (Bacchi, 2009).

The analysis is divided into two parts. First, we present a brief account of fire events and policy approaches by each State government and related authorities. Second, this profiling is complemented by the presentation of sectors, drawing a contrast between the agricultural and tourist sectors, which bear the brunt of disaster events in the selected regions.

## Fires and policy in Victoria and Western Australia

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Victoria and Western Australia have long histories of fire, a few managed in an indigenously informed way as well as the range of bushfires, grass fires and related disaster events. A brief overview is provided, first of fire events and then of policy initiatives in relation to these events.

### 1. Fire events

#### Victoria

The southeast of Australia—where Victoria is located—is the area of the country which experiences the most damaging fires in terms of loss of life and property, and economic impacts (Riordan & Booth 2009). Although fire is more frequent in parts of the north, this vulnerability in the southeast is the result of a combination of the highest population density in the country, in conjunction with fire-prone vegetation and climatic conditions (Riordan & Booth 2009). Since the 1980s, Victoria has a history of extremely damaging bushfires that are well-known disaster events in the State's—and country's—history.

In 2009, the 'Black Saturday' bushfires devastated the State, claiming the lives of 173 people and burning over 450,000 hectares (Ulubasoglu & Beaini 2019a). This was the deadliest recorded bushfire in the State's history, with "the total number of deaths that occurred ... equal to almost one third of the total number of deaths in Australian bushfires over the last 100 years" (Victorian Bushfires Royal Commission 2009, p. 191). The aftermath of Black Saturday thus marked a turning point in fire management and response in Victoria. A Royal Commission into the fires was called, and the findings of this inquiry, in conjunction with the experience of the fires themselves, noticeably shaped current understandings of fire and fire risk, as well as fire management responses.

In particular, the Black Saturday fires marked a shift in emergency response towards a greater emphasis on evacuation. Government messaging shifted from the 'Prepare, Stay and Defend or Leave Early' (PSDLE) policy, which emphasised the value in residents staying to defend their properties from fire, towards a greater emphasis on the 'Leave Early' portion (e.g. CFA 2021). This shift in messaging began to focus on leaving early as the safest option, and included recommendations in situations of extremely high risk for all residents to evacuate an area, to the extent at times that residents may be told that fire-fighting support will not be available to them should they choose to stay. These represent marked changes in the relationship between the Victorian government and residents and bushfire.

In the summer of 2019/20, huge swathes of the southeast, including Victoria, experienced devastating bushfires. Soon after the bushfires, Victoria—having been through Black Saturday and the Royal Commission—established ‘Bushfire Recovery Victoria’ (BRV). This new agency represents the most holistic and comprehensive approach to bushfire recovery of the jurisdictions examined in this report. The remit and approach of this new agency is discussed further below.

## Western Australia

The southern end of Western Australia has experienced significant drying in recent decades, thereby increasing the fire danger in the region. Over the past half-century, the temperature in the region has increased by greater than one degree, with rainfall declining by around 20% (Department of Primary Industries and Regional Development 2020). At the same time, the frequency, duration and intensity of hot spells have increased (Department of Primary Industries and Regional Development 2020). This combination of climatic shifts has rendered fire an increasingly concerning phenomenon in the south of Western Australia.

Fires in Western Australia—while incredibly frequent—are not as deadly as those on the east coast. The Esperance fire of 2015 (a case study for this report) was the State’s equal most deadly with four deaths (Haynes 2015; Department of Fire and Emergency Services 2016). This is in stark contrast to the 173 lives lost in Black Saturday. However, the relatively low death toll in WA is not a reflection of the absence of fire. Indeed, over 90% of the State is susceptible to fire, and the State averages 5,000 bushfires each year (Manfield 2020). WA’s relatively sparse population is a significant factor in the reduced loss of life and devastation from bushfire experienced as compared to east-coast states.

## 2. State-level natural disaster recovery policy

Each State has developed natural disaster policies to address the impacts and consequences of natural disasters.

### Victoria

The contemporary Victorian experience of bushfire disaster is heavily shaped by the Black Saturday bushfires of 2009. These fires marked a turning point in fire management and response in Victoria, due to the significant loss of life and property damage endured. In February 2009, the Victorian Government announced a Royal Commission into the fires (Teague et al. 2010), and in January 2020, the government established a new agency, Bushfire Recovery Victoria, built on the experience of Black Saturday and learnings from the Royal Commission (Business Victoria 2020).

Bushfire Recovery Victoria (BRV) is charged with leading the response to the more recent, 2019/20 fires primarily in the east of the State. However, the agency has a permanent presence and is designed to address future bushfires as well (Business Victoria 2020). The agency has an incredibly strong community focus, and is dedicated to co-creating a holistic and coordinated approach to recovery with affected communities. The agency also is responsible, within Victoria, for intergovernmental communication regarding bushfire recovery, and to lead communications regarding rebuilding and recovery more broadly (Business Victoria 2020).

The agency also has the role of advising the government on recovery approaches and processes. These are determined through engagement with key stakeholders, with a strong focus on ensuring solutions are determined by affected communities, according to their needs, and are therefore appropriate and coordinated. This approach is centred on establishing Community Recovery Committees (CRCs) in affected areas. CRCs are charged with “understand[ing] local impacts, identify[ing] local priorities and develop[ing] a community recovery plan” (State Government of Victoria 2020, p. 13). Community recovery plans will be supported through State Government project funding channelled through BRV, which will also coordinate service delivery and philanthropic assistance (State Government of Victoria 2020). The CRCs will be supplemented with Recovery Hubs and Case Support (State Government of Victoria 2020). Recovery Hubs are designed as a single point of assistance, in situ and staffed by locals, where affected community members can access support and relevant services (State Government of Victoria 2020).

The focus on a Case Support approach to assisting affected households is designed to address the isolation and confusion felt by many of those impacted by natural disaster when trying to access government assistance (State Government of Victoria 2020). Alongside the three key prongs of Committees, Hubs and Case support, BRV is also managing the clean-up process and building assessments in the wake of the 2019/2020 bushfires in Victoria, coordinating the temporary accommodation, and liaising with the Commonwealth and local governments to manage the roll out of relevant grants (State Government of Victoria 2020).

BRV’s work is detailed in its ‘State Recovery Plan’, which is structured around five “lines of recovery”. These are: People and Wellbeing, Aboriginal Culture and Healing, Environment and Biodiversity, Business and Economy, and Building and Infrastructure (State Government of Victoria 2020). The policy includes regular monitoring of key deliverables along these five lines, and agriculture and tourism have been explicitly noted as areas of focus (State Government of Victoria 2020).

The ‘State Recovery Plan’ organises the recovery work going forward into three phases: short-, medium- and long-term (State Government of Victoria 2020). The first six months (short-term), in the immediate aftermath of the fires, are State directed, with a central pillar of this period the establishment of local capacity to undertake longer term recovery planning (State Government of Victoria 2020). In the longer term, the Recovery Plan notes that there are various funding schemes available and that “the Victorian and the Commonwealth Governments have committed more than \$100 million for funding programs that communities and councils can draw upon to deliver on locally-identified needs” (State Government of Victoria, 2020 p. 13). Notably, the Recovery Plan includes a significant focus on partnerships with locals. The Plan particularly emphasises the need to ensure that community voices are able to meaningfully contribute to establishing the direction of recovery policy and processes. In conjunction with this community focus, there is also a dual emphasis on ensuring a whole of government response.

The combination of its breadth, community focus and holistic approach makes BRV and the State Recovery Plan the most long-term, forward-looking and comprehensive approach to bushfire recovery examined in this report.

## Western Australia

In contrast to Victoria, Western Australia does not have such a comprehensive recovery plan and framework. Instead, WA State materials regarding bushfire are heavily focused on risk assessment and risk mitigation. These include guiding documents such as the ‘State Hazard Plan: Fire’ (State Emergency Management Committee 2019) and the ‘State emergency management: A strategic framework for emergency management in Western Australia’ (State Emergency Management Committee 2020), which come under the Department of Fire and Emergency Services and are designed to cover arrangements for “fire prevention, preparedness, response and initial recovery” (State Emergency Management Committee 2019, p. 1). Under initial recovery, however, the Hazard Plan only includes a single page, mainly focussed on process-driven concerns. No provision for longer-term recovery is addressed, aside from a single line stating that “the impacted local government is responsible for managing the community recovery process” (State Emergency Management Committee 2019, p. 25).

A coronial inquest into the deaths of four people in the 2015 Esperance fires has recently led to the adoption of multiple recommendations by the WA State Government (Smith 2020; Linton 2019). These are focused primarily on firefighting capacity and communications. In terms of longer-term recovery, the most prominent policy is simply the Western Australian administration of the DRFA (Department of Fire & Emergency Services 2018).

The Department of Fire and Emergency Services WA website also has some information on bushfire recovery, but again these are focused mostly on initial recovery, and primarily on informing individuals affected – rather than providing a framework for broader community rebuilding and recovery (Department of Fire and Emergency Services 2020). The advice on the website regarding recovery is organised into 6 sub-topics: “Returning home”, “Recovering and restoring household items”, “Insurance, repairs and rebuilding”, “Leaving your home”, “Lifestock [sic], Pet and Wildlife Welfare”, and “Your Wellbeing”, with approximately a paragraph of information and relevant links under each (Department of Fire and Emergency Services 2020, inconsistent capitals in original).

## Summary/Conclusion

The two States have a history of bushfire, often prompting major policy review and revision. In the case of Victoria, this resulted in the establishment of a dedicated agency to address recovery, the BRV established in 2020. In targeted ways, a community based and comprehensive approach to recovery is encouraged. While less developed in Western Australia, the process of review and revise following such events is evident. In each State the test is at the local level.

### 3. Local government level natural disaster recovery policy

Central to an understanding of bushfire and disaster event policies is the ways in which they play out at a place-based level, in this instance at a local government level. The rationale for such a focus is that it is at this level that accountable place-based policies are developed. The task as indicated is to locate sectors within the regional context.

Four regions are identified, creating a matrix between place and sector for the purposes of analysis. Each region had a major set of fires in the 2014/25 period. The four regions:

1. Colac Otway Region, Victoria – 2015
2. East Gippsland Region, Victoria – 2014
3. Esperance in the South Coast Region, Western Australia – 2015
4. Northcliffe in the South West Region, Western Australia - 2015

These four regions have a mix of sectors, with agriculture and tourism providing a contrast that allows for an interrogation of disaster impacts. The focus on sectors for the study is agriculture and tourism. These sectors are indicative of likely sectors that provide the base for regional prosperity in many bush-fire prone regions. This focus allows an interrogation of ways of understanding the impacts of natural disaster in the regions.

For many fire-prone regions these two sectors retain a significance for the prosperity of the regions which is severely disrupted in the event of a natural disaster. agriculture and tourism. Approximately 67% of the value of Australia's exports comes from regional, rural, and remote areas. This comprises (1) the resources sector (mining, oil and gas production) which contributes around 10% of GDP (\$150 billion (Minerals Council of Australia)), (2) agriculture which contributes 3% (about \$50 billion) to GDP (or 12% (about \$150 billion) if value adding processes are included) (National Farmers Federation) and (3) tourism in regional, rural and remote areas which contributes about 1% of Australia's gross domestic product (GDP) (\$16 billion) (Regional Australia Institute - See National Rural Health Alliance, 2015).

Before moving onto these specific industries, it is worth observing the heavy reliance of all four regions on either direct or indirect public sector expenditure for jobs. Across the four regions just four industries, Public Administration and Safety, Education and Training, Health Care, and Social Assistance Services accounted for 23%-32% of all jobs.

Table 1: Direct and Indirect Public Sector Regional Employment, 2016

	Public Admin. & Safety	Education & Training	Health Care	Residential Care Services	Social Assistance Services	Total Public
Gippsland-East (SA3)	5.5%	9.5%	8.1%	5.8%	2.7%	31.5%
Colac-Corangamite (SA3)	4.8%	7.1%	8.0%	2.0%	2.8%	24.7%
Manjimup (SA2)	5.6%	9.2%	5.6%	1.9%	2.2%	24.5%
Esperance (SA2)	4.5%	9.4%	5.2%	1.7%	2.2%	23.0%

Note: Proportion of Total Jobs

Source: ABS Census.2016. Place of Work.

This profile is likely to underestimate the role of public expenditure in supporting local jobs since it does not include activity such as public investment in construction or transfer payments, such as pensions and child support.

## Tourism

There are very significant methodological issues in accurately estimating tourism employment and output across the regions. Based on TRA assumptions regarding the allocation of regional jobs to tourism Table 2 shows the number of 'tourism characteristic jobs' in each of the four regions and the number of persons employed in the main tourism industries. Close to 90 per cent of total tourism employment is engaged in these five industries.

Table 2: Regional employment in selected tourism characteristic industries, 2016\*

	Cafes, restaurants & takeaway food	Accommodation	Retail	Clubs, pubs, taverns and bars	Transport	Tourism as % of total region's jobs
Gippsland-East (SA3)	360	71	312	50	134	6.3
Colac-Corangamite (SA3)	326	58	215	35	139	5.0%
Manjimup (SA2)	146	34	115	45	70	5.1%
Esperance (SA2)	115	23	102	15	137	6.0

Source: ABS 2016 Census. Place of Work \*\*Tourism characteristic industry - at least 25% of its output must be consumed by visitors' (<https://www.tra.gov.au/Economic-analysis/Economic-Value/Regional-Tourism-Satellite-Account/regional-tourism-tr-account>)

## Agriculture

Basic data on employment and output in agriculture and total employment in the four regions is given in Table 3. A notable result is the enormous variation in agricultural employment per dollar of agricultural output. In the case of Manjimup and Esperance both suffered bushfires in 2015 and floods in 2016. One factor behind the very large differences in output per worker is that employment levels in agriculture are much less responsive to changes in output compared to other industries.

The largest occupational group employed in agriculture is Managers, comprising mostly owner-managers, and these continue to remain 'employed' even when output falls dramatically, say due to drought or bushfire.<sup>1</sup> In other words, agriculture has a low elasticity of employment with respect to output compared to other industries (Kapsos 2005).

<sup>1</sup> By way of comparison, total Australian agricultural output per employee in 2015-16 was \$186,000, based on the ABS estimate of total agricultural output for that year and the ABS Labour Force estimate for total employment in agriculture.

Table 3: Output and Employment, Selected Regions. 2015-16

	Gross Value of Agricultural Production (\$m)	Employment		\$ per Agriculture Job	Agriculture Jobs as % of Total Jobs
		Agriculture	Total		
Gippsland-East (SA3)	\$269.4	1411	15731	\$190,928	9%
Colac-Corangamite (SA3)	\$1,007.1	3399	16478	\$296,293	21%
Manjimup (SA2)	\$59.5	1906	8574	\$31,217	22%
Esperance (SA2)	\$52.3	1257	6954	\$41,607	18%

Source: ABS Population Census 2016 and ABS (2017) in Value of Agricultural Commodities Produced, Australia

These regions dealt with the aftermath of bushfire in a variety of ways.

## Victoria

The impact of bushfires on two regions of Victoria have been selected for analysis: the Colac-Otway region and East Gippsland. These local government regions all experienced bushfire events of varying impact in 2014 and 2015, and therefore provide the basis for comparative analysis.

### *Colac Otway Shire*

Major fires in the Otway Ranges began on Christmas Day 2015, which destroyed 98 houses in the coastal village of Wye River, and a further 18 in nearby Separation Creek. Wye River is on the Great Ocean Road, and many of the houses are holiday homes for people who reside outside the region. In total, 116 houses were lost as the fire burnt for 34 days across peak holiday season, in an area that's economy is predominantly tourism as the area is predominantly Otway's National Park. The Great Ocean Road, a major tourist attraction in the region, was closed for 25 days. The impact of the fire was mainly within the Otway SA2, within the wider Warrnambool and South West SA4.

Figure 1: Barwon Region



Source: Barwon Region: <https://www.education.vic.gov.au/about/careers/regional-careers/Pages/barwon-area.aspx>

The Colac-Otway study region is a mix of agriculture, manufacturing and public and private services, and tourism. This region thus provides insight into the effect of bushfire on regional tourism as well as agriculture.

The region is heavily dependent on agriculture, forestry and fishing, accounting for more than one in every five jobs (Table 4).

Table 4: Colac-Corongamite. Ten Largest Employing Industries 2016

Agriculture, Forestry and Fishing	3380	21.8%
Manufacturing	1849	11.9%
Retail Trade	1447	9.3%
Accommodation and Food Services	1244	8.0%
Health Care	1236	8.0%
Education and Training	1105	7.1%
Construction	859	5.5%
Public Administration and Safety	749	4.8%
Transport, Postal and Warehousing	554	3.6%
Professional, Scientific and Technical Services	437	2.8%
Total	12860	83.0%

Source: ABS Census. Place of Work. Totals exclude Inadequately described, Not stated and Not applicable.

Manufacturing is also important accounting for over one in every ten jobs. Of note, it can be assumed that a proportion of manufacturing relates to the agriculture sector. It is also significant that one in every five jobs is publicly supported, directly and indirectly (Health Care, Education and Training, and Public Administration and Safety), 19.9 per cent. Complementing the public service sector of the economy, private services comprise 17.3 percent of the employed population. Reflecting on the earlier tourism data, if tourism was separately identified it would be the seventh largest industry employing more than one in every twenty workers.

Much government attention is given to tourism. In the wake of the Colac-Otway fire of December 2015, the Wye Sep Kennett Renewal Association was established (WSKRA; denoting representation of the most severely affected communities: Wye River, Separation Creek and Kennett River). WSKRA then developed the Wye River, Separation Creek and Kennett River Renewal Plan, March 2018–March 2019. The plan includes five areas of focus: 1. Community Connection and Wellbeing; 2. Flora, Fauna and Beachscape; 3. Planning, Building and Fire; 4. Business and Tourism; and 5. Continuing to transition. The focus on tourism, specifically, in the ‘Business and Tourism’ section, demonstrates the extent to which the region is reliant on tourism as a key industry.

As such, activities such as rebuilding tourism infrastructure, attracting tourists back into the region, and improving on the facilities and elements that draw tourists to the area are vital to the region—to the extent that the Renewal Plan recommends upgrades and changes in the wake of the fire. Regarding tourism, the plan identifies four central aims: 1. Increase visitor length of stay; 2. Increase visitor expenditure; 3. Increase visitor dispersal seasonally; and 4. Increase visitor satisfaction. Within the plan, there is also a focus on “maintain[ing] the environmental sustainability” of the area, with an emphasis on tourism that engages directly with nature. More broadly, all businesses are encouraged to minimise their environmental impact, especially in a “fragile post-fire environment” (WSKRA 2018, p. 18).

The Renewal Plan itself, alongside reporting documents regarding the plan produced by both the Colac Otway Shire local government and WSKRA itself, have since noted several recovery successes. Within these documents, there is an emphasis on the importance of “genuinely collaborative and trusting relationships ... between community and government following a natural disaster” (WSKRA 2019a, p. 2). The final annual report of WSKRA in 2019 suggested the group was “a model for future disaster impacted communities” (WSKRA 2019a, p. 2), and the local government website indicates that key subject matter experts from the LGA have provided support and advice to impacted LGAs in the 2019/2020 fires (Colac Otway Shire 2020).

While the focus of WSKRA is broad, from rebuilding works to community cohesion efforts, to replanting initiatives, much of the focus remains localised, and shies away from employment questions (WSKRA 2019b). Although the Renewal Plan discusses business and tourism, the focus is on projects and initiatives, rather than work and employment, or the workers who will undertake such projects. In the WSKRA summary report of March 2019, no mention is made of employment, jobs or particular industries (WSKRA 2019b). Perhaps economic recovery of that size and type is seen as the responsibility of State and/or Commonwealth government, given the limited resources of local governments in Australia.

## East Gippsland

Separate fires in the East Gippsland region ignited on the 16th of January 2014, burning more than 165,000 hectares of land in total over a 70-day period. Their impact was mainly on the agricultural sector. In total 13 homes were lost, and it has been estimated that 10,000 sheep and 600 cattle died in the fire, along with farm infrastructure (AIDR 2014).

Figure 2: Gippsland Region



Source: Victoria's Gippsland Region <https://www.rdv.vic.gov.au/victorias-regions/gippsland>

The region's employment structure is much less concentrated than other comparable regions.

Table 5: East Gippsland: Ten Largest Employing Industries 2016

Retail Trade	1866	12.6%
Accommodation and Food Services	1431	9.7%
Education and Training	1408	9.5%
Agriculture, Forestry and Fishing	1407	9.5%
Manufacturing	1209	8.2%
Health Care	1191	8.1%
Construction	1008	6.8%
Residential Care Services	854	5.8%
Public Administration and Safety	810	5.5%
Transport, Postal and Warehousing	534	3.6%
Total	11718	79.3%

Source: ABS Census. Place of Work. Totals exclude Inadequately described, Not stated and Not applicable.

In effect, this region comprises a service economy, complemented by agriculture and tourism. The publicly supported industries, Education and Training, Residential Care Services and Public Administration and Safety) account for 23.4 per cent of employment in East Gippsland. Service industries as a whole cover nearly half the regional workforce: public service supported industries, and the Retail Trade and Accommodation and Food Services, 45.7%. Complementing this distribution, the industry distribution of employment in the region is relatively evenly spread between tourism and agriculture. Agriculture, forestry and fishing account for at least 10 per cent of the employed population, and if tourism is separately identified it would be eighth largest industry employing more than one in every twenty workers.

While tourism is an important industry for East Gippsland, and may have affected tourism in the summer of 2014, the effect of the fire is likely to have greater effect on agriculture in the region, given the extent of land and number of sheep impacted. In the wake of the 2014 East Gippsland Bushfires, the East Gippsland Shire Council (EGSC) sought to rethink and reshape its approach to disaster recovery. To support this, it launched the 'Adaptation for Recovery' project, and commissioned RMIT's Centre for Urban Research (CUR) to evaluate its success. In particular, the project focused on "community-directed recovery", with an emphasis on building resilience and developing a strong sense of community (Scott et al. 2017, p. 6). The project report from CUR notes that community development and cohesion can in turn be leveraged to generate new community capacities to respond to and recover from bushfire.

The recovery project centred on immediate recovery, building community bonds, and individuals' sense of their own recovery and readiness to face another disaster event. As with the local response to the Wye River fire noted above, in the case of East Gippsland, the primary recovery foci at the local government area level shy away from questions of work, employment and workers. While brief mention is made of employing locals in the recovery project itself to ensure that money set aside for bushfire recovery is reinvested in local residents, there is no further discussion of how to ensure ongoing employment for locals, post-fire, nor any indication of which sectors might be targeted for this.

In terms of the key sectors of focus for our analysis, while farmers are noted as key constituents (they are often listed as key stakeholders, as a notable group within the affected communities, or as having participated in community recovery events), and also identified as taking a leadership role in land-based community recovery initiatives, there is no discussion of the sector, its place in the East Gippsland economy, how it has been impacted by the fires, or how the sector might move forward productively. Similarly, while specific tourism projects are mentioned in the report, alongside a note regarding the provision of workshops for tourism business owners, a broader analysis of, or roadmap for, the sector is not provided.

While the comparable fire for this project occurred in 2014, the most comprehensive and visible East Gippsland Shire bushfire recovery document came in the wake of the devastating 2019-2020 bushfires along the eastern seaboard of Australia. The 'East Gippsland Fires 2019-20 Recovery Plan' comes under the new Bushfire Recovery Victoria structure. The plan was developed by the East Gippsland Recovery Committee (EGRC), under the new community-led process established under BRV. As such, the plan mirrors the five prongs of recovery that are the focus of BRV (People and Wellbeing, Aboriginal Culture and Healing, Environment and Biodiversity, Business and Economy, and Building and Infrastructure), albeit with a slightly different focus on 'recovery environments' (Social environment, Built environment, Culture and healing environment, Economic environment, Natural environment) (EGRC 2020).

Under the 'economic' recovery environment, the Plan states the primary goal as "build[ing] a business community and local economy that is stronger and more resilient than before the fires" (EGRC 2020, p. 22). Key objectives within this overarching goal include assessing both the "direct and indirect" impacts of the fires, broader industrial shifts and the COVID-19 pandemic on business and local sectors, with a particular focus on tourism (EGRC 2020, p. 22). The explicitness of the holistic approach taken here to assessing and coordinating responses to economic recovery, which goes beyond immediate financial support and rebuilding, is rare in the recovery documents assessed in this report. This may signal a shift in disaster recovery planning and approaches away from piecemeal, short-term, financially focused practices and towards more comprehensive understandings of the complex needs for economic and industrial recovery in disaster-hit areas. As the most recent recovery plan examined for this report, emerging from the newly instituted BRV, which itself comes in the wake of both the Black Saturday Royal Commission and the devastating bushfire season of 2019-2020, the Plan can be seen as the most cutting-edge example of approaches to local recovery examined here.

The 'East Gippsland Fires Recovery Plan' also entails five sub-plans—one for each of the 'recovery environments'. The sub-plans provide a more detailed assessment and outlook for each recovery environment. The 'Economic Recovery Sub-Plan' draws out five key sectors: 'Agriculture', 'Aquaculture', the 'Wine industry', the 'Apiary industry' and the 'Visitor economy' (Regional Development Victoria, East Gippsland Shire Council & Bushfire Recovery Victoria 2020). Interestingly, this is despite the fact that the plan also acknowledges that "Healthcare and social assistance is the largest employer in East Gippsland ... followed by retail trade" (Regional Development Victoria, East Gippsland Shire Council & Bushfire Recovery Victoria 2020, p. 11). A vision of how these sectors may be supported to continue to undergird employment in the region, however, is not apparent. This mirrors a frequent concern in Australian regional development planning, whereby feminised sectors are often devalued in planning processes (Farhall et al. 2020).

Beyond the relatively comprehensive Fires Recovery Plan and its sub-plans, the Shire of East Gippsland does have several further public-facing disaster recovery documents. Primarily, there is the 'Municipal emergency management plan 2018-2020' (East Gippsland Shire Council 2018), which includes seven sub-plans available on request (Animal Welfare Plan, Disaster Waste Management Plan, Fire Management Plan, Heatwave Plan, Influenza Pandemic Plan, Flood Emergency Plan, and the Municipal Fire Prevention Plan). The Emergency Management Plan includes materials focused on recovery, including explanations of the Commonwealth recovery funding arrangements detailed above, as well as explanations of process and responsibilities in the recovery phase. This document is more process-oriented, however, and is focused less on the material content and focus of long-term recovery.

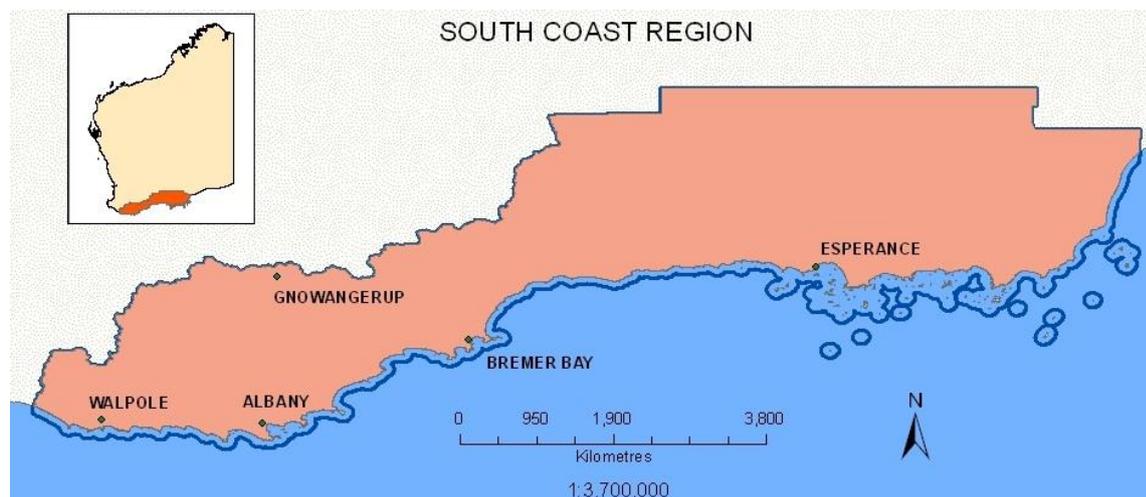
## Western Australia

Two fires occurred in 2015. They thus constitute a broadly comparable time period to the fires in Victoria. These two fires one in Esperance (South Coast Region) and the other in Northcliffe (South West Region) are in local government regions that experienced bushfire events of varying impact between 2011 and 2016, and therefore provide the basis for comparative analysis.

## Esperance

Two fire complexes began in the Esperance region of WA in November 2015, burning over 300,000 hectares of land and four casualties. Along with residences and other buildings, 4,500 head of livestock died and more than 500,000 tonnes of grain were destroyed.

Figure 3: South Coast Region



Source: South Coast Natural Resource Management <https://southcoastnrm.com.au/who-we-are/our-region>

The region 's employment structure is defined largely by agriculture, forestry and fishing and the public services (Table 6).

Table 6: Esperance Ten Largest Employing Industries, 2016

Agriculture, Forestry and Fishing	1254	19.3%
Retail Trade	634	9.7%
Education and Training	609	9.4%
Transport, Postal and Warehousing	549	8.4%
Construction	420	6.5%
Accommodation and Food Services	411	6.3%
Mining	355	5.5%
Health Care	339	5.2%
Public Administration and Safety	295	4.5%
Manufacturing	238	3.7%
Total	5104	78.5%

Source: ABS Census. Place of Work. Totals exclude Inadequately described, Not stated and Not applicable

Agriculture, forestry and fishing account for nearly one in five jobs in the area. It is also worth noting that three industries that make up the public services sector also account for one job in every five in the region (19.1%). Reflecting on the earlier tourism data, if tourism was separately identified it would be the seventh largest industry employing more than one in every twenty workers.

While this is a region where agriculture, forestry and fishing and the public services matter, accounting for nearly 40 per cent of the employed workforce, policy concerns tend to overlook the specificity of this profile. The primary document from the Shire of Esperance concerning bushfire recovery is the 2016 document, the 'Esperance complex fires draft recovery plan: recover, rejuvenate, restore' (Shire of Esperance Local Recovery Committee 2016). This document, produced approximately six months following the 2015 fires, is designed to document and guide community consultation processes and the resulting local initiatives to recover from, and develop resilience to, fires.

The recovery plan is focussed primarily at the community level—which is understandable from a local government perspective. Alongside the community focus (community consultation, events, schools and local services, built and natural environment), there is also an individual or household-level focus (support for landowners, knowledge-building). However, almost unaddressed in the recovery document are questions of the economy, its sectors and the employers and business situated within them. Although minor mentions of farming and agriculture are made, these are mainly to note that farming is getting back on track. No mention of tourism is made at all, and there is no discussion of long-term recovery through the growth of these, or other, specific sectors.

Outside of the 'Recovery plan', the Shire of Esperance has several further publicly available materials dedicated specifically to fire management (although not focussed on recovery). The 'Local planning policy: planning for bush fire protection' (Shire of Esperance 2020a), the 'Bushfire management plan' (Shire of Esperance 2012) and the 'Local policy on bushfire brigades' (Shire of Esperance 2002) speak to risk mitigation and management of bushfire. The 'Planning policy' identifies minimum land development requirements in the area, the 'Management plan' covers risk management issues such as vegetation management and fire breaks, and the 'Brigades' policy guides immediate fire-fighting response.

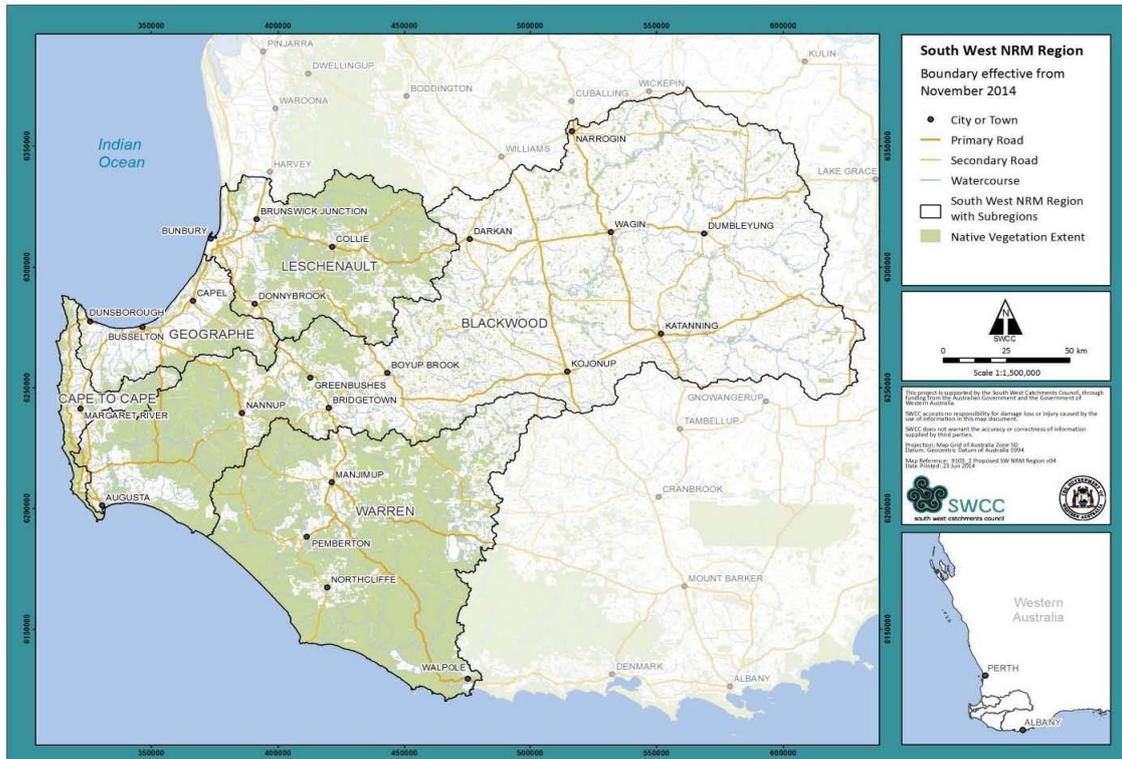
Concerning natural disaster more broadly, the Shire also has a specific 'Coastal hazard adaptation strategy' (Saint-Cast 2016). This policy addresses events including storm surges and landslides, with a view to reducing the area's vulnerability to the impacts of such events. Interestingly, it is also worth noting that the Shire has a prominent (if brief) COVID-19 recovery plan that is specific to the pandemic (Shire of Esperance 2020b). The Shire has also developed specific Business and Community Relief Initiatives in response to COVID-19 (Shire of Esperance 2020c). This is centred on a \$1.23 million package of support addressing financial hardship and cutting local level fees and rates.

Lastly, Esperance has a Local Emergency Management Committee, which in 2016 developed the guiding document, the Shire of Esperance 'Local emergency management arrangements'. However, as is a common theme across all levels of government, the focus within this document is on emergency planning, mitigation and management, rather than recovery.

## Northcliffe

The fires in and around Northcliffe in WA began in late January 2015 and burnt for 11 days, covering over 95,000 hectares. Residents were evacuated, two homes and five other buildings were destroyed, and livestock perished.

Figure 4: South West Region



Source: The South West NRM Region <https://strategy.swccnrm.org.au/south-west-nrm-region/>

The Manjimup regional economy is largely based on agriculture, forestry and fishing, with nearly a quarter of the regional workforce located in this sector (Table 7).

Table 7: Manjimup Ten Largest Employing Industries 2016

Agriculture, Forestry and Fishing	1886	23.6%
Retail Trade	779	9.7%
Education and Training	735	9.2%
Accommodation and Food Services	592	7.4%
Manufacturing	525	6.6%
Construction	475	5.9%
Health Care	448	5.6%
Public Administration and Safety	446	5.6%
Transport, Postal and Warehousing	279	3.5%
Administrative and Support Services	248	3.1%
	6413	80.3%

Source: ABS Census. Place of Work. Totals exclude Inadequately described, Not stated and Not applicable

The region 's employment structure is largely defined by the agriculture, forestry and fishing sector with nearly one job in four accounted for by this sector. As with two of the other regions, this sector is complemented by the public services, which account for over one in five workers in the region. Reflecting on the earlier tourism data, if tourism was separately identified it would be the ninth largest industry employing one in every twenty workers.

As with the Esperance region, there is little in the policy documents to indicate the specificity of the regional economy. The Shire of Manjimup, where Northcliffe is located, has recently updated its 'Local recovery plan, 2020-2025' document. The document is designed to "suppor[t] the affected community in: a) The reconstruction of damaged physical infrastructure; and b) Restoration of the community's emotional, social, economic and physical wellbeing" (Shire of Manjimup 2020a, p. 10). The plan is not disaster-specific, but rather "Describe[s] the roles, responsibilities, available resources and procedures for the management of recovery operations following an emergency impacting the Shire of Manjimup" (Shire of Manjimup 2020a, p. 11).

The 'Local recovery plan' provides for the establishment of Local Recovery Coordinator and a Local Recovery Coordinating Committee, which is charged with "coordinat[ing] and support[ing] local management of the recovery processes within the community" (Shire of Manjimup 2020a, p. 16). This interestingly is a narrower statement than that in the 2013 iteration of the plan, which describes the role of the committee as, "Assessing requirements for recovery activities relating to the psychological, physical and economic and environmental wellbeing of the community" (Shire of Manjimup 2013, p. 14). Beyond establishing roles and responsibilities, the document further details the transition from immediate response to recovery, the process for assessing need and developing and operationalizing recovery initiatives, a section regarding spiritual and cultural needs, as well as strategies for communication with the local community and beyond (Shire of Manjimup 2020a). Lastly, the document covers the establishment of a recovery centre as a 'one

stop shop' for residents, as well as a brief note on State government assistance—before explaining the dismantling of recovery operations when required (Shire of Manjimup 2020a). Of note, this content is strikingly similar to the 2013 precursor document identified above, except that the 2013 document also includes information regarding the provision of health and wellbeing support. In the 2020 document, this is addressed to some extent via under a section on 'Outreach/Visitation Programs'. However, the fact that this is no longer present in a more expansive or obvious form in the 2020 iteration is striking.

Aside from the local recovery document, the Shire has produced several related documents which address natural disasters and emergencies. These include, most prominently, the standard local government documents such as a 'Bushfire brigade operational procedures' plan (Shire of Manjimup 2019), a 'Local Emergency Management Arrangements' document (Shire of Manjimup 2020b) and a 'Local evacuation plan' (Shire of Manjimup 2020c). As in most jurisdictions detailed here, there is a significant focus on preparedness, risk assessment and mitigation, as well as emergency response and management.

## Policy Assessment

As indicated, an understanding of bushfire events requires a consideration of experience, policy and practice from the local level to policy and decision levels. In Australia, as a settler-based federation, this involves examining the policies and activities that derive from Federal, State and Local Government levels, as well as from emergency and support services. Depending on the event and the scale, it may also be necessary to take into account financial agencies, transport arrangements, housing and related provisions. What is required here is to disentangle and identify which dimensions should be taken into consideration in order to fully appreciate the impacts of disaster on a region, the sectors which make up its economy, and the workers who are employed in those sectors.

When examining bushfire-prone areas and considering policy development and intervention, it is critical to locate developments over time. The choice of regions within this report enables us to analyse and compare approaches by policymakers to natural disaster impacts, in this instance fire. Each region is marked by a history of fire and specific events in a similar timeframe. As indicated, the responses are varied and, in some cases—for example East Gippsland—was complemented by extensive reform and intervention following subsequent major fire events during the 2019-2020 period. This suggests that policy development is incremental and on-going. Hence, consideration of policy initiatives should commence from an acceptance that experimentation and learning are not necessarily straightforward and linear. Reflection and a willingness to reconsider and re-evaluate policies in the light of experience becomes critical, as illustrated by the troubled history of the 'Stay or Go' policies evident in the State of Victoria.

A second consideration refers to the variability of experience. As indicated, a disaster event such as bushfire may involve loss of life, injury and threats to personal safety. These events often involve property damage and environmental degradation. Such events have sharp economic effects, at household levels as well as in terms of business concerns and interests. Oftentimes, analysis focuses on the latter, rather than the social and personal impacts, at least in terms of measuring and valuing these events.

The third important consideration to be made regards the policy initiatives that define the intervention and response in each region. Across Australia, policies are produced across all levels of government, as well as by emergency and related services organisations. For each of

these responsible bodies, the scale of the event can prompt a thorough revision of disaster practice, as exemplified by the follow up after the catastrophic events in Victoria in 2009 and the equally concerning events in Queensland and New South Wales in 2019. Such moments often prompt comprehensive reviews of practice and activity, as well as planning and preparation for future events. Such planning is rendered particularly complex, yet also vital, in the context of climate change, and underwritten by the successive assaults of the pandemic. Indeed, the pandemic brought the tension between economic concerns and personal safety to the fore in sharp, often puzzling and even distressing ways.

Finally, questions are raised about how we can measure and value disaster events and their impacts. Working with robust data and evidence about natural disasters and their aftermath is imperative, if we are to respond effectively. These experiences also remind us of what we do not know. The question is how do we build robust databases that are commensurate, comprehensive and accessible. These are the challenges we will address in the following chapters of this report.

## Conclusion

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Bushfire and related disaster events take effect at local and regional levels and in this respect policy development and implementation is critical. The task facing policy makers at all levels but especially in the regions, is to develop recovery plans and promote recovery practices in relation to regionally based economies. As indicated, disaster events are experienced in a variety of way, ranging from preparatory activity, the disaster experience, in the short and long-term, as well as the process of recovery.

The foundation for understanding these developments and processes is to focus on specific disaster events, in this case bushfires, and to identify the policy measures in place. In taking this step we noted the texture of regional economies. The first point to note is the centrality of public services for regional employment and by extension prosperity. In general, around one in five jobs are part of the State and national public service provision, principally in health care, education and training and public administration. Of note, this feature of the regional economy means that disaster impacts take on a national aspect. Directly and indirectly, the public services are impacted by disaster events and can play significant roles in relation to the recovery processes.

Second, while the public services accounts for a substantial part of a regional employed workforce, regional economies are structured in terms of the texture of other sectors, agriculture, forestry and fishing; manufacturing, tourism, retail and so forth. The specific construction of the regional economy in terms of these sectors play out in complex ways as drivers of the prosperity of these regions. To explore this impact, we have reviewed the centrality of considering place and socio-economic sector in disaster recovery proposals.

In the process of presenting these regional profiles, we demonstrate the intersection between place and sector, drawing attention to the socio-economic features of four selected regions. We draw attention to the mix between agriculture and tourism the two selected sectors for study. However, and in relation to these two sectors, and by implication others, it is evident that each 'region' was subject to various recovery policies, reflecting the multi-scalar approaches in a federal polity, but in most instances without specific reference to regional socio-economic profiles. One consequence is that it remains the case that policies are general in their focus and thus impact. The specificities of sectors tend to be overlooked.

Of note, the policies and practices followed in the four regions are varied. To an important extent this variation reflects the distinctiveness of policy approaches from different levels of government as well as the specificity of the scale and scope of these disaster events in different places. Regions are often ill-defined; borders have different degrees of porosity and governments often act to varied metrics and assessments of impact. Nonetheless, as evident in the analysis, these notable disaster events do prompt assessments and considerations that are both immediate as well as to anticipate such future events. Such an enquiry allows us to determine in further analysis and research what is known, what we need to know, and then to consider an approach that is informed by a clear understanding of the texture and profile of regional economies across Australia. It remains unclear how we can measure and value impacts in ways that result in robust and rigorous policy measures in relation to the recovery from natural disaster events.

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains and Natural Disasters**

**Report 3:**

**Regions and Natural Disasters: A Review**

Kate Farhall and Peter Fairbrother

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Kate Farhall and Peter Fairbrother (2021) 'Regions and Natural Disasters: A Review', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 3*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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The purpose of this report is to provide an overview of the planning landscape for long-term recovery from natural disaster across the three tiers of government in Australia. It is designed to address questions around how economic recovery is envisaged by government, and what planning materials exist to guide this economic recovery. In particular, the report provides an outline of bushfire recovery planning documents, based around four case study jurisdictions which have experienced significant fire events since 2014 (Colac-Otway fires, Victoria, 2015; East Gippsland fires, Victoria, 2014; Esperance fires, Western Australia, 2015; Northcliffe fires, Western Australia, 2015). The report is designed to undergird a narrower focus on recovery in the agriculture and tourism sectors, post-disaster. However, as a background document, the report takes a more expansive view.

To begin, in Section Two, we define natural disaster, including the new emphasis within this category on pandemics as a critical form of natural disaster for governments to address, going forward. In doing so, it identifies the core challenge related to disaster recovery: understanding the impacts of natural disaster in enough detail to creatively and meaningfully plan for an effective and equal recovery. From there, the report in Section Three moves to sketch the core facts relating to natural disaster in Australia, before drilling down to examine the history of fire in the two State-level jurisdictions of focus: Victoria and Western Australia. Section Four examines the impact of natural disasters, first detailing the core foci within the literature regarding impact, before drilling down to elaborate on what is already known about regional-level impacts of natural disaster. In Section Five, we consider in greater detail the disaster recovery planning materials that exist across the three levels of government in Australia. The report goes through each jurisdiction in turn, narrowing down from the Commonwealth level, through the two case study States, down to the local government areas affected. The implications of this planning landscape are discussed – firstly, in terms of the planning materials at each level of government, then more broadly in terms of the core recovery challenges and goals that research and reporting identify. The report concludes with a discussion of what we do and do not know about disaster recovery policy, and what information is required going forward to plan for an effective and equitable economic future in regions impacted by natural disaster.

## Natural disaster: definition & puzzle

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Natural disasters are disasters caused by hazards in the natural environment. Predominantly, the literature and policy focus is on weather events including tropical storms, wild/bushfires, flood and drought, as well as—to a lesser extent—earthquakes. In 2020, however, in light of the COVID-19 pandemic, more attention has begun to focus on ‘biological natural disasters’, such as pandemics (Dzigbede et al. 2020).

Natural events or hazards are generally only seen to rise to the level of disaster if they interact with society in such a way as to cause harm. These harms may include injury or other medical impacts, death, significant damage to property, or other social or economic disturbances. Thus, Ulubasoglu (2020, p. 6)—drawing on the Australian Commonwealth government definition—explains that “natural hazards only lead to ‘disaster’ if they intersect with an exposed and vulnerable society (interrupting these systems) and when the consequences exceed people’s capacity to cope”. McKenzie and Canterfeld (2018, p. 9) identify that the level of risk within a

population, when it comes to natural disaster, “involves the interplay of hazard, exposure and vulnerability”. In this sense, some scholars consider ‘natural disaster’ a misnomer; while the origin may be natural, the disaster only emerges through interaction with human populations. Although, this narrow focus on human populations is contested, with some definitions pointing to environmental degradation as a significant outcome of many natural disasters (UNISDR, cited in Ulubasoglu 2020, p. 7).

In 2020, the COVID-19 pandemic has reignited debates around the definitional contours of ‘natural disaster’. Given that SARS-CoV-2, which causes COVID-19, is a naturally occurring viral pathogen—and its impacts certainly met the threshold for a disaster—in this sense it can be termed a natural disaster. As anthropologist Sandrine Revet (2020, n.p.) explains, “disasters occur when a phenomenon, which may be of natural or technological origin, meets a society made vulnerable by political decisions, economic choices, or forms of social organization”. In line with this analysis, COVID-19 has certainly exposed and exploited the vulnerabilities within the political, economic and social global systems, with devastating consequences. For these reasons, we include pandemics in our definition of natural disasters.

The challenge for policy development is to how to achieve recovery. The difficulty is to determine what is the impact, where and on whom. As the subsequent sections show, capturing the ways in which economic, financial, social, psychological, health and environmental impacts intertwine, and thus understanding how best to achieve recover, is complex. Much disaster research and analysis focuses on risk mitigation, preparedness and immediate response. By contrast, long-term recovery remains less well understood. As Drennan et al. (2016, p. 74) explain, while Australia is known for its sophisticated response to natural disaster:

*The capacity of the diverse networks that comprise the disaster management system to coordinate and deliver in the preparedness and response phases of a disaster, and to provide relief in the immediate aftermath, has been developed over time and tested and refined through the experience of frequent, severe disaster events over recent decades. Less well developed is the system’s ability to support economic recovery in disaster-affected communities over the longer term.*

Movement towards better understanding and facilitating this long-term recovery in a regional context is the focus of this paper. To explore the limitations of existing knowledge and policy processes in the area of natural disaster recovery, we focus primarily on four major bushfire events in Victoria and Western Australia in 2014 and 2015.

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## Disaster events

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### Overview: Natural disaster in Australia

Natural disasters are a common aspect of Australian life. The country experiences “significant and frequent natural disasters” (Biggs 2012, p. 26), with such disasters “inherent to Australia’s climate, geography and environment” (Drennan et al. 2016, p. 74). These events span multiple categories, including bushfire, tropical storms, floods, and extreme heat (Drennan et al. 2016). Indeed, extreme weather events are becoming more prevalent, including flooding, storms and drought, predominantly as a result of climate change. Such events bring with them significant economic, social and environmental destruction, with one prediction suggesting the economic costs of disaster in Australia may rise to \$33 billion per year by 2050 (Deloitte 2016, p. 2). Shifting demographics in disaster-prone areas have also, in some cases, heightened the vulnerability of populations to disaster. For example, the increasing urbanisation of coastal regions has amplified the costs related to flood events (Biggs 2012). In 2020, the widespread devastation wrought by COVID-19 has demonstrated the ways in which pandemics represent a complex form of natural disaster that the Australian (and international) public and policymakers are less experienced in addressing.

More specifically, fire is a natural and common part of the Australian landscape, which is necessary for the regeneration of a notable portion of the native flora. However, fires that create severe impacts—including loss of life, livelihood and significant economic, social and psychological impact—are becoming more frequent and more devastating as a result of climate change. Since the 2009 Black Saturday Bushfires, the State of Victoria in particular has changed its approach to addressing significant fire events. Most notably, it has begun to focus more on timely evacuation of residents, over a policy that encourages individuals to stay and defend their properties (CFA 2021; Reynolds & Tyler 2018).

The impacts of natural disasters on local communities and industries are significant. Yet, long-term recovery processes are not well understood or coordinated.

### History of fires in Victoria and Western Australia

Victoria is the State most affected by fire in the long term and thus provides the most appropriate jurisdiction for the research, while Western Australia provides a distinct comparator for the results of the Victorian analyses. Of note, climatic shifts mean that fire is an increasingly likely in the south of Western Australia (WA).

#### Victoria

The southeast of Australia—where Victoria is located—is the area of the country which experiences the most damaging fires in terms of loss of life and property, and economic impacts (Riordan & Booth 2009). Although fire is more frequent in parts of the north, this vulnerability in the southeast is the result of a combination of the highest population density in the country, in conjunction with fire-prone vegetation and climatic conditions (Riordan & Booth 2009). Since the 1980s, Victoria has a history of extremely damaging bushfires that are well-known disaster events in the State’s—and country’s—history.

In 2009, the 'Black Saturday' bushfires devastated the State, claiming the lives of 173 people and burning over 450,000 hectares (Ulubasoglu & Beaini 2019a). This was the deadliest recorded bushfire in the State's history, with:

*...the total number of deaths that occurred ... equal to almost one third of the total number of deaths in Australian bushfires over the last 100 years" (Victorian Bushfires Royal Commission 2009, p. 191).*

The aftermath of Black Saturday thus marked a turning point in fire management and response in Victoria. A Royal Commission into the fires was called, and the findings of this inquiry, in conjunction with the experience of the fires themselves, noticeably shaped current understandings of fire and fire risk, as well as fire management responses. In particular, the Black Saturday fires marked a shift in emergency response towards a greater emphasis on evacuation. Government messaging shifted from the 'Prepare, Stay and Defend or Leave Early' (PSDLE) policy, which emphasised the value in residents staying to defend their properties from fire, towards a greater emphasis on the 'Leave Early' portion (e.g. CFA 2021). This shift in messaging began to focus on the fact that leaving early is the safest option, and included recommendations in situations of extremely high risk for all residents to evacuate an area, to the extent at times that residents may be told that fire-fighting support will not be available to them should they choose to stay. These represent marked changes in the relationship between the Victorian government and residents and bushfire.

In the summer of 2019/20, huge swathes of the southeast, including Victoria, experienced devastating bushfires. Soon after the bushfires, Victoria—having been through Black Saturday and the Royal Commission—established 'Bushfire Recovery Victoria' (BRV). This new agency represents the most holistic and comprehensive approach to bushfire recovery of the jurisdictions examined in this report. The remit and approach of this new agency is discussed further below.

## Western Australia

The southern end of Western Australia has experienced significant drying in recent decades, thereby increasing the fire danger in the region. Over the past half-century, the temperature in the region has increased by greater than one degree, with rainfall declining by around 20% (Department of Primary Industries and Regional Development 2020). At the same time, the frequency, duration and intensity of hot spells have increased (Department of Primary Industries and Regional Development 2020). This combination of climatic shifts has rendered fire an increasingly concerning phenomenon in the south of WA.

Fires in Western Australia—while frequent—are not as deadly as those on the east coast. The Esperance fire of 2015 (a case study for this report) was the State's equal most deadly with four deaths (Haynes 2015; Department of Fire and Emergency Services 2016). This is in stark contrast to the 173 lives lost in Black Saturday. However, the relatively low death toll in WA is not a reflection of the absence of fire. Indeed, over 90% of the State is susceptible to fire, and the State averages 5,000 bushfires each year (Manfield 2020). WA's relatively sparse population is a significant factor in the reduced loss of life and devastation from bushfire experienced as compared to east-coast states.

A coronial inquest into the deaths of four people in the 2015 Esperance fires has recently led to the adoption of multiple recommendations by the WA State Government (Smith 2020; Linton 2019). These are focused primarily on fire fighting capacity and communications.

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## Disaster impact

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### Overview—effects

Disaster impacts are complex, and are thus difficult to identify, quantify and hence respond to. The effects of natural disaster are economic and financial, health and mental-health related, can involve loss of or damage to property, and can also include environmental degradation.

Disaster impacts are often analysed through the lens of vulnerability. Previous research and reports identify particular demographic cohorts that tend to suffer greater negative impacts, with disaster exacerbating pre-existing forms of inequality (Beaini & Ulubasoglu 2019a, 2019b). Vulnerable groups often experience the most significant impacts, including financial impacts—and households are only as resilient as their most vulnerable member (McKenzie & Canterfield 2018). These include those on low incomes, who have a reduced capacity to withstand financial trauma and are more likely to suffer significant and prolonged negative changes to their quality of life (Ulubasoglu 2020). Low-income individuals or families are less likely to have access to insurance and have fewer options for recovery. In the case of the Black Saturday bushfires in Victoria, one study found that across different age brackets, it was those 25-45 years old who “experienced the most negative and significant income losses following the disaster” (Ulubasoglu & Beaini 2019a, p. 6). Older people may have more financial stability, while the young may be able to draw on family and have greater opportunities to rebuild lives and careers.

Equally, women are found to—broadly speaking—suffer greater impacts from natural disaster (Ulubasoglu 2020). Women’s lower incomes and greater likelihood of working part time in less stable jobs—which may be exacerbated by sectoral differences in pay and conditions—leave them more vulnerable to the financial impacts of natural disaster, with flow-on effects for health and wellbeing. Individuals working part time or in seasonal work may also face challenges related to employment, especially given seasonal workers generally rely on land-based occupations. Agriculture more broadly is often one of the hardest-hit sectors, with one study finding that, in the wake of the Black Saturday bushfires in Victoria, those who worked in agriculture “lost 31 per cent of their income”, with retail next hardest hit at 13%, followed closely by tourism at 12% (Ulubasoglu & Beaini 2019a, p. 6). They argue that the prominence of the agricultural sector in terms of economic losses is “well explained by the sector’s prominence within bushfire hit areas and its more land-intensive nature” (Beaini & Ulubasoglu 2018, p. 12). Other vulnerable groupings in terms of disaster recovery may include infants and young children, the elderly (with a high proportion of elderly people in a disaster location also often signalling fewer able-bodied volunteers to help), those without a car, new arrivals or part time populations, public housing tenants, those with low educational attainment, migrants or those with English as an additional language, single parents, and people with disabilities (McKenzie & Canterfield 2018).

Yet vulnerability can be complex and divergent. Changing demographics in a disaster zone can alter patterns of vulnerability over time, through changes in the birth rate or migration flows into and out of the area (McKenzie & Canterfield 2018). Similarly, those areas that experience large population fluctuations throughout the year, due to seasonal work, tourism, or part-time populations (e.g. holiday houses), can face unique challenges across the disaster preparedness, response, relief and recovery continuum (McKenzie & Canterfeld 2018). In some disaster-prone areas, “Towns may vary in population size by a factor of four or five during particular seasons of

the year” (McKenzie & Canterfeld 2018, p. 5). When it comes to recovery specifically, this may hamper community engagement, lead to a loss of tourism income, produce ‘outmigration’ of seasonal populations (where they fail to return, post-disaster), or create great class divides between impacts on different segments of the population or ‘types’ of resident.

Lastly, vulnerabilities can also be “counterintuitive” (McKenzie & Canterfield 2018, p. 9). For example, while for the most part, disasters impact more significantly on those in rental properties—as they are less likely to be insured and more likely to be in substandard or not fire-safe housing (Beaini & Ulubasoglu 2018, p. 15)—those with the ability to invest in property may experience more significant losses from a specific event than those who are less financially invested. Different types of natural disaster can also cause divergent impacts, or be experienced as more challenging for some groups rather than others (McKenzie & Canterfield 2018). Flood and fire require a rapid response, while drought is prolonged, causing different types of hardship. Awareness of all of these complexities is important in disaster recovery processes.

## Region—effects

Identifying the impact of natural disasters—and thus designing appropriate recovery policies and processes—is extremely complex. In terms of regional impacts, the integrated nature of regional economies is such that it is difficult to disentangle the web of economic and business impacts, post-disaster (Ulubasoglu 2020).

On the one hand, areas that disproportionately rely on a particular sector may increase a community or region’s vulnerability to disaster impact. Single-sector economies tend to be more vulnerable to the impacts of natural disaster, and may experience a more prolonged recovery time (Cutter et al. 2008; Ulubaosglu 2020). This is particularly so, if the primary sector is land-based, such as agriculture, forestry or fishing. Retail can also be heavily impacted by natural disaster, as spending contracts during the recovery phase due to reduced incomes (Stephenson 2010). The interdependence of sectors within a regional economy can mean that if the primary local industry is devastated, flow on effects to other sectors may be significant. For example, a dependence on the agricultural sector may mean that “industries more heavily reliant [on its inputs] ... are likely to experience adverse effects to their production” (Ulubasoglu 2020, p. 8).

On the other hand, more varied economic structures may lead to a greater interdependence of sectors. This can lead to messy and uneven recovery processes, as well as less predictable flow-on effects (Yu et al., 2014). In these cases, aggregated statistics can mask diverse impacts on different sectors, businesses or households, with a potential uptick in the construction sector, for example, disguising losses in other areas (Kousky 2014; Ulubasoglu 2020). For this reason, accurate and disaggregated knowledge is crucial to understand and respond to the impact of natural disasters, such as bushfires. Diversified economies may mean it is difficult to tease out the different variables impacting on who is worst hit, where, and why.

Interconnectedness with nearby population centres can cushion the blow for regions affected by natural disaster, mitigating financial impacts. Maintaining the ability, where possible, for residents to commute to major centres for work can allow affected residents to reduce their financial hit. The ability to maintain paid employment can significantly cushion the disaster impact and improve long-term medical and financial outcomes (Ulubasoglu 2020, p. 32).

Lastly, it is worth noting that the focus of economic recovery tends to rest on financial support, with recovery related to mental and physical health viewed as separate. As such, we may often

overlook in-kind and non-financial stimulus contributions to economic recovery—despite the fact that health and wellbeing are closely tied to work and financial stability. Emerging research points to the valuable contribution the business sector can make to the recovery process through these mechanisms: “The most common in-kind contribution was services and other non-physical types. For example, an energy business provided confidential counselling services to team members affected and transferred additional workers to assist in looking after customers” (Van Leeuwen & Gissing 2019, p. 117). Economic and industrial recovery can therefore be productively expanded by breaking down the work–home–community silos and viewing industry, work and employment as centrally involved in broader social and wellbeing recovery processes. This is crucial, given that disaster events can have extremely significant impacts on mental health, which is closely tied to employment and financial (in)stability. Research into previous disaster events has shown that “reduced incomes and financial capabilities were critical factors behind deteriorating mental health of the individuals who lived in the disaster zones” (Ulubasoglu & Beaini 2019a, p. 6; see also Beaini & Ulubasoglu 2018, p. 7). As such, mental health must be understood in tandem with financial recovery when it comes to natural disasters.

## Disaster recovery planning

### Commonwealth-level natural disaster recovery policy

At the Commonwealth (Federal) level, the primary policy instrument is the *Disaster Recovery Funding Arrangements 2018* (DRFA; previously the *Natural Disaster Relief and Recovery Arrangements*, or NDRRA). This policy is the mechanism through which the Commonwealth reimburses States for up to 75% of expenditure (within certain criteria and limitations) in the recovery process post-disaster, including natural disasters and terrorist attacks (Department of Home Affairs 2018).

In the context of this policy, the definition of natural disaster is:

... one, or a combination of the following rapid onset events:

- *Bushfire*
- *Earthquake*
- *Flood*
- *Storm*
- *Cyclone*
- *Storm surge*
- *Landslide*
- *Tsunami*
- *Meteorite strike, or*
- *Tornado*" (Department of Home Affairs 2018, p. 7).

The notable caveats on States' access to this funding are, firstly, that States' relief and recovery efforts are expected to go well beyond this scheme; that is to say, states should not limit themselves to efforts for which they can be reimbursed, alone. And secondly, reimbursement is only valid for expenditure incurred up to 24 months following the end of the financial year in which the disaster occurred (Department of Home Affairs 2018). The Commonwealth understands the DRFA as a safety net for the States, not a comprehensive insurance policy.

Possible funding purposes under the scheme are divided into four categories (Categories A–D). Category A focuses on emergency relief for individuals and households, while Category B centres on rebuilding and reconstruction works, and asset loans, whether for individuals, businesses and NGOs, or public works. Category C is a "... community recovery package that is intended to support a holistic approach to the recovery of regions, communities or sectors severely affected by an eligible disaster" and includes opportunities for community cohesion funding, small business grants and primary producer grants (Department of Home Affairs 2018, p. 21). These grants are normally up to \$10,000, or \$25,000 in exceptional circumstances. Lastly, Category D encompasses "additional assistance measures" which are "carried out to alleviate distress or damage in circumstances which are, in the opinion of the *Commonwealth*, exceptional" (Department of Home Affairs 2018, p. 22). This may include, for example, the rebuilding of key infrastructure. The Commonwealth and States share Category C funding 50/50, rather than the Commonwealth paying 75% of costs (as in Categories A and B). For Category D, the Commonwealth and the States may again split the costs down the middle, or in whatever manner the Commonwealth deems necessary.

The DRFA are supplemented by two further Commonwealth support options. Firstly, the Australian Government Disaster Recovery Payment (AGDRP) is "... a one-off, non-means tested payment of \$1,000 per eligible adult and \$400 per child who have been adversely affected by a major disaster either in Australia or overseas" (Department of Home Affairs 2020a). Secondly, the Disaster Recovery Allowance (DRA) is "... a short-term income support payment to assist individuals who can demonstrate that their income has been affected as a direct result of a disaster" (Department of Home Affairs 2020b). The latter is designed for those who experience a loss of income directly due to the disaster event (this may include farmers, small business owners and employees). The DRA involves up to 13 weeks of payments from when the income loss began. This suite of payments is framed as a recognition by the Commonwealth of the financial stress that a major disaster event can place on a State or Territory. The "cost-sharing arrangement" is designed to support Australian jurisdictions in meeting the significant costs associated with relief and recovery (Department of Home Affairs 2020c).

Alongside this ongoing funding scheme, the Commonwealth government often institutes specific grants or schemes as a direct response to a given disaster event. These are diverse (see, for example, National Bushfire Recovery Agency 2021a, 2021b). For example, for individuals and families impacted by bushfire, the Australian government provides funding to charities to provide emergency relief, including food, household items, and financial support for basic essentials, such as household bills. In response to the COVID-19 pandemic, alternatively, the Commonwealth government legislated to allow early access to superannuation – up to \$20,000 over a two-year period – alongside the JobKeeper wage subsidy program, and other government financial support measures.

For primary producers facing prolonged drought conditions, the Farm Household Allowance provides for four years of financial support in every ten, through the social support system. For small businesses and primary producers, in the wake of the devastating 2019-2020 bushfire season, the Commonwealth government announced several grants, ranging from \$10,000 small business grants to cover essentials such as salaries and utilities, to recovery grants of up to \$75,000 for primary producers, to address the direct impacts of the fires (e.g. damage from smoke or flames). Many financial recovery schemes post-disaster will be funded out of the relatively newly established (December 2019) Emergency Response Fund. This fund provides the government with an extra \$200 million each financial year for disaster preparedness, response and recovery. (Klapdor 2019).

There are two striking aspects to these Commonwealth-level emergency recovery arrangements. Firstly, they tend to focus narrowly on initial financial support, the rebuilding of infrastructure, and the restoration of life to pre-disaster levels. What this does *not* do, is address planning for, and shaping, industrial and economic organisation post-disaster. Nor does it present an aspirational view of what might be achieved, or where strengths might lie, for a community or industry, in the long-term after a natural disaster.

Secondly, many of the programs are relatively responsive, in that they arise in the wake of any given disaster. While there are positives to this related to tailoring support to meet the unique situation or constellation of events, this responsiveness also means that schemes are many, complex, patchwork, time-sensitive and often confusing. Government is clearly aware of this complexity, and has introduced different approaches to streamlining access and supporting individuals and the business community to navigate the recovery landscape. However, this complexity arguably does complicate long-term recovery, both in terms of affected communities

being able to access the support they need to maximise recovery, but also by further focusing attention on the present, and thus drawing it away from the long term. The implications of these policy arrangements are discussed further below, in Section 6.

## State-level natural disaster recovery policy

The two States that this report focuses on are Victoria and Western Australia.

### Victoria

The contemporary Victorian experience of bushfire disaster is heavily shaped by the Black Saturday bushfires of 2009. These fires marked a turning point in fire management and response in Victoria, due to the significant loss of life and property damage endured. In February 2009, the Victorian Government announced a Royal Commission into the fires (Teague et al. 2010), and in January 2020, the government established a new agency, Bushfire Recovery Victoria, built on the experience of Black Saturday and learnings from the Royal Commission (Business Victoria 2020).

Bushfire Recovery Victoria (BRV) is charged with leading the response to the more recent, 2019/20 fires primarily in the east of the State. However, the agency is also permanent, and is therefore designed to address future bushfires as well (Business Victoria 2020). The agency has an incredibly strong community focus, and is dedicated to co-creating an holistic and coordinated approach to recovery with affected communities. The agency is also responsible, within Victoria, for intergovernmental communication regarding bushfire recovery, and to lead communications regarding rebuilding and recovery more broadly (Business Victoria 2020).

The agency also has the role of advising the government on recovery approaches and processes. These are determined through engagement with key stakeholders, with a strong focus on ensuring solutions are determined by affected communities, according to their needs, and are therefore appropriate and coordinated. This approach is centred on establishing Community Recovery Committees (CRCs) in affected areas. CRCs are charged with “understand[ing] local impacts, identify[ing] local priorities and develop[ing] a community recovery plan” (State Government of Victoria 2020, p. 13). Community recovery plans will be supported through State Government project funding channelled through BRV, which will also coordinate service delivery and philanthropic assistance (State Government of Victoria 2020). The CRCs will be supplemented with Recovery Hubs and Case Support (State Government of Victoria 2020). Recovery Hubs are designed as a single point of assistance, *in situ* and staffed by locals, where affected community members can access support and relevant services (State Government of Victoria 2020).

The focus on a Case Support approach to assisting affected households is designed to address the isolation and confusion felt by many of those impacted by natural disaster when trying to access government assistance (State Government of Victoria 2020). Alongside the three key prongs of Committees, Hubs and Case support, BRV is also managing the clean up process and building assessments in the wake of the 2019/2020 bushfires in Victoria, coordinating the temporary accommodation, and liaising with the Commonwealth and local governments to manage the roll out of relevant grants (State Government of Victoria 2020).

BRV’s work is detailed in its ‘State Recovery Plan’, which is structured around five “lines of recovery”. These are: People and Wellbeing, Aboriginal Culture and Healing, Environment and

Biodiversity, Business and Economy, and Building and Infrastructure (State Government of Victoria 2020). The policy includes regular monitoring of key deliverables along these five lines, and agriculture and tourism have been explicitly noted as areas of focus (State Government of Victoria 2020). The 'State Recovery Plan', organises the recovery work going forward into three phases: short-, medium- and long-term (State Government of Victoria 2020). The first six months (short-term), in the immediate aftermath of the fires, are State-directed, with a central pillar of this period the establishment of local capacity to undertake longer term recovery planning (State Government of Victoria 2020). In the longer term, the Recovery Plan notes that there are various funding schemes available and that "the Victorian and the Commonwealth Governments have committed more than \$100 million for funding programs that communities and councils can draw upon to deliver on locally-identified needs" (State Government of Victoria, 2020 p. 13).

Most notably, the Recovery Plan includes a significant focus on partnerships with locals. The Plan particularly emphasises the need to ensure that community voices are able to meaningfully contribute to establishing the direction of recovery policy and processes. In conjunction with this community focus, there is also a dual emphasis on ensuring a whole of government response.

The combination of its breadth, community focus and holistic approach makes BRV and the State Recovery Plan the most long-term, forward-looking and comprehensive approach to bushfire recovery examined in this report.

## Western Australia

In contrast to Victoria, Western Australia does not have such a comprehensive recovery plan and framework. Instead, WA State materials regarding bushfire are heavily focused on risk assessment and risk mitigation. These include guiding documents such as the 'State Hazard Plan: Fire' (State Emergency Management Committee 2019) and the 'State emergency management: A strategic framework for emergency management in Western Australia' (State Emergency Management Committee 2020), which come under the Department of Fire and Emergency Services and are designed to cover arrangements for "fire prevention, preparedness, response and initial recovery" (State Emergency Management Committee 2019, p. 1). Under initial recovery, however, the Hazard Plan only includes a single page, mainly focussed on process-driven concerns. No provision for longer-term recovery is addressed, aside from a single line stating that "the impacted local government is responsible for managing the community recovery process" (State Emergency Management Committee 2019, p. 25).

In terms of longer-term recovery, the most prominent policy is simply the Western Australian administration of the DRFA (Department of Fire & Emergency Services 2018). The Department of Fire and Emergency Services WA website also has some information on bushfire recovery, but again these are focused mostly on initial recovery, and primarily on informing individuals affected – rather than providing a framework for broader community rebuilding and recovery (Department of Fire and Emergency Services 2020). The advice on the website regarding recovery is organised into 6 sub-topics: "Returning home", "Recovering and restoring household items", "Insurance, repairs and rebuilding", "Leaving your home", "Lifestock [sic], Pet and Wildlife Welfare", and "Your Wellbeing", with approximately a paragraph of information and relevant links under each (Department of Fire and Emergency Services 2020, inconsistent capitals in original).

## Local government level natural disaster recovery policy

### Colac Otway Shire

In the wake of the Colac-Otway fire of December 2015, the Wye Sep Kennett Renewal Association was established (WSKRA; denoting representation of the most severely affected communities: Wye River, Separation Creek and Kennett River). WSKRA then developed the Wye River, Separation Creek and Kennett River Renewal Plan, March 2016–March 2019. Reporting documents regarding the plan, produced by the Colac Otway Shire local government and WSKRA itself, have noted the recovery successes and emphasised the importance of “genuinely collaborative and trusting relationships ... between community and government following a natural disaster” (WSKRA 2019a, p. 2). The final annual report of the group in 2019 suggested the WSKRA was “a model for future disaster impacted communities” (WSKRA 2019a, p. 2), and the local government website indicates that key subject matter experts from the LGA have provided support and advice to impacted LGAs in the 2019/2020 fires (Colac Otway Shire 2020).

While the focus of WSKRA is broad—spanning from rebuilding works, to community cohesion efforts, to replanting initiatives—the focus remains localised, and shies away from sectoral and employment questions (WSKRA 2019b). In the WSKRA summary report of March 2019, no mention is made of employment, jobs or particular industries (WSKRA 2019b). Perhaps economic recovery of that size and type is seen the responsibility of State and/or Commonwealth government, given the limited resources of local governments in Australia.

### East Gippsland

The primary East Gippsland Shire bushfire recovery document comes in the wake of the devastating 2019-2020 bushfires along the eastern seaboard of Australia. The ‘East Gippsland Fires 2019-20 Recovery Plan’ comes under the new Bushfire Recovery Victoria structure. The plan was developed by the East Gippsland Recovery Committee (EGRC), under the new community-led process established under BRV. As such, the plan mirrors the five prongs of recovery that are the focus of BRV (People and Wellbeing, Aboriginal Culture and Healing, Environment and Biodiversity, Business and Economy, and Building and Infrastructure), albeit with a slightly different focus on ‘recovery environments’ (Social environment, Built environment, Culture and healing environment, Economic environment, Natural environment) (EGRC 2020).

Under the ‘economic’ recovery environment, the Plan states the primary goal as “build[ing] a business community and local economy that is stronger and more resilient than before the fires” (EGRC 2020, p. 22). Key objectives within this overarching goal include assessing both the “direct and indirect” impacts of the fires, broader industrial shifts and the COVID-19 pandemic on business and local sectors, with a particular focus on tourism (EGRC 2020, p. 22). This explicitness of the holistic approach taken here to assessing and coordinating responses to economic recovery, which goes beyond immediate financial support and rebuilding, is rare in the recovery documents assessed in this report. This may signal a shift in disaster recovery planning and approaches away from piecemeal, short-term, financially-focused practices and towards more comprehensive understandings of the complex needs for economic and industrial recovery in disaster-hit areas. As the most recent recovery plan examined for this report, emerging from the newly instituted BRV, which itself comes in the wake of both the Black Saturday Royal

Commission and the devastating bushfire season of 2019-2020, the Plan can be seen as the most cutting-edge example of approaches to local recovery examined here.

The 'East Gippsland Fires Recovery Plan' also entails five sub-plans—one for each of the 'recovery environments'. The sub-plans provide a more detailed assessment and outlook for each recovery environment. The 'Economic Recovery Sub-Plan' draws out five key sectors: 'Agriculture', 'Aquaculture', the 'Wine industry', the 'Apiary industry' and the 'Visitor economy' (Regional Development Victoria, East Gippsland Shire Council & Bushfire Recovery Victoria 2020). Interestingly, this is despite the fact that the plan also acknowledges that "Healthcare and social assistance is the largest employer in East Gippsland ... followed by retail trade" (Regional Development Victoria, East Gippsland Shire Council & Bushfire Recovery Victoria 2020, p. 11). A vision of how these sectors may be supported to continue to undergird employment in the region, however, is not apparent. This mirrors a frequent concern in Australian regional development planning, whereby feminised sectors are often devalued in planning processes (Farhall et al. 2020).

Beyond the relatively comprehensive Fires Recovery Plan and its sub-plans, the Shire of East Gippsland does have several further public-facing disaster recovery documents. Primarily, there is the 'Municipal emergency management plan 2018-2020' (East Gippsland Shire Council 2018), which includes seven sub-plans available on request (Animal Welfare Plan, Disaster Waste Management Plan, Fire Management Plan, Heatwave Plan, Influenza Pandemic Plan, Flood Emergency Plan, and the Municipal Fire Prevention Plan). The Emergency Management Plan includes materials focused on recovery, including explanations of the Commonwealth recovery funding arrangements detailed above, as well as explanations of process and responsibilities in the recovery phase. This document is more process-oriented, however, and is focused less on the material content and focus of long-term recovery.

## Esperance

The primary document from the Shire of Esperance concerning bushfire recovery is the 2016 document, the 'Esperance complex fires draft recovery plan: recover, rejuvenate, restore' (Shire of Esperance Local Recovery Committee 2016). This document, produced approximately six months following the 2015 fires, is designed to document and guide community consultation processes and the resulting local initiatives to recover from, and develop resilience to, fires.

The recovery plan is focussed primarily at the community level—which is understandable from a local government. Alongside the community focus (community consultation, events, schools and local services, built and natural environment), there is also an individual or household-level focus (support for landowners, knowledge-building). However, almost unaddressed in the recovery document are questions of the economy, its sectors and the employers and business situated within them. Although minor mentions of farming and agriculture are made, these are mainly to note that farming is getting back on track. No mention of tourism is made at all, and there is no discussion of long-term recovery through the growth of these, or other, specific sectors.

Outside of the 'Recovery plan', the Shire of Esperance has several further publicly available materials dedicated specifically to fire management (although not focussed on recovery). The 'Local planning policy: planning for bush fire protection' (Shire of Esperance 2020a), the 'Bushfire management plan' (Shire of Esperance 2012) and the 'Local policy on bushfire brigades' (Shire of Esperance 2002) speak to risk mitigation and management of bushfire. The 'Planning policy'

identifies minimum land development requirements in the area, the 'Management plan' covers risk management issues such as vegetation management and fire breaks, and the 'Brigades' policy guides immediate fire-fighting response.

Concerning natural disaster more broadly, the Shire also has a specific 'Coastal hazard adaptation strategy' (Saint-Cast 2016). This policy addresses events including storm surges and landslides, with a view to reducing the area's vulnerability to the impacts of such events. Interestingly, it is also worth noting that the Shire has a prominent (if brief) COVID-19 recovery plan that is specific to the pandemic (Shire of Esperance 2020b). The Shire has also developed specific Business and Community Relief Initiatives in response to COVID-19 (Shire of Esperance 2020c). This is centred on a \$1.23 million package of support addressing financial hardship and cutting local level fees and rates.

Lastly, Esperance has a Local Emergency Management Committee, which in 2016 developed the guiding document, the Shire of Esperance 'Local emergency management arrangements'. However, as is a common theme across all levels of government, the focus within this document is on emergency planning, mitigation and management, rather than recovery.

## Northcliffe

The Shire of Manjimup, where Northcliffe is located, has recently updated its 'Local recovery plan, 2020-2025' document. The document is designed to "support[t] the affected community in: a) The reconstruction of damaged physical infrastructure; and b) Restoration of the community's emotional, social, economic and physical wellbeing" (Shire of Manjimup 2020a, p. 10). The plan is not disaster-specific, but rather "Describe[s] the roles, responsibilities, available resources and procedures for the management of recovery operations following an emergency impacting the Shire of Manjimup" (Shire of Manjimup 2020a, p. 11).

The 'Local recovery plan' provides for the establishment of Local Recovery Coordinator and a Local Recovery Coordinating Committee, which is charged with "coordinat[ing] and support[ing] local management of the recovery processes within the community" (Shire of Manjimup 2020a, p. 16). This is interestingly a narrower statement than that in the 2013 iteration of the plan, which describes the role of the committee as, "Assessing requirements for recovery activities relating to the psychological, physical and economic and environmental wellbeing of the community" (Shire of Manjimup 2013, p. 14). Beyond establishing roles and responsibilities, the document further details the transition from immediate response to recovery, the process for assessing need and developing and operationalizing recovery initiatives, a section regarding spiritual and cultural needs, as well as strategies for communication with the local community and beyond (Shire of Manjimup 2020a). Lastly, the document covers the establishment of a recovery centre as a 'one stop shop' for residents, as well as a brief note on State government assistance—before explaining the dismantling of recovery operations when required (Shire of Manjimup 2020a). Interestingly, this content is strikingly similar to the 2013 precursor document identified above, *except* that the 2013 document also includes information regarding the provision of health and wellbeing support. In the 2020 document, this is addressed to some extent via under a section on 'Outreach/Visitation Programs'. However, the fact that this is no longer present in a more expansive or obvious form in the 2020 iteration is striking.

Aside from the local recovery document, the Shire has produced several related documents which address natural disasters and emergencies. These include, most prominently, the

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standard local government documents such as a 'Bushfire brigade operational procedures' plan (Shire of Manjimup 2019), a 'Local Emergency Management Arrangements' document (Shire of Manjimup 2020b) and a 'Local evacuation plan' (Shire of Manjimup 2020c). As in most jurisdictions detailed here, there is a significant focus on preparedness, risk assessment and mitigation, as well as emergency response and management.

## Policy Implications

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Bushfire and natural disaster recovery is governed by a patchwork of financial arrangements and recovery support planning documents. These differ in content, focus and comprehensiveness from jurisdiction to jurisdiction, meaning residents in any given local government area or state of Australia may experience disaster recovery planning and support in divergent ways.

### Commonwealth level policy

At the Commonwealth level, the Federal government is primarily focused narrowly on replacing what existed pre-disaster (infrastructure, buildings), and providing financial support in the immediate aftermath of disaster. Support is relatively short-term, and designed to tide over individuals, businesses and State and local governments until their financial functioning returns to 'normal'. This is not a particularly long-term outlook, nor does it provide direction in terms of how to recover effectively. The Commonwealth approach represents a financially-focused form of delegation that hands responsibility for detailed recovery planning to the other two tiers of government.

### State level policy

At the State level, Bushfire Recovery Victoria shifts the focus to the community level, emphasising the need to work with communities to ascertain their recovery needs. This consultative approach is admirable, in that it seeks to work with locals to ensure recovery efforts are targeted at priorities that emerge from the community itself, rather than imposing top-down measures or one-size-fits-all recovery approaches that may not be appropriate or welcome in a given location. This does raise the question, however, of who has a voice in local communities. A challenge to participatory work is how to consult effectively, without re-producing existing power relations? In rural and regional areas of Australia, this often means privileging men over women and citizens over migrants, amongst other power dynamics. A collaborative approach should be mindful of reproducing these dynamics and attending to the needs of the privileged, without hearing the voices of the marginalised.

In Western Australia, disaster recovery policy and planning is notable by its absence. This disparity between the Western Australian and the Victorian approaches is unclear. It is not clear whether the division emerges as a result of perceived necessity. In the wake of the Royal Commission into the Black Saturday fires of 2009 and especially given the compounding effect of the 2019-20 bushfire season, there may be a much greater perception of priority in Victoria with regards to disaster recovery. Victoria is far more fire prone in particular, far more densely populated and thus tends to experience more significant economic impacts and loss of life from natural disaster. This is perhaps one explanation for the greater emphasis within Victoria on disaster recovery, as opposed to the comparative lack of recovery planning in Western Australia.

## Local government level policy

At the local government level, there is a contradiction in play. In many ways, local government recovery planning is the most focused and long-term of all the tiers of government. There is a much greater focus on community and community needs, disaggregating these out into categories such as economic recovery, wellbeing and the built environment. Yet at the same time, the responsibility for major financial support lies with the other two tiers of government. This means that, at times, there is an elision of the role of work and employment, and regional industries, within the local government recovery effort, in favour of a focus on community cohesiveness that is less costly and reflects the expertise of local councils. This perhaps fails to account for the ways in which work and business are crucial to wellbeing and recovery at an individual, household and community level, with important impacts on health and mental health, as well as whether a community is likely to flourish, post-disaster. Where there is a focus on the economic, this is constrained by an inability for local government to provide more than piecemeal financial support (without the support of State or Commonwealth funding), and a lack of resources and capacity to examine economic recovery more broadly at the industry level. This is compounded by a lack of accurate data on disaster recovery across sectors and value chains. A failure of knowledge means that all tiers of government are hampered in their efforts to meaningfully plan for the recovery of core sectors, such as agriculture and tourism.

## Broader policy implications

More generally, lessons from prior research into disaster recovery efforts highlight various recovery challenges, as well as goals that can support long-term recovery from disaster.

### Recovery challenges

On the side of challenges and limitations, existing research highlights five core concerns with regards to disaster recovery in Australia. The primary key concerns are deeply intertwined, and underscore the ways in which recovery is poorly understood, and tends to get lost as preparedness, risk management and immediate relief take centre stage.

Firstly, at times, disaster recovery efforts get the timelines wrong and misunderstand the fundamental purpose of recovery. Recovery should not focus on returning to the level of functionality experienced before the disaster. By narrowly working towards a return to 'normal', longer-term goals around improving future preparedness and positively developing the regional economy may be undermined. While immediate recovery is important, skewing recovery towards short-term goals may extend long-term recovery even further, creating community challenges. Recovery is a long-term process requiring careful planning, which must look beyond immediate reconstruction efforts.

Secondly, this focus on short-term rebuilding can draw attention and effort from the longer-term planning process, which requires focused attention. Recovery must be recognised as long-term, and as a process that requires thought and planning; it does not take care of itself. Long-term recovery that brings with it prosperity and equity in particular does not necessarily stem from a return to standard ways of doing things, but may require research, data, creativity and input from diverse voices.

Thirdly, the privileging of preparedness over recovery planning means that the latter is often reactive rather than proactive, leading to decisions being made in haste. This, in turn, can cause decisions to be made on the fly, across multiple levels of the complex response and planning machinery. Such reactive decision-making can mean not only that recovery lacks coordination or that poor decisions are made, but more broadly that a broader strategic focus does not emerge, or that important patterns to help develop such a strategy are harder to discern in the rushed and uneven processes that arise.

Fourthly, recovery planning and strategy development must better understand the layout of, and interactions within, the regional economy in question. The regional economy must be understood comprehensively both in terms of its pre-disaster functioning, as well as the economic impacts of the disaster, and it must be viewed with a creative lens. Sometimes what was there previously does not represent an economic 'best case scenario'. While immediate economic recovery priorities such as transport and communications may be relatively uniform across jurisdictions, recovery beyond these basic functions must be planned for in light of the economic patterns of the region itself, and its economic and industrial potential.

Lastly, and on a more practical note, the complexity of government relief and recovery packages can overwhelm small business. This can lead to a failure of policy, if those who need support are unable to access it, as well as a deepening of economic inequalities, whereby those who already have greater capacity (and are thus able to navigate grant application processes) are those who receive funding. This is compounded by small business owners who may need to navigate and access multiple types of scheme, as an individual resident or household, and as a business owner. In recent years, government has begun to recognise this challenge and to improve access to case management, as well as streamline application processes. Yet, this remains an ongoing recovery challenge.

## Recovery goals

Alongside the recovery challenges and limitations identified above, the existing literature also identifies six core goals that should ideally shape disaster recovery policy and planning.

Firstly, there is a balance to be struck across the mitigation/preparedness, response, relief and recovery scale. While this report has identified the limitations associated with focussing overwhelmingly on disaster preparedness at the expense of recovery planning, it should be noted that investing in preparedness helps to reduce the shocks of disaster (Ulubasoglu 2020). A greater focus on long-term recovery should not be at the expense of disaster preparedness efforts, as this is ultimately counterproductive.

Secondly, it is important to maintain access to larger economic centres in the aftermath of disaster. The ability to commute to larger, fully-functioning economic centres for work, post-disaster, can help cushion the economic blow and reduce isolation, with Ulubasoglu finding that "ensuring ... [economic centres] remain/are quickly made accessible to community members ... is critical not only for survival, but also for their longer-term health and economic prosperity" (Ulubasoglu 2020, p. 32). Ulubasoglu's finding is a further reminder, too, that the mental and physical health elements of recovery are intimately tied to financial recovery and access to stable, meaningful and productive work.

Thirdly, access to economic centres, where possible, can also form part of an effort to keep the population in place (Ulubasoglu 2020). Reducing post-disaster outmigration can be achieved

through ensuring the maintenance of local services, and the integration and central coordination of different aspects of recovery, including business, household, community and health and wellbeing (RAI 2013).

Fourthly, local knowledge and community connectedness should be leveraged. While local government may be constrained in terms of capacity, as outlined above, what it does have is access to community networks and on-the-ground, place-based expertise (RAI 2013). Local governments should thus be leveraged to guide recovery in a way that makes sense for the local area. Bushfire Recovery Victoria appears to have a greater focus on this kind of local knowledge, with the emphasis on community-led recovery and local recovery committees. This may be useful combined with emerging data and recommendations regarding the role of government in mental health recovery at the individual, household and community levels (Gibbs et al. 2016).

Fifthly, questions remain around the role of the media in disaster recovery. Before a disaster and while it is unfolding, media have an incredibly important role to play in alerting the community to threat. The role of media in supporting disaster recovery is less clear, but perhaps could be productively engaged as part of a community-led recovery strategy.

Lastly, research shows that flexibility and adaptability are central to recovery processes. A key question remains, then, how do we plan effectively to be flexible?

## Disaster recovery policy: what we know and what we don't know

When planning for effective disaster recovery, it is important consider both what we already know and what we do not—as well as what we need to know to achieve core recovery goals.

Given the complexities of natural disaster vulnerability and impact, it is unsurprising that recovery and government response are complicated. Government programs and financial support play an important role in recovery efforts (Ulubasoglu 2020). However, what we do *not* know about natural disaster recovery is important to acknowledge. In 2010, Stephenson pointed out that beyond the visible rebuilding efforts associated with recovery, profound indirect losses result from natural disasters, including, for example, land degradation and long-lasting psychological impacts. Despite various government and non-governmental bodies collecting data relating to their recovery work, Stephenson (2010, p. 2) noted that:

*A consolidated assessment of the impacts of major bushfires that incorporates this information, however, has not been undertaken previously on such a large scale. Importantly, few assessments consider broader and long-term impacts on communities.*

Yet, from all the materials considered above, effective and equitable regional economic recovery relies on a comprehensive understanding of the regional economy in a given locale, as well as a better understanding of what we are aiming for in regional economic development. Despite decades of research and debate, there is still little consensus and a lack of sound research regarding how to move forward effectively with planning for regional economic futures, especially at a time when many regional economies are struggling with transition and/or decline.

Further complicating this picture, the high-risk nature and significant impacts associated with natural disasters can mean that knowledge is held and closely guarded by elites (Sutton et al. 2019). This can lead to lock-in, whereby standard ways of doing things become entrenched, and

may reflect pre-existing biases within organisations or social groups. Better understanding these unknowns and incorporating diverse perspectives may generate more creative or holistic solutions.

As such, better data regarding the composition of regional economies is required, alongside further research into the regional economic impacts of disaster, combined with a clearer understanding of how to plan for equitable and vibrant regional communities in future. We need to better understand what we know, and address what we don't know, when it comes to long-term economic recovery in disaster-hit regions.

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains and Natural Disasters**

**Report 4:**

**Value Chains and Networks: Questions for Regional Analysis**

Todd Denham and Peter Fairbrother

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Todd Denham and Peter Fairbrother (2021) 'Value Chains and Networks: Questions for Regional Analysis', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 4*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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This report presents a conceptualisation for regional analysis founded in global value chain/network theory. This work has not been done before, as most analyses using this theory begins with firms and industry. We are starting from place, which enables an assessment of regional relationships and activity in connection with the food chain from production to consumption or the tourism network, in terms of its complicated and often opaque relationships. The report lays out ways of conceptualising these relationships to develop a robust understanding of relationships within the agriculture sector and tourism as a 'sector' (not formally recognised under the Australian Bureau of Statistics methodology).

The aim is to conceptualise and explain the regional value chains and networks. This requires, for example, an understanding of the food supply and distribution chain: that set of relationships from source, the producer, the harvester and transporter, to the retailer and the consumer, and the networked arrangements that enable the supply chain to operate, such as logistical and financial relations. Debates about the supply chain as a set of coordinated relationships, networks and logistics, have led into considerations about the management and organisation of such chains, and their governance (Carter & Rogers 2008; Gereffi et al. 2005).

Previous studies have largely concentrated on single sectors within countries or supra-national regions (see Jespersen et al. 2014 for example). The approach here connects the value chain and network research to the concept of regional development platforms, which:

*... can be defined as regional resource configurations based on the past development trajectories but presenting the future potential to produce competitive advantage existing in the defined resource configurations. The possible competitive advantage is based on the business potential of the actors working for the platform. The actors of a regional development platform are the firms, technology centres, expertise centres, research centres, education organizations, etc. contributing to the defined development platform (Harmaakorpi 2006: 1089).*

In this way we can identify value-adding nodes along the chain and determine how this value is collected and by whom. In turn, this provides an understanding of the regional industries in relation to the social and economic texture of the region.

## Value Chains and Networks

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The concept of 'value' chains has emerged in recent decades, as an extension of supply chain analysis to include insights into economic outcomes and the power dynamics within systems of production. As Kaplinsky and Morris (2000: 4) explain, a value chain is:

*... the full range of activities which are required to bring a product or service from conception, through the intermediary phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.*

While much of the research has concerned global production systems, the value chain concept is applicable to geographical scales from local to global. As noted by Sturgeon (2008:123):

*Linkages may be forged within the same building, across town, or across great distances ... Regional, national, and local value chains are nested firmly within global value chains, as we perceive them, and GVC [Global Value Chain] governance theory operates equally well at any and all of them*

While conceptually possible, the application and calculation of value chain methodology to small and sub-national regions is rarely undertaken due to the limitations of available data. For trade between nations, international trade data, collected by customs processes and across legally defined borders can be used to measure the locations of supply and demand (Gereffi & Fernandez-Stark 2016). It is also likely that trade in and out of sub-national regions occurs at a much finer degree of detail, in ways that are hard to measure as in many cases it may not be clear to the trader that a study area border had been crossed.

There are two key elements for the analysis of value chains and their economic effects in sub-national regions:

1. The first is where in the chain profits, and particularly over-the-odds profits, are being realized; and,
2. The second aspect of value chains is referred to as governance: who has control over the production system, including the type, amount and quality of production.

Within typical studies of value chains, the focus is on 'upgrading' the study area's role within the production system, to attain greater economic development benefits from participation.

Humphrey and Schmitz (2002) list four types of upgrading:

1. Process upgrading, which transforms inputs into outputs more efficiently by reorganizing the production system or introducing superior technology;
2. Product upgrading, by moving to more sophisticated product lines;
3. Functional Upgrading, which entails acquiring new functions (or abandoning existing functions) to increase the overall skill content of the activities;
4. Chain or inter-sectoral upgrading, where firms move into new but often related industries.

The focus on this project is to investigate existing links in regional value chains in the agriculture and tourism sectors, due to their prominence in regional economies. Opportunities for upgrading within regions are outside of the remit for this research, but the list by Humphrey and Schmitz provides a basis for considering the structures and levels of development of the existing chains and networks within the regions.

## Long and Short Agricultural Value Chains

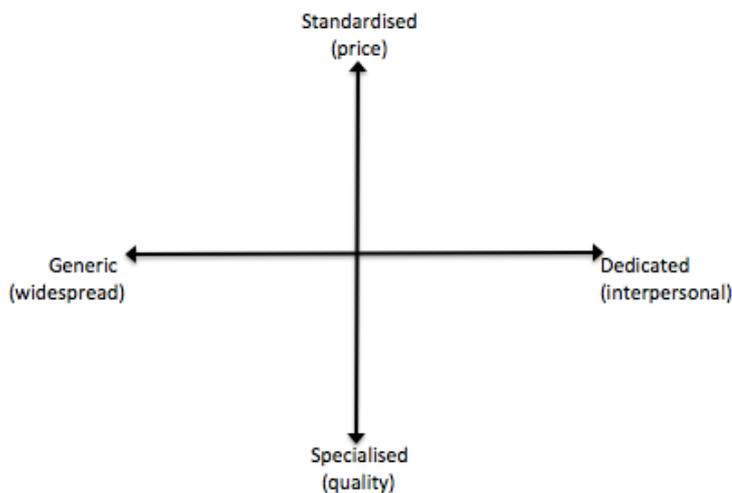
Fairbrother et al. (2018: 7) extended the typology of Marsden et al. (2000) to distinguish between short and long value chains based on the product and its path to the consumer. In detail:

- Long Value Chains: nodes of the production process are segmented, with agents typically providing one step in the production and profiting on the basis of economies of scale and horizontal integration.
- Short Value Chains: nodes of the production process of production are concentrated: farmers may also process, store, transport, market and distribute their own product and thereby profit through vertical integration.

The distinction is important given the emergence of direct to consumer production and the value-add through shared information and experience in some areas of agriculture. Short value chains are those that have few, if any, intermediate steps between the producer and the consumer. The value chain is short in the sense of the connection to place and person. Long value chains typify a more traditional approach to agriculture and product marketing, involving bulk processing and commodified product.

Distinctions between short and long chains also draw on the work of Storper (1997: 109), who sets out dimensions of products on two axes as depicted below.

**Figure 1: Storper's Four Worlds of Production (Storper 1997)**



Source: Storper, M 1997, *The Regional World: Territorial Development in a Global Economy*.

The *standardised* to *specialised* axis can be seen as pertaining to product supply, and the *generic* and *dedicated* axis is demand. In detail:

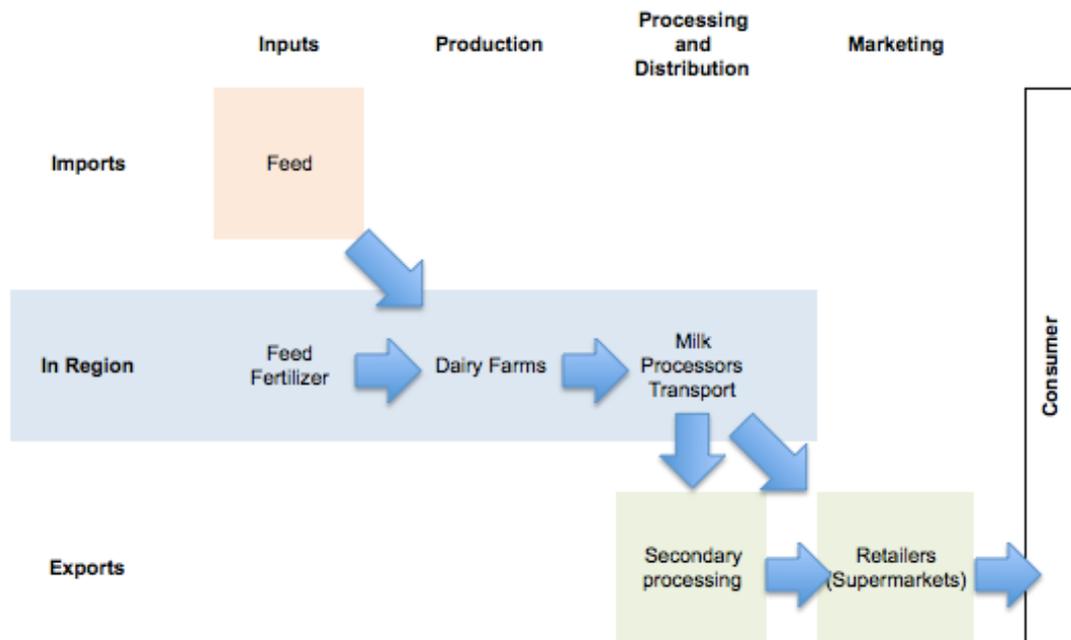
- *standardised* products are easy to supply and cheap to produce and compete on price.
- *specialised* products require specialist inputs that are “rare or costly and time consuming to reproduce” and compete on quality.
- *generic* products are undifferentiated in the market.
- *dedicated* products are targeted to the end-user by the producer.

This conceptualisation has been used in assessing agricultural production, as a strategic shift in the US beef industry has increased profitability by transitioning from a *standardised* commodity to a value-added *specialised* product (Lowe & Gereffi 2009).

As indicated by the figure above, short and long value chains and the aspects of supply and demand that underpin them are degrees rather than absolutes. However, agricultural producers in the middle ground are in decline as they are “often too big to benefit from direct sales models such as CSAs (Community Service Agriculture) or farmer’s markets, they are also too small to build partnerships with larger supply chain partners” (Pullman & Wu 2012: 8).

To use dairy as an example, the long value chain mainstream milk production is *standardised* and the resulting product *generic*, whereas the short value chain artisan cheese production is *specialised* and *dedicated*. Wineries with cellar doors are another primary example of short value chains. The figure below depicts an indicative value chain for the long dairy value chain, indicating where nodes of the production system may occur within a region.

Figure 2: Dairy industry value chain example



Source: Fairbrother et al. (2018: 49)

The impact of natural disasters on agricultural value chains will vary depending on many factors, however the distinction between short and long indicates how susceptible they are to localised disaster events. That is, for long value chains, *standardised* and *generic* implies that direct alternatives for inputs to and outputs from production are likely to be readily available in other locations. For short value chains, it is possible that disaster events are more disruptive, due to the more spatially condensed and specialised inputs and outputs. Whether or not such differentiations can be made from available aggregate datasets, the implication is that the structure and production methods of a region’s agricultural sector will influence the impact of disaster events on value chains.

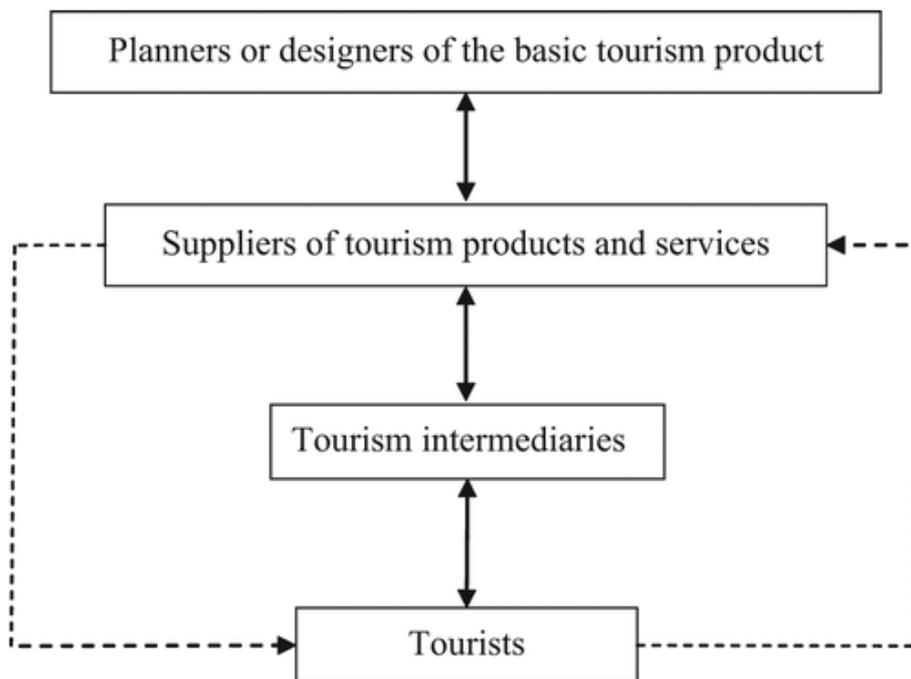
## Tourism Value Chains and Clusters

Tourism regions can be seen as networks, arranged in complex adaptive systems. A distinct element of tourism networks is that their services they must be “produced and consumed in very particular places” (Urry 2002: 38). The conceptualisation of a tourism region as an adaptive network is a result of a region’s tourism sector being “composed of a range of separate industry suppliers which offer one or more components of the final product” (Hjalager 2000: 202).

There are four main elements of the tourism value chain, as depicted in the figure below. Song et al. (2013: 16) describe the roles in the production services as:

- *Planners or designers of the tourism product* are the “actors responsible for policy making and planning”.
- *Suppliers of tourism products and services* are the primary providers to tourists: accommodation, hospitality, transport and souvenir sellers.
- *Tourism intermediaries* broker between suppliers and tourists, and include tour operators and travel agencies.
- *Tourists* are the final consumers of the products and services. The dotted arrows indicate that there are direct flows between the suppliers and consumers, as well as through intermediaries.

**Figure 3: Tourism value chain**



Source: Song et al. (2013: 16)

For this study of regional tourism and the impacts of natural disasters, the lower three nodes in the value chain are likely to be directly affected, while the top node is likely to be instrumental in leading the post-disaster recovery from a regional perspective.

Important factors in the production of tourism services, and thus the tourism value chain, are that:

*... the geographical dimension (i.e. space and place attributes) is an essential component of destinations that affects their market attractiveness and contributes to the significant differences between destinations and districts (Jovicic 2016: 448).*

And secondly, that there is an interdependence between tourism providers within a region, based on a typical industry structure consisting of small businesses delivering complementary products (Hjalager 2000: 200).

These attributes are the basis for the widely used term 'tourism destination' that reflects that in the main, tourists are visiting a distinct geographic space and acquiring the services of a range of businesses, as well as non-commercial services (Urry 2002). A tourism destination can be seen as "a dynamic, geographically based mode of production that provides interdependent and complementary products to tourists and transforms the spaces and places in which this production occurs" (Pearce 2014: 149).

It is for these reasons that regional tourism is predominantly conceptualised using network and cluster theories rather than chain or linear theories. For example, Hjalager (2000: 208) demonstrated that tourism regions can be considered industrial districts because they share:

- a global market;
- an SME-based economy;
- a specialisation in one sector;
- an extended vertical interdependence;
- the existence of a numerical and functional flexibility; and,
- some tendencies towards the establishment of supportive public and semi- public policies and institutions.

More recently, tourism has been described as a complex adaptive system, whereby changes in one element of a destination will not flow through to other elements of the system in clear and linear ways. This has implications for the capacity of tourism regions to adapt to disaster events, as Jovicic (2016: 450) explains:

*The theory of complex adaptive systems facilitates our understanding of the ability of tourism to recover from the natural and man-made events that have occurred in recent period (the energy crisis between 1967–1979, the threat of bird flu, the Indian Ocean tsunami and seaquake in 2004, the recovery from the global economic crisis in 2008, and the swine flu outbreak in 2009, among others) ..."*

Tourism destinations are thus able to adjust to meet challenges, drawing on past experiences to adapt to circumstances as hand.

The notion of tourism regions as a complex adaptive system is a way to understand how the industry mitigates the impact of disasters, which reduces their impact on a tourism region but not the sites directly affected. The tourism value chain is in effect an interactive network, particularly as in the aspects that produce in-region tourism services, complementing each other as a 'tourism destination'.

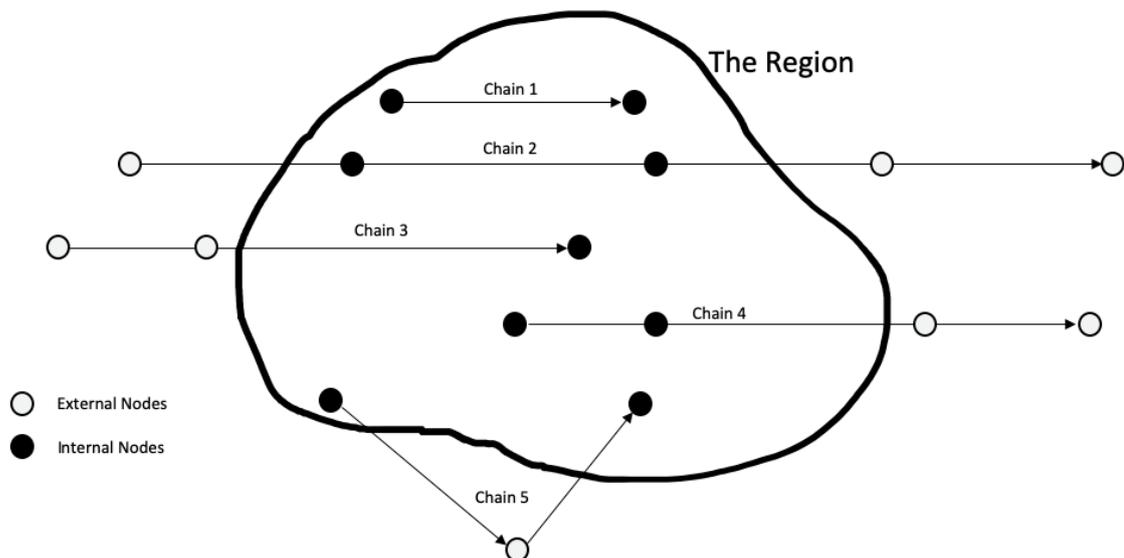
## Assessment: Why Value Matters

The importance of these conceptualisations is that they enable us to understand the complex interrelationships that make up such chains and networks. With such an understanding it becomes possible to trace through the processes of valorisation (where the value-add occurs) and assess the impact on regions. In relation to disaster events it then becomes possible to identify precise socio-economic impacts and inform the development of precise and targeted policy initiatives.

## Industry Linkages

A major gap in our understanding of regional economies is the linkages between producers and suppliers of intermediate inputs into production, and to what extent these links occur within a specified study region. While we may know that there is a large milk processor within a region and a large number of dairy producers, but that does not mean the local milk is only processed in region. As transport costs have declined (or freight has increased productivity) then the likelihood of inputs to production travelling further in their journey from raw materials to consumption has increased. As indicated by previous research on regional production systems, there are a range of different paths to consumption through and within a region, as show in the diagram below.

**Figure 4: Local Value Chain Typologies and Nodes of Production**



This understanding the interconnectedness of industries, as well as what is imported to the region, can inform regional development strategies through the identification of import replacement initiatives. For example, if producers are sourcing transport services from outside the region, it indicates that there may be an opportunity for a viable local supplier.

## Regional Value Added

The industry linkage data above can be enhanced through understanding the value added by each node in the chain of production. Without understanding the value added by industry within a region, as well as the supply chains and intermediate inputs to production, a true picture of the contribution to the regional economy cannot be established.

A prominent example of this is the value of mining to a regional community, such as Gippsland. While census data indicates a small percentage of workers in Gippsland are employed in mining and the associated power supply industry, it is unknown how much of the value produced in power generation is transferred to the local community through supply contracts. Without this information, it is not possible to compare the importance of sectors to regional economies. To return to the Gippsland example, without understanding the secondary employment benefits we cannot know if agriculture is a more significant sector for the region than mining and energy.

A further, connected, issue is the repatriation of profits and the allocation of production benefits between sites of production and head offices. Gippsland energy supply generators are connected to offices in Melbourne and in some instances France (owned by the French company Engie), which raises questions about the allocation of productivity when considering the importance of the region to the national economy. These cross-regional relationships and industry structures cloud questions of regional productivity.

## Employment Mobility

There is an ongoing debate in Australia (and internationally) regarding the availability of employment in regional areas and people's willingness to relocate to take up opportunities. This occurs in migration debates and forcing skilled migrants to 'serve time' in regional areas, arguments regarding increases to Newstart and people's willingness to move for employment, and in personal mobility as a regional development intervention.

The impact of the COVID crisis on regional labour markets has been very significant. In April 2021, there were over 67,000 job vacancies across regional Australia—exceeding the previous high in late 2011 at the height of the mining boom. The RAI reported that the biggest difference between these two peaks is that the current high demand is for a more widely diversified set of labour skills than the primarily mining-related labour demands a decade earlier, and that vacancies are more broadly dispersed across the regions.<sup>1</sup>

Yet, we do not understand the employment outcomes of people who move – whether people who move to regional areas have improved their employment circumstances, have changed jobs or have retained their employment in their previous place of residence.

## Employment and Disaster Events

The key outcome of value chain analysis in regional development and disaster recovery contexts is the interconnectedness of industries. An important consideration for the study of value and supply chain/network analysis is that this conceptualisation requires the recognition that regional boundaries are porous and ill-suited to analyses of contemporary social and economic

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<sup>1</sup> <http://www.regionalaustralia.org.au/home/another-record-month-for-regional-job-vacancies/>

conditions. It appears to be the case that clear spatial demarcations still define jurisdictions such as local government and are integral to understandings of regions.

The two industry sectors which focus this project, tourism and agriculture, have vastly different structures and interdependencies.

*Tourism:* Tourism destinations' appeal is also due to a mix of businesses: accommodation, hospitality, cultural and leisure activities. Businesses are complementary within a tourism destination rather than parts of a supply chain: the complementarity indicates agglomeration benefits and cluster effects (Porter 1998). If some regional tourism businesses close as a result of a disaster, it may impact across the whole region's tourism sector even though they do not supply one another. Also, tourism supplies are likely to be somewhat generic and standardised in terms of Storper's (1997) four worlds of production and thus replacements or substitutes are readily available in coming to terms with an emergency. Downturns in tourism, along with reactions to natural disasters, may also be evident in housing market data due to the prevalence of second homes in these locations (Paris 2010).

*Agriculture:* Large-scale agricultural production systems, whereby produce is sold and supplied through national networks can be seen as long value chains (see Fairbrother et al., 2018). Short value chains typically comprise smaller, niche market producers within the agricultural sector. Short value chains may be similar to tourism, due to cluster benefits, or even be considered as part of regional industries as well as agriculture (such as wineries). However, it is likely that impacts to the long chain agricultural sector are more apparent in regional data analyses due to scale effects.

Therefore, it is likely that the impacts of bushfires on tourism and agriculture differ. Interconnectedness and regional effects of bushfire events in tourism regions, agricultural regions and mixed regions should provide insights into the ways in which natural disasters impact regional industries, and how these effects flow through economies across regions.

Insights for policy development may include measures of the social and economic effects of natural disasters; data gaps in the understanding of such events; the appropriate spatial and temporal scales for analyses of disaster events; indicators of recovery; and, considerations of how to choose appropriate areas for both policy and regional funding in general.

## Conclusion

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This research proposal provides an approach to develop and illustrate an analytical framework for identifying and explaining vulnerabilities to regional supply chains and networks. One important task when planning in relation to value chains/networks is to identify the value-add nodes and the points of vulnerability along the chain (Fairbrother *et al.*, 2018). With this knowledge, it becomes possible to promote appropriate governance arrangements, facilitate the links and support to enhance the chains and identify where intervention may be necessary in relation to disruptions and pressure points. The outcomes will provide insights into the impact of major disruptions to production and markets, and thus policy guidance for the mitigation of such events.

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains and Natural Disasters**

**Report 5:**

**Understanding and Measuring Regional Economies: challenges  
and possibilities**

Marcus Banks and Peter Fairbrother

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Marcus Banks and Peter Fairbrother (2021) 'Understanding and Measuring Regional Economies: challenges and possibilities', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 5*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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When examining the impact of natural disasters at the regional level it is evident that the data limitations we encounter are not the only problem; a more comprehensive and dynamic understanding of the drivers of the economy is also required. We argue that a political economy approach is essential to adequately capture the complexities of a regional economy. The task is twofold: first, to have an economic approach which can identify, measure and value these drivers; and second, to understand how they may interact at a regional level. Analyses must include the centrality of the state as both an enabler and component of the processes driving value creation within and across supply chains and the broader regional economy.

Measuring is both a process and an activity. The meaning and act of understanding a regional economy by measurement and an identification of where value-add occurs is inherently comparative, contextual and social. In a social discipline such as economics, measuring is contested. The what, why and how of measurement are in dispute between orthodox, Keynesian and more critical economic theories. Research in this discipline initially emerged in the historical context of states seeking to interpret and generate data that was relevant to building a nationally competitive economy. Equally, in other disciplines such as sociology, the question of measurement is also contested (see Adkins and Lury, 2012).

This chapter briefly outlines what is entailed in such measurements from a political economy perspective (for a review of the classic views of the state and economy see Przeworski, 1990). The concept derives from a focus on space, quantity and capacity. It is central to applied research and understandings. To apply such an inclusive, socio-economic analysis, attention is drawn to how we are to measure those drivers—including their processes of valorisation. Our more critical approach—and the toolkit we will suggest for policymakers, employers, and other stakeholders – requires an understanding of ways of measuring and valuing a regional economy, such as Gippsland or South Western Australia.

We develop this analysis in four basic steps. First, we propose that regional economies thus should be understood in terms of the overall complexity of these relations (totality) rather than in terms of the separate dimensions that are usually seen as making up the economy (division). Moreover, these relationships are contradictory, and analysis should consider this dimension. Second, following on from point one we suggest that this focus allows us to consider the tensions and possibilities that arise when disaster and other such events take place. We propose an approach that is informed by an understanding that socio-economic forces define and focus activity as both social and place based. Third, we draw attention to the importance of the state in relation to regional (and national) economies. We provide an assessment of this analysis pointing to the ways in which the state is both an enabler and component of regional economies. Finally, we present a conclusion to the analysis.

## Understanding socio-economic relations: totality versus partiality

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Much economic research tends to investigate and evaluate the economy with a method that individualises and compartmentalises each ‘factor’ it identifies before working out how they may intersect with other items to create economic processes (see Milonakis and Fine, 2008). Human beings, for example, are construed as individual persons:

*...entities with a consciousness and (free) will, acting in the world and initiating certain processes—the circulation of capital, struggle for existence or search for love—driven by the rational pursuit of individual interests. For purposes of state administration, persons re construed as “things” with measurable attributes (Harvey, 2020: 105).*

Economic analyses using such an item-centred method are not equipped to recognise that *social relations* (and the institutions arising from these relations) are what fundamentally drives an economy (e.g., Swedberg, 2007).

Our systemic approach starts with *totality*—seeing economic and social life as intimately related. Understanding the economy begins with the overall circulation of value before examining each of the processes involved. The unit of analysis focuses on the socio-economic *relations* that underlie, constitute, produce and disrupt this flow of value. Production, distribution, exchange and consumption of goods and services are treated as fluid and contradictory ‘moments’ in the circulation and realisation of value as part of this whole.

Harvey describes these moments:

*At the outset, capital appears as money. The capitalist spends the money to buy commodities of equivalent value: labour power, machinery, semifinished products, energy and raw materials. At this second ‘moment’ in the circulation process, value resides (as does capital) in these various commodities, waiting to be incorporated in production. In the next ‘moment’, workers use their labour power, under the direction of the capitalist, to re-shape the raw materials and semi-finished products to make a new commodity. This labour process preserves and transfers the pre-existing values, of labour power and the means of production, into the new commodity and adds a surplus value to it. Value, then, is a social relation, which operates as an ‘invisible thread’ within the circulation of capital, which takes on different material forms as it circulates (Harvey, 2020: 101-102).*

In contrast, neoclassical economics, for example, tends to reduce the economy to a machine, as if it operates by a motor comprised of inputs and outputs powered by the energy of supply and demand. A value chain using this construct is considered a train track, where demand ‘signals’ distributed along the line determine what is produced and by how much. Chains are thus seen as linear—where the finish (demand) determines the start (supply).

This approach affirms Piero Sraffa’s famous proof in the 1960s that the value of outputs simply echoed the value of the inputs as determined by the value of the final product (Sraffa, 1960). Food and fibre value chains seem to confirm this proof, where major retailers such as Coles and Woolworths overwhelmingly determine farm-gate prices. But this assumption that the moments of production, distribution, exchange and consumption tend towards equilibrium tends to treat

disruption as external and asocial (Fine and Milonakis, 2012). Disasters and shocks to this machine-like system—such as bushfires, floods, mass unemployment, the Global Financial Crisis, the COVID-19 pandemic etc—are treated as abnormal, rather than endemic to the system (Callinicos, 2014).

Rather, the totality of the system's capacity to continually reproduce itself encompasses production and reproduction in the public sphere of all goods and services and circulation as well as reproduction in the 'private' sphere (McGregor, 2018). Here, a spatial understanding becomes crucial: that there are 'two separate but conjoined spaces—spaces of production of value (points of production) and spaces for reproduction of labour power' (Bhattacharya, 2017: 7).

The distinction between production and reproduction is critical. Brenner and Laslett (2017) expand on this insight to make a useful distinction between 'societal' (economic) and 'social' reproduction, with the latter referring to:

*The activities and attitudes, behaviours and emotions and responsibilities directly involved in maintaining life, on a daily basis and generationally. It involves various kinds of socially necessary work—mental, physical and emotional—aimed at providing the historically and socially, as well as biologically, defined means for maintaining and reproducing population. Among other things, social reproduction includes how food, clothing and shelter are made available for immediate consumption, how the maintenance and socialisation of children is accomplished, how care of the elderly and infirm is provided, and how sexuality is socially constructed (in Bhattacharya, 2017: 6-7).*

The point of this focus is that it is imperative that analysis not only considers the interrelationships that make up the economy in question, in this case a place-based economy defined geographically by a region, but *how* they interrelate. To do so, it is necessary to consider how production and reproduction relations continually constitute and disrupt the regional economy; otherwise the analysis is partial.

Socio-economic relationships are complex and inter-related. The problem that is addressed is how do we measure and understand the relationships that define regional value chains, which have been disrupted by natural disaster. Such events raise questions about the impact of disaster, what is the effect, why did it take a particular form and how can it be addressed? Not only is it important to consider how such impacts may be measured, what data is required and how might it be generated. It is also crucial to consider *how* we might explain and understand the processes we observe, in particular with reference to neoliberal forms of governance (see Gane, 2014).

For example, this more critical approach to processes draws attention to how the 'moments' or nodes in supply chains and networks can have contradictory impacts that disturb their assumed one-way demand-supply trajectory. As Harvey also observes, final consumption does not necessarily determine what is produced—in fact production can determine consumption:

*When China faced a collapse of its consumer export market to the United States in 2008, it immediately experienced a radical contraction in the realm of production with further devastating impacts upon the consumption of raw materials, as well as the diminishing final consumption of suddenly unemployed Chinese workers. The PRC saved its own economy as well as global capitalism by launching a vast programme of productive (not initially final) consumption through rapid urbanization and huge investments in the built*

*environment, which immediately produced its 'other' in the form of a massive expansion of final consumption. But in building some 20,000 miles of highspeed rail network in ten years, it had to create the consumption of rail travel to match, otherwise the production would come to naught. Most of the trains are now packed. China has produced new consumption as the 'other' of the production required to counter the collapse of its 'other'—consumer demand in the United States (Harvey, 2020: 112-113).*

Similarly, changes in productivity across value chain nodes and networks can have contradictory impacts. Milonakis and Fine (2008) contend that underlying economic and social processes undermine the generally accepted idea that, as productivity develops at different paces across the different sectors of the economy, profitability changes in favour of those performing better. They argue that productivity and corresponding price changes and movements of capital will have knock-on effects for the input costs of means of production and in the price of items of consumption.

These underlying processes are often mutually contradictory, as in the imperatives towards vertical integration and disintegration of capitalist production, for deskilling and reskilling of labour, and how productivity increases is experienced both as a *boost* to profitability in the form of lower production costs and as a *threat* to profitability in the form of more intensive competition for markets. They provide the foundation for measuring value creation and value capture (Lepak et al., 2007).

## The region: space and social relationships

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For most researchers, there are just two levels at which socio-economic processes operate and at which theoretical exposition is needed: the micro-level of individual households and firms, and the macro-level of nation states. These two levels constitute 'the economy'. However, the economy is innately geographical (Coe et al., 2007). Economic life is conducted and organised in and across space (local, regional, national and global). It is also a social phenomenon (Swedberg, 2007; see also Adkins and Lurie, 2012). Interests and social relations define and shape economic activity and processes.

This form of organisation has a crucial bearing on how the economy functions, on the performance of individual firms and on the welfare of individual households. A range of constructs/frameworks can be applied to apprehend and measure how the spatial influences firm, city and regional levels of productivity:

*It is not merely a case of recognising that the mechanisms of economic development, growth and welfare operate unevenly across space, but that those mechanisms are themselves spatially differentiated and in part geographically constituted; that is, determined by locally varying, scale-dependent social, cultural and institutional conditions (Martin, 1999).*

To illustrate, Sally Weller's useful analysis of the Latrobe Valley expands on Martin's observations:

*Critical geographers recognise that places and regions are shifting and temporary social constructs (Allen et al., 1998). Regional economies are not 'containers' of action but rather nodes in intersecting global flows of money, commodities, ideas and people (Amin and Thrift, 1992). What happens in places is a product of both their history and their geography, with geography understood relationally as a place's 'positionality' in power-laden regional, national and global dynamics (Sheppard, 2002). From this perspective, patterns of change and continuity arise from the tension between path-dependent place-based processes, which are the product of local histories, and the disruptive effects of external forces like changes in national policy or shifting climatic conditions (Weller, 2017: 384).*

The recognition of place provides an analytical leverage that allows the drivers of an economy to be identified. It also allows an assessment of the likely consequences of varied disaster events on a regional economy.

## Assessment: the state in and of the region

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The focus on natural disaster events and regional implications requires a consideration of the state and its role in relation to such occurrences. Relatively little attention has been given to the state as a constituent of the governance of regions as well as a component of regional economies. The structuring these relationships is not simple, straightforward or determinate but is the outcome of a complex set of concerns and activities that involve the various groupings that make up a region. To explore this feature of the modern state activity it is necessary to consider the multi-levelled nature of the arrangements that make up the Australian state: local, provincial (or State) level and national.

Three points can be made. First, at all levels the state comprises a set of relations and institutions. These features are complex and subject to a wide range of debate especially in recent times with the reconfiguration of state provision in the form of public services (see Whitfield, 2012 on the UK case, where this is especially advanced). Second, the assessment and evaluation of the regional economy in terms of the role of the state, as an economic facilitator and a component of the economy seldom has been examined.

More frequently both private and public services have been tied into together (e.g., for an economic analysis of services, see Kay et al., 2007). Third, with the long-term restructuring of the state sector involving privatisation, commercialisation and the development of marketized relations, it is necessary to contextualise regional economies, noting the ways in which the key private economic drivers, agriculture, manufacturing and tourism are part of a larger whole. The state remains a core component in sustaining the dynamics of economic and social reproduction. Prior to the pandemic, over 25% of the GDP was due to Australian Government expenditures. This proportion is estimated to increase to over 34% of GDP in 2020-2021 (Hawkins, 2020).

These features of the modern state raise difficult questions relating to measurement and the valorisation of regional economies. To explore these aspects, we present a brief analysis of the place of the state in the construction of regional economies, drawing attention to the dual role of the state, as a constituent player in regional economies as well as a component of these economies. Of note, it is necessary to keep in mind the ways in which state agencies develop approaches that often overlook this complexity, as suggested clearly evident in the case of natural disaster preparation and recovery (see Report 3).

### The scale and scope of public services

A central purpose of the state providing social security, health and education is to sustainably reproduce a workforce that has the socially necessary attributes, knowledge, skills, fitness and work-readiness to productively engage in work. Social security payments are by far the largest component of these expenditures (Klapdor, 2020). Social security systems play a key role in sustaining working populations in labour markets. Family Tax Benefit and childcare payments are designed to strengthen a productive relationship between employees and employers by increasing labour utilisation rates (Martin, 2004; Productivity Commission, 2015).

Income support payments (such as JobSeeker Allowance and Parenting Payment) not only provide social insurance during periods of unemployment but also facilitate the increasing demand for casual and part-time workers. Work-and-welfare is the norm for nearly 450,000

underemployed Australians, with 12% of the part-time workforce estimated to be receiving an income support payment in June 2016 (Whiteford and Heron, 2018).

Competition between nation states to support local businesses lies at the economic heart of these provisions. For example, the significant increases in Family Tax Benefit during the previous Howard Government can be understood through this lens of international competition. At stake was the competitive disadvantage the Australian economy faced in the relatively low employment rates among women caring for young children. In 2002, employment rates for Australian women with children under 6 years was 50%—a significant 9% less than the OECD average employment rate (ABS, 2007).

*Such seemingly minor differences had vital economic ramifications. Each percentage point gap in participation rates seriously weakened the competitive capacity of Australian capitalism. Kay Patterson, a FaCS Minister under the Howard Government, claimed that by raising the overall participation rate by 2 per cent, national output would be increased by 9 per cent (Patterson, 2003). A more sober Productivity Commission report {Abhayaratna, 2006 #1274: 72} estimated that such a rate increase would add 1.75 per cent to GDP per capita (Banks, 2011: 148-149).*

The range, quantity and quality of state social expenditures also, of course, impact households. In their report on the Welsh economy, Earle and colleagues identify two types of 'foundational' social provisions household rely upon (Earle et al., 2017). On what they call the demand side are the quantity and quality of services such as income maintenance, health services and care, schooling, retail banking and supermarkets. On the 'supply' side are basic material systems 'which makes everyday life possible, safe and civilised' (p.16). It includes: '...utility networks of pipes and cable, railway lines and tarmac roads, housing (private and social), retail banking and food supply through chain distribution and branches' (p.17). They estimate that this denoted zone of (private and public) goods and services typically employ 40-45% of the workforce in the various regional economic areas of Wales (p.15).

In their earlier report, many of the same authors draw upon these insights to argue for a different way to measure the Welsh economy:

*...the WG [Wales Government] needs new metrics and a multi-indicator economic and social "dashboard" approach to welfare. This would incidentally shift the focus away from consumption spend which in the UK drives GDP growth. It would ensure a much clearer focus on deficiencies in the provision of foundational goods and services for all the population (housing, transport and utility supply, health, education, care and food) (Brill et al., 2015).*

The problem of measurement is a common issue and is more than data availability; attention also should be drawn to the ways in which we use and interpret data.

## The significance of public procurement

In Australia, the national and state taxation systems mainly fund government provision of social services such as income support, housing, education and health. However, procurement by governments at the regional, state and national level of goods, services and works also have a major economic impact. Mupanemunda's recent report on social procurement to the Victorian Government notes that:

*Every year across OECD member states, public procurement accounts for almost 30 per cent of government spending, representing on average 12 per cent of GDP. Given its significance, public procurement can play a major market-influencing role through the process of social procurement. It does this in two ways:*

1. *by stimulating the large-scale production and consumption of goods, services and works that are ecologically and socially conscious; and*
2. *by creating employment opportunities for jobseekers experiencing disadvantage* (Mupanemunda, 2020: 1).

Most governments and public agencies have agreed for the last 10 years that integrating social value considerations into their procurement processes will help generate strong social, economic or environmental impacts for communities. For example, in 2010, the Victorian Government published a typical social procurement guide and toolkit (DPCD, 2010). Benefits were listed:

- Local sustainability
  - Strengthening the local economy and ensuring its financial and environmental sustainability
- Social inclusion
  - Promoting openness and equal opportunity for disadvantaged and vulnerable community groups
  - Building social capital in the community
- Employment and training
  - Creating local employment opportunities through clauses and specifications in council contracts
  - Developing practical training to build long-term employment opportunities
- Diversity and equality
  - Ensuring all businesses have the same opportunity to tender for council contracts
  - Ensuring that the supply markets around essential and key services for council remains diverse and vibrant
  - Ensuring that local suppliers such as small to medium-sized enterprises (SMEs), social enterprises and Indigenous businesses are well-positioned to prosper in the local economy
- Service innovation
  - Fostering a new social economy, addressing service gaps by piloting joint ventures between councils and external partners
- Fair trade
  - Purchasing ethical and fair trade goods to support equitable local, national and international trade
  - Ensuring council supply chains adhere to local, national and international labour standards.

At first glance, this is a commendable list of policies. However, Hebb (2017: 4) argues that 'few engage in measuring and evaluating the outcomes and impacts of their SVP [Social Value Procurement] policies and programs'. Hebb identifies two key reasons hampering these authorities: the resource burden to conduct such measurements; and an 'interpretation challenge' due to a lack of a clear and workable definition of social value that would allow for assessments of value for money (Hebb et al., 2017: 4). Hebb calls for advanced toolkits and frameworks which use more sophisticated on-line platforms for shareable, cross-sector, data collection and analysis (p.5).

## The opaqueness of the state

The challenge facing policy makers in regional policy elaboration, especially in relation to natural disaster events is to develop robust and informed initiatives to address the consequences of such events. This step requires an understanding of the relationships that make up a regional economy as well as the ways in which value capture matters. As noted, relatively little attention has been given to the state as a constituent of the governance of regions as well as a component of regional economies. This neglect is consequential for regional futures and prosperity.

Hence, the processes of data capture, data categorisation and data analysis matter. Additionally, it is consequential for policy formulation if the comprehensive basis in which value is generated and deployed is not acknowledged. The danger is a partiality in response to such as disaster events; the promise is that policy can be developed and focused in ways that enable recovery and possible future avoidance of the worst impacts of such events.

## Conclusion

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Measuring the open-ended economic dynamics of a region firstly requires identifying basic systemic processes—primarily the social relations of land, labour, capital and the state. By then employing these processes, the totality of social, political, material, historical and spatial relations coursing through regional economies provides the foundation for an informed and comprehensive analysis of regional economies. The challenge is to generate the data that allows the analysis to be developed.

This political economy assessment of a region recognises that the dynamics of labour markets, for example, cannot be reduced to the classical economic criteria of supply and demand. Approaching an analysis in terms of this criteria fails to recognise how ‘the inextricably human aspect of the wage relation’ structures and differentiates labour markets (Saad-Filho, 2000: : 212). Labour markets are situated within—and rely upon—people’s overall social, economic, political and cultural relationships. While increasingly connected to other markets (through regional, national and international value chains/networks) each local labour market functions through a specific set of socio-economic relations that need to be sustained and reproduced.

Sustainable production over time (reproduction) necessarily extends well beyond the workplace requirement to replace worn out capital or workers. The workforce itself also needs to be trained, maintained and reproduced in ways that meet the changing needs of the workplace and people’s lives. The human benefits accruing from decent health, education and welfare systems are equally basic preconditions for a thriving economy.

Applying such an approach will identify the spatiality of socio-economic relations: which tend to be locally clustered within a region, which relations extend across a group of regions, and which are found to be more significantly conditioned by state, national or global socio-economic dynamics. We anticipate that scoping the spatiality of these value relations will challenge current approaches that inappropriately equate a political region (primarily Local Government Areas) as an economic region.

These considerations raise the question of how to measure value creation and value capture (Lepak and others, 2007). The task is to identify the what, the why and the how of measurement. This task will be achieved by developing a methodological toolbox incorporating the following dimensions.

1. Economic activity is both socially defined and place based.
2. To meaningfully identify the values flowing from specific economic activities, these values are situated within the totality of the economic activity.
3. Value is constantly in movement and thus moments in value creation are contradictory – disrupting and even destroying value, disturbing temporal and spatial dynamics. Economic shocks such as disease, climate events and recessions are endemic to the system rather than outliers.
4. The state is not simply a facilitator of economic activity but a crucial component of value creation.

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**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains and Natural Disasters**

**Report 6:**

**Measuring the Regional Effects of Disaster Events**

Phillip Toner, Peter Fairbrother and Marcus Banks

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Phillip Toner, Peter Fairbrother and Marcus Banks (2021) 'Measuring the Regional Effects of Disaster Events', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 6*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Introduction

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The purpose of the report is to assess and evaluate available measurements of the impact of disaster events at a subnational regional level. As indicated in other reports (particularly Report 4 and 5) we approach this task via a developed a political economy understanding which captures the complexities of a regional economy. We first propose an economically focused approach which potentially can identify, measure and value these drivers; and second, we suggest that the critical next step is to investigate how they may interact at a regional level, drawing attention to the state as both an enabler and component of the processes driving value creation within and across supply chains and the broader regional economy. Nonetheless the first step is to measure the economic impacts and this report seeks to explore the possibilities and limitations of this first step.

The report comprises an evaluative account of methods used by the Australian Bureau of Statistics and other agencies to estimate the economic contribution of tourism and agriculture at a national and regional level. In this respect, we evaluate the reliability of these methods in providing broad estimates of the regional impact of natural disasters, such as bushfires. The report is divided into three parts. In Part One an account is presented of the regional tourist production networks that define this sector. It comprises an outline for the sector, what is known and do not know about it. In Part Two, we present a similar account for regional agricultural value chains. In each case we present a detailed case, to draw attention to the processes at work in regions. Part Three, concludes the chapter with an account of the methodological and evaluative questions posed by this analysis.

## Part 1: Regional Tourism Data

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Despite these major limitations the Australian Bureau of Statistics uses numerous methods including surveys of households, individuals and businesses and adapting administrative data collected by many different government agencies to compile extensive datasets that provide a partial assessment of regional economic impacts of changes to regional supply and demand relationships. ABS (2020c) provide regional data mostly based on population Census data on Demography, Migration, Employment by Industry; Construction Activity; Income; Education; Health & Disability and Land Use. The data is available at an LGA and Statistical Area 2,3 and 4. The scope of this data collection is large but, crucially, is not sufficient to fully redress the methodological problems identified earlier. The following briefly describes some of the data collection methods for tourism and agriculture and how they can be used to assess changes in supply and/or demand at a regional level due to certain natural disasters.

The first point to note is that 'tourism' is not an industry as defined within standard industrial classifications used by the Australian Bureau of Statistics (ABS). As noted:

*...tourism is not identified as an industry or product in international statistical standards...industries are defined based on the goods and services which they mainly produce. On the other hand, the tourism industry is defined according to the status of the consumer. That is, it is the characteristics of the consumer that determine whether the production is included within the scope of tourism. (ABS 2020b: Explanatory Notes).*

Nevertheless, the value of tourism on national and regional levels can be estimated by measuring what proportion of the output of all domestic industries is used to directly meet the demand of 'visitors', as tourists are officially termed. Further, the 'indirect' demand of industries that supply these tourism industries can also be estimated—by using national input-output tables as explained further below.

## Available regional tourism data

Data on the regional location, volume and composition of tourists' expenditure across various industries and products and data on the duration of visits are derived from annual surveys of domestic and international tourists conducted by Tourism Research Australia (2020). Surveys of domestic tourists comprise annual telephone interviews with 120,000 Australian resident respondents aged 15 years and over and entails over 70 questions relating to all aspects of their domestic tourist activities in the preceding year. The international tourist survey samples 40,000 departing, short-term international travellers aged 15 years and over at airports who have been visiting Australia and comprises over 100 questions relating to their tourist activities within Australia. This data is also used to determine the impact of visitor activity on economic activity and employment, though Tourism Research Australia supplements this survey data with other model-based approach approaches, to allocate visitors' spending across Australia (<https://www.tra.gov.au/about-us/methodology/regional-expenditure>).

It is important to note that the TRA data should be regarded as the prime data source on tourism activity at both a national and regional level. Data on the impact of tourism is published by Tourism Research Australia at a national, state and regional level with the latter available at either a 'tourism region' ([https://www.tra.gov.au/tra/2016/Tourism\\_Region\\_Profiles/Region\\_profiles/index.html](https://www.tra.gov.au/tra/2016/Tourism_Region_Profiles/Region_profiles/index.html)) or Local Government Area (<https://www.tra.gov.au/Regional/local-government-area-profiles>). A tourism region is defined by the TRA in consultation with national and state/territory tourism organisations. Each tourism region is constructed from aggregations of whole Statistical Area Level 2s (SA2s). There are 77 tourism regions across Australia (<https://www.tra.gov.au/regional/tourism-regions/tourism-regions>). However, it is important to note that the scope of data provided by TRA at an LGA and tourism region level are quite different, though complementary.<sup>1</sup> Both datasets provide annual time series from 2006-07 to 2018-19.

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<sup>1</sup> The LGA data includes for example tourism expenditure; number and size (employees) of tourism businesses; domestic and international tourists and daily spending (<https://www.tra.gov.au/Regional/local-government-area-profiles>). Tourism region data includes for example, number of overnight visitors; visitor/population ratio; accommodation (rooms, occupancy and RevPAR); aviation (seats available and seat utilisation); tourism businesses and Tourism investment (projects and value). ([https://www.tra.gov.au/tra/2016/Tourism\\_Region\\_Profiles/Region\\_profiles/index.html#](https://www.tra.gov.au/tra/2016/Tourism_Region_Profiles/Region_profiles/index.html#)).

## Direct and indirect effects of tourism

The key data of interest for determining regional impact of changes to tourism activity generated by TRA are direct and indirect tourism output and employment. The procedure for estimating these regional impacts is as follows. First, the detailed surveys of tourist expenditure are used to determine what products and industries supply inputs directly to tourists and the value of tourist's expenditure. Second, the total output of these products and industries in Australia is known from other national and state-based ABS surveys permitting an estimate to be made of the proportion of this output that is consumed by tourists. Finally, the ratios of industry output consumed by tourists is applied to employment data by industry to determine the numbers of persons across different industries reliant on demand from tourists and who can therefore be classified as employed in the 'tourist' industry' (Tourism Research Australia 2014: 12). Specifically, the TRA:

*...measures direct tourism employment by applying the tourism GVA ratio in the benchmark year to the ABS Labour Force Survey estimates for tourism-related industries in subsequent years. This method assumes that the employment generated by tourism is directly proportional to the 'value added' generated by tourism in the benchmark year. While this might not be strictly accurate, the method provides a way of apportioning total industry employment between servicing demands of visitors and non-visitors. (TRA 2014: 21).*

Because expenditure by tourists affects not just tourism industries and products but cascades through the entire economy, as indeed does change to any industry's demand and supply conditions, the TRA calculates both direct and indirect effects of tourist activity, including at a regional level. 'Using the direct tourism contribution alone will under-estimate the total contribution of tourism to the economy. In order to account for tourism's contribution correctly, the consumption of...direct and...indirect tourism output are combined to calculate the flow-on effects...The flow-on or 'indirect' effects are the changes in supply that result from spending of the tourism industry's receipts on goods and services from other industries. For example, when a visitor purchases a meal from a hotel:

- the hotel purchases vegetables and meat from a food supplier
- the food supplier purchases these from a farming company
- the farming company 'purchases' labour and transport to deliver the produce to market' (Tourism Research Australia 2014: 2).

These indirect effects are identified through national input-output tables which record intra and industry flows of goods and services and allow the calculation of output and employment multipliers which quantify the additional output and employment created in other industries from an initial expansion in output a given industry. TRA in effect assumes these national multipliers apply at a regional level. As a broad generalisation the TRA analysis finds that a \$1 direct expansion in the output of the tourist industry produces approximately a \$1 expansion indirectly in many other industries (The output multiplier is thus 2, comprised of \$1 directly and \$1 indirectly). The most important direct industries supported by tourism are, as expected accommodation, food and beverage, transport, retail and education and training. (The latter due to the many short-term overseas students). These account for around 70% of total direct tourism expenditure (Tourism Research Australia 2014: 5). The most important indirect industries include manufacturing (such as food processing); professional, scientific and technical services (proving

accounting and computer services to tourism businesses); finance/insurance, agriculture and wholesale, account for around 80% of indirect output.

Whilst direct and indirect effects of tourism activity on output are roughly similar a different relation holds for direct and indirect employment. For every job generated directly in tourism .66 of a job is generated indirectly. This is 'largely due to tourism being more labour intensive than many other industries' (Tourism Research Australia 2014: 10). As expected, a similar range of industries to those for tourism output accounted for most of the tourism employment directly and indirectly.

## Regional impact of a change in tourism demand: an example

An examination of TRA data revealed that there was little variation in the composition of tourist expenditure outside of the major capital cities so that for example, the types of output and employment generated per unit tourist expenditure on tourism across the region did not vary greatly. In all cases the largest components are accommodation, food and beverage, transport and retail. The implication is that the key variable of interest in determining the effect of changes in tourism induced by natural disasters will be changes in the volume of tourist expenditure over time as differences in the composition of tourist expenditure across regions will have a minor effect on output and employment.

In addition, it was found there is a lack of correspondence between disaggregated TRA employment and output estimates at an industry level and ABS data. Specifically, there are large differences within the same regions between TRA employment estimates and ABS Population Census data on employment.<sup>2</sup> The latter is regarded as the most accurate since it uses a complete enumeration of residents and does not rely, as TRA does, on multiple assumptions to compile estimates.

Finally, the TRA data confirms the problem identified earlier of obtaining data for small or specific regions to determine the impact of natural disasters. TRA 'tourism region' geographic boundaries are quite aggregated so that there are 77 of these regions Australia-wide compared to 358 SA3 regions and 2310 SA2 regions. The effect is that only one of the four regions selected for analysis matches a TRA tourism region (The Lakes).<sup>3</sup> Aside from The Lakes it was found the TRA tourism regions are too large to provide the small area data that are necessary to determine the impact of natural disasters.

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<sup>2</sup> Because TRA employment data is a direct function of TRA tourism output estimates it follows that the lack of correspondence between ABS and TRA employment data is caused either by issues with its estimates of regional tourist output (or equivalently, tourist expenditure data) and/or its method for apportioning the number of direct and indirect jobs created by tourist expenditure.

<sup>3</sup> For example, Manjimup (SA2) is aggregated into one of 30 other SA2 regions comprising the what the TRA term Australia's South West (<https://www.tra.gov.au/Regional/tourism-regions>). Esperance (SA2) is but one of eighteen SA2 regions in the TRA's Australia's Golden Outback. Colac-Corangamite (SA3) is composed of five SA2's but these comprise only one-third of the 15 SA2's within the tourism region of Great Ocean Road.

At a regional level especially TRA data should be used as broadly indicative of a change in output and employment in the overall tourism industry that may be caused by a natural disaster. It should not be viewed as providing a precise measure of employment and output effects in specific industries or in aggregate induced by a natural disaster. Given these reservations regarding the reliability of tourist employment and output estimates it was deemed appropriate to limit the study of tourism to one region, the tourist region around Lakes Entrance in Victoria, the Lakes region.

## The Lakes Tourism Region

The Lakes tourism region is comprised of five SA2 regions and constitutes the SA3 region of East Gippsland.<sup>4</sup> In January-February 2014 East Gippsland, which encompasses the TRA Lakes Tourism region, experienced a severe bushfire (<https://www.abc.net.au/news/2014-01-22/bushfires-still-burning-in-east-gippsland/5212374>). The local member for the region noted that:

*...this is a vast fire. It is in the order of 130,000 hectares...It is the biggest fire we have seen in Victoria for quite some time and it will require a substantial amount of rain to extinguish it completely. The people in that community have been on high alert now for three or four weeks and the stress on families is genuine.*  
(<https://darrenchester.com.au/gippsland-bushfires-2014/>)

The same bushfire also caused brown coal deposits in Moe to ignite and caused severe health effects for residents. Tables 1 and 2 present TRA tourism data on direct and indirect output and employment within the region. (Note that direct value added, and employment is economic activity and jobs generated *within* the Lakes region and indirect is economic activity mostly generated *outside* of the region).

Table 1: Tourism Gross value added. Direct and Indirect (\$m) basic prices\*, Lakes Tourism Region. Victoria. 2006-07 to 2018-19

	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	% Δ
Direct \$m.	94	109	96	118	128	121	150	137	124	124	125	146	149	
Annual % change		16%	-12%	23%	8%	-6%	24%	-8%	-10%	0%	0%	17%	2%	3.6%
Indirect \$m.	98	111	94	120	131	118	149	134	117	116	115	136	134	
Annual % change		13%	-16%	28%	9%	-10%	27%	-10%	-13%	-1%	-1%	18%	-1%	2.4%

Source: <https://www.tra.gov.au/Economic-analysis/Economic-Value/Regional-Tourism-Satellite-Account/regional-tourism-satellite-account> \*Direct tourism gross value added is the value of direct tourism output at basic prices, less the value of the inputs used in producing these tourism products. This measure is directly comparable with the value added of 'conventional' industries such as mining and manufacturing.

<sup>4</sup> Alps-East, Bairnsdale, Bruthen-Omeo, Lake King, Lakes Entrance, Orbost and Paynesville

Table 2: Direct and Indirect Tourism Employment. ('000). Lakes Tourism Region. Victoria

	06-07	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16	16-17	17-18	18-19	CAGR
Direct	2.9	3.2	2.8	3.4	3.7	3.2	3.9	3.5	3.2	3.1	3.1	3.6	3.4	
Annual % change		10%	-12%	23%	10%	-15%	24%	-13%	-8%	-3%	1%	16%	-6%	1.3%
Indirect	0.6	0.7	0.6	0.8	0.8	0.7	0.9	0.9	0.7	0.7	0.7	0.9	0.9	
Annual % change		12%	-15%	27%	11%	-10%	26%	-9%	-13%	0%	-1%	20%	-2%	2.6%

Source: <https://www.tra.gov.au/Economic-analysis/Economic-Value/Regional-Tourism-Satellite-Account/regional-tourism-satellite-account>

The main points from tables 1 and 2 are that:

- Tourist activity is quite volatile within considerable variation in value added from year to year. The direct and indirect output trends are quite similar. Over the 13 years the compound average annual rate of output growth was 3.6%.
- The data appears to show a quite strong effect of the bushfires on direct tourist output in the region as value added falls by 10% in 2013-14 over the previous year, with another fall of 8% in 2014-15 followed by two years of no growth in output. From the peak in output in 2012-13 to the trough two years later output fell by 17%. There is a strong recovery in the following two years to 2018-19.
- In 2019-19 direct tourism employment was 3,400, which represents around 22% of the total Lakes region workforce (ABS 2019)
- Employment follows a similar trend to output with employment falling by 21% between the peak in 2012-13 a trough in 2015-16
- The recovery in employment was not as rapid as for output resulting in a much lower compound average annual rate of 1.3%
- Around 900 jobs are generated indirectly distributed within the Lakes Tourism region but mostly across Australia.

TRA also provide a detailed distribution of direct tourist employment by industry by region. Table 3 shows that employment is highly concentrated in just three industries which account for 81% of total direct employment in The Lakes region. These industries are Cafes, restaurants and takeaway food services (39%); Accommodation (23%); Retail (11%) and Clubs, pubs, taverns and bars (8%).

Table 3: 2018-19 Tourism Detailed Industry of Direct Employment 2018-19. Lakes Region

<b>Tourism industries</b>	Direct Tourism Jobs	Share of Total Direct Tourism Jobs
Accommodation	776	23%
Cafes, restaurants and takeaway food services	1,322	39%
Clubs, pubs, taverns and bars	278	8%
Rail transport	3	0%
Road transport and transport equipment rental	98	3%
Air, water and other transport	151	4%
Travel agency and tour operator services	142	4%
Cultural services	89	3%
Casinos and other gambling services	4	0%
Other sports and recreation services	72	2%
Retail trade	361	11%
Education and training	64	2%
All other industries	55	2%
<b>Total</b>	<b>3,415</b>	<b>100%</b>

Source: <https://www.tra.gov.au/Economic-analysis/Economic-Value/Regional-Tourism-Satellite-Account/regional-tourism-satellite-account>

An important finding of this study is that there is a lack of correspondence in many of the TRA estimates of direct employment in 2018-19 and the ABS Population Census data for 2016 that cannot be plausibly accounted for by a 2-year difference between the ABS Census and TRA estimates. Of note, the TRA estimates of direct regional tourism employment by industry should in all instances be smaller than for the Census since tourism expenditure accounts for only a small proportion of total expenditure on the industries in the region. In several key tourist industries, the ratio of direct tourism employment to the Census estimate is larger than 1. This is an implausible result. For example, TRA estimate 776 jobs in Accommodation due to demand for tourism, but the ABS Census estimates that just 462 persons were employed in this industry in total. Similarly, the estimate of the number of tourist related jobs created in cafes, restaurants and takeaway food services is over two times the total number of jobs in the region in this industry.

Table 4: Comparison of TRA Direct Tourism Employment Estimates (2018-19) and ABS Census Data Total Industry Employment (2016) Lakes Region

<b>Tourism industries</b>	Direct Tourism Jobs	Census*	Ratio of Direct to Census
Accommodation	776	462	1.68
Cafes, restaurants and takeaway food services	1,322	649	2.04
Clubs, pubs, taverns and bars	278	303	0.92
Rail transport	3	11	0.29
Road transport and transport equipment rental	98	7	14.06
Air, water and other transport	151	63	2.40
Travel agency and tour operator services	142	28	5.07
Cultural services	89	208	0.43
Casinos and other gambling services	4	5	0.84
Other sports and recreation services	72	169	0.42
Retail trade	361	1879	0.19
Education and training	64	1422	0.05
All other industries	55	10529	0.01
<b>Total</b>	<b>3,415</b>	<b>15735</b>	<b>0.22</b>

Source: <https://www.tra.gov.au/Economic-analysis/Economic-Value/Regional-Tourism-Satellite-Account/regional-tourism-satellite-account> and ABS (2019).

Note: \*Employment is based on Place of Work as this is a more accurate measure of how economic activity within a region generates jobs within the region. This is conceptually consistent with the TRA method which is to measure tourist jobs created within a given region. The alternative Census measure is Place of Residence of employed workers, but this captures workers who can either reside and work in the same region or reside in the region but work in a different region.

There is a similar lack of correspondence between the TRA estimates and other ABS data compiled in the Regional Data series (ABS 2020c). The latter uses ABS and a variety of sources such as Tax Office, Education and Social Security Departments and Local Government to compile a very broad range of statistics at a small area level (SA2). An example of this lack of correspondence between the peak of employment of tourism in the region is that in 2012-13 tourism employment fell by 800 or 21%. However, ABS Regional data on employment in key tourist industries Accommodation and food services increased by 10% over the same period. According to TRA data this industry accounts for around 70% of total tourism in The Lakes region. It is necessary to note that the TRA employment estimates are based on the ABS Labor Force publication in which employment is based on the concept of the 'main job' held by the worker. However, the ABS Regional Data is based on the concept of 'number of jobs' which includes multiple job holdings. Thus, the number of total jobs in the latter will be greater than in the former as many workers are engaged in multiple jobs. Moreover, overall employment

increased in 2014 rather than declined as would be expected (ABS 2020c). It is the case however, that the ABS Regional Data does show a small overall fall in employment between the peak in 2013 and 2017, which could be interpreted as being 'consistent' with the TRA data but, problematically, this fall is accounted for mostly by industries such as Construction, Public Administration and Professional and Scientific Services which are not important in the TRA measure of direct tourism employment.

## Tourism data and natural disasters: Conclusion

The TRA data is useful in identifying what industries are likely to be affected by a natural disaster that reduces the output of the tourist industry, but much less useful in quantifying, with any precision, the flow-on impacts of a natural disaster on regional output and employment. The main reasons for this relate to the methods TRA is required to use to derive its estimates as these are based on surveys of tourist spending by region and an aggregated input-output model of supply and demand relationships across industries at a national level. These input-out relationships do not hold at a regional level, or at least do not hold with accuracy.

There are, however, major problems with developing alternative quantitative approaches. For example, the most accurate and detailed regional employment data is provided in the five-year Population Census. This is ideal for identifying regional changes in employment, but it does not measure value of output. Census data to be supplemented with ABS Regional Data which provides for example very comprehensive data and can tell a fuller story but even here the data is collected at a quite aggregated industry level (typically broad categories like agriculture or manufacturing) reducing its usefulness for charting the flow-on effects of changes in the output of one industry on others.

If the objective is to gather intelligence on the effect of a natural disaster on the specific region and the industries within it is recommended that a hybrid approach be employed. This approach would use aggregate models, such as the one used by TRA to identify the probable inter-industry chain of causation or what industries are likely to be affected by a change in the output of other industries. A second step would be to supplement this with data such as the ABS Regional series as this provides useful information at frequent intervals, sometimes even quarterly. But due to the idiosyncratic structure of many regional economies and the unpredictable chains of inter-industry causation that a natural disaster can give rise to (a bushfire giving rise to a construction or population boom) more targeted small area data collection methods could be employed. To assess the specific and detailed effects of a natural disaster at a small area level also requires labour intensive research methods such as telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries. Such an approach should be longitudinal to capture adjustment over time. This hybrid approach (outlined in Part Three) is useful in combining both quantitative and qualitative research methods.

## Part Two: Agriculture

There is no equivalent to the Tourism Australia data for agriculture in Australia. Accordingly, a different, but related, approach must be employed in applying mainstream quantitative approaches to estimating the impact of changes to agricultural output on inter-industry output and employment at a regional level. The approach adopted here entails first, identifying the value of agricultural output for a region for a given year; second, using Australian input-output data to identify the inter-industry supply and demand relationship of agriculture with other industries and finally, identifying the effects of a change in the output of agriculture on output and employment in other industries at a regional level. The purpose of this section is to describe this method, provide examples of its application and assess its utility for the purpose of quantifying the impact of natural disasters on regional economies.

This method closely replicates the approach of Tourism Australia but has the advantage of making the approach more transparent for the reader by detailing the methods and data used and, importantly, makes clear the uses and limitations of this method. To anticipate the results, the same overall conclusion that applied to the TRA data also holds for the agricultural data. The quantitative approach does not produce reliable estimates of inter-industry impacts following a change in agricultural output at a regional level but, nevertheless, the results are useful in identifying, as it were, 'where to look' for industries and jobs that are likely to be affected by such a change.

Four regions were selected for analysis, Gippsland-East (SA3), Colac-Corangamite (SA3), Manjimup (SA2) and Esperance (SA2). Overall, these regions have different agricultural specialisations and obviously different locations across Australia.

### Regional agriculture, employment and Input-Output structure data

Data on regional agricultural output in dollar value terms by broad commodity type at a disaggregated regional level is published annually by the ABS (2017) in *Value of Agricultural Commodities Produced, Australia*. Employment in agriculture in the four regions was derived from the ABS *Population Census 2016* using the Place of Work variable for regional employment. The input-output structure of the aggregate national agriculture industry is given in ABS (2018) *Australian National Accounts: Input-Output Tables 2015-16*. Employment in total Australian agriculture and the industries that supply inputs into the agricultural sector at a national level is derived from the ABS (2020d) *Australian Labour Force*. (Since most industries supply their output to multiple industries it is assumed that the level of employment in the supplying industry corresponds to the industry's share of total output used by the agricultural industry).

Basic data on employment and output in agriculture and total employment in the four regions is given in Table 5. A notable result is the enormous variation in agricultural employment per dollar of agricultural output. In the case of Manjimup and Esperance both suffered bushfires in 2015 and floods in 2016. One factor behind the very large differences in output per worker is that employment levels in agriculture are much less responsive to changes in output compared to other industries.

Table 5: Output and Employment. Selected Regions. 2015-16

	Gross Value of Agricultural Production (\$m)	Employment		\$ per Agriculture Job	Agriculture Jobs as % of Total Jobs
		Agriculture	Total		
Gippsland-East (SA3)	\$269.4	1411	15731	\$190,928	9%
Colac-Corangamite (SA3)	\$1,007.1	3399	16478	\$296,293	21%
Manjimup (SA2)	\$59.5	1906	8574	\$31,217	22%
Esperance (SA2)	\$52.3	1257	6954	\$41,607	18%

Source: ABS Population Census 2016 and ABS (2017) in *Value of Agricultural Commodities Produced, Australia*

The largest occupational group employed in agriculture is Managers, comprising mostly owner-managers, and these continue to remain 'employed' even when output falls dramatically, say due to drought or bushfire. By way of comparison, total Australian agricultural output per employee in 2015-16 was \$186,000, based on the ABS estimate of total agricultural output for that year and the ABS Labour Force estimate for total employment in agriculture. In other words, agriculture has a low elasticity of employment with respect to output compared to other industries (Kapsos 2005).

## Modelling regional employment in agriculture and related industries

The first task is to identify what industries will be affected by a change in the level of agricultural output in these regions. Column 1 in Appendix Table 9 shows the proportion of inputs from all industries used by agriculture. Column 2 shows for each industry that supplies these inputs what share of its total output (total supply) is consumed by agriculture.

Column 1 reveals that agriculture purchases inputs from many industries, though no one industry contributes more than 12% to total purchases of inputs from other industries. The most important supplying industry is Agriculture, Forestry and Fishing Support Services. Petroleum and Coal Product Manufacturing (mostly petrol and diesel) accounts for 2% of total purchases from other industries and Wholesale (hardware etc) accounts for 8%.

Column 2 reveals that agriculture consumes 5% of the total output of the Wholesale industry across Australia. Applying these ratios to agriculture in Colac-Corangamite indicates that agriculture contributed 16 of the 321 wholesale industry jobs in 2016. (It follows that a one third increase or decrease in the output of agriculture in the region would require a direct change in wholesale employment of around 5.3 jobs).

The second task is to test the validity of using these methods on a regional level. This is done by comparing the actual level of employment in a given industry taken from the 2016 Population Census with the level of employment predicted by using the Australian ratio of output to employment in a given industry and applying this to the known level of output in a given region. This is, in essence, the logic of applying input-output techniques to regional economies and

labour markets adopted by TRA earlier and used by many governments and regional economic consulting firms. This method of applying national level ratios of industry output and employment to regional output data is known in input-out terms as 'direct' effect of a change in output, Input-output also calculates the 'indirect' or flow-on effects of the initial change in output via 'multipliers'. TRA employed these indirect effects in its estimates of tourism regional employment, but this complication is not examined here. Using direct and indirect (multiplier) methods would further exaggerate the over-estimate of employment and only marginally improve the under-estimates. Two examples are given: first agricultural employment as a whole and second, an important industry within the agriculture industry Agriculture, Forestry and Fishing Support Services.

Table 6 records the actual and predicted level of employment in agriculture based on the level of agricultural output in each region. Only for Gippsland-East does the model predict with any accuracy the level of employment.

Table 6: Difference between actual and estimated total agricultural regional employment. 2016

	Actual Agriculture Jobs (Census data)	Estimated Agricultural Jobs	Ratio of Estimated to Actual
Gippsland-East (SA3)	1411	1448	1.026351
Colac-Corongamite (SA3)	3399	54145	1.592747
Manjimup (SA2)	1906	320	0.167811
Esperance (SA2)	1257	281	0.223662

For Colac-Corongamite the model *over-estimates* the number of agricultural jobs 1.6 times the actual figure. In Manjimup and Esperance, the model *under-estimates* the number of agricultural jobs by a factor of 6 and 5, respectively.

In 2016 total Australian employment in the Agriculture, Forestry and Fishing Support Services industry was 20,800. Total agricultural output in the same year was \$56bn and importantly, almost the entire output of this industry (94%) was consumed by agriculture. Thus, one job in the Support Services industry is generated for every \$2.69m of gross output in agriculture. Table 7 records the actual and predicted level of employment of this industry in each of the four regions. Again, there are large differences between the actual and predicted level of employment; and again, the model either over-estimates or under-estimates the number of jobs compared to the actual.

For example, given agricultural output of \$1.007bn in Colac-Corongamite in 2016 this predicts that total employment in the Agriculture, Forestry and Fishing Support Services industry is 374. The actual level of employment in this industry in 2016 was 138. The model over-estimated the number of persons employed 2.7 times. The reasons for such a large discrepancy will be examined in more detail below but a key factor is that output per person employed in agriculture in Colac-Corongamite is substantially above that for Australia as a whole. Conversely, total agricultural output in Manjimup in 2016 was just \$60m. The model predicts just 22 persons employed in Agriculture, Forestry and Fishing Support Services but, in fact, 77 persons were employed in 2016. In this case the model under-estimated the number of persons employed by a

factor of 5. A similar model under-estimate applies to Esperance. One possible explanation is that Manjimup and Esperance serve as regional hubs for agricultural professional services to regions surrounding Manjimup and Esperance. Also output per person in the two regions in the period 2015-16 may have been adversely affected by bushfire and flood.

Table 7: Difference between actual and estimated Agriculture, Forestry and Fishing Support Services industry regional employment. 2016

	Actual Agriculture, Forest. & Fishing Support Services industry Jobs (Census data)	Estimated Agriculture, Forest. & Fishing Support Services industry Jobs	Ratio of Estimated to Actual
Gippsland-East (SA3)	69	100	1.5
Colac-Corangamite (SA3)	138	374	2.7
Manjimup (SA2)	93	22	.23
Esperance (SA2)	80	19	.24

## Reasons for problems with the model

Clearly, the model used here is very simple and one would expect that in the case of agriculture, given the enormous variety and specialisation in commodities produced and techniques of production across the regions, that large errors would occur in applying a single national ratio of output to employment to estimate regional employment. Some idea of this diversity is that, across Australia as a whole, just 8% of total agricultural value is Fruit and nuts (excluding grapes). In Manjimup it is 67%. For Australia, as a whole 14% of total agricultural output is Livestock products (wool, milk and eggs) while another 37% is Livestock (slaughtered and other disposals). In Manjimup the corresponding figures are 1% and 7%. In Colac-Corangamite 55% of total agricultural output is Livestock products (wool, milk and eggs) or more than 4 times the proportion of total Australian agriculture.

Unfortunately, even if such disaggregated commodity level output data across the regions is used, major barriers to improve the accuracy of modelling approaches for agriculture persist. Some of these barriers include:

1. Differences in the classification systems used by the ABS in their collections across agricultural output, input-output data and the principal industry classification used by the ABS to collect data on industry output and employment. For example, the ABS classification system used for *Value of Agricultural Commodities, Australia* (VACA) uses a highly detailed agricultural commodity classification and its purpose is to collect data on the value of each commodity and the location of its production. By contrast the Australian and New Zealand Standard Industrial Classification (ANZSIC), which is also used to collect data on output but also other variables such as employment is based on a 'type of industry' system, not a specific commodity as is the agricultural classification. Thus, whilst VACA records separately the value of production of say wheat and sheep for a specific region, ANZSIC collects output and employment data for combined Sheep and Wheat Farms, as well as specialist enterprises producing each commodity, in recognition of the fact that this is the way the industry is structured. Because the inputs and the final markets for wheat and sheep are quite

distinct it is likely that using separate commodity output data to forecast employment for a combined wheat and sheep sector will be misleading. A similar but related issue is that, although VACA provides data on value of output at a very detailed commodity level, ANZSIC based surveys do not collect employment data down to that same disaggregated commodity level. Finally, a similar problem of incompatibility between VACA, ANZSIC and input-output data applies. The latter uses the Input Output Industry Group (IOIG) classification which is based on the ANZSIC system but IOIG is much more aggregated. To take a concrete example Table 8 shows that IOIG treats the agricultural industry with the largest output, that is, Sheep, Grains, Beef and Dairy Cattle, as a single entity, although ANZSIC disaggregates it to 8 different commodity types. Input output, in effect, treats these diverse industries as if they had an identical input use per dollar of inputs, including employment, and each sells their output to the same user industries. The highly aggregated nature of IOIG necessarily introduces errors into calculations of output to employment ratios and identifying the flow-on effects for a specific region of a downturn in say the Sheep, Grains, Beef and Dairy Cattle industry on other industries.

Table 8: Differences in IOIG and ANZSIC treatment of a single agricultural industry

Input Output Industry	ANZSIC
Sheep, Grains, Beef and Dairy Cattle	Sheep Farming (Specialised)
	Beef Cattle Farming (Specialised)
	Beef Cattle Feedlots (Specialised)
	Sheep-Beef Cattle Farming
	Grain-Sheep or Grain-Beef Cattle Farming
	Rice Growing
	Other Grain Growing
	Dairy Cattle Farming

Source: <https://www.abs.gov.au/ausstats/abs@.nsf/7d12b0f6763c78caca257061001cc588/933d2f9ec4183da6ca257801000e4b0b!OpenDocument>

- 2015-16 was the last ABS collection of *Value of Agricultural Commodities Produced, Australia* to collect data at a disaggregated SA2 regional level. Subsequent publications have used only SA4 which greatly reduces the utility of ABS data for determining the impact of regions of changes to agricultural output. There are 2310 SA2 regions across Australia; 358 SA3's and only 107 SA4 regions. SA2's is designed to reflect functional areas that represent a community that interacts together socially and economically. In major urban areas SA2s often reflect one or more related conurbations. SA2s generally have a population range of 3,000 to 25,000 persons and have an average population of about 10,000 persons. Statistical Areas Level 4 (SA4s) are specifically designed for the output of Labour Force Survey data and reflect labour markets within each State and Territory within the population limits imposed by the Labour Force Survey sample. Most SA4s have a population above 100,000 persons Australia

([https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1270.0.55.001~July%202016~Main%20Features~Statistical%20Area%20Level%20%20\(SA2\)~10014](https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1270.0.55.001~July%202016~Main%20Features~Statistical%20Area%20Level%20%20(SA2)~10014)).

## Agricultural data: Conclusion

The principal conclusion of this analysis is that first, it is not feasible to use standard techniques to quantify with any precision the impact on regional employment of a natural disaster on agricultural employment and output. The reasons for this fall into four broad categories. First, generally the industry has a low elasticity of employment with respect to output. Second, there are enormous differences in agricultural commodities produced across the regions, though aggregated input-output data cannot capture these regional differences but rather imposes a uniform pattern of resource use on what are known to be non-uniform regions. Third, certain regions can be hubs or points of concentration of employment for industries that supply inputs to agricultural industry or use and process its output. (This significantly affects the accuracy of regional employment estimates based on detailed input-output models). Fourth, there are incompatibilities in classification systems used to collect agricultural output and employment data at a regional level. Finally, the ABS has ceased collecting highly disaggregated agricultural output data.

Nonetheless, it is found that input-output is useful in identifying what industries could be affected by a change in supply and demand relations for agriculture resulting from a natural disaster. As with the TRA tourism data, modelling methods assist in knowing 'where to look' for interindustry effects flowing from natural disasters, though it is much less useful in quantifying these effects.

## Part 3: A Way Forward

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This research suggests that there are limitations in relations to measurement and the assessment of value-add in relation to regional economies facing natural disaster events. The steps required to address these deficiencies are the first step in developing and implementing robust and informed policy initiatives.

In turn to generate the appropriate data base for analysis requires two related steps.

### *Step 1 – Basic economic data*

1. Quantitative.
  - a. Use available sector data to identify probable inter-industry value outputs. However, much of this data is not sufficiently reliable to develop input-output values at a regional level
  - b. It will be necessary to supplement this data with ABS Regional series only partially resolves this issue.
2. Qualitative
  - a. SA2 level data is still lacking and should be supplemented with new, qualitative data.
  - b. Data collection would involve such as telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries.

Such a hybrid approach should be longitudinal to capture adjustment over time.

### *Step 2- Integrating the data as a ‘real’ world analysis*

As noted elsewhere, we propose a political economy analysis. We argue that a political economy approach is essential to adequately capture the complexities of a regional economy. The task is twofold: first, to have an economic approach which can identify, measure and value these drivers; and second, to understand how they may interact at a regional level. Analyses must include the centrality of the state as both an enabler and component of the processes driving value creation within and across supply chains and the broader regional economy.

Nonetheless, the first step in this process is to generate a robust and complex based economic database. It is thus necessary to supplement basic economic data with other data. It means considering how to incorporate the social, political and cultural relationships impacting regional sectors is essential for any comprehensive analysis.

The three methods described below require extensive interviews with communities, businesses and governments.

- a. Map and compare the internal characteristics of local and regional social, political, cultural and economic relationships with other regions.
- b. Network analysis focusing on tourism economy to compare the relative effect of these relationships on basic value flows within and across region – marketing; finance; hospitality services; tour guides; transport; and construction.
- c. Assess and compare the economic impact of regional governance and policy legacies and initiatives, focusing on its tourism sectors.

By integrating such data into analysis, it becomes possible to assess and understand the regional-specific drivers of – and barriers to – the different industries that make up a regional economy. Such approaches underpin the development of methodological toolboxes to provide the basis for robust and useable data.

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## Appendix

**Table 9: Industry Inputs into Agriculture as percentage of Agriculture (column 1) and percentage of Industry (Column 2)**

	1	2
	Industry Input into Agriculture as % of Total Agriculture Intermediate Use	Industry's input into Agriculture as a % of the Industry's Total Intermediate Output
Sheep, Grains, Beef and Dairy Cattle	8%	12%
Poultry and Other Livestock	1%	6%
Other Agriculture	11%	37%
Aquaculture	0%	4%
Forestry and Logging	1%	13%
Fishing, hunting and trapping	0%	4%
Agriculture, Forestry and Fishing Support Services	12%	94%
Coal mining	0%	1%
Oil and gas extraction	0%	1%
Iron Ore Mining	0%	2%
Non-Ferrous Metal Ore Mining	0%	0%
Non-Metallic Mineral Mining	0%	1%
Exploration and Mining Support Services	0%	1%
Meat and Meat product Manufacturing	1%	2%
Processed Seafood Manufacturing	0%	3%
Dairy Product Manufacturing	0%	2%
Fruit and Vegetable Product Manufacturing	0%	1%
Oils and Fats Manufacturing	0%	1%
Grain Mill and Cereal Product Manufacturing	0%	2%
Bakery Product Manufacturing	0%	1%
Sugar and Confectionery Manufacturing	0%	0%

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Other Food Product Manufacturing	3%	32%
Soft Drinks, Cordials and Syrup Manufacturing	0%	1%
Beer Manufacturing	0%	2%
Wine, Spirits and Tobacco	0%	1%
Textile Manufacturing	0%	1%
Tanned Leather, Dressed Fur and Leather Product Manufacturing	0%	1%
Textile Product Manufacturing	0%	2%
Knitted Product Manufacturing	0%	2%
Clothing Manufacturing	0%	3%
Footwear Manufacturing	0%	4%
Sawmill Product Manufacturing	0%	0%
Other Wood Product Manufacturing	0%	0%
Pulp, Paper and Paperboard Manufacturing	0%	1%
Paper Stationery and Other Converted Paper Product Manufacturing	0%	1%
Printing (including the reproduction of recorded media)	1%	7%
Petroleum and Coal Product Manufacturing	2%	10%
Human Pharmaceutical and Medicinal Product Manufacturing	0%	3%
Veterinary Pharmaceutical and Medicinal Product Manufacturing	0%	21%
Basic Chemical Manufacturing	2%	14%
Cleaning Compounds and Toiletry Preparation Manufacturing	0%	2%
Polymer Product Manufacturing	0%	1%
Natural Rubber Product Manufacturing	0%	1%
Glass and Glass Product Manufacturing	0%	1%
Ceramic Product Manufacturing	0%	0%
Cement, Lime and Ready-Mixed Concrete Manufacturing	0%	0%
Plaster and Concrete Product Manufacturing	0%	1%
Other Non-Metallic Mineral Product Manufacturing	0%	0%
Iron and Steel Manufacturing	0%	0%
Basic Non-Ferrous Metal Manufacturing	0%	1%
Forged Iron and Steel Product Manufacturing	0%	1%

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Structural Metal Product Manufacturing	0%	1%
Metal Containers and Other Sheet Metal Product manufacturing	0%	1%
Other Fabricated Metal Product manufacturing	0%	1%
Motor Vehicles and Parts; Other Transport Equipment manufacturing	0%	1%
Ships and Boat Manufacturing	0%	7%
Railway Rolling Stock Manufacturing	0%	0%
Aircraft Manufacturing	0%	0%
Professional, Scientific, Computer and Electronic Equipment Manufacturing	0%	7%
Electrical Equipment Manufacturing	0%	2%
Domestic Appliance Manufacturing	0%	2%
Specialised and other Machinery and Equipment Manufacturing	1%	5%
Furniture Manufacturing	0%	1%
Other Manufactured Products	0%	1%
Electricity Generation	0%	2%
Electricity Transmission, Distribution, On Selling and Electricity Market Operation	1%	1%
Gas Supply	0%	0%
Water Supply, Sewerage and Drainage Services	3%	13%
Waste Collection, Treatment and Disposal Services	1%	3%
Residential Building Construction	1%	2%
Non-Residential Building Construction	1%	3%
Heavy and Civil Engineering Construction	1%	4%
Construction Services	5%	1%
Wholesale Trade	8%	5%
Retail Trade	2%	3%
Accommodation	0%	1%
Food and Beverage Services	1%	2%
Road Transport	3%	5%
Rail Transport	0%	2%
Water, Pipeline and Other Transport	0%	1%

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Air and Space Transport	0%	1%
Postal and Courier Pick-up and Delivery Service	0%	1%
Transport Support services and storage	3%	3%
Publishing (except Internet and Music Publishing)	0%	0%
Motion Picture and Sound Recording	0%	0%
Broadcasting (except Internet)	0%	0%
Internet Service Providers, Internet Publishing and Broadcasting, Web search Portals and Data Processing	0%	0%
Telecommunication Services	0%	0%
Library and Other Information Services	0%	0%
Finance	5%	3%
Insurance and Superannuation Funds	0%	2%
Auxiliary Finance and Insurance Services	5%	5%
Rental and Hiring Services (except Real Estate)	1%	3%
Ownership of Dwellings	0%	
Non-Residential Property Operators and Real Estate Services	2%	1%
Professional, Scientific and Technical Services	6%	2%
Computer Systems Design and Related Services	0%	0%
Employment, Travel Agency and Other Administrative Services	2%	1%
Building Cleaning, Pest Control and Other Support Services	0%	1%
Public Administration and Regulatory Services	0%	1%
Defence	0%	0%
Public Order and Safety	0%	0%
Primary and Secondary Education Services (incl Pre-Schools and Special Schools)	0%	0%
Technical, Vocational and Tertiary Education Services (incl undergraduate and postgraduate)	0%	0%
Arts, Sports, Adult and Other Education Services (incl community education)	0%	0%
Health Care Services	0%	0%
Residential Care and Social Assistance Services	0%	0%
Heritage, Creative and Performing Arts	0%	0%

## Report 6: Measuring the Regional Effect of Disaster Events

Sports and Recreation	0%	0%
Gambling	0%	1%
Automotive Repair and Maintenance	0%	2%
Other Repair and Maintenance	1%	4%
Personal Services	0%	1%
Other Services	0%	0%
	100%	3%

Source: ABS (2018) Table 5

Note: Column 1 represents each industry's share of total intermediate inputs used by agriculture and column 2 represents agriculture's share of total supply from the given industry. Red colours indicate equal to or more than 2% of the total.



**Report for Regional Australia Institute - Regions, Work and  
Vulnerability: Regional Supply Chains/Networks and Natural  
Disasters**

**Report 7:**

**Next Steps: Methodological Toolboxes**

Peter Fairbrother and Marcus Banks

May 2021

The research was conducted and presented by a research team led by Professor Peter Fairbrother, College of Business and Economics, University of Tasmania. The program of work began under the auspices of the Centre for People, Organisation & Work (CPOW), an interdisciplinary research centre, RMIT University. With Professor Fairbrother's move to the University of Tasmania, the research was undertaken and completed by his research team under the auspices of Applied Research Services.

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**Citation:** Peter Fairbrother and Marcus Banks (2021) 'Next Steps: Methodological Toolboxes', *Regions, Work and Vulnerability: Regional Supply Chains and Natural Disasters, Report 7*, Regional Australia Institute, Applied Research Services <https://appliedresearch.org.au/projects/>

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## Regions, Work and Vulnerability

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Disaster events matter. The entangled economic, social, political and environmental vulnerabilities exposed by bushfire and related disaster events take effect at local and regional levels. The challenge is to ensure that policy development and implementation takes place in appropriate and accessible and accountable ways. The development of recovery plans and the promotion and implementation of recovery practices must begin from the foundation of regionally based economies. While natural disaster events are experienced in a variety of ways, ranging from preparatory activity, the disaster experience itself, in the short and long-term, as well as the process of recovery, policy responses can be partial and underdeveloped.

In sub-national regions, such events have consequential impacts on those who live and work in the regions. These events raise questions about regional economies and the drivers that underpin them. Businesses will be disrupted. The provision of goods and services are likely to be impacted. While regions are defined geographically and administratively, the economic and social relations that define them are likely to operate at different scalar levels, including the provincial (State) level, national and increasingly international levels. The outcomes are a complex of regional and interregional connections and relationships. At the same time, the political and governance relations that matter for regions often involve a diverse range of actors, contributing to processes that may distort the most viable strategic agenda for these regions.

The first point to note is that regional governance and the agenda developed often appear general and imprecise. As noted in Report 3, government responses tend to be complicated, involving programs of support, including financial packages. While much effort is devoted to obvious rebuilding activities, it is also the case that there are more long-term and indirect effects, including land degradation and long-term financial and psychological impacts. Nonetheless, it has been noted that few assessments of recovery and what is involved consider the broader and long-term impacts that regions experience (Stephenson, 2010). As noted in the accompanying Reports, if we are to achieve equitable and effective economic recovery it is critical that policy makers and implementers have a comprehensive and informed understanding of regional economies, often region by region. There is a lack of research about ways to achieve regional economic recovery and positive futures. Such research is critical if we are to lay the foundation for long-term recovery in disaster effected regions.

Second, the economic and social base of regions is varied, with implications for experience of impact of natural disaster events (as indicated in Report 2). To explore the dynamics of these processes we consider the structure and organisation of regional economies. It was noted that sub-national regions in Australia are defined in part by the centrality of public services for regional employment and prosperity. On average, the State and national public service provision, principally in health care, education and training and public administration account for 20 per cent of jobs. It means that public services should be taken into account when planning for both preparatory and recovery activity. Even so, it is necessary to note that regional economies are structured in terms of the texture of other sectors, agriculture, forestry and fishing; manufacturing, tourism, retail and so forth. These sectors constitute the specific construction of regional economies and play out in complex ways as drivers of the prosperity of these regions.

Third, to begin to understand the texture and dynamics of regional economies and how the recovery process may be enhanced it is necessary consider the construction of these economies (Report 4). This step draws attention to the relationship that define economic relations, in this case the relationships and activity in connection with the food chain, for example, from production to consumption, or the tourism network, in terms of its complicated and often opaque relationships. The purpose of this consideration is to provide a way of identifying and explaining vulnerabilities to regional supply chains and networks. It thus becomes possible to identify what might be appropriate governance arrangements in relation to disaster events, how to facilitate the links and support to enhance the chains and identify where intervention may be necessary. The outcomes of such analysis will provide insights into the impact of major disruptions to production and markets, and thus policy guidance for the mitigation of such events.

Fourth, the initial challenge to understanding is more fundamental: to determine what we know and what we do not, as outlined in Report 5. There are basic data limitations when considering the drivers of regional economies, exemplified by the knowledge basis of such sectors as agriculture, manufacturing, tourism and so forth. This step requires an approach which can identify, measure and value these drivers as well as understanding how they may interact at a regional level. Analyses must include the centrality of the state as both an enabler and component of the processes driving value creation within and across supply chains and the broader regional economy.

These considerations raise questions about ways of measuring value creation and value capture. We lay the foundation for assessing what we know in a detailed study of two sectors, agriculture, forestry and fishing, and tourism (Report 6). As indicated in other reports (particularly Reports 4 and 5) we approach this task via a developed a political economy understanding. Nonetheless, the first step is to measure the economic impacts and this report seeks to explore the possibilities and limitations of this first step. We provide an evaluative account of methods used by the Australian Bureau of Statistics and other agencies to estimate the economic contribution of tourism and agriculture at a national and regional level. As noted, we evaluate the reliability of these methods in providing broad estimates of the regional impact of natural disasters, such as bushfires. This Report also reviews the regional tourist production networks that define this sector and is followed by a similar account for regional agricultural value chains. In each case we present a detailed case, to draw attention to the processes at work in regions. We conclude with an account of the methodological and evaluative questions posed by this analysis.

## The Challenge

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The challenge facing decision-makers and those who experience and deal with natural disaster impacts is to lay the foundation for measuring the impact and considering where value add occurs. There are two aspects to the challenge. First, what do we know about the regional economy and what do we not know? Second, when interrogating specific sectors of the regional economy we can ask the same question. As indicated in Report 6, there are limits to our knowledge and the intent here is to address this lack of data.

Three methodological toolboxes are proposed to address this data challenge: a Regional toolbox and two 'Sectoral' toolboxes—one for agriculture and the other for tourism. The goal of each toolbox is to provide an updatable resource for policymakers and other stakeholders. These toolboxes will offer clear, detailed, place-based understandings of the intersections of hazard, exposure and vulnerability, in the economic, social and political life of regions experiencing disaster events (Report 2).

## The regional methodological toolbox

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This research suggests that there are limitations in relation to the measurement and the assessment of value-add in relation to regional economies facing natural disaster events (Reports 4 and 5). The accurate assessment of both gross output and value added is hard to achieve, in relation to the regional impact of natural disasters, or other changes to supply and demand relationships across industries within a region.

The purpose here is to develop a methodological toolbox to provide a way of understanding the impacts of disaster events on regional economies Drawing on the methods developed for the *CRC Project Sprint Gippsland Food value chain: Data-driven regional development* report (Fairbrother et al., 2018), we specify a foundational approach for analysing regional economies. The dilemma facing regional decisionmakers, at all levels, is that there is no coherent base for data collection, capture, analysis and provision. The 2018 study identified the data deficit challenge in relation to regional economies (Fairbrother et al., 2018) and a solution has been proposed by KPMG and Food and Fibre Gippsland (2019). In relation to the food and fibre industry the 2019 report noted that data availability is a major problem. As stated:

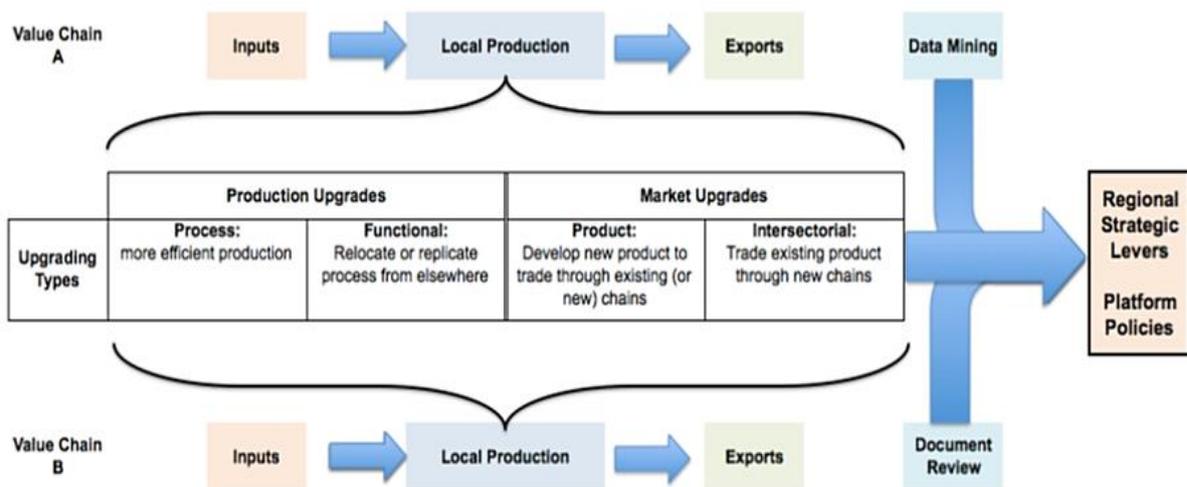
*Another main challenge is linked to the source of data on which the sector is valued, emerging issues are identified, and key projects are initiated that do not easily, reliably and accurately reflect on-ground realities. Available data of the GRP for Gippsland's food and fibre industry is indeed a critical challenge. The Australian Bureau of Statistics (ABS) reports data by Australian New Zealand Standard Industrial Classification codes, a format which collates data into pre-farm gate 'Agriculture, forestry and fishing', while post-farm gate data is blended into 'manufacturing' data. This lack of distinction inhibits the ability to deep dive into the detail across the whole food and fibre value chain.*

More generally, the region is marked by inconsistent availability of data across the whole region as well as the challenge to knowledge resulting from the porosity of value chains as goods and services flow in and out of the region adding value as this occurs (KPMG and Food and Fibre Gippsland, 2019: 9). Hence, as stated:

*Informed decisions rely on accurate measures of performance, underpinning the need for the industry to own the process of collecting, collating and analysing data. There is a need to invest and develop a data platform for more accurate and reliable information to better reflect the whole food and fibre value chain, based on a consistent definition of the industry (p. 9)*

The solution is to develop a regional intelligence platform that has the potential to harness data and drive strategic policy development (KPMG and Food and Fibre Gippsland, 2019: 20). Such data provision would provide benefits for consumers, supply chain partners, regulators and in this case farm management (pp. 22-23). It would allow connectivity between growers, producers, consumers and the research community as well as cooperative planning and organisation of supply chains. The approach to translating recommendations for individual sectors to regional development interventions is depicted in Figure 1 below.

Figure 1: Regional Value Chain Process



Value Chain A and B indicate individual sector analyses that point to upgrade possibilities within the region: only two chains are represented for clarity, in practice more chains will be included in the fully developed analysis. The upgrade possibilities are then compared across the chains to identify initiatives that facilitate upgrading in multiple chains, as well as within individual chains.

The multi-chain recommendations are known as strategic levers or platform policies; interventions that work across industries, rather than being industry specific. This is in accordance with the view that:

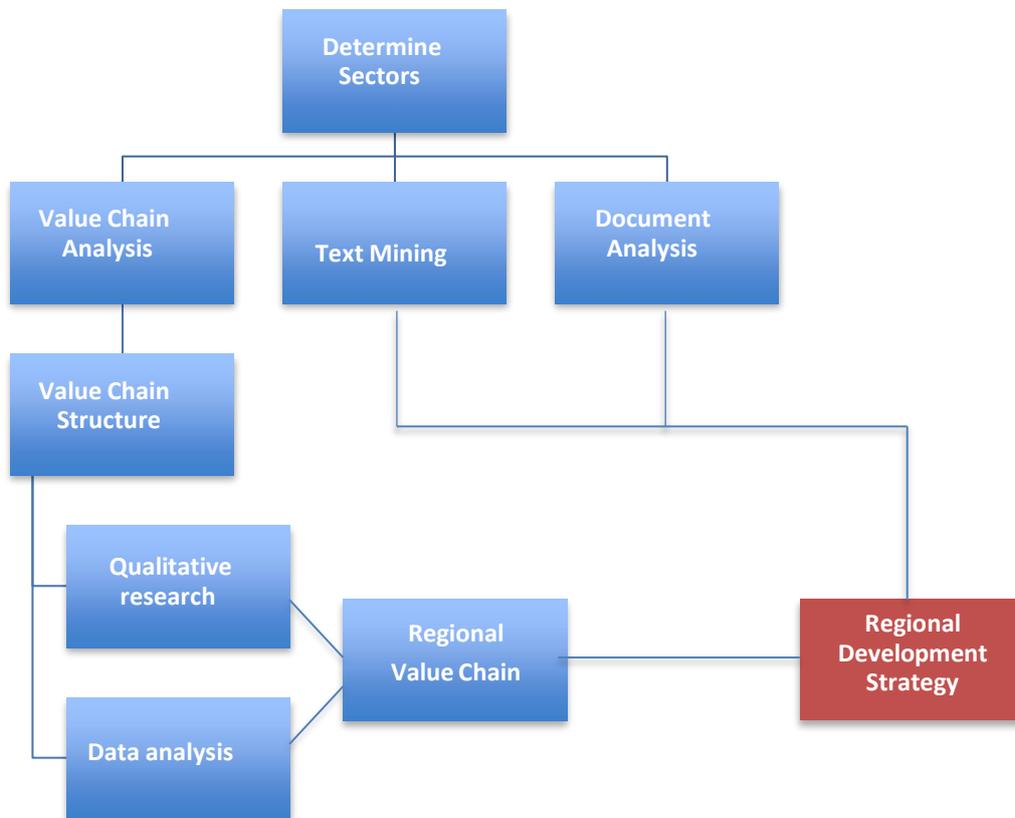
*... there is a need for tailor-made policy strategies, geared towards specific potentials, and focused on tackling specific bottlenecks in regions. As a result, regional policy needs to evolve, capitalising on region-specific assets, rather than selecting from a portfolio of*

*specific policy models and recipes that owed their success in different environments* (Asheim et al. 2011, p. 17).

This step underwrites the purpose of undertaking the value chain analyses, to identify bottlenecks and region-specific assets, as well as pointing towards the regional development initiatives that respond to prevailing capacities and opportunities.

Following the selection of industry sectors for analysis, there are three strands to the methodology, as depicted in the following diagram.

**Figure 2: Regional value chain methodology**



The first strand is the value chain analysis, which investigates the distribution of profits and control of production flows through the chain. The second is text mining, which involves relationship analysis across different entities, to recognise the important entities within this value chain, the type, and how this relationship can be abstracted to inform a knowledge base or extract a summary. The third strand is a review of regional development, planning and strategies, which provides a critical basis for recommendations and development opportunities.

The steps required to address these deficiencies are the first stage in developing and implementing robust and informed policy initiatives. Such assessments require the creation of detailed input-output (IO) tables which record the ‘upstream’ supply of inputs used by a given industry, including the value of labour, capital and ‘intermediate’ inputs (the latter are purchases from other industries from within the given region and externally). These tables also record

'downstream' flows of the output from a given industry to other industries within the region and externally and to different categories of final demand, such as private and public consumption and investment. In addition, the detailed employment structure within a region is also required, ideally in terms of employment by industry, occupation and hours worked at a sub-regional (SA4) level. The latter provides a more accurate measure of labour demand per unit output compared to using total employment given that many people work on a part time or casual basis).

Some idea of the resource intensity necessary to construct a regional input-output table is that the minimum requirement for industry data is 2 digit Australian and New Zealand Standard Industry Classification comprising 86 distinct industries

(<https://www.abs.gov.au/ausstats/abs@.nsf/mf/1292.0>). The minimum requirement for the occupational variable is 35 minor group occupations within the Australian and New Zealand Standard Occupational Classification.

(<https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1220.0First%20Edition,%20Revision%201?OpenDocument>). The resulting matrix for regional data therefore comprises 7396 cells for inter and intra-industry purchases and supplies and an additional 3010 cells to record the occupational structure of the 86 industries. Collecting the data requires surveys of firms, government and consumers within each region. It may require a census of some or all the above depending on the population (people and firms) size of the region.

Further, this data needs to be updated on a five-year basis to ensure the input-output model captures regional changes such as the exit and entry of new firms or industries and new technology. The semi-decadal ABS Census of Population and Housing collects this employment data but neither the Census data nor any other official statistics capture economic data such as value added and gross product by detailed industry. Hence, it is not possible to construct accurate regional input-output models. Nonetheless, some commercial regional economic modelling entities do attempt to build such models. In these cases, they use the distribution of regional employment across a given State to apportion total State value added and gross output by industry, since this data is generally available at a State level. This exercise is problematic since it does not take account of the very large productivity differences across firms within the same industry, such as those associated with differences in firm size. For example, it is illicit to compare the output per worker of, say, a small corner shop in a rural town against the output per worker in a large Coles store, since both would be classified to the grocery retailing industry. Commercial modellers may attempt to control for these productivity gaps by using hourly wage differences in a given industry across regions, but this is also unsatisfactory and introduces further assumptions into the analysis. In addition, such commercially available regional models assume that the pattern of intra and inter-industry demand and supply relationships evident at a State or national level apply at a regional level. As a result, since the ABS 'is bound by the principles of official statistics, which control the quality of standards and methodologies and consistency in the data production, *the significant number of unsubstantiated assumptions is a deterrent for using non-survey methods in compiling official regional IO tables*' (Lenzen et al 2017: 3, our highlight).

Clearly, this 'ideal' method for data collection is not only highly resource and data intensive but even if regularly updated, any regional model can be quickly invalidated by the entry or exit of a large firm or industry. National input-output models are produced by the ABS on an irregular basis (ABS 2020a). Despite these limitations, many private and public organisations use these

national tables and their associated output and employment multipliers to estimate the effect of changes to supply and demand at a regional level. The following relies in part on these studies to identify regional impacts of natural disasters on tourism and agriculture.

Of note, the socio-economic effects of natural disasters, even of a catastrophic nature, can be quite localised in terms of their geographic extent. Such localised events can easily be hidden within current official regional data because such data typically covers a comparatively wider geographic area. In turn, this is because official data collection needs to balance the utility of regional data against the high costs of collecting small area data.

To make this point concrete, considerable economic and demographic data is available from official sources on a Local Government Area level, although LGAs typically comprise several or more conurbations and, due to policies over several decades of local government consolidation, the scale of LGAs has increased markedly over the years. Bushfires, storms or pandemics may 'wipe-out' economic activity in several conurbations where, for example, especially susceptible industries, such as tourism, are over-represented. Of note, these effects will be diluted when aggregated LGA data is employed. Aside from the effect of the geographic concentration of particular industries within a region, certain disasters, such as storm, drought or bushfire, will adversely impact some industries more than others, notably agriculture and tourism. As a rule, as the diversity of industries grows with population increases, the effect of a natural disaster on a single industry will also be diluted for the larger the region for which official data is available. Finally, the results of any assessment of the regional impact of natural disasters are critically dependent on the time allowed to elapse between the disaster and the assessment.

Thus, there are two related steps to undertake.

*Step 1 – Basic economic data*

1. Quantitative.
  - a. Use available sector data to identify probable inter-industry value outputs. However, much of this data is not sufficiently reliable to develop input-output values at a regional level
  - b. It will be necessary to supplement this data with ABS Regional series—which only partially resolves this issue.
2. Qualitative
  - a. SA2 level data is still lacking and should be supplemented with new, qualitative data.
  - b. Data collection would involve such as telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries.

Such a hybrid approach should be longitudinal to capture adjustment over time.

*Step 2- Integrating the data as a 'real' world analysis*

We argue that a political economy approach is essential to adequately capture the complexities of a regional economy, as noted elsewhere (Report 5). The task is twofold: first, to have an economic approach which can identify, measure and value these drivers; and second, to understand how they may interact at a regional level. Analyses must include the centrality of the state as both an enabler and component of the processes driving value creation within and across supply chains and the broader regional economy. Nonetheless, the first step in this process is to generate a robust and complex based economic database. It is thus necessary to supplement basic economic data with other data. It means considering how to incorporate the social, political and cultural relationships impacting regional sectors, a critical step for any comprehensive analysis.

The three methods described below require extensive research with communities, businesses and governments.

- a. Map and compare the internal characteristics of local and regional social, political, cultural and economic relationships with other regions.
- b. Network analysis focusing on tourism economy to compare the relative effect of these relationships on basic value flows within and across region – marketing; finance; hospitality services; tour guides; transport; and construction.
- c. Assess and compare the economic impact of regional governance and policy legacies and initiatives, focusing on its tourism sectors.

By integrating such data into analysis, it becomes possible to assess and understand the regional-specific drivers of – and barriers to – the different industries that make up a regional economy. Such approaches underpin the development of methodological toolboxes to provide the basis for robust and useable data.

The task is to identify the what, the why and the how of measurement. This task will be achieved by developing a methodological toolbox incorporating the following dimensions.

1. Economic activity is both socially defined, and place based.
2. Values flow from specific economic activities and are situated within the totality of the economic activity.
3. Value is constantly in movement and thus moments in value creation are contradictory, disturbing temporal and spatial dynamics.
4. Hence, economic shocks such as disease, climate events and recessions are endemic to the system rather than outliers.
5. The state is not simply a facilitator of economic activity but a crucial component of value creation.

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## Sector methodological toolboxes

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The focus on sectors for the study is agriculture and tourism. These sectors are indicative of likely sectors that provide the base for regional prosperity in many bush-fire prone regions. This focus on agriculture, forestry and fishing, *and* tourism allows an interrogation of ways of understanding the impacts of natural disaster in the regions. For many fire-prone regions these two sectors retain a significance for the prosperity of the regions which is severely disrupted in the event of a natural disaster. agriculture and tourism.

For many fire-prone regions these two sectors retain a significance for the prosperity of the regions which is severely disrupted in the event of a natural disaster. agriculture and tourism. Approximately 67% of the value of Australia's exports comes from regional, rural, and remote areas. This comprises (1) the resources sector (mining, oil and gas production) which contributes around 10% of GDP (\$150 billion (Minerals Council of Australia)), (2) agriculture which contributes 3% (about \$50 billion) to GDP (or 12% (about \$150 billion) if value adding processes are included) (National Farmers Federation) and (3) tourism in regional, rural and remote areas which contributes about 1% of Australia's gross domestic product (GDP) (\$16 billion) (Regional Australia Institute - See National Rural Health Alliance, 2015).

### Analytical Methods

The analysis considered trends in the datasets at three geographic scales, to highlight how the observed impact varies over different geographic units of analysis. Three geographies will be used: the AGSG SA2 and SA4, and local government areas (LGAs), where:

1. SA2s are 'medium-sized general-purpose areas ... to represent a community that interacts together socially and economically' (ABS 2016) and have an average population of approximately 10,000 people.
2. SA4s are constructed from sets of SA2s 'have been designed for the output of a variety of regional data ... (t)hese areas represent labour markets or groups of labour markets within each State and Territory' (ABS 2016). More accurately, SA4s are constructed from SA3s, which are constructed from SA2s. The key point is that as the statistical geography hierarchy progresses from 1 through to 4, each area is a constructed from contiguous elements from the lower hierarchy.
3. LGAs are administrative areas, generally reflecting historic, land use and environment spatial divisions (rivers for example). Within Victoria, major rationalisation of LGAs under the Kennett State Government in the 1990s means that they are of a scale between SA2 and SA4, but less likely to capture discrete communities or labour markets.

The AGSG was introduced in 2011, therefore analysis of trends spanning back to 2006 could only be undertaken at the LGA level. For the SA2s trends will be compared to surrounding regions and within the SA4 in order to identify shifts in the data that may be attributable to the bushfire disaster.

Modes of analysis included:

- Descriptive statistics and cross-tabulations
- Chi-squared tests for independence (ie: are the variables significantly different)
- Shift share analyses to decompose changes into national, industry and regional effects.
- Regional input-output analysis.

Three categories of analysis are proposed for the intercensal period:

- Changes to the industrial structure of the regions
- Demographic changes to provide a baseline for growth within the regions
- Changes to employment and jobs as an indicator of the social impact of economic changes.

The outcomes of this approach are evident in each sector study (Report 6).

## Tourism

Two sources of data are available:

1. **ABS data** is available but basic economic data for tourism is missing. The Regional Data series only has broad industry categories which reduces its usefulness for charting the flow-on effects of changes in the output of one industry on others (such as tourism). The Census provides the most detailed regional employment data but does not measure value of output.
2. **TRA data.** Annual surveys of domestic and international tourists by Tourism Research Australia (TRA). Regional-level data on tourist visit period, expenditure across various industries and products. TRA survey data is not sufficiently reliable to develop input-output values at a regional level.

The TRA data is useful in identifying what industries are likely to be affected by a natural disaster that reduces the output of the tourist industry, but much less useful in quantifying, with any precision, the flow-on impacts of a natural disaster on regional output and employment. The main reasons for this relate to the methods TRA is required to use to derive its estimates as these are based on surveys of tourist spending by region and an aggregated input-output model of supply and demand relationships across industries at a national level. These input-out relationships do not hold at a regional level, or at least do not hold with accuracy.

There are, however, major problems with developing alternative quantitative approaches. For example, the most accurate and detailed regional employment data is provided in the five-year Population Census. This is ideal for identifying regional changes in employment, but it does not measure value of output. Census data to be supplemented with ABS Regional Data which provides for example very comprehensive data and can tell a fuller story but even here the data is collected at a quite aggregated industry level (typically broad categories like agriculture or manufacturing) reducing its usefulness for charting the flow-on effects of changes in the output of one industry on others.

If the objective is to gather intelligence on the effect of a natural disaster on the specific region and the industries within it is recommended that a hybrid approach be employed. This approach would use aggregate models, such as the one used by TRA to identify the probable inter-industry chain of causation or what industries are likely to be affected by a change in the output of other industries. Second, supplement this with data such as the ABS Regional series as this provides useful information at frequent intervals, sometimes even quarterly. But due to the idiosyncratic structure of many regional economies and the unpredictable chains of inter-industry causation that a natural disaster can give rise to (a bushfire giving rise to a construction or population boom) more targeted small area data collection methods could be employed. To assess the specific and detailed effects of a natural disaster at a small area level also requires labour intensive research methods such as telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries. Such an approach should be longitudinal to capture adjustment over time. This hybrid approach is useful in combining both quantitative and qualitative research methods.

**Solution: develop a hybrid approach.**

1. Quantitative.
  - a. Use TRA data to identify probable inter-industry value outputs
  - b. Supplementing this data with ABS Regional series only partially resolves this issue
2. Qualitative
  - a. SA2 level data is still lacking and will need to supplement with new, qualitative data.
  - b. Telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries.
  - c. Such a hybrid approach should be longitudinal to capture adjustment over time.
3. Note:
  - a. Gather basic economic data gathered through a hybrid approach will need to be supplemented with more concrete data.
  - b. Understand the social, political and cultural relationships impacting a region's tourism sectors is essential for any comprehensive analysis.
  - c. All three methods described below require extensive interviews with communities, businesses and governments.
    - i. Mapping Network analysis focusing on tourism economy to compare the relative effect of these relationships on basic value flows within and across region – marketing; finance; hospitality services; tour guides; transport; and construction.
    - ii. Critically assess and compare the economic impact of regional governance and policy legacies and initiatives, focusing on its tourism sectors.

Properly integrated, this qualitative data will enrich the basic tourism data with region-specific drivers of – and barriers to – growing this industry.

## Agriculture

The data base for the agriculture sector is comprehensive for some value chains (eg., dairy) and absent for others (eg., poultry). Moreover, there is a variability in the data collected and analysed.

The principal conclusion of the analysis of the agriculture sector (Report 6) is that first, it is not feasible to use standard techniques to quantify with any precision the impact on regional employment of a natural disaster on agricultural employment and output. The reasons for this fall into four broad categories. First, generally the industry has a low elasticity of employment with respect to output. Second, there are enormous differences in agricultural commodities produced across the regions, though aggregated input-output data cannot capture these regional differences but rather imposes a uniform pattern of resource use on what are known to be non-uniform regions. Third, certain regions can be hubs or points of concentration of employment for industries that supply inputs to agricultural industry or use and process its output. (This significantly affects the accuracy of regional employment estimates based on detailed input-output models). Fourth, here are incompatibilities in classification systems used to collect agricultural output and employment data at a regional level. Finally, the ABS has ceased collecting highly disaggregated agricultural output data.

Nonetheless, it is found that input-output is useful in identifying what industries could be affected by a change in supply and demand relations for agriculture resulting from a natural disaster. As with the TRA tourism data, modelling methods assist in knowing ‘where to look’ for interindustry effects flowing from natural disasters, though it is much less useful in quantifying these effects.

### **Approach:**

1. Identify the value of agricultural output for a region for a given year
2. Use Australian input-output data to identify the inter-industry supply and demand relationship of agriculture with other industries
3. Identify the effects of a change in the output of agriculture on output and employment in other industries at a regional level.

### **Applying this approach: data limitations**

The quantitative approach does not produce reliable estimates of inter-industry impacts following a change in agricultural output at a regional level. The results are useful to identify ‘where to look’ for industries and jobs that are likely to be affected by such a change.

**Solution: develop a hybrid approach.**

- Quantitative.
  - Develop a model using available ABS data to identify probable inter-industry value input-output changes over time
- Qualitative
  - SA2 level data is still lacking and will need to supplement with new, qualitative data.
  - Telephone interviews with key respondents across many sectors, town hall meetings and interviews with small and large firms across a representative range of industries.
  - Such a hybrid approach should be longitudinal to capture adjustment over time.
- Modelling basic economic agricultural data will need to be supplemented with more concrete data.
- Understanding the social, political and cultural relationships impacting a region's various agricultural sectors is essential for any comprehensive analysis.
- All three methods described below require extensive interviews with communities, businesses and governments.
  - Mapping
  - Network analysis focusing on agricultural economy to compare the relative effect of these relationships on basic value flows within and across region – marketing; finance; labour relationships, transport, etc
  - Critically assess and compare the economic impact of regional governance and policy legacies and initiatives, focusing on its agriculture sectors.
- Properly integrated, this qualitative data will enrich the basic modelling data with region-specific drivers of – and barriers to – growing the region's diverse range of agricultural industries.

## Conclusion

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This research suggests that there are limitations in relations to measurement and the assessment of value-add in relation to regional economies facing natural disaster events. The steps required to address these deficiencies are the first step in developing and implementing robust and informed policy initiatives.

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