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**POLICY BRIEF**

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# **Disasters and economic resilience in small regional communities**

## Toodyay case study

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### About this research

This research began in 2013 and was conducted as part of the *Optimising post-disaster recovery interventions in Australia* project. The project investigated how recent natural hazards have impacted and rippled through communities and the broader economy over time, through case studies of the 2009 Black Saturday bushfires, 2009 Toodyay bushfire, 2010-11 Queensland floods and 2013's Tropical Cyclone *Oswald*. The research findings will help policymakers better understand the socio-economics of natural hazards and formulate public policies in a way that better distributes budgets and resources towards vulnerable socio-economic groups and sectors of employment.

### Background

This report investigates the income effects of the December 2009 Toodyay bushfire on the income trajectory of residents of Toodyay. A small regional town in Western Australia, Toodyay had a population of 4,450 people around the time of the bushfire. The fire conditions were some of the worst seen in Western Australia at the time, and the fire burnt around 2,900 hectares, the equivalent of two per cent of the Shire of Toodyay's total area. While no casualties were reported, the total cost of damages was estimated at \$100 million (FESA, 2010).

### Aims and objectives

*Disasters and economic resilience in small regional communities: the case of Toodyay* (Ulubasoglu 2020) has investigated the income impacts associated with a bushfire that afflicted a small, regional community.

From a policy perspective, the report contributes to a greater understanding of the potential economic effects of disasters caused by natural hazards on individuals and communities living in small regional towns in Australia (see Figure 1, below).

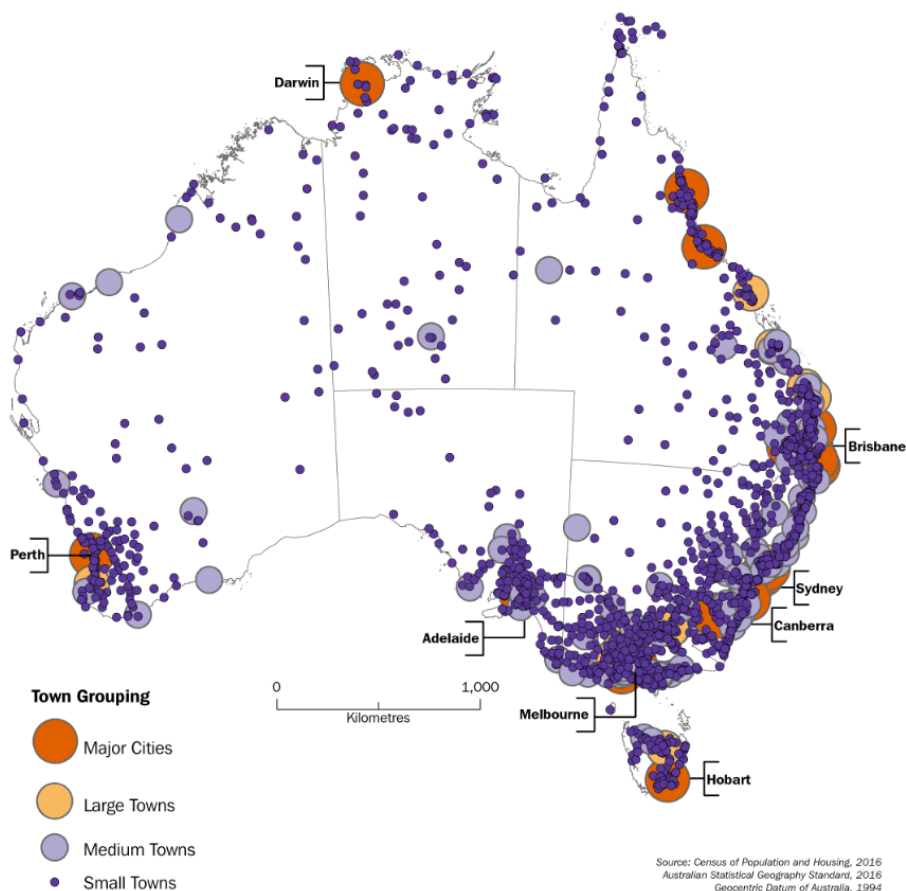


Figure 1: Small, medium and large towns, and major cities, in Australia.

Toodyay is fairly typical of such small, regional Australian towns, having an ageing population within the 1,000–4,999 population range, and an economy historically linked to agriculture, mining and manufacturing – industries which are known to be sensitive to disasters caused by natural hazards (Ulubasoglu et al., 2019). Such towns (~1,700 in 2016) form 9.7 per cent of Australia’s population and are mostly concentrated around Australia’s eastern seaboard (Australian Bureau of Statistics, 2018).

## Methodology

At its core, this research aims to determine the disruptive effects of a disaster caused by natural hazards on individuals’ income trajectory. It used a statistical technique called difference-in-differences (DID) modelling to analyse the effect of the Toodyay bushfire on the income of individuals in the workforce who resided in Toodyay in 2006. The model mimics experimental research design by comparing the effect of a treatment (i.e. a disaster) on a ‘treatment group’ relative to a ‘control group’. That is, it compares the effect of this treatment on an outcome (individual income) by comparing the changes in income in the treatment group before and after the disaster, relative to the changes in the control group.

The research team used the rich individual-level Australian Census Longitudinal Dataset (ACL) available through ABS Datalab, which not only provides convenient ‘baseline’ (2006) and ‘end-line’ (2011) surveys for the DID design, but also allowed the team to explore the differential effect of the disaster on demographic groups (Australian Bureau of Statistics, 2016). As the research is interested in the impacts on income, the sample was refined to incorporate only Toodyay residents who were in the labour force and reported non-negative income (n=889). The sample was further restricted to those who did not move between the census years (non-movers, n=447).

The modelling considers Toodyay residents as the members of the treatment group; the control group is made up of residents of two of Toodyay’s immediate neighbours, Northam and Chittering. The socio-economic characteristics of Northam and Chittering closely resemble those of Toodyay (see Figure 2, below left). The available data show that the treatment and control groups have an average income of around \$38,200, an average age of around 39, home ownership of around 70 per cent, unemployment rate of 3.5 per cent, and highly similar educational attainment, thus meeting the necessary conditions of this model, and enabling bushfire-driven effects to be pinpointed.

## Findings

The key highlight of this research is that it is an analysis of a disaster that afflicted a small regional town in Australia. As per similar studies that the research team has conducted using case studies of the 2009 Victorian Black Saturday bushfires, 2010–11 Queensland floods and 2013’s Tropical Cyclone *Oswald*, this research is trying to understand the impact of the Toodyay bushfire on individuals’ income in different sections of the workforce. Research limitations have been more acute for this particular study, given the small sample size of Toodyay, but nonetheless the findings accord with the other case studies noted above; vulnerable groups such as low-income individuals, and female employees, are adversely affected by bushfire.

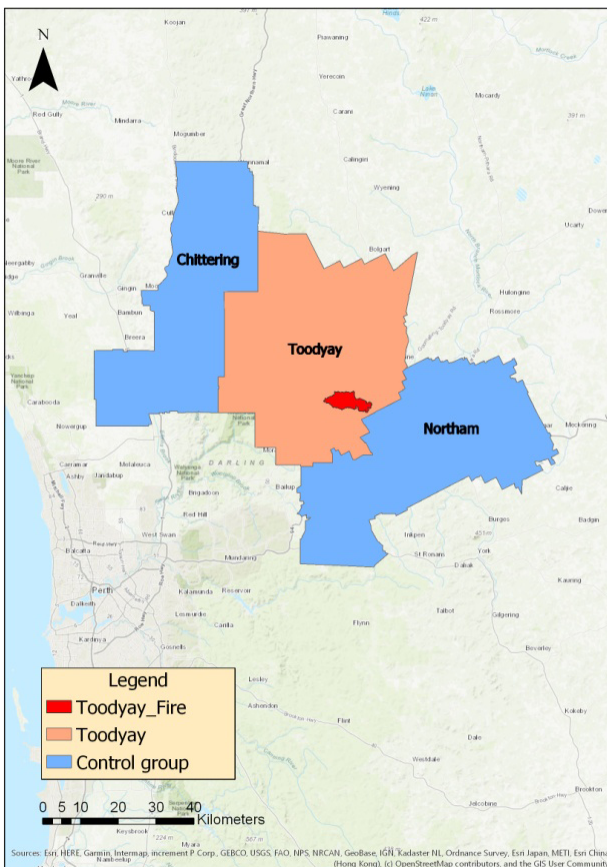


Figure 2: Treatment group (Toodyay) and control group (Northam and Chittering).

This research is a step towards understanding the economic wellbeing of small communities following natural hazards in Australia.

Its key findings are:

1. The 2009 Toodyay bushfire did not adversely affect the overall income trajectory of individuals who were in the labour force in 2006.
2. Two groups of people are vulnerable and affected economically by bushfires: low-income earners and female employees.

## Policy implications

Government disaster relief and recovery programs play an important role in supporting regional economies recover from natural hazards.

It is noted that the degree of economic exposure and speed of recovery activities are likely to have also influenced economic resilience to the fire:

- Recovery assistance: combined with public bushfire appeals and Western Power settlements, available monetary assistance for the Toodyay bushfires totalled \$16.5 million, with up to \$10.6 million distributed as at October 2012.
- Degree of economic exposure: with a significant number of non-employing local businesses, employed residents mostly work outside Toodyay. This fact, and the historical shift away from disaster-sensitive industries like agriculture, naturally limits the fire's effect on overall income trajectory.
- Speed of recovery activities: compared to bushfires with significant effects (e.g. the 2009 Victorian Black Saturday bushfires), the Toodyay bushfire was relatively small and quickly contained (14 hours), and 29 per cent of public assistance was distributed within the first three months.

While individuals, particularly sole traders, within Toodyay may have suffered significant income losses, this does not appear to have translated into any persistent changes to the income trajectory of the broader Toodyay community (in comparison to the control group).

Arguably, Toodyay residents' continued access to neighbouring unaffected areas on which they were economically dependent is likely to have significantly contributed to reducing or eliminating any persistent income losses they may have experienced. This also has an added and material benefit: in the case of bushfires, the longevity of disruptions to income post-disaster has been shown to materially affect the mental health of those affected by bushfires (Gibbs et al., 2016).

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