

Rural Land Ownership Change in NSW, 2004-20

Gross rural land ownership change analysis

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THE UNIVERSITY OF
SYDNEY



Department of
Primary Industries

Rural Land Ownership in NSW, 2004-20

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Acknowledgements and Overview

This report is an output from the Australian Research Council Linkage Project ‘The impacts of land ownership change on rural social and economic change’ (LP170101125) undertaken by the University of Sydney in partnership with the NSW Department of Primary Industries. Research reported here has the approval of the University of Sydney Human Research Ethics Committee (Protocols 2018/020 and 2019/749).

The aim of this project is to identify and explain key trends in the spatial and temporal patterns of gross rural land ownership change in NSW. Gross rural land ownership change is measured by adding up the total area of all parcels of land for which the name of the owner on the land title register has changed in a given year.¹ The core component for achieving this objective is the construction of a unique, research-ready, spatially informed database that records and maps every land transaction in rural NSW over the 16-year period from **January 2004** to **January 2020**. Details of the methodology for generating this dataset are provided in this report.

The NSW Department of Primary Industries commissioned this report as part of the workplan for this research project, funding for which was obtained through the Australian Research Council’s competitive peer-review process. Key findings and the methodological issues have been presented for peer-review consideration at the Institute of Australian Geographers’ 2021 Annual Conference, and a special seminar of the Australian Rural Geographers Study Group, held in September 2021. This report presents original research that addresses the issue of how to understand and measure changes in rural land ownership using new approaches and extends the boundaries of knowledge in this area.

Preparation of this report has had oversight from the project’s Steering Committee in the NSW Department of Primary Industries. We wish to thank members of the Steering Committee, the project liaisons, Tamara Prentice, and Mary Kovac. We also thank and acknowledge Dr Robyn Hean in the NSW Department of Primary Industries, who was our liaison officer in the initiation stages of the project.

We would like to acknowledge all Aboriginal and Torres Strait Islander Traditional Custodians of Country and recognise their continuing connection to land, sea, culture and community. We pay our respects to Elder’s past and present. In particular, we acknowledge and pay respect to the Gadigal people of the Eora Nation whose ancestral lands that the University of Sydney (Camperdown Campus) is built and all Traditional Custodians of Country in NSW upon which this research is conducted upon. As we share our own knowledge, teaching, learning and research practices within this University may we also pay respect to the knowledge embedded forever within the Aboriginal Custodianship of Country.

The concept of land ownership is contested and often deeply linked with histories of dispossession of land and discrimination, especially in settler-colonial countries such as Australia. This project uses ‘ownership’ according to the Torrens Title register which is the primary register for land held in NSW under the Real Property Act 1900. The recorded owner of land (otherwise known as the registered proprietor) in the NSW land title system is used for research purposes to investigate the dynamics of change for land ownership in NSW. It is important, however, to acknowledge that this approach does not represent Traditional Custodianship of Country.

¹ Gross ownership change includes all instances of on-paper name changes. Other reports published as part of this project use the concept of ‘substantive change’, which excludes instances in which the previous owner and new owner in a land-title registration are more than 70% similar. There are benefits to both approaches, as it is further explained in this report.

1 Executive Summary

Insight 1: Annual variation in the rate at which rural land changes hands in NSW appear to be increasing. Variability, in recent years, has been accompanied by strong macro-trends for primary producers in NSW and changing patterns of ex-urban migration.

- The study found that during the period January 2004 - January 2020, the median annual gross rate of rural land ownership change was 5.7% of the area of rural NSW (this is the NSW gross median 'churn rate').
- From 2004-15, annual fluctuations in the gross median churn rate were relatively narrow, in a band between 5.0 to 7.2%.
- After 2015, annual fluctuations in the gross median churn rate became more volatile, increasing from 5.4% to 7.3% in the two years to 2017-18, and then falling propitiously to 4.2% in 2019-20.
- The volatility was greatest in five clusters in NSW: (1) the grazing and copping belts of western NSW; (2) New England; (3) the Far North Coast (specifically, Ballina, Byron, Kyogle and Richmond Valley); (4) a cluster approximately two to three hours driving time west of Sydney; (5) a cluster from the Southern Highlands to Queanbeyan. The considerable differences between these clusters emphasise the disparate drivers generating trends in annual rates of rural land ownership of change.

Policy implication: More variable year-to-year peaks and troughs of ownership change rates imply greater volatility in patterns of rural change, emphasising the importance of real-time data collection and trend monitoring.

Question for future research: How will COVID's disruptions to the economy affect patterns of rural land ownership change?

Why this is important: The COVID pandemic is producing strong impulses for urban to rural migration. The majority of urban -rural migrants will settle in country towns and regional cities, but some will buy rural properties. COVID can therefore be conceived as an intensifier of land ownership variability in the rate of rural land ownership change.

The acquisition of rural properties by ex-urban migrants may take land out of agricultural production in some places, but arrest population decline in others. The COVID pandemic has been accompanied by strong macro-trends for primary producers in NSW, including record-level commodity prices, favourable seasonal conditions across most of NSW following years of drought, and record low-interest rates. In many ways, these trends are competing with those generated by the COVID-19 pandemic, creating new dynamics in rural land markets.

Monitoring these trends would provide a valuable resource for rural planners and policymakers and may lead to new debates on appropriate settings for relevant planning instruments, such as dwelling entitlements, minimum lot sizes and rural zoning.

Insight 2: At the regional level, gross median churn rates are relatively uniform and close to the NSW gross median rate of rural land ownership change (5.7%). However, at the LGA level, considerable differences exist.

- The gross median churn rate over the sixteen years of the study (Jan 2004-Jan 2020) for all of the major rural NSW Planning Regions was constrained to a relatively narrow band between 5.9% (Hunter, the region with the highest median annual churn), and South East & Tablelands (5.2%, the lowest).
- However, within each region there was considerable variability among LGAs in both the average churn rate over the study period and the trend patterns from year to year.

Policy implication: *There are significant limitations in analysing rural land ownership trends at regional scales; however, there is considerable intra-region heterogeneity at the LGA scale. For these data to best inform rural policy and planning, policymakers should investigate patterns and trends at LGA scales, rather than rely on regional averages.*

Question for future research: *Which LGAs will experience greater/reduced rates of rural land ownership change as the economy moves out of COVID?*

Why is this important? Rural NSW is being restructured by long-term trends including population growth in high amenity and coastal environments, and declining population in some areas as a result of farm consolidation, changing rural labour demand and reduced access to services. Patterns of rural land ownership change are a manifestation of these broader trends, suggesting that planning and policymaking needs to be more agile in responding to different dynamics, including important local government contextual factors. Data on rural land ownership churn assists this endeavour and enables comparison between LGAs.

Insight 3: LGAs with relatively higher median rates of rural land ownership change are clustered in northern NSW; those with lower median rates are clustered in southern NSW.

- The study used a spatial statistical tool (optimised Hot Spot analysis using the Getis Ord GI*) to identify regional clusters of LGAs exhibiting similar median rates of rural land ownership change over the study period.
- Two significant clusters were identified: (1) a continuum of LGAs along the northern border that displayed 'Hot Spot' characteristics (high rates of change, statistically influenced by their neighbours), and (2) a continuum of 'Cold Spot' LGAs in the eastern Riverina, through the Southern Highland and onto the South Coast.

Policy implications: *Given the diversity of rural land use within these two continuums, the outcomes cannot be attributed to a single driver. However, the results point to an overall higher level of activity in the north of the state compared to the south of the state.*

Question for future research: *Is rural NSW moving towards a 'two-speed' rural land market, with overall higher levels of activity in the north, albeit propelled by different drivers?*

Why is this important? Spatial statistical insights into regional clusters of LGAs experiencing similar rates of rural land ownership change can better enable policymakers to identify long term trends of rural change

Insight 4: Central West & Orana – relatively stable overall, but with slightly higher gross annual churn rates in northern and north-western parts of the region.

- During the study period, the annual gross churn rates for the Central West & Orana region increased over time, representing greater levels of activity in rural land markets. However, trends tended to stay close to the NSW average for most of the study period.
- The three LGAs with the highest churn rates in the Central West & Orana region were in the north and northwest of the region (Bogan, Warrumbungle and Mid-Western). Three of the four LGAs with the lowest rates were in the south (Blayney, Bathurst Regional, Weddin).

Policy implications: *Central West & Orana is a diverse region in a strategically important part of the state. Despite the disparate pressures on rural land brought by this diversity, longitudinal data paints a picture of a region with a more stable pattern of rural land ownership change than might otherwise be assumed. The greatest evidence of change is in the western and north-western parts of the region, dominated by broadacre cropping and grazing. Farm consolidation and acquisition is likely to be a major driver of change in these areas, alongside other contributing factors such as expectations over the Parkes Special Activation Project.*

Question for future research: *As COVID-era urban to rural migration, will this generate increased acquisition of rural land in LGAs proximate to regional cities, notably Orange, Bathurst and Dubbo?*

Why is this important? Our data indicates, somewhat surprisingly, that Central West has been a stable region when it comes to rates of rural land ownership change. Ex-urban migration may intensify demand for rural land in coming years, placing pressure on policymakers to review planning instruments that currently place curbs on the fragmentation or sub-division of existing agricultural holdings.

Insight 5: Far West – slowing rates of land ownership change, but high levels of year-on-year volatility

- The rate at which rural land is changing hands in Far West NSW is slowing, however year-by-year rates of change are volatile, and increasingly so. There is considerable diversity in average churn rates and trend patterns within the LGAs of the region. The neighbouring LGAs of Cobar, Brewarrina and Bourke exhibited the highest churn rates during the entirety of the study period, but in the period 2015-20, Wentworth, Central Darling and Balranald displayed a highly volatile peak and trough cycle.

Policy implications: *The Far West is a region where large acquisitions and disposals create considerable bounce in yearly trends. Setting this aside, there seems a long-term decline in average levels of rural land ownership change.*

Question for future research: *Will the rural landscape in Far West NSW further evolve into a smaller number of large holdings for large-scale agriculture, conservation or Indigenous occupancy, further squeezing out family farm heritages?*

Why this is important: Far West NSW contains much country that has marginal agricultural potential. Transition strategies to date have involved consolidation of farms, and replacement of agriculture for conservation and Indigenous uses. Analysis of rural land ownership data provides insight into whether these processes are accelerating or not, with long term regional consequences.

Insight 6: Hunter – high rates of annual gross rural land ownership change, especially in LGAs associated with mining.

- The Hunter region recorded the highest median gross land ownership churn rate for any of the major rural NSW regions during the study period (5.9%). Even though there was a slightly higher incidence of land ownership change in Hunter, compared to the rest of the state, year-on-year trends aligned closely with state-wide patterns. Rates were higher in inland parts of the region, notably Upper Hunter Shire, Muswellbrook, Dungog, Cessnock and Singleton, potentially reflecting considerable land ownership change associated with mining. High yearly volatility in these LGAs provides further evidence of the role of large land acquisitions driving regional churn rates.

Policy implications: *The Hunter has experienced considerable regional economic transformation linked to the expansion of mining during the first two decades of the twenty-first century, and this is reflected in high rates of rural land ownership change. This will likely continue as further restructuring of the region's economy occurs, based on the economic significance of the mining sector in contexts of changing demand for fossil fuels.*

Question for future research: *The period of our study, Jan 2004-Jan 20, has been a momentous era for the Hunter. The mining boom generated massive shifts to the composition of the regional economy and the ownership of land. As the region transitions away from fossil fuel extraction, how will rural land ownership patterns change?*

Why this is important: The Hunter economy appears at an inflexion point. Understanding the broad ramifications of regional change and who owns land will contribute to evidence-based policy about the region's future.

Insight 7: New England North West – large investors moving in, but overall patterns of land ownership relatively stable.

- During the study period, the average median rate of rural land ownership change in New England North West (5.7%) was identical to that of NSW as a whole. Annual gross rates of ownership change stayed within a narrow band for most of this time, and were aligned with broader yearly trends in the state. The highest rates of change were in the three LGAs in the far northeast of the region (Gwydir, Tenterfield and Inverell).

Policy implications: *The relative stability of rural land ownership in New England North West is surprising, given that during this period there was the well-documented entry of some large agribusiness investors and considerable effects of drought. These data suggest that these processes had a lesser impact on region-wide patterns of rural land ownership than might have been expected.*

Question for future research: *Will there be continued interest by large agribusiness firms in acquiring land in this region, and what will this mean for overall patterns of change and land concentration?*

Why this is important: New England North West is very valuable contributor to the NSW agricultural economy. As investors seek to capture of scale economies in the cotton, grains and gazing sectors, will this intensify trends of aggregation and the concentration of agricultural land?

Insight 8: North Coast – rapid population growth and restructuring of forestry driving an increase in churn rates.

- The North Coast experienced a dramatic increase in the median rate of gross rural land ownership change in 2015-16. In 2014-15, 5.4% of rural land in the region changed hands. The following year, this increased to 8.1%, and it remained significantly higher than the state average for the remaining years of the study. There is little doubt that non-agricultural drivers were key to this outcome. Faster population growth and lifestyle migration generated increased demand for rural land. This combined with significant changes to ownership of forestry land in some LGAs (notably, the three with the highest churn rates, Clarence Valley, Richmond Valley and Kyogle) contributes to high rates of churn.

Policy implications: *The future of agriculture in the North Coast is being pressured by population growth and higher land prices. Population pressure is spilling out from towns into adjacent agriculturally productive areas. Monitoring this process will generate clearer insights into the future of agriculture in the region.*

Question for future research: *What is the future for agriculture on the North Coast, and what shape will it take?*

Why this is important: Population growth and high demand for rural land on the North Coast place intensified pressures on existing norms for agricultural production. These pressures are manifested through an array of planning challenges, including: (1) land-use conflict at the rural residential/ agriculture interface; (2) demands for the relaxation of planning instruments that constrain the subdivision and building of dwellings on agricultural land, and (3) securing land for agriculture in contexts of rapid increases in property prices. Two specific agricultural policy implications arise from this third point. The increased cost of agricultural land necessitates shifts towards agricultural activities to those with higher rates of return per land unit, either through intensification or boutique, high-value products. Higher cost of agricultural land also generates barriers to farmer entry, potentially encouraging moves from direct farm ownership to land leasing and co-operative farming arrangements.

Insight 9: Riverina Murray – low gross rates of rural land ownership change amidst major changes to regional agriculture.

- Riverina Murray has undergone considerable rural change during the study period Jan 2004-Jan 2020, with a major driver being the implementation of changed water entitlement arrangements. Nevertheless, the rate at which rural land changed hands during the period was considerably lower than the state as a whole.
- Of the 20 LGAs in Riverina Murray, eleven had average median churn rates less than 5%. There was also a low level of year-on-year variation.
- The outlier to this regional pattern was Leeton, a relatively small LGA, which experienced a dramatic peak and trough cycle in 2015-16 and 2019-20.

Policy implications: *Major changes to the composition and economic context of agriculture in Riverina Murray, associated especially with water entitlements, have failed to generate a high level of responsiveness in terms of the overall rate at which rural land changes hands.*

Question for future research: What role is being played by land in the agricultural restructuring of Riverina Murray?

Why this is important: Changes to the ownership of rural land are manifestations of agricultural restructuring. Relatively low rates of rural land ownership change may indicate (1) low rates of agricultural restructuring, or (2) an ability of landholders to restructure their operations without heightened need to dispose or acquire agricultural land. The database used in this study can separately identify irrigated and non-irrigated land and can shed light on these questions.

Insight 10: South East & Tablelands – the most stable region in the state.

- Over the sixteen years of the study period, from Jan 2004- Jan 2020, the annual median gross rate of rural land ownership change in South East & Tablelands remained remarkably stable, within a band between 4.9% and 6.6%.
- South East & Tablelands has the least year-on-year variability by far of any major rural region. The one distinguishing feature of trends in this region is that annual gross churn rates were much more stable, year-on-year, for agricultural than for non-agricultural land. The overwhelming majority of rural land in this region is agricultural and so its stability underpins wider regional trends.
- The region contains a diversity of LGAs from those on the coast (Bega Valley and Eurobodalla) to those several hundreds of kilometres inland (Yass Valley, Hilltops) yet there is no obvious geographical pattern between LGA results.

Policy implications: South East & Tablelands is a region undergoing change, especially associated with its amenity-driven coastal and ‘Capital Region’ attributes. Annual rates of rural land ownership change for non-agricultural land reveal these processes, but in contexts where ownership arrangements for agricultural land are very stable

Question for future research: What are the processes driving change rates for non-agricultural rural land?

Why this is important: This region, more than any other, highlights the changing composition of rural land. However, if the region continues to transition to greater non-agriculture land uses, will how will this stability be affected? Data can inform questions into who is acquiring non-agricultural land, and why?

2 Background

2.1 The Importance of Rural Land Ownership Data

Rural land ownership has been a key focus of recent public and policy debate. The growing interest in this topic has been triggered by concerns over the role of land ownership on agriculture and the sustainable management of rural land. Significant public attention has been given to the loss of agricultural land to mining and rural residences, and the implications of land acquisition by large domestic and foreign agribusiness corporations.

Despite this increasing public attention on patterns and effects of rural land ownership change, there has been a lack of authoritative assessment of long-term regional and state-wide trends in rural land ownership in Australia. Rural policymakers and other stakeholders routinely access and interpret data about population change (from the Census and other ABS publications), agricultural production (from industry surveys such as those conducted by ABARES and other agencies), and rural land use (via remote sensed databases that have emerged recently through a spate of platforms). However, in the data-rich environment of rural policy- and decision-making, there exists no comprehensive, longitudinal database or analytical approach for measuring and assessing land ownership change. The only sources of information available in this area come from real estate and financial companies who publish updates on market trends, based on sales price data (for example, see: Rural Bank, various years). These sources however speak to client interests only, meaning that they fail to provide an overarching overview across the entire rural sector (including agricultural and non-agricultural uses of land), and do not delve into forensic analytics, such as what types of entities are acquiring what types of land, where and from whom.

Public policymaking in NSW is much richer with the availability of longitudinal data on rural land ownership change. Specific attributes of having these available are –

- Enabling identification of trends on the rate of rural land ownership change (the ‘churn rate’) at state, regional and LGA scales. This allows analysis of ‘hot spots’ and ‘cold spots’ of change, thereby directing where policy resources may be focused.
- Allowing, for the first time, systematic assessment of the concentration and fragmentation of rural land, which can be attached to cognate spatial datasets on Biophysical Strategic Agricultural Land (BSAL) and planning regulations (Zones, Minimum Lot Size limits, etc), can generate sophisticated analysis of long-term trends which impact on the safeguarding of agricultural land.
- Elevating analytical capabilities for rural policymaking more generally. For example:
 - Longitudinal data on land ownership change coupled with Combined Drought Indicator data can bring empirical insights into the ways in which droughts affect rural land markets. Such insights, to the extent to which they have existed to date, have tended to be premised on anecdotal or small-scale sources of information.
 - Longitudinal data on land ownership change can reveal dynamics associated with the fragmentation and/or sub-division of rural land associated with rural lifestyle and amenity land uses. Mapping these patterns can generate data on the average size of rural lifestyle/amenity holdings, and their prior and current land uses.
 - Longitudinal data on land ownership can also identify trends in farm aggregation and ownership concentration over time. This provides important context to debates on the future of farming, and its contribution to regional economies if the number of separately owned family-farms declines over time.

2.2 The Research Project

The purpose of this research project is to fill the analytical gap described above for the state of New South Wales (NSW). To do so, a rigorous spatial inquiry methodology was applied to a purpose-built database of over 9 million records based on matching land titles and spatial cadastral data for rural NSW for the 16-year period between 2004 and 2020. The project aims to inform ongoing public policy debates on the future of rural land by providing evidence-based analysis of the dynamics of rural land ownership change. This is pursued through the following threefold research strategy that was developed by the project Steering Committee, representing the researchers and DPI officials:

1. Preparation of an overview report that provides a public record of the key summary data at state-wide, regional and LGA scales, and outlines the methodology used (this report).
2. A series of four ‘regional transect’ reports that identify and assess the drivers of rural land change in key parts of the state. The four regional transects are Northern NSW, Hunter, Central West, and Riverina.
3. Research to be submitted and published in peer-reviewed research journals that addresses the four research questions outlined in Table 2.2-1.

Table 2.2-1. Project Overarching Research Questions.

| Theme | Research question |
|--|--|
| 1. Agricultural commodities | How do the incidence and characteristics of land ownership change differ across agricultural-commodity systems and how can this information help policy formulation for enhancing agricultural efficiency and sustainability? |
| 2. Corporate agriculture and the ‘family farm’ | To what extent are declining numbers of farms explained via processes of consolidation, particularly associated with the acquisition of ‘family farms’ by larger agri-corporate entities? |
| 3. Water sensitivity | How responsive are the incidence and characteristics of land ownership change to the effects of water scarcity? Do more farms change hands during drought? |
| 4. The effects of planning decisions | How do planning rules relating to the subdivision of rural land affect ownership and land use patterns, with reference to: (a) conversion of farmland to non-farm uses; (b) changes in average farm property size, (c) correlation between the construction of a dwelling on a property and its use for agricultural purposes? |
| 5. The economic impacts of farm subdivision | How does subdivision of farms, if it replaces traditional agriculture with rural residential land uses, impact on the economies of local towns? How is this related to potential land use conflicts arising from this process, especially in relation to nuisance complaints? |

2.3 Report purpose

The aim of this report is to provide a state-wide analysis of trends in rural land ownership change over the sixteen years of the study period, Jan 2004- Jan 2020. The key metric for much of this analysis is the *gross churn rate*, defined as the amount of rural land changing ownership in a particular year, represented as a proportion of the total amount of rural land potentially available to change hands (hence, as elaborated later in this report, our methodology excludes land in towns and regional cities, and land not able to be transferred, such as National Parks). *Gross churn rates* are calculated at different geographical scales (state-wide, regional, and LGA-level), across the study period.

Gross churn rates are different to *substantive churn rates*. The gross churn rate is the overall rate of land ownership change, including all name-changes on title as per the information on the land titles register. Gross churn rates, thus include instances in which the name of the previous owner and new

owner are more than 70% similar. In most instances, a change of name on a parcel's title represents a sale of land to a party unrelated to the original owner. We refer to these as 'substantive changes.' However, there are instances in which a name-change is the result of the change of name of the owner (for example as a result of a marriage), a typographical correction or, in some cases, the inclusion or removal of a person from the title in cases of multi-person ownership. We refer to these as 'partial changes.' For the purpose of these report, we do not make a distinction between substantive churn rates and partial churn rates. Rather, the focus is on *gross churn rates*, which include all instances of name changes on a land-title.

The assessment of gross churn rates in this report provides a baseline perspective of key land ownership change patterns across the 10 planning regions in NSW and the rural LGAs within them (Figure 2.3-1). The use of churn rates as an analytical concept allows us to compare regional and state-wide patterns of change across different years. The analysis provided in this report represents the first time this perspective on rural NSW has been able to be viewed. This overcomes a potential tendency, in the absence of longitudinal state-wide data, for individual transactions to be interpreted out of context. For example, an acquisition of a series of large holdings by an agribusiness corporation may elicit knee-jerk responses at the local level about a rapid concentration in land ownership. However, the data presented here enables such activities to be situated in their wider temporal and spatial contexts.

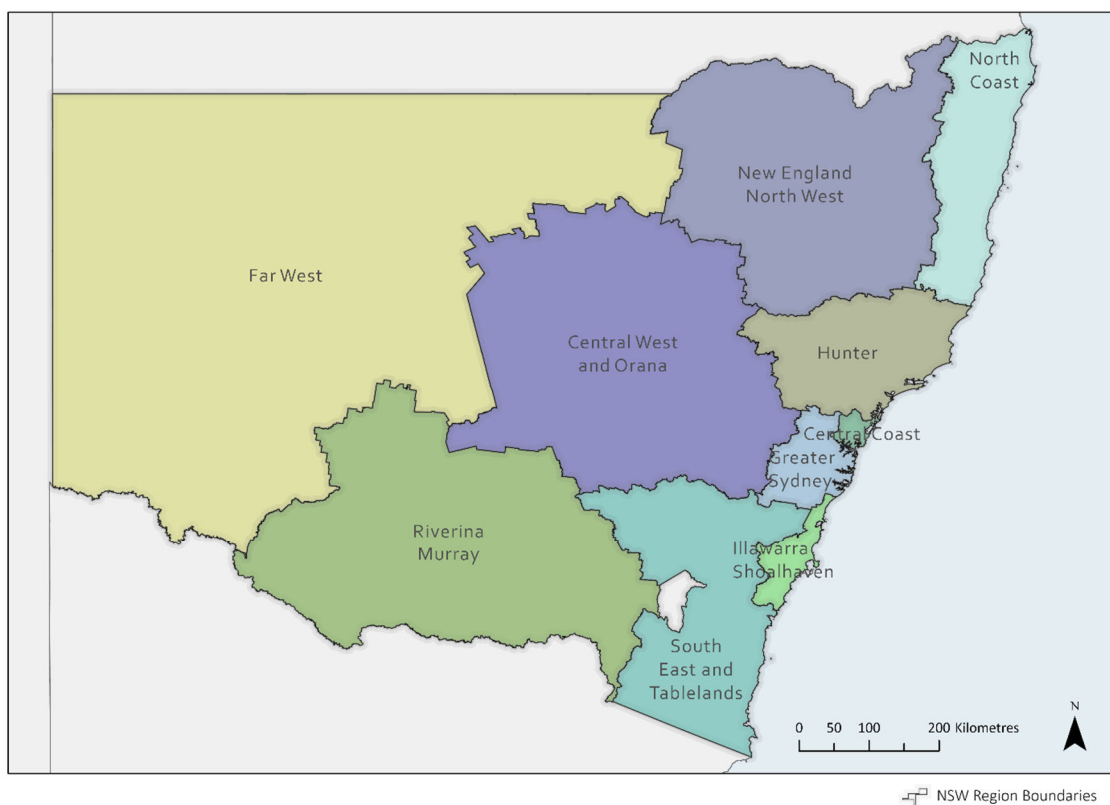


Figure 2.3-1. NSW Region Boundaries

2.4 The land ownership database

The spatial database was designed by the University of Sydney research team based on land titles data provided by the NSW Land Registry Services (LRS). Large-scale land titles data has been a largely untapped resource for researchers and policymakers. This is because land titles databases are used primarily to facilitate the extraction of point-in-time single records for 'over-the-counter' enquiries about land titles, rather than for the extraction of state-wide records over a multi-year period.

Consequently, the creation of a research-ready database required the development of sophisticated methodologies to facilitate the extraction, cleaning, and interpretation of the data. In addition to issues of database design, a clear electronic record of every land parcel in the state is not always available due to digitisation issues of historic parcel data. This is further complicated by typographical errors in the data and convention differences in the use of abbreviations and acronyms.

Furthermore, land titling has inherent legal and administrative complexities, including business registration rules, co-ownership of land between private owners and public agencies, land covenants, and name changes. Thus, for this project's 16-year study period, annual land titles data was cleaned and formatted so that it could be matched to cadastral spatial data provided by NSW Spatial Services. This process of matching spatial and ownership data allowed the research team to create a research-ready database showing ownership and seller data for every land parcel in rural NSW for each year of the study, that covers 91% of rural NSW.

2.5 The Torrens Title system

This research defines land ownership on the basis of the Torrens Title system, which is the primary method to legally ascertain ownership administration information in NSW (NSW Land Registry Services, 2021). The Torrens Title system was introduced to NSW with the commencement of the *Real Property Act 1863* and currently operates under the *Real Property Act 1900*. The Torrens system is now universally used in Australia and in many other countries around the World (Hartwig, et al., 2020).

The Torrens Title system divides land into parcels, with each parcel having a single registered 'land title.' Land titles are kept in a centralised title register by the Registrar General. Each land parcel's title is updated with each new transaction which ensures that ownership is recorded in a single document and is guaranteed by the NSW Government. The 'indefeasibility' of title of the Torrens system lends itself well to statistical analysis, as land ownership records can be extracted and organised in a large-scale database for quantitative analysis. The benefit of this approach is the ability to provide evidence-based analysis of how land is held and occupied in NSW by using a consistent, large-scale, and legally recognised source of data.

Although we employ the Torrens Title principles in our analysis, we note there are many ways of conceptualising land ownership (ICSM, 2021), and in the Australian context, the concept of property and land ownership is deeply linked with histories of dispossession of land. It is important, then, to recognise that the Torrens Title system does not represent Traditional Custodianship of Country. Its introduction in NSW in 1863 is part of a history of marginalisation and displacement of Aboriginal and Torres Strait Islander peoples in Australia (see e.g., Wensing, 2014; Hartwig, et al., 2020). We acknowledge the shortcomings of using the Torrens Title system as one of many ways to conceptualise land ownership and its role as part of the dispossession of land from Aboriginal and Torres Strait Islander peoples in our research.

3 Methodology

3.1 Overview

This project analyses patterns of land ownership change across rural NSW based on analysis of data stored in the spatial database purpose-built by the University of Sydney research team. The spatial database was constructed by matching two datasets obtained from government agencies:

- **Land registrations data** obtained from the NSW Government custodian agency (Land Registry Services and its predecessors) at 1 January each year for the 16 years of the study period (January 2004 - January 2020).
- **Cadastre data** obtained from NSW Spatial Services showing the spatial location and area of land parcels for specified LGAs at 1 January each year for each of the 16 years of the study period (January 2004 - January 2020).

The combination of the two datasets, using cadastre ID (CADID) numbers as the matching feature, allows for a spatial analysis of time-specific land registration transactions.

The final research-ready spatial database includes the following information for each parcel of land in the study area for each year in the study period:

- **Land parcel details:** including area (sqm), Cadastre ID (CADID), LGA, and region where it is located
- **Ownership information:** including owner category and names of owners
- **Seller information:** including seller category and names of sellers (for parcels changing hands in the relevant year)
- **Subdivision and amalgamation data:** whether the parcel was subdivided or combined with other parcels in the calendar year
- **Land use information:** the total area of the different land uses that apply to the parcel of land and the proportion of the lot that is dedicated to agriculture, developed by the overlay of Australian Land Use & Management (ALUM) onto our land parcel spatial dataset
- **Other information:** whether the lot changed hands in the calendar year and the proportion of similarity between the owners and the seller.

The methods used to create the database are explained below. A complete table of the fields that comprise the final research-ready database can be found in 0

3.2 The baseline

The starting point for the research was a point-in-time dataset showing ownership data for 597,909 unique land parcels in rural NSW as of 1 January 2004. This dataset was obtained from the NSW land title custodian agency for a previous study conducted by the lead researcher in 2012 (see Pritchard et al., 2012).² It covers 96 non-metropolitan local government areas (LGAs) across the 10 NSW regions. A list of the 96 LGAs is provided in Table 3.2-1.

² The use of these data for the current project was approved by relevant ethics protocols.

Table 3.2-1. List of LGAs included in the study area, based on 2016 ABS boundaries.

| | | | |
|-------------------|--------------------|------------------------------|-------------------------|
| Albury | Coffs Harbour | Lachlan | Richmond Valley |
| Armidale Regional | Coolamon | Lake Macquarie | Shoalhaven |
| Ballina | Coonamble | Leeton | Singleton |
| Balranald | Cowra | Lismore | Snowy Monaro Regional |
| Bathurst Regional | Dungog | Lithgow | Snowy Valleys |
| Bega Valley | Edward River | Liverpool Plains | Tamworth Regional |
| Bellingen | Eurobodalla | Lockhart | Temora |
| Berrigan | Federation | Maitland | Tenterfield |
| Bland | Forbes | Mid-Coast | Tweed |
| Blayney | Gilgandra | Mid-Western Regional | Unincorporated NSW |
| Bogan | Glen Innes Severn | Moree Plains | Upper Hunter Shire |
| Bourke | Goulburn Mulwaree | Murray River | Upper Lachlan Shire |
| Brewarrina | Greater Hume Shire | Murrumbidgee | Uralla |
| Broken Hill | Griffith | Muswellbrook | Wagga Wagga |
| Byron | Gundagai | Nambucca | Walcha |
| Cabonne | Gunnedah | Narrabri | Walgett |
| Camden | Gwydir | Narrandera | Warren |
| Campbelltown | Hawkesbury | Narromine | Warrumbungle Shire |
| Carrathool | Hay | Oberon | Weddin |
| Central Coast | Hilltops | Orange | Wentworth |
| Central Darling | Inverell | Parkes | Western Plains Regional |
| Cessnock | Junee | Port Macquarie-Hastings | Wingecarribee |
| Clarence Valley | Kempsey | Port Stephens | Wollondilly |
| Cobar | Kyogle | Queanbeyan-Palerang Regional | Yass Valley |

The data obtained from the custodian agency for these 96 LGAs as of 1 January 2004 covers only 83% of the land parcels in these LGAs. Data was missing for 17% of parcels in these LGAs as a probable result of incomplete digitisation of the NSW cadastral and land titles record base at the time the baseline data was requested. The practical effect of these gaps is that parcels missing full ownership information in the baseline have been removed from the study. The lack of baseline ownership data for these land parcel means that they are not useful to trace ownership patterns across the study period.

3.3 Geographic filters

In addition to removing parcels of land with no ownership information from the baseline, the following areas were also excluded from the analysis:

1. **Urban areas:** based on the Australian Bureau of Statistics (ABS) definition of Urban Centres and Localities (UCLs) as “areas of concentrated urban development with populations of 200 people or more.” The spatial 2016 UCLs layer was used to carve out parcels of land falling within UCLs from the baseline. Excluding these urban areas ensures the focus of our research remains firmly on rural land.
2. **Metropolitan LGAs:** LGAs with little to no rural land (by area) and LGAs with low proportions of rural land area in the sample after the exclusion of UCLs were removed from the baseline.

In total, 33 LGAs were excluded from the NSW study area.³ The boundaries of LGAs used were the ones existing in 2016.⁴

3. **Small land parcels:** The study area additionally excluded land parcels with an area of less than 200 square metres from the baseline to ensure that the data was not skewed by parcels with minimal relevance to broader patterns in the rural economy, such as road reserves, drainage easements, and small parcels used for telecommunication towers.

The application of these three filters produced the baseline study area which includes 597,909 land parcels as of 1 January 2004. This baseline area covers 639, 975 km². This baseline data was subsequently spatially joined with spatial cadastral data for the same date and geographic extent to create a spatial baseline for the research project. This baseline is mapped in Figure 3.4-1.

3.4 Representing ownership changes

After having defined the baseline extent for 1 January 2004, the research team mapped ownership changes for the rest of the 16-year study period (January 2004- January 2020) for every parcel of land in the study area. Changes in ownership for each parcel were identified using two different sets of data:

- For the 3-year period between 1 January 2005 and 1 January 2008, data obtained for the previous study conducted by the lead researcher was used (Pritchard et al., 2012). This report refers to it as **Dataset 1**.
- For the 10-year period between 1 January 2009 and 1 January 2020, a specific request was made to NSW Land Registry Services for ownership changes in each calendar year. This report refers to this dataset as **Dataset 2**.

Mapping these ownership changes was achieved by joining land registry information to cadastral data provided by the NSW Government Spatial Services in the form of a Digital Cadastral Database (DCDB).⁵ The cadastral data was provided in shapefile format and mapped all land parcels as if 1 January for each year between 2004 and 2020.

Cadastral ID as a common field

Ownership data for each year of the study period includes a field identifying the cadastral identification number (CADID). The CADID is a unique number attached to every land parcel. Its uniqueness means that it can act as a joining field between the land ownership dataset and the NSW Digital Cadastral Database.

Joining the ownership dataset and the cadastral spatial dataset involved matching two databases using CADID as a joining field.⁶ The number of CADIDs in the study area is not static as new lots are

³ The following LGAs were excluded (by region): Greater Sydney (Blacktown, Blue Mountains, Botany Bay, Burwood, Canada Bay, Canterbury-Bankstown, Cumberland, Fairfield, Georges River, Hornsby, Hunters Hill, Inner West, Ku-ring-gai, Lane Cove, Liverpool, Mosman, North Sydney, Northern Beaches, Parramatta, Penrith, Randwick, Rockdale, Ryde, Strathfield, Sutherland Shire, Sydney, The Hills Shire, Waverley, Willoughby, Woollahra); Illawarra Shoalhaven (Wollongong, Shellharbour, Kiama); and Hunter (Newcastle).

⁴ Since the study period for this project includes years in which significant changes to LGA boundaries occurred, we apply the 2016 LGA boundaries to all years in our dataset. This ensures that we analyse LGA spatial areas consistently.

⁵ The Digital Cadastral Database (DCDB) is a state-wide integrated digital representation of the cadastre of New South Wales (NSW). The DCDB contains spatial representations of current land titles including land parcels, strata parcels, legal road easements, water bodies, and unidentified parcels (Spatial Services, 2015).

⁶ For example, ownership registration changes from 1/1/05 to 31/1/05 are joined to the spatial layer for 1/1/06.

created each year.⁷ This methodology accounts for subdivisions and amalgamation of land parcels occurring during a calendar year, as the cadastral data as 1 January each year accounts for all the new lots created during the previous calendar year through subdivisions, boundary adjustments, and amalgamations.

Identifying sellers

After having joined the spatial cadastral databases and the ownership databases for each of the 16 years in the study period, the research team identified the ‘seller’ for each parcel of land which changed hands in each calendar year. The method to identify the sellers of land involved matching the ownership data for each parcel of land in the baseline to its subsequent year using CADID as the joining field. For new parcels of land created through subdivision (which have new CADIDs) and later sold, a spatial join was performed in ArcGIS to match the owner from the lot which was subdivided to the new lot created. This allowed the research team to spatially identify the ‘seller’ of this newly created lot.

This process was applied to all years subsequent to 2004 in chronological order. The result of this methodology was a database that identified the following fields:

- Owner or owners (as on 1 January each year)
- Whether the parcel changed hands in the previous calendar year
- Seller (only for parcels which changed hands in the previous calendar)
- Whether the parcel is a result of a subdivision or amalgamation the previous calendar year.

⁷ New CADIDs can be created when a subdivision occurs and old CADIDs removed if parcels are amalgamated. Thus, aligning the dates of spatial cadastre layer and land registration data is crucial to achieving the maximum number of matches between the datasets.

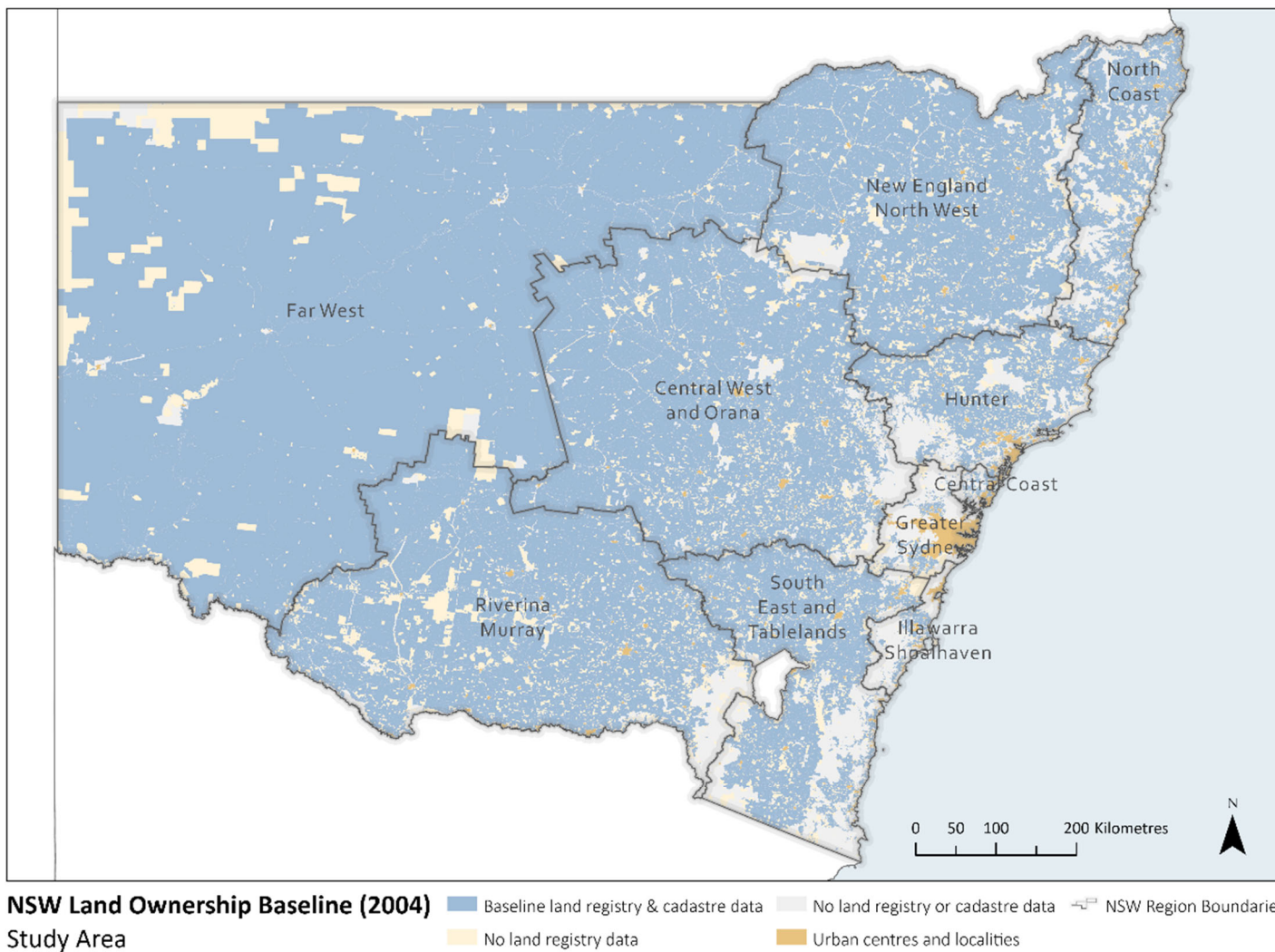


Figure 3.4-1. NSW land ownership baseline study area.

Map of NSW defining the 2004 baseline sample of the land ownership database where there is both land registry and cadastre information available, cadastre data with land registry information, and no land registry or cadastre data. Urban centres and localities (as defined by the ABS, 2016) are also shown, as land parcels in these areas are excluded from the baseline.

3.5 Data preparation

Datasets 1 and 2 identify all land title registration events for each unique land parcel, based on the cadastral identification number (CADID).⁸ However, land parcel information recorded across the two datasets have varying formats and naming conventions, including different use of acronyms, special characters and name spellings (such as ltd., co, &, Mr). The research team developed a method to remove inconsistencies as much as possible by replacing equivalent acronyms and special characters with a consistent convention across both datasets. For instance, “Pty Ltd” was amended to “Pty Limited”, to ensure that land parcels recorded as being owned by (say) “ABC Pty Ltd” and “ABC Pty Limited” were consolidated into a single consistent owner name (“ABC Pty Limited”), reducing the potential for these to be spuriously identified as being different owners.

Identifying inconsistencies

Some formatting inconsistencies are not as simple to identify and clean due to the scale of the dataset, and the possibility remains for certain administrative inconsistencies being picked up as ‘ownership changes.’ For example, the correction of a spelling error for the same parcel of land across datasets could be classified as an ‘event’ because it involves a change in the owners’ record name (e.g. a land parcel held by ‘Jonathon Smith’ one year and ‘Johnathon Smith’ the next may refer either to a spelling correction for the same person, or an actual transfer of ownership between two people with remarkably similar names). The same issue occurs when the owner has the same name but a different surname across multiple years, which may represent a name change (for example due to a marriage) or it may represent a sale between two different people who share a given name. Some of these may be naming and spelling corrections, however the possibility remains that these are legitimate transactions between individuals with similar names or transactions between family members.

In other situations, a parcel of land may be owned by (say) five individual owners, and one of these is removed from the title and an additional owner added. Classifying examples like these as transactions requires making a judgment of the extent under which a name is similar enough to be classified as being the same owner. The research team sought to clean the data as far as possible, but the possibility remains for certain data anomalies being picked up as transactions.

Cleaning inconsistencies using Fuzzy Lookup

The method used by the research team to minimise the false identification of these formatting inconsistencies as changes in ownership was based on identifying the extent of similarities between the seller and owner fields in the database. The *Fuzzy Lookup* ad-in for Microsoft Excel was used to determine the similarity between ‘strings of text’ in the owner and seller fields of the database. This tool provides a similarity score based on the percentage of the text string which matches.

The following thresholds were defined based on the percentage similarity between the owner and seller fields for each parcel of land on each year:⁹

- **0-20% similarity (substantial change):** this level of similarity is considered a definite ownership change with little or null possibility for typographical or formatting errors to be present.

⁸ A registration event has a short date (e.g. 23/11/2006). This is the date of a change of ownership is determined.

⁹ These thresholds were identified by undertaking a survey of similarities across all years.

- **20-70% similarity (substantial change):** this level of similarity is considered to be an ownership change; however, it includes instances in which there are partial ownership changes, including:
 - One or multiple owners being replaced in a multi-owner arrangement
 - Potential family transactions, where the owner and seller share a surname
 - Name changes (for example due to marriage)
 - Typographical and formatting errors are also possible, including different spellings for the same surname or given name, and different use of acronyms and special characters.
- **70-100% similarity (partial change):** when the similarity is above 70% it is considered not to be a substantial ownership change, but a clear change of name for the same owner, a typographical or formatting issue associated with the same owner or similar situations where the name of the previous owner and the new owner are over 70% similar.

For the purposes of the analysis presented in this report, both substantial and partial changes (where similarity between owner and seller is below 70%) are considered to be a 'change of ownership' as they both indicate a significant change to the name on the land title. As such, it needs to be recognised that our measurements of change ('gross churn rates') encapsulate both arm's length/non-arms' length, and commercial/non-commercial changes in ownership. For example, if a rural property is transferred from the name of a mother and father to a son/daughter and in-laws in a non-commercial (intra-family) transfer of ownership, this may be recorded in our database as an ownership change, depending on how the configuration and overlap of the same surnames is manifested in the 'degree of similarity' test we apply using the fuzzy logic methodology. While these issues temper in a strict sense the precision of our analysis, we note: (1) this same approach is used consistently for every year of the study period, so churn rates are equivalent 'like-for-like' between years, and (2) pragmatically, given a baseline dataset of 597,909 parcels, this approach provides the most effective way to generate a large and consistent dataset of transactions. Again, we note that the land titles databases from which our analysis are derived are not formatted for extraction of state-wide records over a multi-year period but for 'over-the-counter' enquiries about single land titles, posing these types of methodological dilemmas in our research. Appendix B presents 'substantive' (similarity of buyer and seller below 70%) and 'partial' ('similarity of buyer and seller above 70%) for all regions. As the data in Appendix B indicate, the large majority of changes are substantive.

3.6 Defining agricultural land

An important consideration in the study is the land use status of parcels changing hands. Rural NSW contains a wide array of land uses, including agriculture, mining, residences, forestry and natural vegetation. To attach land use categories to individual parcels in the database, the research team used the publicly available NSW Government land use spatial dataset.¹⁰ This data is part of the

¹⁰ Land use information has been captured in accordance with standards set by the Australian Collaborative Land Use Mapping Program (ACLUMP) and using the Australian Land Use and Management ALUM Classification Version 8. Land use classes are assigned based on land use activities occurring in the last 5-10 years that may be part of a rotational practice. Time-series LANDSAT information has been used in conjunction with more recent Satellite Imagery to determine whether grasslands have been disturbed or subject to ongoing land management activities over the past 30 years.

Australian Collaborative Land Use Mapping Program (ACLUMP) and uses the Australian Land Use and Management (ALUM) Classification system.¹¹

Three versions of the NSW Government land use spatial data are available: 2007, 2013, and 2017. The existence of three time points of the NSW land use spatial dataset provides an indicator of land use change over the study period. Each dataset is an average of the years preceding it, and so it was appropriate to join it to years it retrospectively covers. Thus, the 2007 land use dataset was applied to the cadastral layer for the years 2004-07. The 2013 land use dataset was applied to the cadastral layer for the years 2008-2013 and the 2017 dataset was applied to the cadastral layer for the years 2014-2017. In the absence of a more recent version, 2017 has also been attributed to the years 2018-20. A map of the land uses as per the 2017 Land Use Classification is included in Figure 3.10-1.

Identifying agricultural land parcels

The spatial nature of the NSW land use dataset allowed the research team to identify the proportion of the area of each parcel of land attributed to different types of land uses according to the ALUM classification system. Every land parcel was then classified according to the proportion of area dedicated to agriculture. Land parcels with 50% or more of their total area dedicated to an agricultural land use (as defined by the categories in Table 3.6-1) were classified as ‘agricultural’. Parcels in which agricultural uses make up less than 50% of their total area were classified as being ‘non-agricultural’. Figure 3.10-2 shows the breakdown of the study area on this basis.

Table 3.6-1. ALUM land uses used to define agricultural land.

| | |
|---------------------|---|
| Grazing | 2.1.0 Grazing native vegetation |
| | 3.2.0 Grazing modified pastures |
| | 4.2.0 Grazing irrigated modified pastures |
| Cropping | 3.3.0 Cropping |
| | 4.3.0 Irrigated cropping |
| Horticulture | 3.4.0 Perennial horticulture |
| | 3.5.0 Seasonal horticulture |
| | 4.4.0 Irrigated perennial horticulture |
| | 4.5.0 Irrigated seasonal horticulture |

Excluded agricultural land uses

Intensive agricultural uses, farm infrastructure, land in transition, and forestry uses were not included in the calculation of agricultural land parcels. These classifications include uses which are not strictly rural, so including them in the sample may have skewed the data to include non-rural uses. For example, the classification 5.4 Residential and farm infrastructure includes urban residential uses and small remote communities. Classification 3.6 Land in transition and 4.6 Irrigated land in transition include degraded land under rehabilitation and land cleared of intact native vegetation where the proposed land use is not known. The broad nature of these land use categories makes it necessary to excluded them from the calculation of agricultural land to ensure that they do not skew the data away from purely agricultural uses.

¹¹ The data can be access via the NSW Government SEED Portal: <https://datasets.seed.nsw.gov.au/organization/department-of-planning-industry-and-environment>, (accessed 2 March 2021).

Intensive agricultural uses were not included in the calculation of ‘agricultural lots’ as intensive agricultural uses have specific land area and location requirements compared to extensive agricultural uses. In addition, these uses are often located near urban centres and localities, which are excluded from the study area. Forestry uses were also excluded from the definition of ‘agricultural’ land since they follow different patterns of ownership and land use management. For this reason, including forestry and intensive land uses in the calculation of agricultural land would have potentially skewed the data and so they were excluded.

3.7 Owner type categories

Rural land parcels can be held in the name of a range of different entities, including public authorities, the Crown, corporations, individuals, community groups, and Indigenous organisations. To gain insights into these patterns of ownership, the research team manually coded land parcels according to the schema described in Table 3.7-1. Search functions were used to identify parcels owned by ‘Her Majesty Queen Elizabeth’ (and minor variants) and classify these as Category 1. Land held in the name of ‘Minister for...’ or ‘Department of...’, and variants were classified as Category 2. Where Category 2 parcels also had a private or corporate name listed, they were classified as Categories 3 and 4, respectively. Categories 5, 6, and 8 were clear cases of private land, held either in the name of one or more individuals (Category 5), one or more companies (indicated by “Pty Limited” on the land title, Category 8) or a combination of both (Category 6). Finally, Category 9 was land held by Trustees (typically associated with deceased estates), Category 10 was where there was an identifiable community interest (e.g., golf clubs, land held by identifiable Indigenous organisations, racecourses). As displayed in Table 3.7-2 and Table 3.7-3, land classified under Categories 5, 6, and 8 (private land) accounted for 86.7% (by area), and 93.6% (by number of parcels) of our data coverage.

Table 3.7-1. Classification of ownership types

| Category | Category No. | Description |
|------------------------------|--------------|---|
| Public land | 1 | Crown land (Her Majesty the Queen) either solely or jointly with a government entity |
| | 2 | Government as the sole title (title under the State of NSW, a Minister, a local government, a department, public sector corporation, board, authority, or agency) |
| | 3 | A Government entity (same as ‘2’) on the title along with one or more private individuals |
| | 4 | A Government entity (same as ‘2’) on the title along with one or more incorporated entities |
| Individual/s | 5 | One or more individuals on the land title |
| Joint Individual/s & Company | 6 | One or more individuals and an incorporated entity on the land title |
| No ownership information | 7 | Parcels with missing ownership data (excluded from the database) |
| Company | 8 | A company on the land title |
| Other | 9 | Public Trustee/Official Trustee |
| | 10 | Community, sporting, or religious group |

Table 3.7-2. Landowner type by region (% area)

| Region | Public (% Area) | Individual/s (% Area) | Joint Individual/s & Company (% Area) | Company Only (% Area) | Other (% Area) |
|-------------------------|--------------------|--------------------------|--|-----------------------------|-------------------|
| Central Coast | 15.0% | 69.0% | 0.0% | 14.1% | 1.8% |
| Central West & Orana | 1.4% | 80.2% | 0.1% | 18.2% | 0.1% |
| Far West | 2.3% | 79.5% | 0.0% | 16.9% | 1.3% |
| Greater Sydney | 26.8% | 57.7% | 0.0% | 14.3% | 1.1% |
| Hunter | 5.1% | 65.2% | 0.1% | 29.2% | 0.5% |
| Illawarra Shoalhaven | 8.8% | 74.9% | 0.1% | 15.3% | 1.0% |
| New England North West | 3.2% | 73.1% | 0.1% | 23.1% | 0.5% |
| North Coast | 8.6% | 79.7% | 0.0% | 10.8% | 0.8% |
| Riverina Murray | 1.6% | 69.5% | 0.4% | 28.5% | 0.1% |
| South East & Tablelands | 4.1% | 74.9% | 0.3% | 20.1% | 0.6% |
| Grand Total | 2.6% | 76.7% | 0.1% | 19.9% | 0.7% |

Table 3.7-3. Landowner type by region (% parcels)

| Region | Public (% Parcels) | Individual/s (% Parcels) | Joint Individual/s & Company (% Parcels) | Company Only (% Parcels) | Other (% Parcels) |
|-------------------------|-----------------------|-----------------------------|---|--------------------------------|----------------------|
| Central Coast | 11.2% | 79.7% | 0.0% | 8.4% | 0.7% |
| Central West & Orana | 4.7% | 78.2% | 0.1% | 16.6% | 0.5% |
| Far West | 10.3% | 69.4% | 0.1% | 18.2% | 2.1% |
| Greater Sydney | 10.2% | 82.1% | 0.0% | 6.6% | 1.0% |
| Hunter | 5.9% | 72.7% | 0.0% | 20.7% | 0.7% |
| Illawarra Shoalhaven | 23.9% | 63.1% | 0.0% | 12.6% | 0.3% |
| New England North West | 3.9% | 75.4% | 0.1% | 19.9% | 0.7% |
| North Coast | 6.3% | 86.1% | 0.0% | 6.8% | 0.8% |
| Riverina Murray | 4.2% | 71.0% | 0.2% | 24.1% | 0.5% |
| South East & Tablelands | 5.8% | 78.2% | 0.2% | 15.3% | 0.6% |
| Grand Total | 5.8% | 76.5% | 0.1% | 17.0% | 0.7% |

3.8 Quantifying change

There are two ways in which land ownership change can be quantified. The first way is to calculate the number of parcels changing hands as a proportion of the total number of parcels. The second way is to measure the area of land which changed hands as a proportion of total area. This research opts for the latter approach. Quantifying change by measuring individual parcels of land has substantial methodological shortcomings. For once, it is important to note that a parcel of land does not often equal a single landholding. In fact, most farm holdings include multiple parcels, which would make the transfer of multi-parcel landholdings give the false impression of a hotspot of transactions if individual parcels are counted separately.

Additionally, the size and shape of cadastral parcels vary substantially. The lack of uniformity of individual land parcels makes it difficult to arrive at meaningful conclusions about patterns of ownership change by simply counting the total number of lots changing hands in an area. The

difference in parcel sizes becomes more pronounced between LGAs in Western NSW compared to those in Eastern NSW, as shown in Figure 3.8-1. Adding up the number of individual parcels changing hands would give less weight to transactions of larger lots and more weight to transactions of smaller lots, which is particularly problematic when comparing areas in Western NSW to areas in more urbanised Eastern LGAs.

Quantifying change by total area of land changing hands at an LGA, regional, or state-wide level, removes the issues associated with the overrepresentation of smaller lots and prevents multi-parcel holdings from skewing the results. Therefore, using total area as a measure to quantify regional patterns of ownership change provides a better approach for the purposes of this study. This is not to say that quantifying total area of land does not have its drawbacks. Smaller LGAs and LGAs with multiple small parcels and a few larger parcels are subject to stronger peaks as larger transactions may skew the data for each year. However, these scenarios can be easily observed, and it is possible to remove outlier transactions on a case-by-case basis if required.

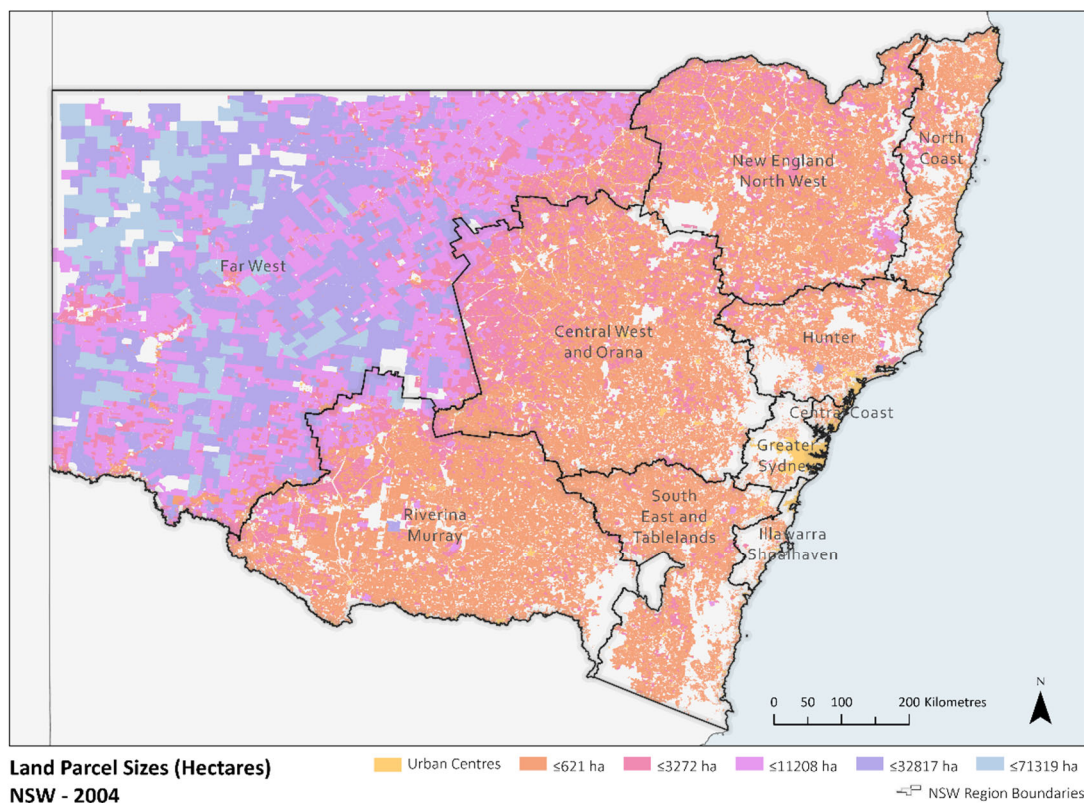


Figure 3.8-1. Distribution of land parcel sizes in NSW (hectares).

3.9 Data limitations

The creation of our NSW-wide spatial database of land ownership patterns provides important capabilities for analysis of regional and state-wide trends. However, as with any other source of data, it is subject to a series of limitations.

One important limitation is the meaning of legal ownership. The names on a land title do not necessarily match financial or operational realities associated with a parcel of land. There are instances where individual landowners decide to register a parcel of land under a company name for legal and tax purposes. It is also common for corporate agricultural businesses to operate on land registered under the individual name of the CEO or other member of the business. From the names on the title alone, it is not possible to make inferences about these realities.

Another common aspect of agricultural land ownership relates to family farm succession. It is common for family-operated farm holdings to have different parcels of land under the names of different family members. In the case for farm succession a parent may bequeath a farm between two siblings who then divide different parcels between them (so parcels are listed separately in each sibling's name) but operate the entire farm through a joint-owned holding company. In some cases, a parcel of land may have five or more names in its title, which may be related to legal or tax reasons, making it difficult to make any inferences about patterns of family-farm ownership.

Joint-ownership arrangements, for example between an individual landowner and a council or an individual and a corporate owner, may also be reflective of land-management arrangements which are not clear by just looking at the names on the land title. Covenants on title, deeds, and other legal agreements may influence how land ownership is structured. Keeping this in mind is important to avoid assumptions about the patterns found in the spatial land ownership database.

Trends towards non-traditional forms of ownership and leasing, including those where financial risk is divided between the landowner and the operator (sharing arrangements), add another level of complexity. There are many variants of the ownership-operation interface, including temporary use of another's land for payment (cattle agistment), seasonal leasehold contracts, the use of cooperatives as operating entities spanning across different individual-owned holdings, and longer-term asset management arrangements, as seen in the forestry and tree crop sectors. The name on the land title sheds little or no insight whatsoever into these processes.

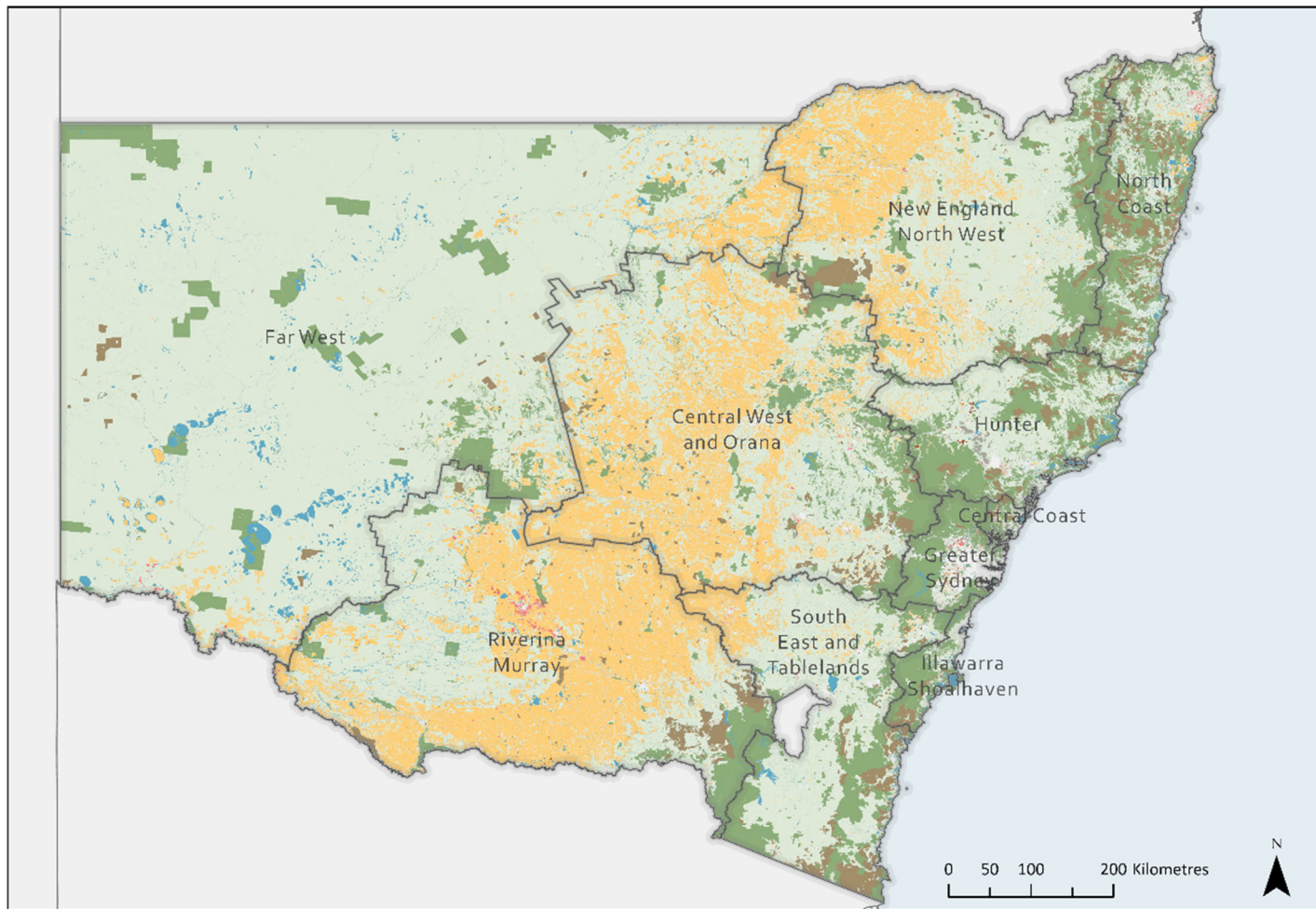
Finally, corporate structures can occlude substantive ownership. Multi-level corporations may have complex forms of land ownership not apparent on the land title. For instance, if one corporate owner has two subsidiaries and each own land separately, these will appear as two different owners in our database, notwithstanding their common corporate parentage. In some instances, we are able to infer common ownership from information that is readily known in public. For example, our database contains land titles under the names of both Paraway Pastoral Company Ltd and Macquarie Agriculture. It is publicly known that Paraway is a wholly owned operating entity of the Macquarie Pastoral Fund, part of the wider Macquarie Group. However, in a strict legal sense, these are different owners of land. These considerations apply also to the foreign ownership of rural land. A foreign-owned entity operating in Australia typically uses corporate vehicles registered under Australian law, and the land titles database does not flag this ultimate parentage. Hence, our database alone cannot provide an accurate basis from which to measure the extent of foreign ownership of agricultural land. However, further research that connects the names of land titles with ASIC corporate affair records would be able to uncover these dimensions.

3.10 Future research

The research-ready database can be easily combined with other spatial datasets for further analysis. For example, the data can be combined with drought indicators to understand the relationship between drought and land ownership changes. The data can also be overlaid with land use planning controls, such as land use zoning and minimum lot size data to understand the incidence of planning decisions on ownership changes. This type of analysis is core to addressing the research questions listed in Table 2.2-1. and will be reported on in future publications.

Additionally, our database ends on 1 January 2020. Extension into the years thereafter is relatively straightforward and would provide NSW with a unique longitudinal data asset spanning back to 2004. Similarly, the methods applied to build this database can be used to build similar databases for other Australian states or areas of NSW excluded from the present analysis.

The methodology presented in this report opens many doors for future research and creates a significant opportunity for spatial research to inform rural policy development by providing evidence-based insights into the trends affecting land ownership in rural NSW.

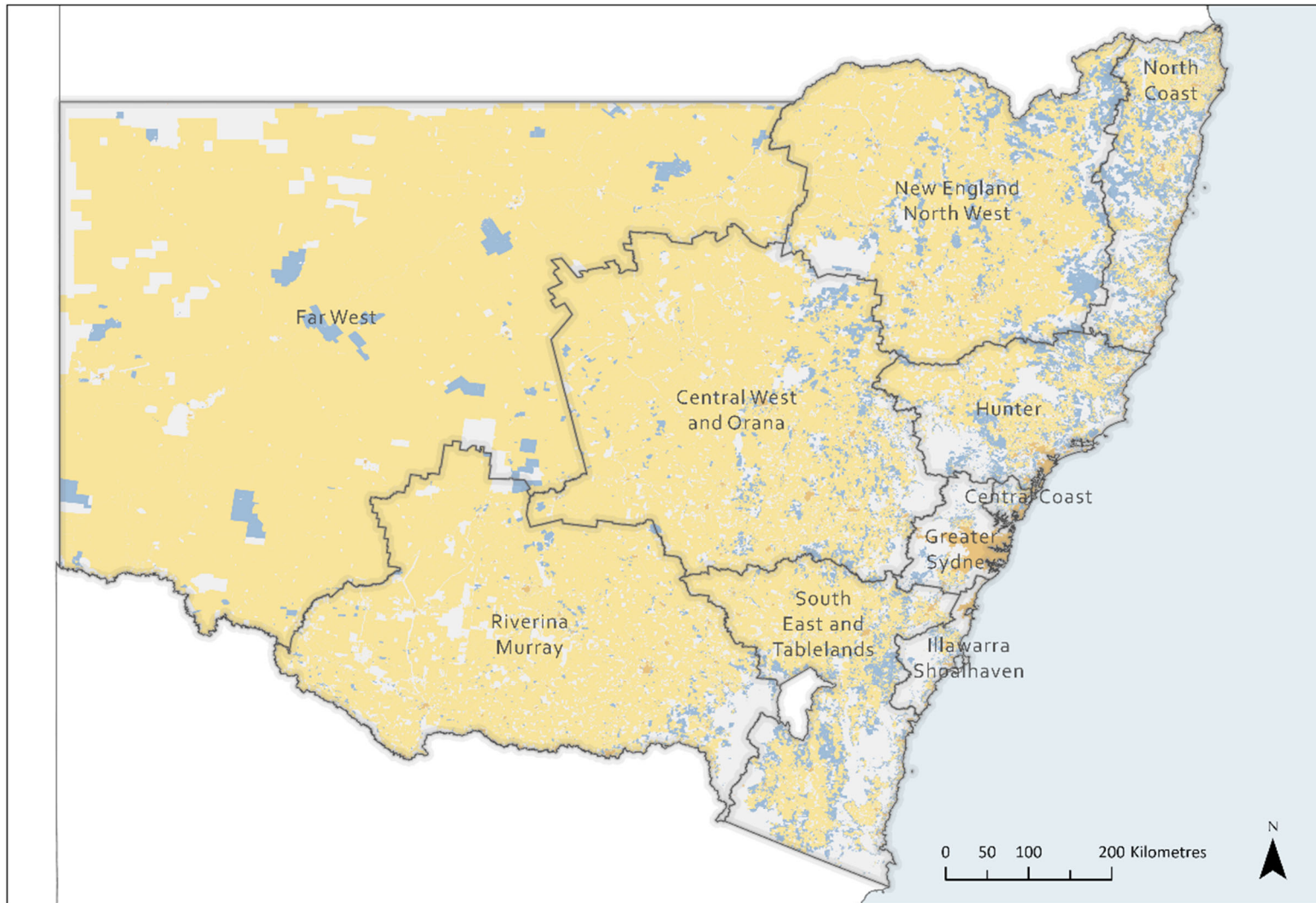


NSW Land Uses 2017
 Australian Land Use & Management Classification



Figure 3.10-1. NSW Land Uses 2017

Summarised ALUM (2017) land uses to show primary agricultural activities and other major land uses in NSW (by area). ALUM Version 8 classifications of the summarised land use categories: Cropping (3.3.0, 4.3.0); Grazing (2.1.0, 3.2.0, 4.2.0); Horticulture (3.4.0, 3.5.0, 4.4.0, 5.1.0); Intensive animal production (5.2.0); Plantations & Forestry (2.2.0, 3.1.0, 4.1.0); Conservation (1.1.0, 1.2.0, 1.3.0); Water (6.1.0, 6.2.0, 6.3.0, 6.4.0, 6.5.0, 6.6.0); Mining (5.8.0).



NSW Land Ownership Baseline (2004)
 Agricultural Land Sample

| | | |
|--|---|---|
| Agricultural Land | Urban centres and localities | NSW Region Boundaries |
| Non-Agricultural Land | No land registry/cadastral data | |

Figure 3.10-2. NSW Land ownership baseline agricultural land sample.

4 Key Findings

4.1 The Big Picture: State-wide trends

During the sixteen years of the study period, the annual gross median rate of change for rural NSW was **5.7%**. This means that around 5.7% of the land area of rural NSW has a change of name on title every year.

For the first twelve years of this period, gross median annual rates of rural land ownership change (the 'gross churn rate') fluctuated within a relatively narrow band between 5.0% (in 2009-10) to 7.2% (in 2006-07) (Figure 4.1-2). From 2015-16 onwards the gross churn rate became substantially more volatile, increasing from 5.4% to 7.3% in the two years to 2017-18, and then falling propitiously to 4.2% in 2019-20.

The identification of greater overall variability in the gross churn rate is a significant finding from this study. Although this trend is identified only for the last four years of the study period, the end date of our data (1 January 2020) was less than two months before the COVID-19 pandemic began wreaking disruption to the national economy. Economic uncertainty associated with the COVID-19 pandemic period would be expected to engender an ongoing trend of heightened variability in annual rates of rural land ownership change. Notably however, our data indicates that rural NSW entered the COVID-19 period already on a trend of increasing variability, from which the pandemic would be expected to accentuate.

Over 90% of the area of the sample is constituted by agricultural land.¹² Comparing trends for agricultural and non-agricultural land indicates that from 2004 to 2017 there was a degree of countertrend between these two types of rural land. In 2006-07, 2009-10, and 2015-16, a peak or trough in the churn rate for agricultural land was accompanied by the inverse for non-agricultural land. However, from 2018 onwards, the gross churn rates for both agricultural and non-agricultural land declined in similar fashion.

Trends in land ownership change have considerable geographical complexity. The richness of this complexity for each region is addressed in the following sections of this report. At the State-wide level, the overall trend is that the ten NSW Planning Regions display relatively small differentiation between one another in median rates of rural land ownership change, but LGAs within each region can and do vary significantly. This is explained as follows:

- There are ten planning regions in NSW, however for three of these (Illawarra Shoalhaven, Central Coast and Greater Sydney) the area of rural land is relatively small, creating analytical difficulties in interpreting data for these regions. For the other seven regions – all with substantial areas of rural land – the median gross churn rate for all rural land over the study period converged within a relatively narrow band from 5.2% (Riverina Murray, and South East & Tablelands) to 5.9% (Hunter) (Table 4.1-3). Given the diversity across the state and the length (16 years) of the study period. It suggests that a churn rate of

¹² In a strict sense, we define this by the total area of land parcels with more than 50% of their land use being agricultural. The three ALUM surveys we used indicate that state-wide, between 90-92% of the land area in the baseline sample area was agricultural. See Appendix A.

between 5-6% is akin to a region-scale 'natural rate' over time that is relevant across different geographical settings.

- Nevertheless, within each region there can be considerable variation at the LGA scale. This is most pronounced in Riverina Murray, where a region-wide median gross churn rate of 5.2% represented the outcome from widespread divergence among constituent LGAs, ranging from a median churn rate of 3.8% in Albury to 7.3% in Leeton.

This aspect of geographical scale is highly relevant for rural policy and planning. Median gross churn rates represent the amount of activity in rural land markets over time. These data can play important roles in informing decisions about patterns and trends of rural change. Analyses using regional averages will fail to observe potential high levels of variation at LGA-by-LGA scales. An important insight from this report is that *scale matters*, and that activity patterns can deviate considerably between LGAs.

Regional drivers of the peak/trough cycle 2015-20

The increased volatility in the gross churn rate identified from 2015-20 (Figure 4.1-2) is a major observation from our data. Table 4.1-1 and Figure 4.1-1 summarise how individual regions and LGAs contributed to this state-wide result, using data presented in Appendix D.¹³ Two regions (Far West and North coast) exhibited peak/trough cycles in the period 2015-20 that were more exaggerated than the state-wide average. Hence, these two regions can be understood as major drivers of this trend. Interestingly, the two regions are extremely different in their social and economic composition. The peak/trough cycle in Far West was in the context of land use dominated by extensive grazing, indicating the peak and trough cycles corresponded to dramatic swings in demand for properties, potentially impacted also by government purchases for conservation purposes. In North Coast, the strong peak/trough cycle would seem to be linked to the effects of rapid population growth. It needs noting that although North Coast experienced a downturn in the churn rate during the last year of the study period, this was not as severe as other regions, indicating the persistence of a churn rate that was higher than the state average.

Reiterating the previous point about the importance of differences at the LGA scale, analysis of our data brings into focus five distinct regions where the peak and trough in churn rates 2015-20 exceeded the state-wide average:

- The western NSW cropping and grazing belt, where the peak and trough might be assumed to be driven by commodity and drought cycles.
- North-east NSW (Ballina, Byron, Richmond Valley and Kyogle) which may be connected to population growth.
- New England, potentially signifying the effects of large-scale agricultural land acquisition followed by a decline in activity.
- Zones approximately two to three hours driving time out of Sydney, where ex-urban population dynamics and conversion of agricultural land for non-agricultural purposes may have encouraged trends.

¹³ Greater Sydney, Central Coast and Illawarra Shoalhaven are excluded from this analysis, because of their relatively small contribution to the overall state-wide average.

Table 4.1-1. Regional and LGA contributors to 2015-20 peak/trough cycle

| Regions with churn volatility greater than NSW, 2015-20 | LGAs with churn rate volatility greater than NSW average, 2015-20 | LGAs with churn rate volatility less than NSW average or out of synch with NSW trend, 2015-20 |
|---|---|---|
| Far West | Balranald, Bourke, Brewarrina, Central Darling, Cobar, Wentworth | Broken Hill, Unincorporated NSW, Walgett, |
| North Coast | Ballina, Bellingen, Byron, Kyogle, Richmond Valley | Clarence Valley, Coffs Harbour, Kempsey, Lismore, Nambucca, Port Macquarie-Hastings, Tweed |
| Regions with churn rate volatility less than NSW, 2015-20 | LGAs with churn rate volatility greater than NSW average, 2015-20 | LGAs with churn rate volatility less than NSW average or out of synch with NSW trend, 2015-20 |
| Central West & Orana | Bathurst Regional, Coonamble, Forbes, Lachlan, Lithgow, Narromine, Warren, Weddin | Blayney, Bogan, Cabonne, Cowra, Gilgandra, Mid-Western Regional, Oberon, Orange, Parkes, Warrumbungle, Western Plains Regional |
| Hunter | Dungog, Lake Macquarie, Muswellbrook, Singleton | Cessnock, Maitland, Mid-Coast, Port Stephens, Upper Hunter |
| New England North West | Armidale Regional, Glen Innes Severn, Gunnedah, Gwydir, Inverell, Narrabri, Tamworth Regional, Uralla, Walcha | Liverpool Plains, Moree Plains, Tenterfield |
| Riverina Murray | Edward River, Hay, Murrumbidgee | Albury, Berrigan, Bland, Carrathool, Coolamon, Federation, Greater Hume, Griffith, Gundagai, Junee, Leeton, Lockhart, Murray River, Narrandra, Snowy Valleys, Temora, Wagga Wagga |
| South East & Tablelands | Goulburn Mulwaree, Queanbeyan-Palerang, Wingecarribee | Bega Valley, Eurobodalla, Hilltops, Snowy Monaro Regional, Upper Lachlan, Yass Valley |

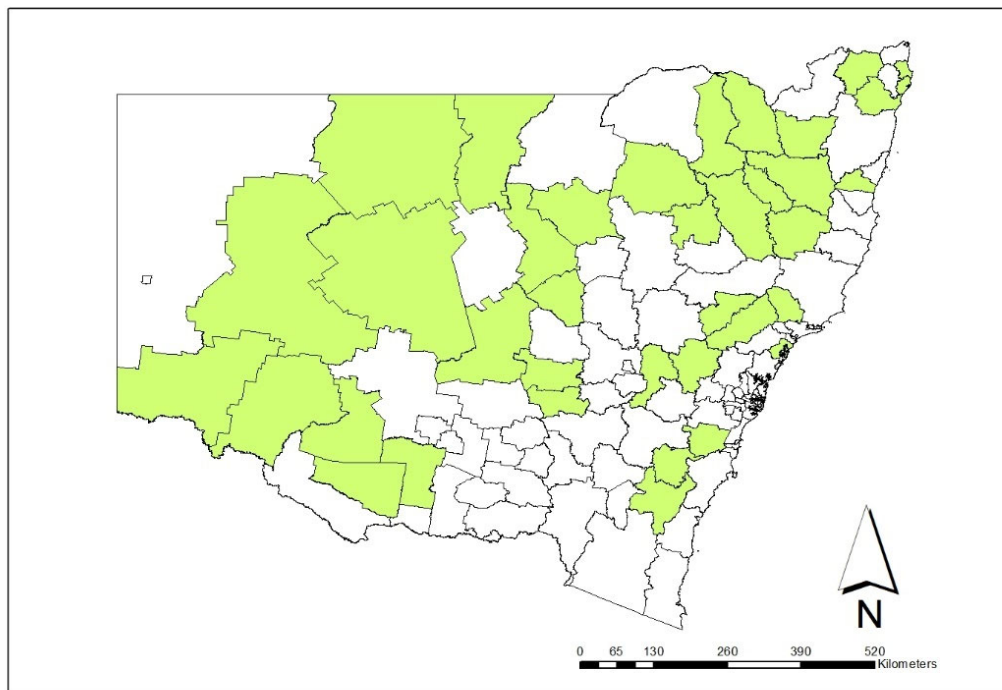


Figure 4.1-1. LGAs with greater churn rate volatility than NSW average, 2015-20

Table 4.1-2. Median Rate of Change Summary, All NSW.

| Region | Median Rate of Change | Distance from NSW median |
|-------------------------|-----------------------|--------------------------|
| Illawarra Shoalhaven | 6.1% | +0.4% |
| Hunter | 5.9% | +0.2% |
| North Coast | 5.7% | 0.0% |
| Central West & Orana | 5.7% | 0.0% |
| New England North West | 5.7% | 0.0% |
| Far West | 5.6% | -0.2% |
| Riverina Murray | 5.2% | -0.5% |
| South East & Tablelands | 5.2% | -0.5% |
| Central Coast | 4.7% | -1.0% |
| Greater Sydney | 4.1% | -1.6% |
| All NSW | 5.7% | - |

Table 4.1-3. Median Rate and standard deviations of rates of change for all regions in NSW.

| Region | Agricultural land | | Non-agricultural land | | All rural land | |
|-----------------|-----------------------|--------------------|-----------------------|--------------------|-----------------------|--------------------|
| | Median Rate of change | Standard deviation | Median Rate of change | Standard deviation | Median Rate of change | Standard deviation |
| Ill. Shoalhaven | 5.5% | 1.3% | 6.2% | 1.7% | 6.1% | 1.4% |
| Hunter | 6.1% | 1.2% | 5.1% | 1.3% | 5.9% | 1.1% |
| North Coast | 5.9% | 1.1% | 5.8% | 1.2% | 5.7% | 1.1% |
| CW & Orana | 5.6% | 0.9% | 6.1% | 1.1% | 5.7% | 0.9% |
| New Eng. NW | 5.6% | 0.9% | 5.7% | 2.0% | 5.7% | 0.9% |
| Far West | 5.7% | 1.6% | 5.2% | 2.5% | 5.6% | 1.5% |
| Riv. Murray | 5.3% | 0.9% | 5.6% | 2.4% | 5.2% | 0.8% |
| SE & Tablelands | 5.1% | 0.6% | 5.8% | 1.6% | 5.2% | 0.5% |
| Central Coast | 5.9% | 1.4% | 4.2% | 2.1% | 4.7% | 1.6% |
| Greater Syd. | 5.5% | 1.8% | 3.4% | 1.6% | 4.1% | 1.2% |
| All NSW | 5.7% | 0.9% | 5.8% | 1.0% | 5.7% | 0.8% |

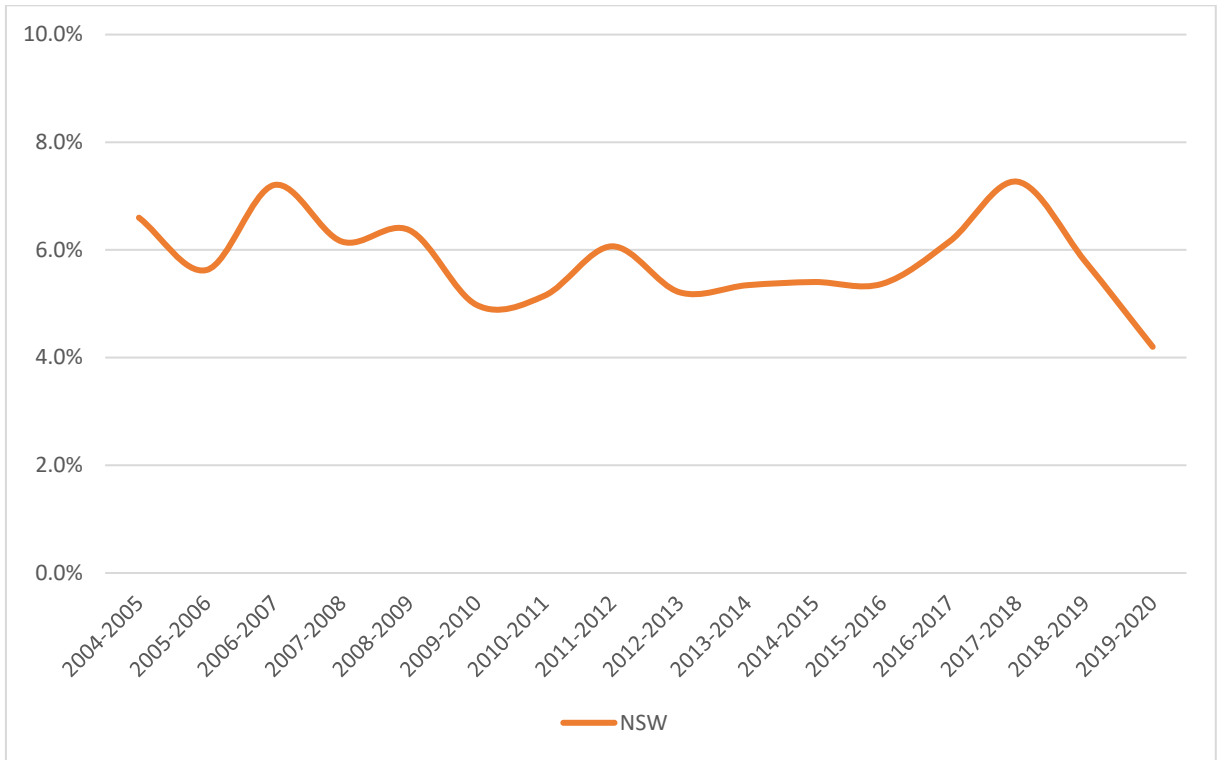


Figure 4.1-2. Incidence of all rural land ownership changes (% Area), Rural NSW.

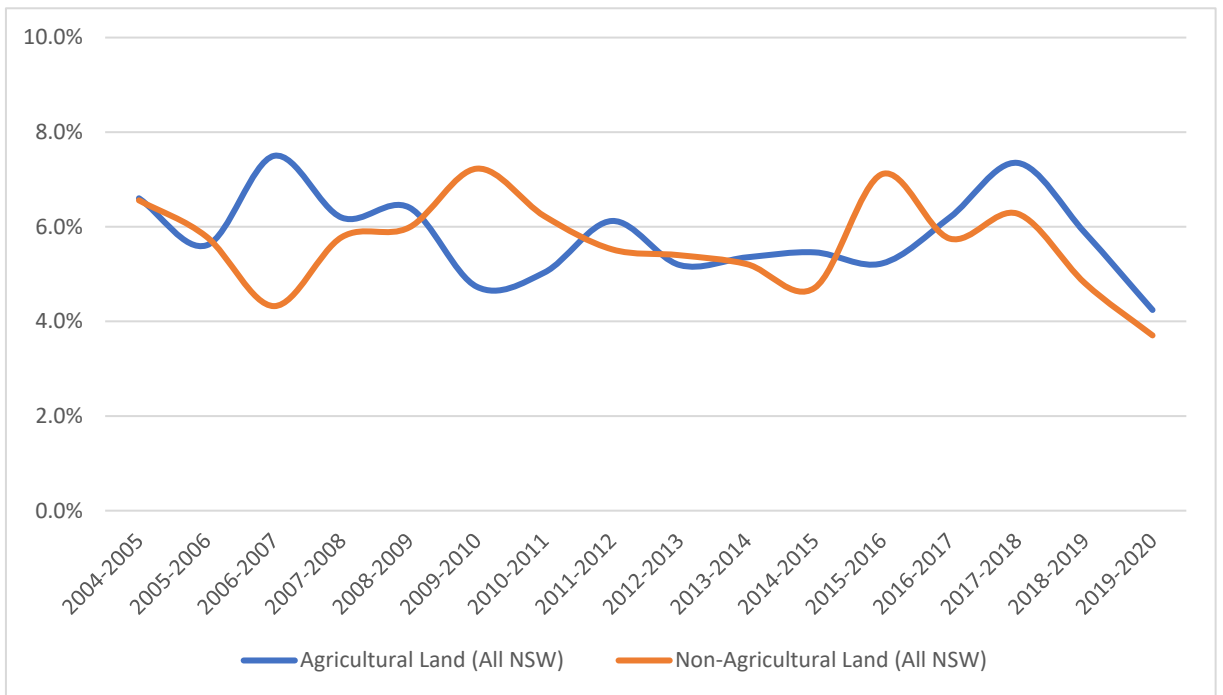


Figure 4.1-3. Incidence of agricultural/ non-ag land ownership changes (% Area), Rural NSW.

4.2 Identifying regional clusters of change through Hot Spot analysis

Figure 4.2-1 shows the median gross annual rate of change for each LGA (by area %) for the 16-year period, 01/01/2004 to 01/01/2020, using a fivefold classification.¹⁴ The figure shows that the highest medians occur in Leeton, Cobar and Brewarrina (>7.1%) whilst the lowest (<3.7%) are in Broken Hill, Wollondilly and Campbelltown.

From Figure 4.2-1, a crude identification of regional clusters can be made. In the north of the State, the adjoining LGAs of Bourke, Brewarrina, Cobar and Bogan all exhibit high rates of change; as does a collection of LGAs that stretch from eastern New England North West into the North Coast (Tamworth Regional, Gwydir, Inverell, Tenterfield, Richmond Valley, Clarence Valley). Conversely, there are apparent clusters of LGAs with lower rates of change over the study period in the south of state in the Riverina Murray stretching into Hilltops and Yass Valley, and in Central Darling and Balranald in Far West.

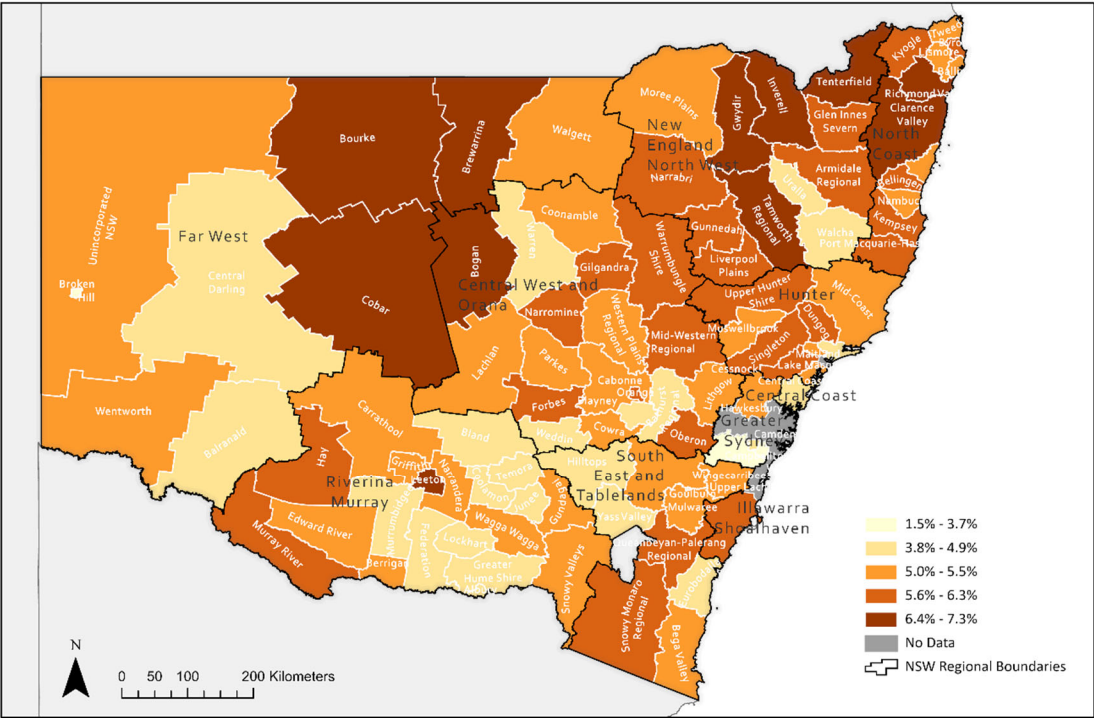


Figure 4.2-1. LGA median rate of rural land ownership change (percent of area), Jan 2004- Jan 2020

Although Figure 4.2-1 sheds light on geographical patterns in median gross rates of rural land ownership change over the study period, it alone cannot demonstrate the presence of regional clustering in these data. For this, the descriptive statistics displayed in Figure 4.1-2 need to be augmented by spatial statistical tools with the ability to identify regional clusters.

¹⁴ Data are classified using Jenks natural breaks. Classes are defined based on natural groupings inherent in the data where breaks are created in a way that best groups similar values together and maximizes the differences between classes. Features are divided into classes with boundaries set where there are relatively large differences in data values.

To this end, optimised Hot Spot analysis was conducted using the Getis Ord G_i^* statistic.¹⁵ This is a spatial statistical technique which generates a measure of the extent to which the result for a single feature (in our case, an LGA's median rate of change) is statistically similar to/different from its neighbouring features (i.e., medians for surrounding LGAs). Thus, for the purposes of our research, it provides a method to identify statically significant clusters of LGAs with high and low median values.

Using this method, each LGA can be classified according to three broad categories. It is identified as a 'Hot Spot' if its median gross rate of rural land ownership change over Jan 2004- Jan 2020 was higher than the NSW average and this outcome is greater than what an outcome of random chance would predict.¹⁶ Hence, they are LGAs with statistically significant evidence that their location (defined in terms of both their results and those of their neighbours) is a factor in encouraging a higher-than-average rate of land ownership change. 'Cold spots' are the inverse. These are LGAs with median rates of rural land ownership change lower than the state average and with evidence that their location (defined in terms of both their results and those of their neighbours) is a factor in generating this outcome. For both 'Hot Spots' and 'Cold Spots', outcomes are assessed in terms of whether they are statistically significant with confidence levels of 99%, 95% and 90%. Thirdly, LGAs can be neither 'Hot Spots' nor 'Cold Spots' if their median rates of rural land ownership change are not statistically related to their neighbours. This means that although the median rate of rural land ownership change for an individual LGA may be higher or lower than the state average, there is no evidence that its location (defined in terms of the results for its neighbours) played a part in generating this outcome.¹⁷

In lay terms, the optimised Hot Spot analysis was conducted using the Getis Ord G_i^ statistic is a tool that seeks to answer the following question: for any LGA, is its median rate of rural land ownership change over the study period a product of its geography? That is, is relatively high or low rate a random product of its own circumstances, or is it statistically similar to the results for its neighbouring LGAs, meaning that it is part of a process where its geography matters?*

Figure 4.2-2 maps the optimised Hot Spots Getis Ord G_i^* data for NSW. Comparing this map with the previous Figure 4.2-1 emphasises how this statistical technique brings sharper contrast to key spatial patterns. The map suggests a distinct story of regional effects driving a hot spot across northern NSW; and cold spots across much of southern NSW and also in the Far West.

¹⁵ Optimized hot spot analysis implements the Getis-Ord G_i^* method, assessing attributes of the input feature class to determine settings that will produce optimal analysis results (e.g. identifies an appropriate scale of analysis, and corrects for both multiple testing and spatial dependence). This method assesses each feature within the context of neighbouring features and compares the local situation to the global situation. The outcome is statistically meaningful clusters of high values (hot spots) and low values (cold spots). (Esri 2) In mathematical terms, hot spots are calculated thus: "The local sum for a feature and its neighbours is compared proportionally to the sum of all features; when the local sum is very different from the expected local sum, and when that difference is too large to be the result of random chance, a statistically significant z-score results." (Esri 3)

¹⁶ Clustering is more intense where the z-score is higher (or lower). "A high (positive) z-score and a low p-value for a feature indicates a significant hotspot. A low (negative) z-score and a small p-value indicates a significant cold spot. A z-score near 0 means no spatial clustering." (1. Esri)

¹⁷ Optimised hotspot analysis results: Properties for MEDIAN (Min, 1.4922; Max, 7.3024; Mean, 5.3292; Std. Dev., 0.8788). The optimal fixed distance band is based on peak clustering found at 253851.0548 Meters. There are 56 (of 96) output features statistically significant based on an FDR correction for multiple testing and spatial dependence. 6.2% of features had less than 8 neighbours based on the distance band of 253851.0548 Meters

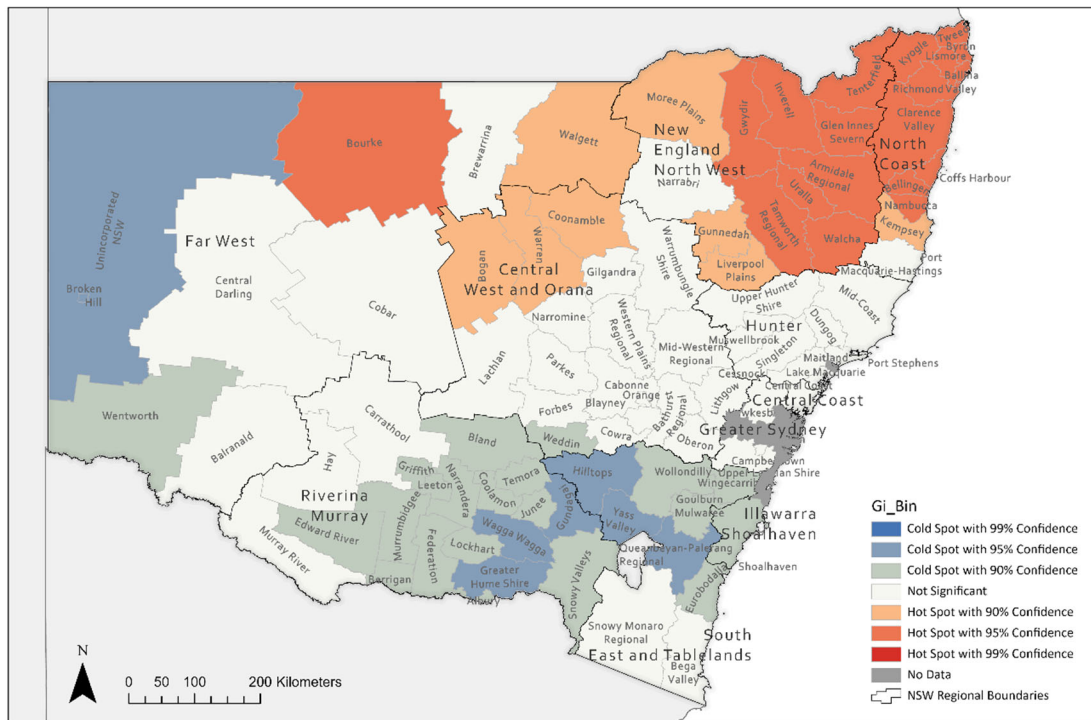


Figure 4.2-2. Hot Spot Analysis (Getis-Ord GI*) – LGA median rate of ownership change (area %), January 2004 - January 2020

Interpreting the northern NSW Hot Spot. From Bourke to Byron there is an almost uninterrupted continuum of 27 hot spot LGAs. To recall, this indicates that for these LGAs, their location (defined in terms of both their results and those of their neighbours) was a factor encouraging a higher-than-average rate of land ownership change over the study period. This continuum is both illuminating but perplexing. Its existence across northern NSW is strongly indicative of a common geographical process that encourages higher than average median rates of rural land ownership change. However, clearly, this continuum covers a wide range of different rural landscape types – Bourke is very different from Byron.

In light of this diversity, it seems reasonable to assume that although these LGAs display as a continuum across the northern border region, this is a product of an array of different processes separately encouraging higher than average rates of rural land ownership change. West of the divide, this farm aggregations and relatively high levels of interest in the acquisition of properties. On the ranges, significant turnover of large forestry holdings over the study period made a major contribution to high rates of change. On the Far North Coast, population growth and rural land use change fuelled a relatively high rate of land changing hands. Each of these processes was manifested across a larger area than a single LGA, indicating a ‘neighbour effect’ that is represented in statistically significant Getis-Ord GI* outcomes.

Interpreting the southern NSW Cold Spot. The southern NSW Cold Spot covers a contiguous stretch of country from the eastern Riverina through to the Southern Highlands and onto Shoalhaven and Eurobodalla LGAs on the South Coast. As with the northern NSW region, there would appear to be different drivers across this continuum. The 17 LGAs of the eastern Riverina represent a clear Cold Spot cluster. These 17 LGAs are dominated by cropping as an agricultural land use (Figure 3.10-1), with the three Riverina Murray LGAs dominated by grazing (Carrathool,

Hay, Murray River) all conspicuously not in the cluster. This suggests a common geographical driver attached to southern NSW cropping in explaining relatively lower rates of rural land ownership change. Cropping also dominates in the Cold Spot LGAs of Weddin, Yass Valley and Hilltops, all adjoining the Riverina Murray Region, signifying a common driver in these areas as well. The fact that LGAs in the Southern Highlands and South Coast identify as Cold Spots can be presumed to require a different explanation, and at face value no obvious candidate exists.

Interpreting the Far West Cold Spot. In the Far West, Wentworth and Unincorporated NSW are also identified as a Cold Spot; however explaining this is conceptually challenging as a result of significant fluctuations in the rate of change between years for both LGAs (see Appendix D) and thus, should be understood with caution.

4.3 Central West & Orana

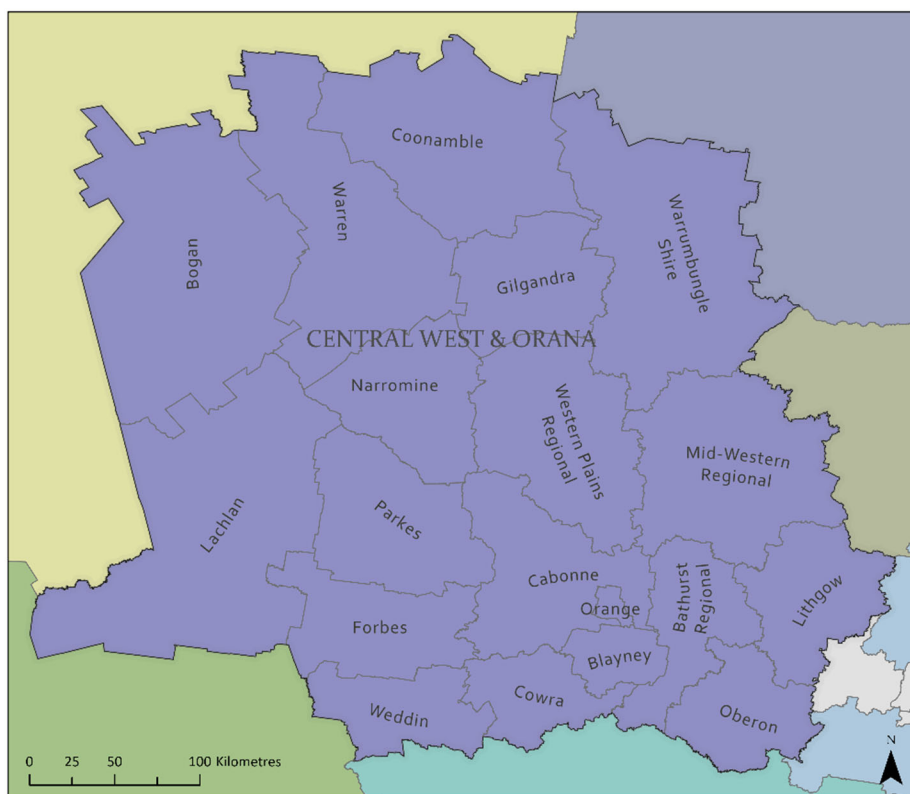


Figure 4.3-1. Central West & Orana Region Boundary

Insight: the annual gross churn rate for the Central West & Orana region tended to increase over time, representing greater levels of activity in rural land markets, but trends tended to stay close to the NSW average for most of the study period. The three LGAs with the highest gross churn rates were in the north and northwest of the region (Bogan, Warrumbungle and Mid-Western); three of the four LGAs with the lowest rates were in the south (Blayney, Bathurst Regional, Weddin).

- The median gross churn rate for the Central West & Orana region for the study period is 5.7% (Table 4.3-1. Median Gross Churn Rate Summary, Central West & Orana), which is the same as for all NSW. Standard deviation of the annual rate of change for all years is 0.9%. These are very similar to the overall trends for NSW and are relatively stable across this period. Peaks occurred in 2017 (7.3%), 2011 (7.0%), and 2018 (7.0%), with the lowest rates in 2007 (4.6%) and 2019 (4.8%) (Figure 4.3-2). (See Appendix 0 for LGA specific graphs).
- Within the region, median gross rates of change were higher in the LGAs of Bogan (6.5%), Warrumbungle (6.3%), Mid-Western Regional (6.3%), Oberon (6.1%), and Orange (6.0%) (Table 4.3-1. Median Gross Churn Rate Summary, Central West & Orana). These median rates were >0.3% higher than the region. Median rates were much lower in Cowra (5.0%), Lithgow (5.0%), Parkes (4.9%), Warren (4.8%), Weddin (4.8%), Bathurst Regional (4.8%), and Blayney (4.5%), at least >0.7% less than the region median (Table 4.3-1. Median Gross Churn Rate Summary, Central West & Orana).

- LGAs with the highest deviation between years were Coonamble (3.3%), Warren (2.7%), Forbes (1.8%), Orange (1.7%), Weddin (1.7%), Lachlan (1.5%), and Lithgow (1.5%). Those with the lowest were Cowra (0.7%), Cabonne (0.7%), and Blayney (0.8%). However, these are quite similar to the regional standard deviation (0.9%). Bogan, Oberon, Mid-Western Regional, Narromine, Warrumbungle, Gilgandra, Western Plains Regional, Bathurst Regional, and Parkes had a standard deviation <0.5% than that of the region.
- The agricultural land subset has similar median and deviation (5.6%; 0.9%) to the region overall (5.7%; 0.9%). The remaining rural, non-agricultural land has a higher median rate (6.1%) and deviation (1.1%). Consistent with their higher medians is agricultural land in Bogan (6.6%), Oberon (6.2%), Orange (6.0%), and Mid-Western Regional (6.0%). In the same way, Weddin (4.8%), Warren (4.8%), Blayney (4.7%) and Parkes (4.6%) have lower medians for agricultural land rates of change. Variability is higher in Coonamble (3.3%), Warren (2.7%), and Forbes (1.8%). Variability is lowest in Cowra (0.7%).

Table 4.3-1. Median Gross Churn Rate Summary, Central West & Orana

| LGA | Median Gross Rate of Change | Distance from Region Median | Distance from State Median |
|--|-----------------------------|-----------------------------|----------------------------|
| Bogan | 6.5% | +0.8% | +0.8% |
| Warrumbungle Shire | 6.3% | +0.6% | +0.6% |
| Mid-Western Regional | 6.3% | +0.6% | +0.6% |
| Oberon | 6.1% | +0.4% | +0.4% |
| Orange | 6.0% | +0.3% | +0.2% |
| Forbes | 5.9% | +0.2% | +0.2% |
| Narromine | 5.9% | +0.2% | +0.2% |
| Gilgandra | 5.8% | +0.1% | +0.1% |
| Cabonne | 5.4% | -0.3% | -0.3% |
| Lachlan | 5.2% | -0.5% | -0.5% |
| Western Plains Regional | 5.2% | -0.5% | -0.5% |
| Coonamble | 5.2% | -0.5% | -0.5% |
| Cowra | 5.0% | -0.7% | -0.7% |
| Lithgow | 5.0% | -0.7% | -0.7% |
| Parkes | 4.9% | -0.8% | -0.8% |
| Warren | 4.8% | -0.9% | -0.9% |
| Weddin | 4.8% | -0.9% | -0.9% |
| Bathurst Regional | 4.8% | -0.9% | -0.9% |
| Blayney | 4.5% | -1.2% | -1.2% |
| Central West & Orana Region | 5.7% | - | 0.0% |



Figure 4.3-2. Incidence of all rural land ownership changes (% Area), Central West & Orana.

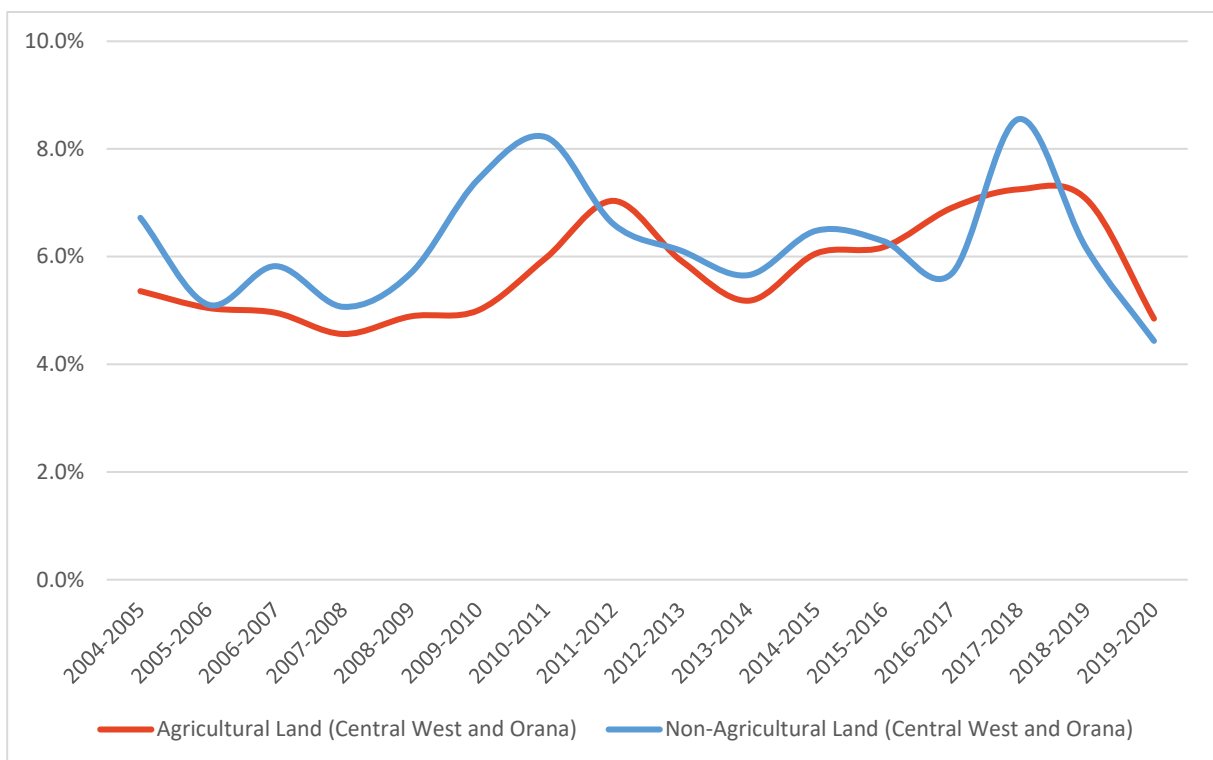


Figure 4.3-3. Incidence of agricultural land ownership changes, Central West & Orana (% Area).

4.4 Far West

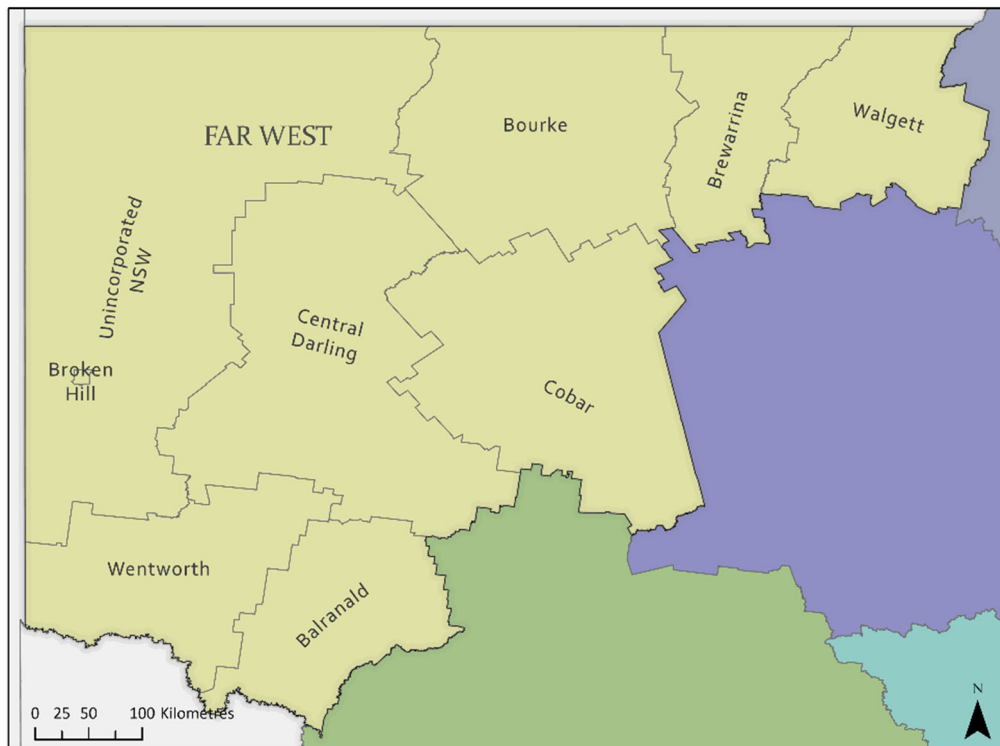


Figure 4.4-1. Far West Region Boundary

Insight: the rate at which rural land is changing hands in Far West NSW is slowing, however year-by-year rates of change are volatile, and increasingly so. There is considerable diversity in average churn rates and trend patterns within the LGAs of the region. The neighbouring LGAs of Cobar, Brewarrina and Bourke exhibited the highest churn rates during the entirety of the study period, but in the period 2015-20, Wentworth, Central Darling and Balranald displayed a highly volatile peak and trough cycle.

- The median gross rate of change for the Far West region for the study period is 5.6%, which is very close to that of all NSW (Table 4.4-1. Median Gross Churn Rate Summary, Far West.). Standard deviation of the annual gross rate of change for all years is 1.5%. Whilst the median of annual ownership rates of change is similar to all of NSW, variation between years is notably higher, and is the second highest region in the state. Regionally, the highest peaks were in 2006 (9.2%), 2004 (7.6%), 2008 (7.3%), and 2017 (7.3%) (Figure 4.4-2). The lowest rates occurred in 2019 (3.4%), 2015 (4.1%), and 2010 (4.5%). As displayed in Figure 4.4-2, there is an identifiable slowing down of the incidence of change over time in this region.
- Within the region, median gross rates of change were substantially higher (>1.3% above region median) in the LGAs of Cobar (7.1%), Brewarrina (7.1%), and Bourke (6.9%) (Table 4.4-1). Wentworth (5.5%), Unincorporated NSW (5.0%), Walgett (5.0%), Central Darling (4.7%), and Balranald (4.6%) were much closer to the region's median (within -1%), whilst Broken Hill (1.5%) was substantially lower (due to small sample area of the LGA).

- All LGAs in the Far West with the exception of Walgett (1.7%) had a standard deviation >2.2% with the highest occurring in Broken Hill (4.1%), Unincorporated NSW (2.9%), and Balranald (2.8%). This high standard deviation would seem to suggest year-on-year volatility in ownership change, reflecting the vagaries of weather cycles and the potential effects of large transactions creating ‘bumpy’ trends.
- The agricultural land subset has similar median and standard deviation (5.7%; 1.5) to the overall (5.6%; 1.5%). The remaining rural, non-agricultural land has a lower median rate (5.1%) and higher deviation between years (2.5%). Consistent with patterns for all rural land, standard deviations remain high (>2.0%) for agricultural land in all LGAs except for Walgett (1.7%); with the highest occurring in Unincorporated NSW (2.9%), Balranald (2.8%), and Central Darling (2.7%).

Table 4.4-1. Median Gross Churn Rate Summary, Far West.

| LGA | Median gross rate of Change | Distance from Region Median | Distance from State Median |
|--------------------|-----------------------------|-----------------------------|----------------------------|
| Cobar | 7.1% | 1.6% | 1.4% |
| Brewarrina | 7.1% | 1.6% | 1.4% |
| Bourke | 6.9% | 1.3% | 1.2% |
| Wentworth | 5.5% | -0.1% | -0.2% |
| Unincorporated NSW | 5.0% | -0.5% | -0.7% |
| Walgett | 5.0% | -0.6% | -0.7% |
| Central Darling | 4.7% | -0.8% | -1.0% |
| Balranald | 4.6% | -0.9% | -1.1% |
| Broken Hill | 1.5% | -4.1% | -4.2% |

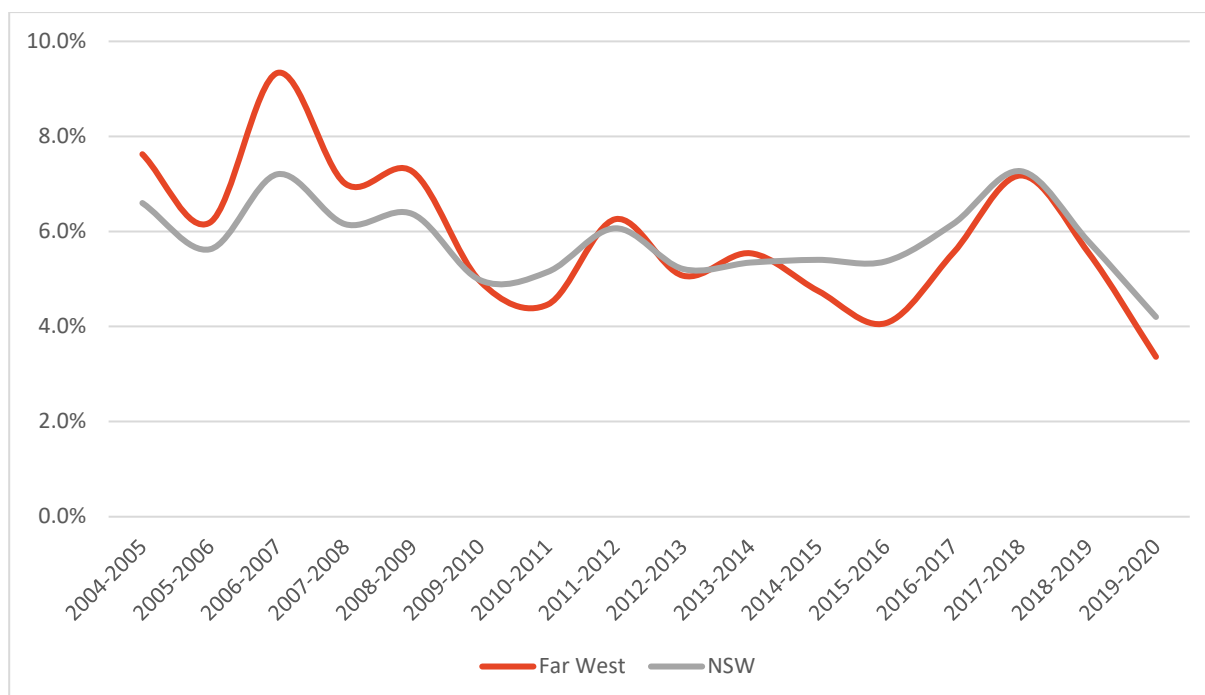


Figure 4.4-2. Incidence of all rural land ownership changes (% area), Far West.

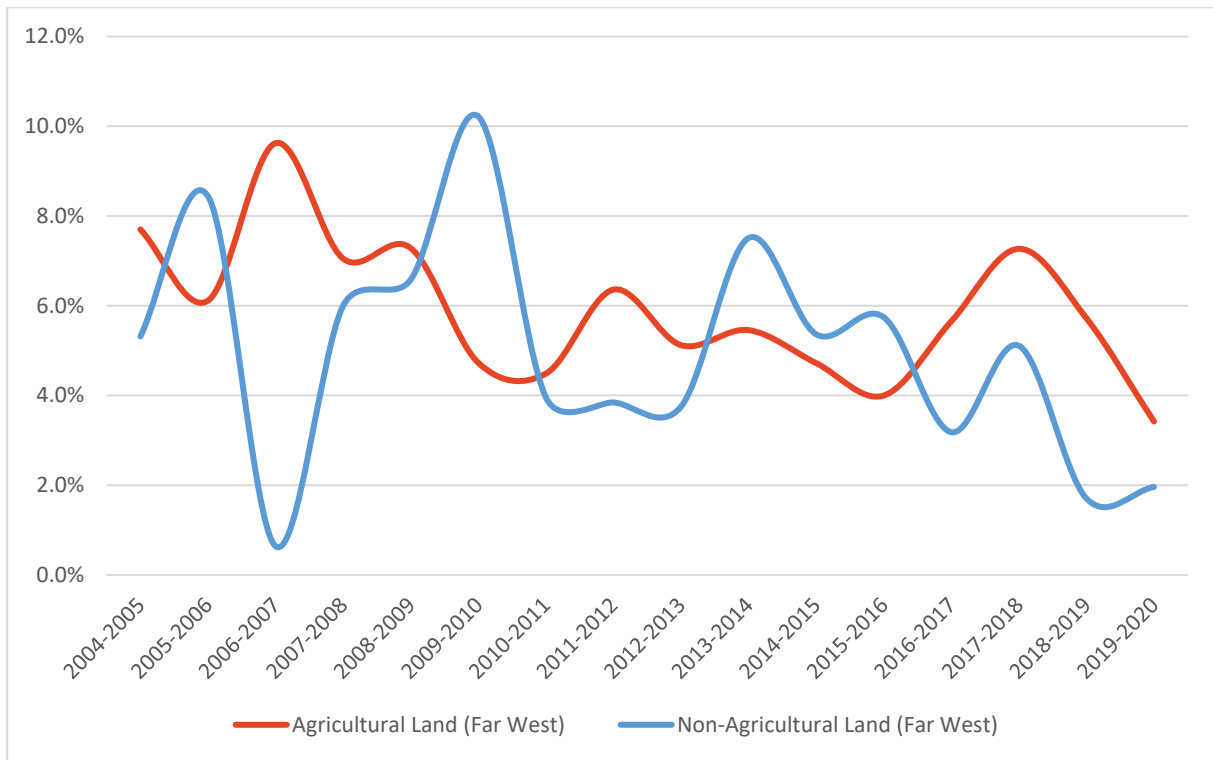


Figure 4.4-3. Incidence of agricultural land ownership changes, Far West (% area).

4.5 Hunter



Figure 4.5-1. Hunter Region Boundary

Insight: The Hunter region recorded the highest median gross churn rate for any of the major rural NSW regions during the study period (5.9%). Even though there was a slightly higher incidence of land ownership change in Hunter, compared to the rest of the state, year-on-year trends aligned closely with state-wide patterns. Rates were higher in inland parts of the region, notably Upper Hunter Shire, Muswellbrook, Dungog, Cessnock and Singleton, potentially reflecting considerable land ownership change associated with mining. High yearly volatility in these LGAs provides further evidence of the role of large land acquisitions driving regional churn rates.

- The median gross rate of change for the Hunter region for the study period is 5.9%, which is the second highest regional median in the state, albeit only 0.2% higher than all NSW (5.7%) (Table 4.5-1). Standard deviation of the annual rate of change for all years is 1.1%, which is consistent with other regions, thus variation is not significantly higher or lower than in other areas. Regionally, the highest peaks were in 2015 (7.8%) and 2017 (8.1%) (Figure 4.5-2). The lowest rate occurred in 2010 (4.1%).
- Within the region, median gross rate of change was higher in the LGAs of Upper Hunter Shire (6.0%), Dungog (5.8%), Cessnock (5.6%), Singleton (5.6%), and Muswellbrook (5.5%); however, these rates remain close to the regional median (<0.3%) (Table 4.5-1). Mid-Coast (5.3%), Lake Macquarie (5.2%), and Maitland (5.2%) have slightly lower rates than the whole region; the lowest change is occurring in Port Stephens (4.6%).
- Standard deviation of LGAs varies within the Hunter region and are all higher than that of the whole region. The highest occur in Muswellbrook (3.0%), Upper Hunter Shire (2.1%),

Singleton (2.0%), Maitland (1.9%), Dungog (1.9%), and Lake Macquarie (1.8%). Deviation is lowest in Cessnock (1.2%), Port Stephens (1.3%), and Mid-Coast (1.6%).

- The agricultural land subset has similar median and standard deviation (6.1%; 1.2%) to the overall (5.9%; 1.1%). The remaining rural, non-agricultural land has a lower median rate (5.1%) and consistent deviation between years (1.3%). Standard deviations vary for agricultural land across the Hunter LGAs but are consistent with those for all rural land, albeit more differentiated. The highest occur in Muswellbrook (3.0%), Lake Macquarie (2.3%), Upper Hunter Shire (2.2%), Maitland (2.1%), Dungog (2.1%), and Singleton (2.0%). Relative to this, the lowest standard deviations occur in Cessnock (0.8%), Mid-Coast (1.4%), and Port Stephens (1.8%).

Table 4.5-1. Median Gross Churn Rate Summary, Hunter.

| LGA | Median Rate of Change | Distance from Region Median | Distance from State Median |
|----------------------|-----------------------|-----------------------------|----------------------------|
| Upper Hunter Shire | 6.0% | +0.1% | +0.3% |
| Dungog | 5.8% | -0.1% | +0.1% |
| Cessnock | 5.6% | -0.3% | -0.1% |
| Singleton | 5.6% | -0.3% | -0.1% |
| Muswellbrook | 5.5% | -0.4% | -0.2% |
| Mid-Coast | 5.3% | -0.6% | -0.4% |
| Lake Macquarie | 5.2% | -0.7% | -0.5% |
| Maitland | 5.2% | -0.7% | -0.5% |
| Port Stephens | 4.6% | -1.3% | -1.1% |
| Hunter Region | 5.9% | - | 0.2% |



Figure 4.5-2. Incidence of all rural land ownership changes (% area), Hunter.

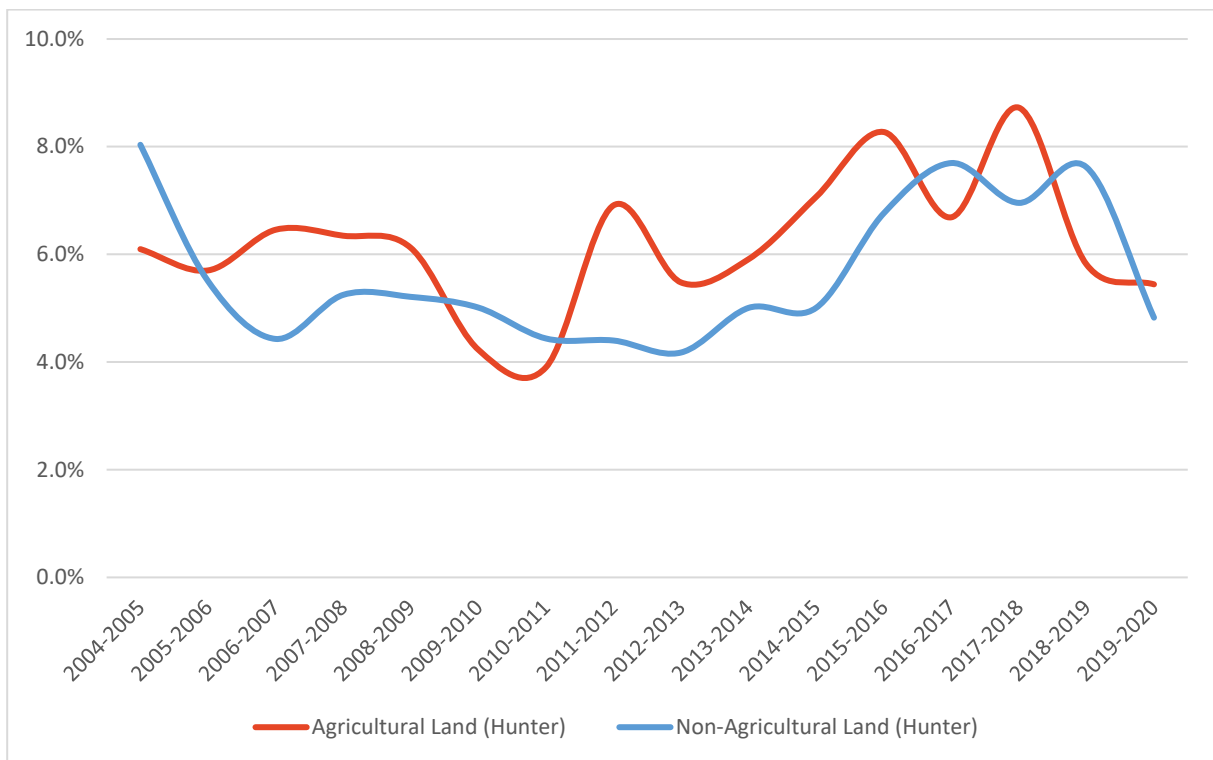


Figure 4.5-3. Incidence of agricultural land ownership changes, Hunter (% area).

4.6 New England North West

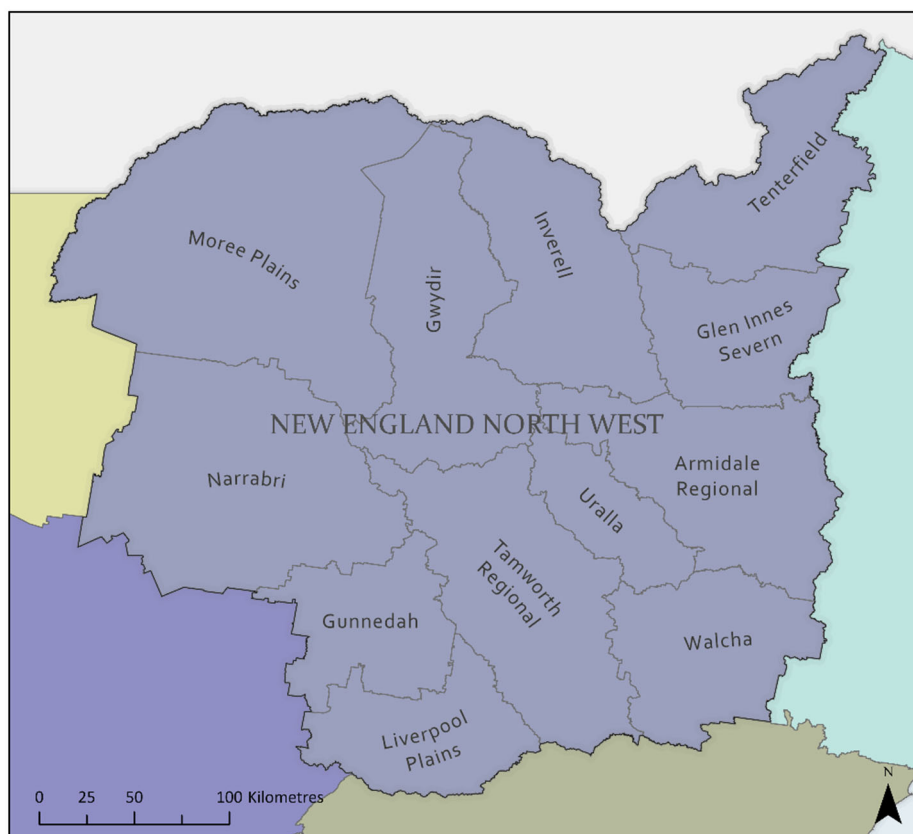


Figure 4.6-1. New England North West Region Boundary

Insight: During the study period, the median gross rate of rural land ownership change in New England North West (5.7%) was identical to NSW as a whole; stayed within a narrow band for most of this time, and was aligned with broader yearly trends in the state. The highest rates of change were in the three LGAs in the far north-east of the region (Gwydir, Tenterfield and Inverell).

- The median gross rate of change in the New England North West (NENW) region is 5.7%, which is the same as that of NSW as a whole (Table 4.6-1). There is little variation in the rate of changes between years, with the rate of change for most years hovering around the regional median. Even though there are no significant troughs, there are some peaks in 2008 (7.4%) and 2017 (7.7%) (Figure 4.6-2).
- Despite the average regional median gross rate of change, there are some significant differences between the LGAs in the NENW region. Median rates of change are higher in Gwydir (6.8%), Tenterfield (6.6%), Inverell (6.4%), and Tamworth (6.4%) (Table 4.6-1). Meanwhile, Uralla (4.6%) and Walcha (4.3%) have particularly low median rates of change compared to the entire region. The rest of the LGAs in the region remain around the average.
- The standard deviation for the region is 0.9%, which reflects a small degree of variation between years in the study period. The variance for individual LGAs is higher than the

regional standard deviation, hovering between 1.2% (Moree Plains) and 2.4% (Walcha). This shows a higher degree of variance within each LGA compared to the region as a whole.

- The subset of agricultural parcels has a median rate of change of 5.6%, consistent with the overall median rate of change. Non-agricultural land has a median rate of 5.7%, indicating very few differences in the patterns between the two subsets. However, the standard deviation for non-agricultural land is 2%, which is higher than that for agricultural land (0.9%) and demonstrates higher variability in the rate of change of non-agricultural land. This is reflected in the higher number of peaks and troughs overall.

Table 4.6-1. Median Gross Churn Rate Summary, New England North West.

| LGA | Median Rate of Change | Distance from Region Median | Distance from State Median |
|--------------------------------------|-----------------------|-----------------------------|----------------------------|
| Gwydir | 6.8% | 1.1% | 1.1% |
| Tenterfield | 6.6% | 0.9% | 0.9% |
| Inverell | 6.4% | 0.7% | 0.7% |
| Tamworth Regional | 6.4% | 0.7% | 0.7% |
| Gunnedah | 5.8% | 0.2% | 0.1% |
| Armidale Regional | 5.8% | 0.2% | 0.1% |
| Liverpool Plains | 5.8% | 0.2% | 0.1% |
| Narrabri | 5.8% | 0.1% | 0.1% |
| Glen Innes Severn | 5.8% | 0.1% | 0.0% |
| Moree Plains | 5.2% | -0.5% | -0.5% |
| Uralla | 4.6% | -1.1% | -1.1% |
| Walcha | 4.3% | -1.4% | -1.4% |
| New England North West Region | 5.7% | - | 0.0% |

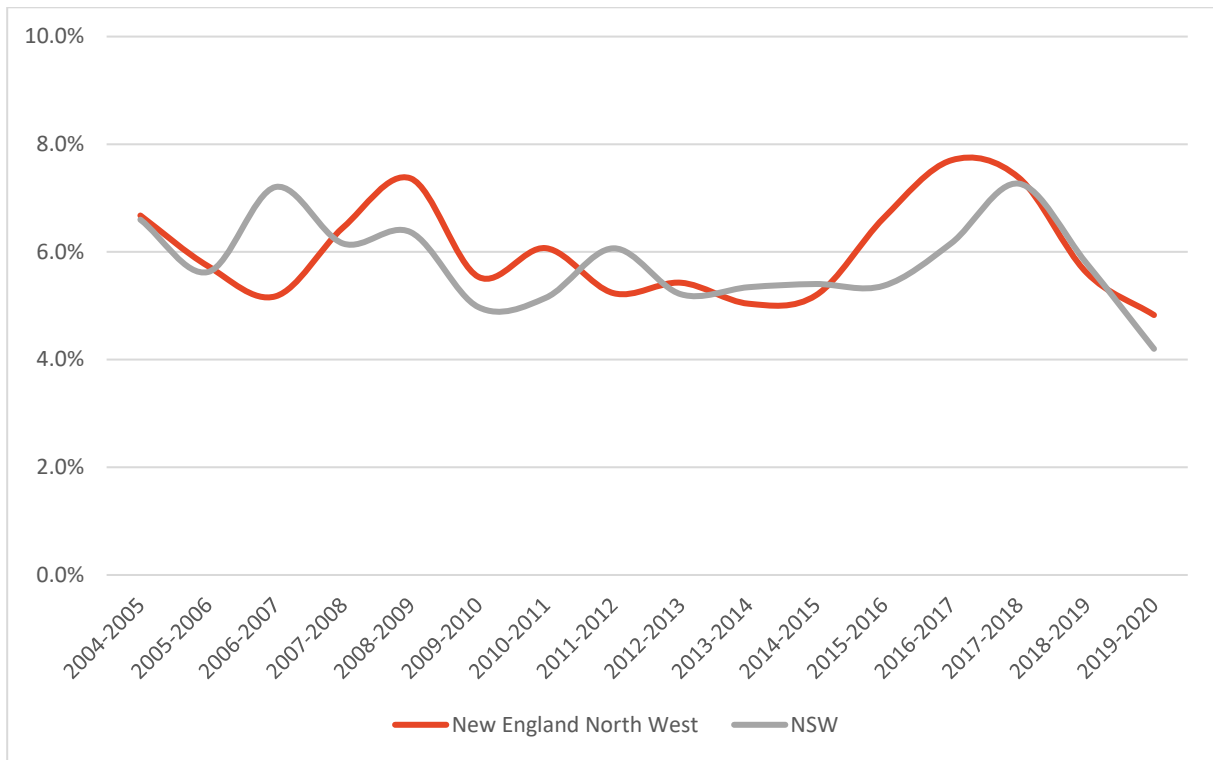


Figure 4.6-2. Incidence of all rural land ownership changes (% area), New England North West.

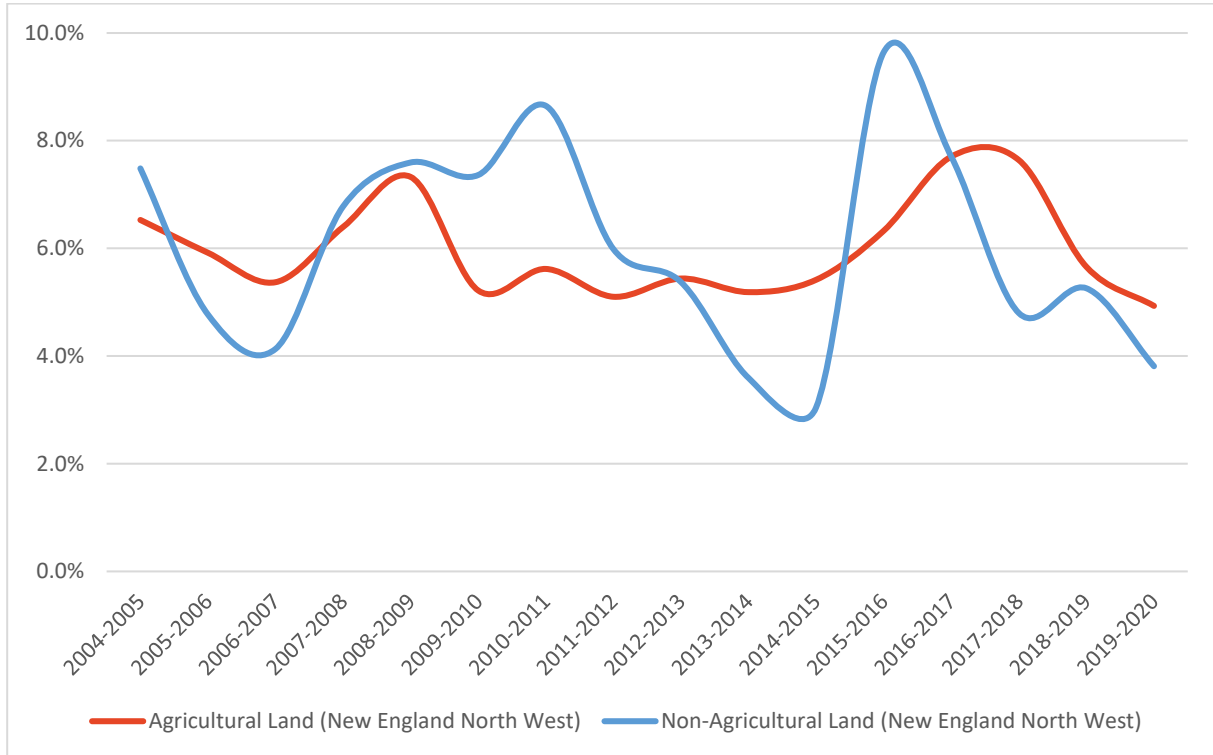


Figure 4.6-3. Incidence of agricultural land ownership changes, New England North West (% area).

4.7 North Coast

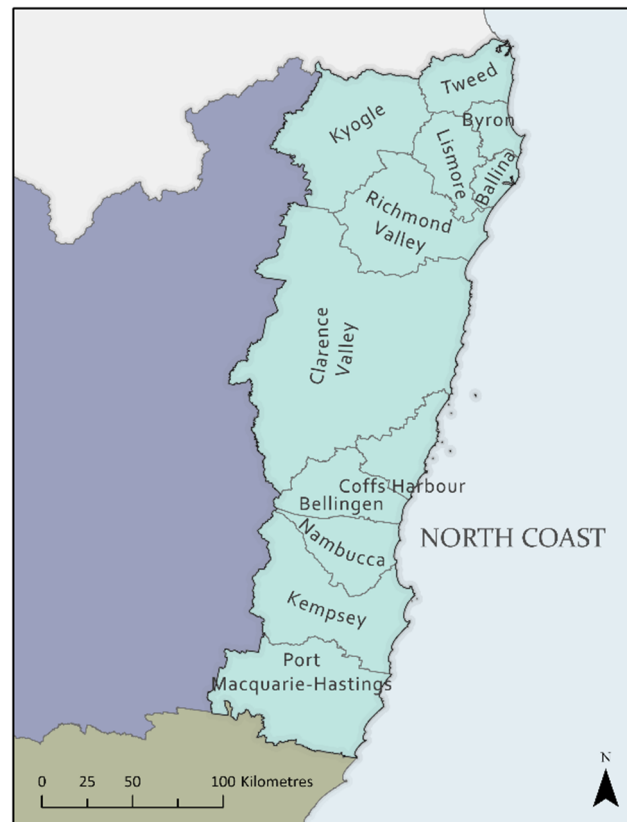


Figure 4.7-1. North Coast Region Boundary

Insight: The North Coast experienced a dramatic increase in the median rate of rural land ownership change in 2015-16. In 2014-15, 5.4% of rural land in the region changed hands. The following year, this increased to 8.1%, and it remained significantly higher than the state average for the remaining years of the study. There is little doubt that non-agricultural drivers were key to this outcome. Faster population growth and lifestyle migration generated increased demand for rural land. This combined with significant changes to ownership of forestry land in some LGAs (notably, the three with the highest churn rates, Clarence Valley, Richmond Valley and Kyogle) contributes to high rates of churn.

- The median gross rate of change in the North Coast region for the study period is 5.7%, consistent with that of all NSW (Table 4.7-1). Standard deviation of the annual rate of change for all years is 1.1% which is slightly higher than for the whole state, but similar to other regions. Regionally, the highest peaks occurred in 2015 (8.1%), 2016 (7.2%), and 2017 (7.8%), with sustained higher than average rates in 2015-2018 (Figure 4.7-2). The lowest rates occurred in 2012 (4.4%), 2013 (5.0%), and 2014 (5.2%).
- Within the region, gross rates of change for LGAs varied around the regional median. Substantially higher rates occurred in the Clarence Valley (6.6%), Richmond Valley (6.5%), and Kyogle (6.2%) (Table 4.7-1). Nambucca has the lowest rate (5.3%), -0.5% relative to North Coast. LGAs where the medians are closer the regional (within 0.3%) are Port-Macquarie Hastings (6.0%), Byron (5.9%), Bellingen (5.8%), Kempsey (5.7%), Ballina (5.5%), Lismore (5.4%), Coffs Harbour (5.4%), and Tweed (5.4%).

- Standard deviation of the annual rates of change for LGAs is varied in the North Coast region. The highest are in Kyogle (2.3%) and Bellingen (1.8%). The least variation occurs in Tweed (1.1%), Lismore (1.1%), Coffs Harbour (1.2%), Port Macquarie Hastings (1.2%), and Clarence Valley (1.3%). There is modest variation in Byron (1.4%), Richmond Valley (1.4%), Nambucca (1.5%), Ballina (1.5%), and Kempsey (1.6%).
- The agricultural land subset has similar median and standard deviation (5.9%; 1.1%) to the overall (5.7%; 1.5%). The remaining rural, non-agricultural land has a similar overall median rate and standard deviation (5.8%; 1.2%). Variation among LGAs for agricultural land is lesser than in other regions. The most dispersed rates of change occur in Bellingen (2.4%), Coffs Harbour (2.1%), and Ballina (1.7%). The least variation occurs in Lismore (1.1%) and Port Macquarie Hastings (1.2%).

Table 4.7-1. Median Gross Churn Rate Summary, North Coast.

| LGA | Median Rate of Change | Distance from Region Median | Distance from State Median |
|---------------------------|-----------------------|-----------------------------|----------------------------|
| Clarence Valley | 6.6% | 0.9% | 0.9% |
| Richmond Valley | 6.5% | 0.8% | 0.8% |
| Kyogle | 6.2% | 0.5% | 0.5% |
| Port Macquarie-Hastings | 6.0% | 0.3% | 0.3% |
| Byron | 5.9% | 0.2% | 0.2% |
| Bellingen | 5.8% | 0.1% | 0.1% |
| Kempsey | 5.7% | 0.0% | 0.0% |
| Ballina | 5.5% | -0.2% | -0.2% |
| Lismore | 5.4% | -0.3% | -0.3% |
| Coffs Harbour | 5.4% | -0.3% | -0.3% |
| Tweed | 5.4% | -0.3% | -0.3% |
| Nambucca | 5.3% | -0.5% | -0.5% |
| North Coast Region | 5.7% | - | 0.0% |

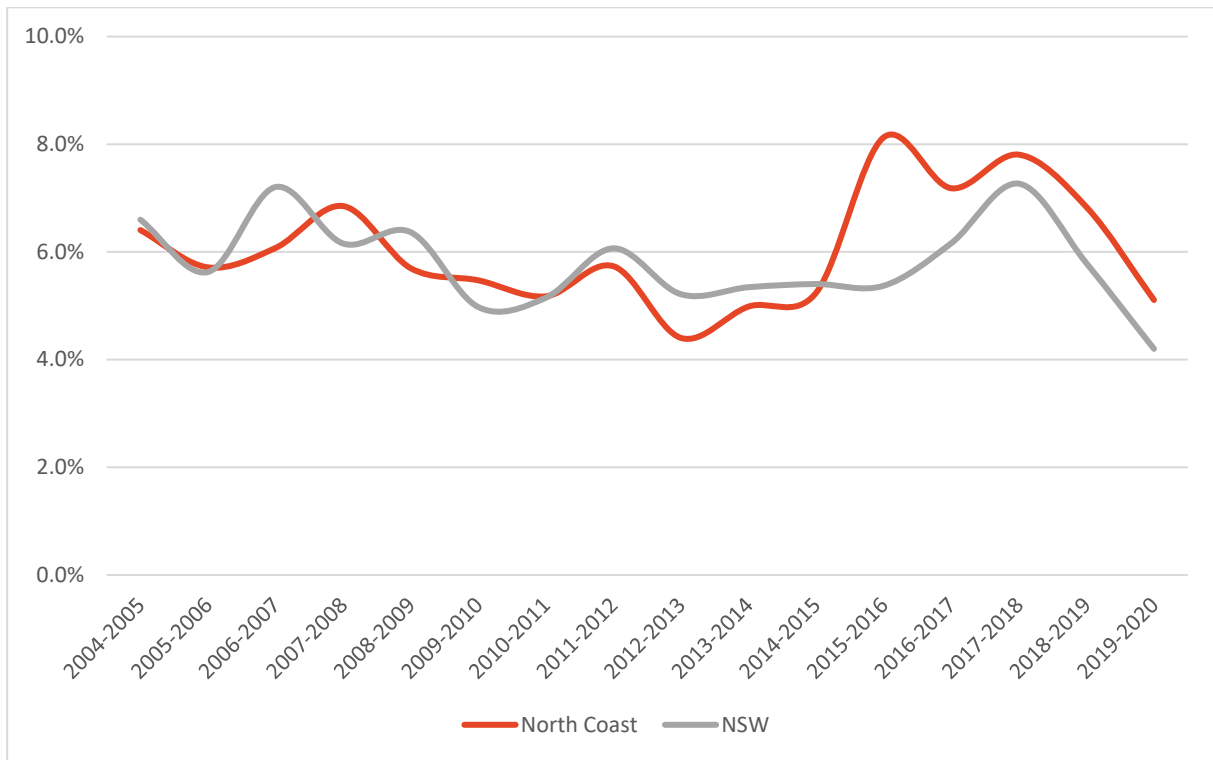


Figure 4.7-2. Incidence of all rural land ownership changes (% area), North Coast.

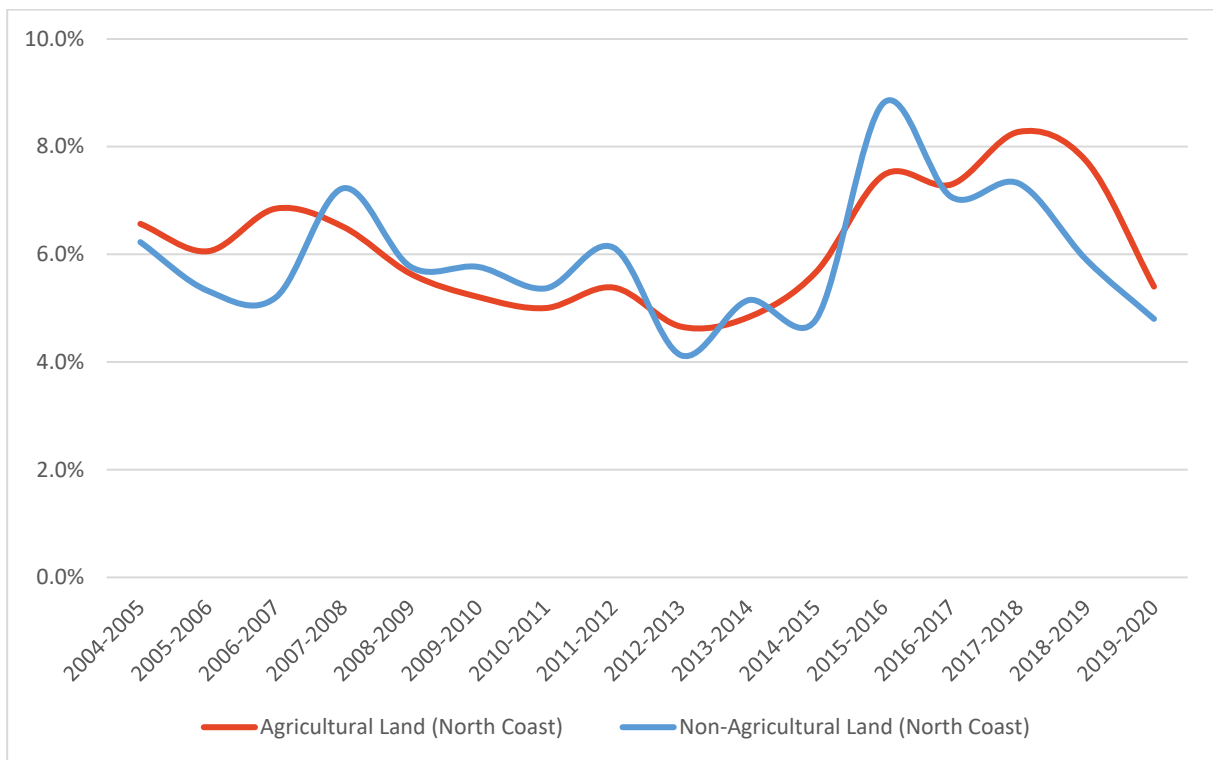


Figure 4.7-3. Incidence of agricultural land ownership changes, North Coast (% area).

4.8 Riverina Murray

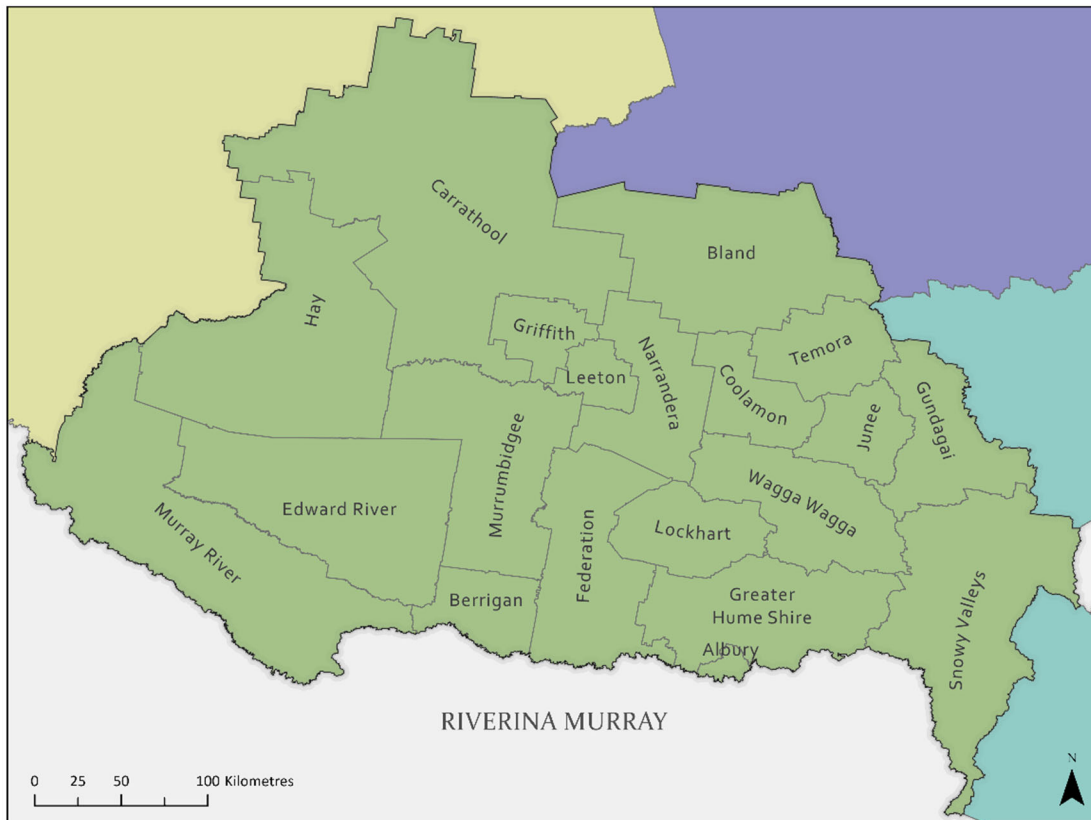


Figure 4.8-1. Riverina Murray Region Boundary

Insight: Riverina Murray has undergone considerable rural change during the study period Jan 2004- Jan 2020, with a major driver being the implementation of changed water entitlement arrangements. Nevertheless, the rate at which rural land changed hands during the period was considerably lower than the state as a whole. Of the 20 LGAs in Riverina Murray, eleven had average median churn rates less than 5%. There was also a low level of year-on-year variation. The outlier to this regional pattern was Leeton, a relatively small LGA, which experienced a dramatic peak and trough cycle in 2015-16 and 2019-20.

- The median gross rate of change in the Riverina Murray region is 5.2%, which is lower than that of NSW as a whole (5.7%) (Table 4.8-1). Through most of the study period the rates of change in the Riverina Murray remained around the median, however, there were two peaks in 2014 (6.8%) and 2017 (7.6%), and a trough in 2009 (4.4%) (Figure 4.8-2). (See Appendix 0 for LGA specific graphs).
- Although the region as a whole has relatively low median rates of change compared to NSW, the following LGAs have particularly low rates: Lockhart (4.3%), Coolamon (4.2%), Temora (4.1%), Federation (3.9%), and Albury (3.8%) (Table 4.8-1). Murray River (5.8%) and Hay (5.7%) are closer to the state median than the rest of the region. Leeton is an outlier with an especially high median rate of change of 7.3%.
- The standard deviation for the region is 0.8%, which reflects a small degree of variation between years in the study period. Most individual LGAs in the region have a standard

deviation between 1% and 1.8%. However, individual LGAs reflect a high degree of volatility in how land changes hand year-to-year. Particularly volatile is Murrumbidgee LGA with a standard deviation of 5.1%, followed by Hay (3.7%), Griffith (3.2%), Leeton (2.7%), and Edward River (2.7%).

- The subset of agricultural parcels has a median rate of change of 5.2%, similar to the overall median rate of change. The media rate of change of non-agricultural land is slightly higher at 5.6%. However, the standard deviation for non-agricultural land is 2.4% – higher than that for agricultural land (0.9%) – and demonstrates higher variability in the rate of change of non-agricultural land. Such explains the higher rate of peaks and troughs for non-agricultural land.

Table 4.8-1. Median Gross Churn Rate Summary, Riverina Murray.

| LGA | Median Rate of Change | Distance from Region Median | Distance from State Median |
|-------------------------------|-----------------------|-----------------------------|----------------------------|
| Leeton | 7.3% | 2.1% | 1.6% |
| Murray River | 5.8% | 0.5% | 0.1% |
| Hay | 5.7% | 0.5% | 0.0% |
| Wagga Wagga | 5.5% | 0.3% | -0.2% |
| Griffith | 5.4% | 0.2% | -0.3% |
| Berrigan | 5.4% | 0.1% | -0.3% |
| Snowy Valleys | 5.2% | 0.0% | -0.5% |
| Gundagai | 5.1% | -0.1% | -0.6% |
| Narrandera | 5.0% | -0.2% | -0.7% |
| Carrathool | 5.0% | -0.3% | -0.7% |
| Edward River | 4.9% | -0.3% | -0.8% |
| Bland | 4.9% | -0.3% | -0.8% |
| Greater Hume Shire | 4.7% | -0.5% | -1.0% |
| Murrumbidgee | 4.5% | -0.7% | -1.2% |
| Junee | 4.5% | -0.8% | -1.2% |
| Lockhart | 4.3% | -0.9% | -1.4% |
| Coolamon | 4.2% | -1.0% | -1.5% |
| Temora | 4.1% | -1.1% | -1.6% |
| Federation | 3.9% | -1.4% | -1.8% |
| Albury | 3.8% | -1.5% | -1.9% |
| Riverina Murray Region | 5.2% | - | -0.5% |



Figure 4.8-2. Incidence of all rural land ownership changes (% Area), Riverina Murray.



Figure 4.8-3. Incidence of agricultural land ownership changes, Riverina Murray (% area).

4.9 South East & Tablelands

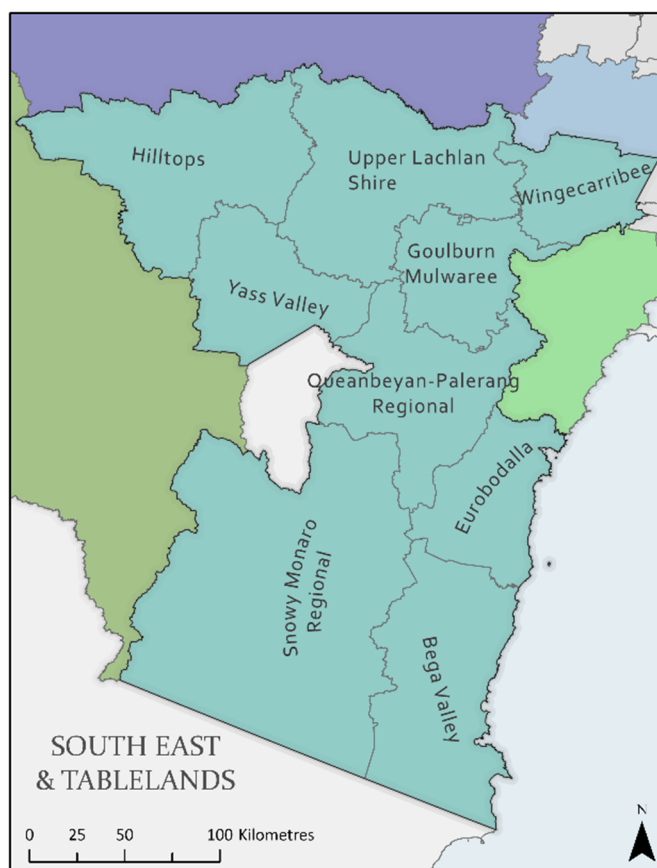


Figure 4.9-1. South East & Tablelands Region Boundary

Insight: Over the sixteen years of the study period, from Jan 2004- Jan 2020, the annual median gross rate of rural land ownership change in South East & Tablelands remained remarkably stable, within a band between 4.9% and 6.6%. South East & Tablelands has the least year-on-year variability by far of any major rural region. The one distinguishing feature of trends in this region is that annual churn rates were much more stable, year-on-year for agricultural than for non-agricultural land. The overwhelming majority of rural land in this region is agricultural (between 76-90%) and so its stability underpins wider regional trends. The region contains a diversity of LGAs from those on the coast (Bega Valley and Eurobodalla) to those several hundreds of kilometres inland (Yass Valley, Hilltops) yet there is no obvious geographical pattern between LGA results.

- The median gross rate of change for the South East & Tablelands region for the study period is 5.2% and is one of lowest in the state (Table 4.9-1. Median Gross Churn Rate Summary, South East & Tablelands.). Rates of change are very stable and reflected in the low standard deviation (0.5%), the lowest in the state. Regionally, rates were consistently low for January 2004 - January 2020, remaining at ~5%. The highest rates occurred in 2015 (6.6%) and 2017 (6.2%) and fell again to 5.3% in 2019 (Figure 4.9-2).
- Within the region, median gross rates of change for LGAs varied moderately. Higher rates occurred in Snowy Monaro Regional (5.7%), Queanbeyan-Palerang Regional (5.6%), and Goulburn Mulwaree (5.5%). Eurobodalla (4.7%), Hilltops (4.7%), and Yass Valley (4.8%) had

the lowest rates, 0.4-0.5% lower than the regional median. The medians closer to the regional level (within 0.1%) are Upper Lachlan (5.3%), Bega Valley (5.1%), and Wingecarribee (5.1%).

- Standard deviation of the annual rates of change for LGAs is fairly varied in this region. The highest occurred in Goulburn Mulwaree (1.9%), Eurobodalla (1.8%), Wingecarribee (1.8%), and Queanbeyan-Palerang Regional (1.7%). The remaining LGA's had more modest variation in annual rates of change. The least variation occurred in Hilltops (0.6%) and Snowy Monaro Regional (0.7%).
- The agricultural land subset has similar median and standard deviation (5.1%; 0.6%) to the overall (5.2%; 0.5%). Non-agricultural land has a median rate and standard deviation of 5.8% and 1.6% respectively, indicating some differences in the two subsets. Variation of LGA rates of change for agricultural land are consistent, but more pronounced relative to all rural land. The most dispersed rates of change occur in Eurobodalla (2.3%), Queanbeyan-Palerang Regional (1.8%), Wingecarribee (1.8%), and Goulburn Mulwaree (1.6%). Again, Hilltops (0.6%) and Snowy Monaro Regional (0.8%) have very little variation.

Table 4.9-1. Median Gross Churn Rate Summary, South East & Tablelands.

| LGA | Median gross rate of change | Distance from Region Median | Distance from State Median |
|---|-----------------------------|-----------------------------|----------------------------|
| Snowy Monaro Regional | 5.7% | 0.5% | 0.0% |
| Queanbeyan-Palerang Regional | 5.6% | 0.3% | -0.1% |
| Goulburn Mulwaree | 5.5% | 0.2% | -0.3% |
| Upper Lachlan Shire | 5.3% | 0.1% | -0.4% |
| Bega Valley | 5.1% | -0.1% | -0.6% |
| Wingecarribee | 5.1% | -0.2% | -0.6% |
| Yass Valley | 4.8% | -0.4% | -0.9% |
| Eurobodalla | 4.7% | -0.5% | -1.0% |
| Hilltops | 4.7% | -0.5% | -1.0% |
| South East & Tablelands Region | 5.2% | - | -0.5% |



Figure 4.9-2. Incidence of all rural land ownership changes (% Area), South East & Tablelands.

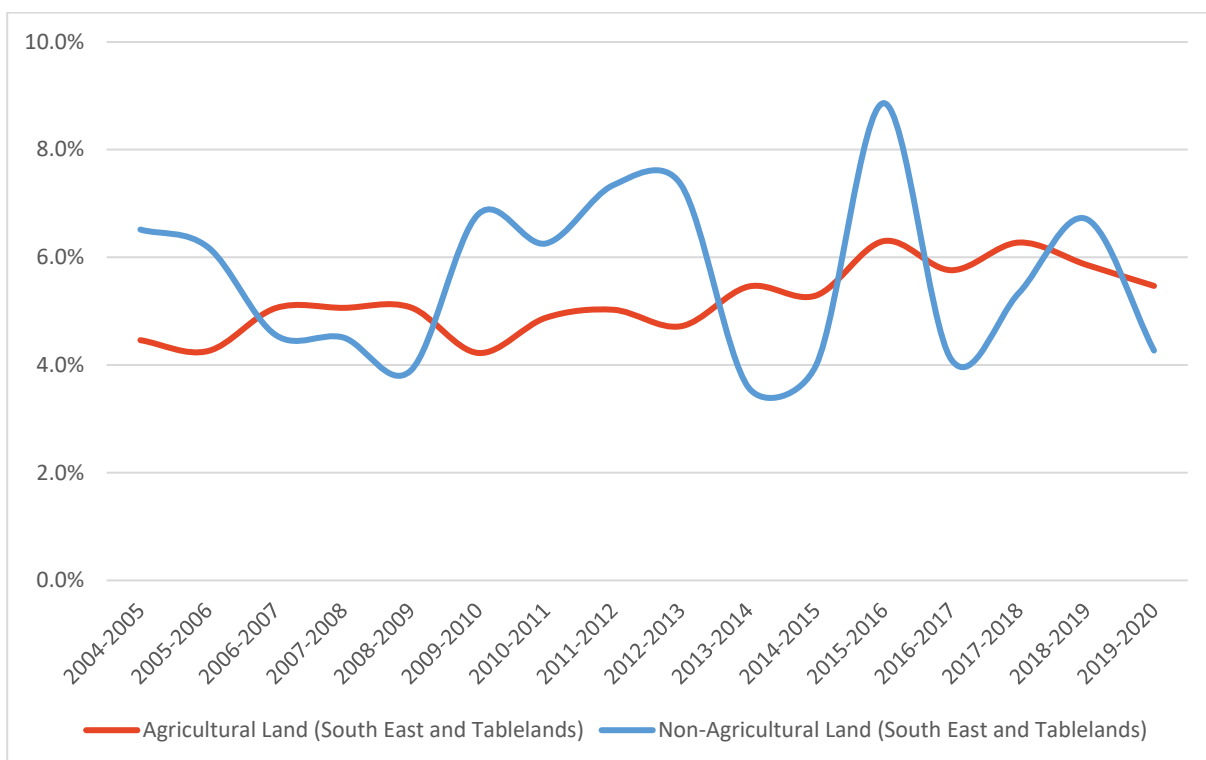


Figure 4.9-3. Incidence of agricultural land ownership changes, South East & Tablelands (% area).

4.10 Central Coast

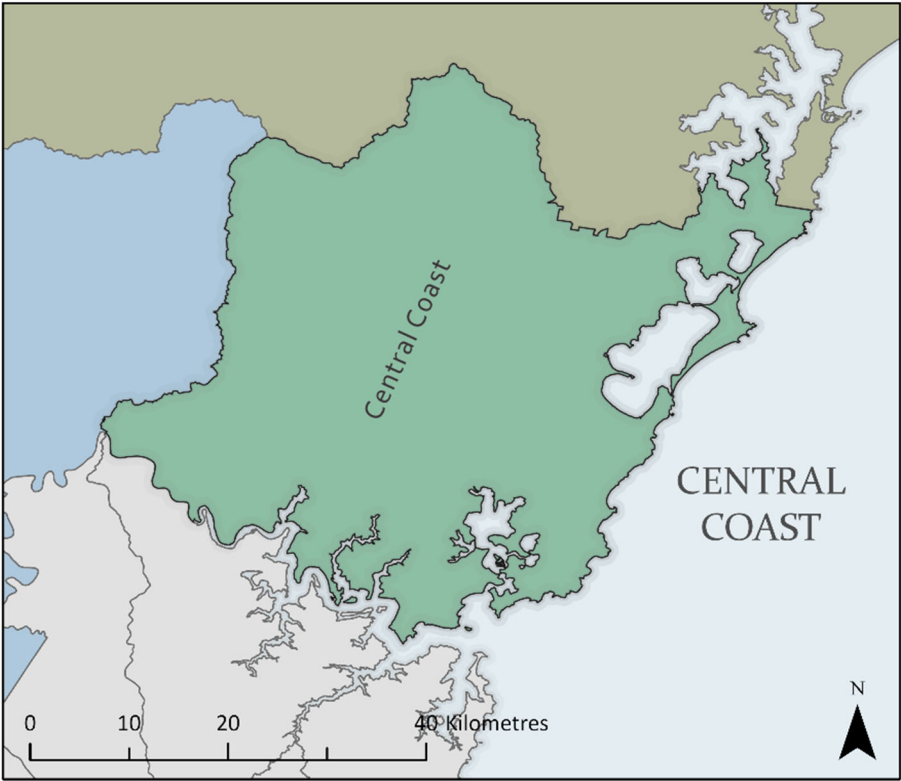


Figure 4.10-1. Central Coast Region Boundary

- The median gross rate of change for the Central Coast region for the study period is 4.7%, one of the lowest in the state (Table 4.10-1. Median Gross Churn Rate Summary, Central Coast.). Rates of change vary substantially more than in other regions and NSW overall, reflected by 1.6% standard deviation. The annual rate of change fluctuates a lot between years. Rates peaked significantly in 2007 (8.6%) and 2015 (8.4%) (Figure 4.10-2). A notable trough occurred between 2010-2013, where rate of change remained ~3.6%.
- The agricultural land subset has a higher median and lower standard deviation (5.9%; 1.4%) to the overall (4.7%; 1.6%), suggesting that agricultural parcels experience higher rates of change more consistently (with less variation) than rural land as a whole. Non-agricultural land has a median rate and standard deviation of 4.2% and 2.1%, indicating differences in the patterns of the two subsets.

Table 4.10-1. Median Gross Churn Rate Summary, Central Coast.

| LGA | Median gross rate of change | Distance from Region Median | Distance from State Median |
|-----------------------------|-----------------------------|-----------------------------|----------------------------|
| Central Coast | 4.7% | 0.0% | -1.0% |
| Central Coast Region | 4.7% | - | -1.0% |

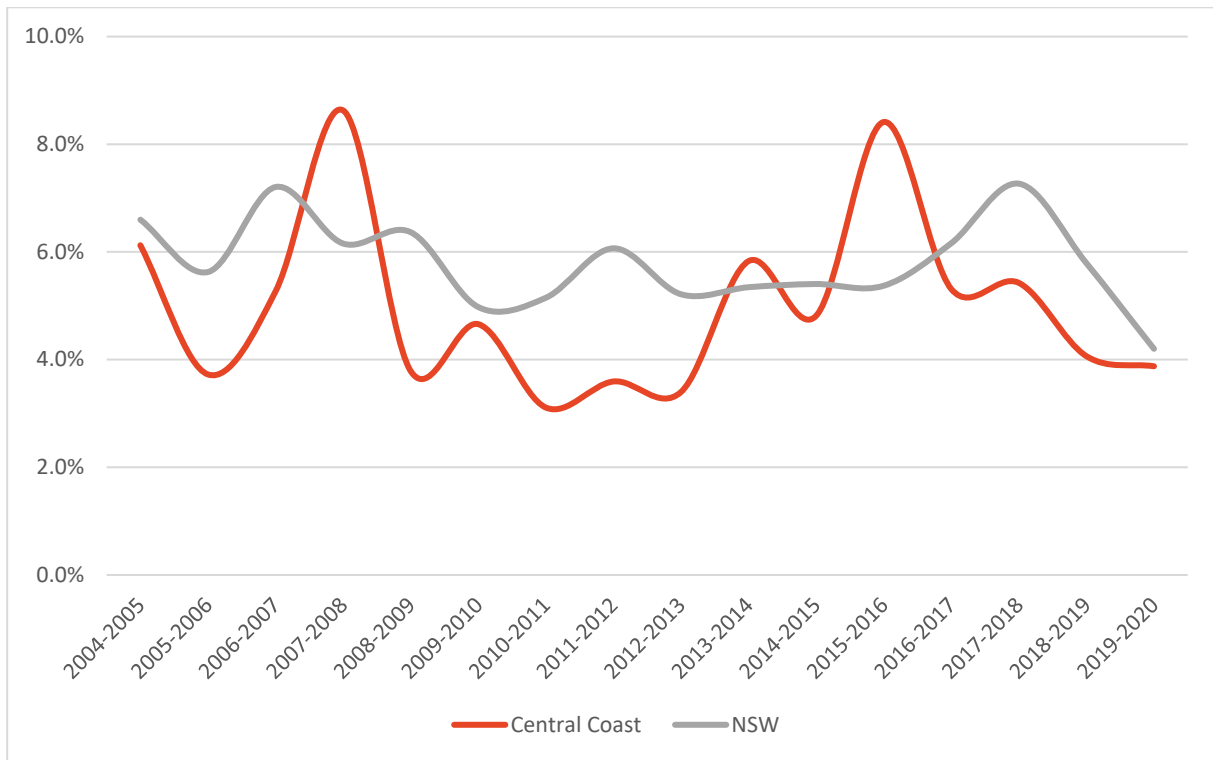


Figure 4.10-2. Incidence of all rural land ownership change (% area), Central Coast.

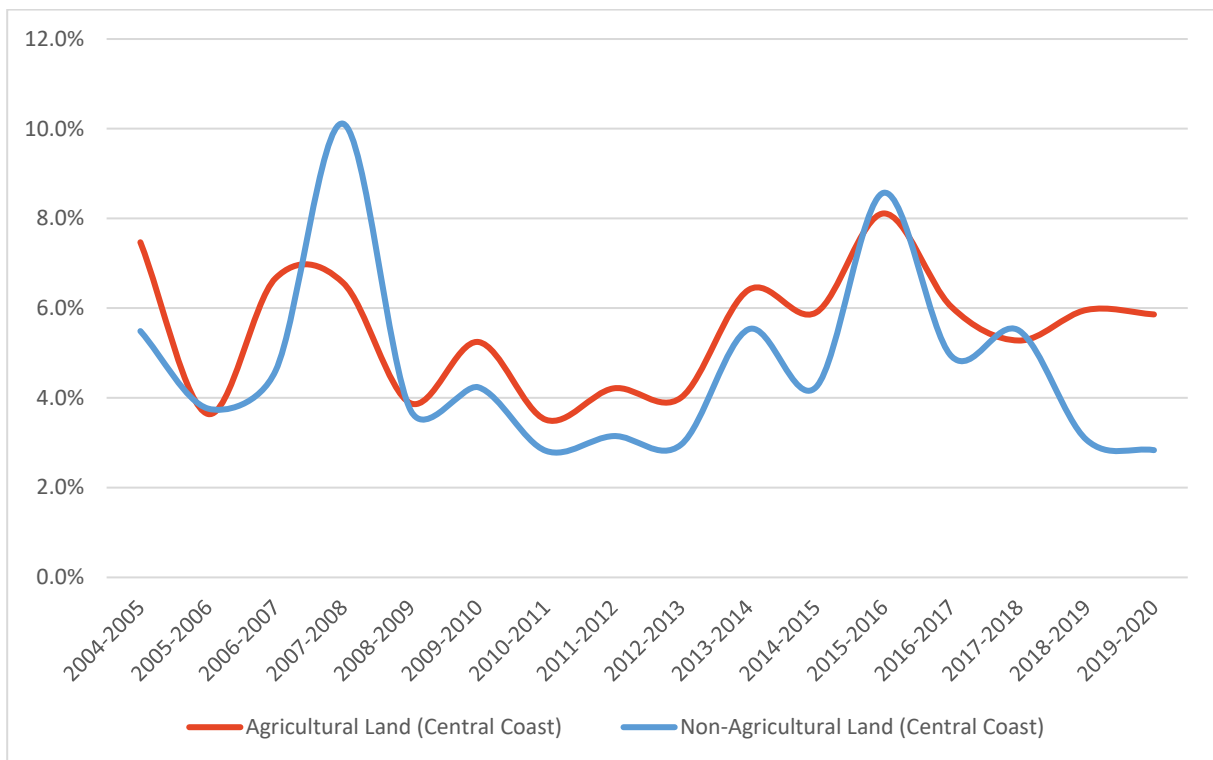


Figure 4.10-3. Incidence of agricultural land ownership changes (% area), Central Coast.

4.11 Greater Sydney

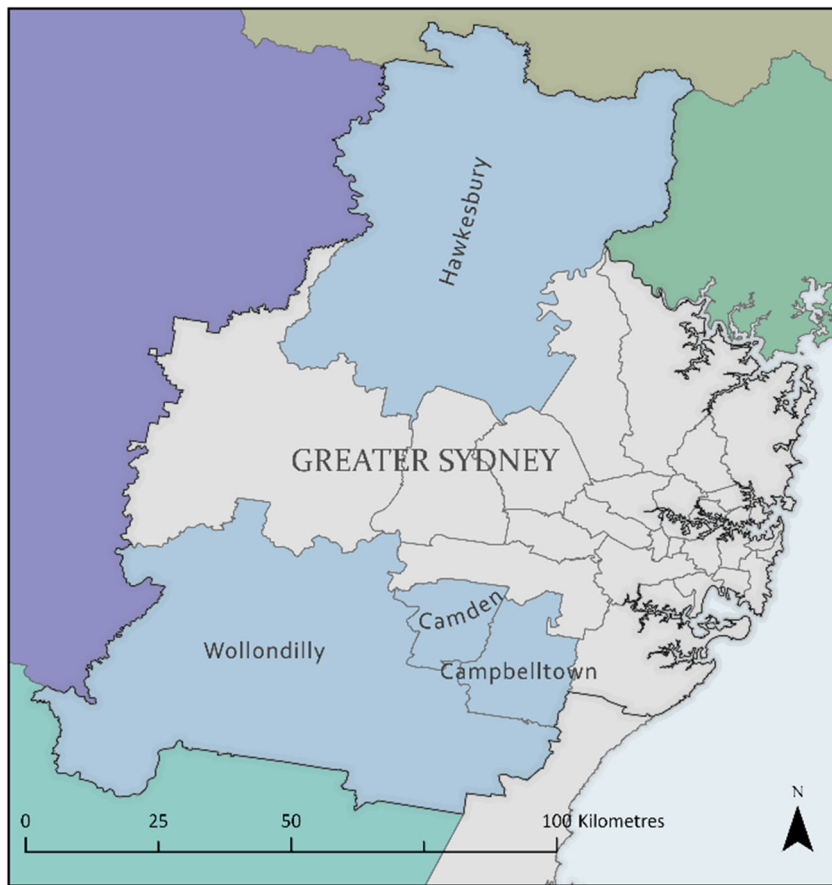


Figure 4.11-1. Greater Sydney Region

- The median gross rate of change for the selected area of the Greater Sydney region for the study period is 4.1%, which is lower than most other regions (Table 4.11-1). Rates of change have similar variation between years to other regions and NSW overall, reflected by 1.2% standard deviation. The annual rate doesn't fluctuate a lot between years, remaining close to the average. However, two significant increases occur in 2006 (7.5%) and moderately in 2015 (6.5%) (Figure 4.11-2).
- LGAs within the region have varied rates of change suggesting different patterns. Hawkesbury (5.4%) has the highest median annual rate of change whilst Camden (3.9%) sits close to the region median. The lowest rates occur in Campbelltown (3.4%) and Wollondilly (3.3%). There is a lot more variation between years for the LGAs as compared to the whole region, likely a result of smaller areas. Substantially higher variation occurs in Camden (4.4%) and Campbelltown (4.6%), whilst Wollondilly (1.6%) and Hawkesbury (1.0%) have more modest dispersion.
- The agricultural land subset has a higher median and standard deviation (5.5%; 1.8%), compared to the overall (4.1%; 1.4%), suggesting that agricultural parcels experience higher rates of change with more variation between years for this region. Non-agricultural land has a median rate and standard deviation of 3.4% and 1.6%, indicating key differences in the patterns of the two subsets reflected by a much lower median rate of change. Rates of

change for agricultural parcels vary substantially between the LGAs; Hawkesbury (5.9%) and Wollondilly (5.3%) have much higher rates than Camden (3.8%) and Campbelltown (2.1%). All LGAs have high variations between years for the agricultural subset; however, Hawkesbury (2.0%) and Wollondilly (1.5%) are more stable than Camden (5.7%) and Campbelltown (9.4%).

Table 4.11-1. Median Gross Churn Rate Summary, Greater Sydney.

| LGA | Median gross rate of change | Distance from Region Median | Distance from State Median |
|-----------------------|-----------------------------|-----------------------------|----------------------------|
| Hawkesbury | 5.4% | 1.3% | -0.3% |
| Camden | 3.9% | -0.2% | -1.8% |
| Campbelltown | 3.4% | -0.7% | -2.3% |
| Wollondilly | 3.3% | -0.8% | -2.4% |
| Greater Sydney | 4.1% | - | -1.6% |

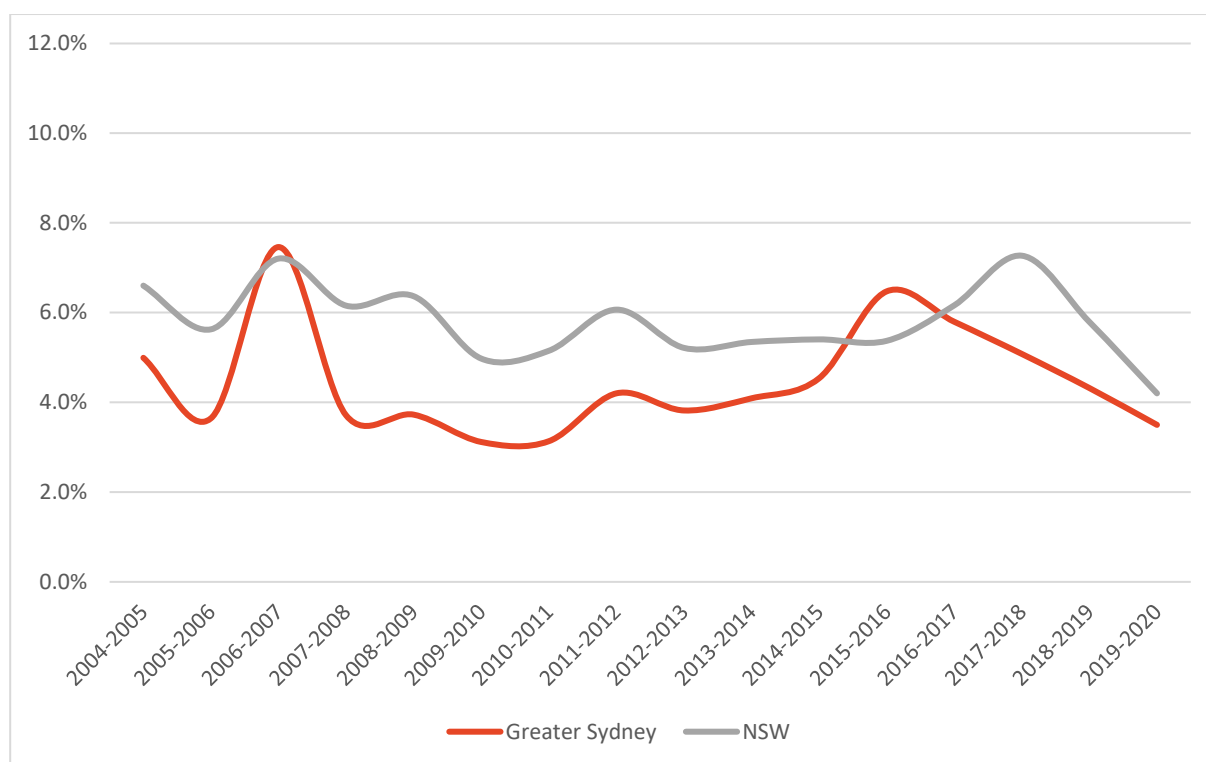


Figure 4.11-2. Incidence all rural land ownership changes (% area), Greater Sydney.

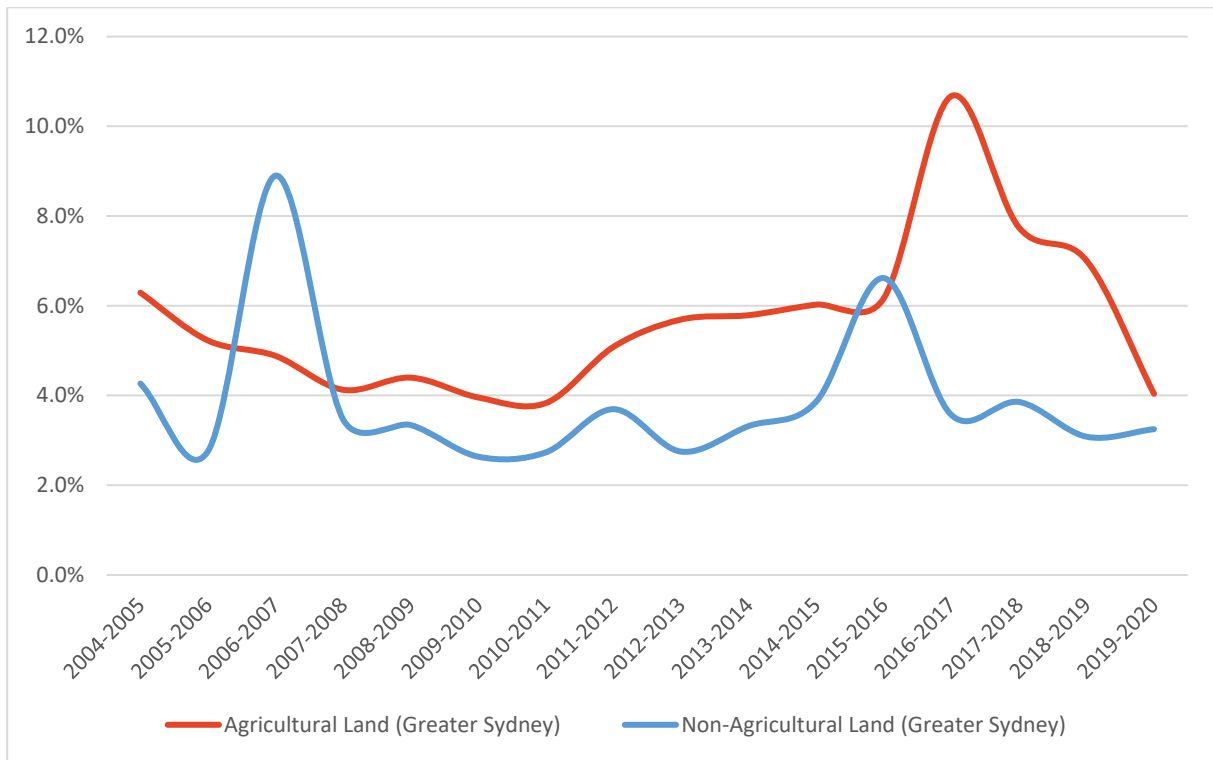


Figure 4.11-3. Incidence of agricultural land ownership changes, Greater Sydney (% area).

4.12 Illawarra Shoalhaven

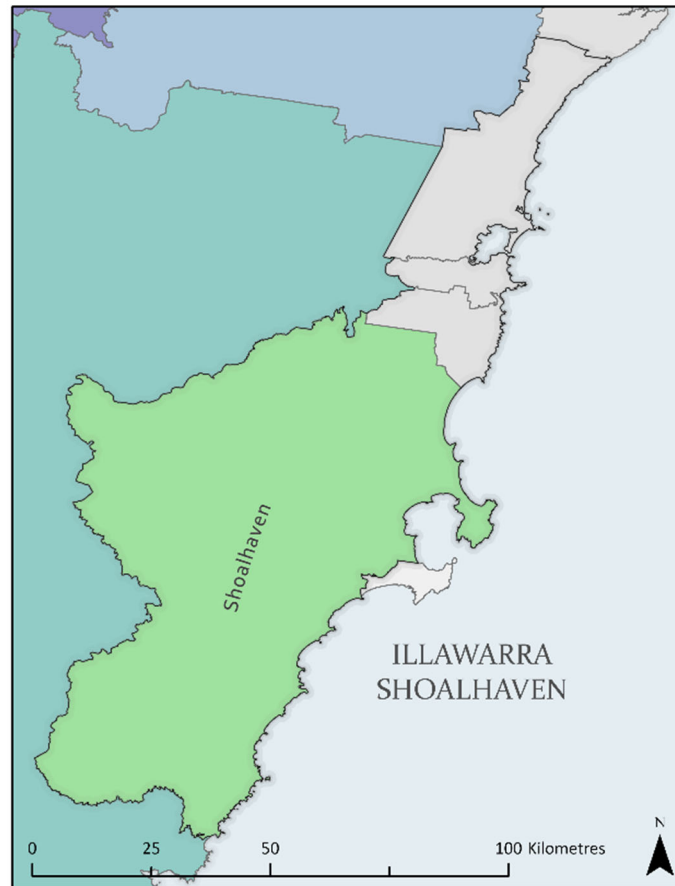


Figure 4.12-1. Illawarra Shoalhaven Region Boundary

- The median gross rate of change for the selected area of the Illawarra Shoalhaven region for the study period is 6.1%, which is higher than other regions (Table 4.12-1). Rates of change vary substantially more than in other regions and NSW overall, reflected by 1.4% standard deviation. The annual rate of change fluctuates a lot between years. Rates peaked significantly in 2014 (8.4%) and moderately in 2017 (7.0%) (Figure 4.12-2). A notable trough occurred in 2007-2009 where annual rate of change dropped to ~4.2%, and again in 2011 (3.7%).
- The agricultural land subset has a median and standard deviation (5.5%; 1.3%) lower than the overall (6.1%; 1.4%), suggesting that agricultural parcels experience lower rates of change with similar variation between years compared to rural land as a whole. Non-agricultural land has a median rate and standard deviation of 6.2% and 1.7%, indicating key differences in the patterns of the two subsets reflected by a higher median rate of change and greater variation between years.

Table 4.12-1. Median Gross Churn Rate Summary, Illawarra Shoalhaven.

| LGA | Median Rate of Change | Distance from Region Median | Distance from State Median |
|------------------------------------|-----------------------|-----------------------------|----------------------------|
| Shoalhaven | 6.1% | 0.0% | 0.4% |
| Illawarra Shoalhaven Region | 6.1% | - | 0.4% |

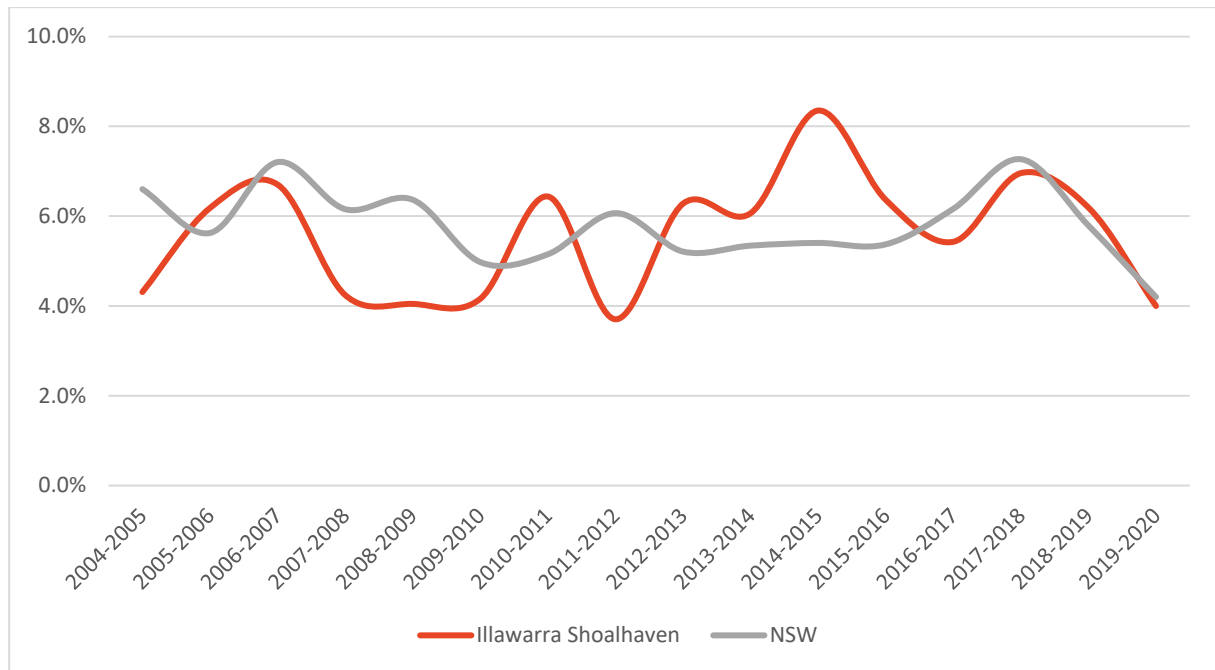


Figure 4.12-2. Incidence of all rural land ownership change in Illawarra Shoalhaven (% Area).

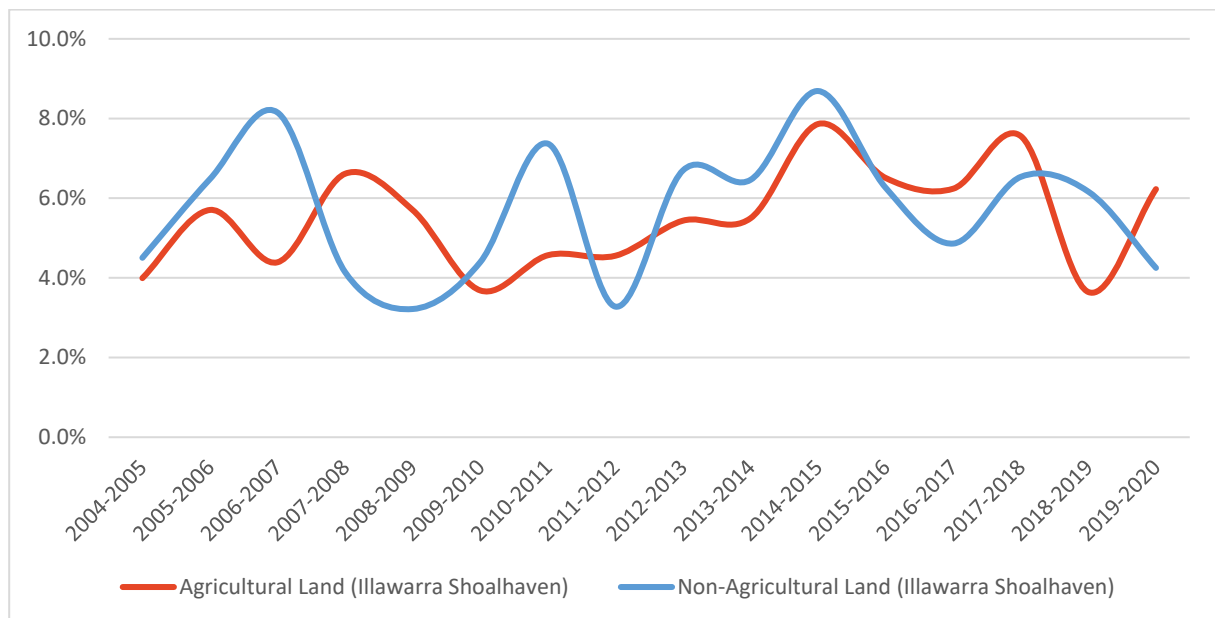


Figure 4.12-3. Incidence of agricultural land ownership changes, Illawarra Shoalhaven (% Area).

5 Conclusions

This research project rigorously analyses rural land ownership patterns for NSW using a comprehensive geo-database of land registration changes for January 2004 - January 2020. It focuses on the concept of gross rural land ownership change. The Report provides an overview of the research methods and state-wide, regional and local government area level trends. Subsequent publications will explore the drivers and consequences of the patterns of land ownership churn observed in this report. These patterns are summarised below:

- **Gross rural land ownership churn rates are generally consistent across the 10 planning regions of NSW.** Despite expected regional and LGA-specific differences in the drivers of ownership change, the overall churn of rural land appears to be relatively stable. Rural land near the state's metropolitan regions, however, exhibits high variation in the median annual rate of land ownership change, rendering it difficult to establish clear trends. Land in Illawarra-Shoalhaven and Hunter regions have the highest median gross churn rate, while Greater Sydney and the Central Coast have the lowest, likely a result of the low number of land parcels in these regions.
- **A moderate degree of fluctuation is present between annual gross churn rates for the study period January 2004- January 2020.** At a state-wide scale, the peaks and troughs of land ownership change between years are confined to a band of 4.2% to 7.3%, with the most significant variation occurring since 2015. Prior to this, the incidence of land ownership change is relatively stable. At a regional scale, patterns of annual change differ greatly. Most regions follow the state-wide trend, with a peak in 2017-18 and then sharp decline indicating a slow-down in land transactions. However, the South East & Tablelands region has a distinctly low and stable rate of change while the rates of change for Central Coast, Greater Sydney, and Illawarra Shoalhaven vary substantially from the state-wide pattern. Year-to-year variation is particularly high in Far West, Central Coast, and Illawarra Shoalhaven. These variations point to the vagaries of climate, the influence of region-specific drivers, and the potential effects of small numbers of land parcels or large transactions on annual churn rates.
- **Non-agricultural land tends to experience higher year-to-year volatility than agricultural land, particularly at a regional scale.** Although agricultural and non-agricultural land have similar gross churn rates at a state-wide level, there is a higher degree of deviation for non-agricultural land in the majority of the 10 regions. The median gross rates of change for agricultural and non-agricultural land vary region-to-region, with some areas of state exhibiting a higher turnover of non-agricultural land while agricultural land changes hands more frequently in others. There is no immediately discernible pattern for areas where agricultural land churn is higher.

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Appendix A: Baseline Sample Area

All NSW

This baseline dataset of rural land transactions at 01/01/2004, comprises 597,909 unique land parcels, accounting for 639,975 km². Of the baseline rural study area, 91% has been classified as agricultural land determined by the 2007 ALUM land use activities data. This is consistent with results from the two subsequent ALUM datasets: 90% in 2013 and 92% in 2017.

Baseline sample summary of NSW.

| | Baseline Sample Area (km ²) | No. of Land Parcels |
|------------|---|---------------------|
| NSW | 639,975 | 597,909 |

Total area (km²) and count of unique land parcels in the database baseline.

Proportion of agricultural land, NSW (January 2004 - January 2020).

| | 2004-2007 | 2008-2013 | 2014-2020 |
|------------|-----------|-----------|-----------|
| NSW | 91% | 90% | 92% |

Percentage of rural land area in the study area that is defined as agricultural in all NSW. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Central West & Orana

The Central West & Orana region encompasses the local government areas listed below. The 2004 baseline has land registry information for 102,267 km² and 118,022 unique land parcels. Of the baseline rural study area of this region, 92% is defined as agricultural in the 2004 baseline. This is consistent for the sample duration and corresponding ALUM data; 92% in 2013 and 94% in 2017.

Baseline study area summary of the Central West & Orana.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|---------------------------------------|---|---------------------|
| Bathurst Regional | 2,953 | 7,858 |
| Blayney | 1,243 | 5,090 |
| Bogan | 13,448 | 3,374 |
| Cabonne | 4,670 | 10,615 |
| Coonamble | 8,512 | 5,301 |
| Cowra | 2,227 | 6,018 |
| Forbes | 3,840 | 4,689 |
| Gilgandra | 4,251 | 3,008 |
| Lachlan | 13,671 | 5,977 |
| Lithgow | 1,692 | 5,865 |
| Mid-Western Regional | 6,195 | 15,278 |
| Narromine | 4,593 | 3,211 |
| Oberon | 1,975 | 5,277 |
| Orange | 161 | 1,117 |
| Parkes | 5,192 | 5,194 |
| Warren | 9,446 | 5,801 |
| Warrumbungle | 9,496 | 8,804 |
| Weddin | 2,799 | 4,512 |
| Western Plains Regional | 5,903 | 11,033 |
| Central West & Orana Total | 102,267 | 118,022 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Central West & Orana (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|---|-------------------------|-------------------------|---------------------|
| Bathurst Regional | 81% | 80% | 88% |
| Blayney | 95% | 96% | 95% |
| Bogan | 98% | 97% | 98% |
| Cabonne | 90% | 90% | 96% |
| Coonamble | 99% | 99% | 100% |
| Cowra | 88% | 88% | 97% |
| Forbes | 97% | 98% | 99% |
| Gilgandra | 95% | 95% | 95% |
| Lachlan | 97% | 96% | 97% |
| Lithgow | 66% | 67% | 73% |
| Mid-Western Regional | 77% | 79% | 80% |
| Narromine | 98% | 98% | 100% |
| Oberon | 69% | 69% | 81% |
| Orange | 96% | 95% | 89% |
| Parkes | 96% | 95% | 99% |
| Warren | 99% | 99% | 99% |
| Warrumbungle Shire | 76% | 76% | 83% |
| Weddin | 95% | 95% | 100% |
| Western Plains Regional | 91% | 92% | 94% |
| Central West & Orana Total | 92% | 92% | 94% |

Percentage of rural land area in the study area that is defined as agricultural in the Central West & Orana region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013 and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Far West

The Far West region encompasses the local government areas listed below. The database baseline has land registry information for 291, 775 km² and 20, 279 unique land parcels in this region. Of the baseline rural study area of this region, ~97% is defined as agricultural. This is consistent for the sample duration and corresponding ALUM data; 96% in 2013 and 96% in 2017.

Baseline study area summary of the Far West.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|-----------------------|---|---------------------|
| Balranald | 20,904 | 2,063 |
| Bourke | 38,664 | 2,324 |
| Brewarrina | 17,922 | 1,149 |
| Broken Hill | 16 | 223 |
| Central Darling | 51,219 | 1,830 |
| Cobar | 42,649 | 2,807 |
| Unincorporated NSW | 75,778 | 1,605 |
| Walgett | 20,493 | 5,172 |
| Wentworth | 24,129 | 3,106 |
| Far West Total | 291,775 | 20,279 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Far West (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|-----------------------|--------------|--------------|--------------|
| Balranald | 98% | 96% | 95% |
| Bourke | 97% | 94% | 94% |
| Brewarrina | 99% | 98% | 98% |
| Broken Hill | 53% | 45% | 47% |
| Central Darling | 96% | 96% | 96% |
| Cobar | 96% | 95% | 95% |
| Unincorporated NSW | 98% | 98% | 98% |
| Walgett | 94% | 93% | 94% |
| Wentworth | 96% | 97% | 95% |
| Far West Total | 97% | 96% | 96% |

Percentage of rural land area in the study area that is defined as agricultural in the Far West region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013 and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

The Hunter

Hunter region encompasses the local government areas listed below. The database baseline has land registry information for 19, 104 km² and 62, 683 unique land parcels in this region. Of the baseline rural study area of this region, ~66% is defined as agricultural. This is consistent for the sample duration and corresponding ALUM data; 68% in 2013 and 67% in 2017.

Baseline study area summary of the Hunter.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|---------------------|---|---------------------|
| Cessnock | 910 | 5,352 |
| Dungog | 1,396 | 4,841 |
| Lake Macquarie | 168 | 2,451 |
| Maitland | 177 | 1,473 |
| Mid-Coast | 6,058 | 22,332 |
| Muswellbrook | 1,536 | 4,523 |
| Port Stephens | 348 | 3,509 |
| Singleton | 2,501 | 7,669 |
| Upper Hunter Shire | 6,011 | 10,533 |
| Hunter Total | 19,104 | 62,683 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Hunter (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|---------------------|--------------|--------------|--------------|
| Cessnock | 38% | 44% | 44% |
| Dungog | 82% | 82% | 82% |
| Lake Macquarie | 24% | 26% | 19% |
| Maitland | 96% | 88% | 89% |
| Mid-Coast | 51% | 52% | 51% |
| Muswellbrook | 76% | 77% | 75% |
| Port Stephens | 35% | 36% | 37% |
| Singleton | 48% | 61% | 58% |
| Upper Hunter Shire | 88% | 88% | 88% |
| Hunter Total | 66% | 68% | 67% |

Percentage of rural land area in the study area that is defined as agricultural in the Hunter region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

New England North West

The New England North West region encompasses the 12 LGAs listed below. The database baseline has land registry information for 79,780 km² and 90,210 unique land parcels in this region. Of the baseline rural study area of this region, ~84% is defined as agricultural. This is relatively consistent for the sample duration and corresponding ALUM data; 85% in 2013 and 91% in 2017.

Baseline sample summary of New England North West.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|-----------------------------|---|---------------------|
| Armidale Regional | 6,554 | 10,657 |
| Glen Innes Severn | 3,785 | 6,638 |
| Gunnedah | 3,912 | 4,844 |
| Gwydir | 8,195 | 6,501 |
| Inverell | 7,221 | 8,226 |
| Liverpool Plains | 4,141 | 5,995 |
| Moree Plains | 16,009 | 8,066 |
| Narrabri | 8,680 | 6,770 |
| Tamworth Regional | 8,316 | 14,491 |
| Tenterfield | 5,586 | 7,534 |
| Uralla | 2,772 | 5,112 |
| Walcha | 4,609 | 5,376 |
| New England NW Total | 79,780 | 90,210 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, New England North West (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|-----------------------------|--------------|--------------|--------------|
| Armidale | 77% | 78% | 82% |
| Glen Innes Severn | 74% | 76% | 82% |
| Gunnedah | 91% | 94% | 97% |
| Gwydir | 88% | 89% | 98% |
| Inverell | 77% | 78% | 94% |
| Liverpool Plains | 93% | 92% | 93% |
| Moree Plains | 98% | 98% | 99% |
| Narrabri | 88% | 89% | 98% |
| Tamworth | 86% | 87% | 94% |
| Tenterfield | 55% | 56% | 66% |
| Uralla | 93% | 94% | 99% |
| Walcha | 66% | 65% | 65% |
| New England NW Total | 84% | 85% | 91% |

Percentage of rural land area in the study area that is defined as agricultural in the New England North West region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

North Coast

The North Coast region encompasses the local government areas listed below. The database baseline has land registry information for 19, 236 km² and 71, 360 unique land parcels in this region. Of the baseline rural study area of this region, ~53% is defined as agricultural. This is consistent for the sample duration and corresponding ALUM data; 53% in 2013 and 51% in 2017.

Baseline sample summary of the North Coast.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|--------------------------|---|---------------------|
| Ballina | 361 | 3,498 |
| Bellingen | 756 | 3,535 |
| Byron | 412 | 3,951 |
| Clarence Valley | 6,491 | 14,695 |
| Coffs Harbour | 491 | 3,866 |
| Kempsey | 1,903 | 7,095 |
| Kyogle | 2,389 | 5,145 |
| Lismore | 994 | 6,604 |
| Nambucca | 765 | 4,218 |
| Port Macquarie-Hastings | 1,685 | 6,445 |
| Richmond Valley | 2,123 | 6,345 |
| Tweed | 866 | 5,963 |
| North Coast Total | 19,236 | 71,360 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, North Coast (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|--------------------------|--------------|--------------|--------------|
| Ballina | 73% | 77% | 77% |
| Bellingen | 51% | 51% | 49% |
| Byron | 67% | 74% | 74% |
| Clarence Valley | 43% | 40% | 40% |
| Coffs Harbour | 45% | 47% | 45% |
| Kempsey | 48% | 51% | 46% |
| Kyogle | 73% | 66% | 66% |
| Lismore | 83% | 89% | 88% |
| Nambucca | 56% | 57% | 50% |
| Port Macquarie-Hastings | 52% | 52% | 50% |
| Richmond Valley | 48% | 49% | 48% |
| Tweed | 58% | 59% | 59% |
| North Coast Total | 53% | 53% | 51% |

Percentage of rural land area in the study area that is defined as agricultural in the North Coast region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Riverina Murray

The Riverina Murray region encompasses the local government areas listed below. The database baseline has land registry information for 90,793 km² and 99,998 unique land parcels in this region. Of the baseline rural study area of this region, ~96% is defined as agricultural. This is consistent for the sample duration and corresponding ALUM data; 95% in 2013 and 97% in 2017.

Baseline study area summary of the Riverina Murray.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|------------------------------|---|---------------------|
| Albury | 188 | 1,079 |
| Berrigan | 1,709 | 1,974 |
| Bland | 7,813 | 4,938 |
| Carrathool | 16,518 | 5,532 |
| Coolamon | 2,143 | 2,761 |
| Edward River | 7,006 | 7,512 |
| Federation | 4,573 | 6,571 |
| Greater Hume | 4,432 | 9,561 |
| Griffith | 1,321 | 2,890 |
| Gundagai | 3,227 | 8,621 |
| Hay | 9,735 | 4,325 |
| Junee | 1,687 | 3,805 |
| Leeton | 924 | 2,272 |
| Lockhart | 2,486 | 3,548 |
| Murray River | 9,188 | 7,942 |
| Murrumbidgee | 5,120 | 4,334 |
| Narrandera | 3,350 | 3,673 |
| Snowy Valleys | 2,998 | 8,351 |
| Temora | 2,459 | 3,432 |
| Wagga Wagga | 3,917 | 6,877 |
| Riverina Murray Total | 90,793 | 99,998 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Riverina Murray (January 2004 - January 2020)

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|------------------------------|-------------------------|-------------------------|-------------------------|
| Albury | 73% | 78% | 76% |
| Berrigan | 98% | 98% | 99% |
| Bland | 97% | 97% | 99% |
| Carrathool | 96% | 95% | 97% |
| Coolamon | 99% | 99% | 100% |
| Edward River | 98% | 99% | 100% |
| Federation | 99% | 97% | 98% |
| Greater Hume | 88% | 87% | 91% |
| Griffith | 98% | 97% | 98% |
| Gundagai | 93% | 93% | 95% |
| Hay | 99% | 95% | 95% |
| Junee | 98% | 98% | 99% |
| Leeton | 98% | 99% | 99% |
| Lockhart | 99% | 99% | 99% |
| Murray River | 97% | 93% | 95% |
| Murrumbidgee | 98% | 99% | 99% |
| Narrandera | 95% | 96% | 99% |
| Snowy Valleys | 71% | 68% | 83% |
| Temora | 97% | 97% | 100% |
| Wagga Wagga | 97% | 96% | 98% |
| Riverina Murray Total | 96% | 95% | 97% |

Percentage of rural land area in the study area that is defined as agricultural in the Riverina Murray region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

South East & Tablelands

The South East & Tablelands region encompasses the local government areas listed below. The database baseline has land registry information for 34,003 km² and 101,619 unique land parcels in this region. Of the baseline rural study area of this region, ~76% is defined as agricultural. This is consistent for the 2007 and 2013 ALUM data; however, increases to 90% in 2017.

Baseline sample summary of the South East & Tablelands.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|--|---|---------------------|
| Bega Valley | 1,753 | 9,743 |
| Eurobodalla | 695 | 5,365 |
| Goulburn Mulwaree | 2,528 | 7,049 |
| Hilltops | 6,139 | 17,002 |
| Queanbeyan-Palerang Regional | 3,380 | 13,429 |
| Snowy Monaro Regional | 9,308 | 19,706 |
| Upper Lachlan Shire | 5,898 | 15,551 |
| Wingecarribee | 1,271 | 6,038 |
| Yass Valley | 3,031 | 7,736 |
| South East & Tablelands Total | 34,003 | 101,619 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, South East & Tablelands (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|--|--------------|--------------|--------------|
| Bega Valley | 62% | 66% | 90% |
| Eurobodalla | 32% | 38% | 72% |
| Goulburn Mulwaree | 66% | 67% | 73% |
| Hilltops | 97% | 97% | 98% |
| Queanbeyan-Palerang Regional | 61% | 62% | 79% |
| Snowy Monaro Regional | 67% | 68% | 92% |
| Upper Lachlan Shire | 90% | 89% | 98% |
| Wingecarribee | 64% | 63% | 63% |
| Yass Valley | 83% | 83% | 94% |
| South East & Tablelands Total | 76% | 76% | 90% |

Percentage of rural land area in the study area that is defined as agricultural in the South East & Tablelands region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Central Coast

The Central Coast region encompasses the Central Coast local government area. This is a small region and mainly urban. The database baseline has land registry information for 480 km² and 6,146 unique land parcels in this region. Of the baseline rural study area of this region, ~32% is defined as agricultural. This fluctuates slightly between ALUM datasets; 32% in 2007, 42% in 2013 and 34% in 2017.

Baseline sample summary of the Central Coast.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|---------------|---|---------------------|
| Central Coast | 480 | 6,146 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Central Coast (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|---------------|--------------|--------------|--------------|
| Central Coast | 32% | 42% | 34% |

Percentage of rural land area in the study area that is defined as agricultural in the Central Coast region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Greater Sydney

Greater Sydney encompasses 33 local government areas which are predominately metropolitan and of little relevance as they are highly urbanized. The local government areas of Camden, Campbelltown, Hawkesbury, and Wollondilly have been included in the study as they include a reasonable proportion of rural land area relative to their urban centres and localities. The database baseline has land registry information for 1,481 km² and 16,160 unique land parcels in this region. Of the baseline rural study area of this region (that is, outside of urban areas), ~36% is defined as agricultural. This is consistent for the 2007 and 2013 ALUM datasets but declines in 2017 to 31%, most probably on account of Sydney's urban expansion.

Baseline sample summary of the Greater Sydney.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|-----------------------------|---|---------------------|
| Camden | 67 | 1,068 |
| Campbelltown | 62 | 994 |
| Hawkesbury | 484 | 8,016 |
| Wollondilly | 869 | 6,082 |
| Greater Sydney Total | 1,481 | 16,160 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by LGA.

Proportion of agricultural land, Greater Sydney (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|-----------------------------|--------------|--------------|--------------|
| Camden | 83% | 83% | 54% |
| Campbelltown | 45% | 45% | 41% |
| Hawkesbury | 31% | 31% | 23% |
| Wollondilly | 34% | 35% | 33% |
| Greater Sydney Total | 36% | 36% | 31% |

Percentage of rural land area in the study area that is defined as agricultural in the Greater Sydney region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Illawarra Shoalhaven

The only LGA in the Illawarra Shoalhaven region assessed in this study is Shoalhaven. Other regional LGAs (Kiama, Shellharbour, and Wollongong) were excluded because they are predominately urban with a relatively small proportion of rural land (by area) remaining after the exclusion of ABS urban centres and localities.) The database baseline has land registry information for 1,055 km² and 11,432 unique land parcels in this region. Of the baseline rural study area of this region, ~39% is defined as agricultural. This fluctuates slightly between ALUM datasets; 39% in 2007, 33% in 2013, and 41% in 2017.

Baseline sample summary of the Illawarra Shoalhaven.

| LGA | Baseline Sample Area (km ²) | No. of Land Parcels |
|------------|---|---------------------|
| Shoalhaven | 1,055 | 11,432 |

Regional sum of area (km²) and count of unique land parcels in the database baseline, by local government area.

Proportion of agricultural land, Illawarra Shoalhaven (January 2004 - January 2020).

| LGA | 2004 to 2007 | 2008 to 2013 | 2014 to 2020 |
|------------|--------------|--------------|--------------|
| Shoalhaven | 39% | 33% | 41% |

Percentage of rural land area in the study area that is defined as agricultural in the Illawarra Shoalhaven region. This is derived from the 3 available ALUM land use spatial datasets that span our dataset (January 2004 - January 2020): 2007, 2013, and 2017. The table below reflects how the proportion of land defined as agricultural changes in our study area using these as 3 temporal moments.

Appendix B: Owner Data Composition by Region (Substantial and Partial Changes)

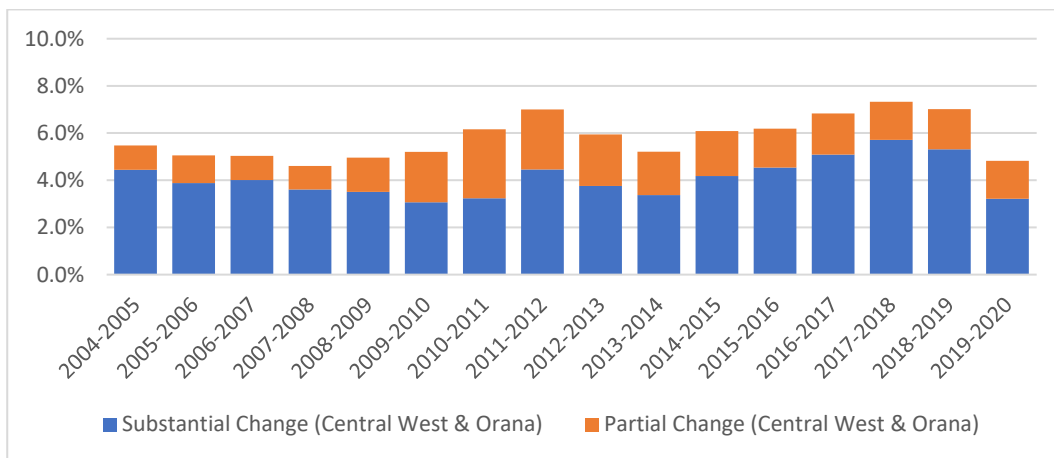


Figure B.1. Composition off all rural land ownership changes (% area), Central West & Orana. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Central West & Orana region.

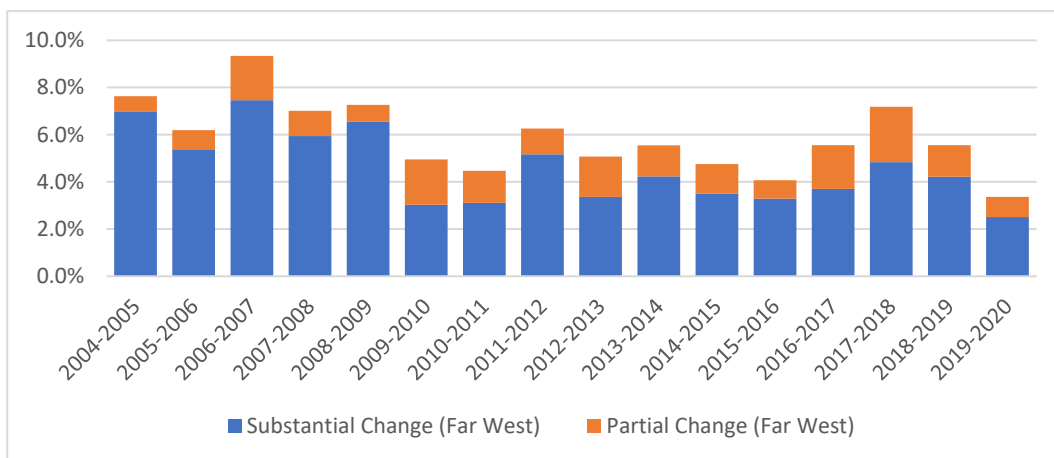


Figure B.2. Composition of all rural land ownership changes (% area), Far West. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Far West region.

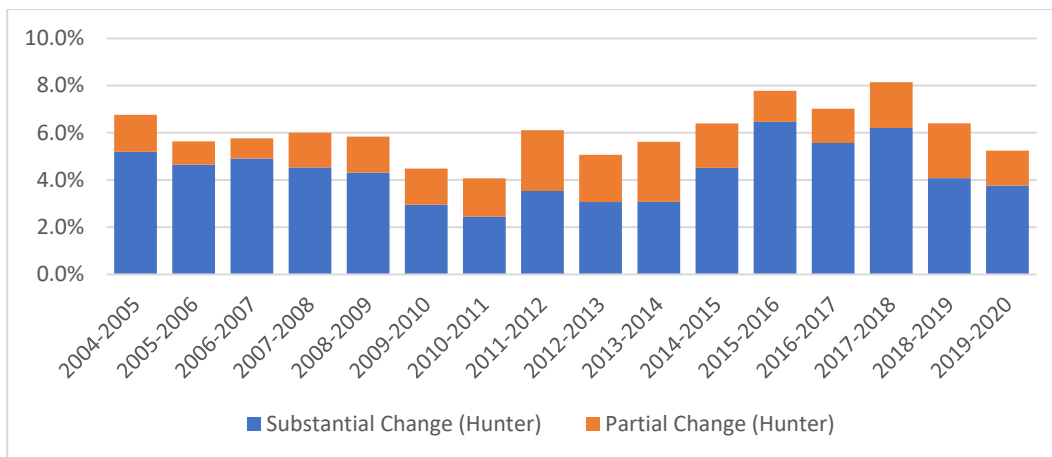


Figure B.3. Composition of all rural land ownership changes (% area), Hunter. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Hunter region.

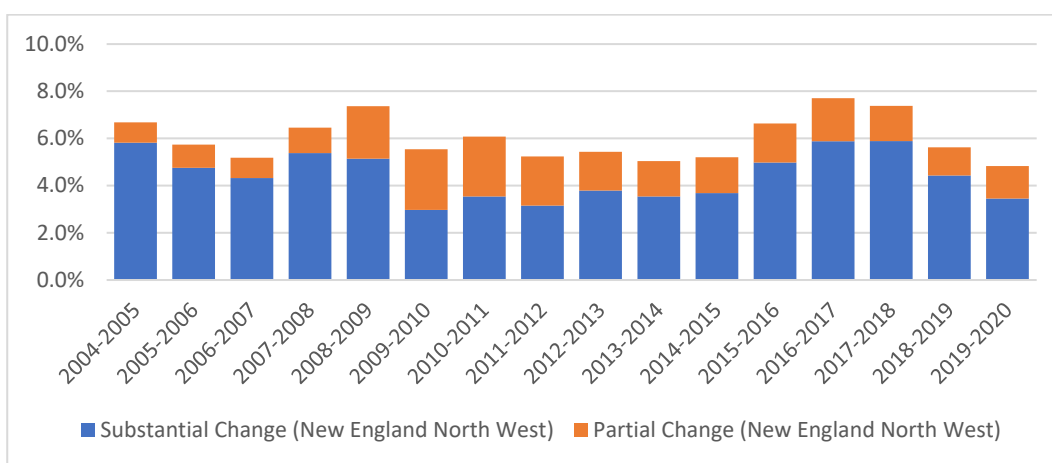


Figure B.4. Composition of all rural land ownership changes (% area), New England North West. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the New England North West region.

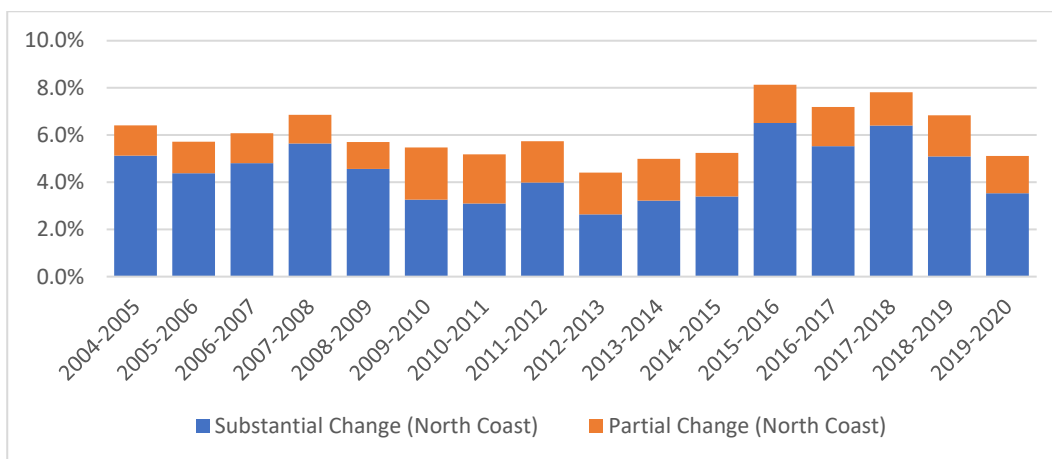


Figure B.5. Composition of all rural land ownership changes (% area), North Coast. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the North Coast region.

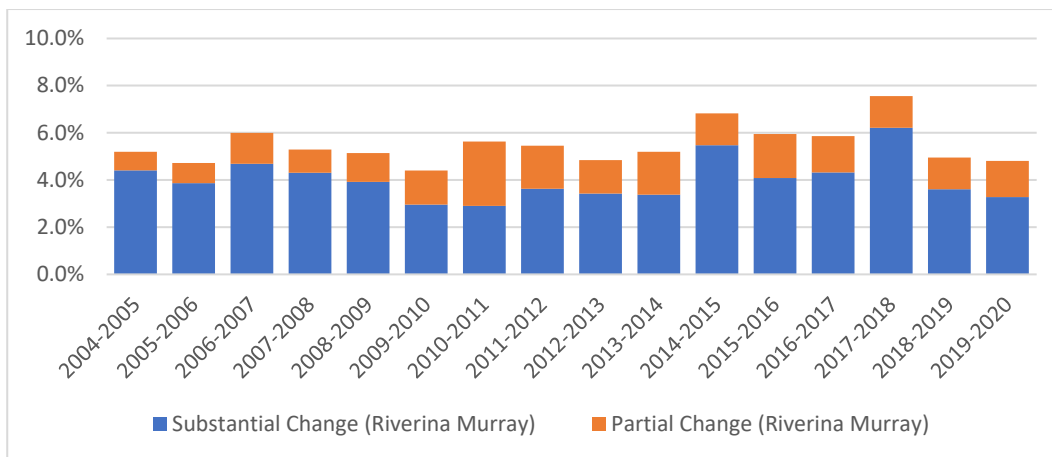


Figure B.6. Composition off all rural land ownership changes (% area), Riverina Murray. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Riverina Murray region.

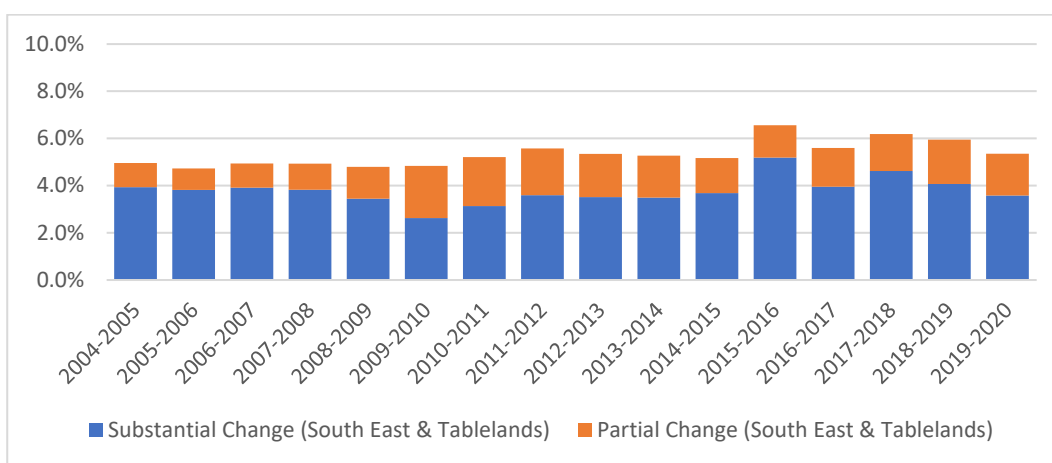


Figure B.7. Composition off all rural land ownership changes (% area), South East & Tablelands. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the South East & Tablelands region.

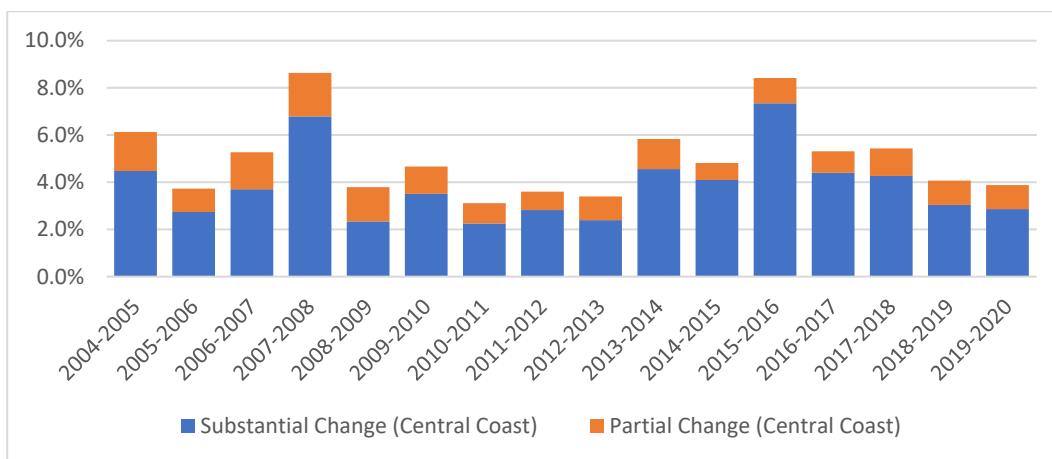


Figure B.8. Incidence of all rural land ownership changes (% Area), Central Coast. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Far West region.

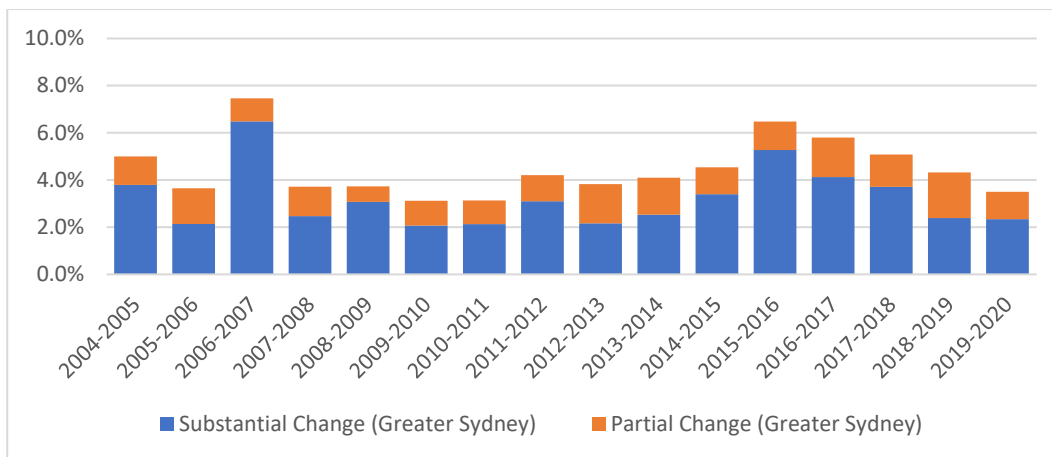


Figure B.9. Composition of all rural land ownership changes (% area), Greater Sydney. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Greater Sydney region.

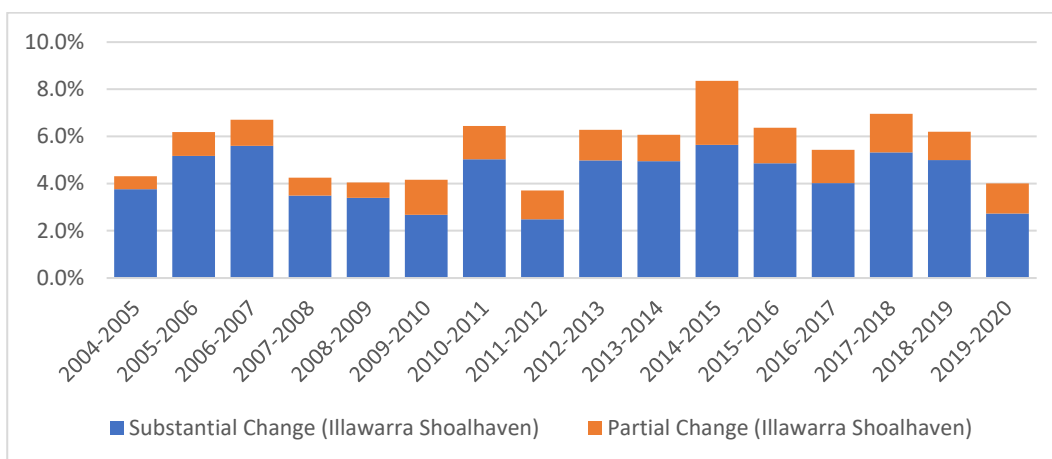


Figure B.10. Incidence of all rural land ownership changes (% Area), Illawarra Shoalhaven. Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for the Illawarra Shoalhaven region.

Appendix C: Median Rates of Change by Local Government Areas

| LGA | Median Rate of Change (All Rural) | Distance from State Median | LGA | Median Rate of Change (All Rural) | Distance from State Median |
|-------------------------|-----------------------------------|----------------------------|-------------------------|-----------------------------------|----------------------------|
| Leeton | 7.3% | 1.6% | Berrigan | 5.4% | -0.3% |
| Cobar | 7.1% | 1.4% | Upper Lachlan Shire | 5.3% | -0.4% |
| Brewarrina | 7.1% | 1.4% | Mid-Coast | 5.3% | -0.4% |
| Bourke | 6.9% | 1.2% | Nambucca | 5.3% | -0.5% |
| Gwydir | 6.8% | 1.1% | Snowy Valleys | 5.2% | -0.5% |
| Tenterfield | 6.6% | 0.9% | Lachlan | 5.2% | -0.5% |
| Clarence Valley | 6.6% | 0.9% | Lake Macquarie | 5.2% | -0.5% |
| Bogan | 6.5% | 0.8% | Western Plains Regional | 5.2% | -0.5% |
| Richmond Valley | 6.5% | 0.8% | Maitland | 5.2% | -0.5% |
| Inverell | 6.4% | 0.7% | Moree Plains | 5.2% | -0.5% |
| Tamworth Regional | 6.4% | 0.7% | Coonamble | 5.2% | -0.5% |
| Warrumbungle Shire | 6.3% | 0.6% | Bega Valley | 5.1% | -0.6% |
| Mid-Western Regional | 6.3% | 0.6% | Gundagai | 5.1% | -0.6% |
| Kyogle | 6.2% | 0.5% | Wingecarribee | 5.1% | -0.6% |
| Oberon | 6.1% | 0.4% | Unincorporated NSW | 5.0% | -0.7% |
| Shoalhaven | 6.1% | 0.4% | Cowra | 5.0% | -0.7% |
| Port Macquarie-Hastings | 6.0% | 0.3% | Narrandera | 5.0% | -0.7% |
| Upper Hunter Shire | 6.0% | 0.2% | Walgett | 5.0% | -0.7% |
| Orange | 6.0% | 0.2% | Carrathool | 5.0% | -0.7% |
| Forbes | 5.9% | 0.2% | Lithgow | 5.0% | -0.7% |
| Narromine | 5.9% | 0.2% | Parkes | 4.9% | -0.8% |
| Byron | 5.9% | 0.2% | Edward River | 4.9% | -0.8% |
| Gunnedah | 5.8% | 0.1% | Bland | 4.9% | -0.8% |

| LGA | Median Rate of Change (All Rural) | Distance from State Median | LGA | Median Rate of Change (All Rural) | Distance from State Median |
|------------------------------|-----------------------------------|----------------------------|--------------------|-----------------------------------|----------------------------|
| Armidale Regional | 5.8% | 0.1% | Yass Valley | 4.8% | -0.9% |
| Liverpool Plains | 5.8% | 0.1% | Warren | 4.8% | -0.9% |
| Gilgandra | 5.8% | 0.1% | Weddin | 4.8% | -0.9% |
| Bellingen | 5.8% | 0.1% | Bathurst Regional | 4.8% | -0.9% |
| Dungog | 5.8% | 0.1% | Eurobodalla | 4.7% | -1.0% |
| Murray River | 5.8% | 0.1% | Central Coast | 4.7% | -1.0% |
| Narrabri | 5.8% | 0.1% | Greater Hume Shire | 4.7% | -1.0% |
| Glen Innes Severn | 5.8% | 0.0% | Central Darling | 4.7% | -1.0% |
| Hay | 5.7% | 0.0% | Hilltops | 4.7% | -1.0% |
| Snowy Monaro Regional | 5.7% | 0.0% | Uralla | 4.6% | -1.1% |
| Kempsey | 5.7% | 0.0% | Balranald | 4.6% | -1.1% |
| Cessnock | 5.6% | -0.1% | Port Stephens | 4.6% | -1.1% |
| Singleton | 5.6% | -0.1% | Murrumbidgee | 4.5% | -1.2% |
| Queanbeyan-Palerang Regional | 5.6% | -0.1% | Blayney | 4.5% | -1.2% |
| Muswellbrook | 5.5% | -0.2% | Junee | 4.5% | -1.2% |
| Wagga Wagga | 5.5% | -0.2% | Lockhart | 4.3% | -1.4% |
| Ballina | 5.5% | -0.2% | Walcha | 4.3% | -1.4% |
| Wentworth | 5.5% | -0.2% | Coolamon | 4.2% | -1.5% |
| Goulburn Mulwaree | 5.5% | -0.3% | Temora | 4.1% | -1.6% |
| Lismore | 5.4% | -0.3% | Camden | 3.9% | -1.8% |
| Coffs Harbour | 5.4% | -0.3% | Federation | 3.9% | -1.8% |
| Griffith | 5.4% | -0.3% | Albury | 3.8% | -1.9% |
| Tweed | 5.4% | -0.3% | Campbelltown | 3.4% | -2.3% |
| Hawkesbury | 5.4% | -0.3% | Wollondilly | 3.3% | -2.4% |
| Cabonne | 5.4% | -0.3% | Broken Hill | 1.5% | -4.2% |
| All NSW | 5.7% | | | | |

| LGA | Median Rate of Change (Agricultural Land) | Standard Deviation (Agricultural Land) | Median Rate of Change (Non-agricultural land) | Standard Deviation (Non-Agricultural Land) | Median Rate of Change (All Rural Land) | Standard Deviation (All Rural Land) |
|---------------------------|--|---|--|---|---|--|
| Albury | 4.1% | 3.2% | 1.9% | 4.1% | 3.8% | 3.1% |
| Armidale Regional | 5.8% | 1.3% | 4.6% | 3.7% | 5.8% | 1.3% |
| Ballina | 5.9% | 1.7% | 5.1% | 1.7% | 5.5% | 1.5% |
| Balranald | 4.6% | 2.8% | 3.1% | 6.6% | 4.6% | 2.8% |
| Bathurst Regional | 5.0% | 1.4% | 4.6% | 3.4% | 4.8% | 1.3% |
| Bega Valley | 5.7% | 1.2% | 3.5% | 1.3% | 5.1% | 1.0% |
| Bellingen | 6.4% | 2.4% | 4.2% | 1.9% | 5.8% | 1.8% |
| Berrigan | 5.3% | 1.7% | 2.2% | 7.3% | 5.4% | 1.7% |
| Bland | 4.9% | 1.1% | 3.3% | 12.1% | 4.9% | 1.2% |
| Blayney | 4.7% | 0.9% | 2.3% | 1.6% | 4.5% | 0.8% |
| Bogan | 6.6% | 1.2% | 1.9% | 7.0% | 6.5% | 1.2% |
| Bourke | 6.0% | 2.5% | 0.0% | 12.3% | 6.9% | 2.6% |
| Brewarrina | 7.2% | 2.4% | 1.7% | 6.4% | 7.1% | 2.4% |
| Broken Hill | 0.8% | 4.7% | 1.2% | 6.6% | 1.5% | 4.1% |
| Byron | 6.1% | 1.6% | 4.9% | 1.6% | 5.9% | 1.4% |
| Cabonne | 5.4% | 0.9% | 2.9% | 3.5% | 5.4% | 0.7% |
| Camden | 3.8% | 5.7% | 3.9% | 3.5% | 3.9% | 4.4% |
| Campbelltown | 2.1% | 9.4% | 3.2% | 2.9% | 3.4% | 4.6% |
| Carrathool | 5.1% | 1.4% | 2.2% | 8.2% | 5.0% | 1.3% |
| Central Coast | 5.9% | 1.4% | 4.2% | 2.1% | 4.7% | 1.6% |
| Central Darling | 4.9% | 2.7% | 0.0% | 0.9% | 4.7% | 2.6% |
| Cessnock | 5.5% | 0.8% | 5.7% | 1.8% | 5.6% | 1.2% |
| Clarence Valley | 6.5% | 1.5% | 6.0% | 1.3% | 6.6% | 1.3% |
| Cobar | 7.3% | 2.3% | 6.7% | 5.3% | 7.1% | 2.2% |
| Coffs Harbour | 6.2% | 2.1% | 4.8% | 1.2% | 5.4% | 1.2% |
| Coolamon | 4.2% | 1.4% | 3.5% | 4.2% | 4.2% | 1.4% |
| Coonamble | 5.2% | 3.3% | 0.9% | 4.6% | 5.2% | 3.3% |
| Cowra | 5.1% | 0.7% | 3.9% | 2.9% | 5.0% | 0.7% |
| Dungog | 5.9% | 2.1% | 5.4% | 2.2% | 5.8% | 1.9% |
| Edward River | 4.9% | 2.7% | 2.0% | 3.5% | 4.9% | 2.7% |
| Eurobodalla | 5.4% | 2.6% | 4.1% | 2.4% | 4.7% | 1.8% |
| Federation | 3.9% | 1.4% | 2.2% | 3.2% | 3.9% | 1.4% |
| Forbes | 5.9% | 1.8% | 2.4% | 7.6% | 5.9% | 1.8% |
| Gilgandra | 5.7% | 1.4% | 6.7% | 7.5% | 5.8% | 1.4% |
| Glen Innes Severn | 5.5% | 1.4% | 5.9% | 3.1% | 5.8% | 1.3% |
| Goulburn Mulwaree | 5.2% | 1.6% | 4.9% | 3.1% | 5.5% | 1.9% |
| Greater Hume Shire | 4.4% | 1.0% | 5.9% | 5.8% | 4.7% | 1.0% |
| Griffith | 5.5% | 3.3% | 1.9% | 15.1% | 5.4% | 3.2% |
| Gundagai | 5.3% | 1.2% | 1.4% | 2.5% | 5.1% | 1.1% |
| Gunnedah | 5.9% | 2.1% | 5.6% | 5.8% | 5.8% | 2.1% |
| Gwydir | 6.8% | 1.6% | 4.1% | 4.0% | 6.8% | 1.6% |

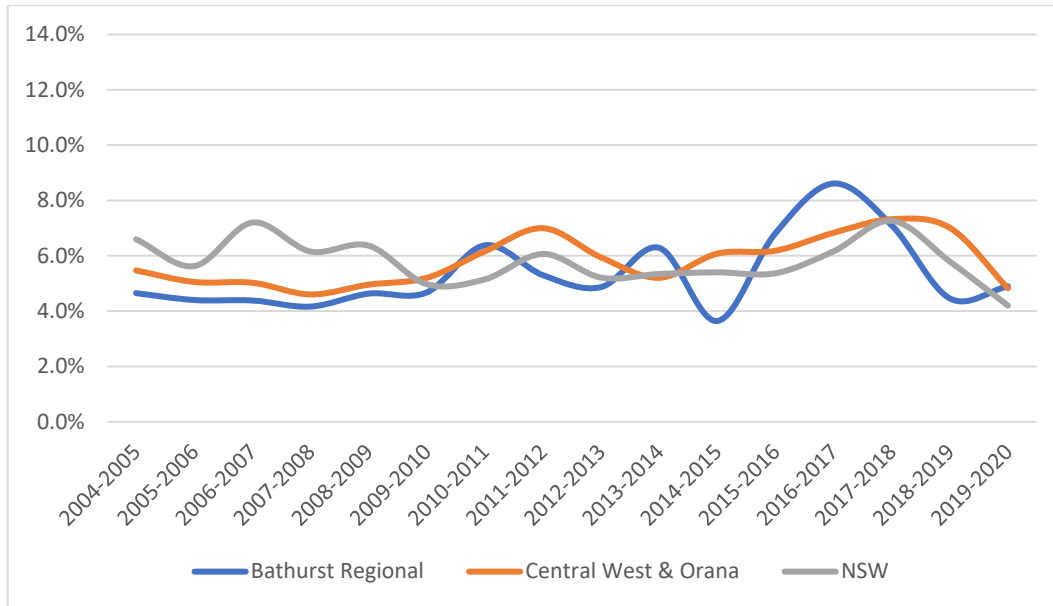
| LGA | Median Rate of Change (Agricultural Land) | Standard Deviation (Agricultural Land) | Median Rate of Change (Non-agricultural land) | Standard Deviation (Non-Agricultural Land) | Median Rate of Change (All Rural Land) | Standard Deviation (All Rural Land) |
|-------------------------------------|--|---|--|---|---|--|
| Hawkesbury | 5.9% | 2.0% | 5.1% | 0.9% | 5.4% | 1.0% |
| Hay | 5.8% | 3.9% | 0.8% | 10.4% | 5.7% | 3.7% |
| Hilltops | 4.7% | 0.6% | 4.1% | 2.7% | 4.7% | 0.6% |
| Inverell | 6.4% | 1.7% | 4.8% | 2.8% | 6.4% | 1.6% |
| Junee | 4.6% | 1.8% | 1.0% | 3.1% | 4.5% | 1.8% |
| Kempsey | 6.0% | 1.6% | 5.6% | 2.1% | 5.7% | 1.6% |
| Kyogle | 6.0% | 1.5% | 5.5% | 4.4% | 6.2% | 2.3% |
| Lachlan | 5.1% | 1.5% | 7.0% | 3.3% | 5.2% | 1.5% |
| Lake Macquarie | 6.0% | 2.3% | 5.2% | 2.2% | 5.2% | 1.8% |
| Leeton | 7.3% | 2.8% | 4.7% | 6.3% | 7.3% | 2.7% |
| Lismore | 5.7% | 1.1% | 4.9% | 2.1% | 5.4% | 1.1% |
| Lithgow | 5.0% | 1.3% | 4.3% | 2.6% | 5.0% | 1.5% |
| Liverpool Plains | 5.8% | 1.4% | 4.5% | 3.0% | 5.8% | 1.3% |
| Lockhart | 4.4% | 1.3% | 0.5% | 14.0% | 4.3% | 1.3% |
| Maitland | 5.3% | 2.1% | 5.1% | 3.5% | 5.2% | 1.9% |
| Mid-Coast | 5.9% | 1.4% | 4.8% | 2.1% | 5.3% | 1.6% |
| Mid-Western Regional | 6.0% | 1.4% | 6.0% | 2.0% | 6.3% | 1.3% |
| Moree Plains | 5.1% | 1.1% | 2.8% | 4.6% | 5.2% | 1.2% |
| Murray River | 5.8% | 2.4% | 1.2% | 3.3% | 5.8% | 2.3% |
| Murrumbidgee | 4.6% | 5.2% | 2.4% | 6.7% | 4.5% | 5.1% |
| Muswellbrook | 5.8% | 3.0% | 4.2% | 4.4% | 5.5% | 3.0% |
| Nambucca | 4.7% | 1.5% | 6.6% | 1.9% | 5.3% | 1.5% |
| Narrabri | 5.8% | 2.3% | 5.4% | 2.6% | 5.8% | 2.1% |
| Narrandera | 4.9% | 1.6% | 3.1% | 13.7% | 5.0% | 1.5% |
| Narromine | 5.9% | 1.2% | 3.5% | 2.9% | 5.9% | 1.2% |
| Oberon | 6.2% | 1.6% | 4.0% | 3.5% | 6.1% | 1.4% |
| Orange | 6.0% | 1.7% | 2.3% | 5.5% | 6.0% | 1.7% |
| Parkes | 4.6% | 1.1% | 4.8% | 9.0% | 4.9% | 1.1% |
| Port Macquarie-Hastings | 6.2% | 1.2% | 5.9% | 1.4% | 6.0% | 1.2% |
| Port Stephens | 4.9% | 1.8% | 3.5% | 2.3% | 4.6% | 1.3% |
| Queanbeyan-Palerang Regional | 5.2% | 1.8% | 5.7% | 2.6% | 5.6% | 1.7% |
| Richmond Valley | 6.2% | 1.3% | 7.1% | 2.2% | 6.5% | 1.4% |
| Shoalhaven | 5.5% | 1.3% | 6.2% | 1.7% | 6.1% | 1.4% |
| Singleton | 5.6% | 2.0% | 5.8% | 2.6% | 5.6% | 2.0% |
| Snowy Monaro Regional | 5.7% | 0.8% | 4.8% | 2.9% | 5.7% | 0.7% |
| Snowy Valleys | 5.3% | 1.1% | 5.6% | 3.2% | 5.2% | 1.1% |
| Tamworth Regional | 6.4% | 1.6% | 6.2% | 1.9% | 6.4% | 1.4% |
| Temora | 4.1% | 1.3% | 2.6% | 4.4% | 4.1% | 1.3% |
| Tenterfield | 6.2% | 1.6% | 7.0% | 2.5% | 6.6% | 1.4% |

| LGA | Median Rate of Change (Agricultural Land) | Standard Deviation (Agricultural Land) | Median Rate of Change (Non-agricultural land) | Standard Deviation (Non-Agricultural Land) | Median Rate of Change (All Rural Land) | Standard Deviation (All Rural Land) |
|--------------------------------|--|---|--|---|---|--|
| Tweed | 5.6% | 1.4% | 5.3% | 1.5% | 5.4% | 1.1% |
| Unincorporated NSW | 5.2% | 2.9% | 0.0% | 12.5% | 5.0% | 2.9% |
| Upper Hunter Shire | 5.8% | 2.2% | 6.6% | 2.2% | 6.0% | 2.1% |
| Upper Lachlan Shire | 5.2% | 1.1% | 6.0% | 3.8% | 5.3% | 1.0% |
| Uralla | 4.8% | 1.7% | 4.8% | 2.7% | 4.6% | 1.6% |
| Wagga Wagga | 5.5% | 1.0% | 5.2% | 4.7% | 5.5% | 1.0% |
| Walcha | 4.9% | 1.6% | 3.7% | 4.4% | 4.3% | 2.4% |
| Walgett | 5.1% | 1.7% | 5.5% | 4.2% | 5.0% | 1.7% |
| Warren | 4.8% | 2.7% | 4.9% | 4.8% | 4.8% | 2.7% |
| Warrumbungle Shire | 5.8% | 0.9% | 7.5% | 2.3% | 6.3% | 0.9% |
| Weddin | 4.8% | 1.6% | 3.5% | 4.0% | 4.8% | 1.7% |
| Wentworth | 5.7% | 2.2% | 0.1% | 8.2% | 5.5% | 2.2% |
| Western Plains Regional | 5.2% | 1.0% | 4.1% | 1.9% | 5.2% | 0.9% |
| Wingecarribee | 5.3% | 1.8% | 4.8% | 2.3% | 5.1% | 1.8% |
| Wollondilly | 5.3% | 1.5% | 2.1% | 2.6% | 3.3% | 1.6% |
| Yass Valley | 4.9% | 1.3% | 4.8% | 2.7% | 4.8% | 1.0% |
| All NSW | 5.7% | 0.9% | 5.8% | 1.0% | 5.7% | 0.8% |

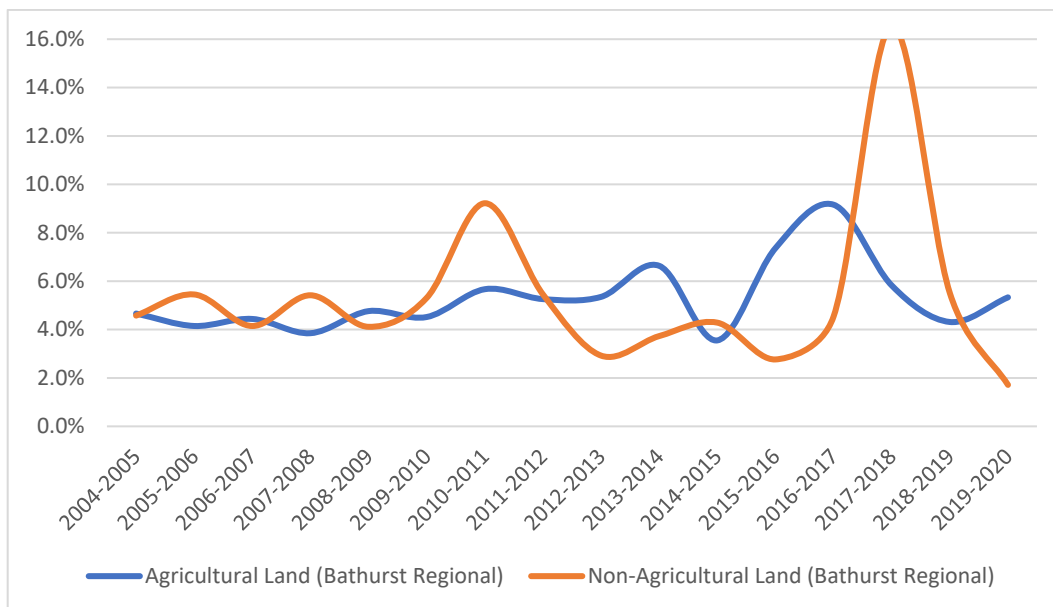
Appendix D: LGA Rate of Change Graphs

Central West & Orana

Bathurst Regional

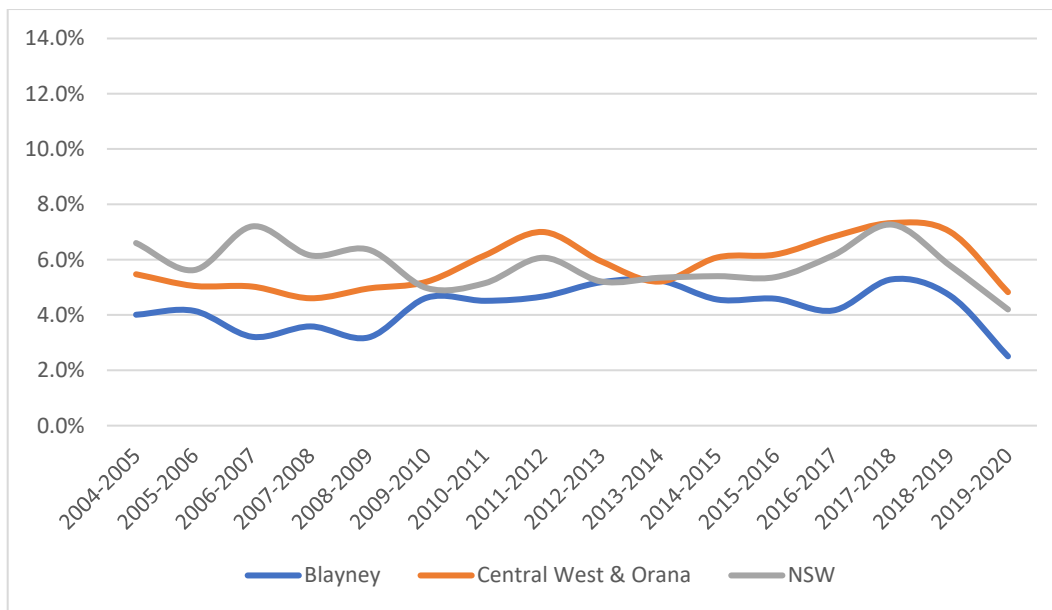


Incidence of all rural land ownership change in Bathurst Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Bathurst Regional LGA, as compared to regional and state-wide rates of change.

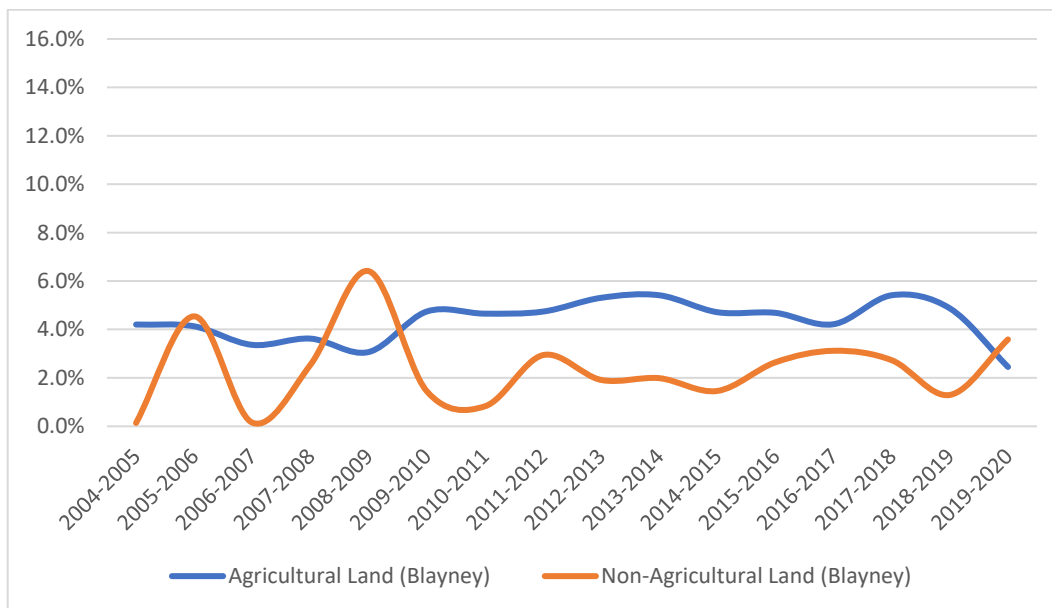


Incidence of agricultural land ownership changes in Bathurst Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bathurst Regional LGA, as compared to the rate of change for non-agricultural rural land.

Blayney

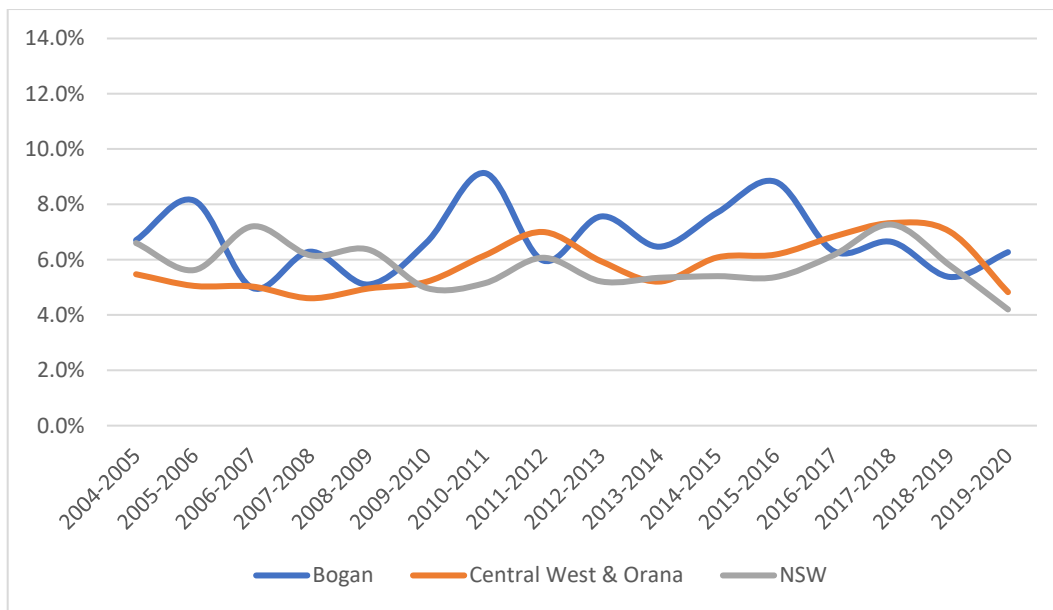


Incidence of rural land ownership change in Blayney (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Blayney LGA, as compared to regional and state-wide rates of change.

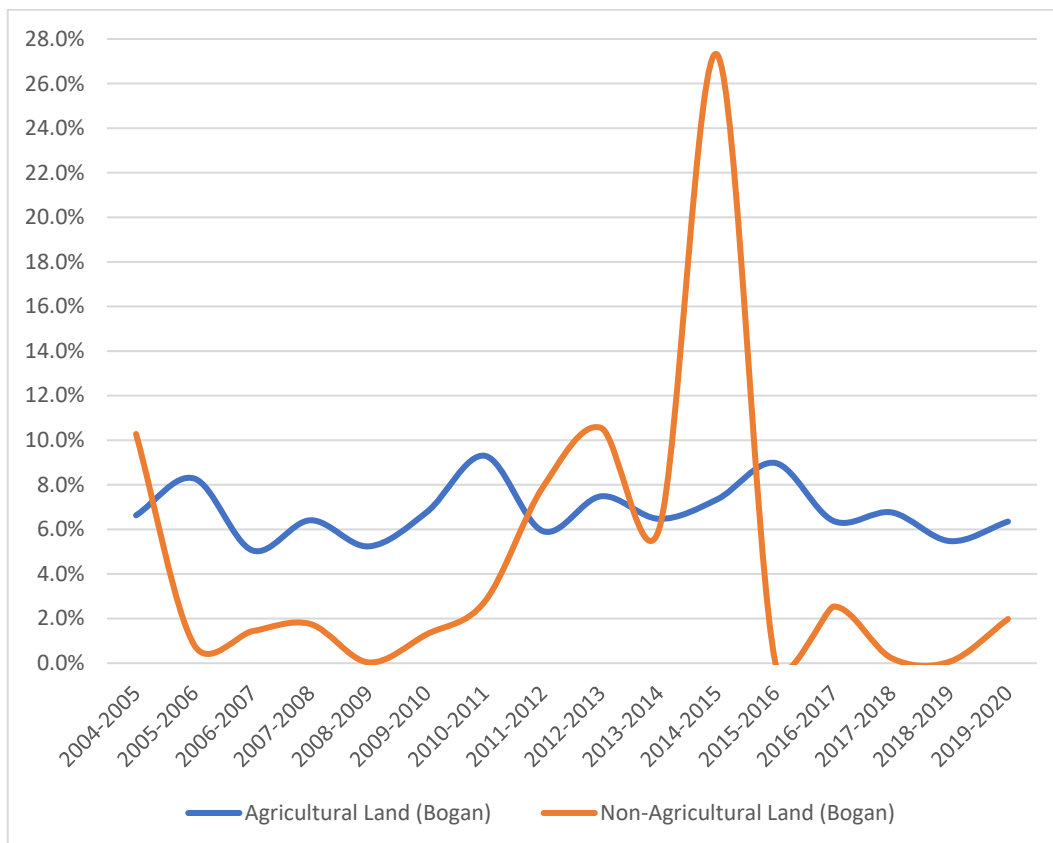


Incidence of agricultural land ownership changes in Blayney (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Blayney LGA, as compared to the rate of change for non-agricultural rural land.

Bogan

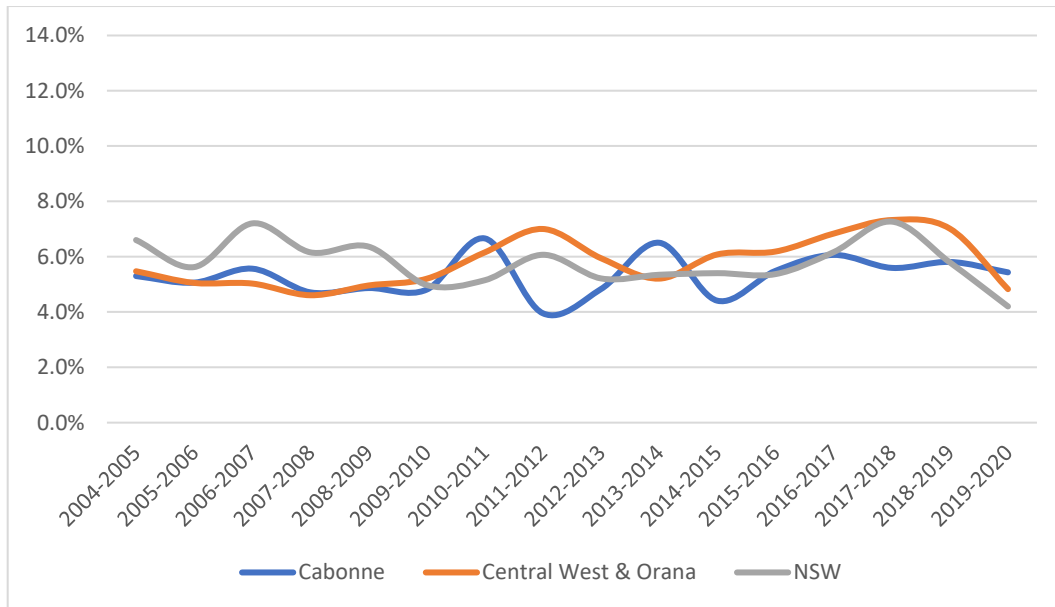


Incidence of rural land ownership change in Bogan (% Area). Percentage of total area which changed owner/s by year for the period 2004-2020 January 2004 - January 2020 for Bogan LGA, as compared to regional and state-wide rates of change.

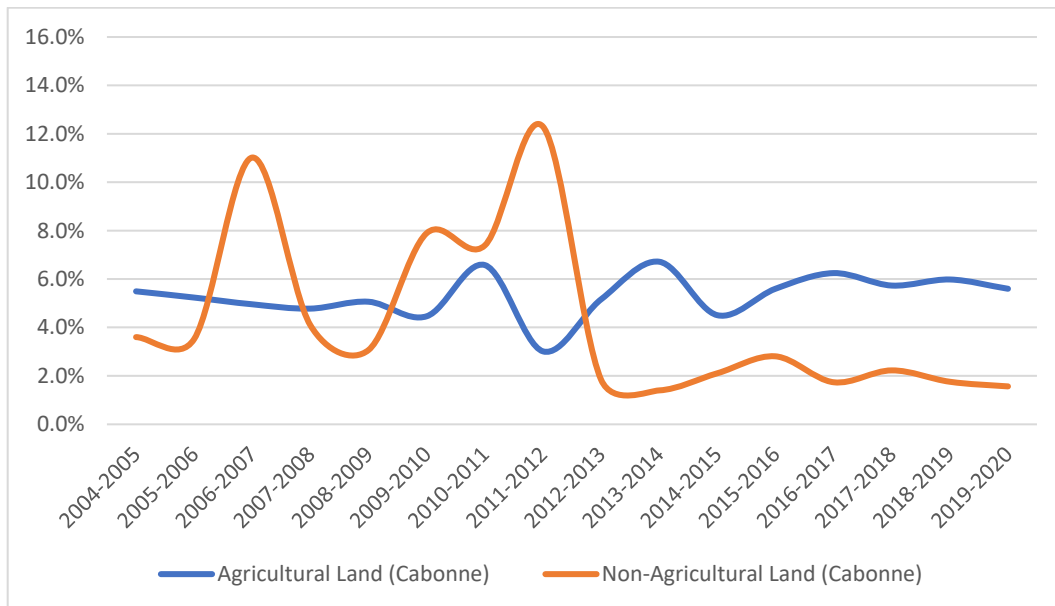


Incidence of agricultural land ownership changes in Bogan (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bogan LGA, as compared to the rate of change for non-agricultural rural land.

Cabonne

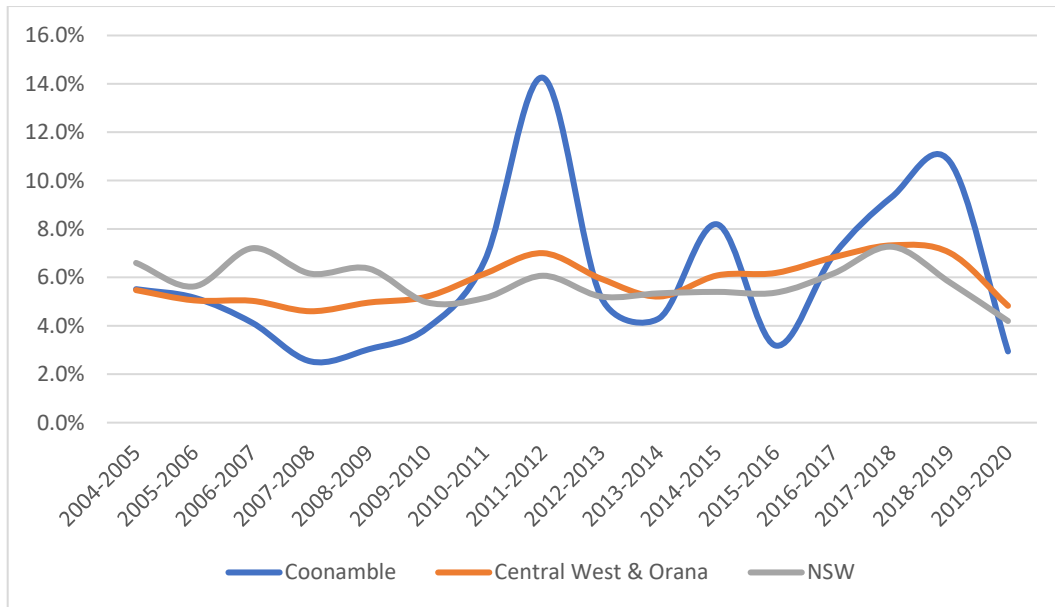


Incidence of rural land ownership change in Cabonne (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Cabonne LGA, as compared to regional and state-wide rates of change.

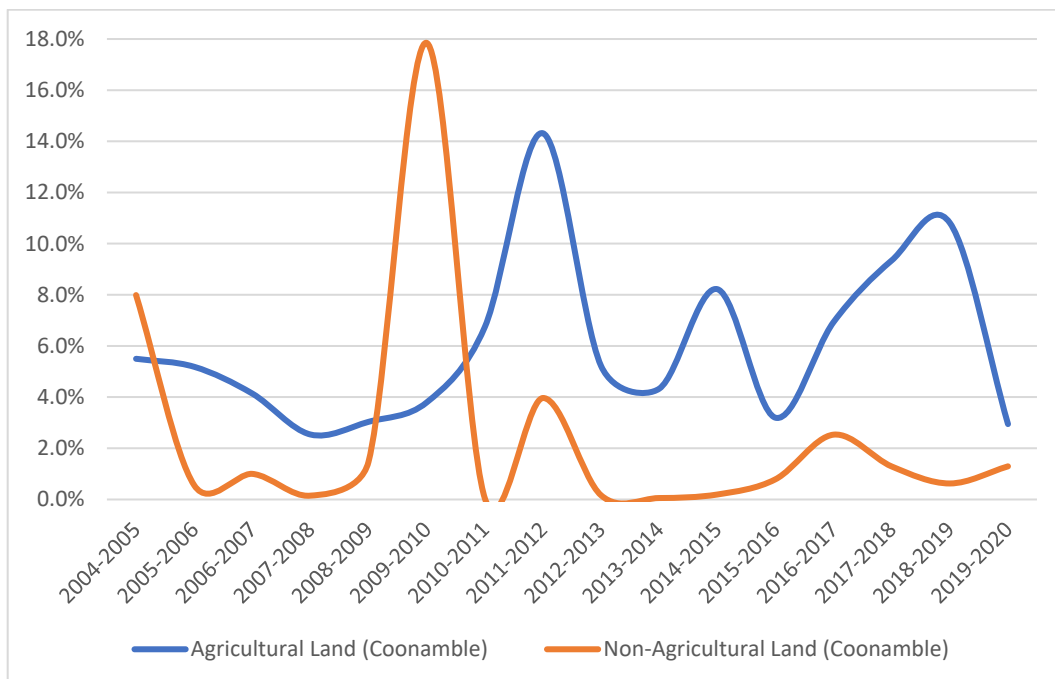


Incidence of agricultural land ownership changes in Cabonne (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Cabonne LGA, as compared to the rate of change for non-agricultural rural land.

Coonamble

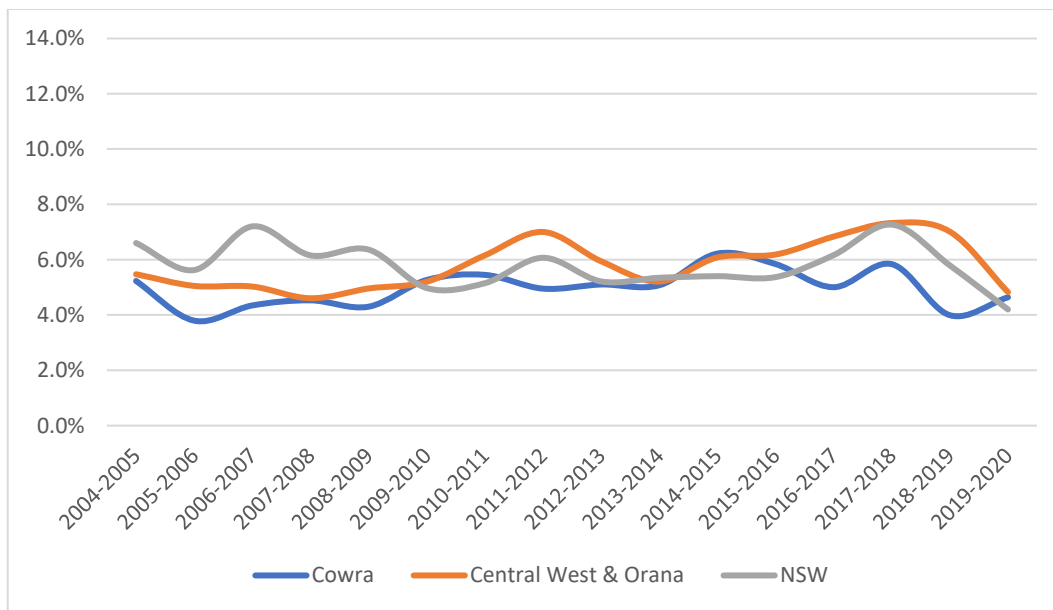


Incidence of rural land ownership change in Coonamble (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Coonamble LGA, as compared to regional and state-wide rates of change.

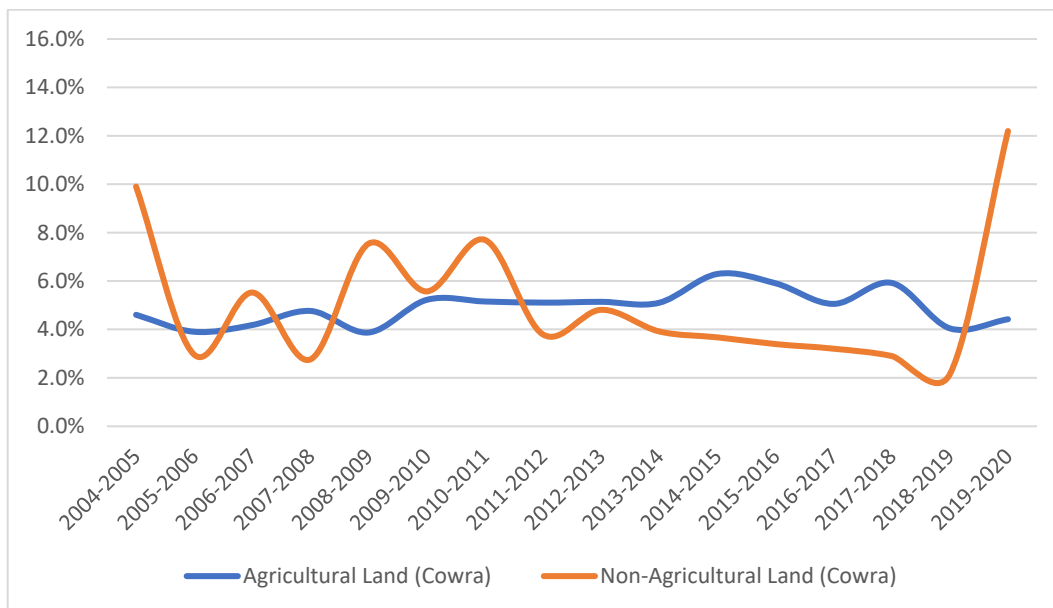


Incidence of agricultural land ownership changes in Coonamble (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Coonamble LGA, as compared to the rate of change for non-agricultural rural land.

Cowra

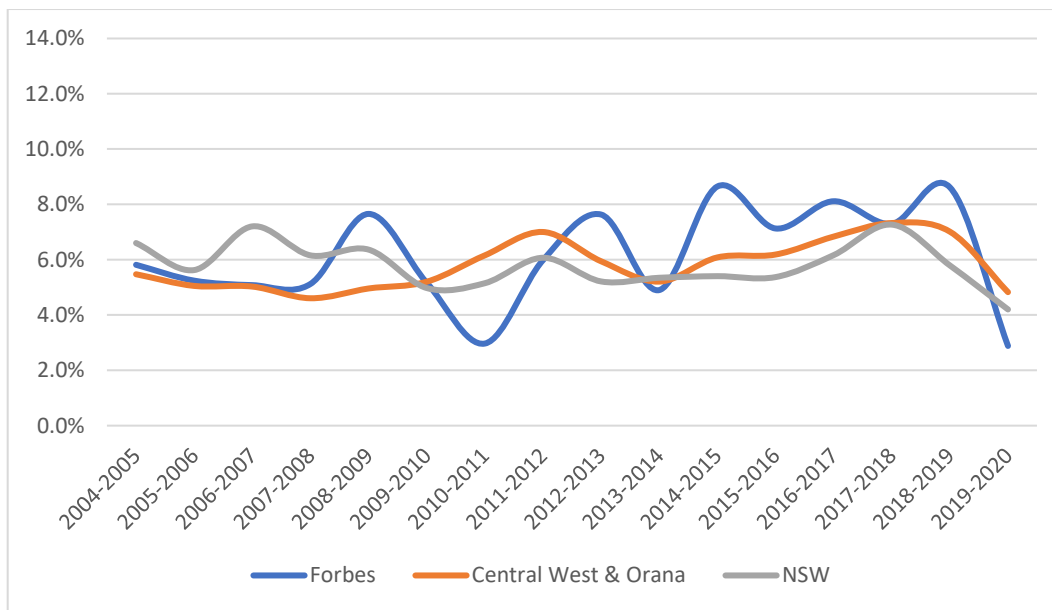


Incidence of rural land ownership change in Cowra (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Cowra LGA, as compared to regional and state-wide rates of change.

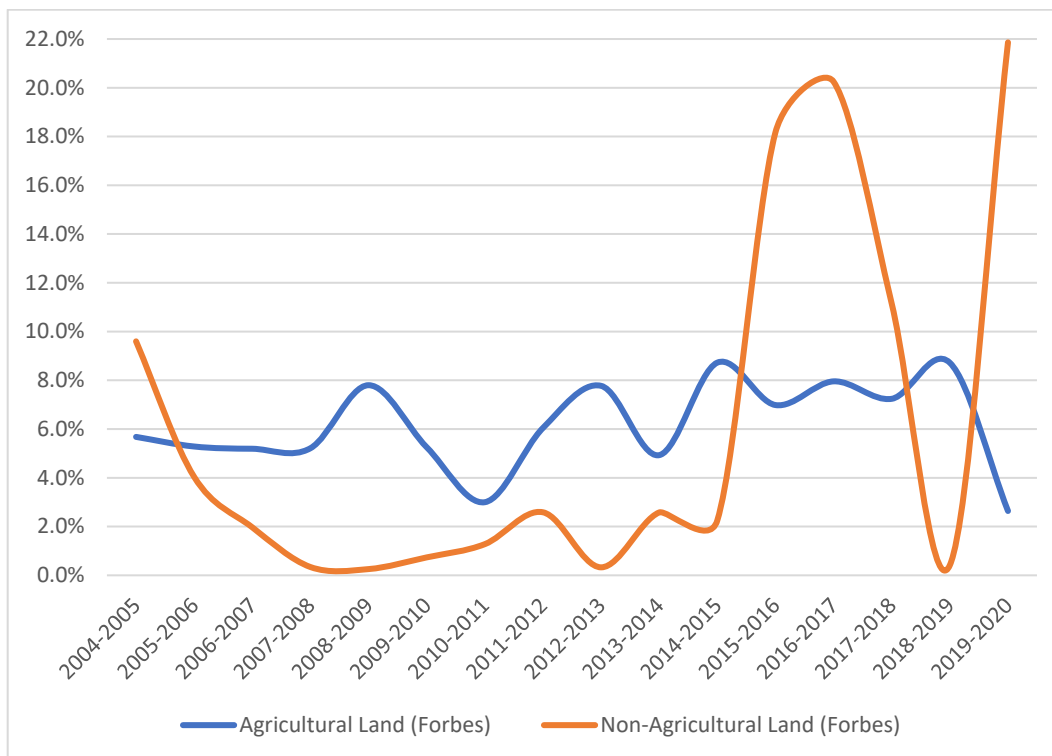


Incidence of agricultural land ownership changes in Cowra (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Cowra LGA, as compared to the rate of change for non-agricultural rural land.

Forbes

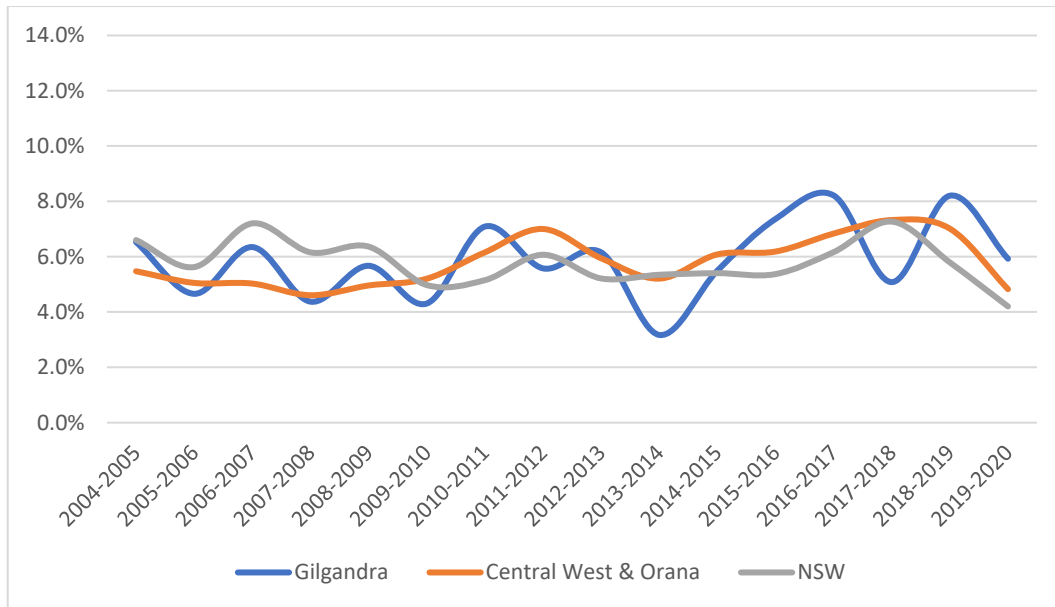


Incidence of all rural land ownership change in Cowra (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Cowra LGA, as compared to regional and state-wide rates of change.

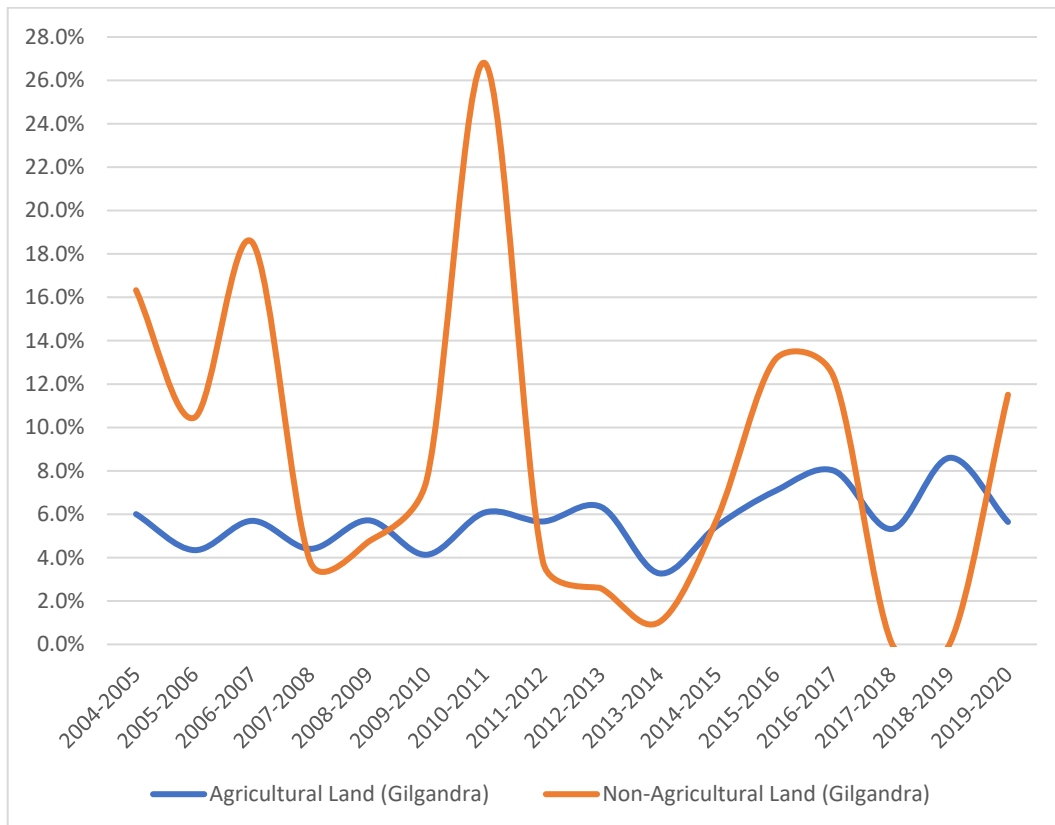


Incidence of agricultural land ownership changes in Forbes (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Forbes LGA, as compared to the rate of change for non-agricultural rural land.

Gilgandra

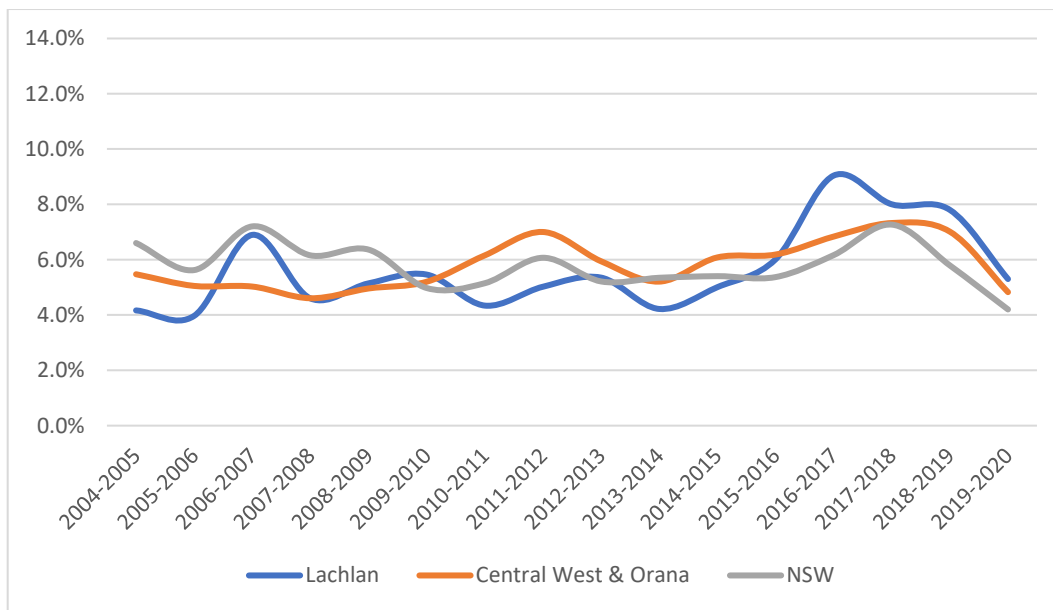


Incidence of all rural land ownership change in Gilgandra (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Gilgandra LGA, as compared to regional and state-wide rates of change.

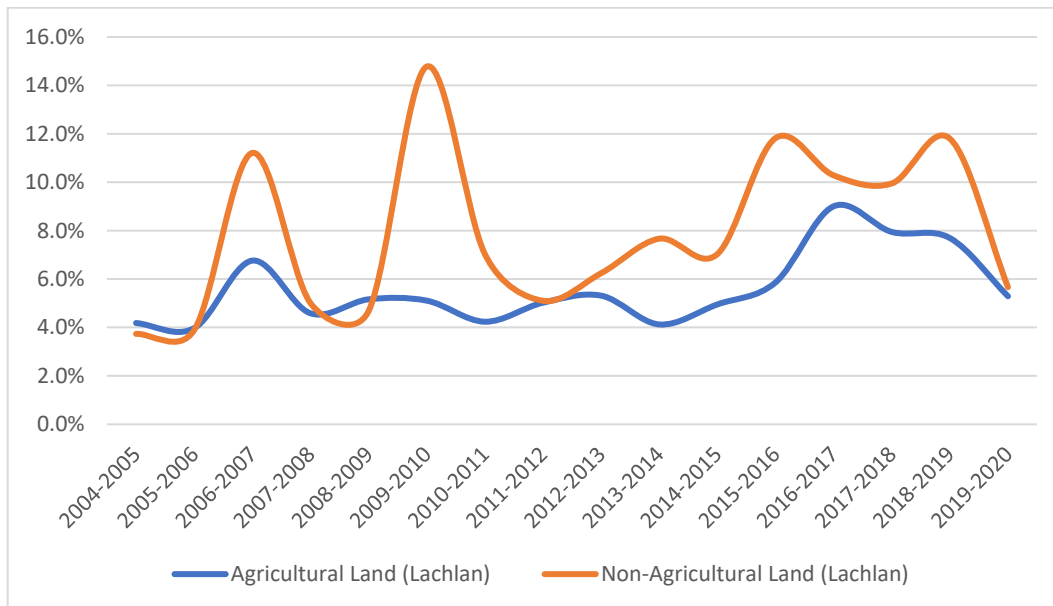


Incidence of agricultural land ownership changes in Gilgandra (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Gilgandra LGA, as compared to the rate of change for non-agricultural rural land.

Lachlan

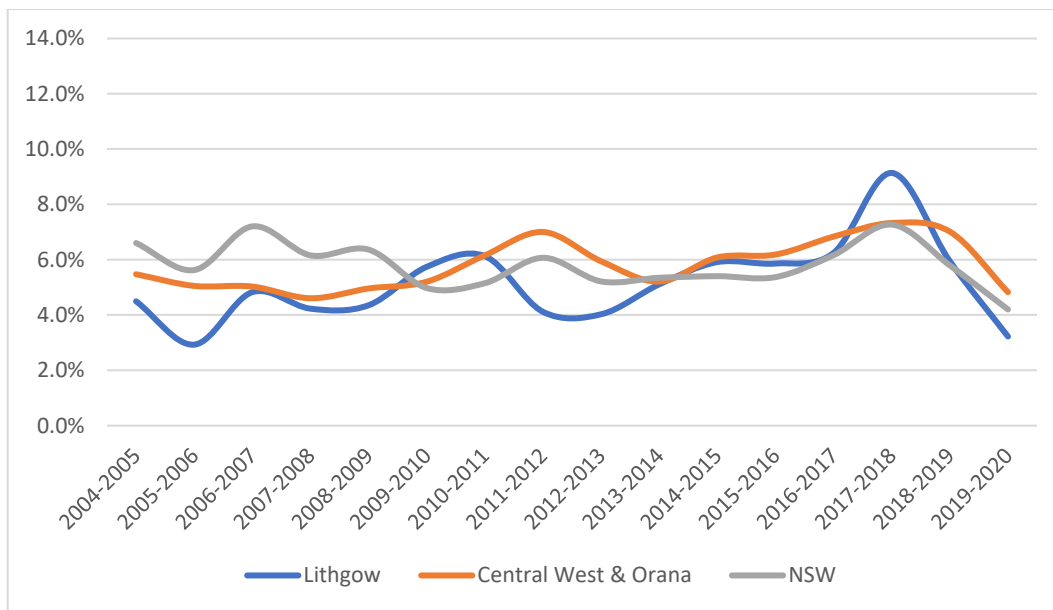


Incidence of all rural land ownership change in Lachlan (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Lachlan LGA, as compared to regional and state-wide rates of change.

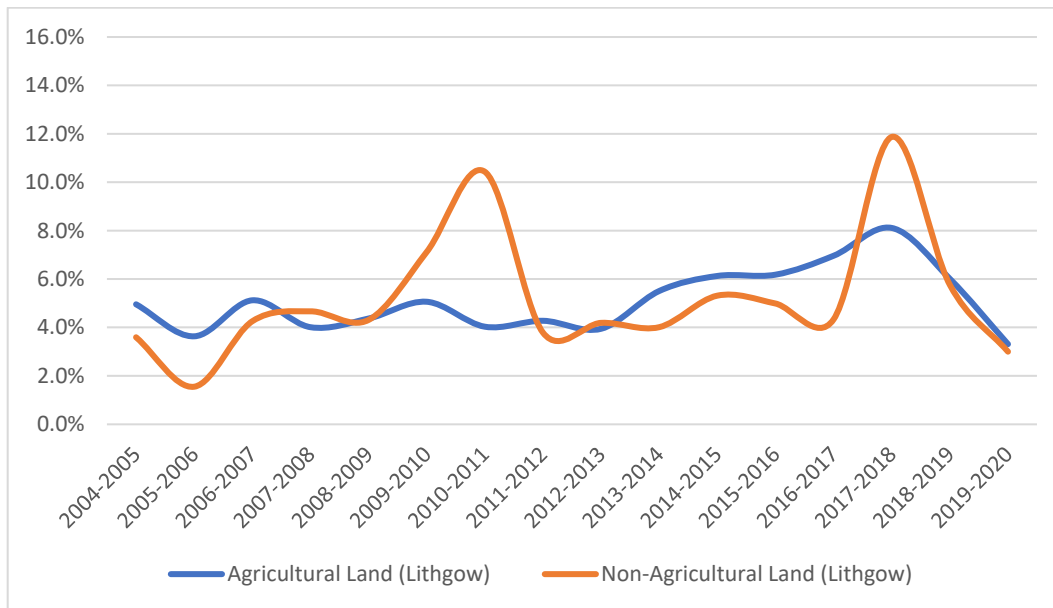


Incidence of agricultural land ownership changes in Lachlan (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Lachlan LGA, as compared to the rate of change for non-agricultural rural land.

Lithgow

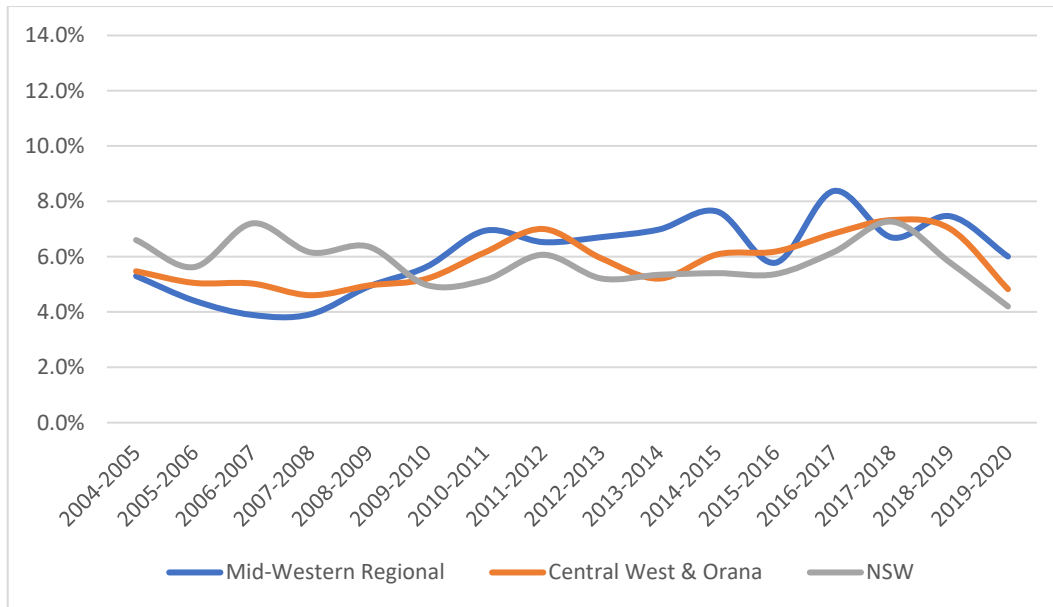


Incidence of all rural land ownership change in Lithgow (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Lithgow LGA, as compared to regional and state-wide rates of change.

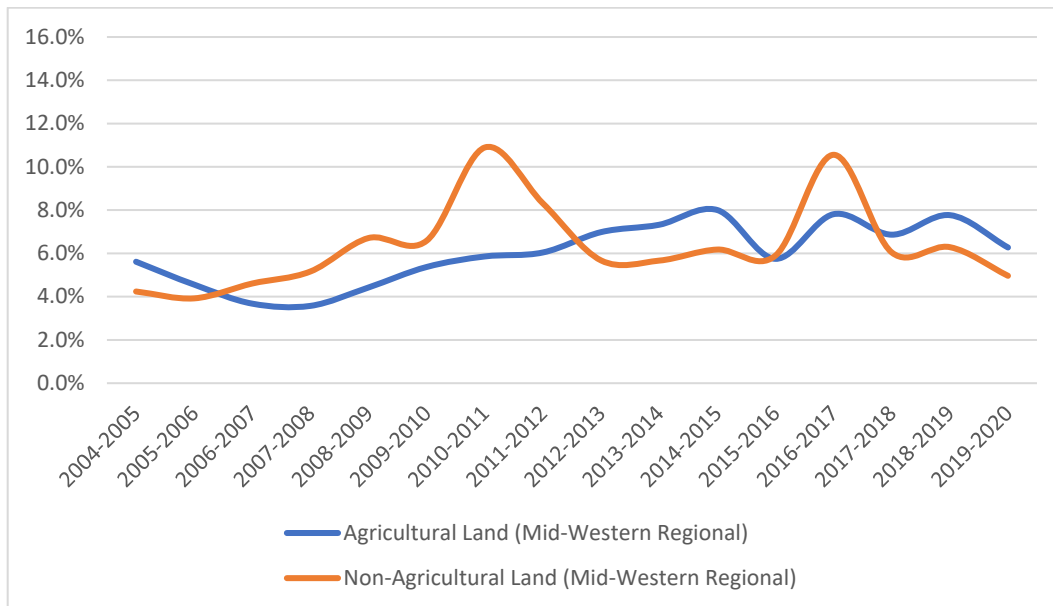


Incidence of agricultural land ownership changes in Lithgow (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Lithgow LGA, as compared to the rate of change for non-agricultural rural land.

Mid-Western Regional

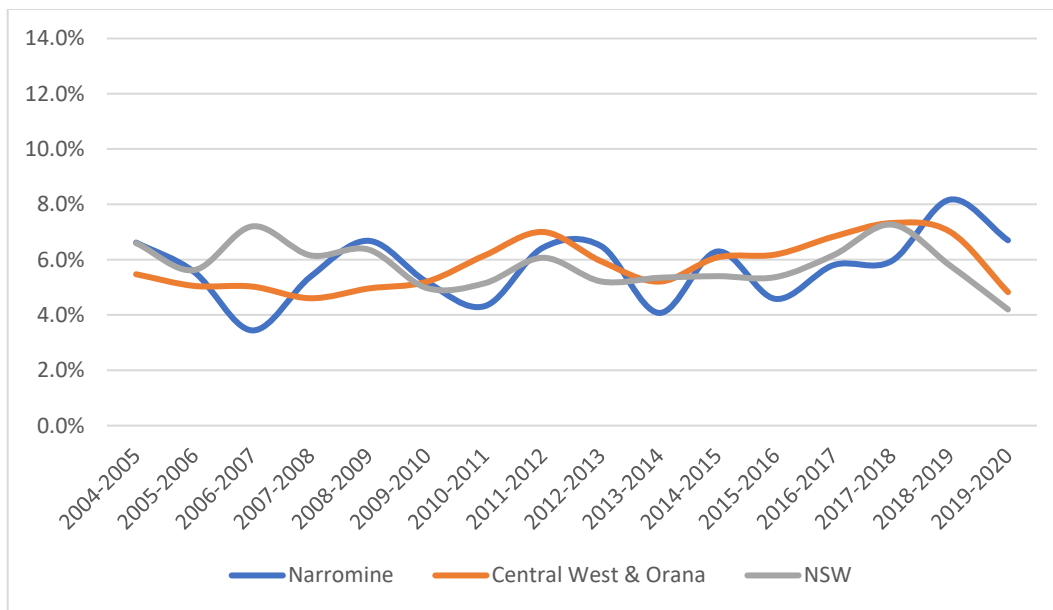


Incidence of all rural land ownership change in Mid-Western Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Mid-Western Regional LGA, as compared to regional and state-wide rates of change.

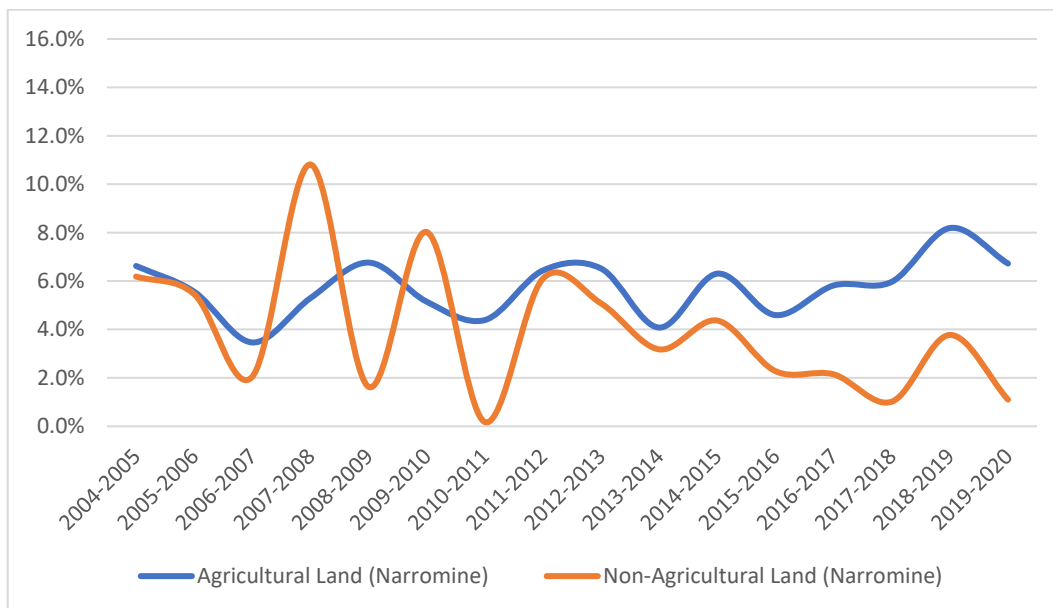


Incidence of agricultural land ownership changes in Mid-Western Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Mid-Western Regional LGA, as compared to the rate of change for non-agricultural rural land.

Narromine

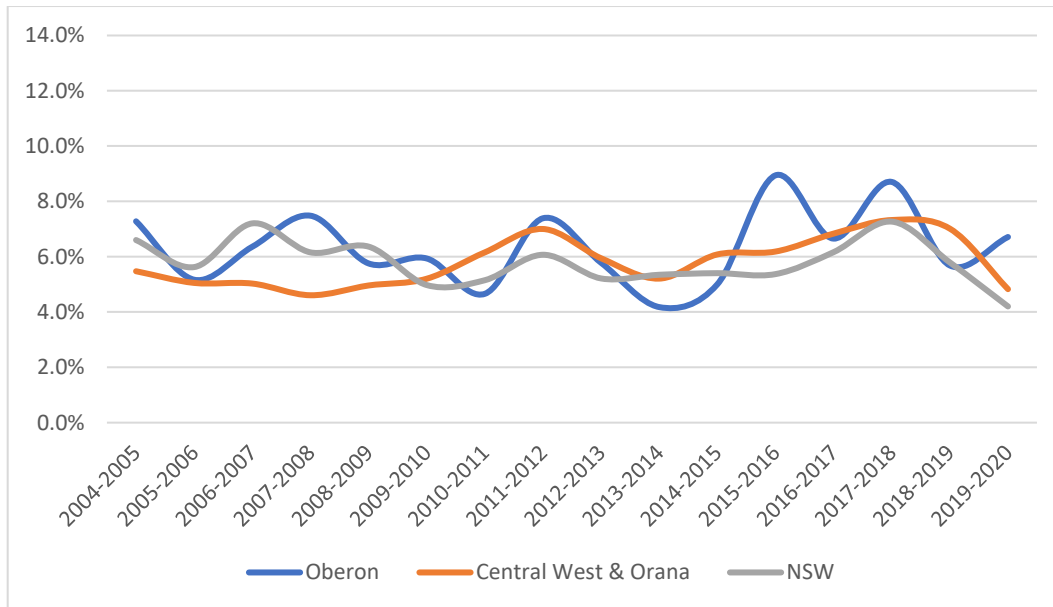


Incidence of all rural land ownership change in Narromine (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Narromine LGA, as compared to regional and state-wide rates of change.

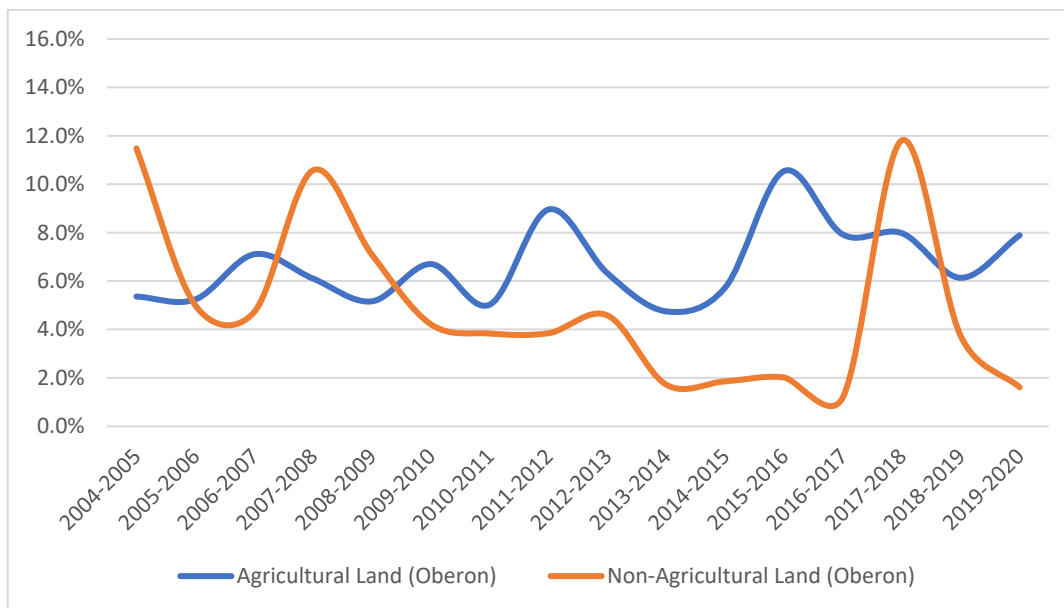


Incidence of agricultural land ownership changes in Narromine (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Narromine LGA, as compared to the rate of change for non-agricultural rural land.

Oberon

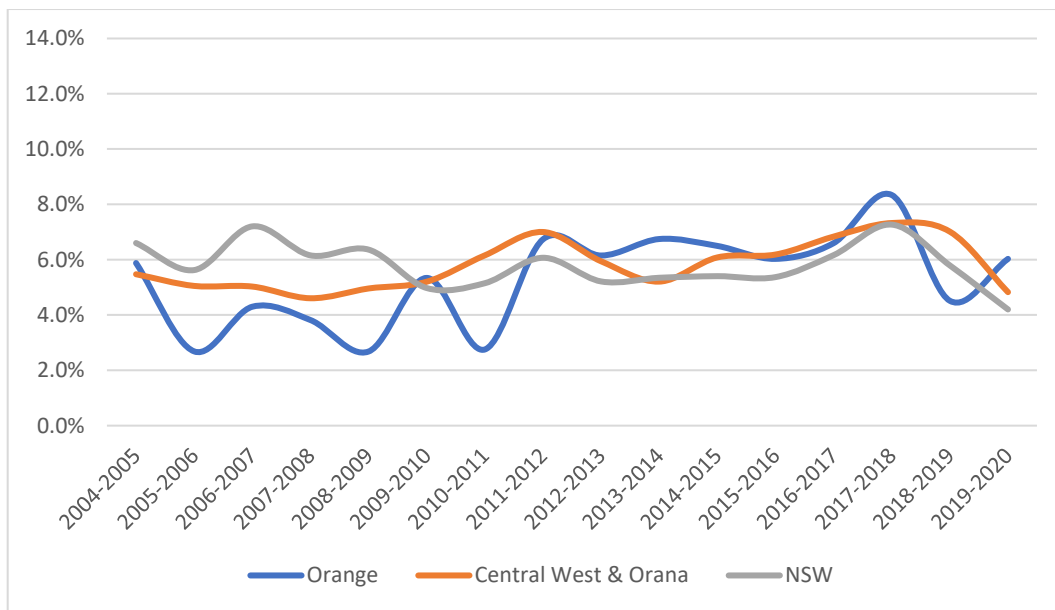


Incidence of all rural land ownership change in Oberon (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Oberon LGA, as compared to regional and state-wide rates of change.

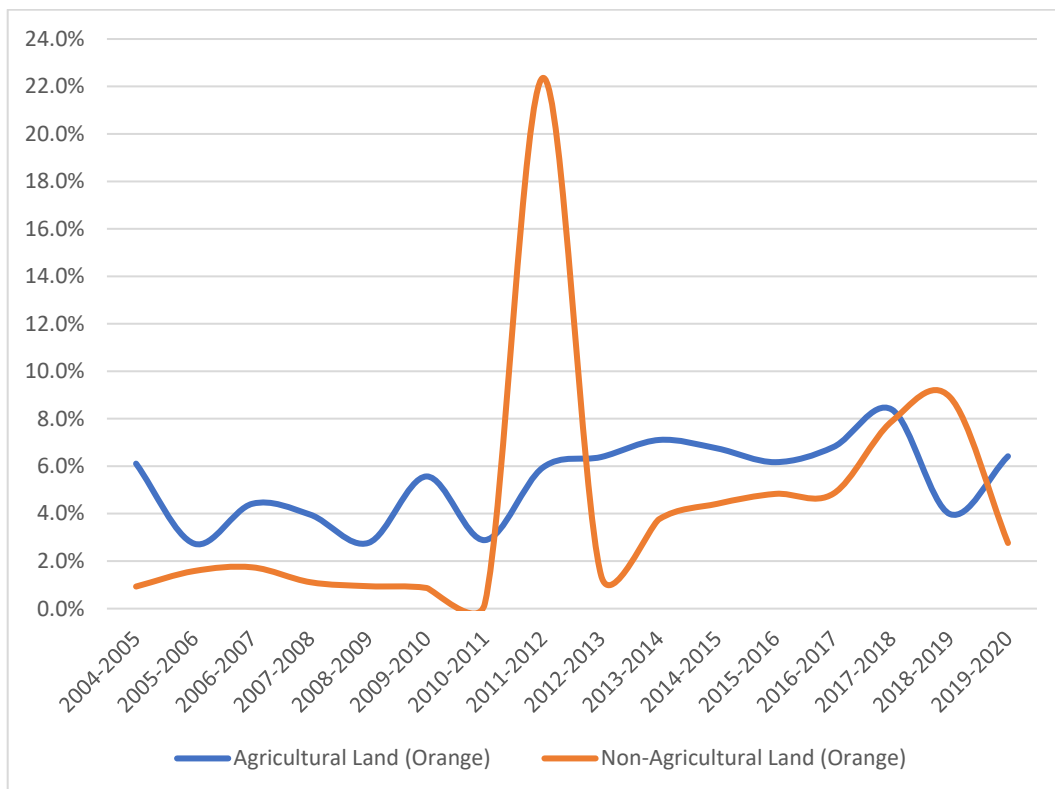


Incidence of agricultural land ownership changes in Oberon (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Oberon LGA, as compared to the rate of change for non-agricultural rural land.

Orange

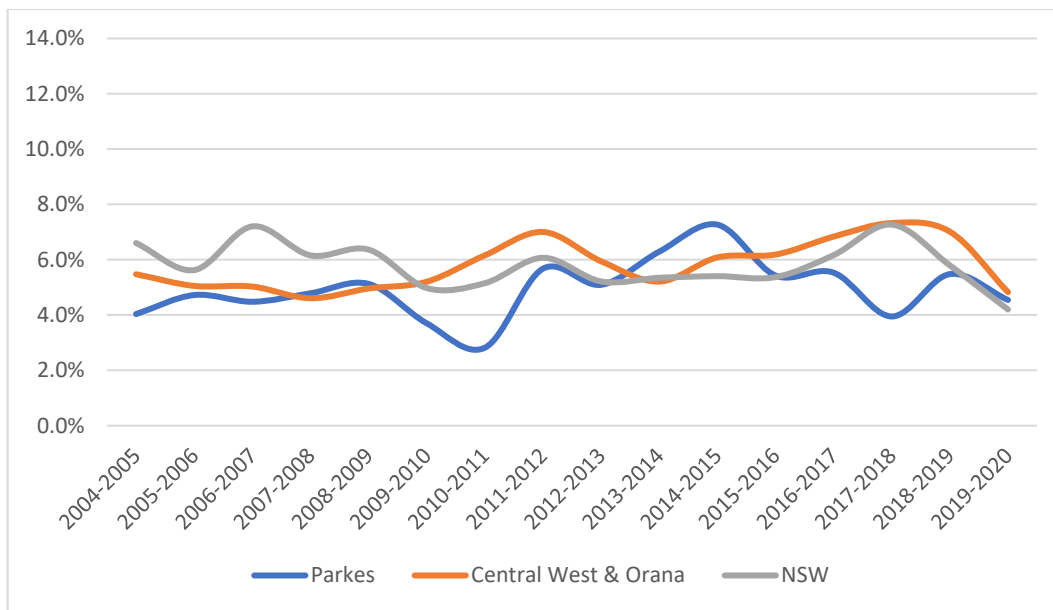


Incidence of all rural land ownership change in Orange (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Orange LGA, as compared to regional and state-wide rates of change.

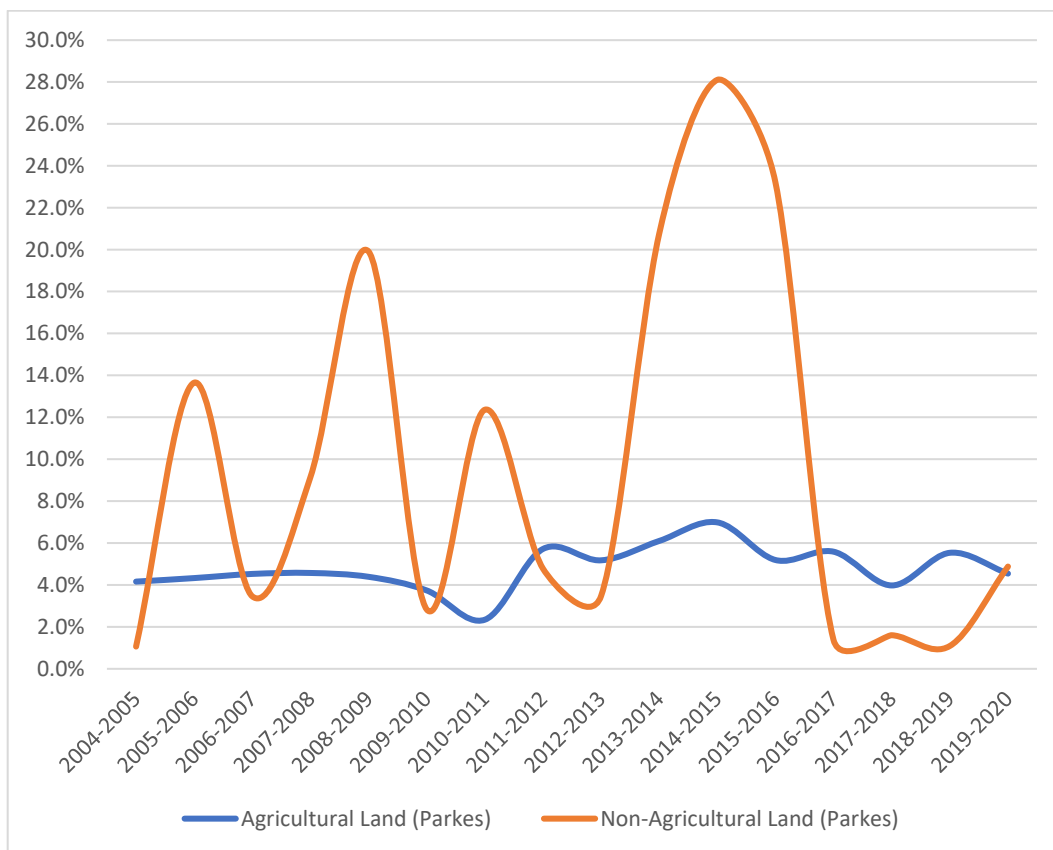


Incidence of agricultural land ownership changes in Orange (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Orange LGA, as compared to the rate of change for non-agricultural rural land.

Parkes

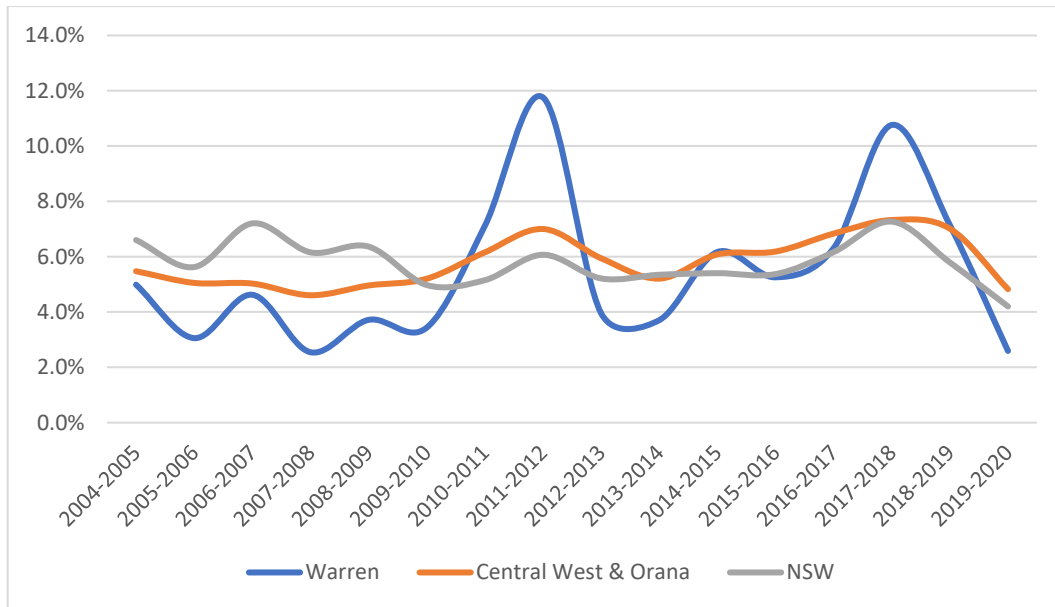


Incidence of all rural land ownership change in Parkes (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Parkes LGA, as compared to regional and state-wide rates of change.

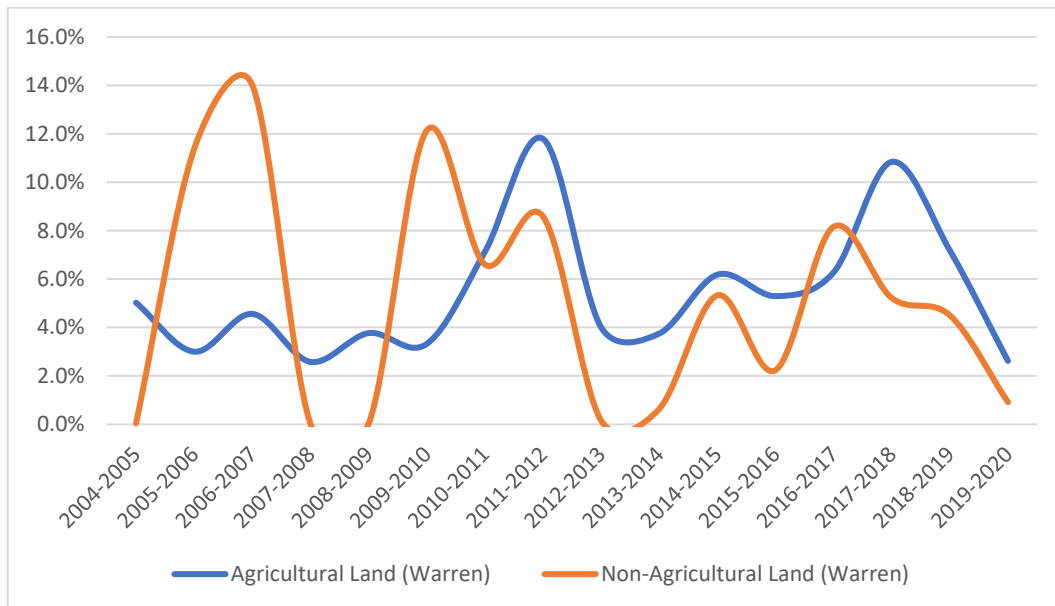


Incidence of agricultural land ownership changes in Parkes (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Parkes LGA, as compared to the rate of change for non-agricultural rural land.

Warren

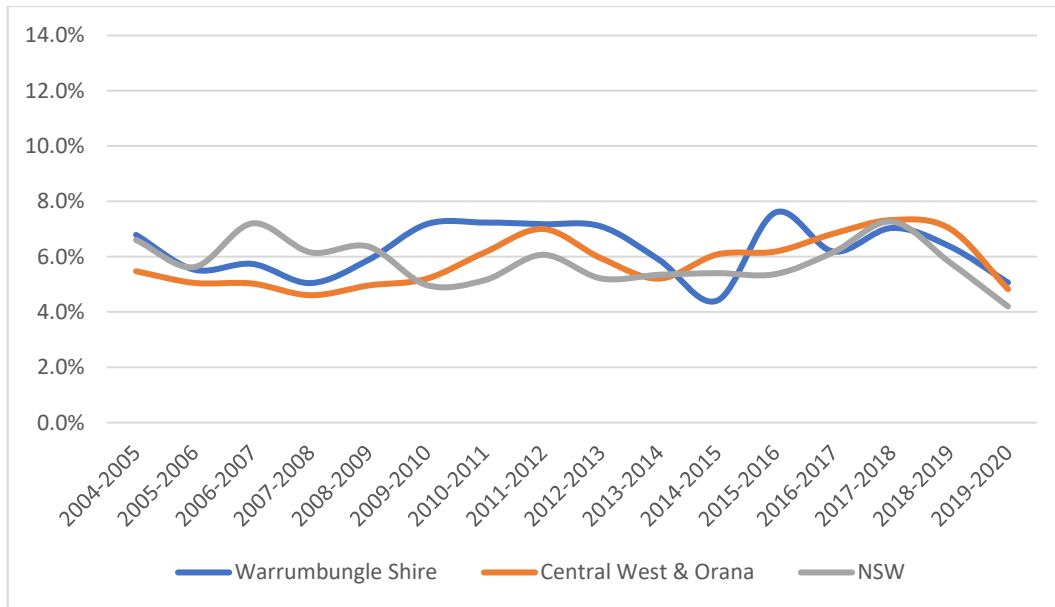


Incidence of all rural land ownership change in Warren (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Warren LGA, as compared to regional and state-wide rates of change.

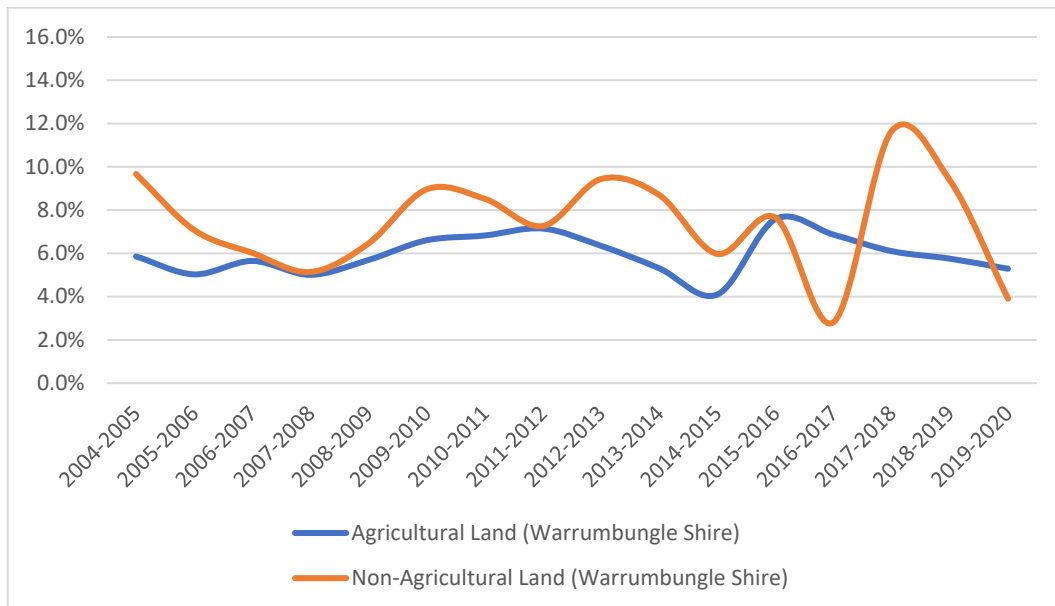


Incidence of agricultural land ownership changes in Warren (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Warren LGA, as compared to the rate of change for non-agricultural rural land.

Warrumbungle Shire

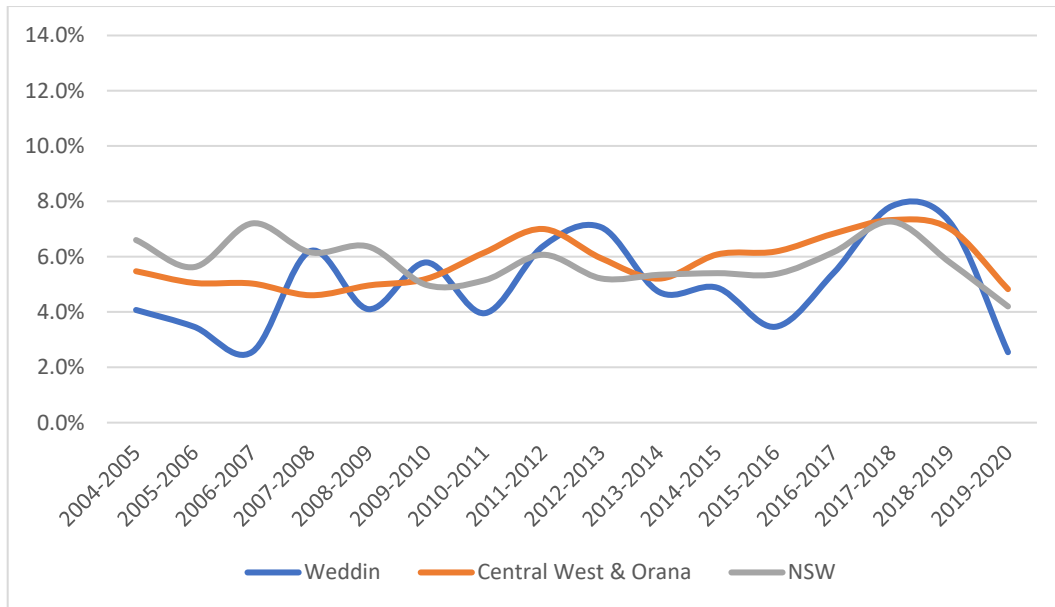


Incidence of all rural land ownership change in Warrumbungle (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Warrumbungle LGA, as compared to regional and state-wide rates of change.

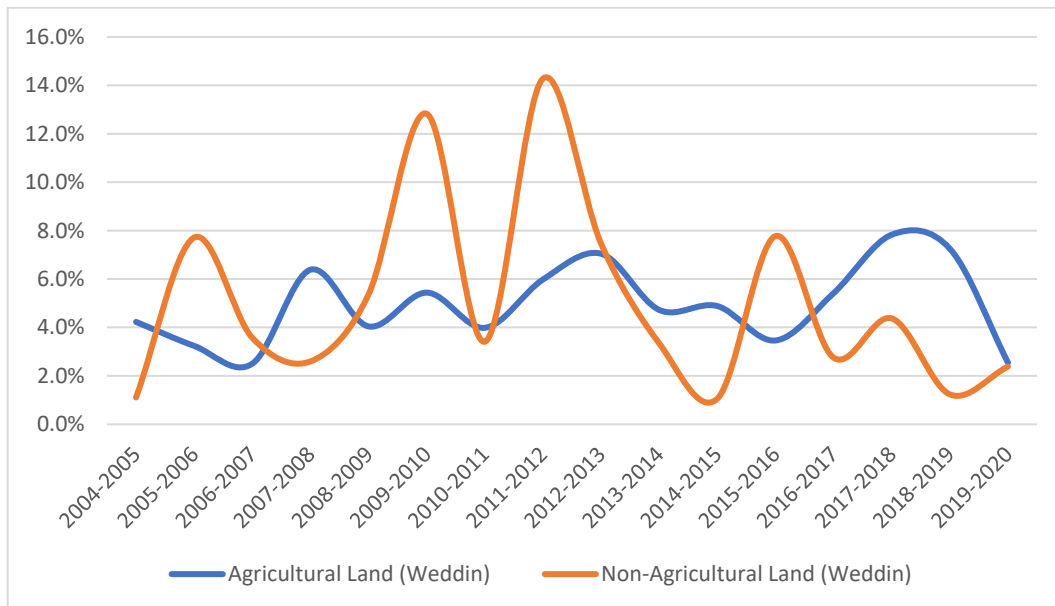


Incidence of agricultural land ownership changes in Warrumbungle (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Warrumbungle LGA, as compared to the rate of change for non-agricultural rural land.

Weddin

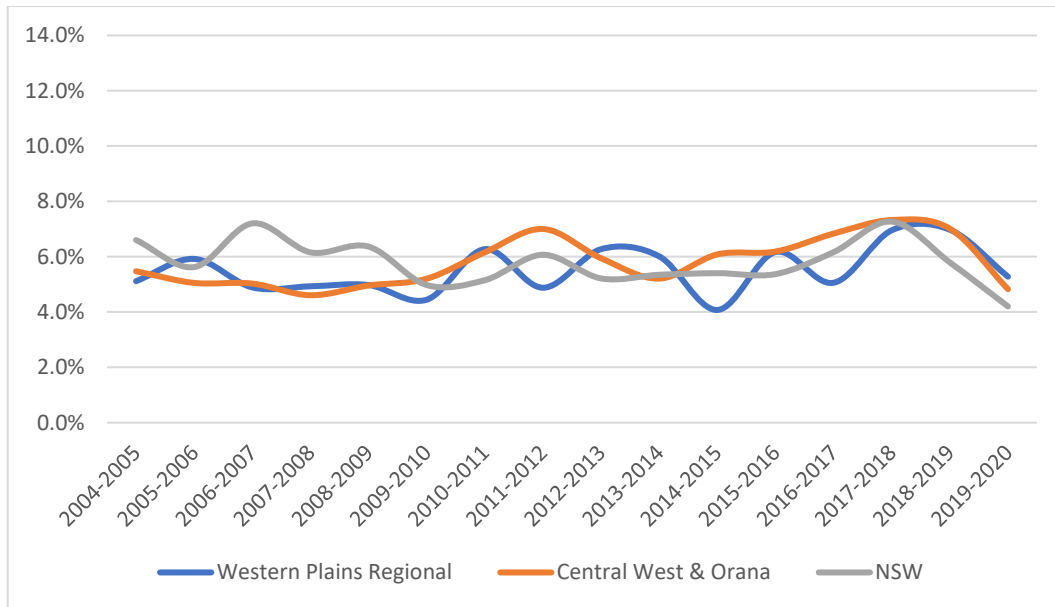


Incidence of all rural land ownership change in Weddin (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Weddin LGA, as compared to regional and state-wide rates of change.

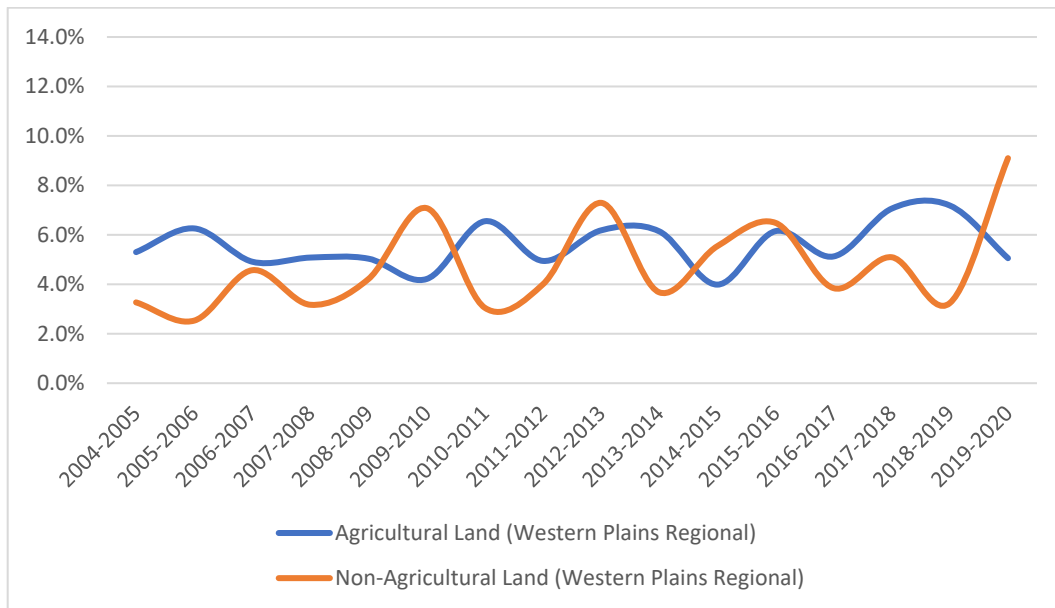


Incidence of agricultural land ownership changes in Weddin (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Weddin LGA, as compared to the rate of change for non-agricultural rural land.

Western Plains Regional



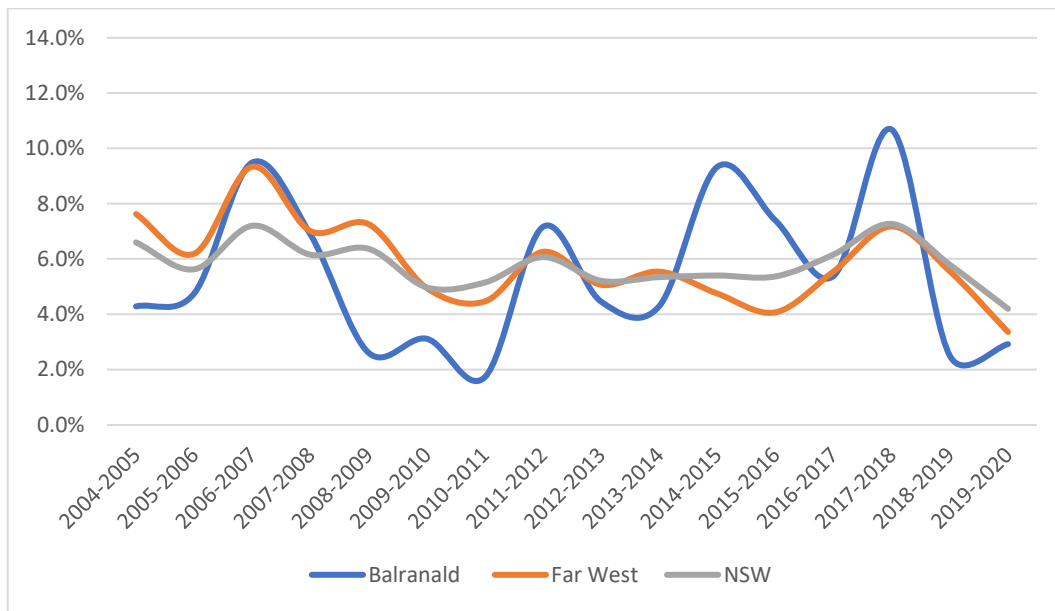
Incidence of all rural land ownership change in Western Plains Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Western Plains Regional LGA, as compared to regional and state-wide rates of change.



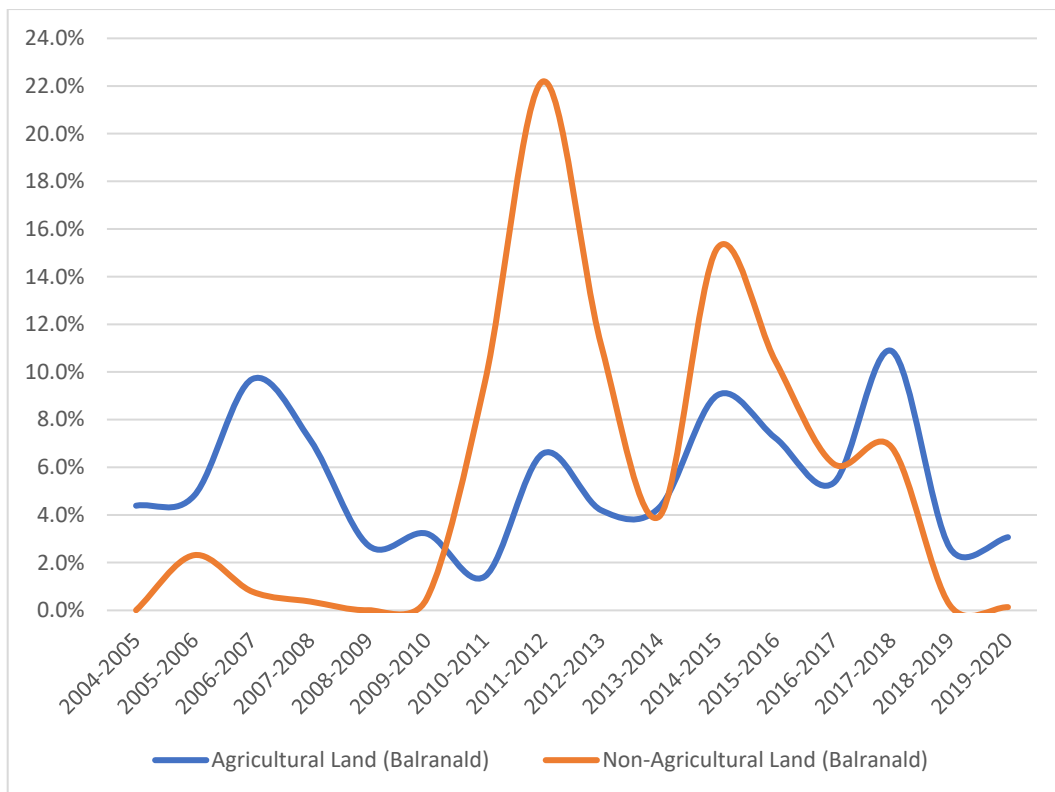
Incidence of agricultural land ownership changes in Western Plains Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Western Plains Regional LGA, as compared to the rate of change for non-agricultural rural land.

Far West

Balranald

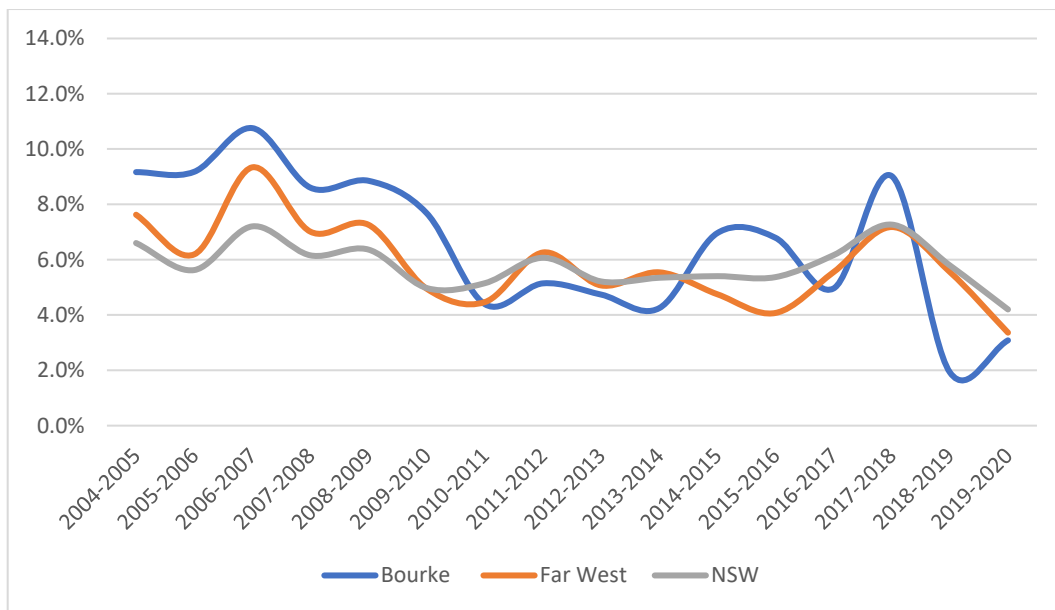


Incidence of all rural land ownership change in Balranald (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Balranald LGA, as compared to regional and state-wide rates of change.

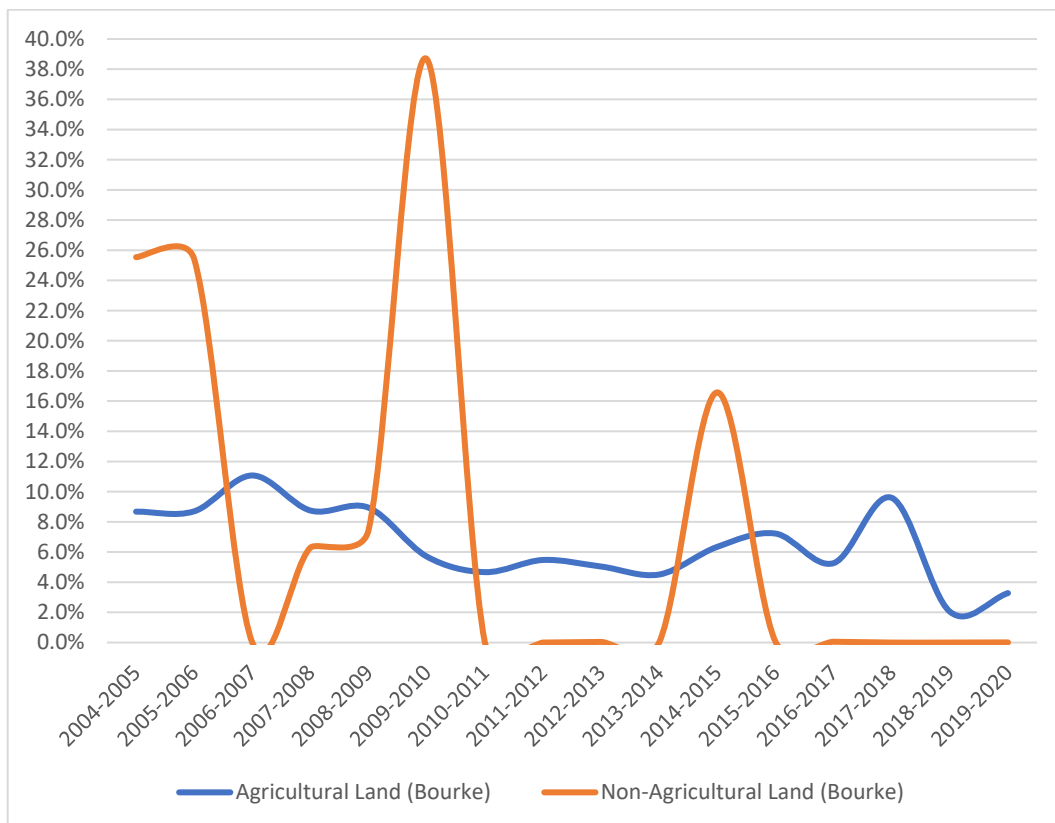


Incidence of agricultural land ownership changes in Balranald (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Balranald LGA, as compared to the rate of change for non-agricultural rural land.

Bourke

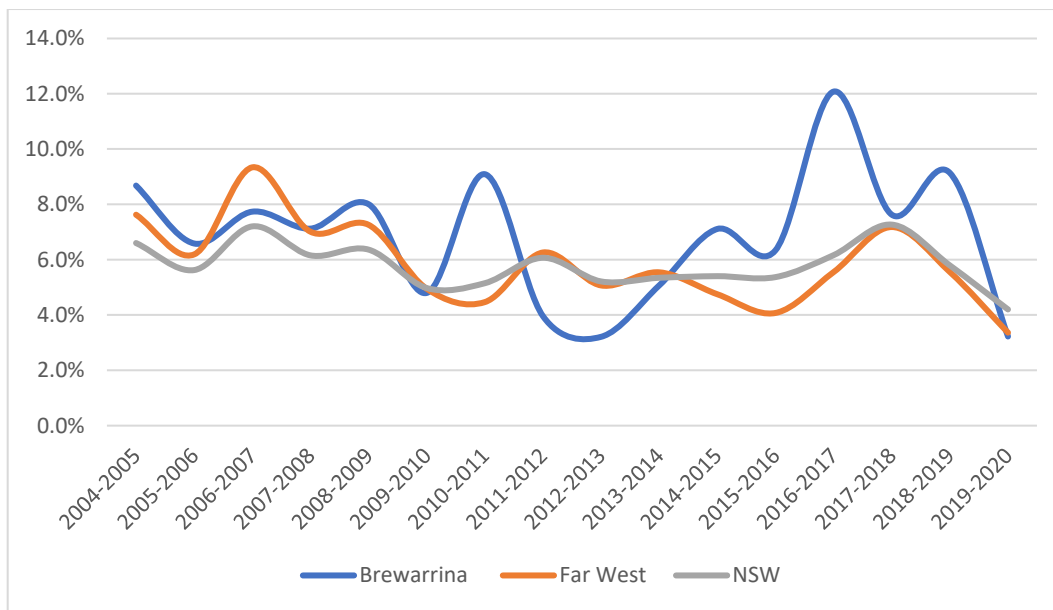


Incidence of all rural land ownership change in Bourke (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Bourke LGA, as compared to regional and state-wide rates of change.

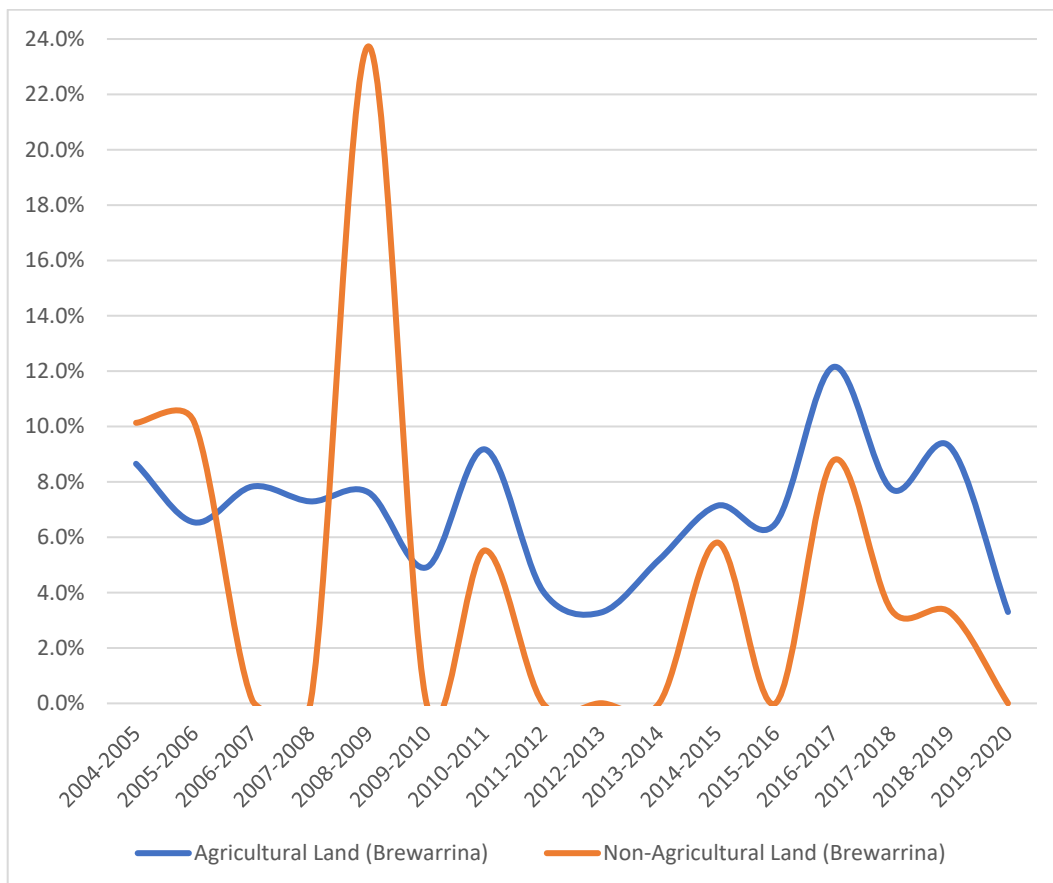


Incidence of agricultural land ownership changes in Bourke (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bourke LGA, as compared to the rate of change for non-agricultural rural land.

Brewarrina

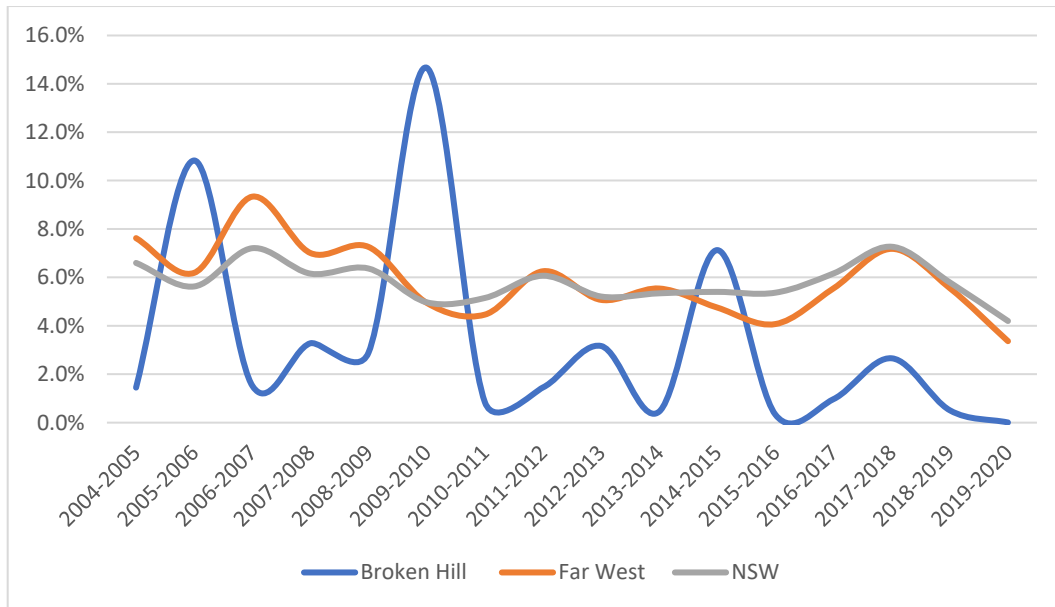


Incidence of all rural land ownership change in Brewarrina (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Brewarrina LGA, as compared to regional and state-wide rates of change.

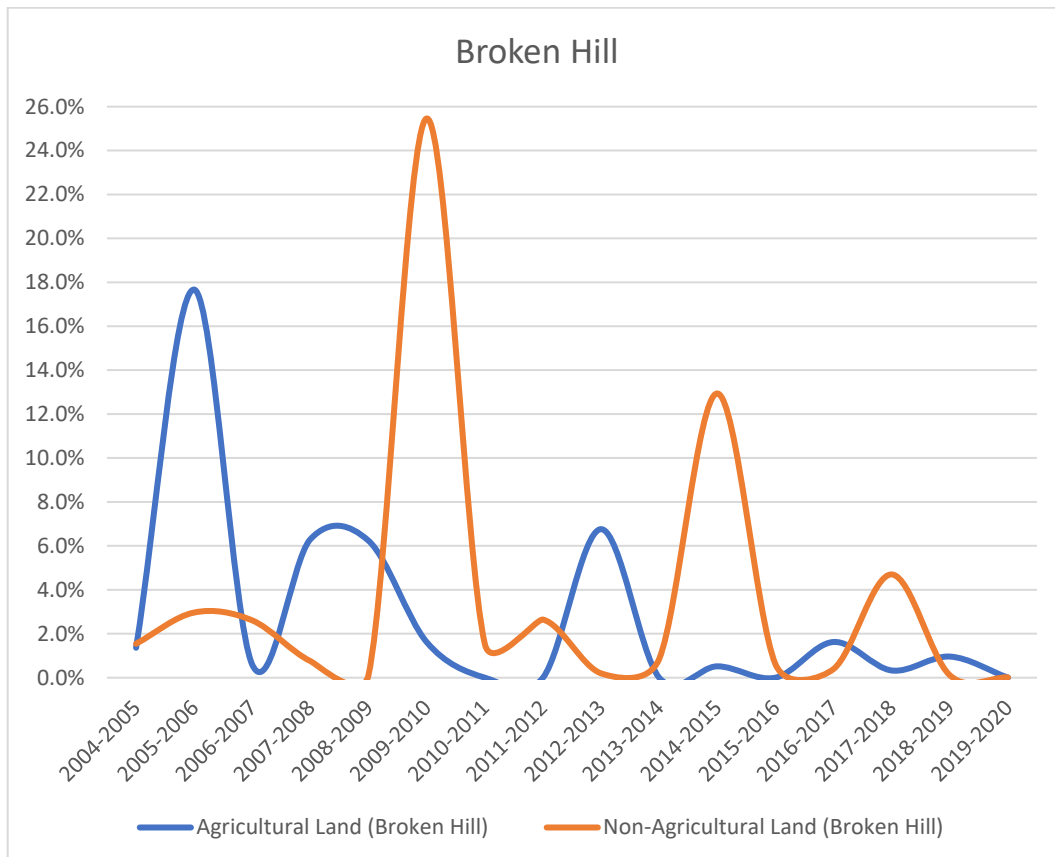


Incidence of agricultural land ownership changes in Brewarrina (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Brewarrina LGA, as compared to the rate of change for non-agricultural rural land.

Broken Hill

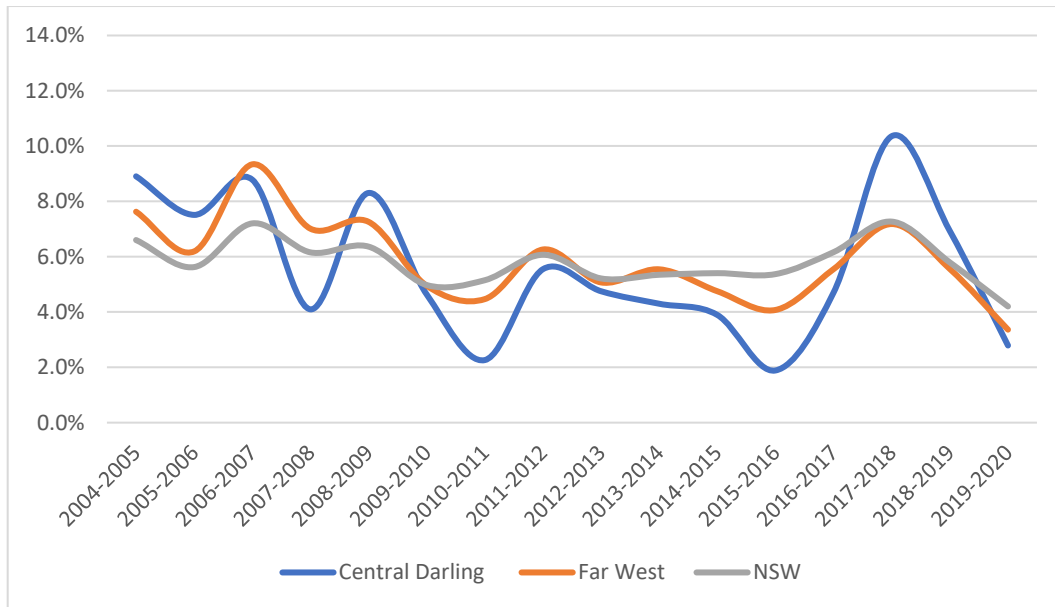


Incidence of all rural land ownership change in Broken Hill (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Broken Hill LGA, as compared to regional and state-wide rates of change.

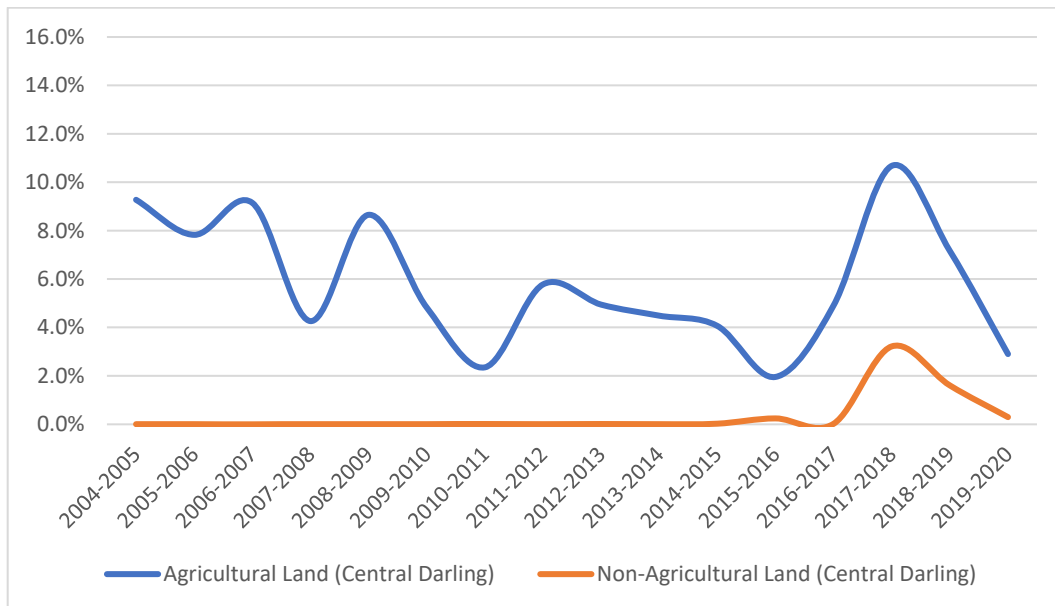


Incidence of agricultural land ownership changes in Broken Hill (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Broken Hill LGA, as compared to the rate of change for non-agricultural rural land.

Central Darling

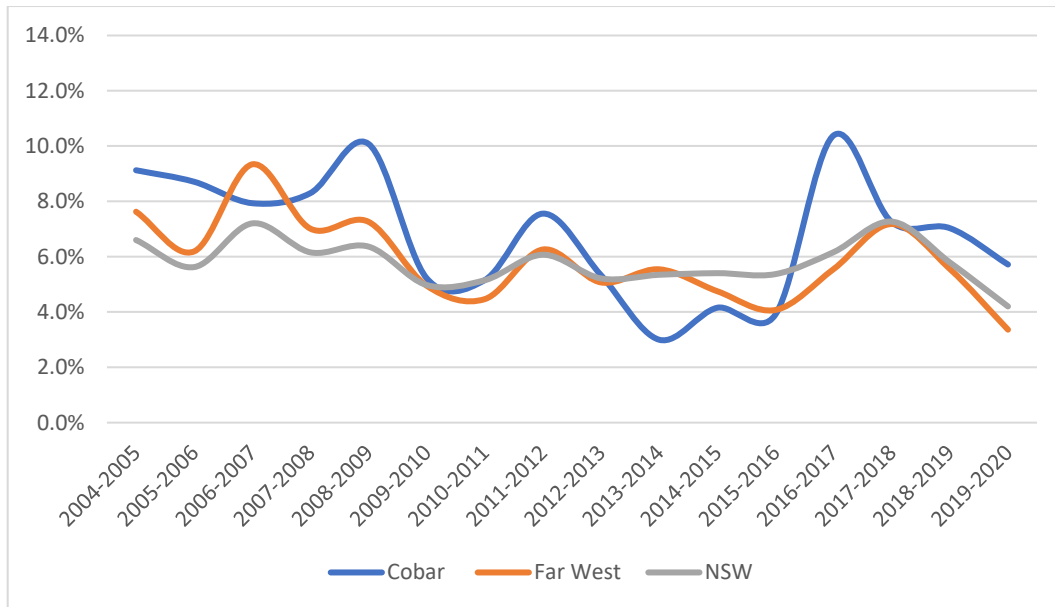


Incidence of all rural land ownership change in Central Darling (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Central Darling LGA, as compared to regional and state-wide rates of change.

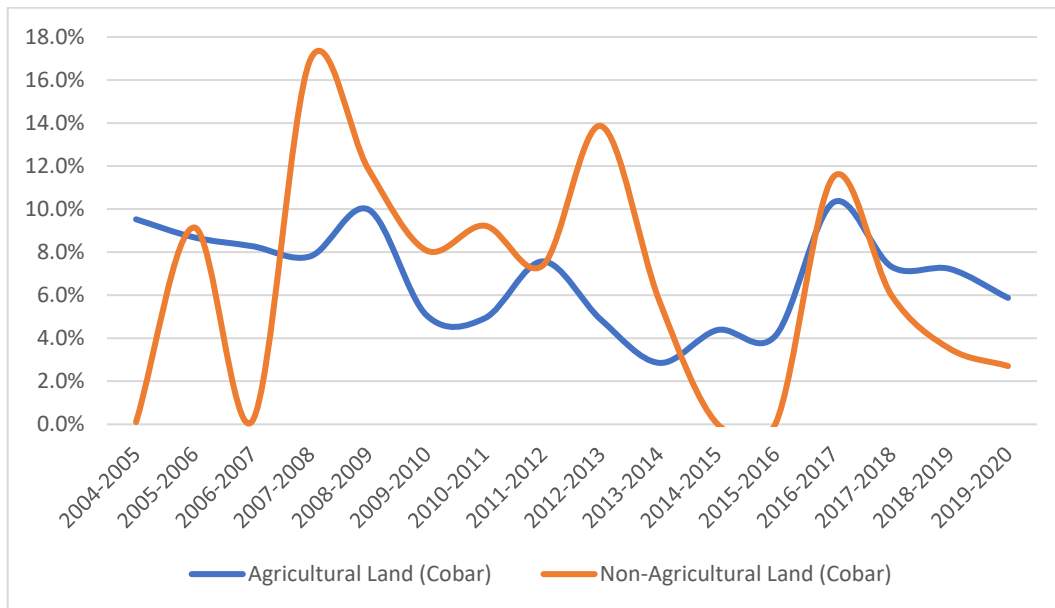


Incidence of agricultural land ownership changes in Central Darling (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Central Darling LGA, as compared to the rate of change for non-agricultural rural land.

Cobar

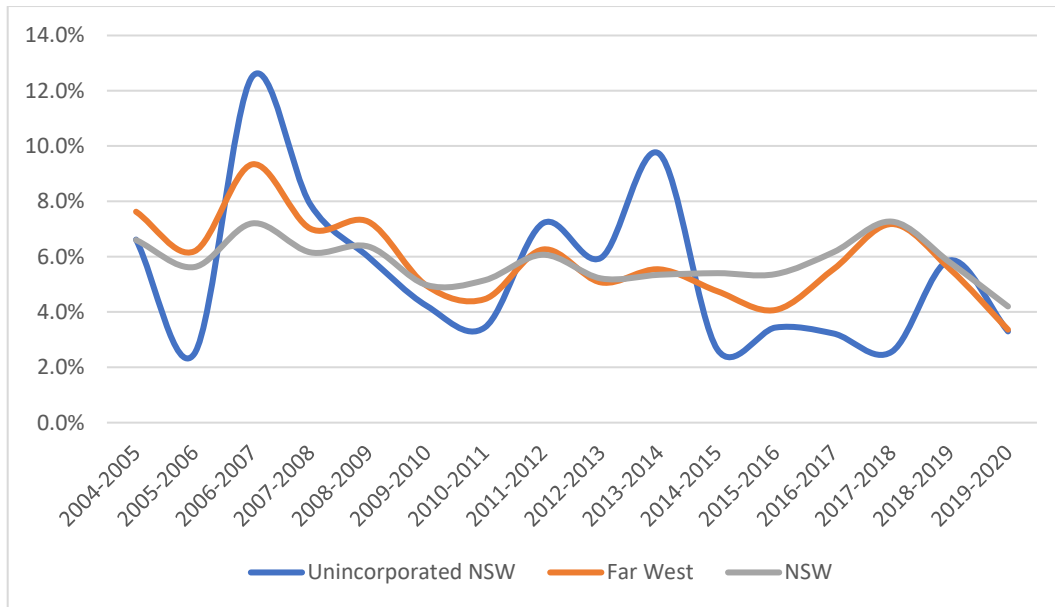


Incidence of all rural land ownership change in Cobar (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Cobar LGA, as compared to regional and state-wide rates of change.

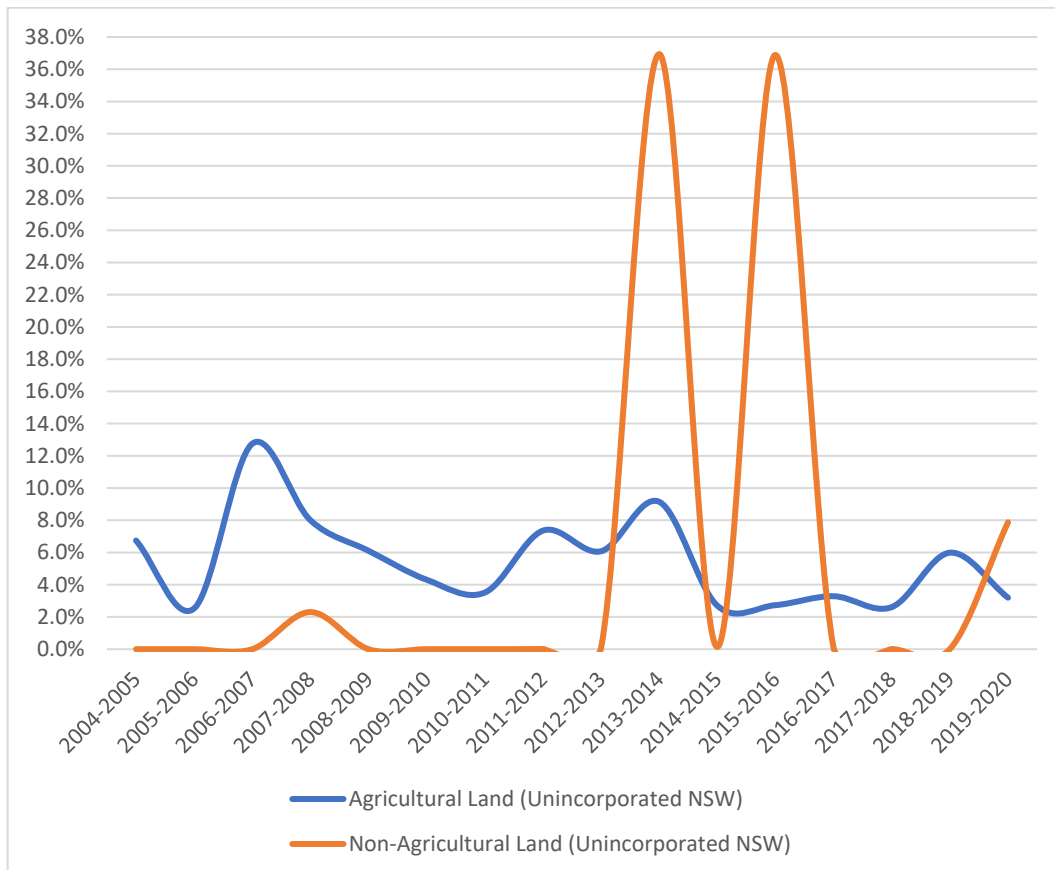


Incidence of agricultural land ownership changes in Cobar (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Cobar LGA, as compared to the rate of change for non-agricultural rural land.

Unincorporated NSW

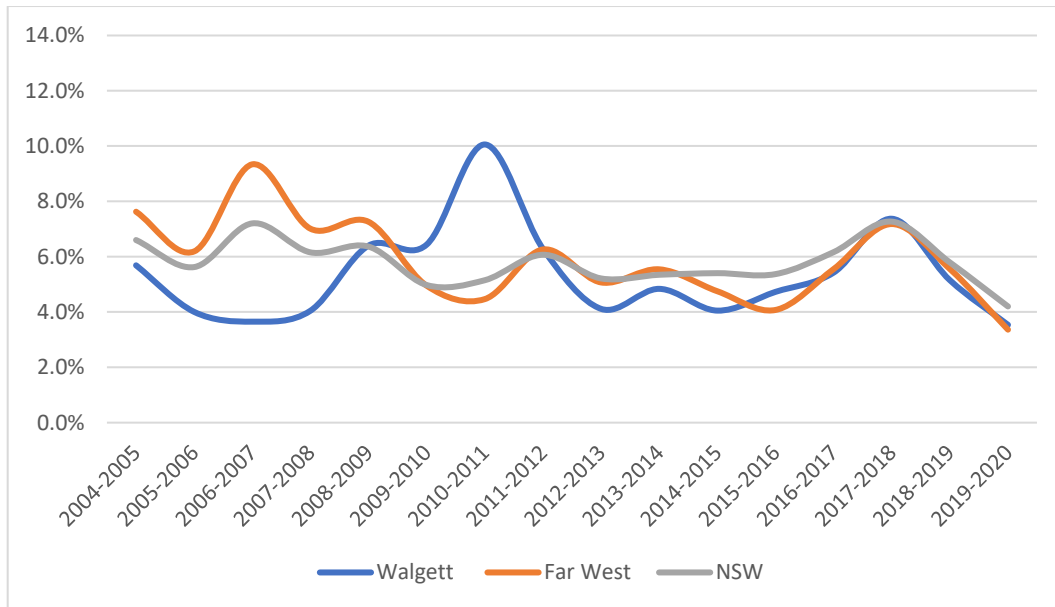


Incidence of all rural land ownership change in Unincorporated NSW (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Unincorporated NSW LGA, as compared to regional and state-wide rates of change.

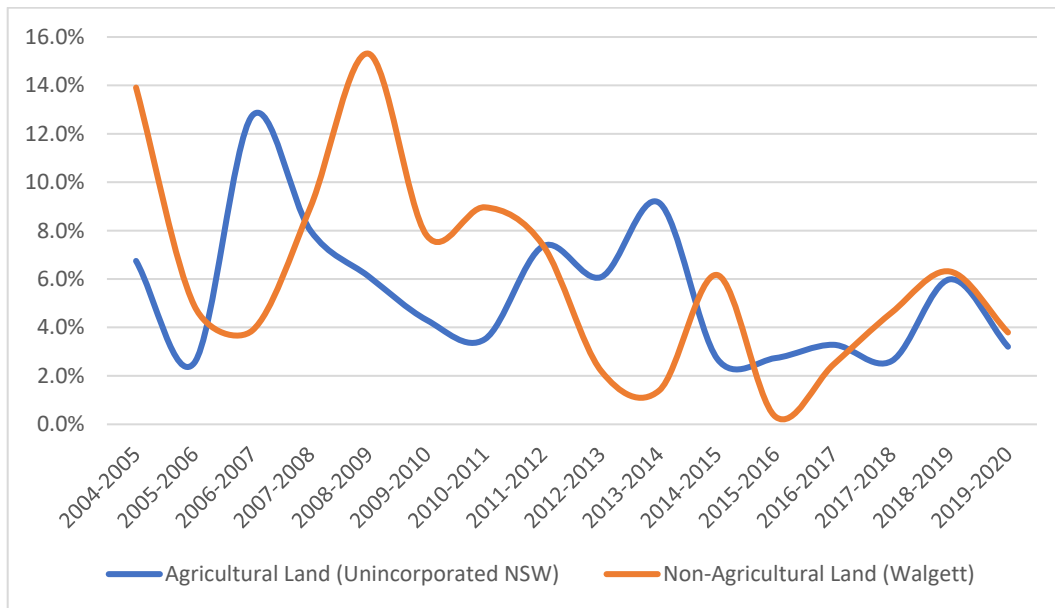


Incidence of agricultural land ownership changes in Unincorporated NSW (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Unincorporated NSW LGA, as compared to the rate of change for non-agricultural rural land.

Walgett

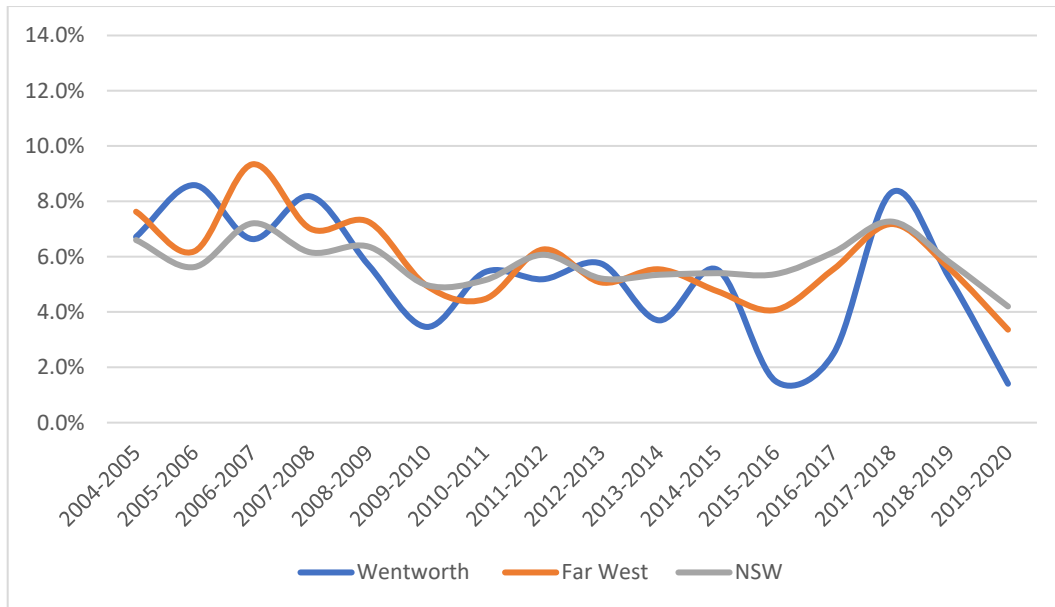


Incidence of all rural land ownership change in Walgett (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Walgett LGA, as compared to regional and state-wide rates of change.

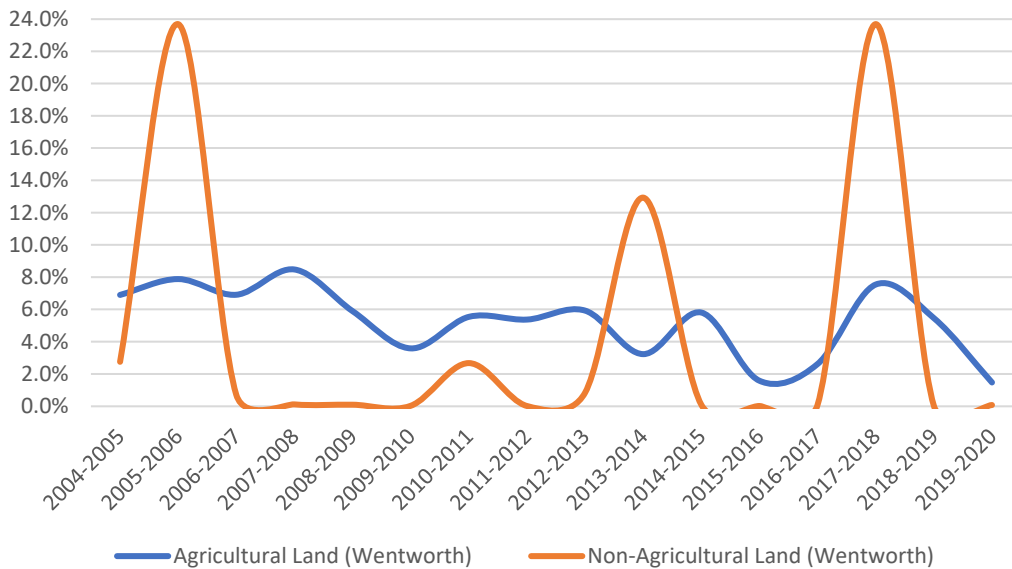


Incidence of agricultural land ownership changes in Walgett (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Walgett LGA, as compared to the rate of change for non-agricultural rural land.

Wentworth



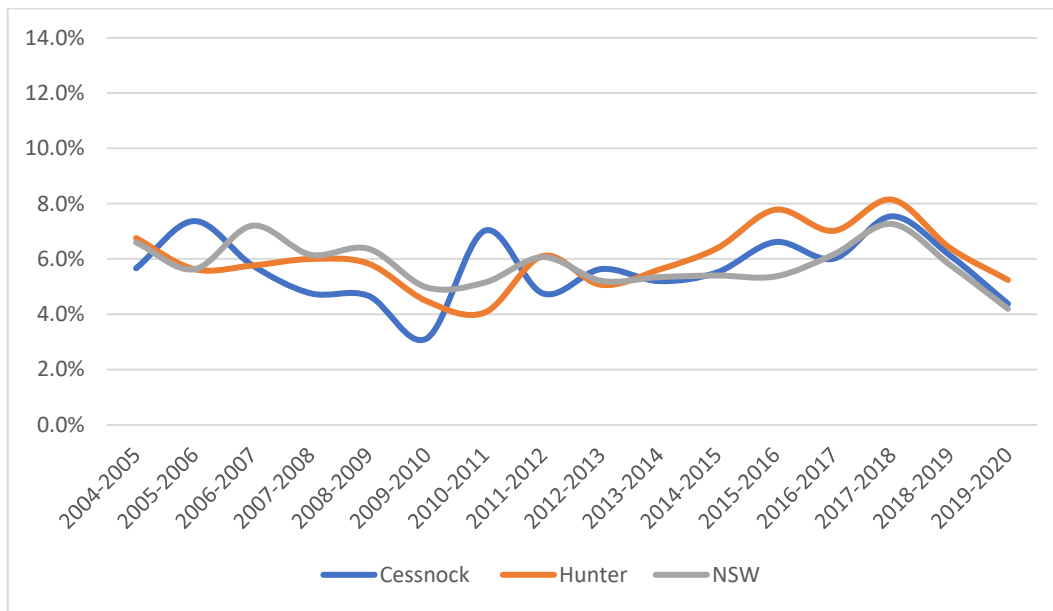
Incidence of all rural land ownership change in Wentworth (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Wentworth LGA, as compared to regional and state-wide rates of change.



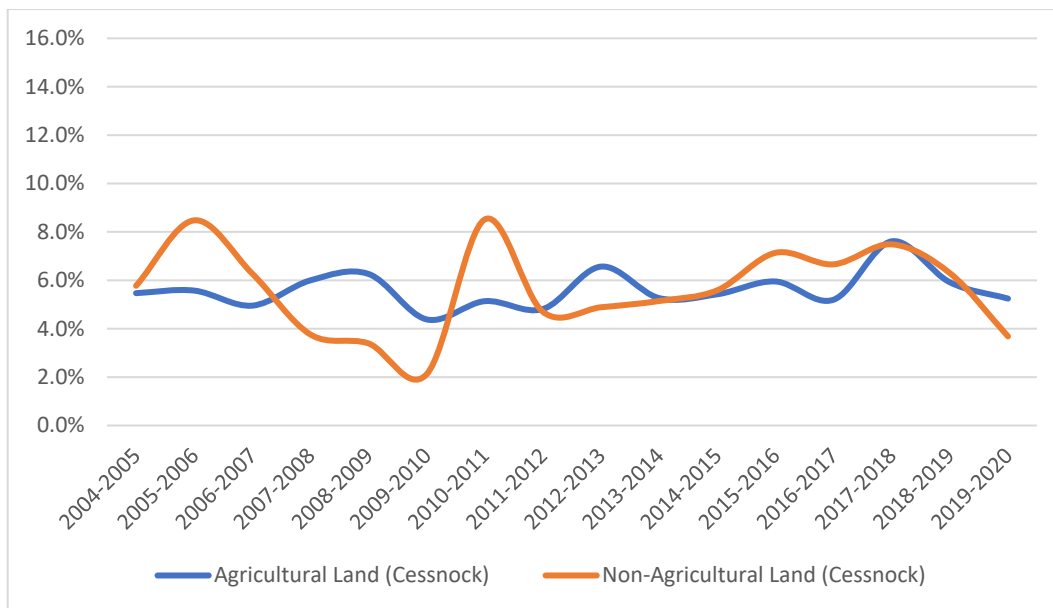
Incidence of agricultural land ownership changes in Wentworth (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Wentworth LGA, as compared to the rate of change for non-agricultural rural land.

Hunter

Cessnock

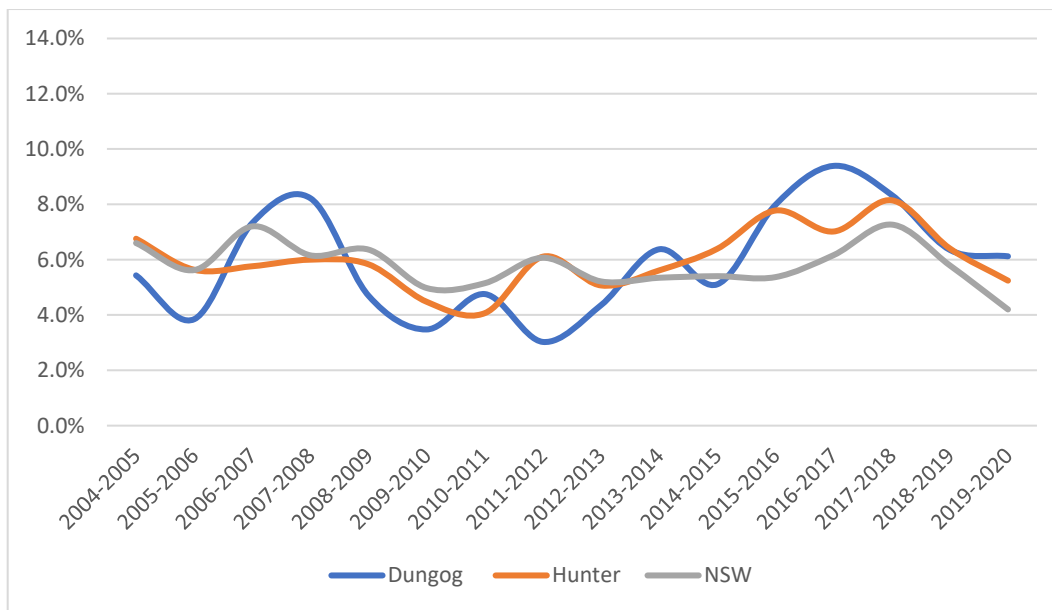


Incidence of all rural land ownership change in Cessnock (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Cessnock LGA, as compared to regional and state-wide rates of change.

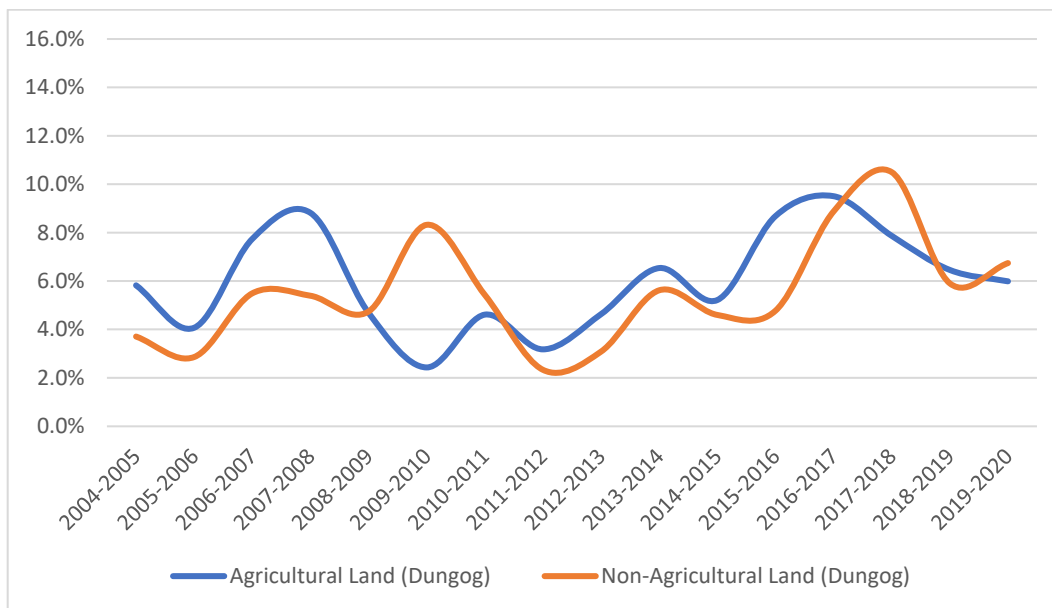


Incidence of agricultural land ownership changes in Cessnock (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Cessnock LGA, as compared to the rate of change for non-agricultural rural land.

Dungog

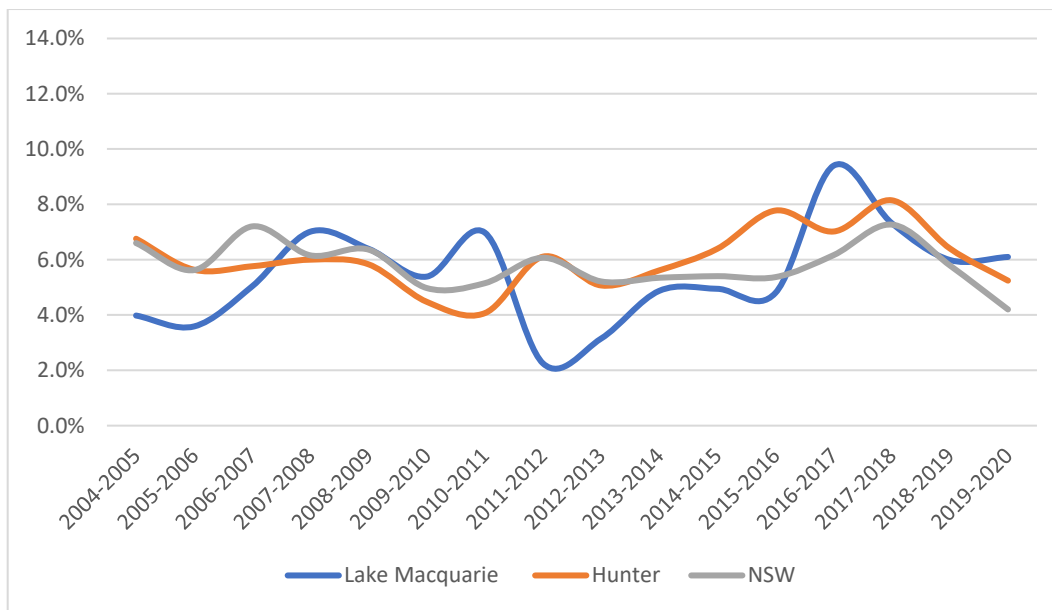


Incidence of all rural land ownership change in Dungog (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Dungog LGA, as compared to regional and state-wide rates of change.

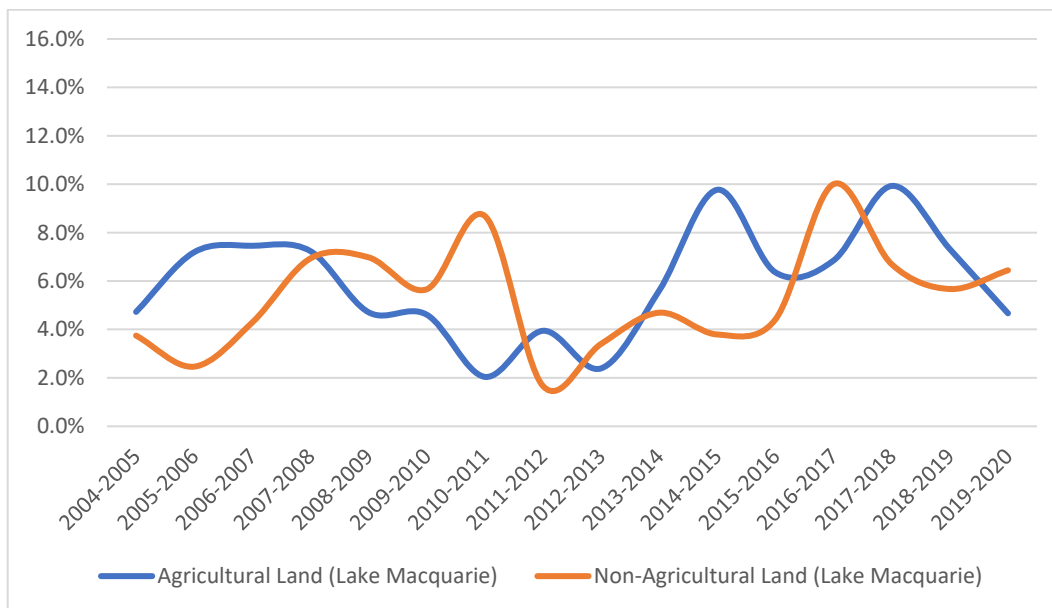


Incidence of agricultural land ownership changes in Dungog (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Dungog LGA, as compared to the rate of change for non-agricultural rural land.

Lake Macquarie

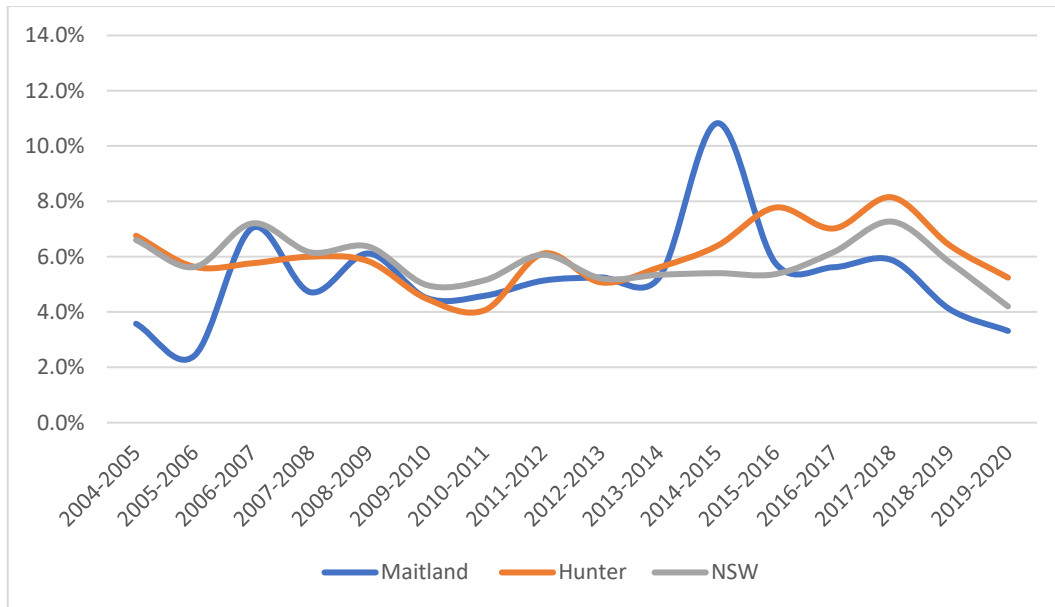


Incidence of all rural land ownership change in Lake Macquarie (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for in Lake Macquarie h LGA, as compared to regional and state-wide rates of change.

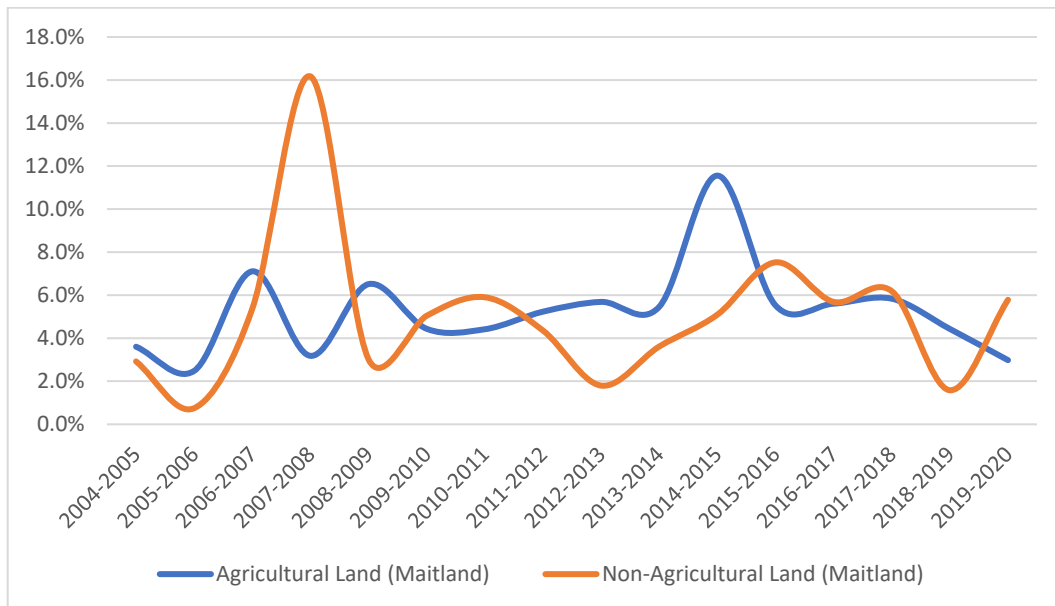


Incidence of agricultural land ownership changes in in Lake Macquarie (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in in Lake Macquarie LGA, as compared to the rate of change for non-agricultural rural land.

Maitland

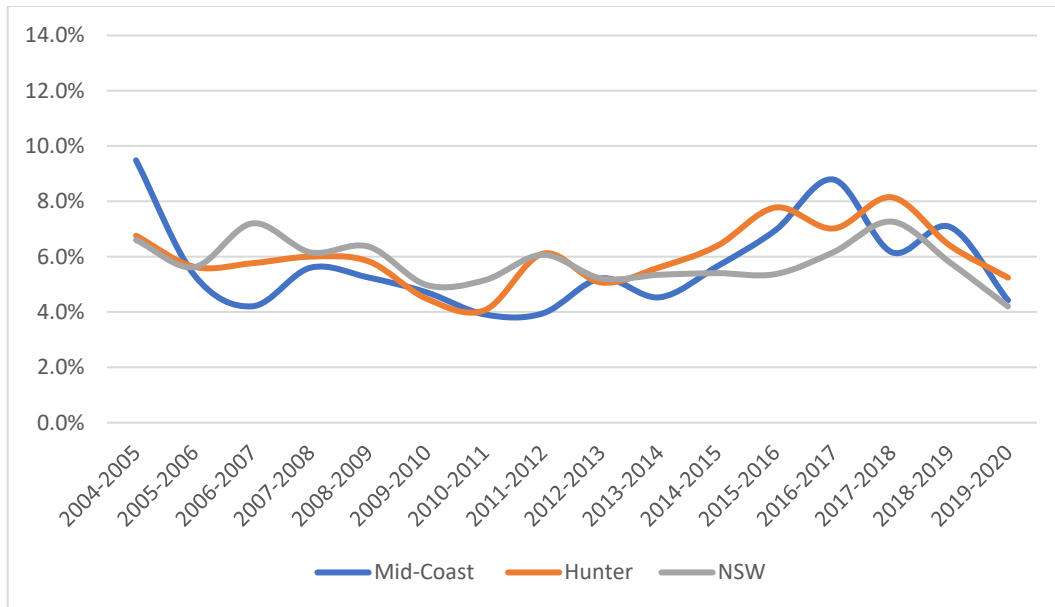


Incidence of all rural land ownership change in Maitland (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Maitland LGA, as compared to regional and state-wide rates of change.

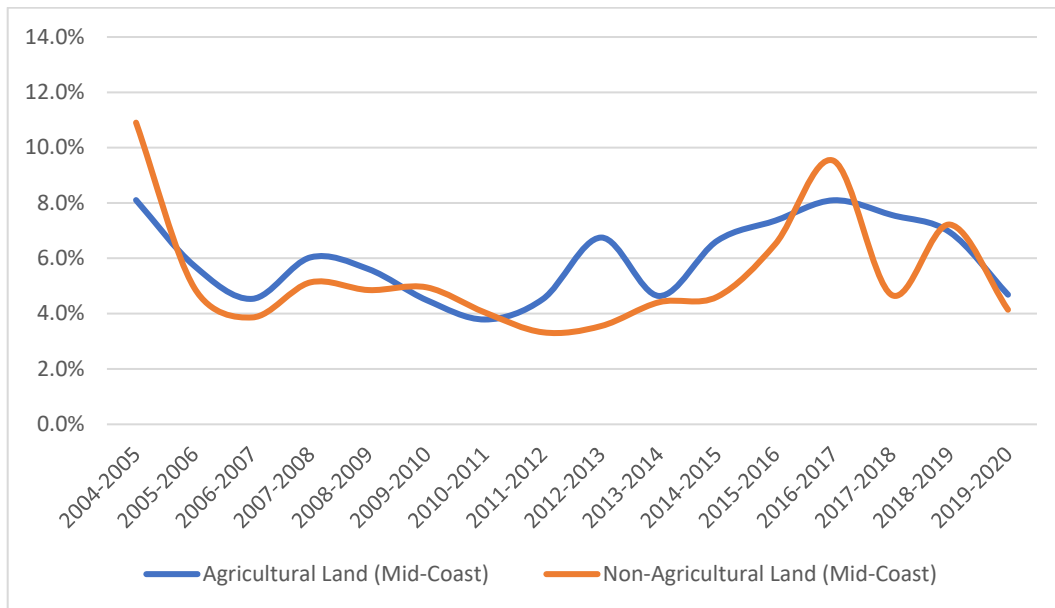


Incidence of agricultural land ownership changes in Maitland (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Maitland LGA, as compared to the rate of change for non-agricultural rural land.

Mid-Coast



Incidence of all rural land ownership change in Mid-Coast (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Mid-Coast LGA, as compared to regional and state-wide rates of change.

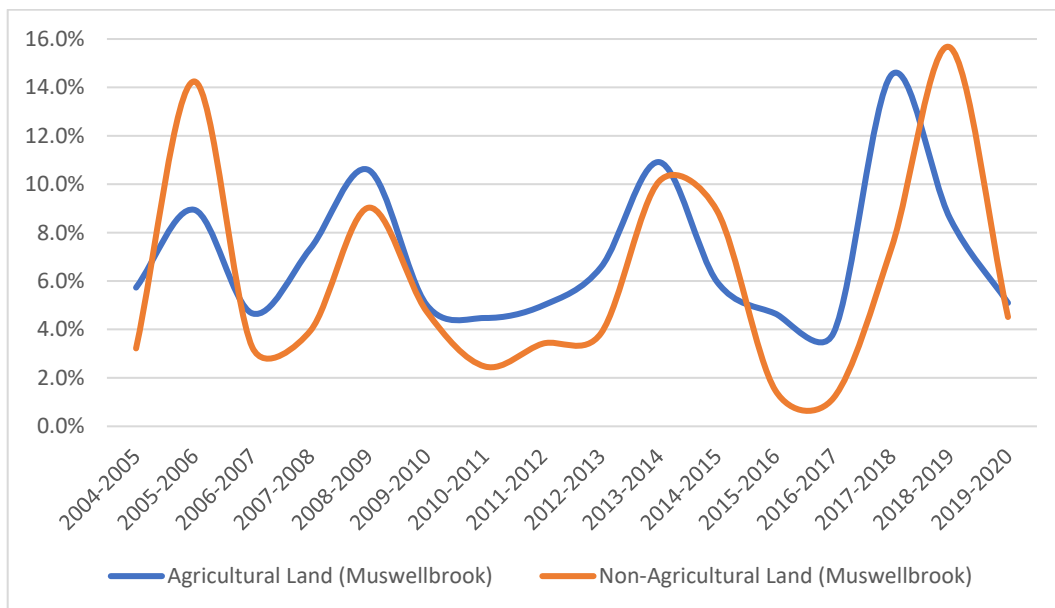


Incidence of agricultural land ownership changes in Mid-Coast (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Mid-Coast LGA, as compared to the rate of change for non-agricultural rural land.

Muswellbrook

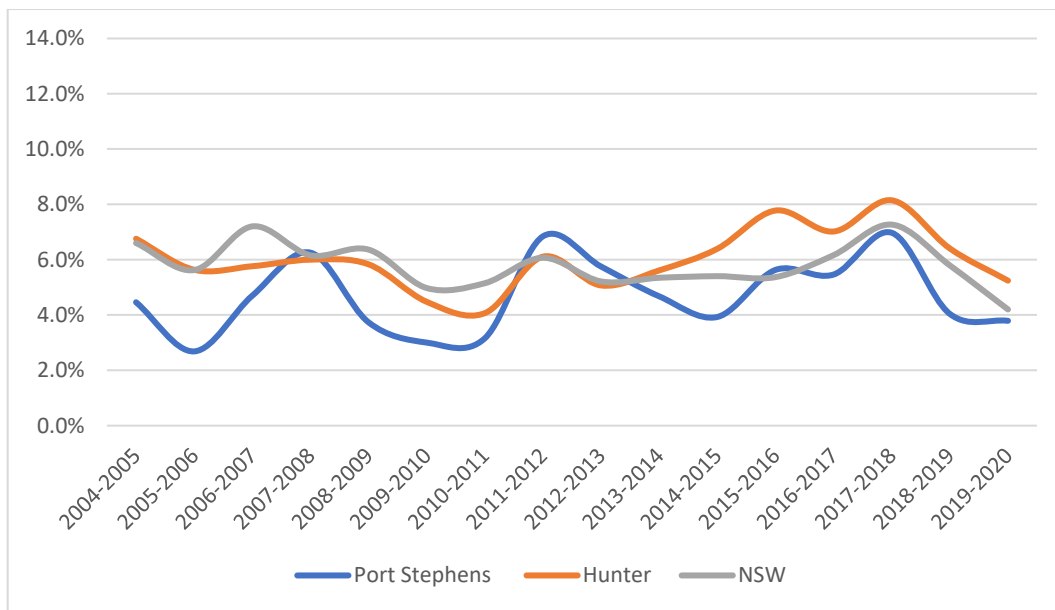


Incidence of all rural land ownership change in Muswellbrook (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Wentworth LGA, as compared to regional and state-wide rates of change.

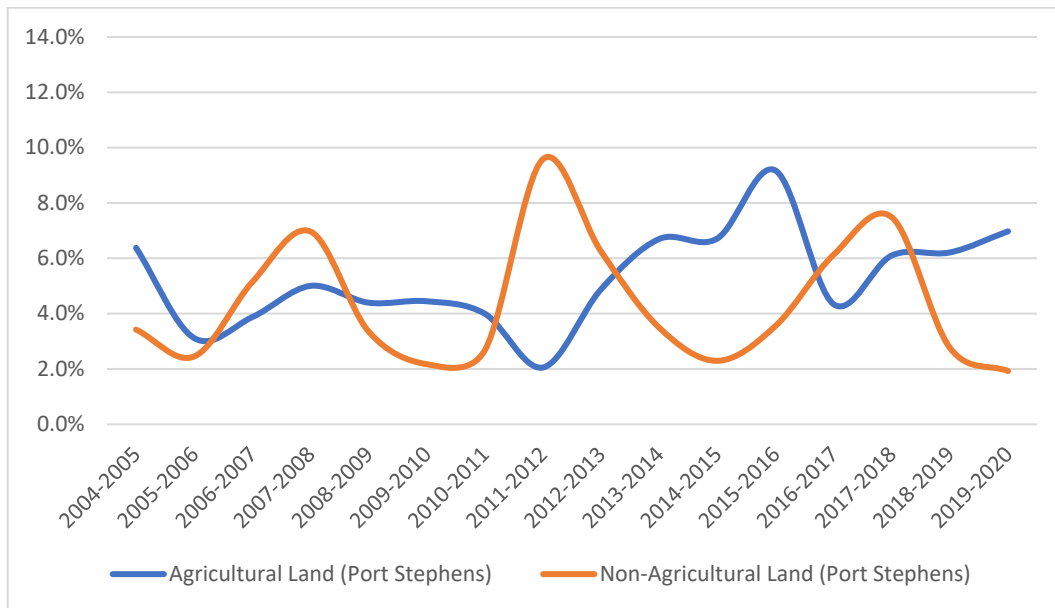


Incidence of agricultural land ownership changes in Muswellbrook (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Wentworth LGA, as compared to the rate of change for non-agricultural rural land.

Port Stephens

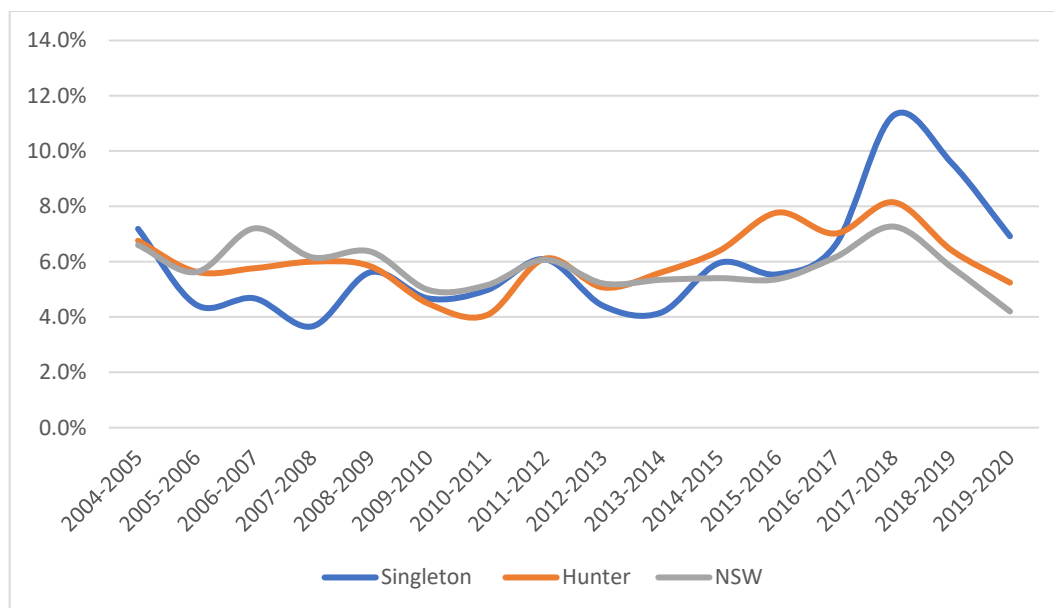


Incidence of all rural land ownership change in Port Stephens (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Port Stephens LGA, as compared to regional and state-wide rates of change.

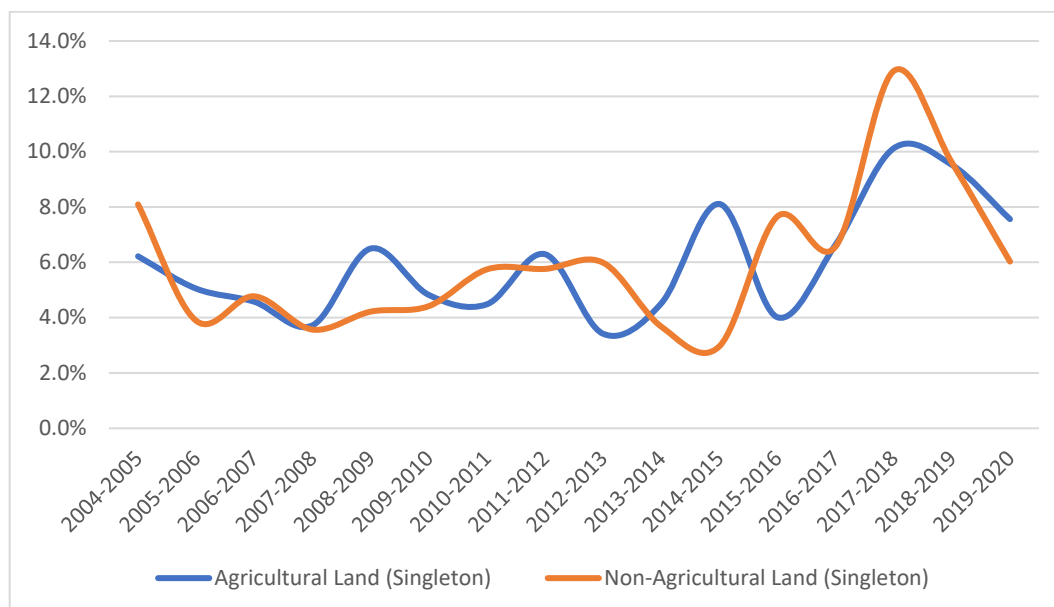


Incidence of agricultural land ownership changes in Port Stephens (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Port Stephens LGA, as compared to the rate of change for non-agricultural rural land.

Singleton



Incidence of all rural land ownership change in Singleton (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Singleton LGA, as compared to regional and state-wide rates of change.

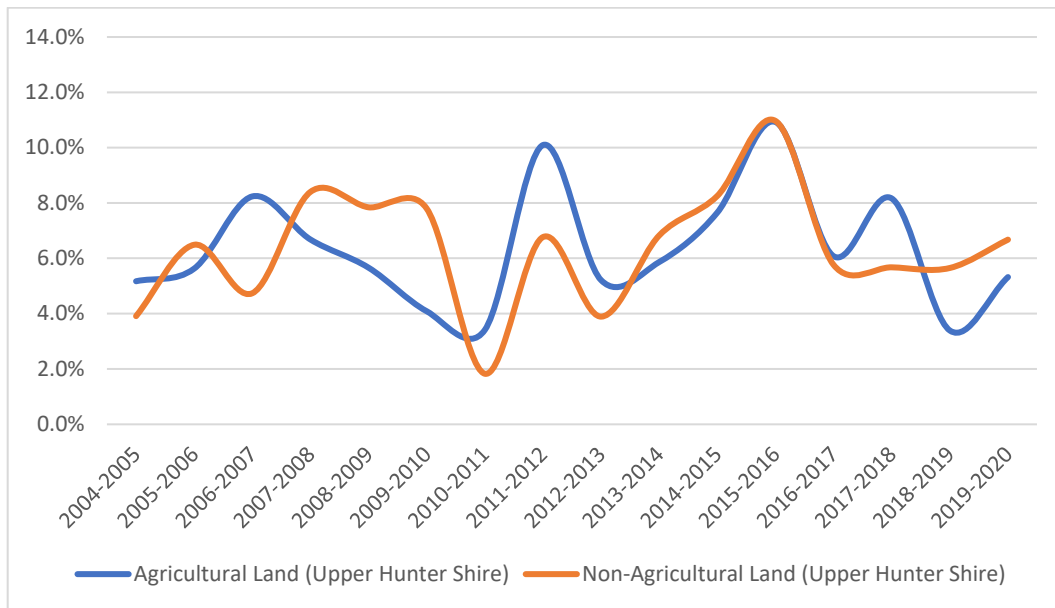


Incidence of agricultural land ownership changes in Singleton (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Singleton LGA, as compared to the rate of change for non-agricultural rural land.

Upper Hunter Shire



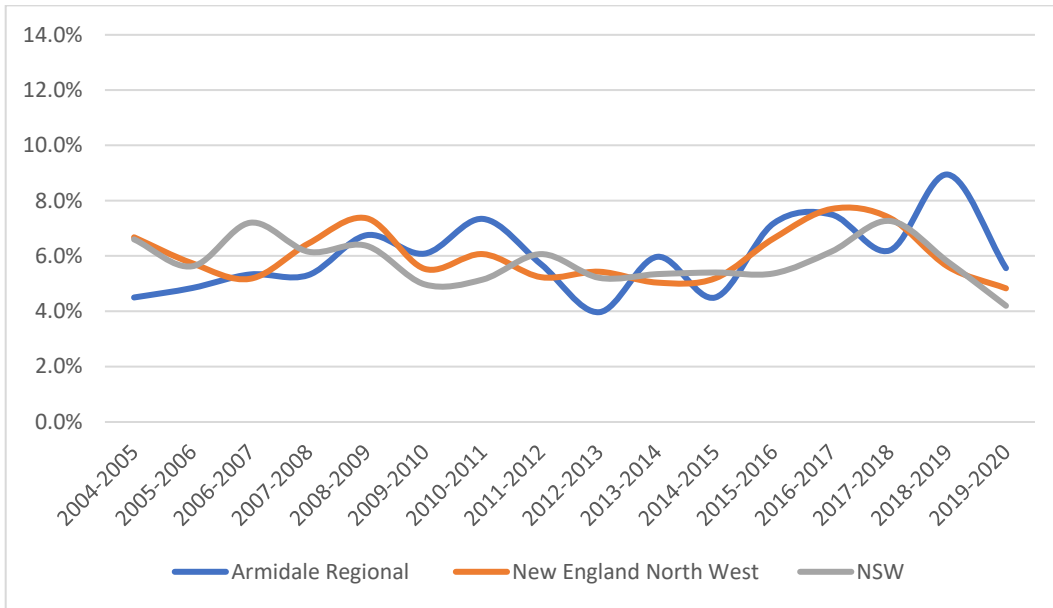
Incidence of all rural land ownership change in Upper Hunter Shire (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Upper Hunter Shire LGA, as compared to regional and state-wide rates of change.



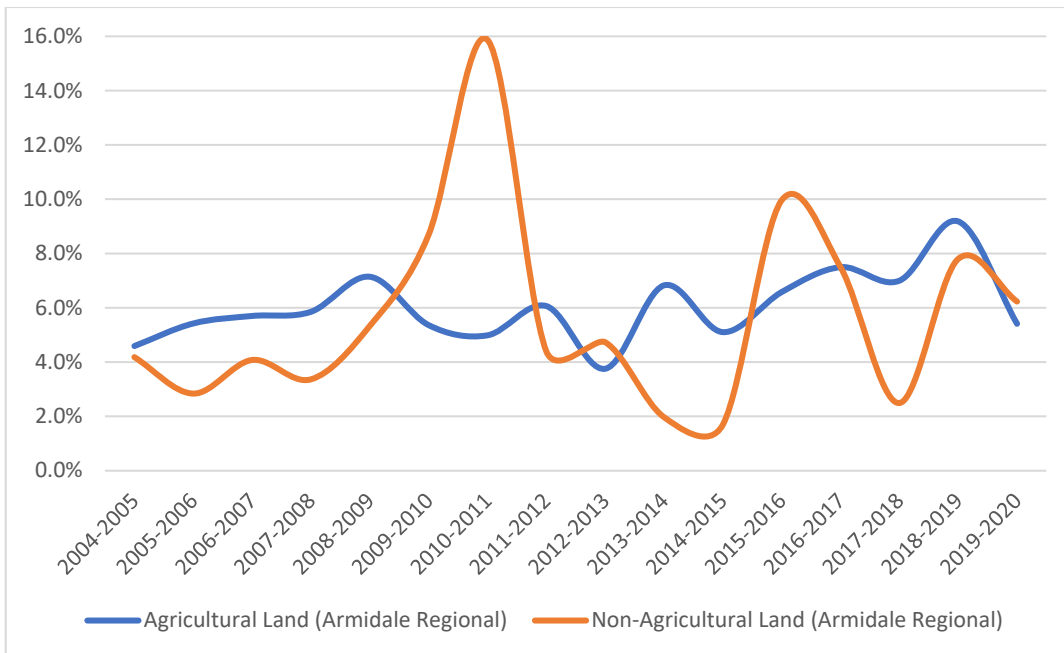
Incidence of agricultural land ownership changes in Upper Hunter Shire (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Upper Hunter Shire LGA, as compared to the rate of change for non-agricultural rural land.

New England North West

Armidale Regional

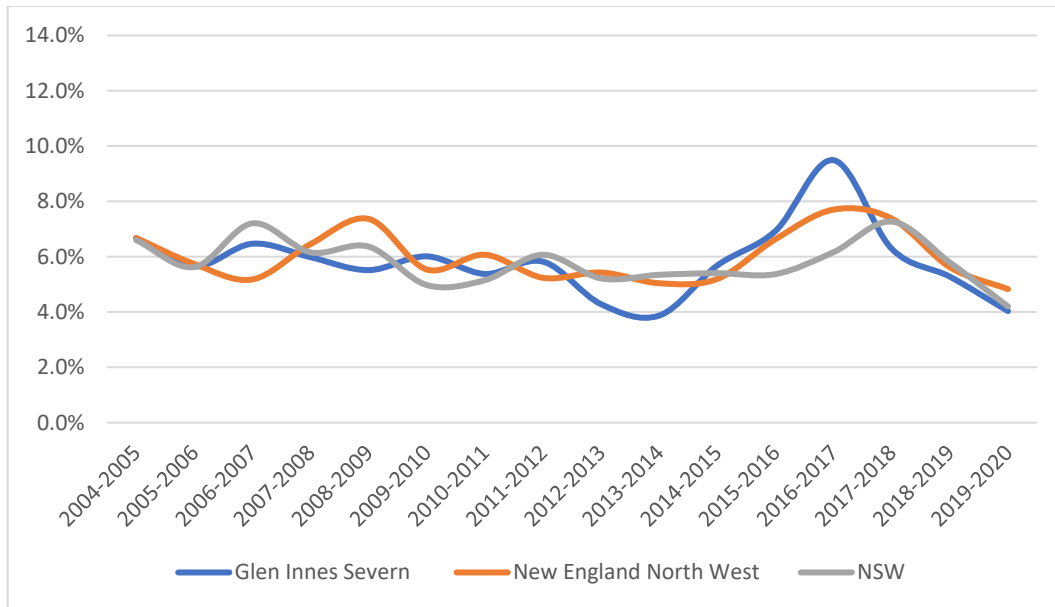


Incidence of all rural land ownership change in Armidale Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Armidale Regional LGA, as compared to regional and state-wide rates of change.

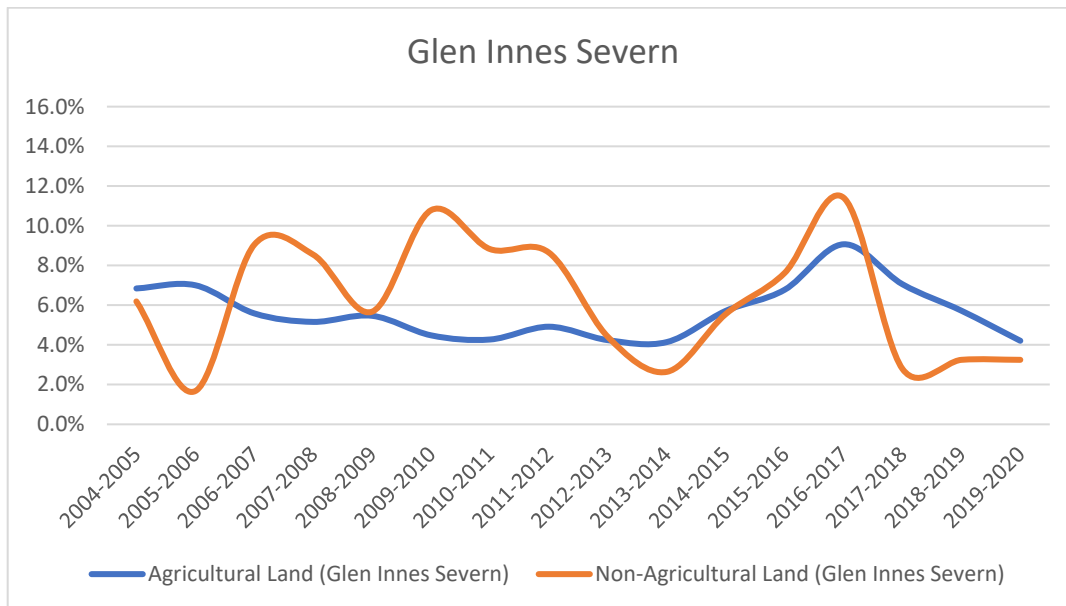


Incidence of agricultural land ownership changes in Armidale Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Armidale Regional LGA, as compared to the rate of change for non-agricultural rural land.

Glen Innes Severn

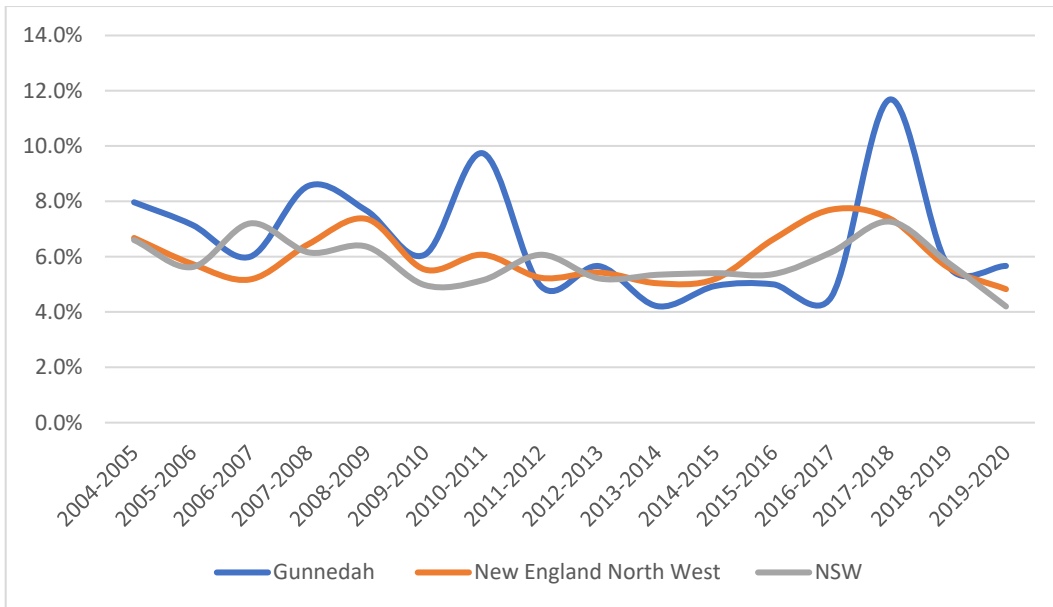


Incidence of all rural land ownership change in Glen Innes Severn (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Glen Innes Severn LGA, as compared to regional and state-wide rates of change.

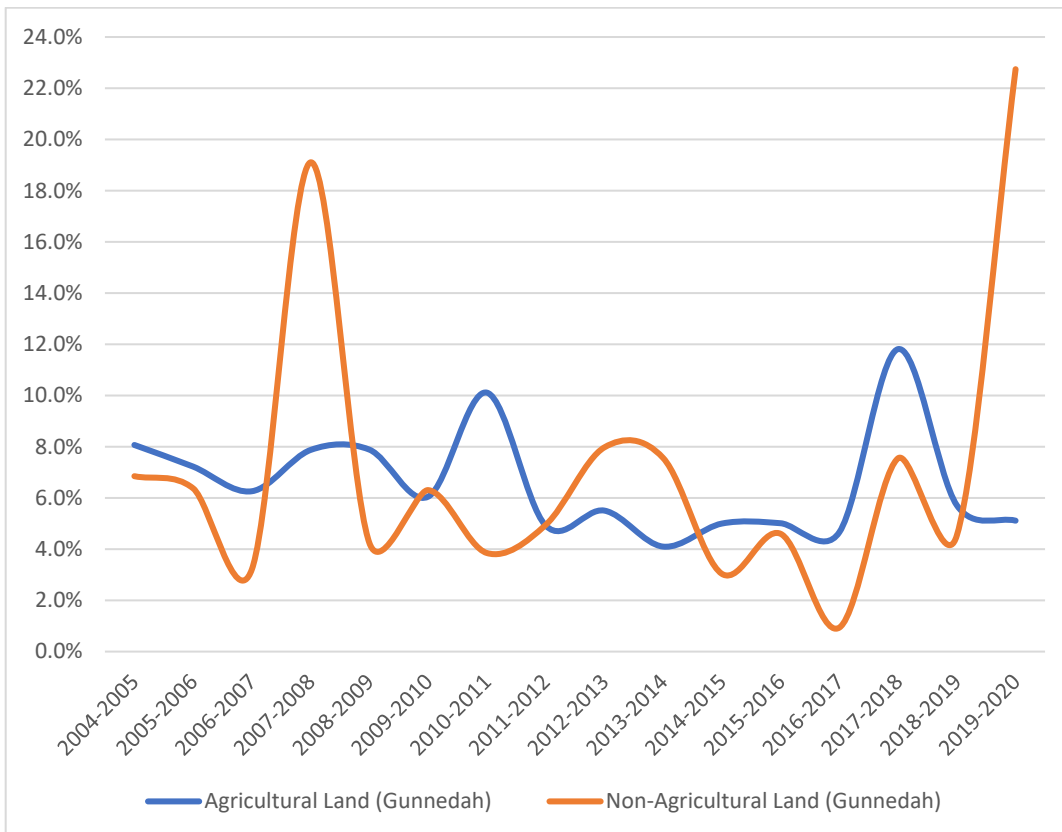


Incidence of agricultural land ownership changes in Glen Innes Severn (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Glen Innes Severn LGA, as compared to the rate of change for non-agricultural rural land.

Gunnedah

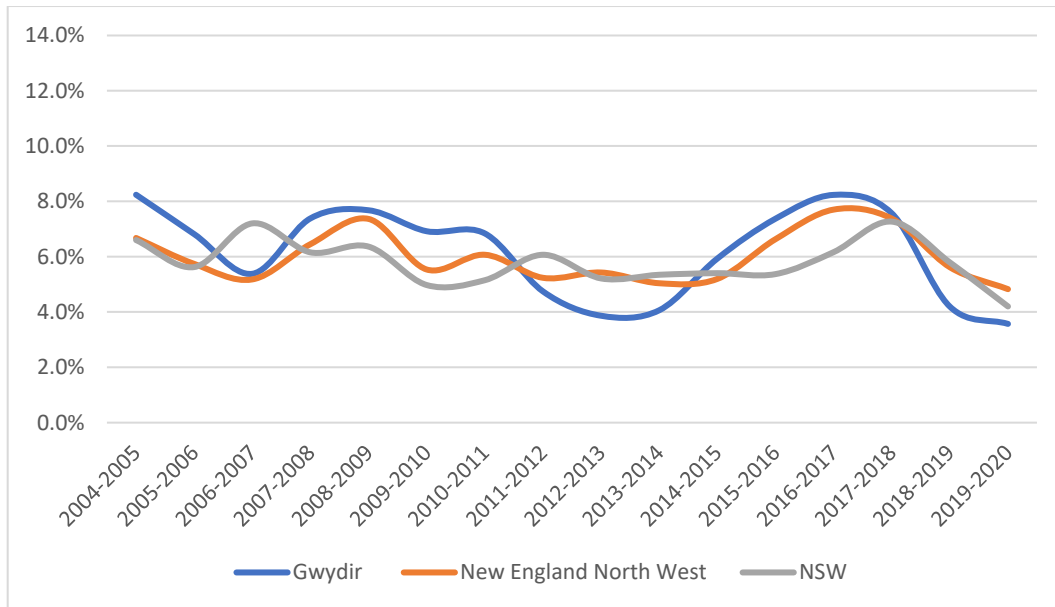


Incidence of all rural land ownership change in Gunnedah (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Gunnedah LGA, as compared to regional and state-wide rates of change.

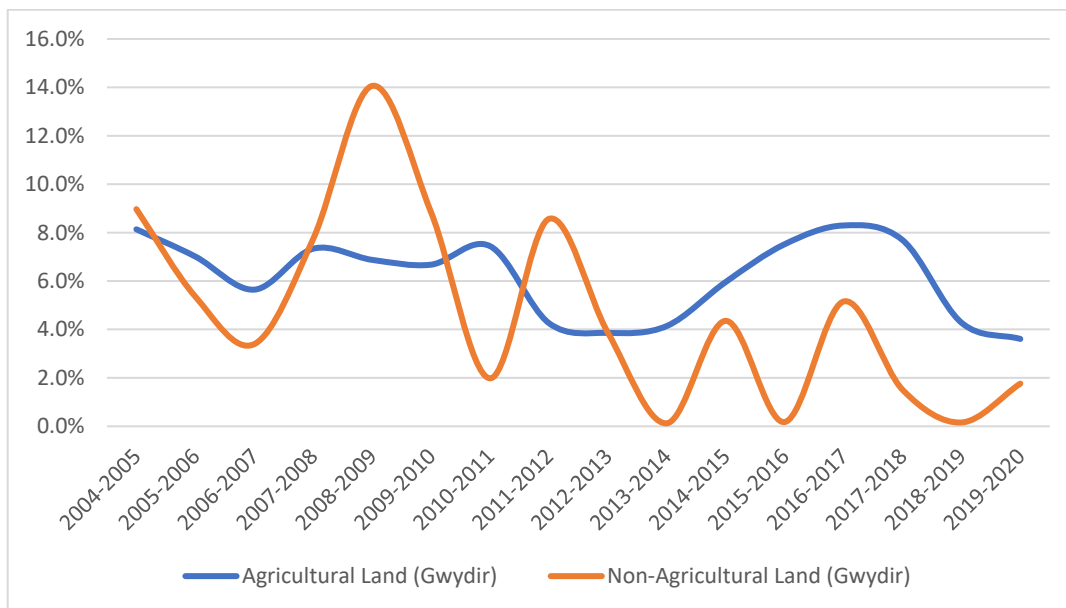


Incidence of agricultural land ownership changes in Gunnedah (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Gunnedah LGA, as compared to the rate of change for non-agricultural rural land.

Gwydir

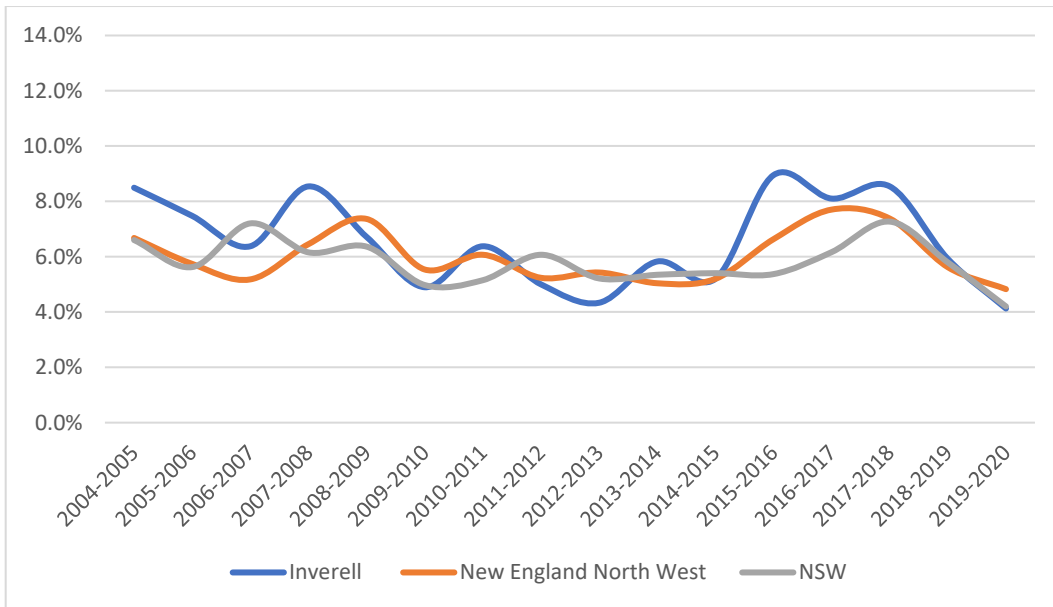


Incidence of all rural land ownership change in Gwydir (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Gwydir LGA, as compared to regional and state-wide rates of change.

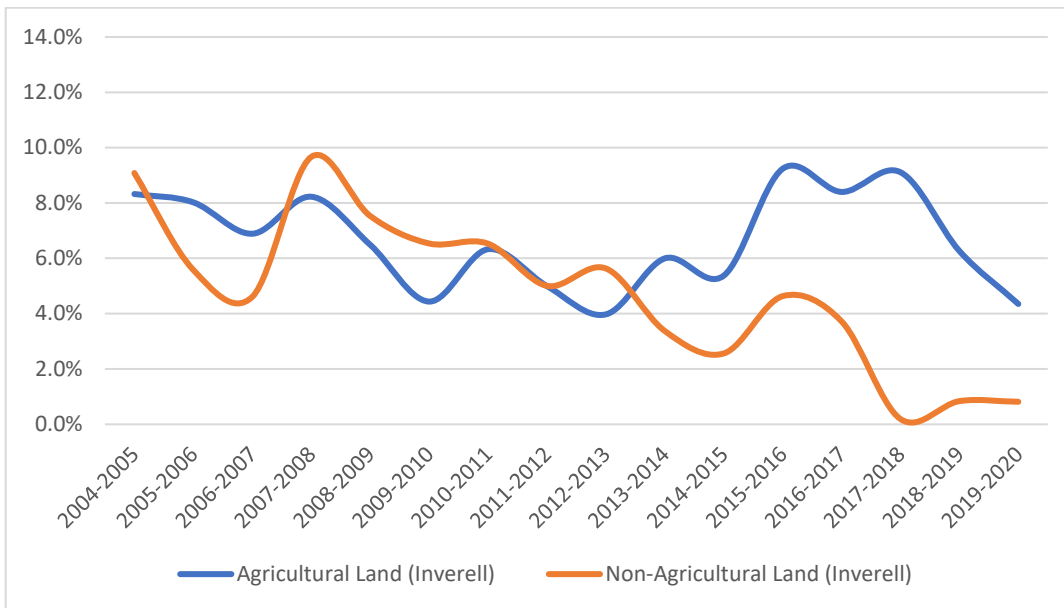


Incidence of agricultural land ownership changes in Gwydir (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Gwydir LGA, as compared to the rate of change for non-agricultural rural land.

Inverell

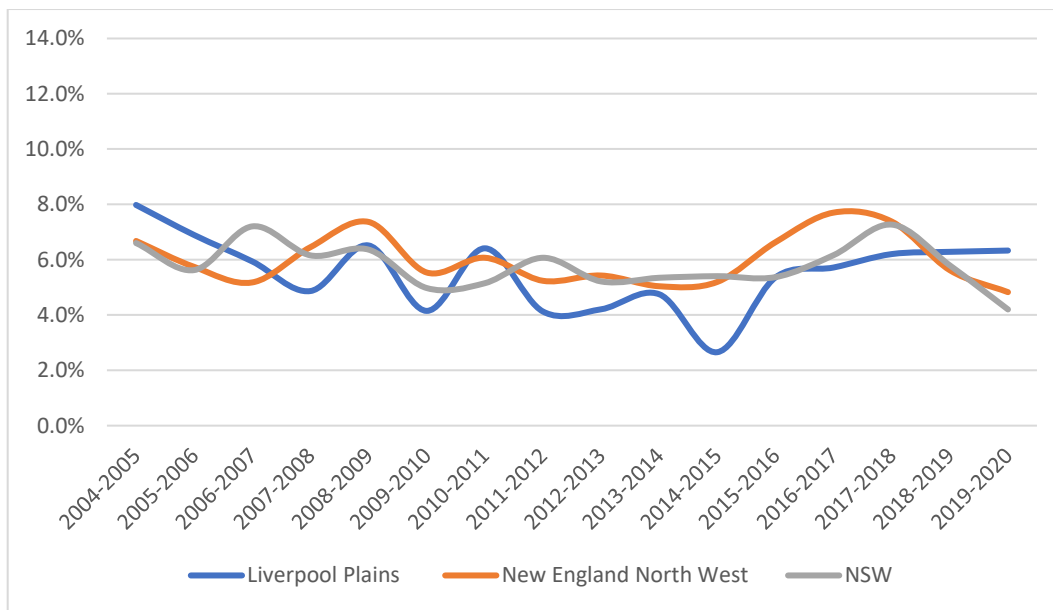


Incidence of all rural land ownership change in Inverell (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Inverell LGA, as compared to regional and state-wide rates of change.

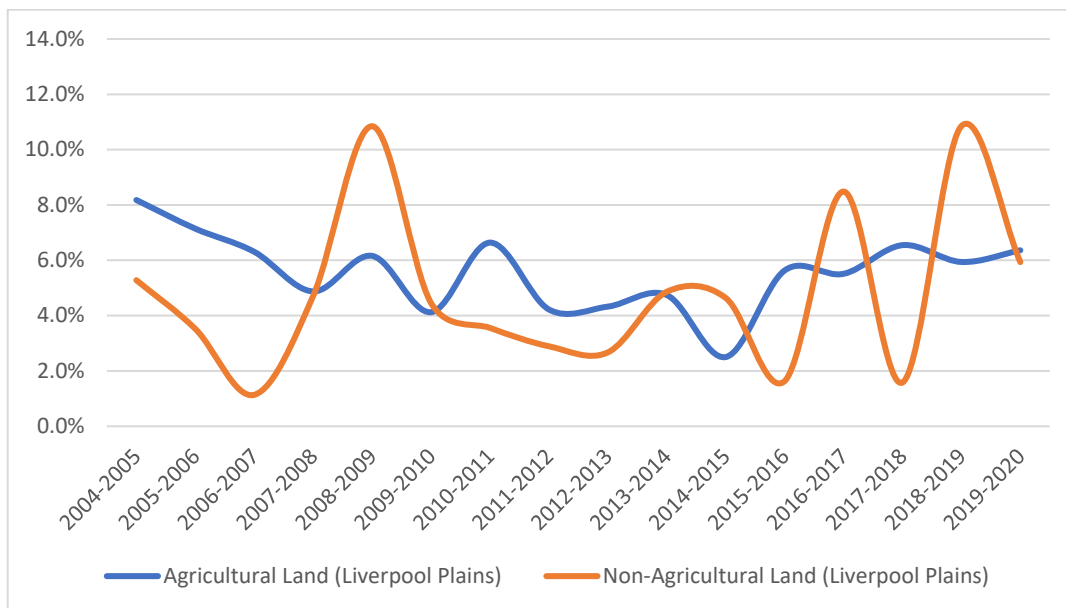


Incidence of agricultural land ownership changes in Inverell (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Inverell LGA, as compared to the rate of change for non-agricultural rural land.

Liverpool Plains

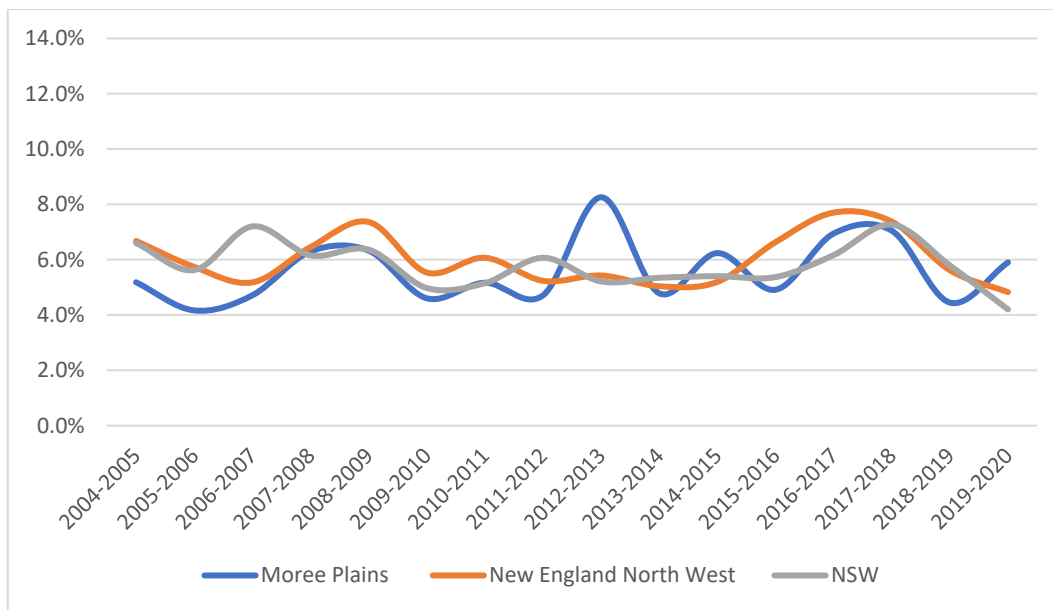


Incidence of all rural land ownership change in Singleton (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Singleton LGA, as compared to regional and state-wide rates of change.

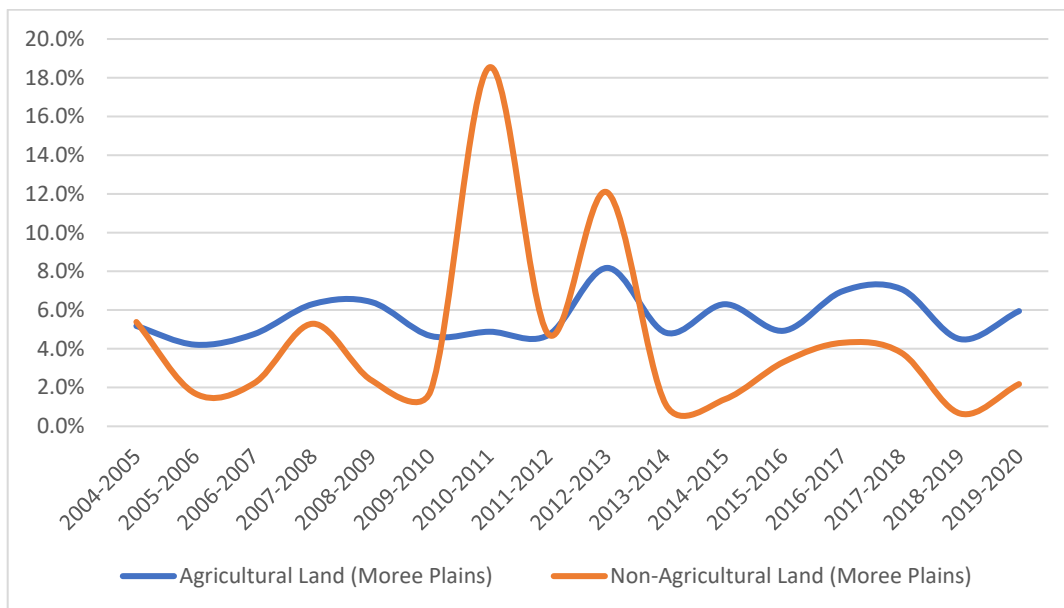


Incidence of agricultural land ownership changes in Singleton (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Singleton LGA, as compared to the rate of change for non-agricultural rural land.

Moree Plains

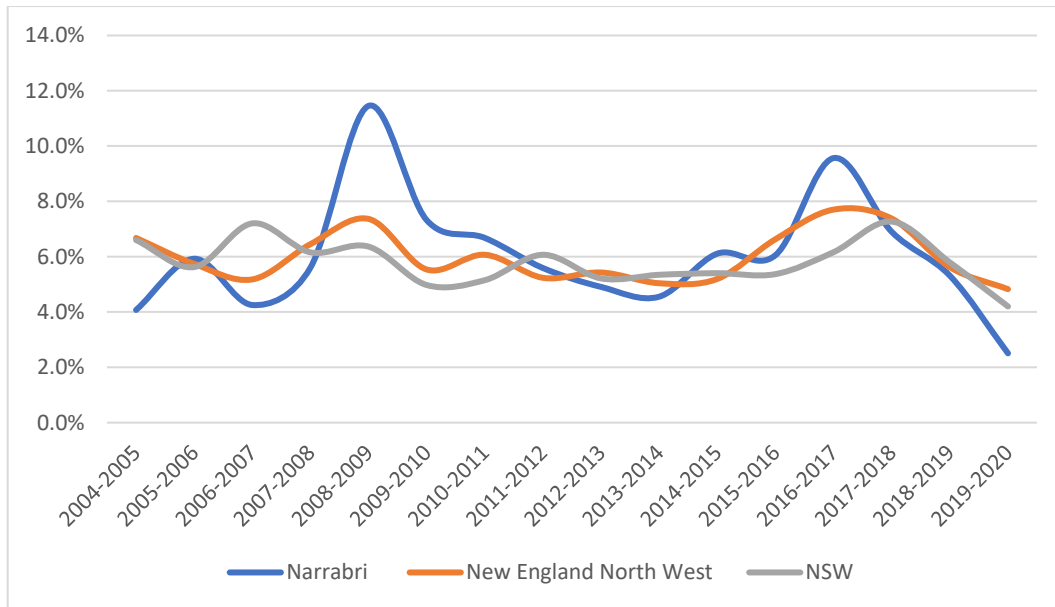


Incidence of all rural land ownership change in Moree Plains (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Moree Plains LGA, as compared to regional and state-wide rates of change.

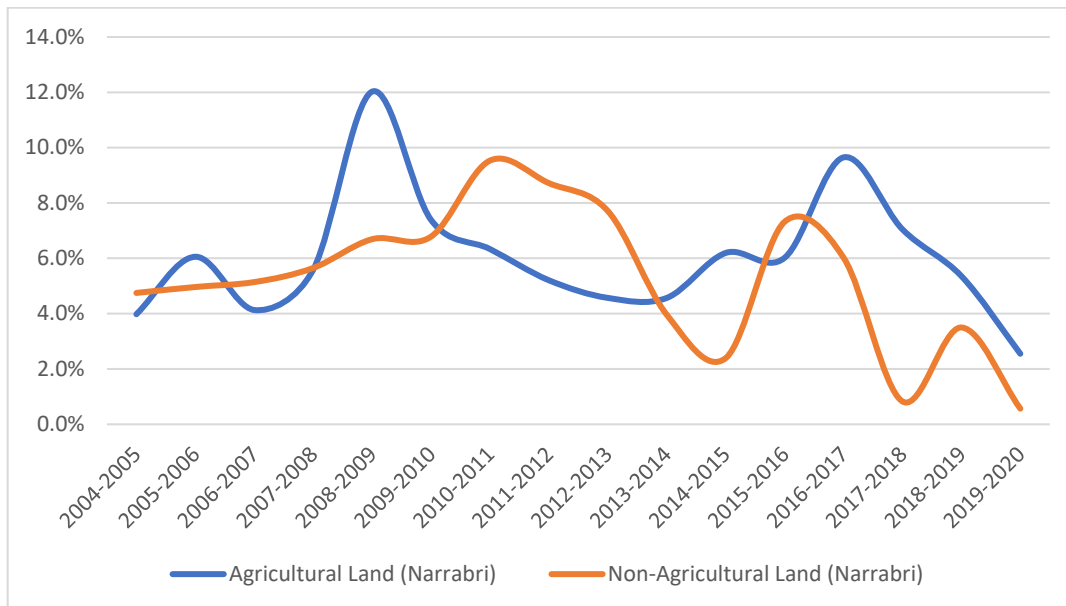


Incidence of agricultural land ownership changes in Moree Plains (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Moree Plains LGA, as compared to the rate of change for non-agricultural rural land.

Narrabri

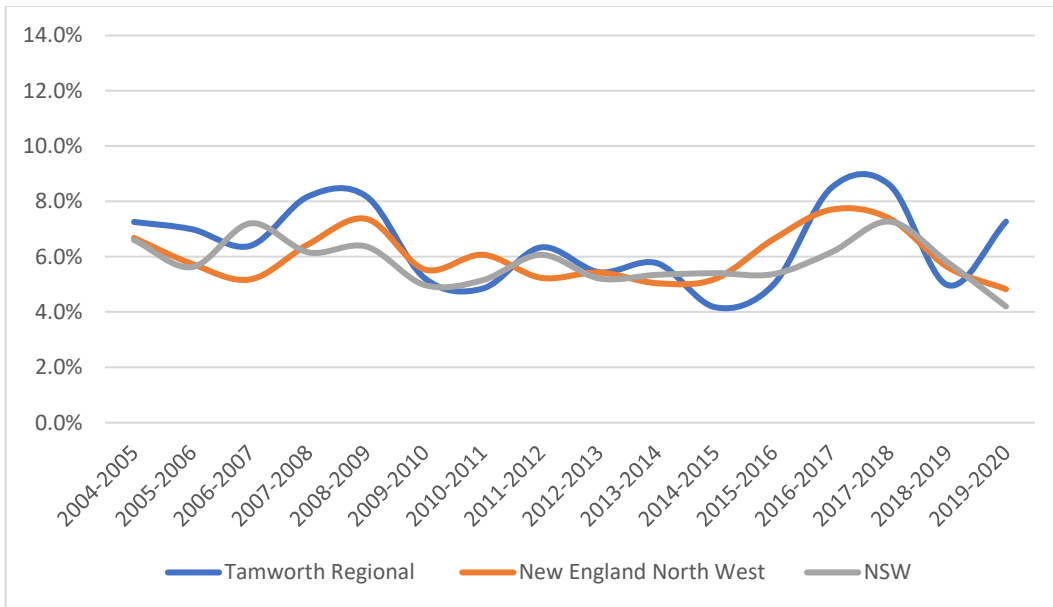


Incidence of all rural land ownership change in Narrabri (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Narrabri LGA, as compared to regional and state-wide rates of change.

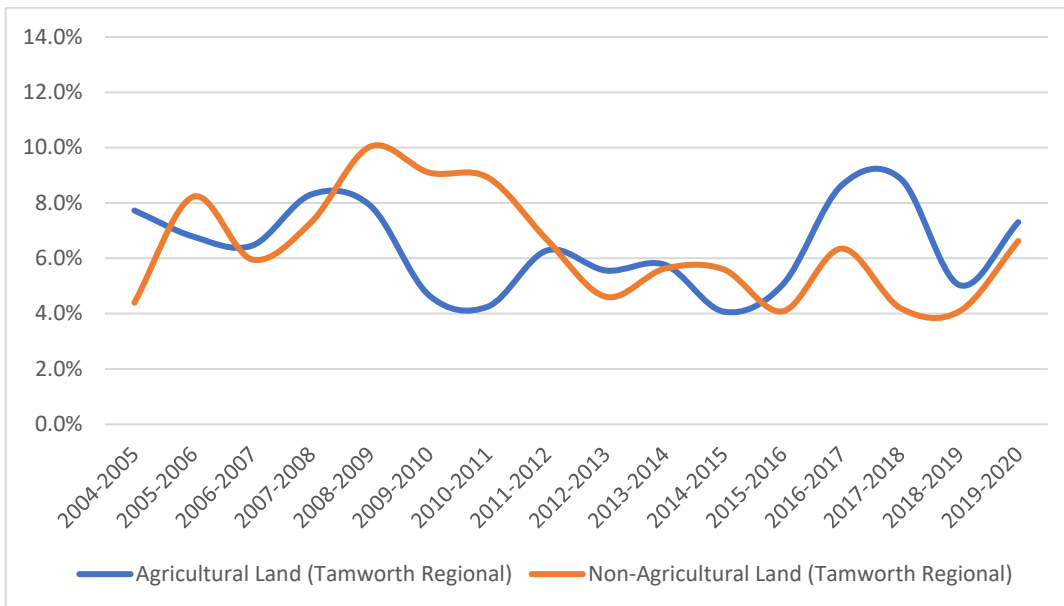


Incidence of agricultural land ownership changes in Narrabri (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Narrabri LGA, as compared to the rate of change for non-agricultural rural land.

Tamworth Regional

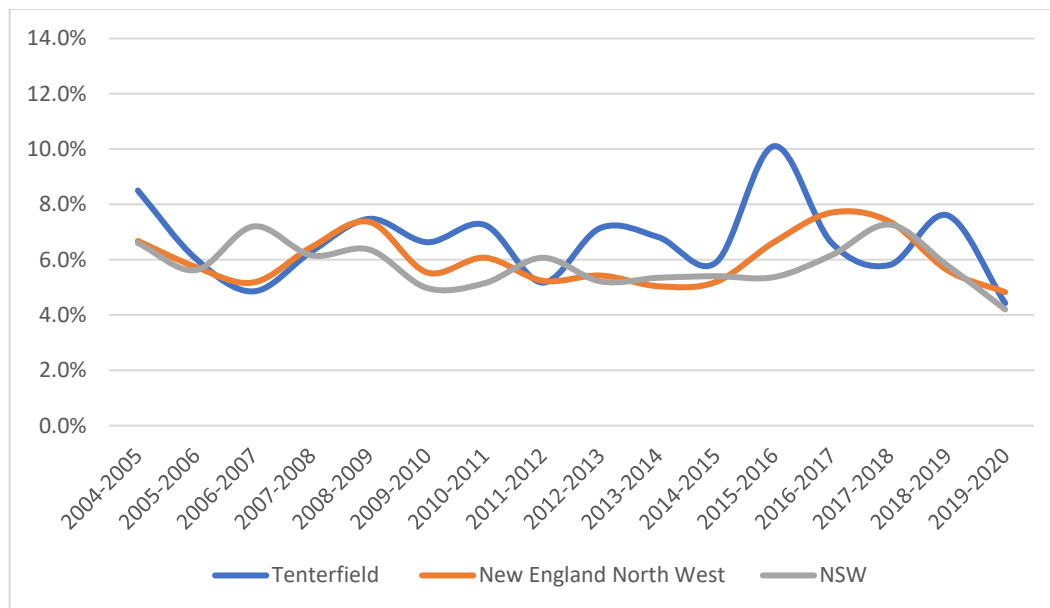


Incidence of all rural land ownership change in Tamworth Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Tamworth Regional LGA, as compared to regional and state-wide rates of change.

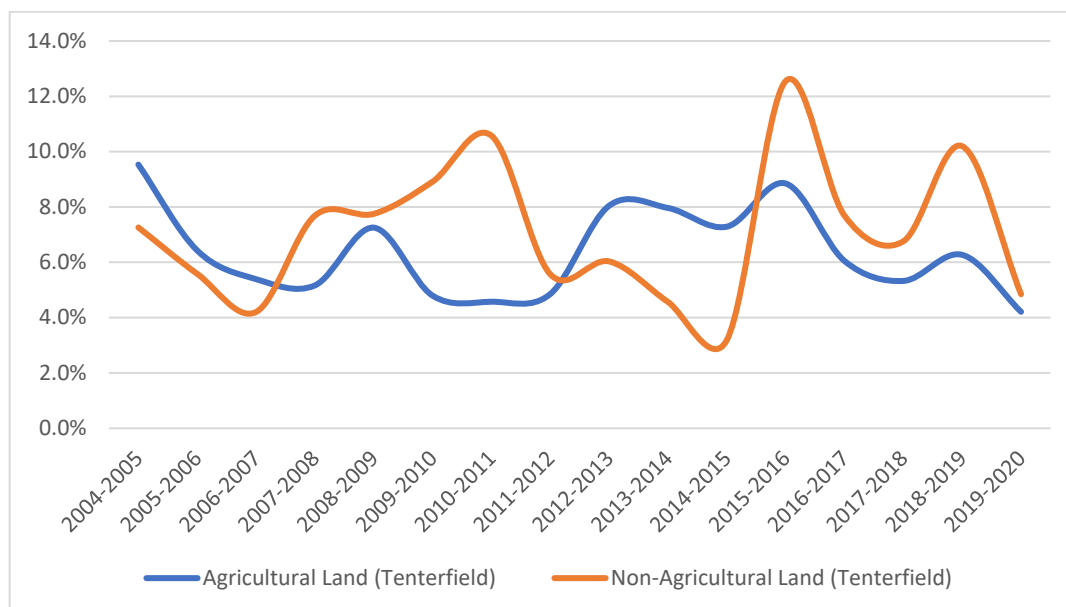


Incidence of agricultural land ownership changes in Tamworth Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Tamworth Regional LGA, as compared to the rate of change for non-agricultural rural land.

Tenterfield

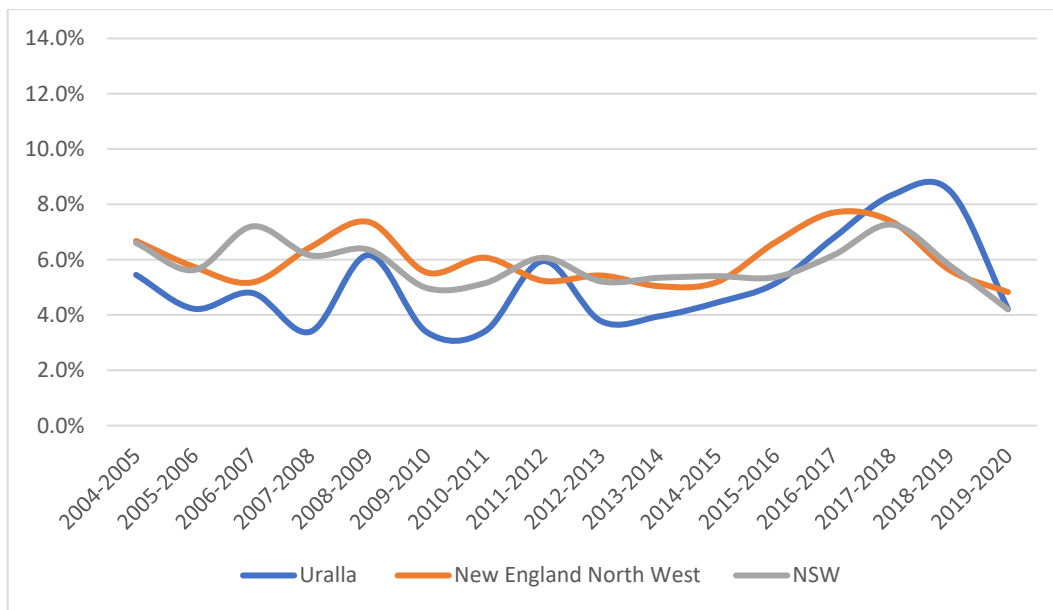


Incidence of all rural land ownership change in Tenterfield (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Tenterfield LGA, as compared to regional and state-wide rates of change.

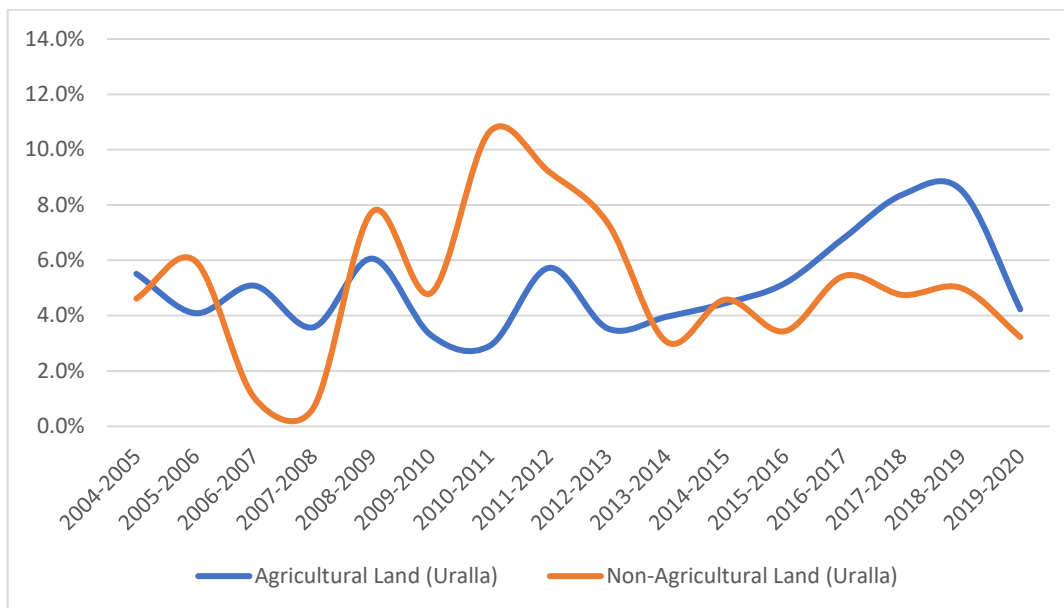


Incidence of agricultural land ownership changes in Tenterfield (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Tenterfield LGA, as compared to the rate of change for non-agricultural rural land.

Uralla

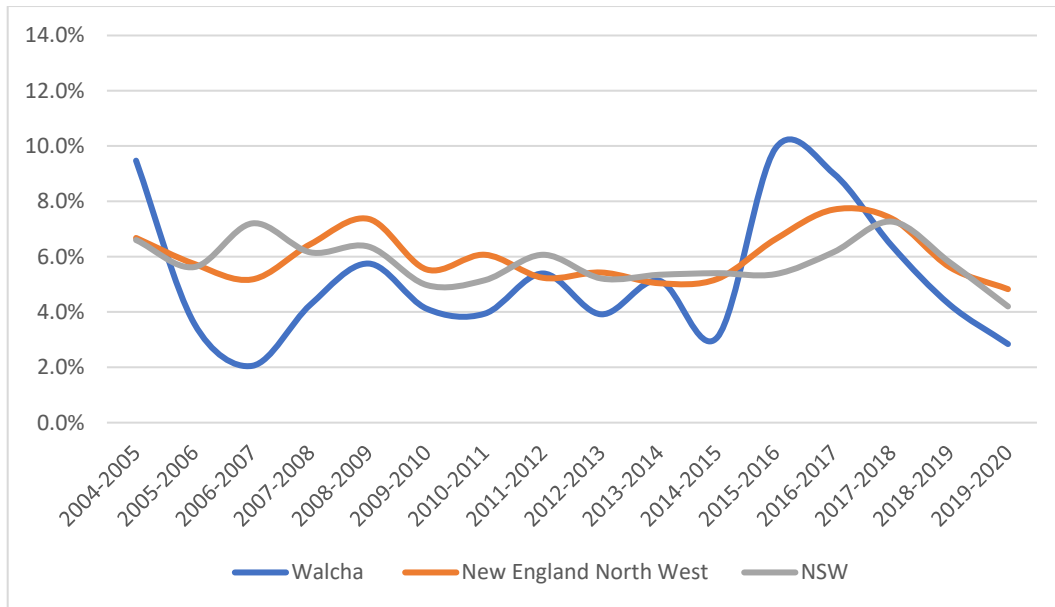


Incidence of all rural land ownership change in Uralla (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Uralla n LGA, as compared to regional and state-wide rates of change.

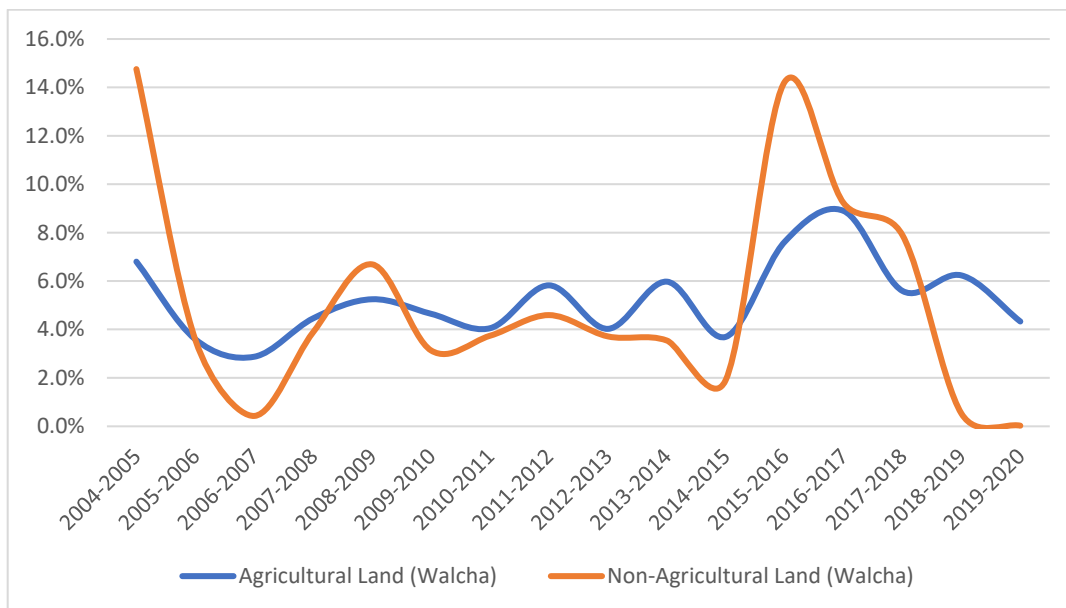


Incidence of agricultural land ownership changes in Uralla (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Uralla LGA, as compared to the rate of change for non-agricultural rural land.

Walcha



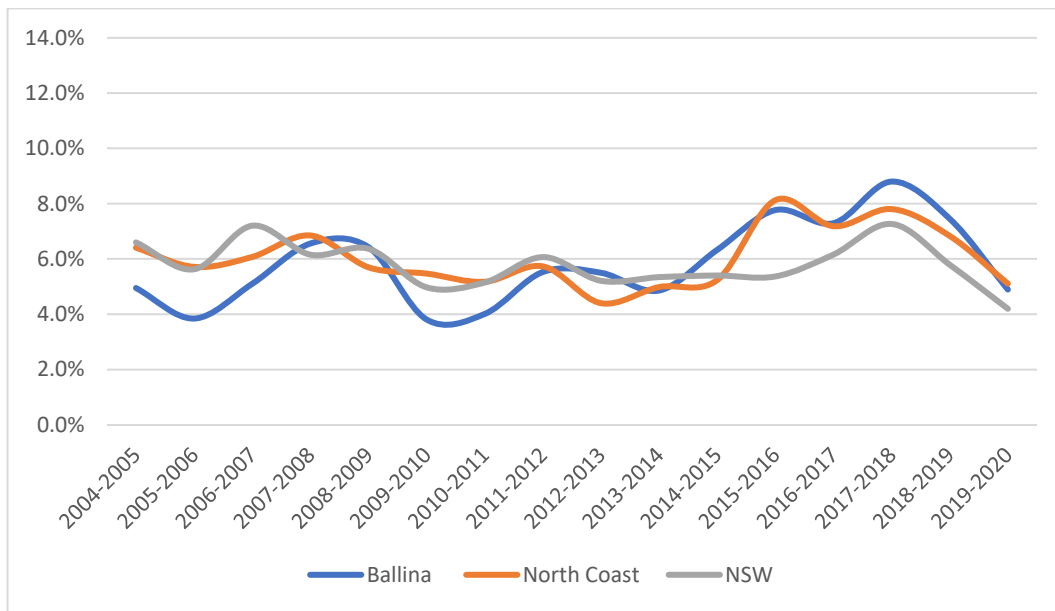
Incidence of all rural land ownership change in Walcha (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Walcha LGA, as compared to regional and state-wide rates of change.



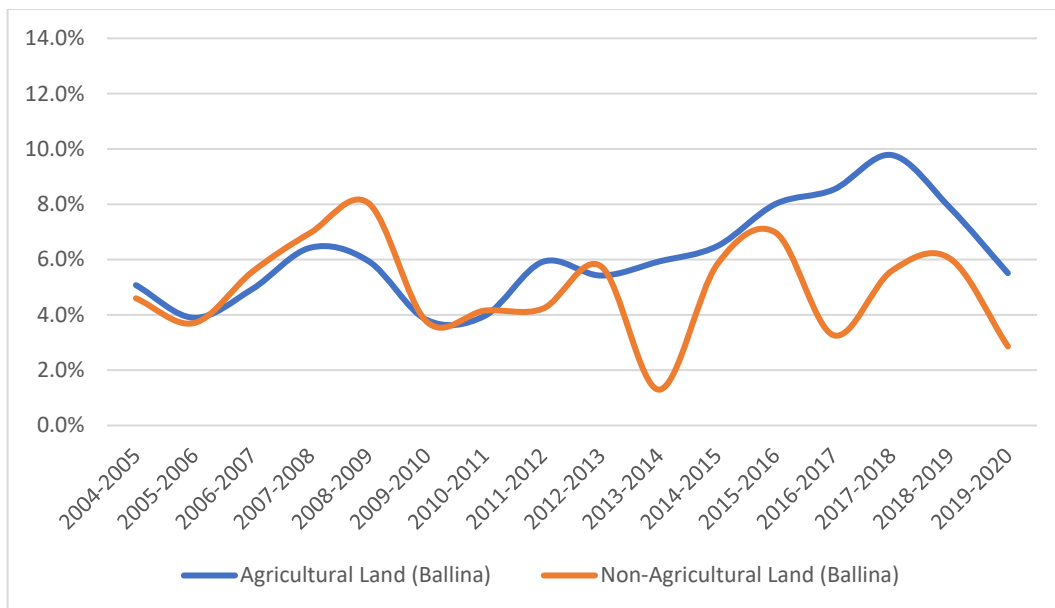
Incidence of agricultural land ownership changes in Walcha (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Walcha, as compared to the rate of change for non-agricultural rural land.

North Coast

Ballina

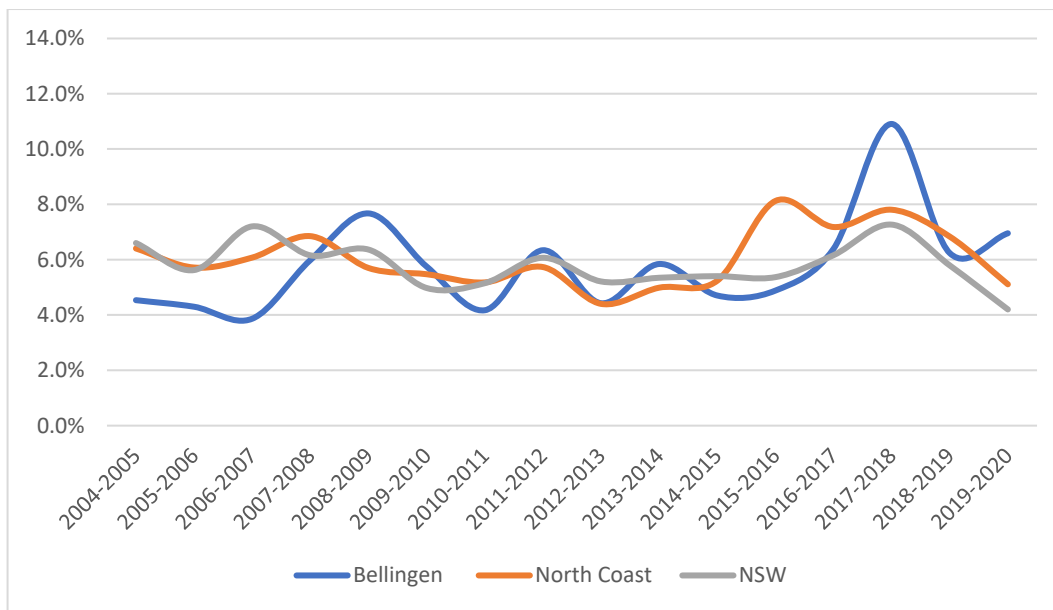


Incidence of all rural land ownership change in Ballina (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Ballina LGA, as compared to regional and state-wide rates of change.

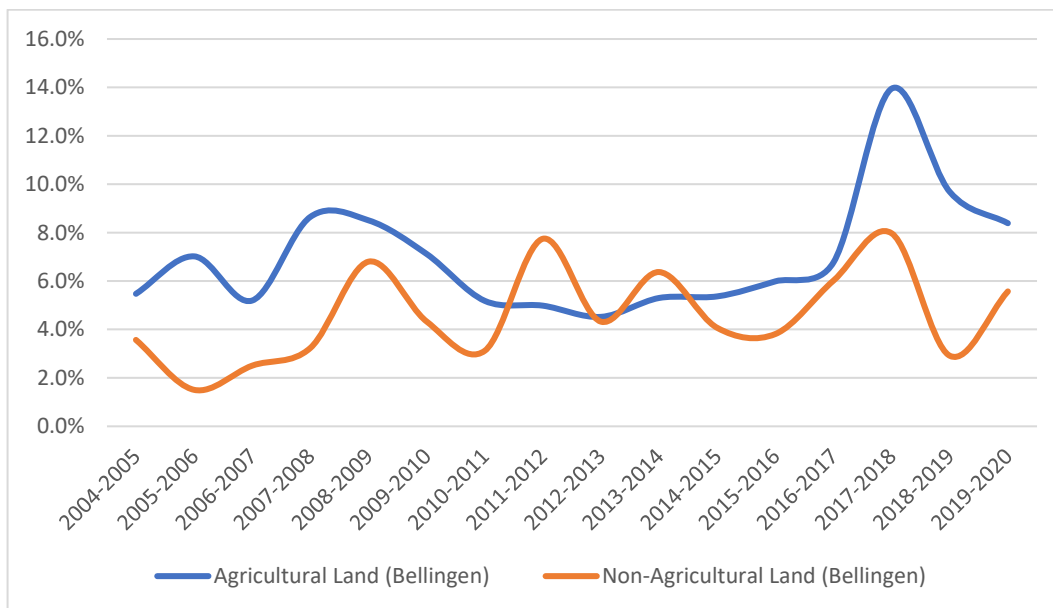


Incidence of agricultural land ownership changes in Ballina (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Ballina, as compared to the rate of change for non-agricultural rural land.

Bellingen

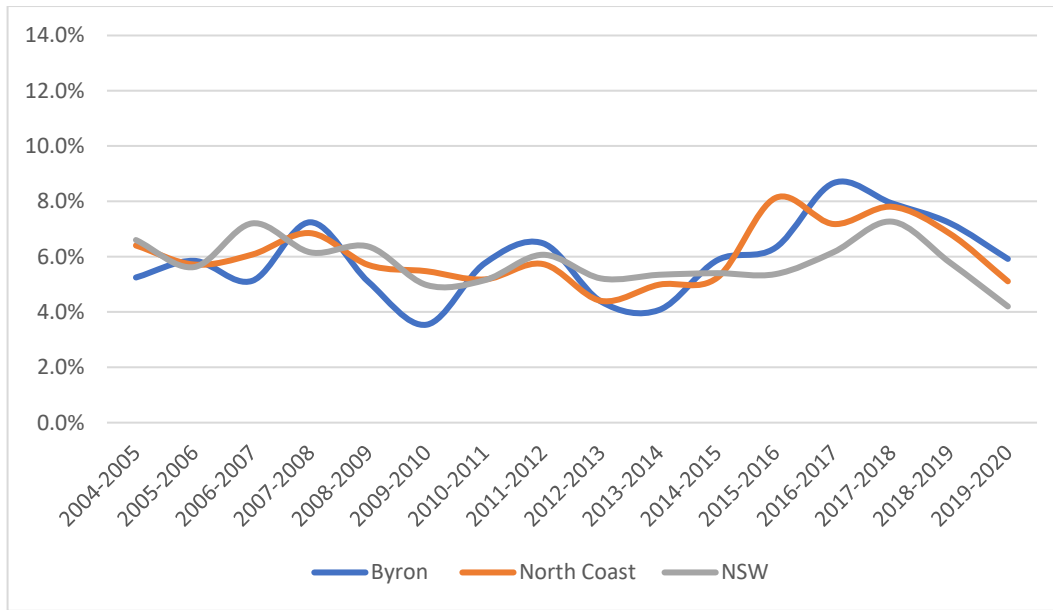


Incidence of all rural land ownership change in Bellingen (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Bellingen LGA, as compared to regional and state-wide rates of change.

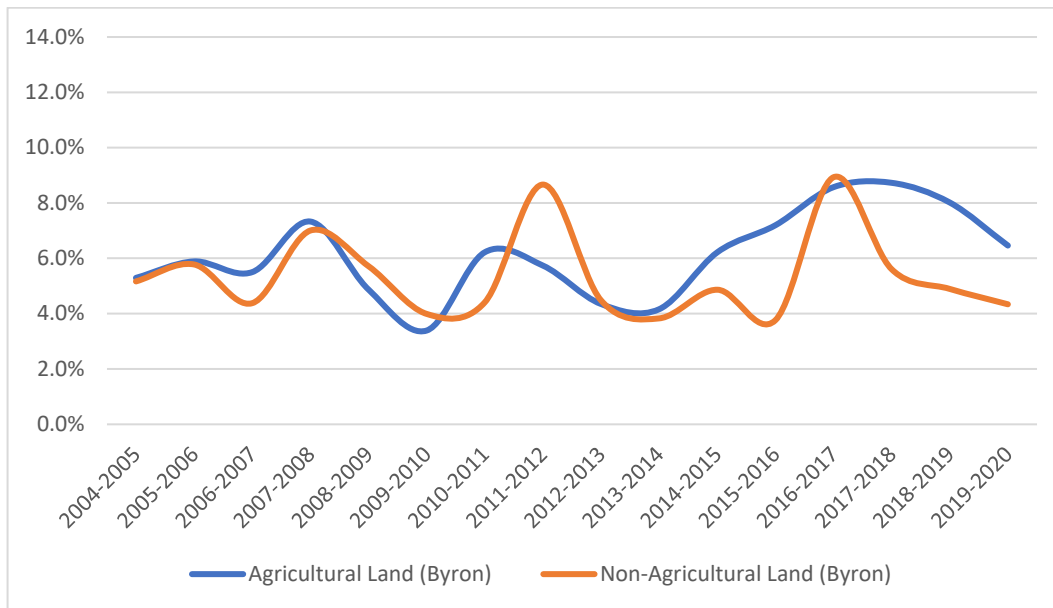


Incidence of agricultural land ownership changes in Bellingen (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bellingen, as compared to the rate of change for non-agricultural rural land.

Byron

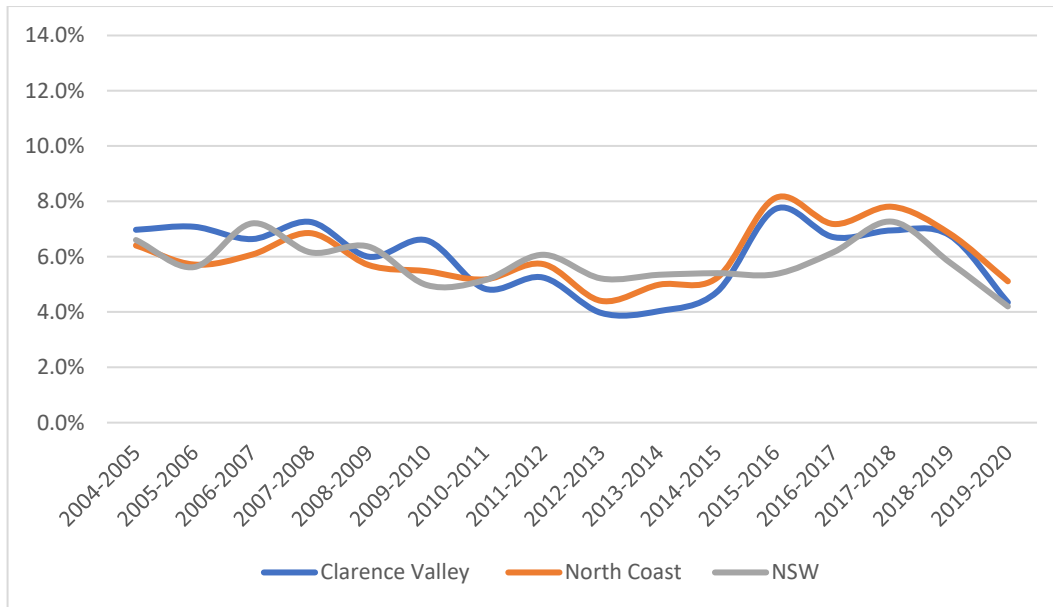


Incidence of all rural land ownership change in Byron (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Byron LGA, as compared to regional and state-wide rates of change.

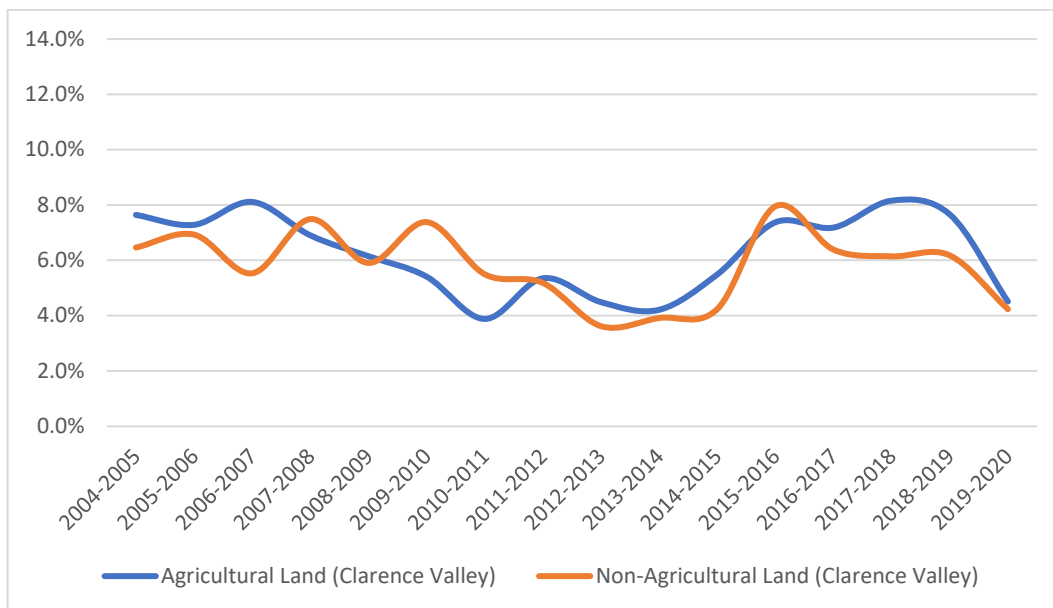


Incidence of agricultural land ownership changes in Byron (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Byron, as compared to the rate of change for non-agricultural rural land.

Clarence Valley

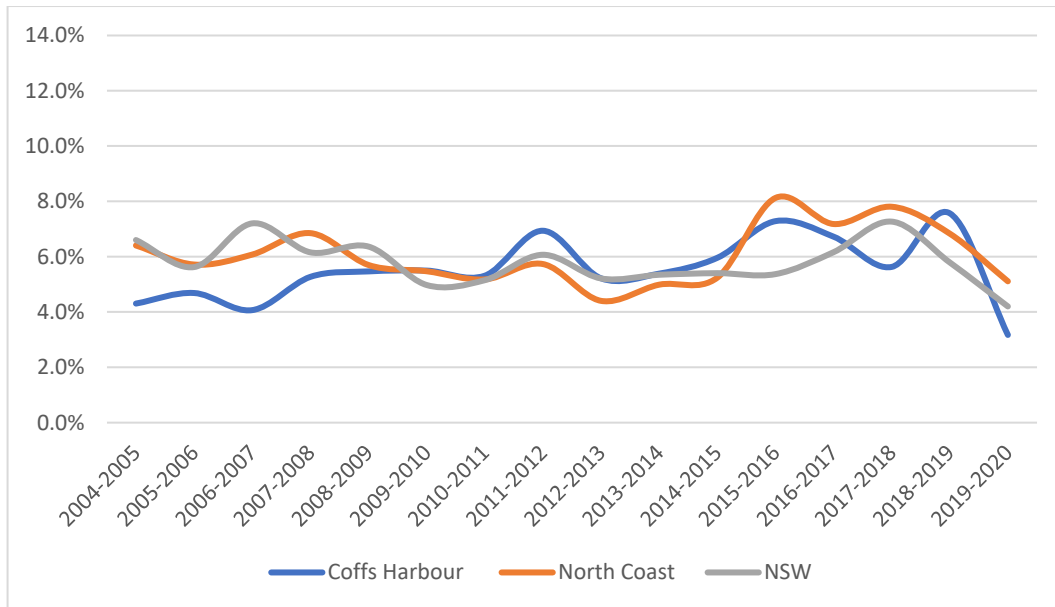


Incidence of all rural land ownership change in Clarence Valley (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Clarence Valley LGA, as compared to regional and state-wide rates of change.

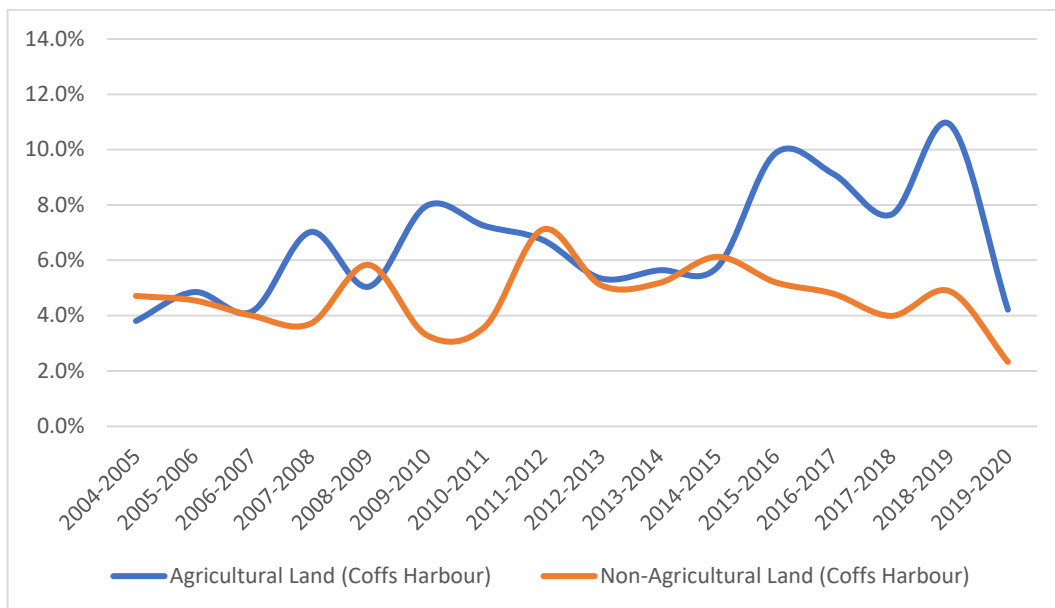


Incidence of agricultural land ownership changes in Clarence Valley (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Clarence Valley, as compared to the rate of change for non-agricultural rural land.

Coffs Harbour

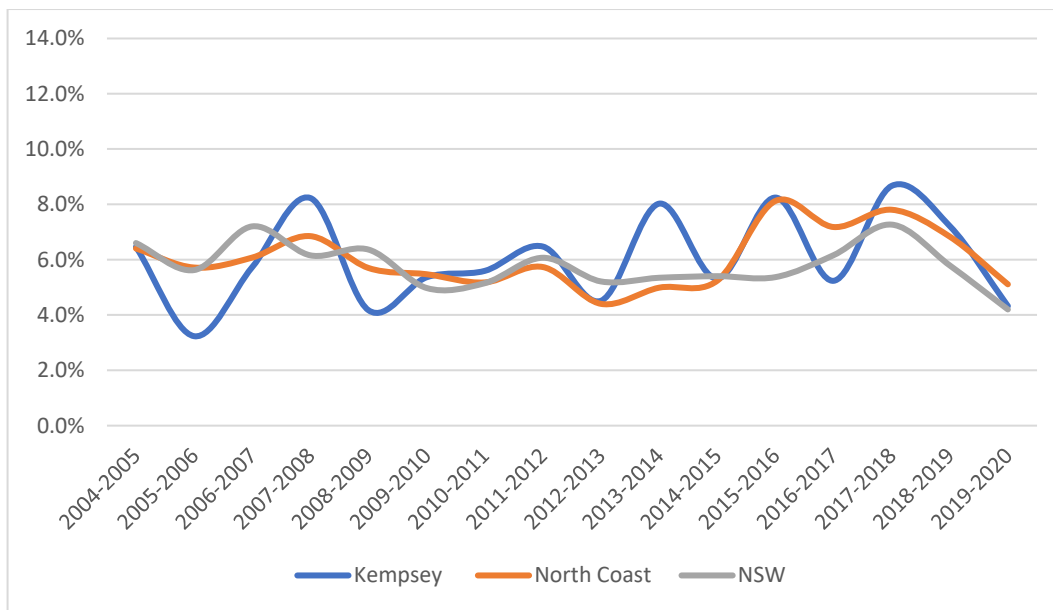


Incidence of all rural land ownership change in Coffs Harbour (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Coffs Harbour LGA, as compared to regional and state-wide rates of change.

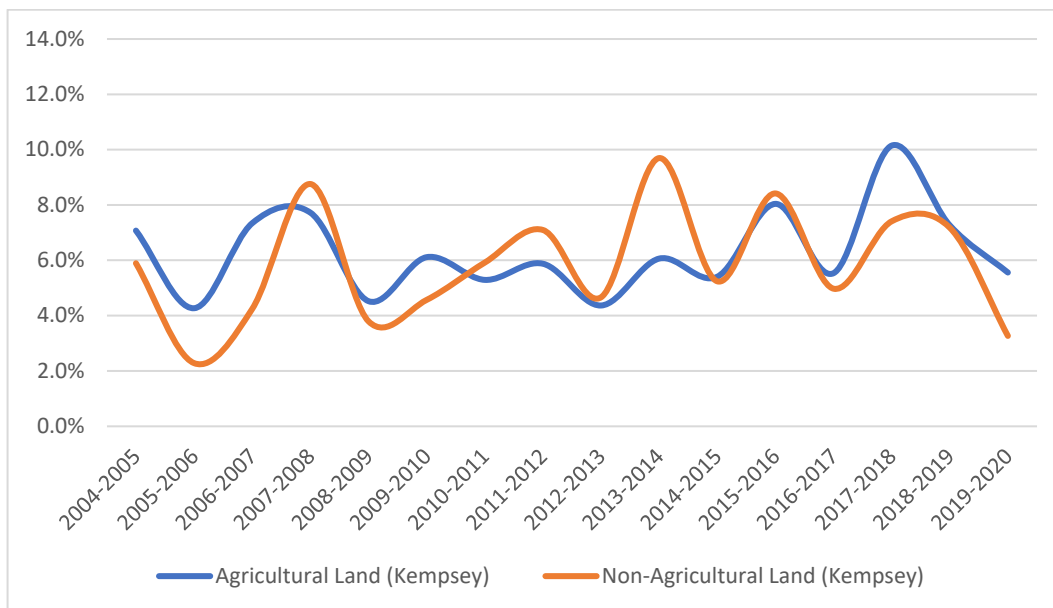


Incidence of agricultural land ownership changes in Coffs Harbour (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Coffs Harbour, as compared to the rate of change for non-agricultural rural land.

Kempsey

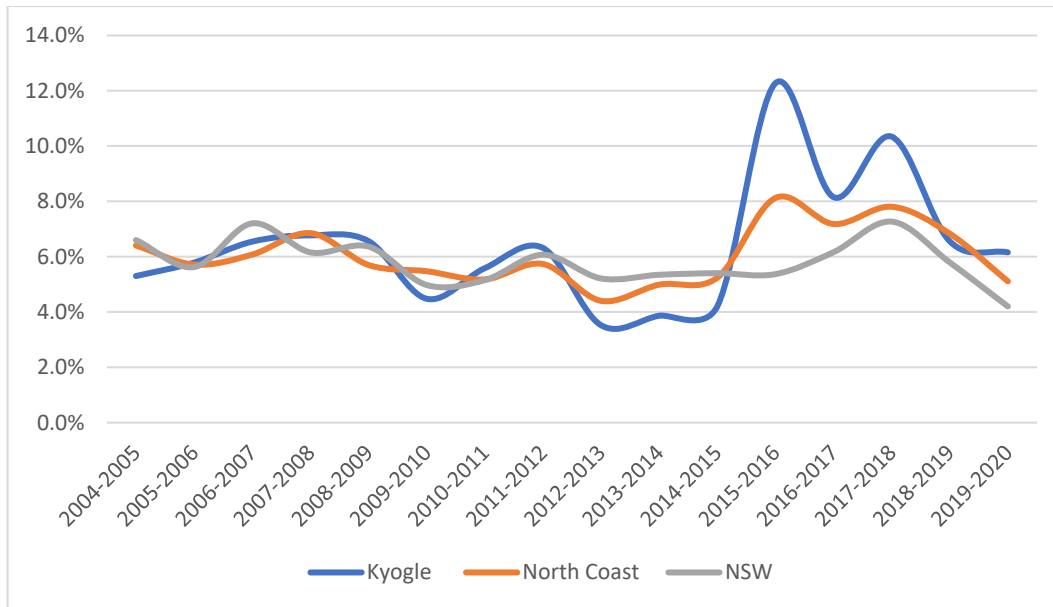


Incidence of all rural land ownership change in Kempsey (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Kempsey LGA, as compared to regional and state-wide rates of change.

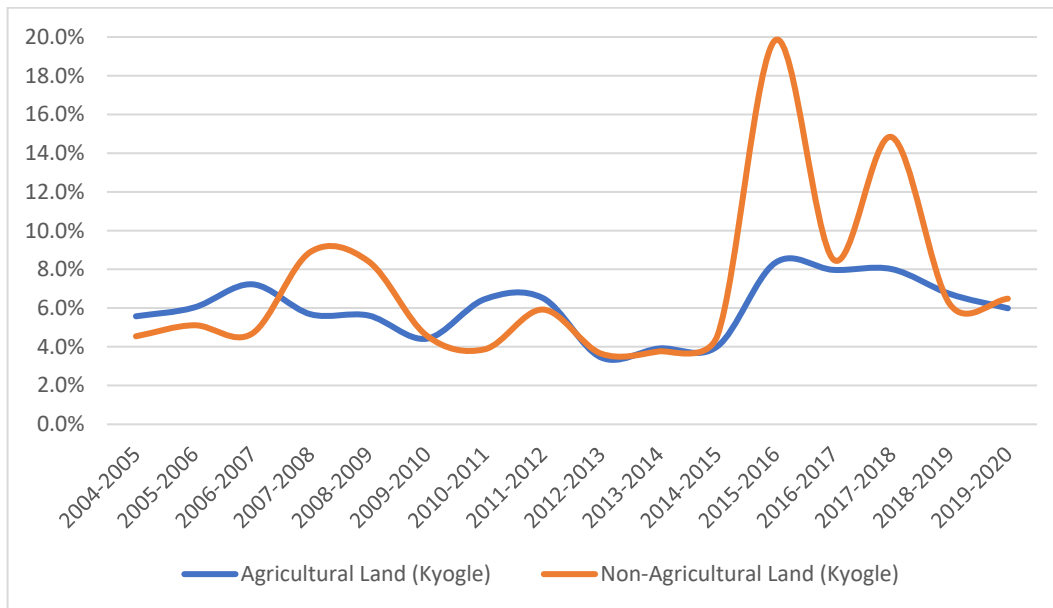


Incidence of agricultural land ownership changes in Kempsey (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Kempsey, as compared to the rate of change for non-agricultural rural land.

Kyogle

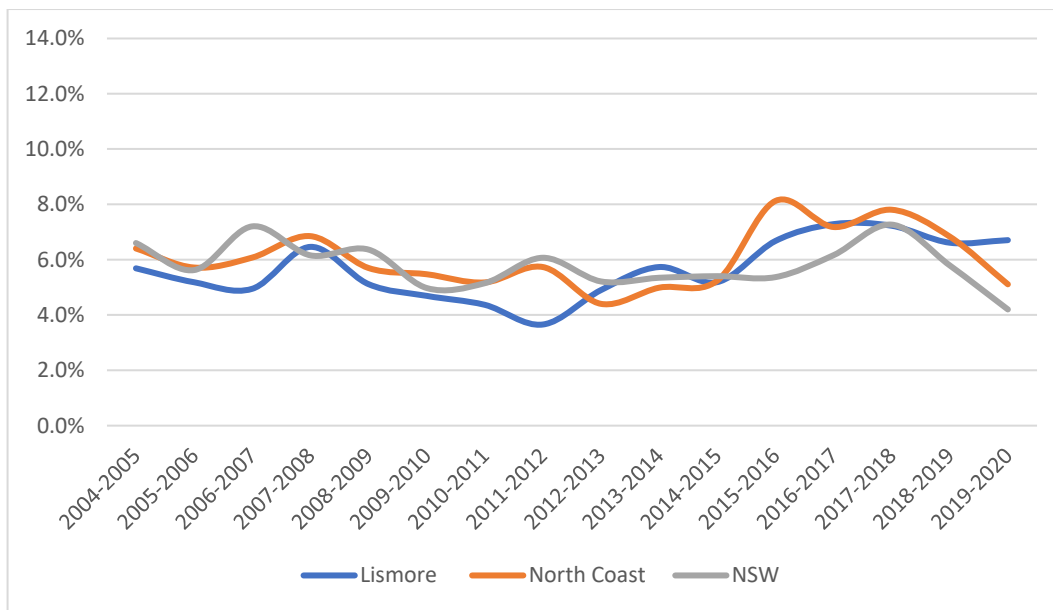


Incidence of all rural land ownership change in Kyogle (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Kyogle LGA, as compared to regional and state-wide rates of change.

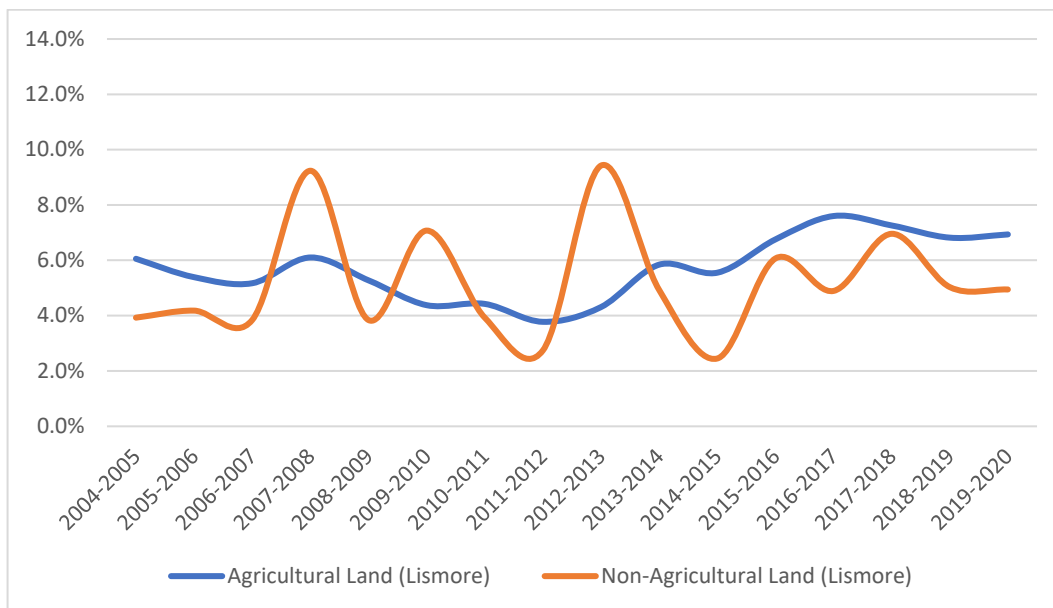


Incidence of agricultural land ownership changes in Kyogle (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Kyogle, as compared to the rate of change for non-agricultural rural land.

Lismore

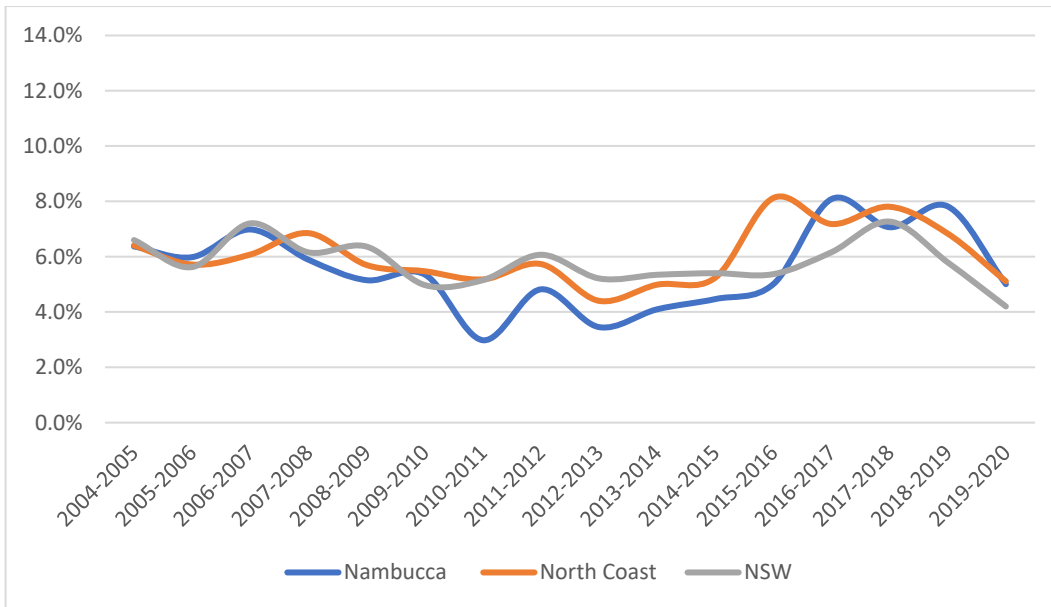


Incidence of all rural land ownership change in Lismore (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Lismore LGA, as compared to regional and state-wide rates of change.

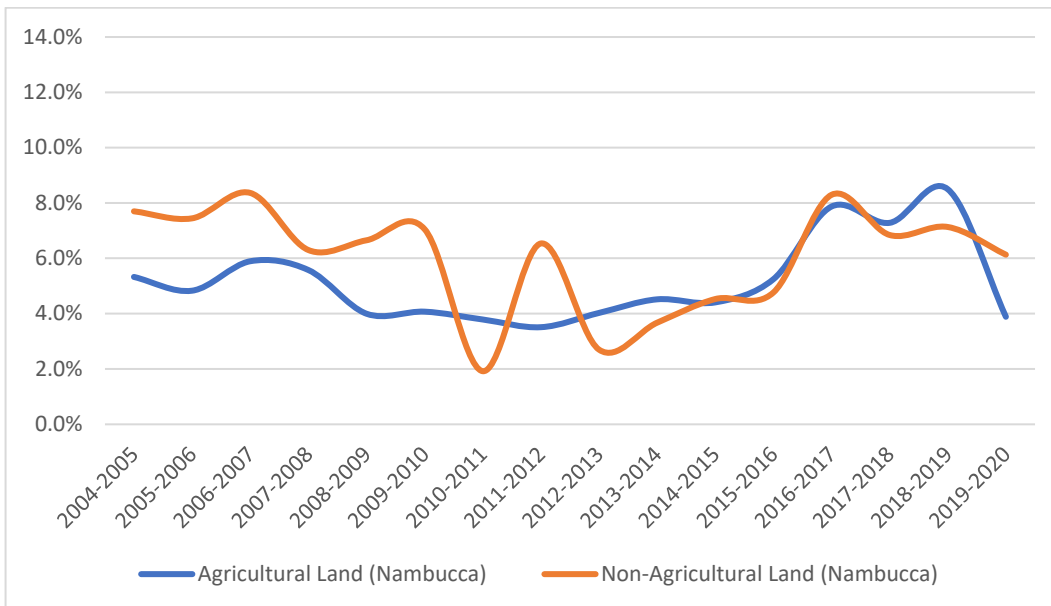


Incidence of agricultural land ownership changes in Lismore (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Lismore, as compared to the rate of change for non-agricultural rural land.

Nambucca

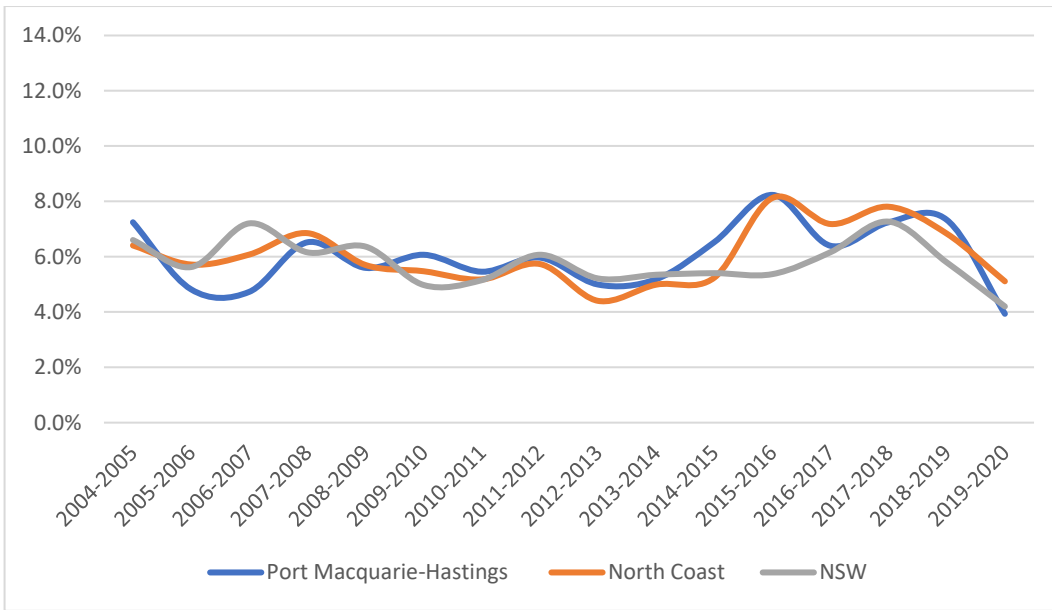


Incidence of all rural land ownership change in Nambucca (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Nambucca LGA, as compared to regional and state-wide rates of change.

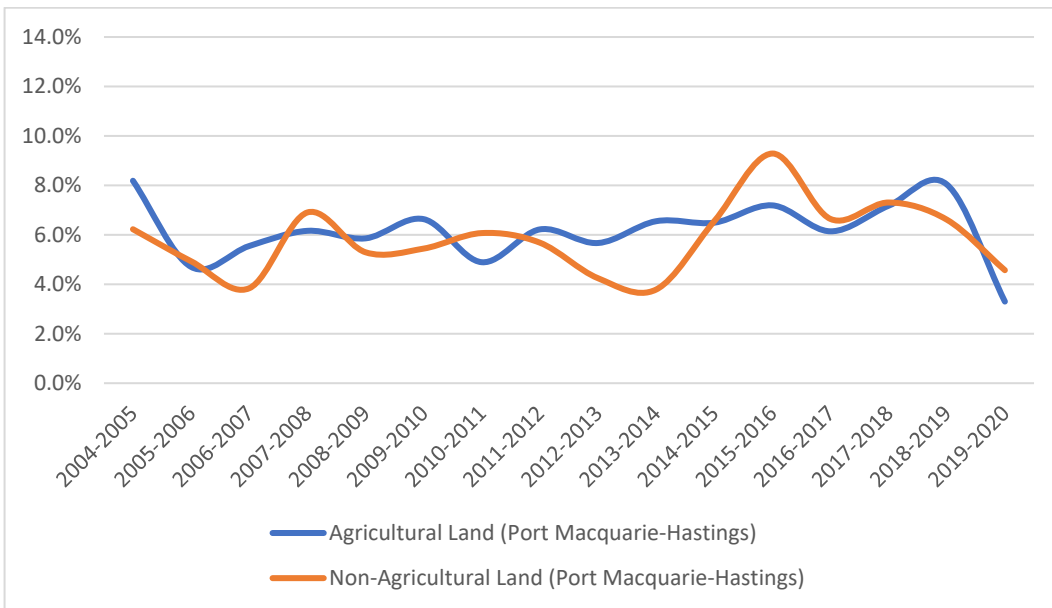


Incidence of agricultural land ownership changes in Nambucca (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Nambucca, as compared to the rate of change for non-agricultural rural land.

Port Macquarie-Hastings

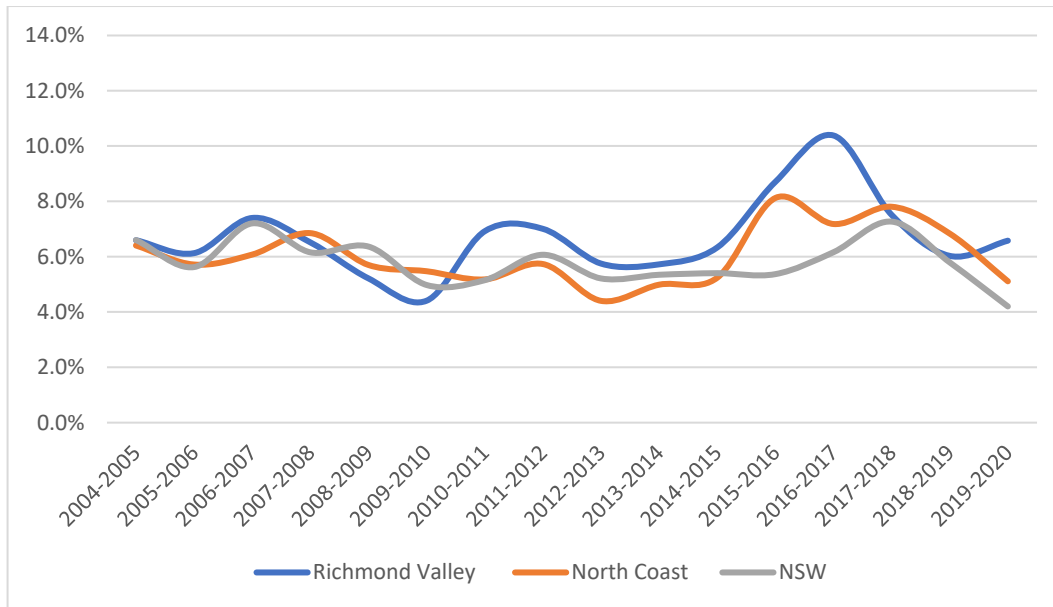


Incidence of all rural land ownership change in Port Macquarie-Hastings (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Port Macquarie-Hastings LGA, as compared to regional and state-wide rates of change.

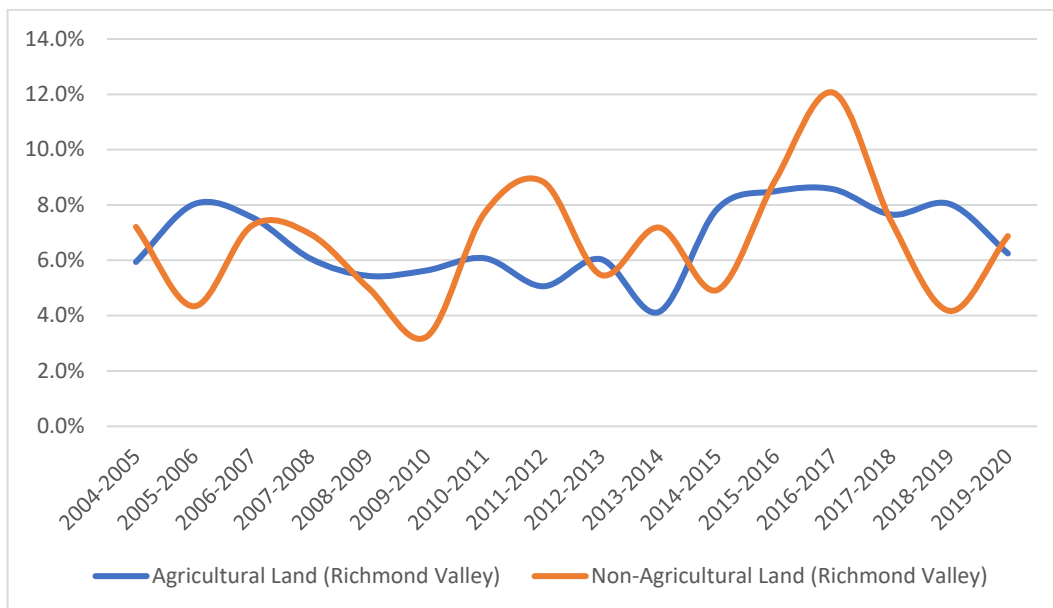


Incidence of agricultural land ownership changes in Port Macquarie-Hastings (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Port Macquarie-Hastings, as compared to the rate of change for non-agricultural rural land.

Richmond Valley

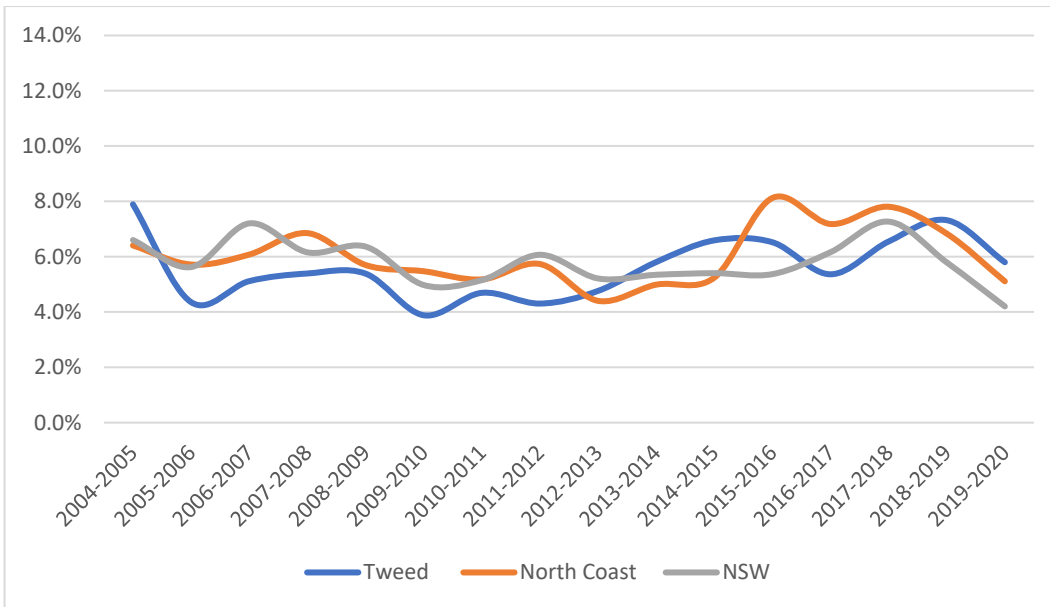


Incidence of all rural land ownership change in Richmond Valley (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Richmond Valley LGA, as compared to regional and state-wide rates of change.

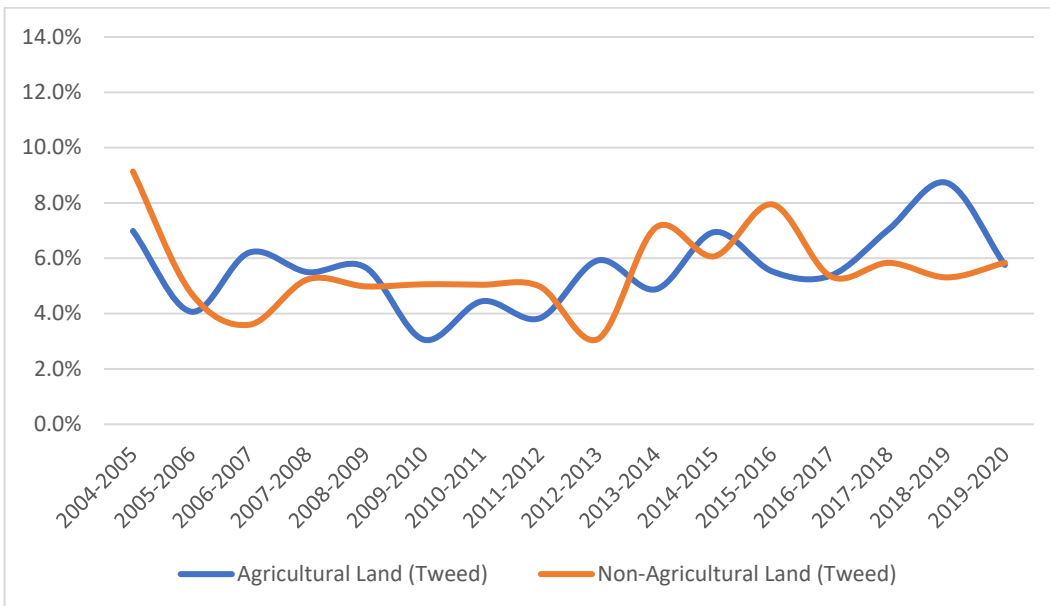


Incidence of agricultural land ownership changes in Richmond Valley (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Richmond Valley, as compared to the rate of change for non-agricultural rural land.

Tweed



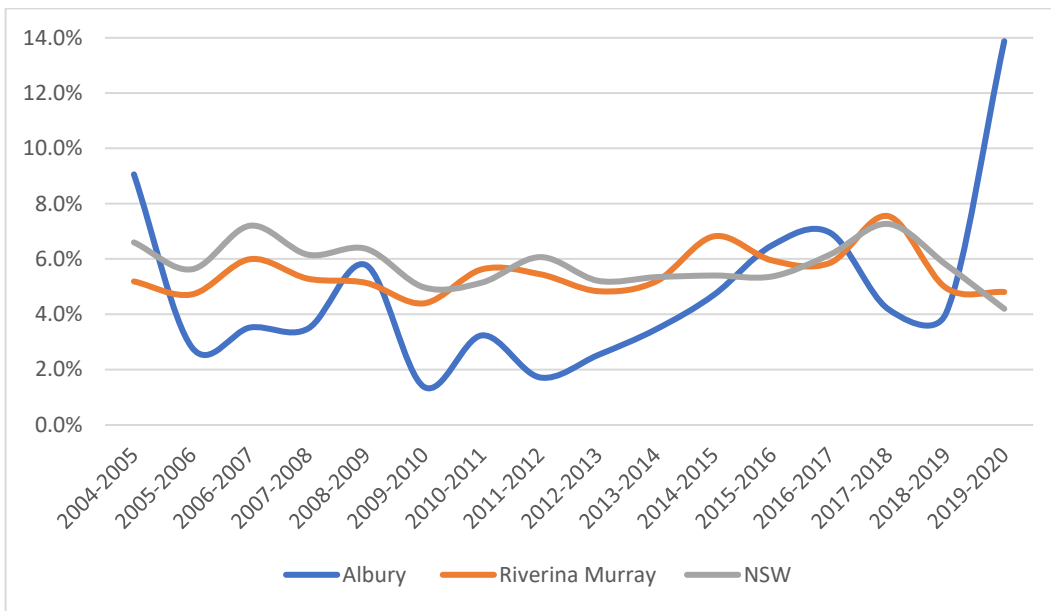
Incidence of all rural land ownership change in Tweed (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Tweed LGA, as compared to regional and state-wide rates of change.



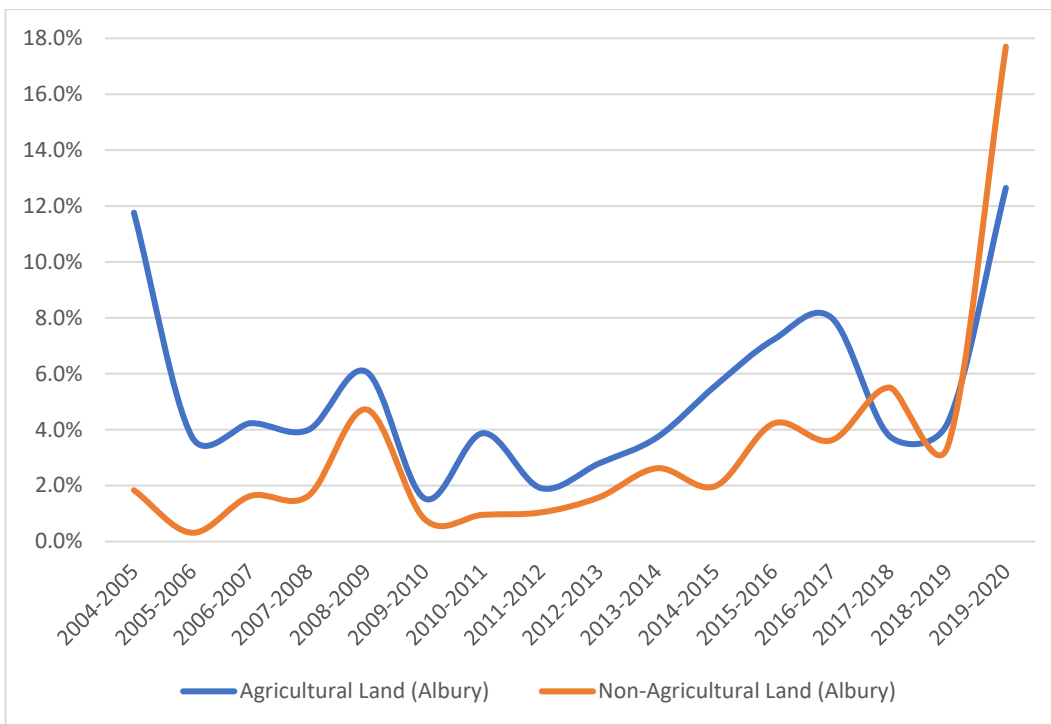
Incidence of agricultural land ownership changes in Tweed (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Tweed, as compared to the rate of change for non-agricultural rural land.

Riverina Murray

Albury

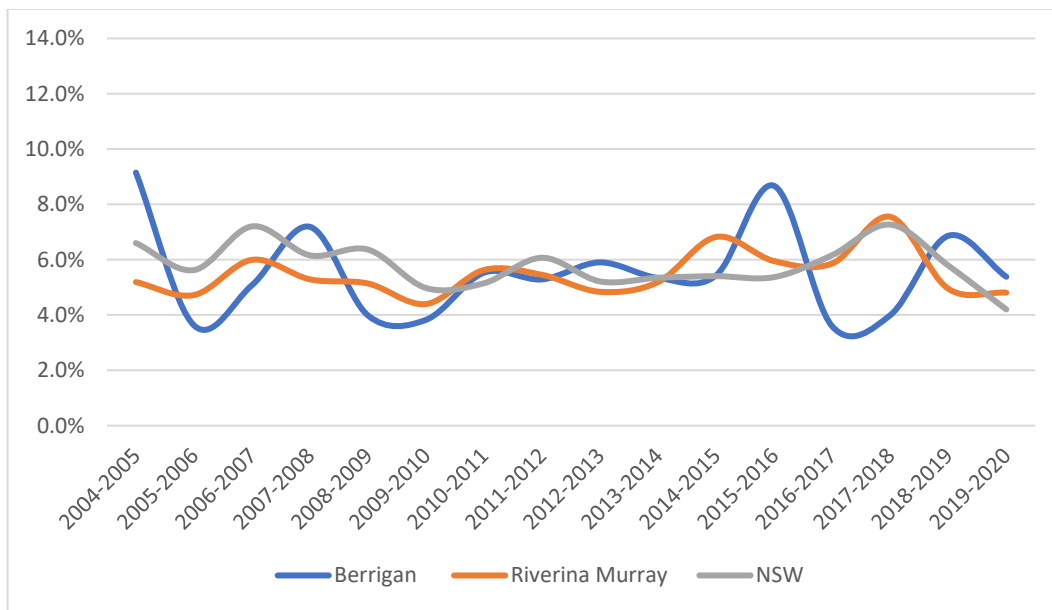


Incidence of all rural land ownership change in Albury (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Albury LGA, as compared to regional and state-wide rates of change.

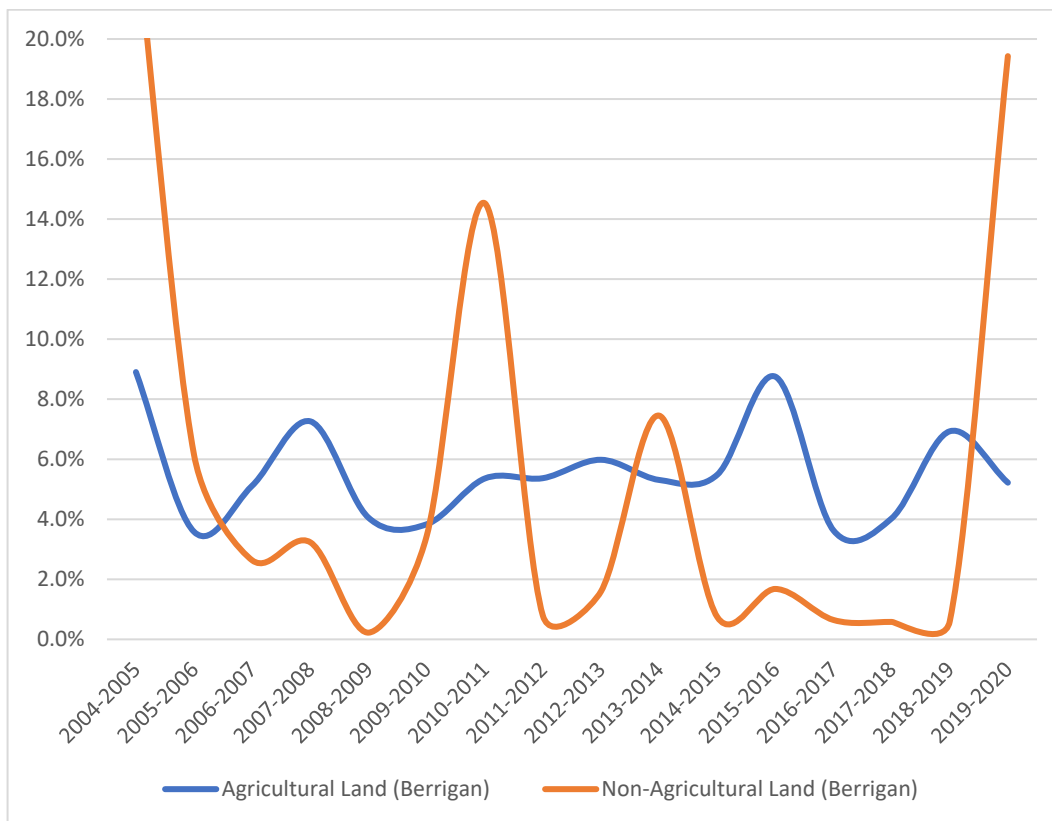


Incidence of agricultural land ownership changes in Albury (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Albury, as compared to the rate of change for non-agricultural rural land.

Berrigan

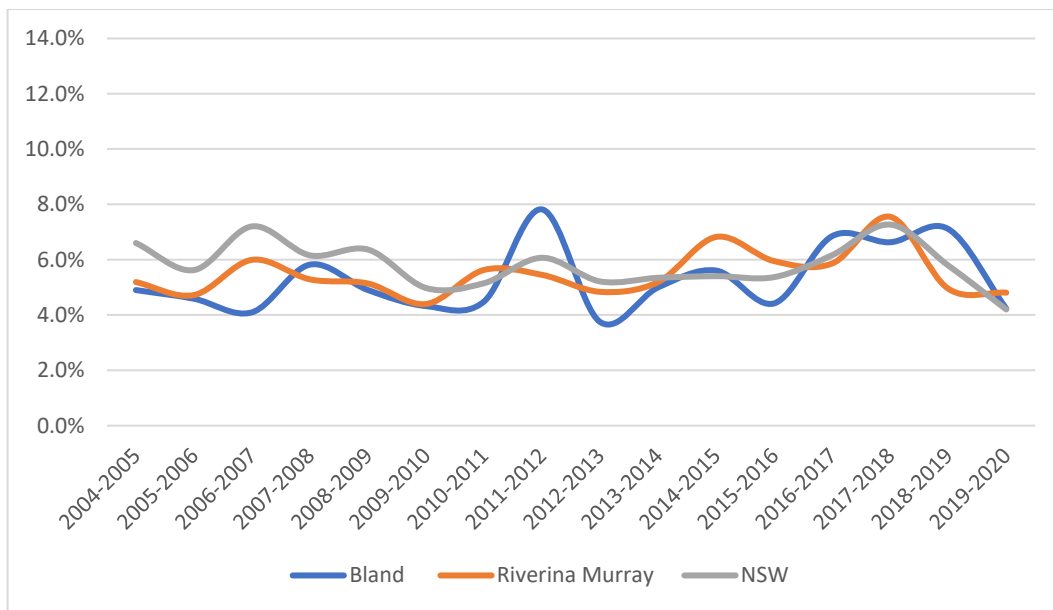


Incidence of all rural land ownership change in Berrigan (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Berrigan LGA, as compared to regional and state-wide rates of change.

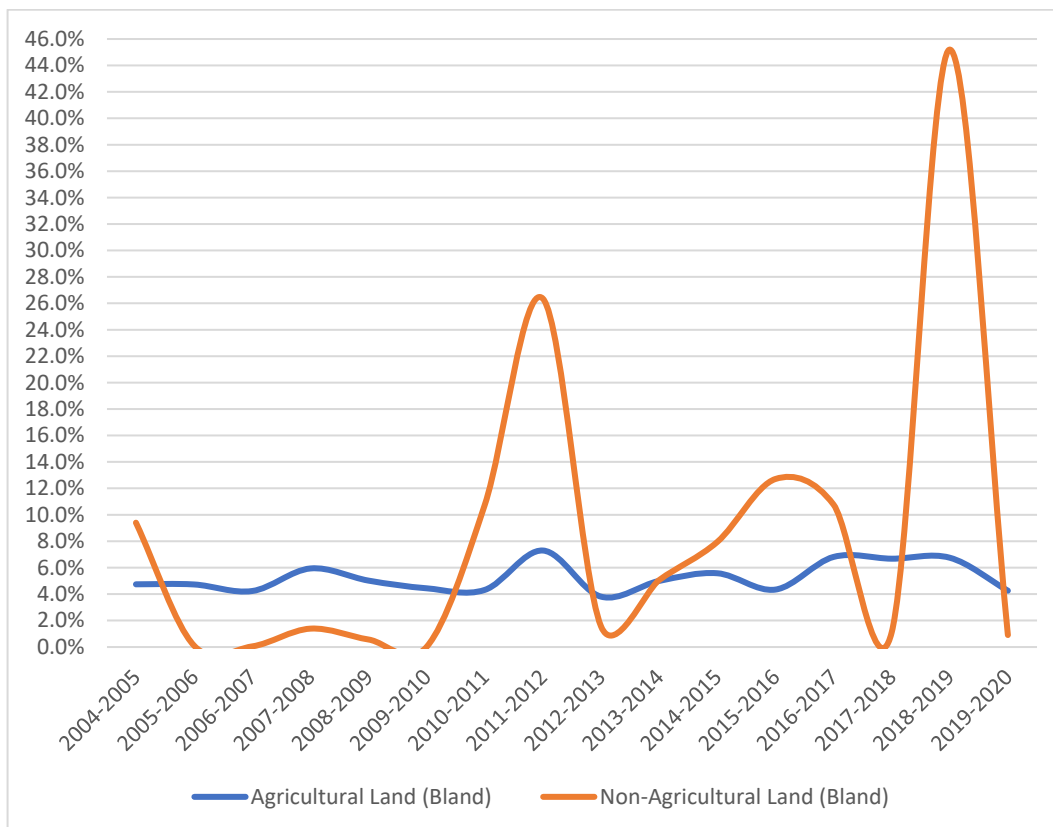


Incidence of agricultural land ownership changes in Berrigan (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Berrigan, as compared to the rate of change for non-agricultural rural land.

Bland

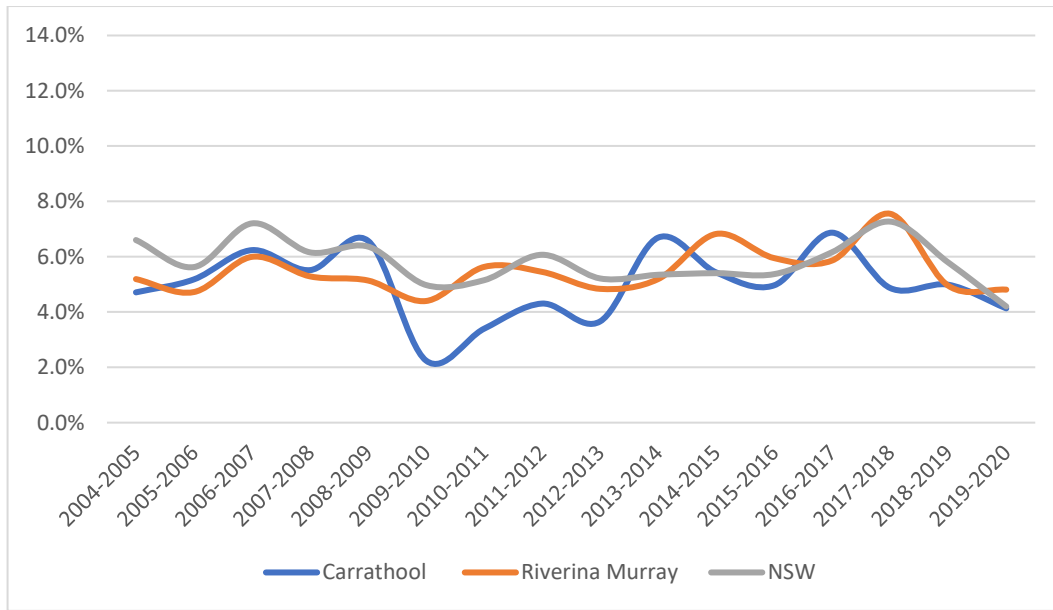


Incidence of all rural land ownership change in Bland (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Bland LGA, as compared to regional and state-wide rates of change.

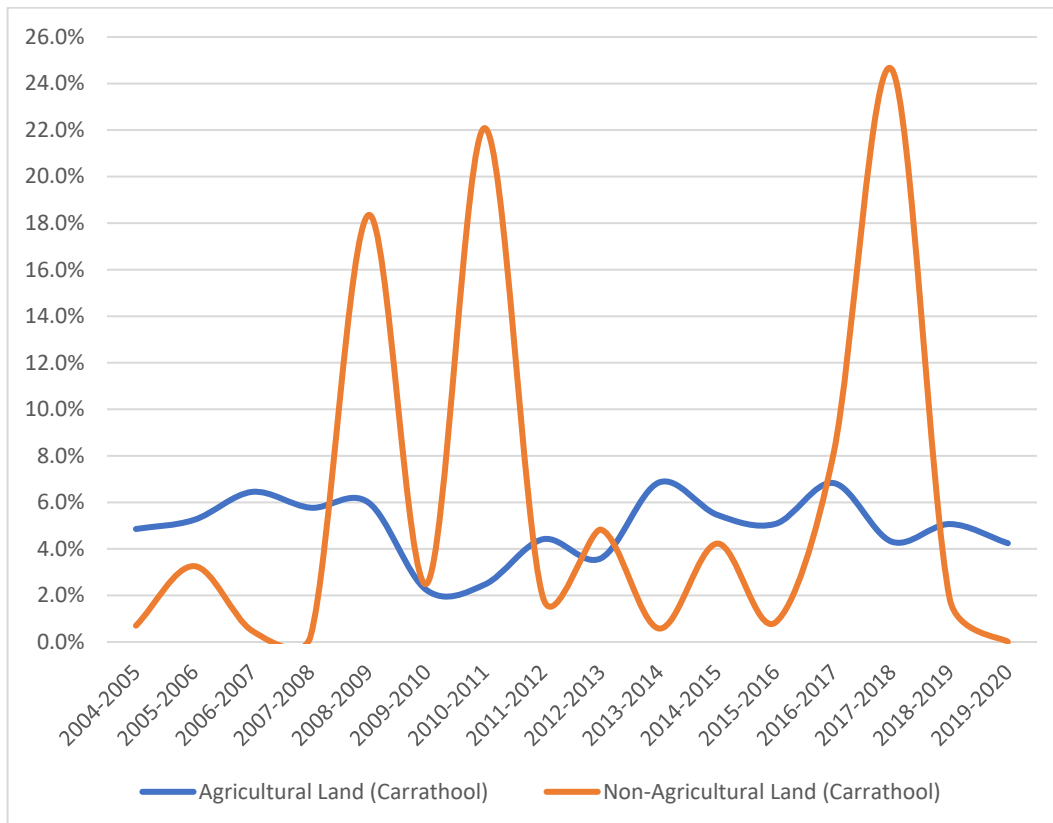


Incidence of agricultural land ownership changes in Bland (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bland, as compared to the rate of change for non-agricultural rural land.

Carrathool

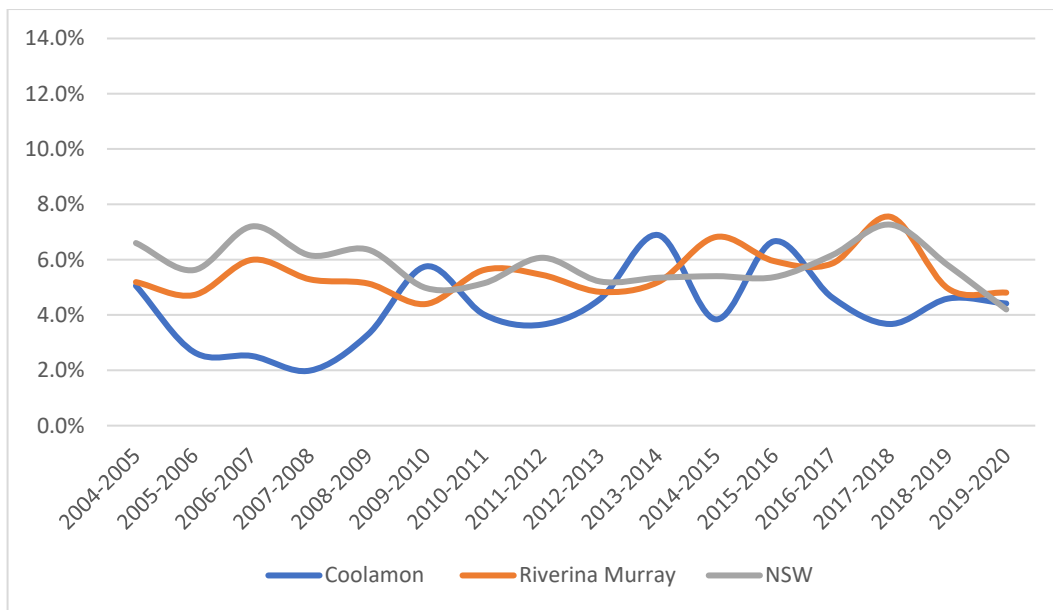


Incidence of all rural land ownership change in Carrathool (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Carrathool LGA, as compared to regional and state-wide rates of change.

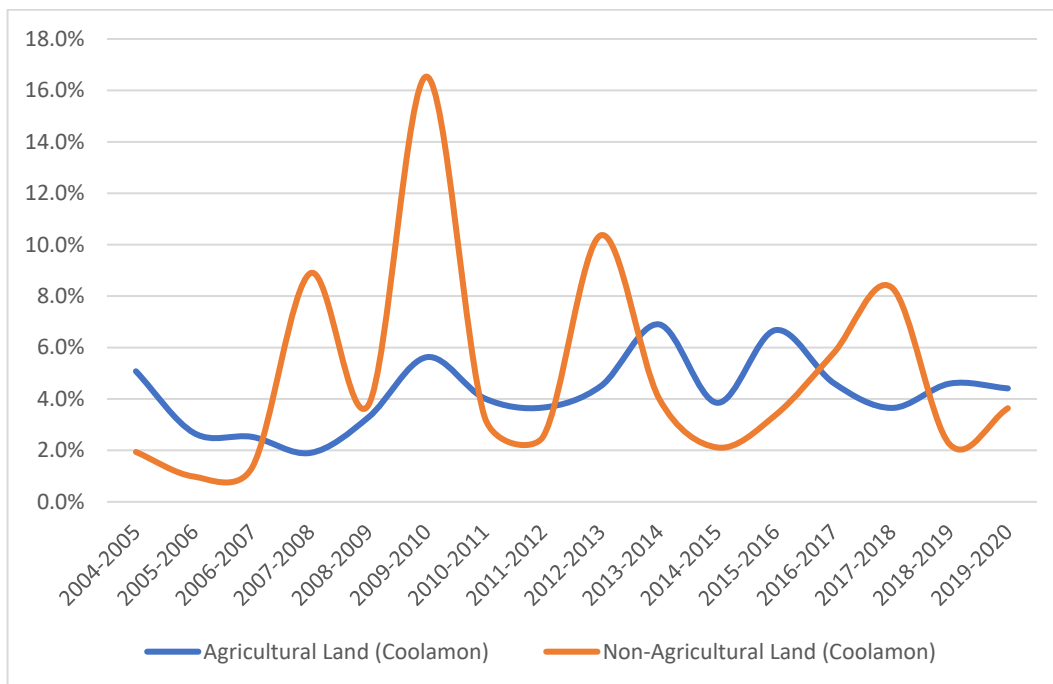


Incidence of agricultural land ownership changes in Carrathool (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Carrathool, as compared to the rate of change for non-agricultural rural land.

Coolamon

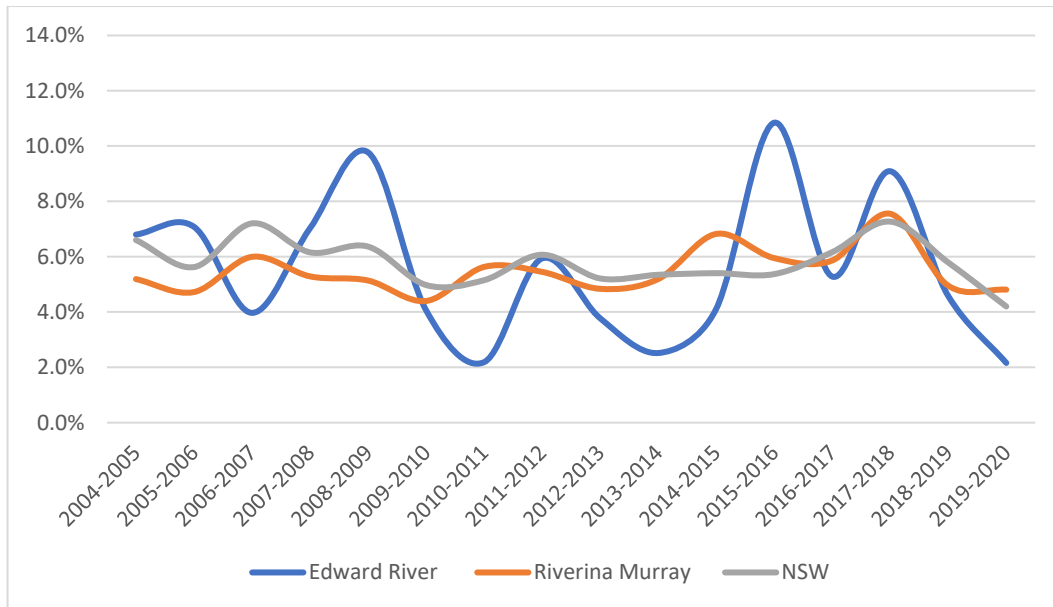


Incidence of all rural land ownership change in Coolamon (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Coolamon LGA, as compared to regional and state-wide rates of change.

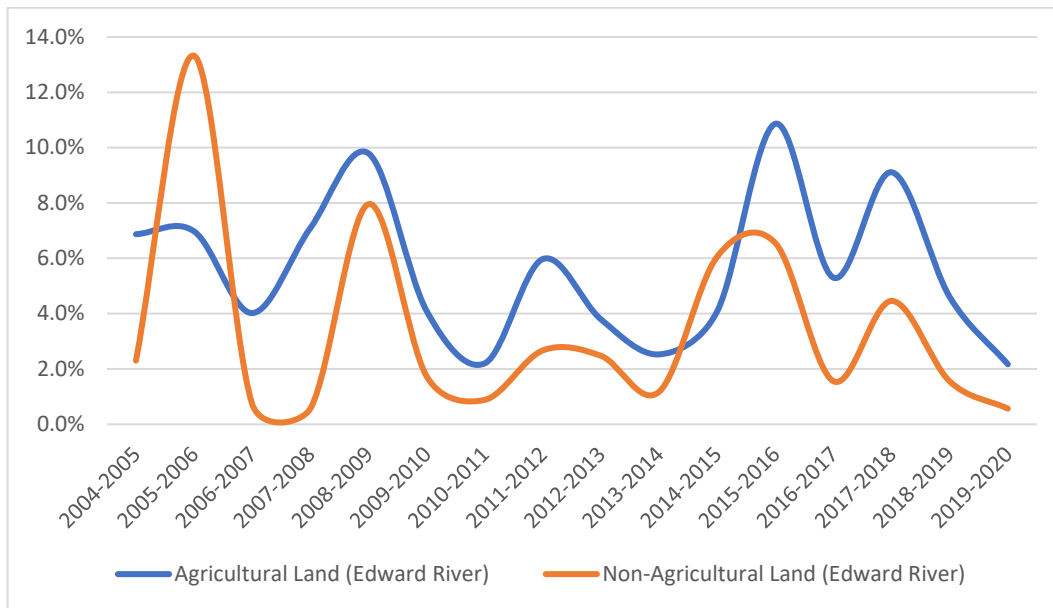


Incidence of agricultural land ownership changes in Coolamon (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Coolamon, as compared to the rate of change for non-agricultural rural land.

Edward River

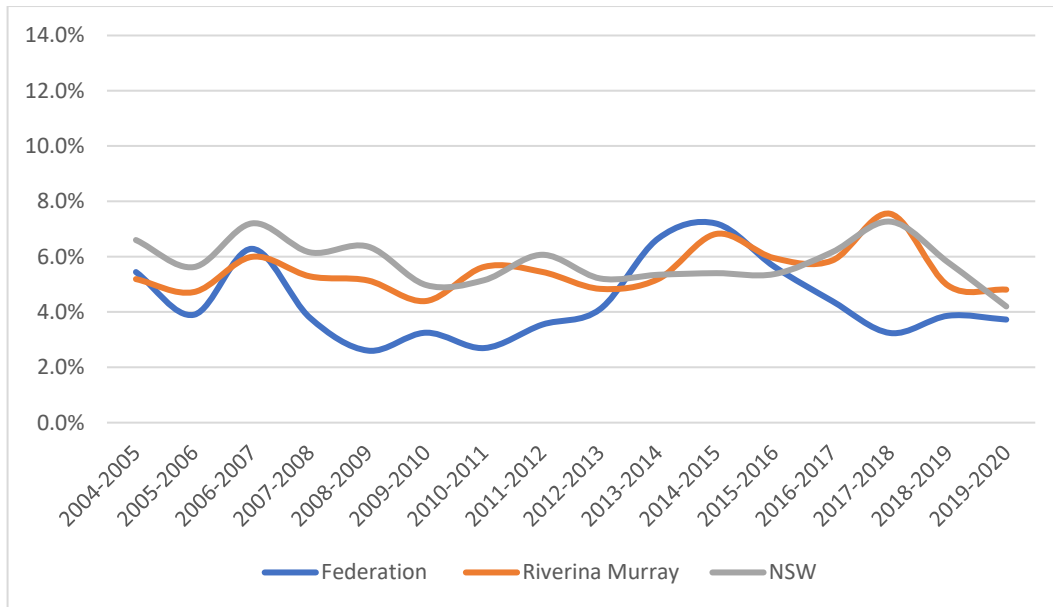


Incidence of all rural land ownership change in Edward River (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Edward River LGA, as compared to regional and state-wide rates of change.

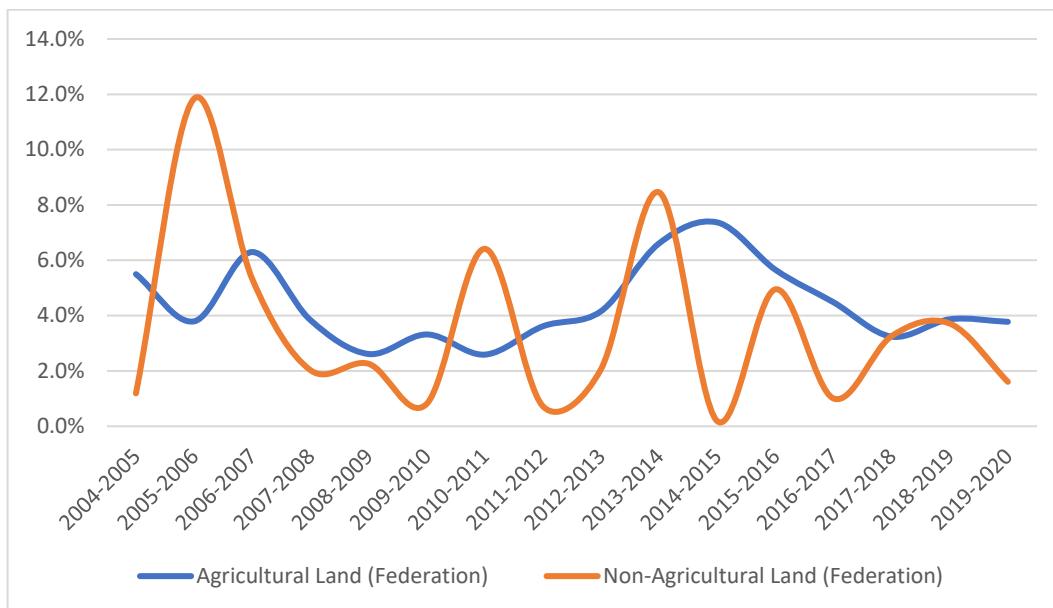


Incidence of agricultural land ownership changes in Edward River (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Edward River, as compared to the rate of change for non-agricultural rural land.

Federation

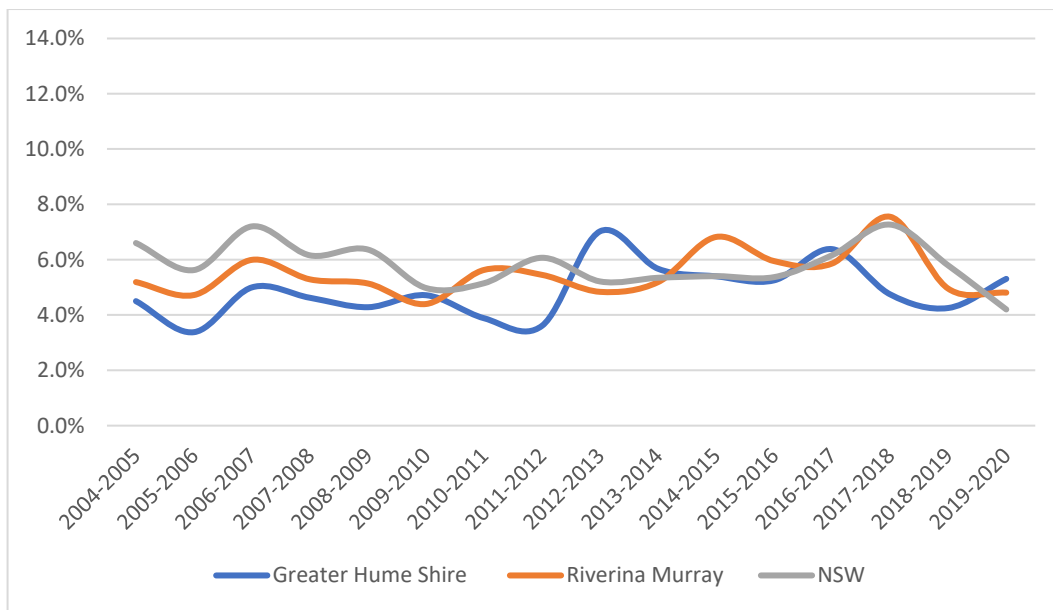


Incidence of all rural land ownership change in Federation (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Federation LGA, as compared to regional and state-wide rates of change.

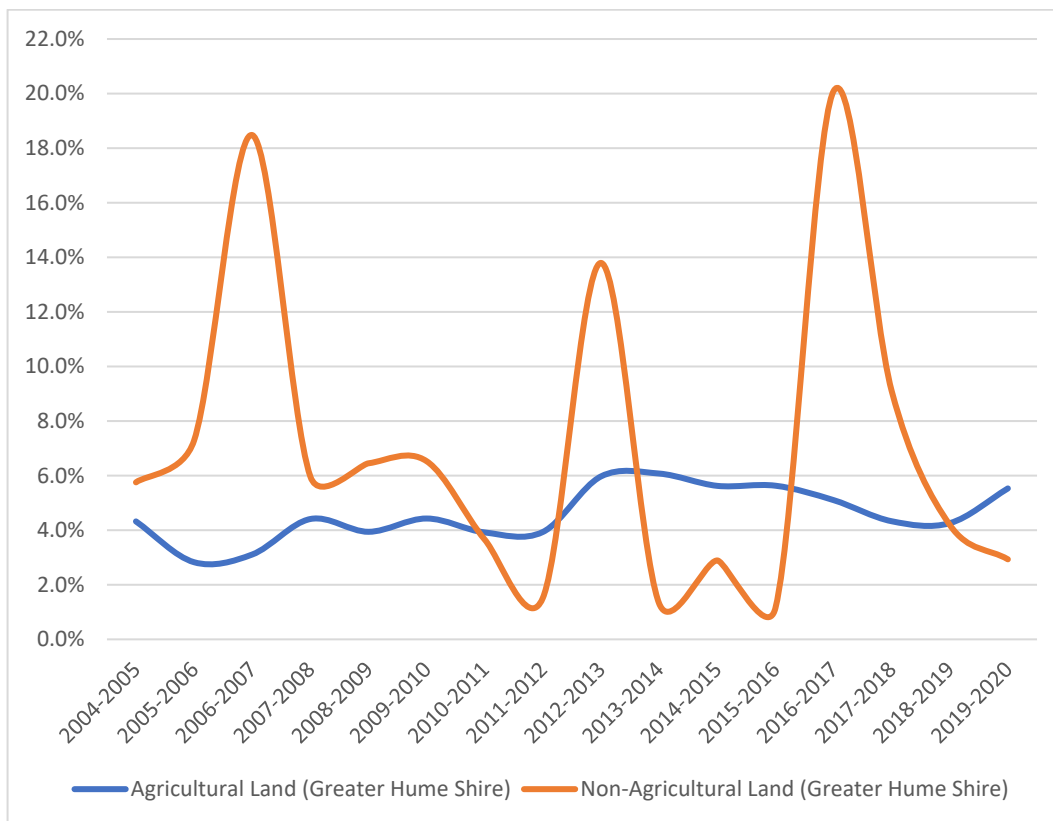


Incidence of agricultural land ownership changes in Federation (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Federation, as compared to the rate of change for non-agricultural rural land.

Greater Hume Shire

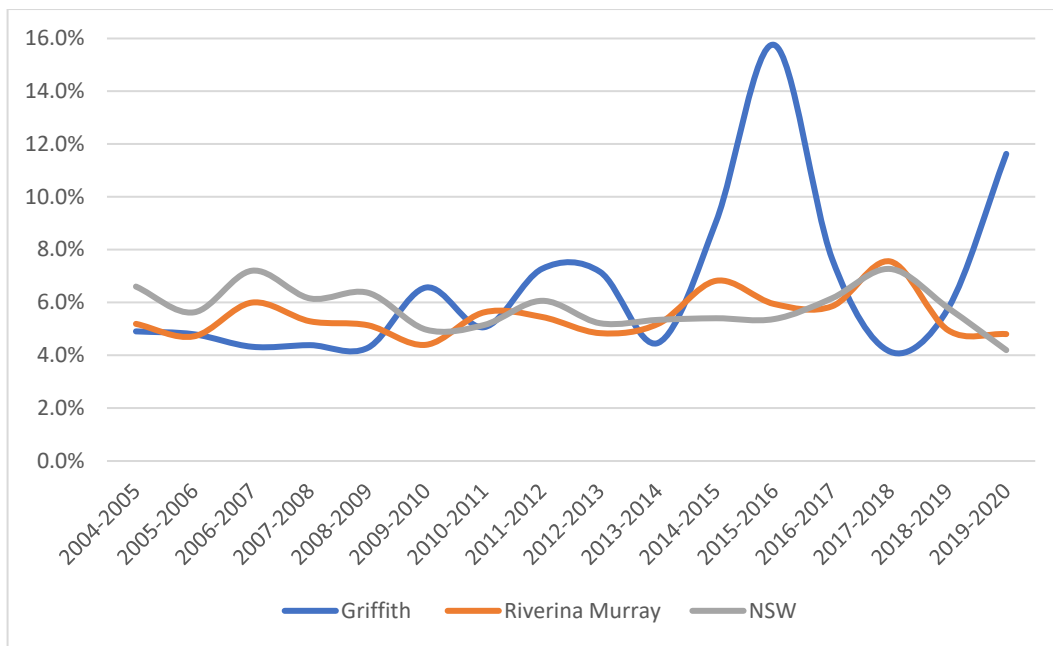


Incidence of all rural land ownership change in Greater Hume Shire (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Greater Hume Shire LGA, as compared to regional and state-wide rates of change.

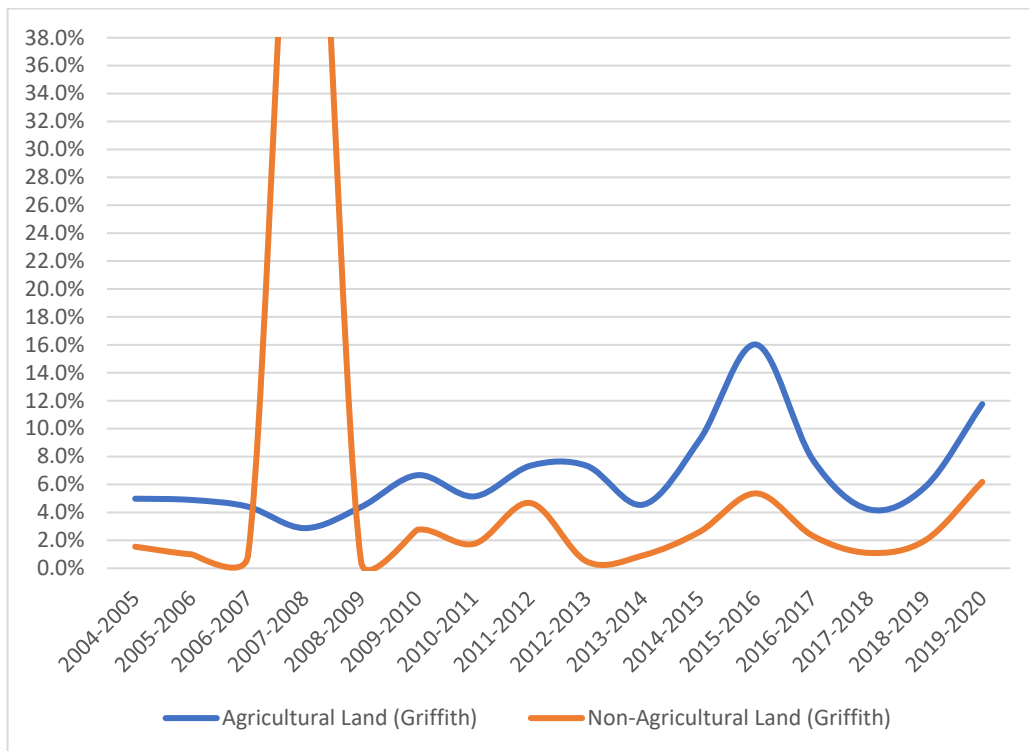


Incidence of agricultural land ownership changes in Greater Hume Shire (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Greater Hume Shire, as compared to the rate of change for non-agricultural rural land.

Griffith

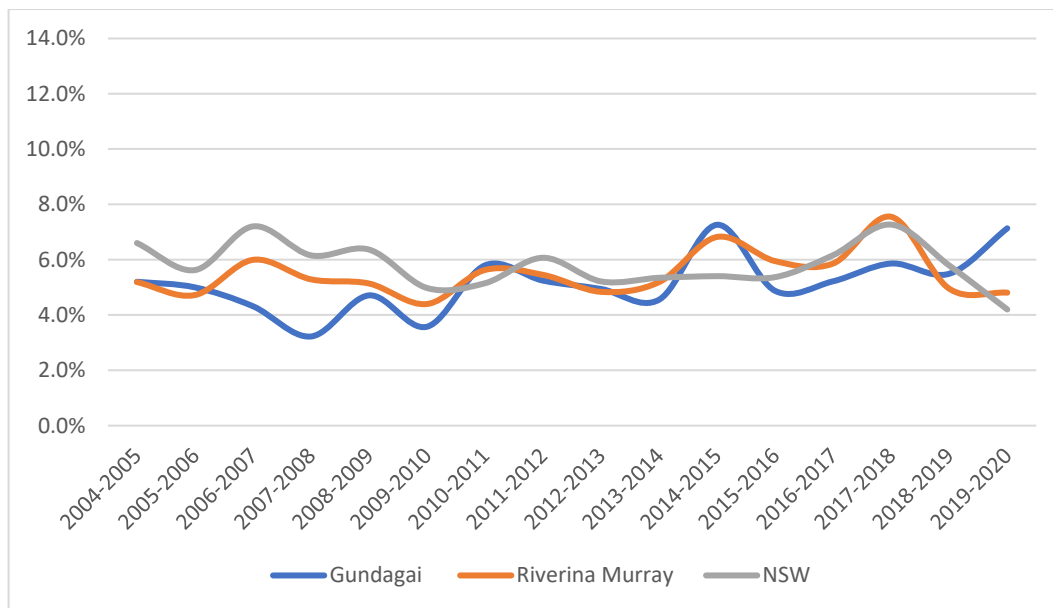


Incidence of all rural land ownership change in Griffith (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Griffith LGA, as compared to regional and state-wide rates of change.

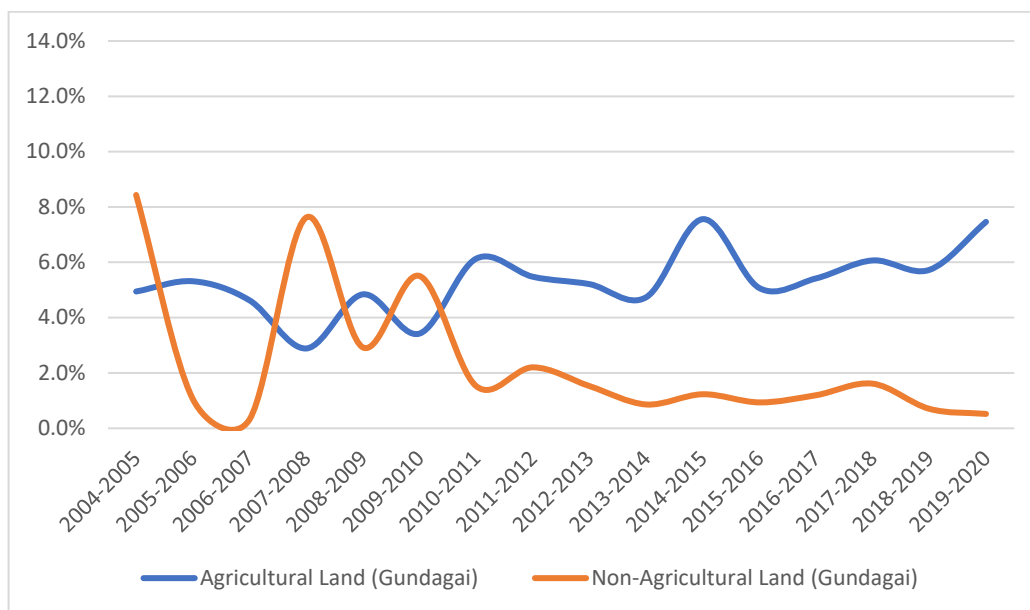


Incidence of agricultural land ownership changes in Griffith (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Griffith, as compared to the rate of change for non-agricultural rural land.

Gundagai

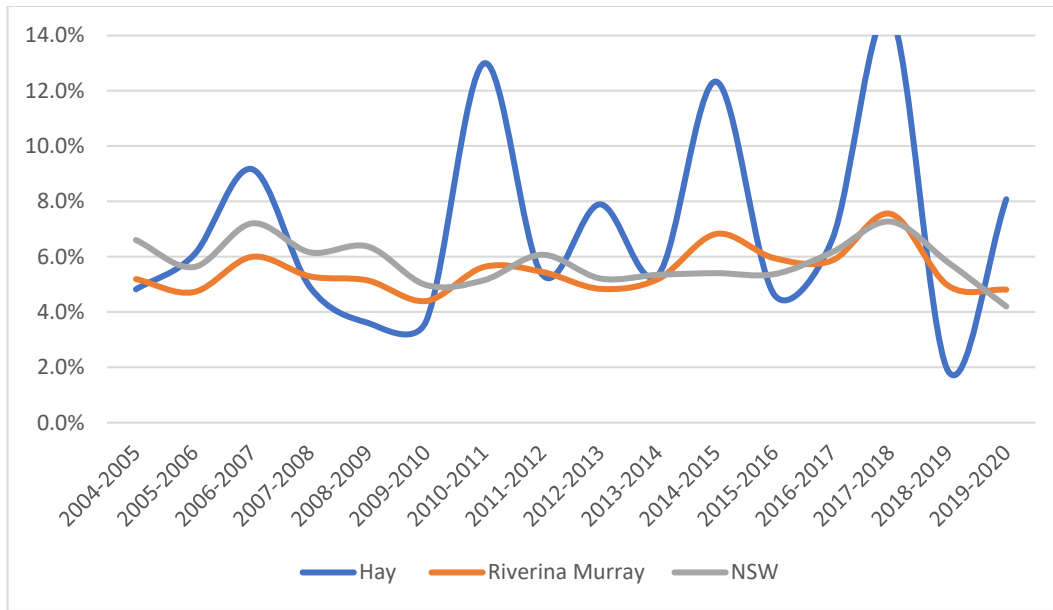


Incidence of all rural land ownership change in Gundagai (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Gundagai LGA, as compared to regional and state-wide rates of change.

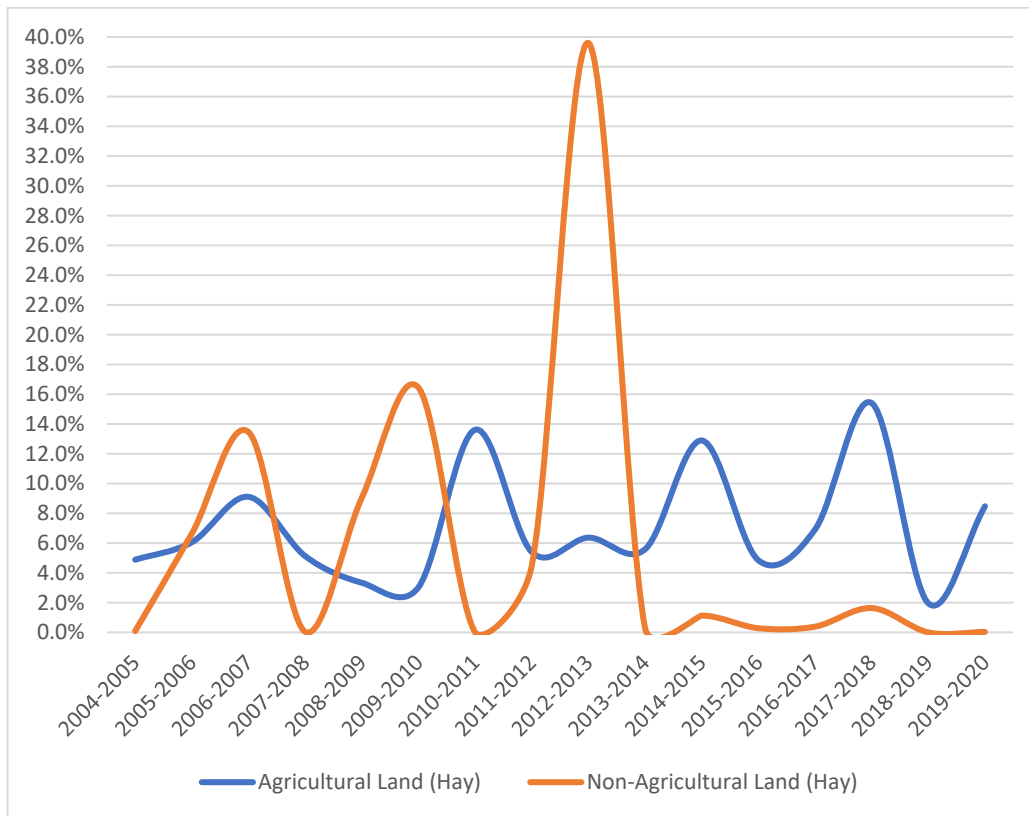


Incidence of agricultural land ownership changes in Gundagai (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Gundagai, as compared to the rate of change for non-agricultural rural land.

Hay

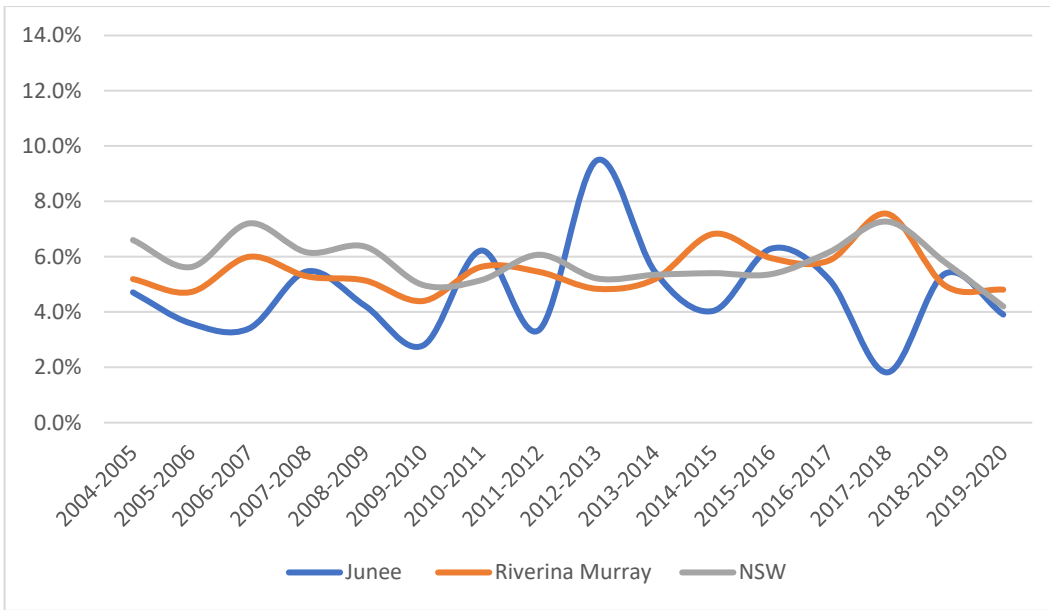


Incidence of all rural land ownership change in Hay (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Hay LGA, as compared to regional and state-wide rates of change.

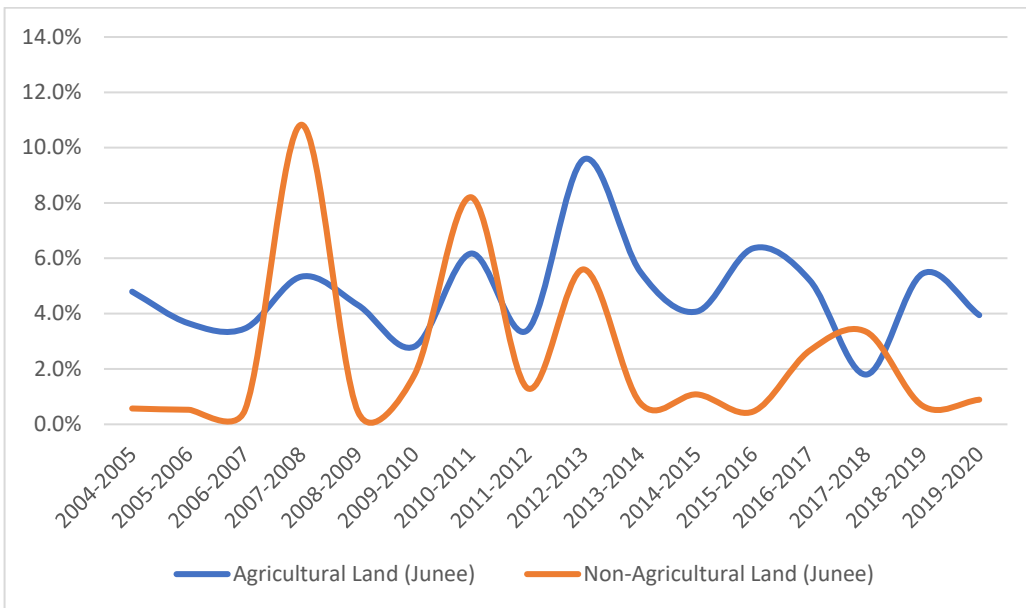


Incidence of agricultural land ownership changes in Hay (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Hay, as compared to the rate of change for non-agricultural rural land.

Junee

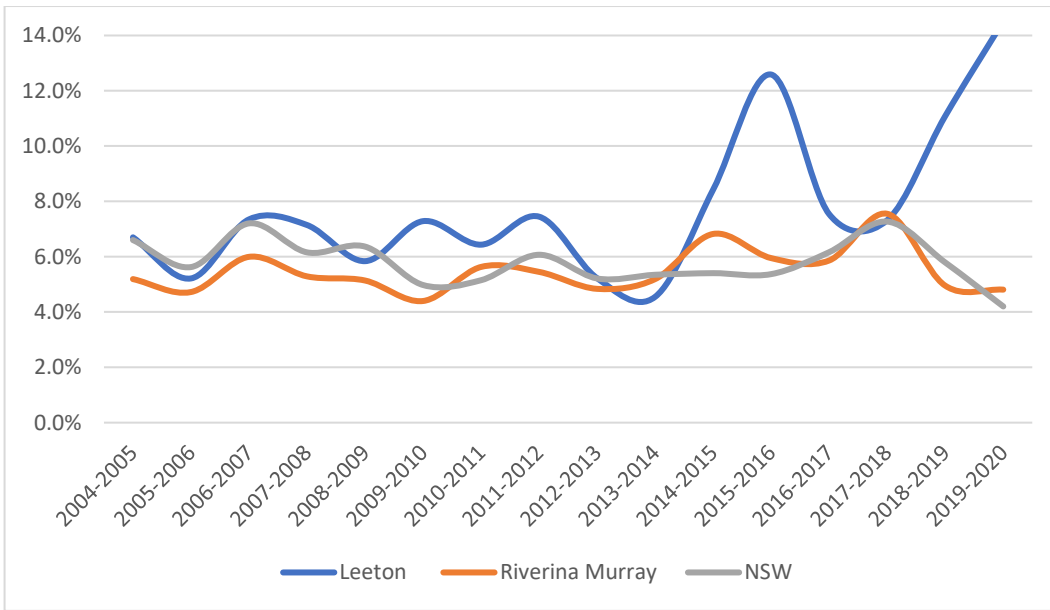


Incidence of all rural land ownership change in Junee (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Junee LGA, as compared to regional and state-wide rates of change.

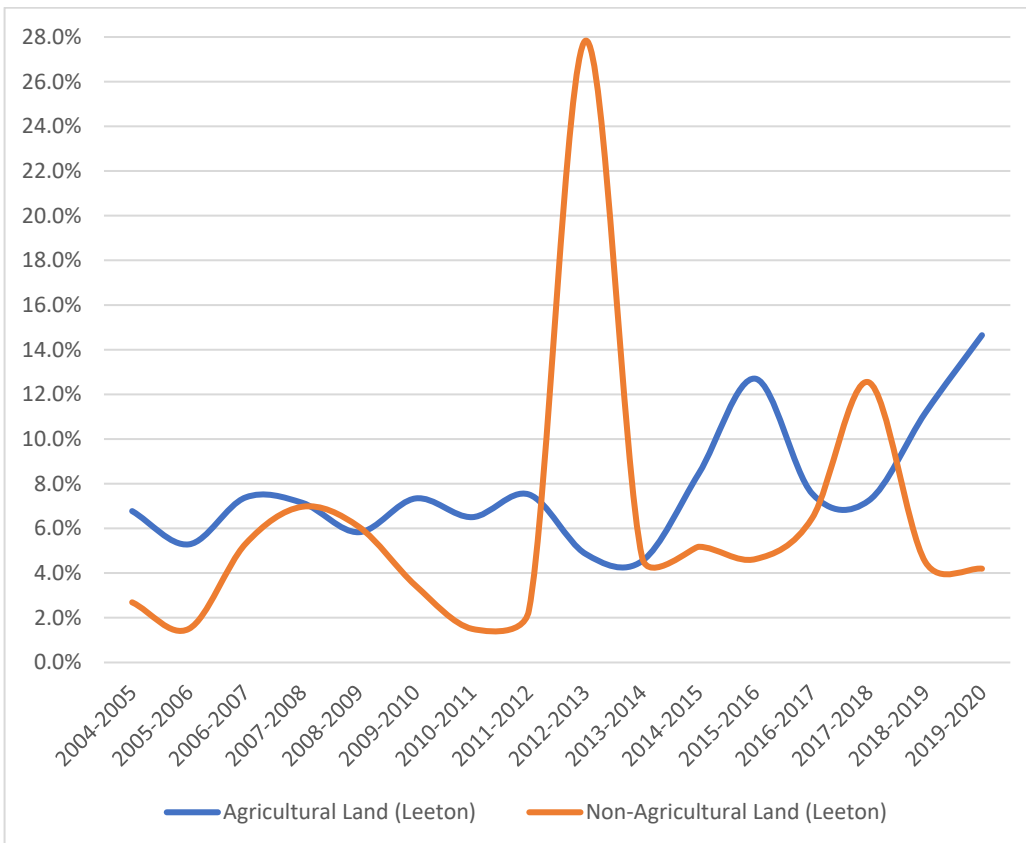


Incidence of agricultural land ownership changes in Junee (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Junee, as compared to the rate of change for non-agricultural rural land.

Leeton

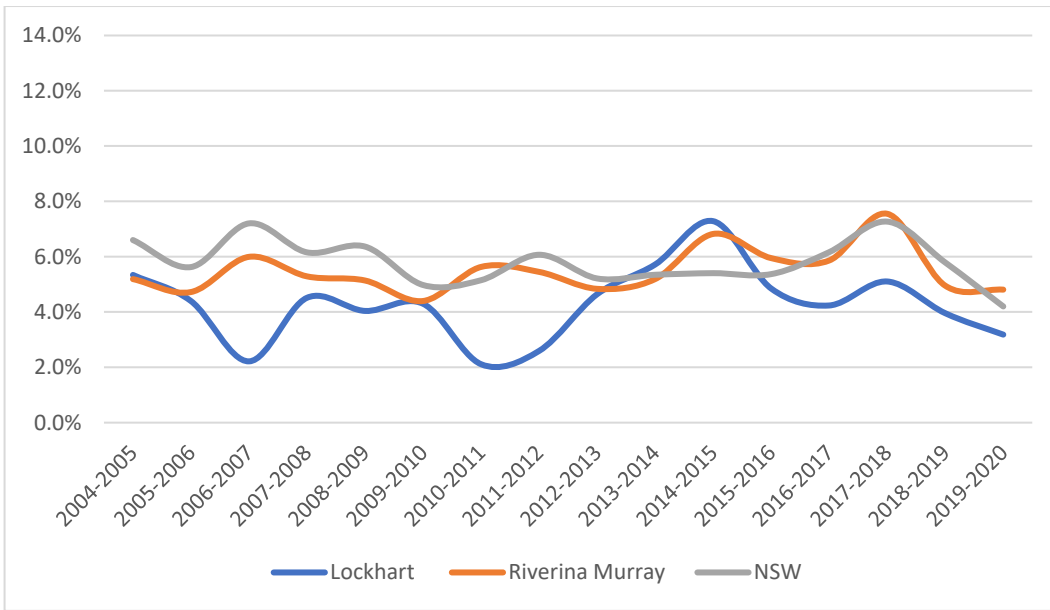


Incidence of all rural land ownership change in Leeton (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Leeton LGA, as compared to regional and state-wide rates of change.

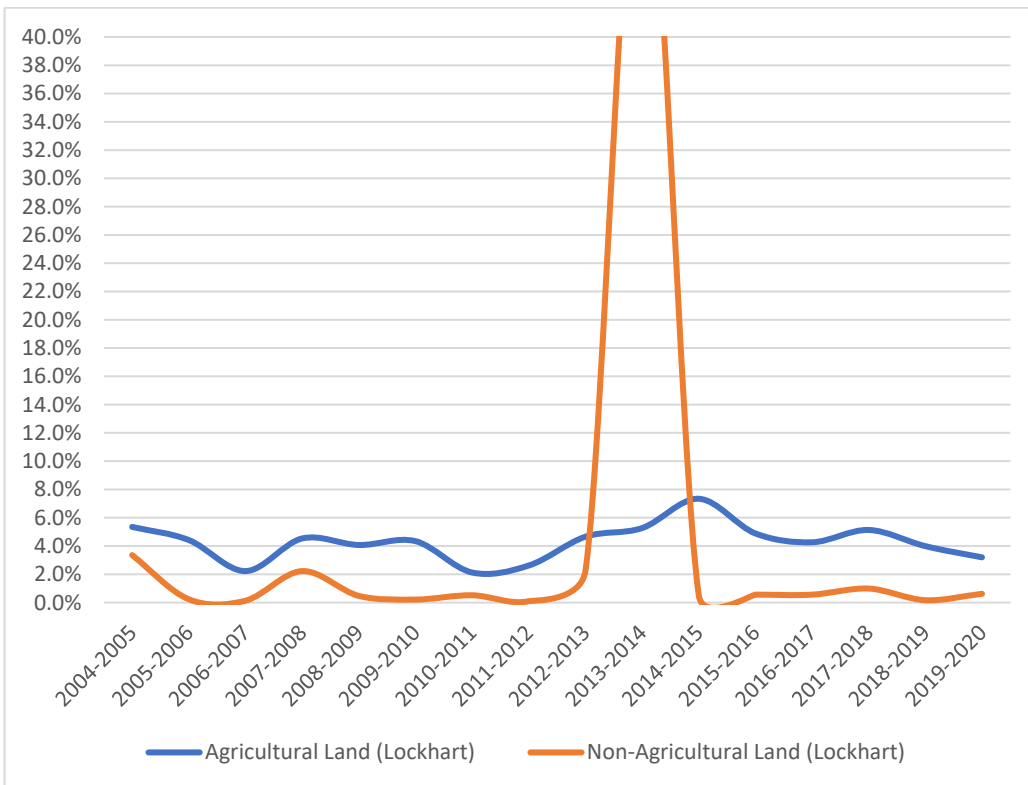


Incidence of agricultural land ownership changes in Leeton (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Leeton, as compared to the rate of change for non-agricultural rural land.

Lockhart

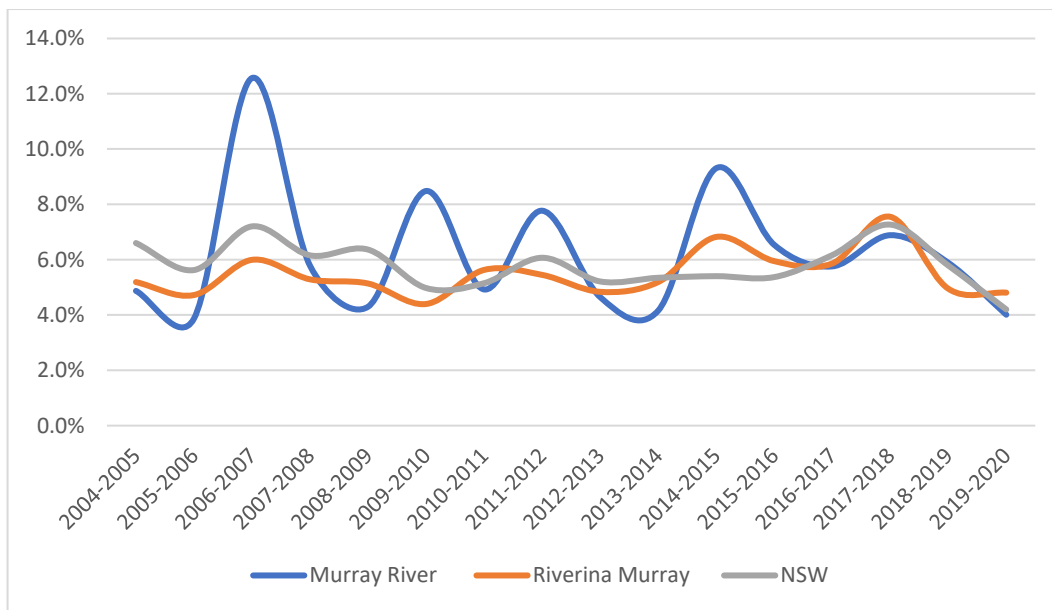


Incidence of all rural land ownership change in Lockhart (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Lockhart LGA, as compared to regional and state-wide rates of change.

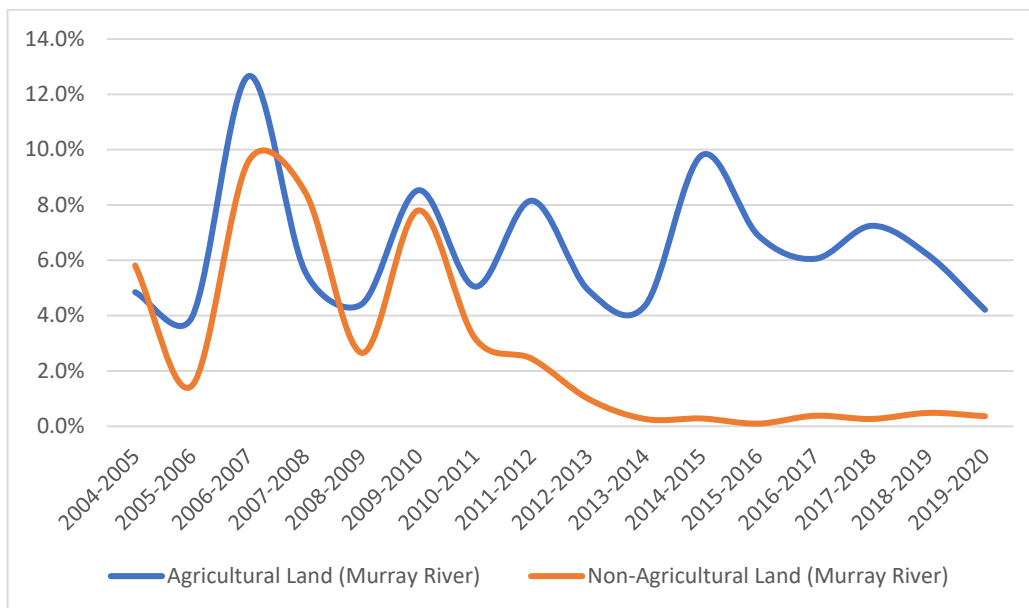


Incidence of agricultural land ownership changes in Lockhart (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Lockhart, as compared to the rate of change for non-agricultural rural land.

Murray River

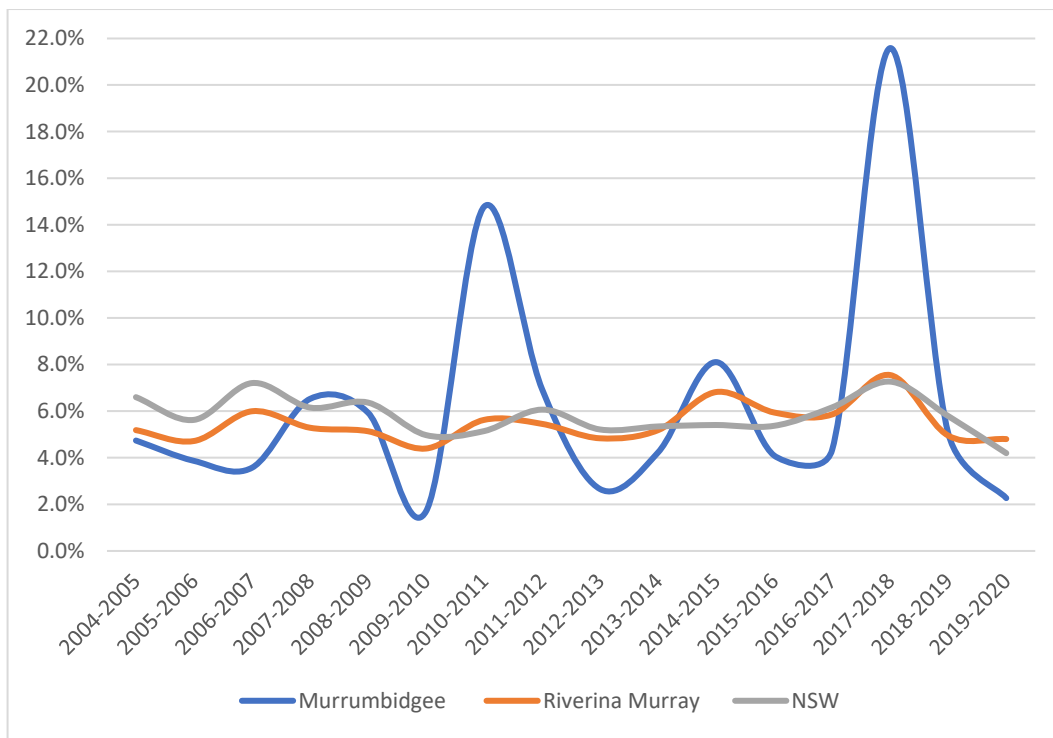


Incidence of all rural land ownership change in Murray River (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Murray River LGA, as compared to regional and state-wide rates of change.

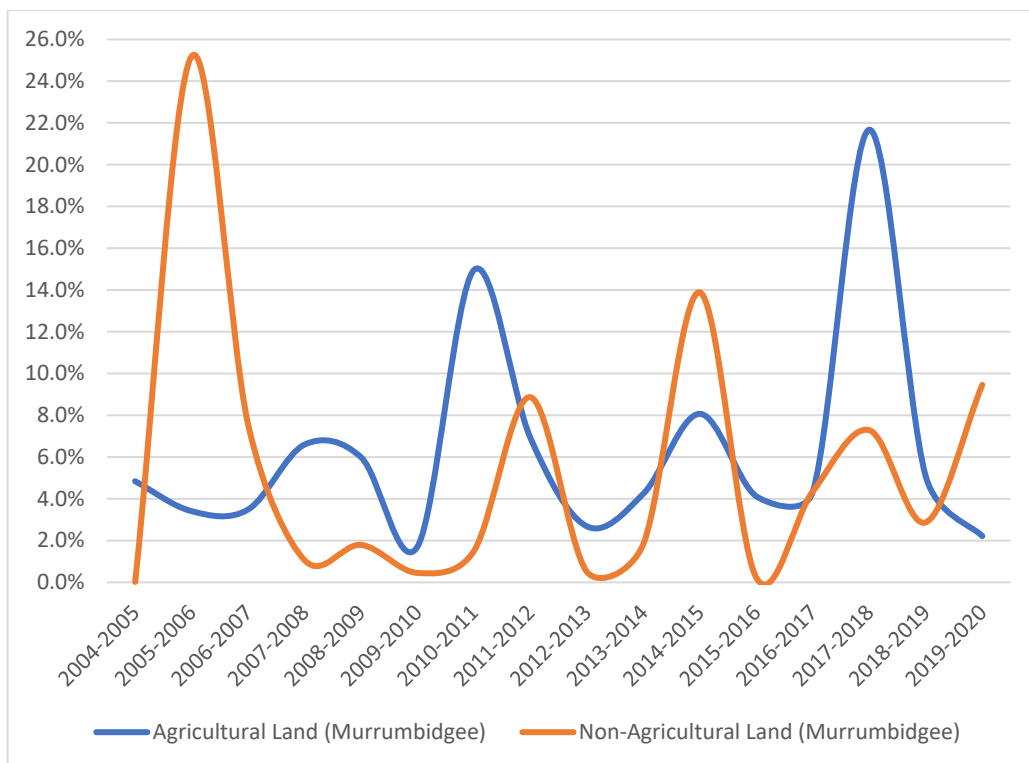


Incidence of agricultural land ownership changes in Murray River (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Murray River, as compared to the rate of change for non-agricultural rural land.

Murrumbidgee

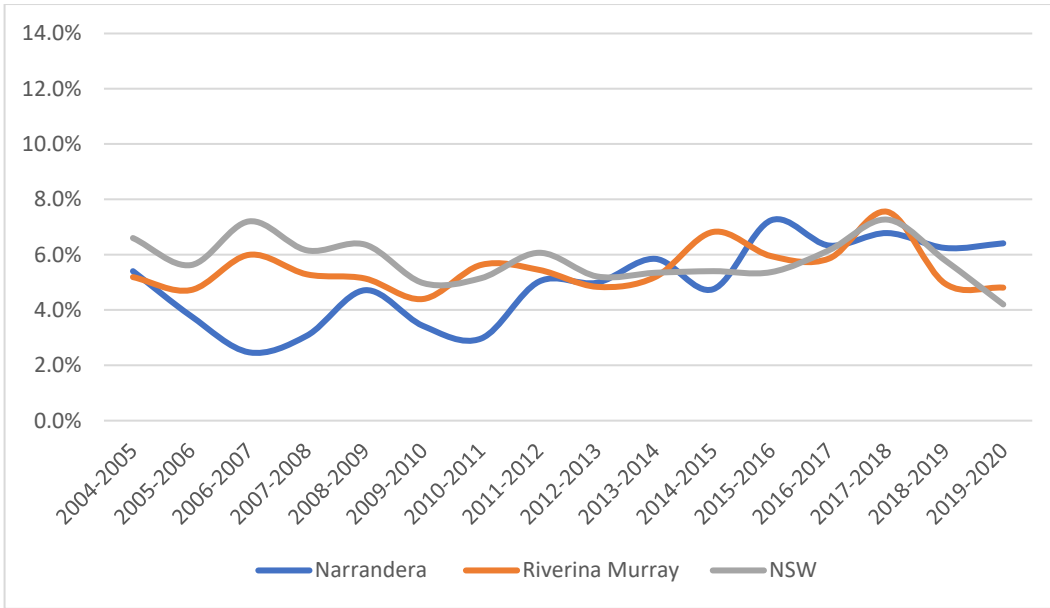


Incidence of all rural land ownership change in Murrumbidgee (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Murrumbidgee LGA, as compared to regional and state-wide rates of change.

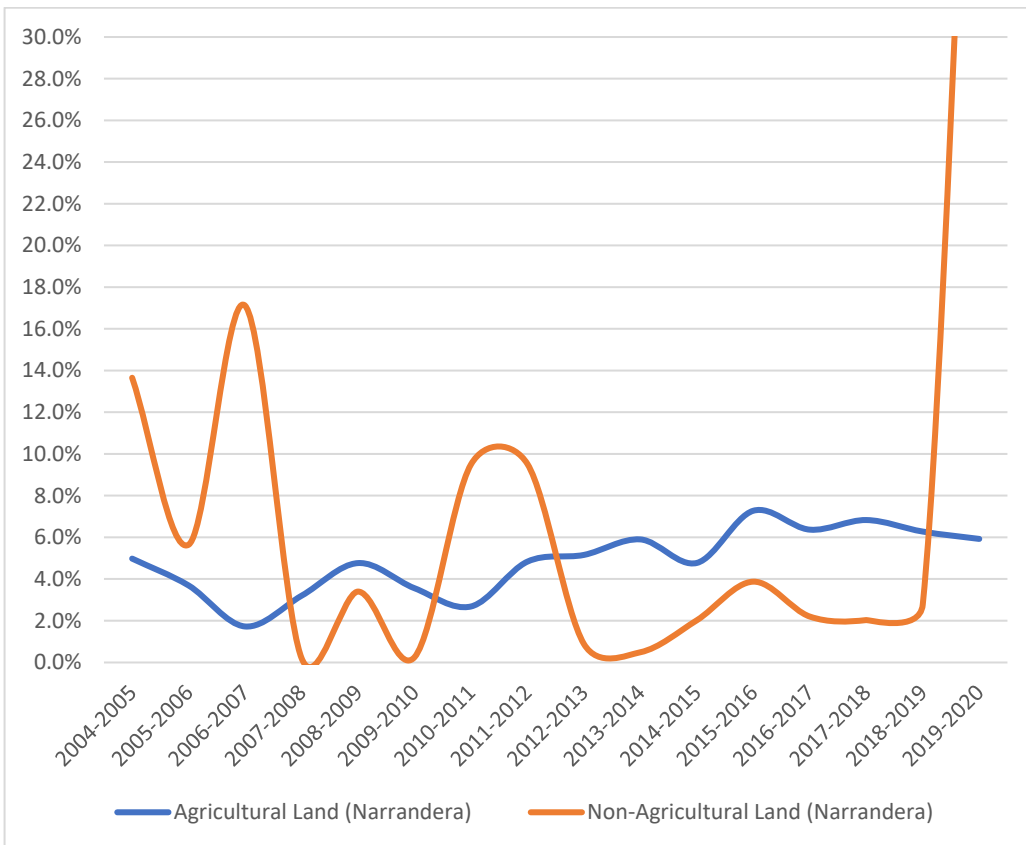


Incidence of agricultural land ownership changes in Murrumbidgee (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Murrumbidgee, as compared to the rate of change for non-agricultural rural land.

Narrandera

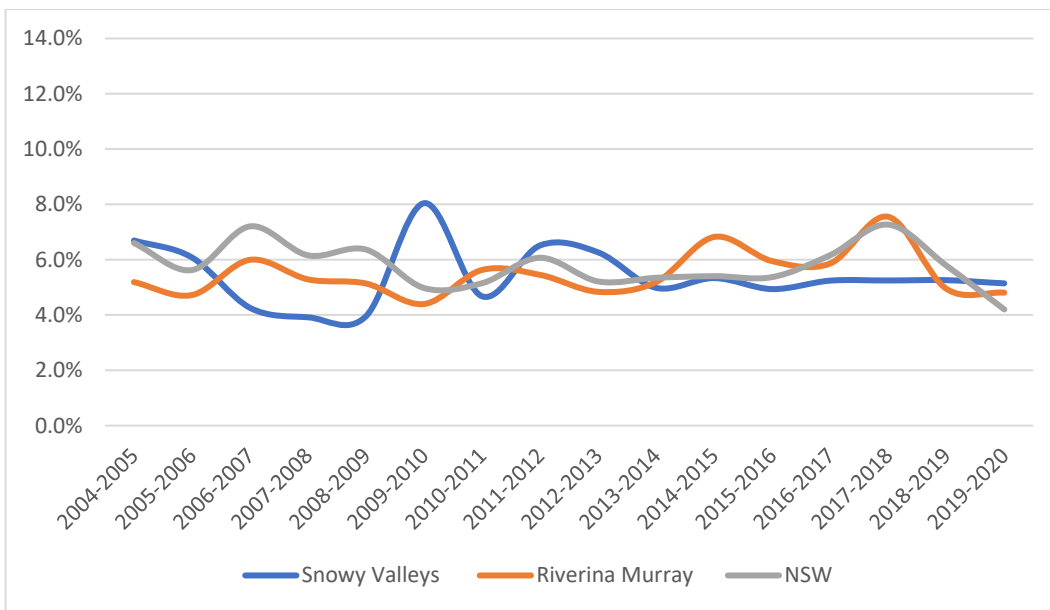


Incidence of all rural land ownership change in Narrandera (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Narrandera LGA, as compared to regional and state-wide rates of change.

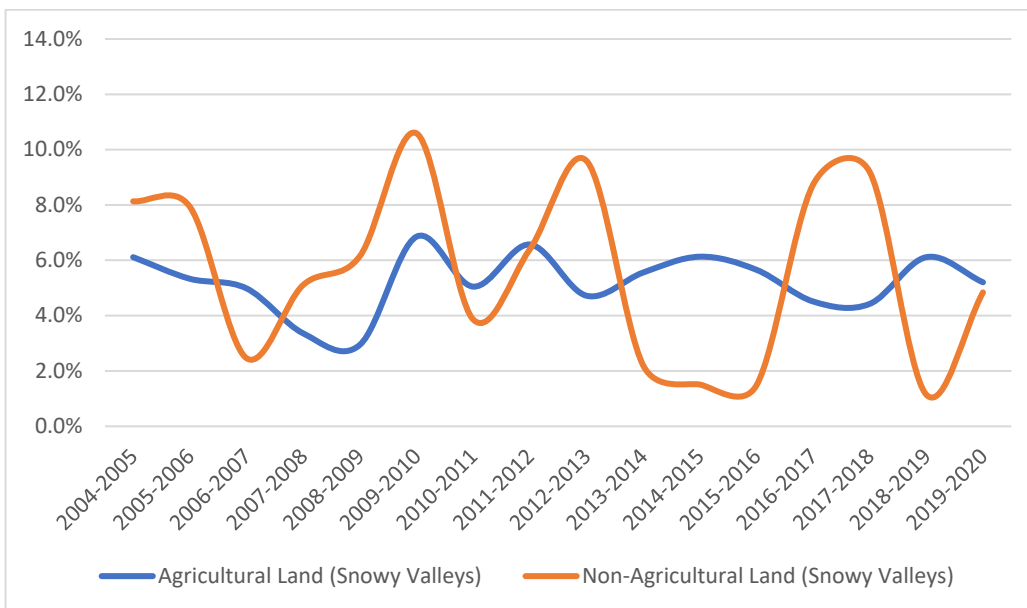


Incidence of agricultural land ownership changes in Narrandera (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Narrandera, as compared to the rate of change for non-agricultural rural land.

Snowy Valleys

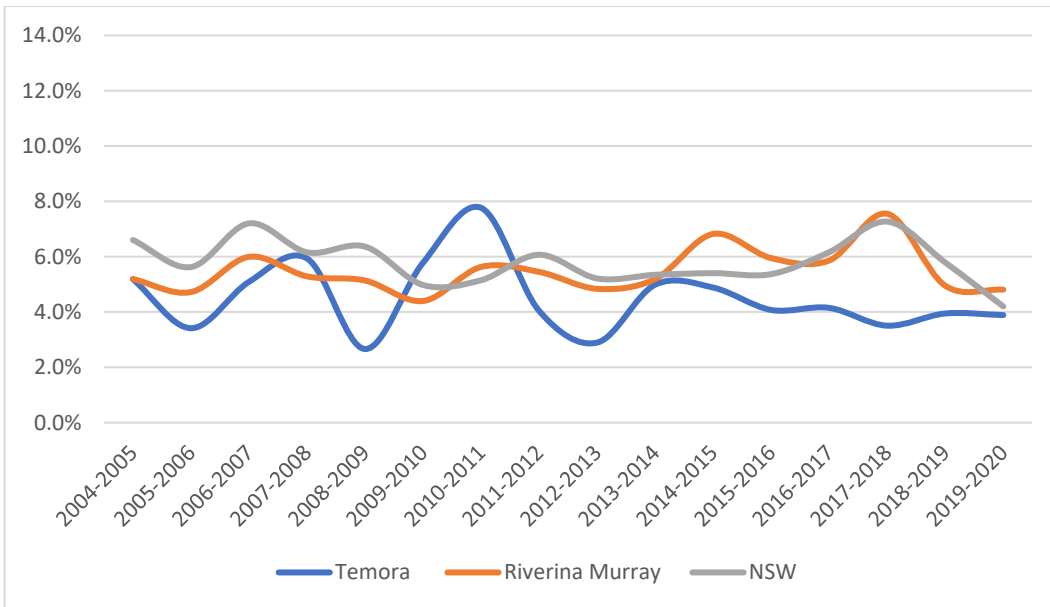


Incidence of all rural land ownership change in Snowy Valleys (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Snowy Valleys LGA, as compared to regional and state-wide rates of change.

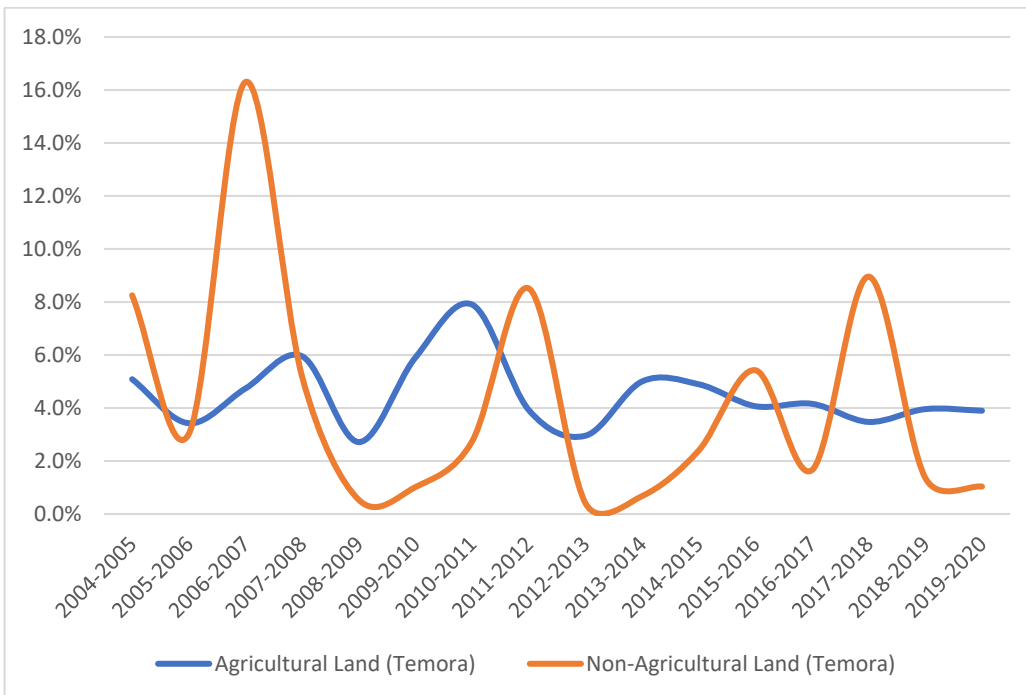


Incidence of agricultural land ownership changes in Snowy Valleys (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Snowy Valleys, as compared to the rate of change for non-agricultural rural land.

Temora

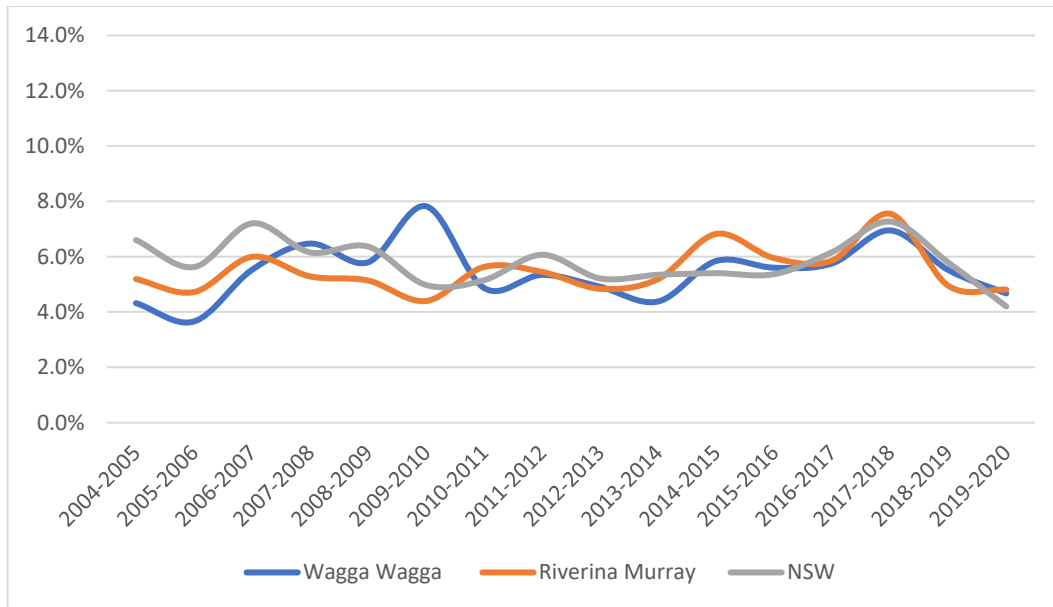


Incidence of all rural land ownership change in Temora (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Temora LGA, as compared to regional and state-wide rates of change.

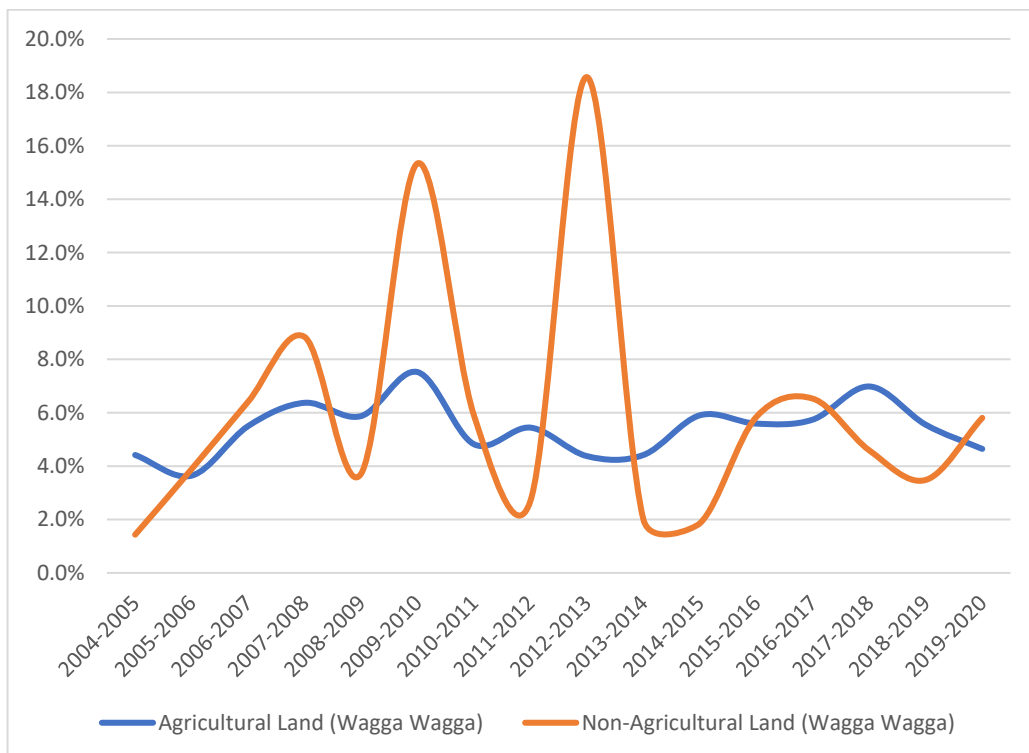


Incidence of agricultural land ownership changes in Temora (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Temora, as compared to the rate of change for non-agricultural rural land.

Wagga Wagga



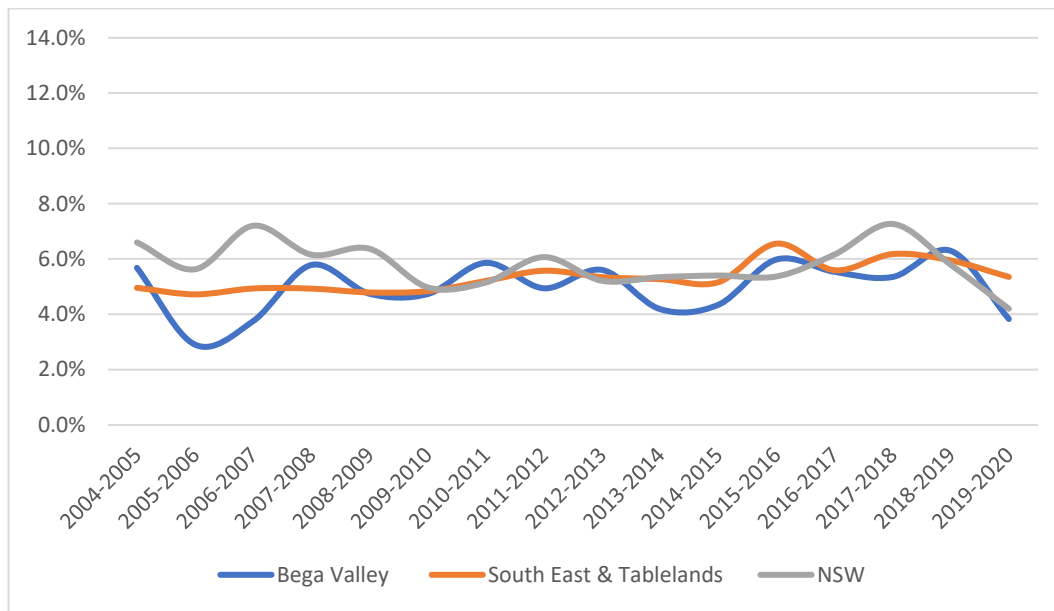
Incidence of all rural land ownership change in Wagga Wagga (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Wagga Wagga LGA, as compared to regional and state-wide rates of change.



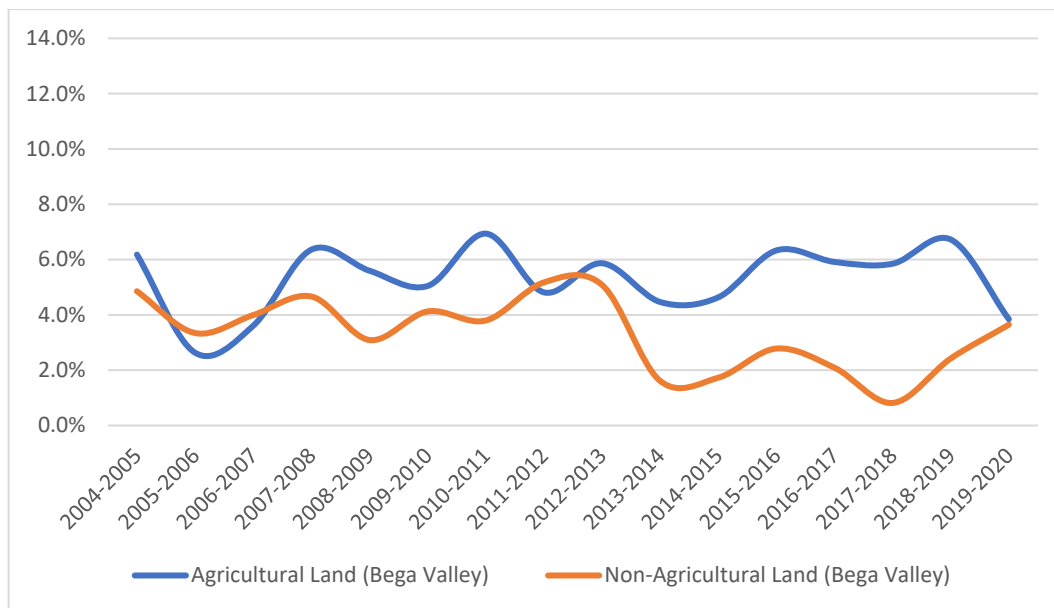
Incidence of agricultural land ownership changes in Wagga Wagga (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Wagga Wagga, as compared to the rate of change for non-agricultural rural land.

South East & Tablelands

Bega Valley

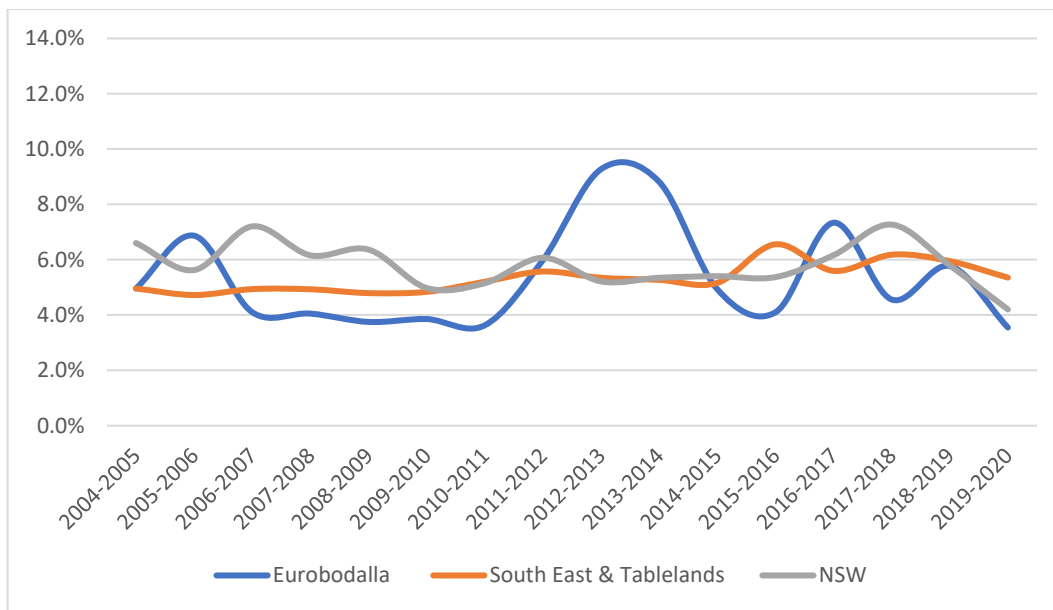


Incidence of all rural land ownership change in Bega Valley (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Bega Valley LGA, as compared to regional and state-wide rates of change.

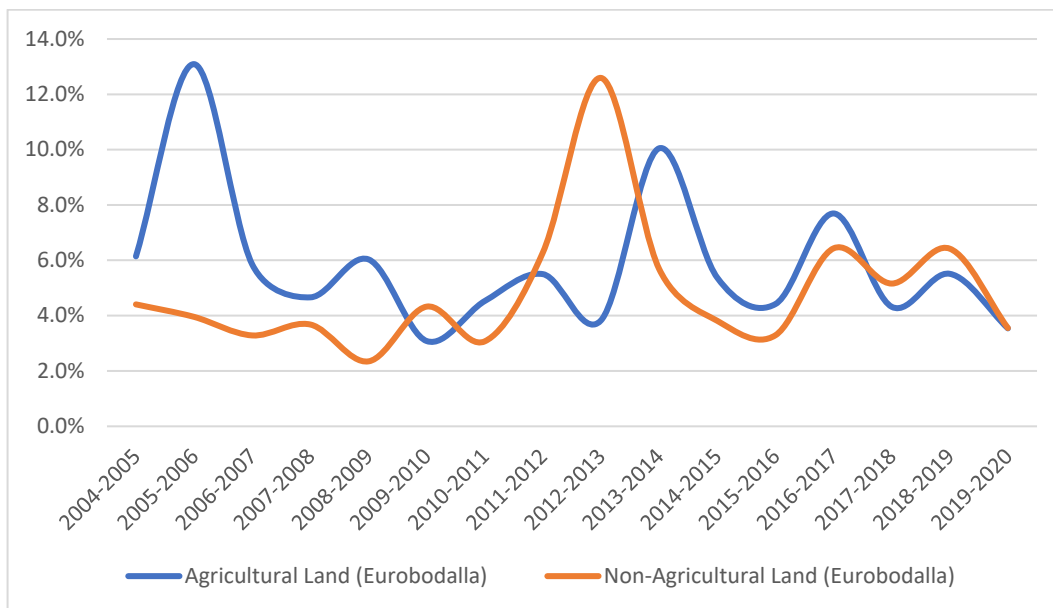


Incidence of agricultural land ownership changes in Bega Valley (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Bega Valley LGA, as compared to the rate of change for non-agricultural rural land.

Eurobodalla

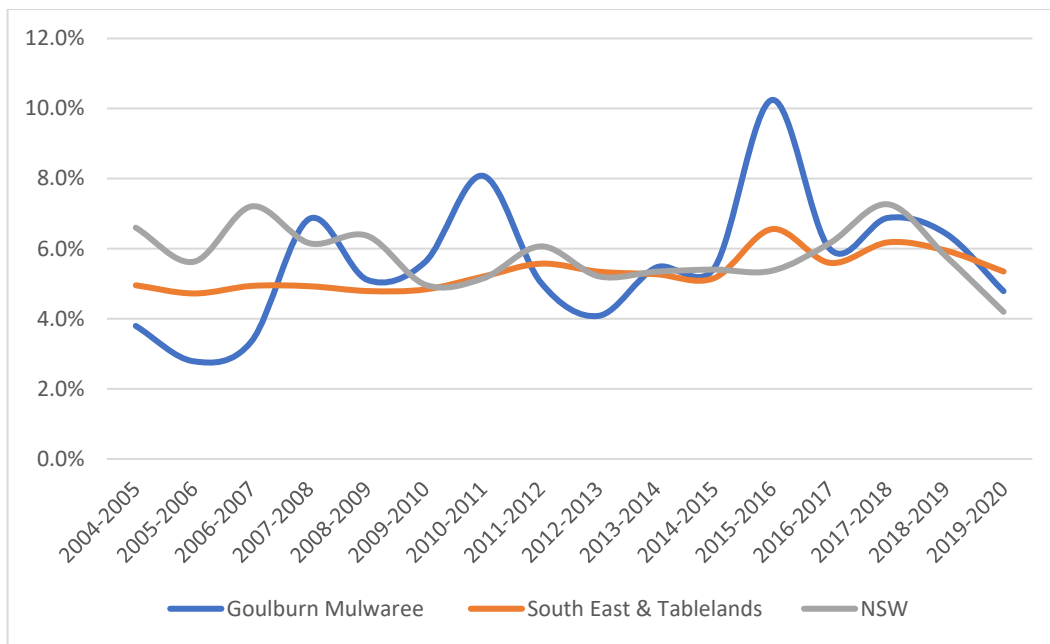


Incidence of all rural land ownership change in Eurobodalla (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Eurobodalla LGA, as compared to regional and state-wide rates of change.

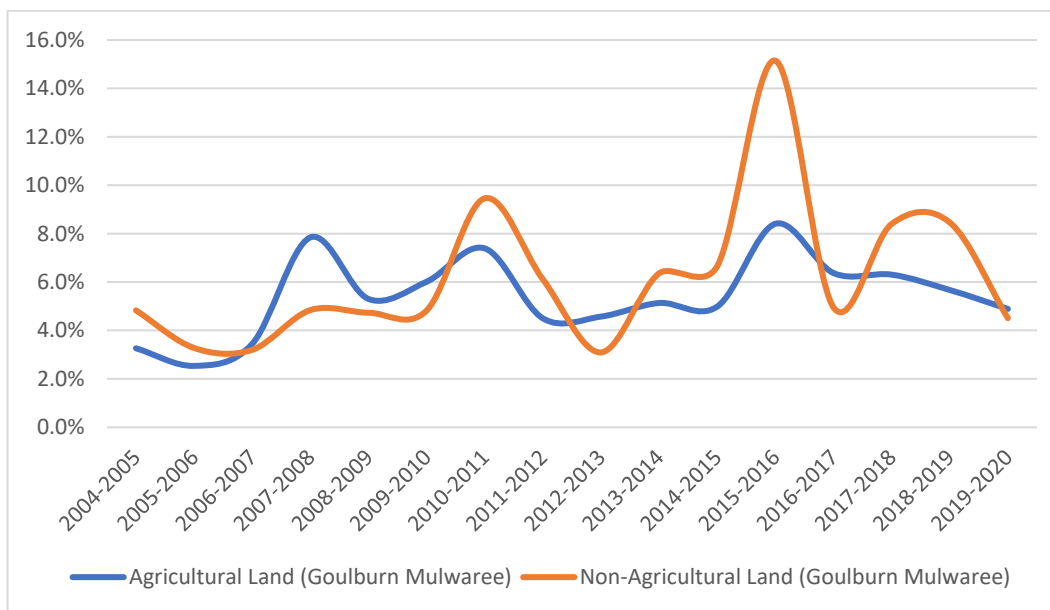


Incidence of agricultural land ownership changes in Eurobodalla (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Eurobodalla LGA, as compared to the rate of change for non-agricultural rural land.

Goulburn Mulwaree

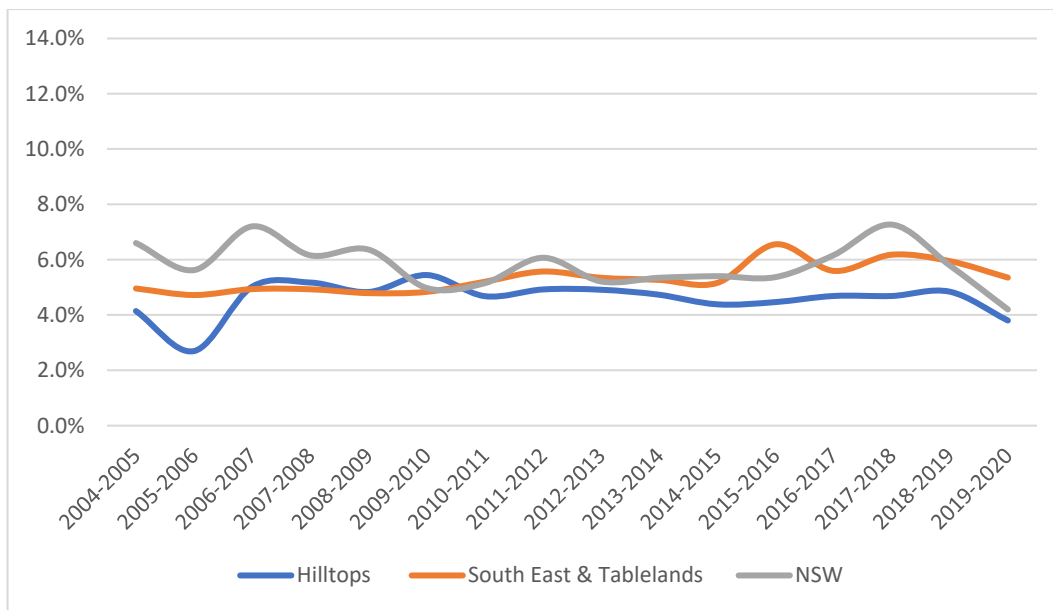


Incidence of all rural land ownership change in Goulburn Mulwaree (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Goulburn Mulwaree LGA, as compared to regional and state-wide rates of change.

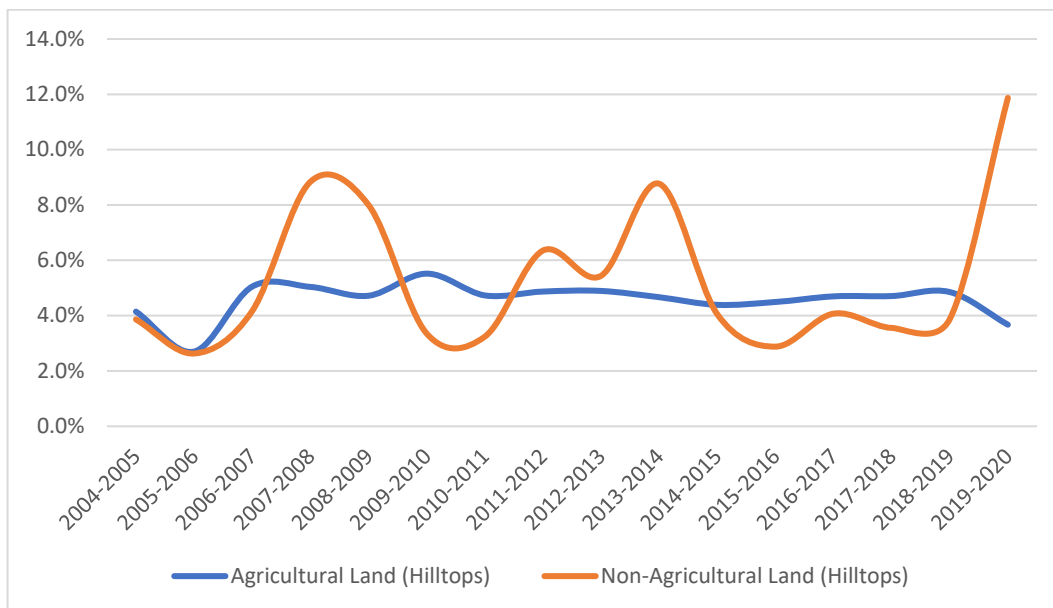


Incidence of agricultural land ownership changes in Goulburn Mulwaree (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Goulburn Mulwaree LGA, as compared to the rate of change for non-agricultural rural land.

Hilltops

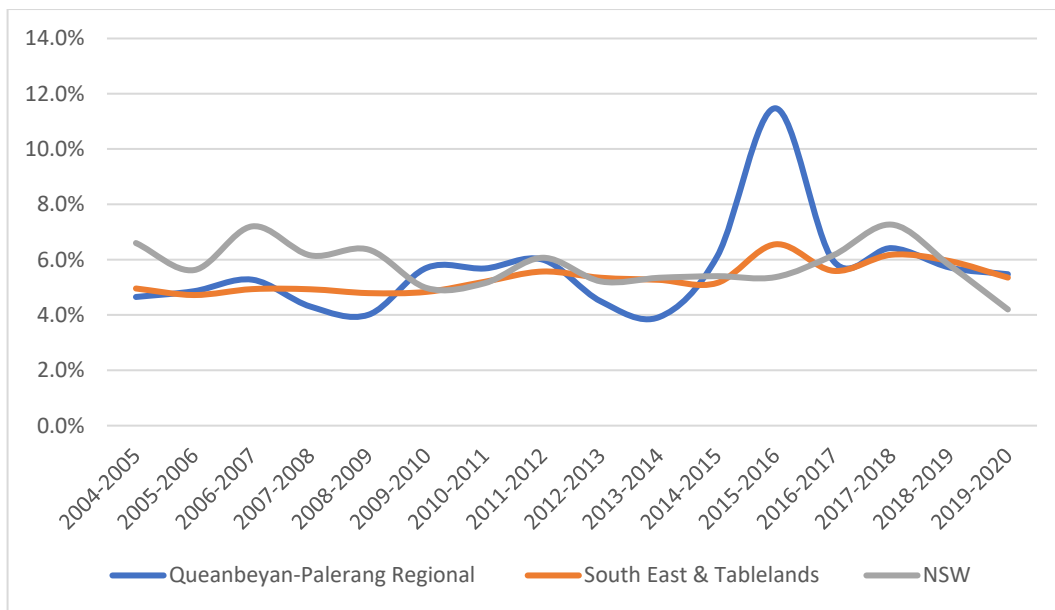


Incidence of all rural land ownership change in Hilltops (% Area). Percentage of total area which changed owner/s by year for the period 2004-2020 January 2004 - January 2020 for Hilltops LGA, as compared to regional and state-wide rates of change.

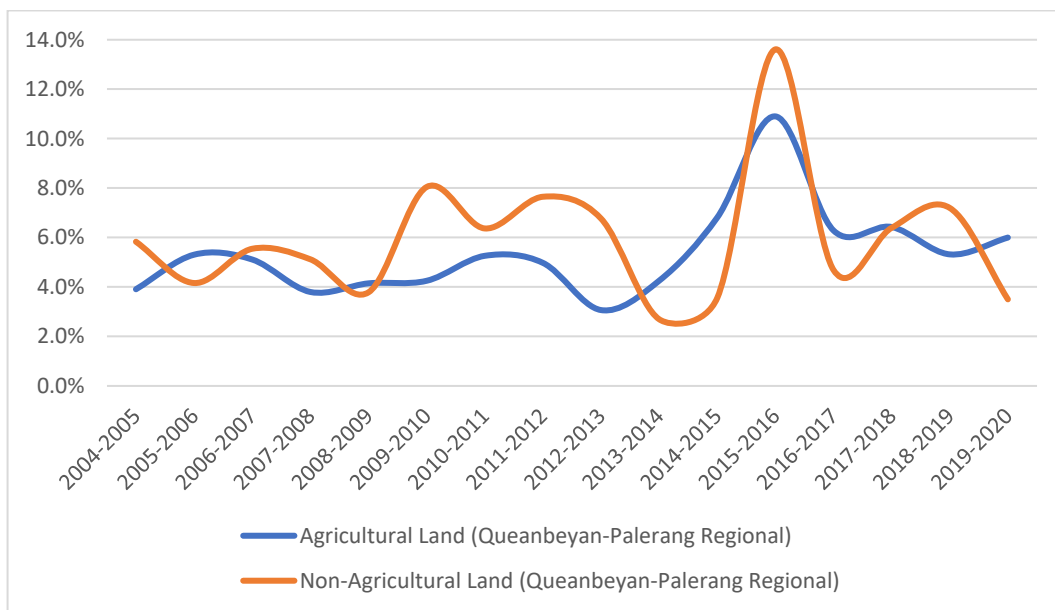


Incidence of agricultural land ownership changes in Hilltops (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Hilltops LGA, as compared to the rate of change for non-agricultural rural land.

Queanbeyan-Palerang Regional

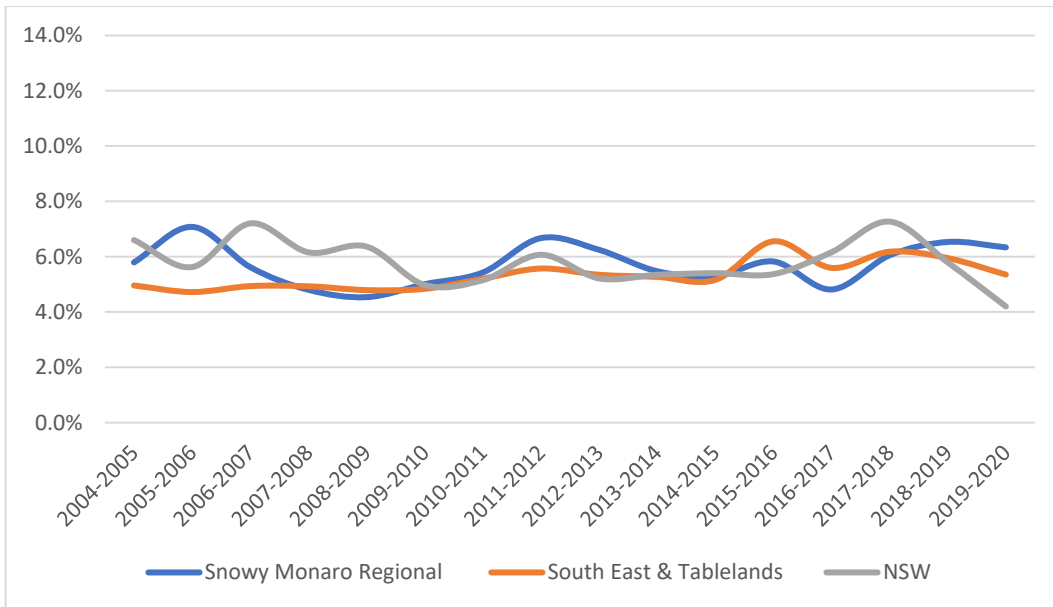


Incidence of all rural land ownership change in Queanbeyan-Palerang Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Queanbeyan-Palerang Regional LGA, as compared to regional and state-wide rates of change.

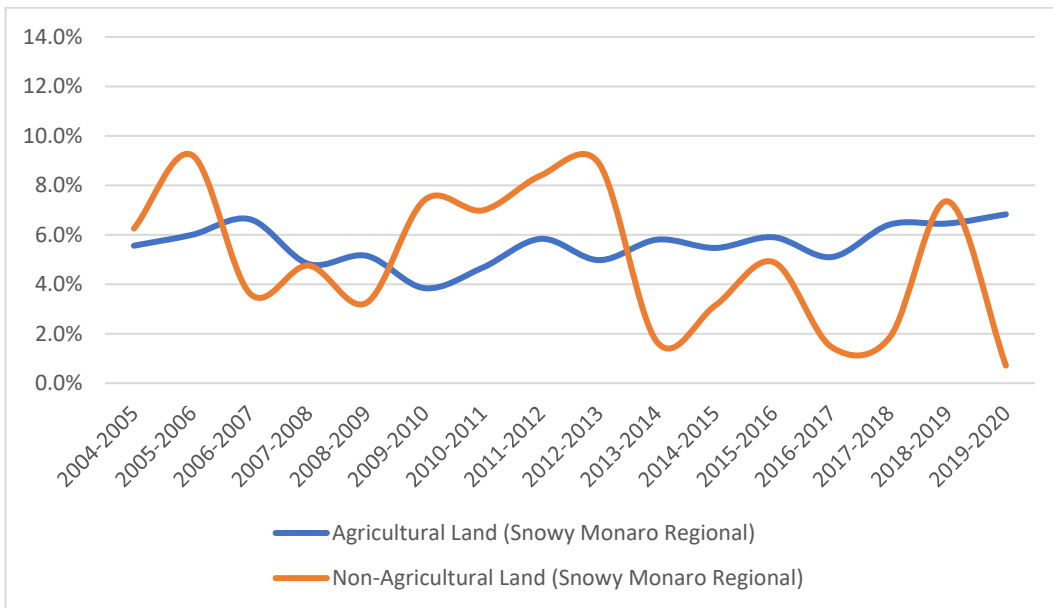


Incidence of agricultural land ownership changes in Queanbeyan-Palerang Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Queanbeyan-Palerang Regional LGA, as compared to the rate of change for non-agricultural rural land.

Snowy Monaro Regional

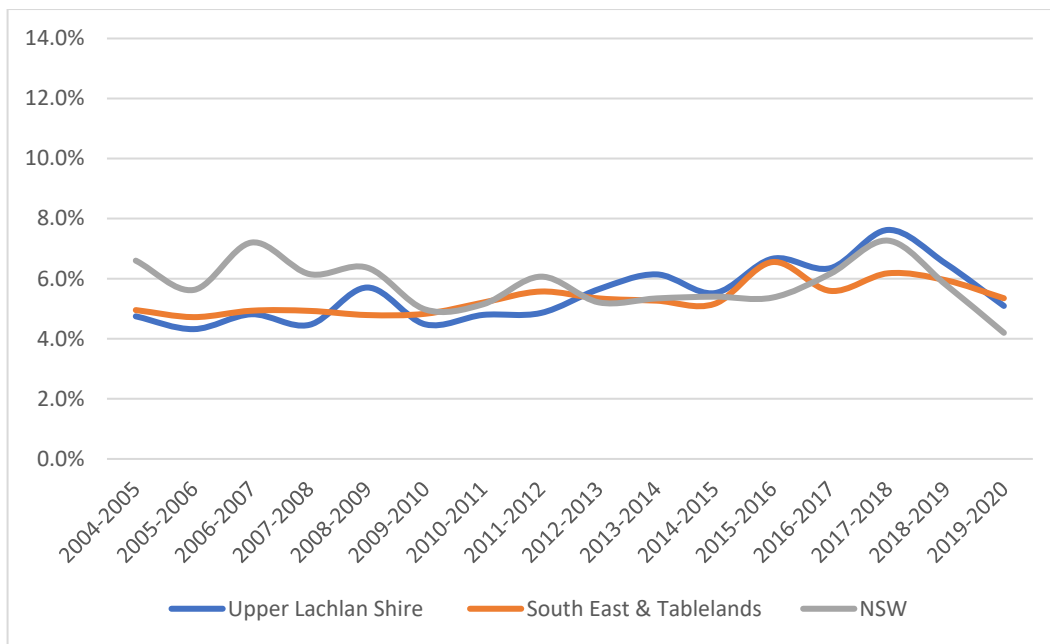


Incidence of all rural land ownership change in Snowy Monaro Regional (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Snowy Monaro Regional LGA, as compared to regional and state-wide rates of change.

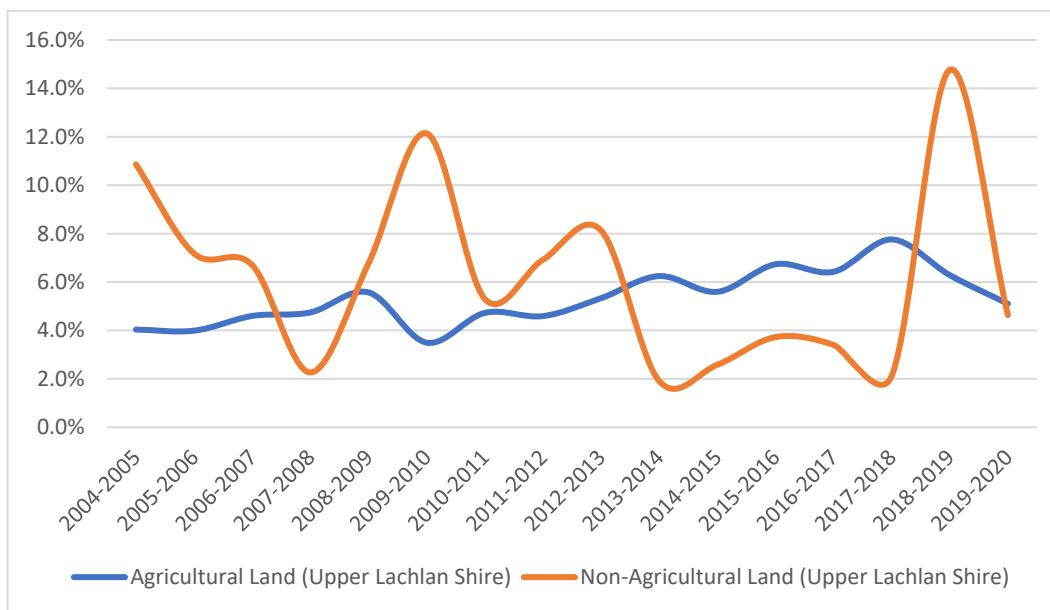


Incidence of agricultural land ownership changes in Snowy Monaro Regional (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Snowy Monaro Regional LGA, as compared to the rate of change for non-agricultural rural land.

Upper Lachlan Shire

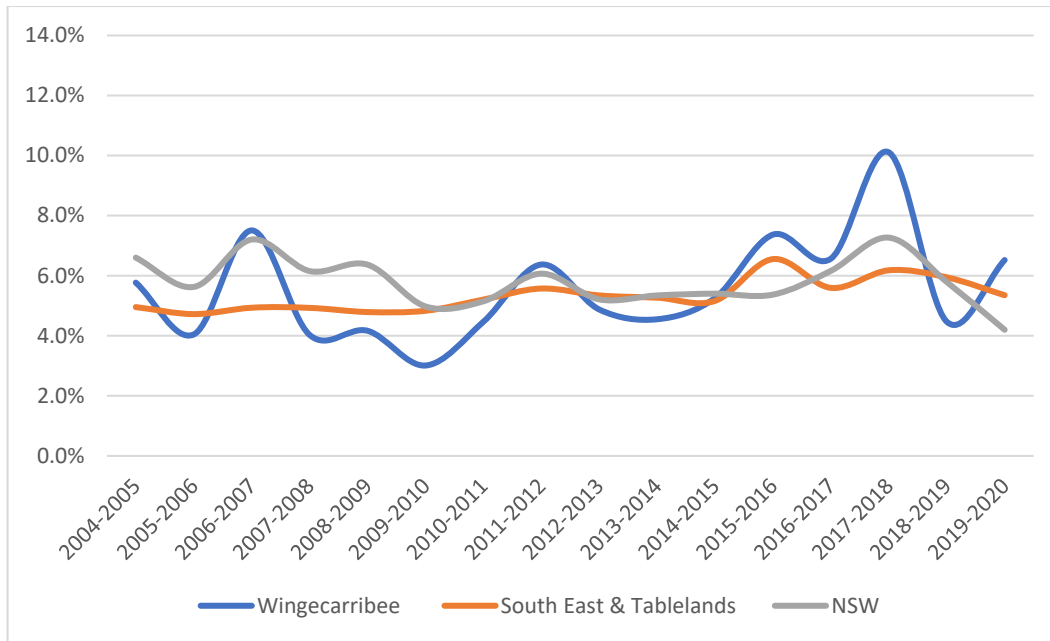


Incidence of all rural land ownership change in Upper Lachlan Shire (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Upper Lachlan Shire LGA, as compared to regional and state-wide rates of change.

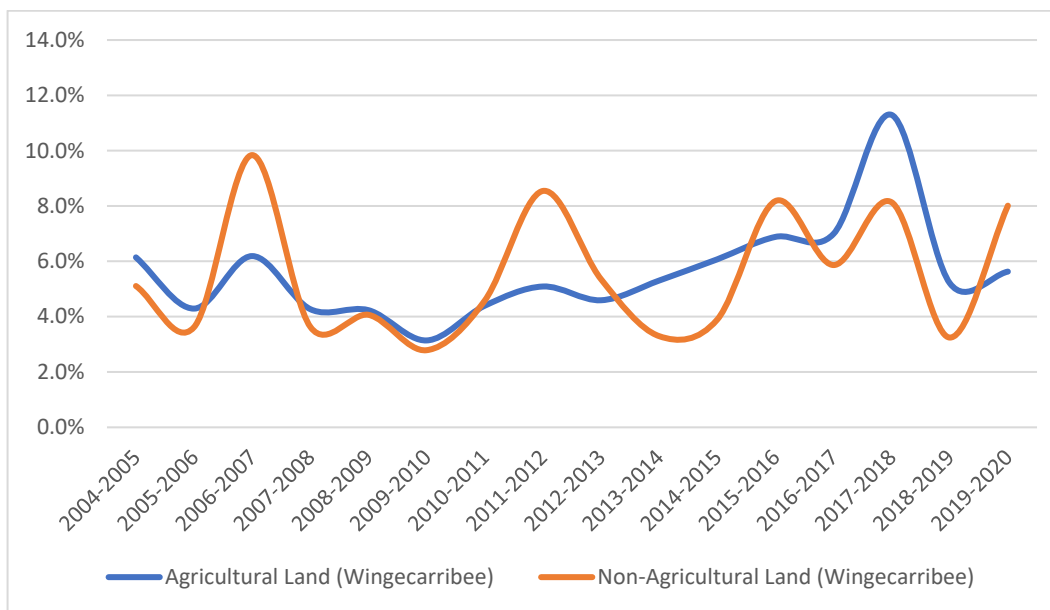


Incidence of agricultural land ownership changes in Upper Lachlan Shire (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Upper Lachlan Shire LGA, as compared to the rate of change for non-agricultural rural land.

Wingecarribee

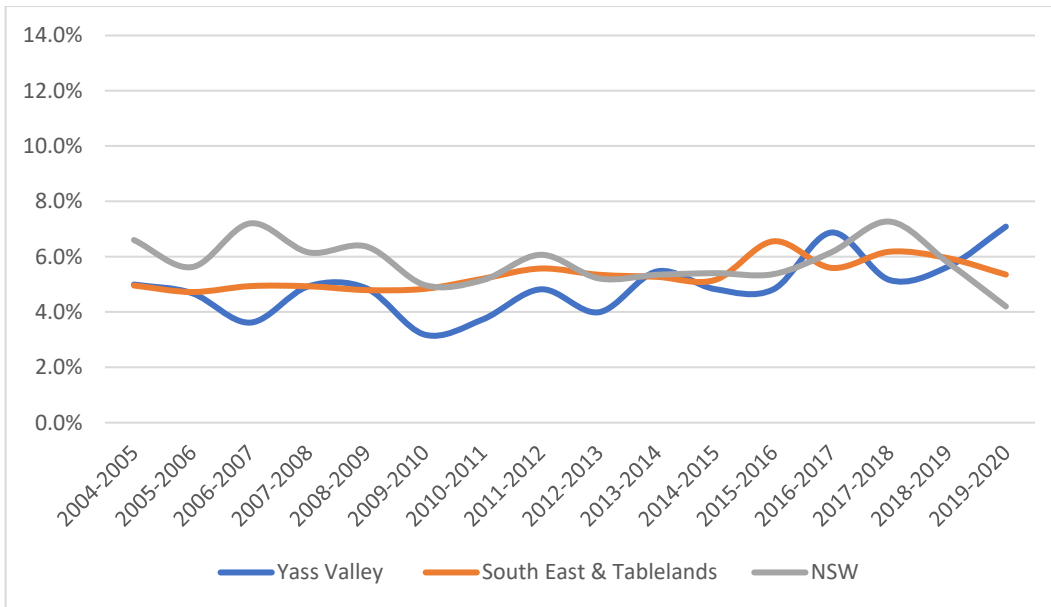


Incidence of all rural land ownership change in Wingecarribee (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Wingecarribee LGA, as compared to regional and state-wide rates of change.

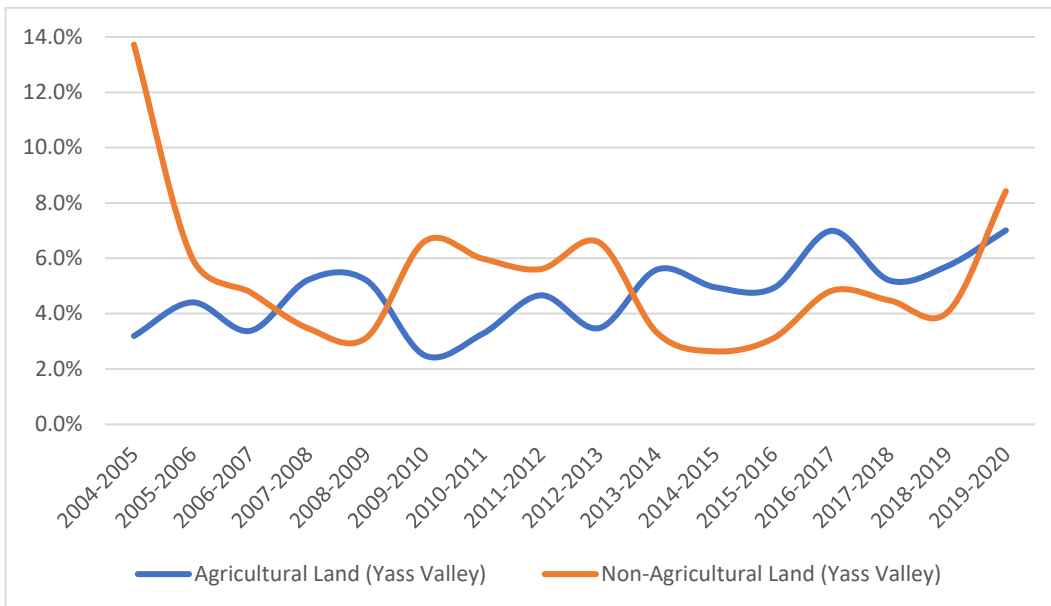


Incidence of agricultural land ownership changes in Wingecarribee (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Wingecarribee LGA, as compared to the rate of change for non-agricultural rural land.

Yass Valley



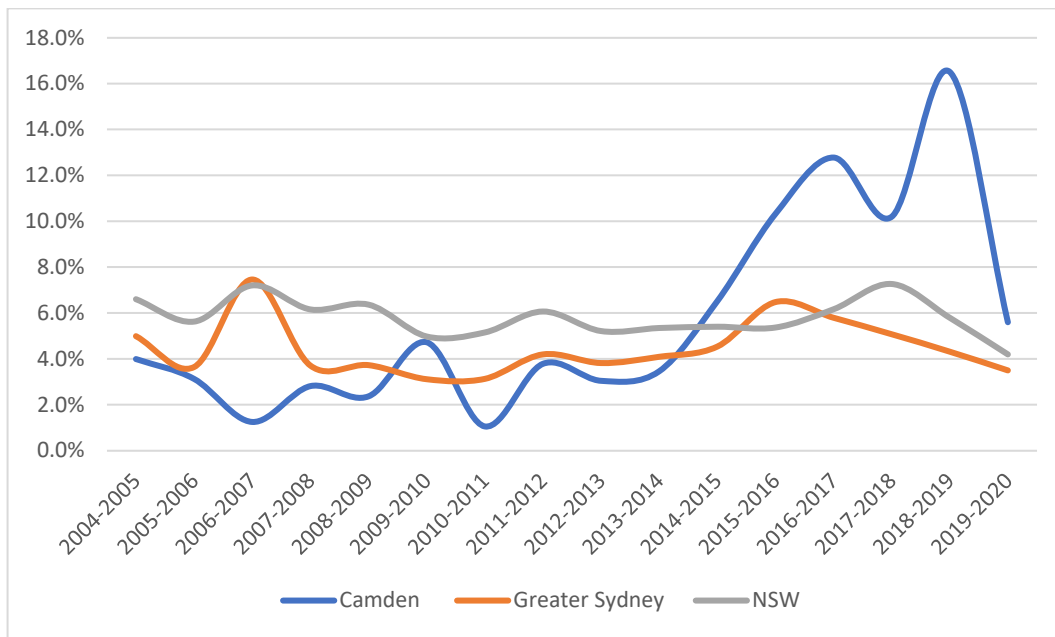
Incidence of all rural land ownership change in Yass Valley (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Yass Valley LGA, as compared to regional and state-wide rates of change.



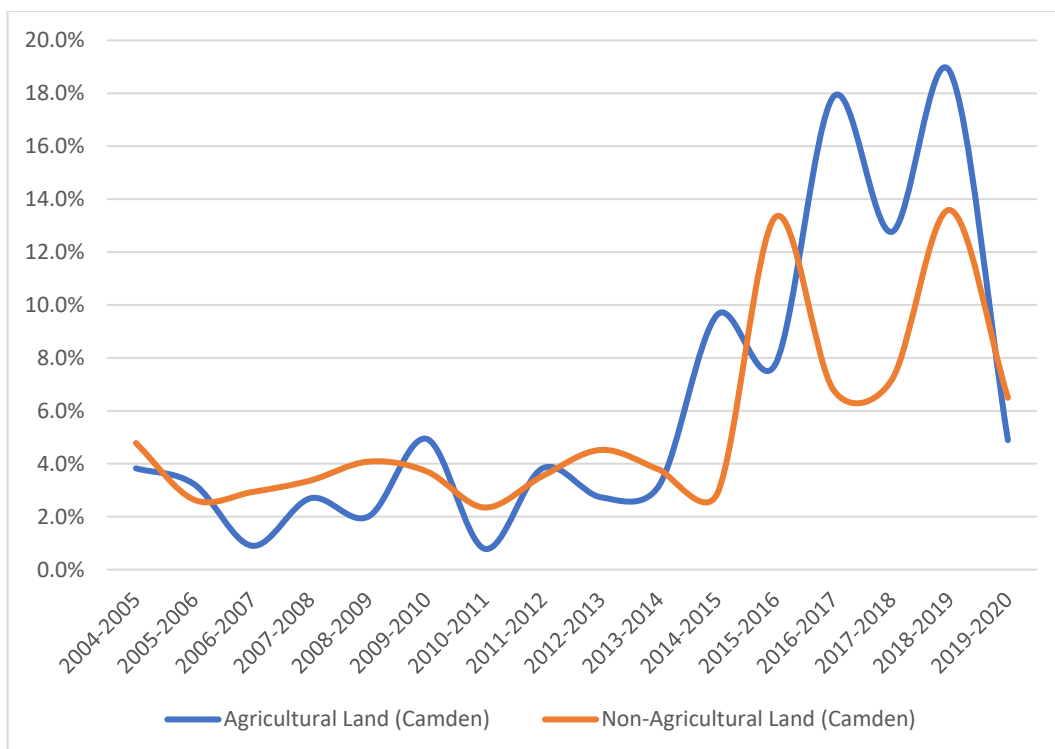
Incidence of agricultural land ownership changes in Yass Valley (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Yass Valley LGA, as compared to the rate of change for non-agricultural rural land.

Greater Sydney

Camden

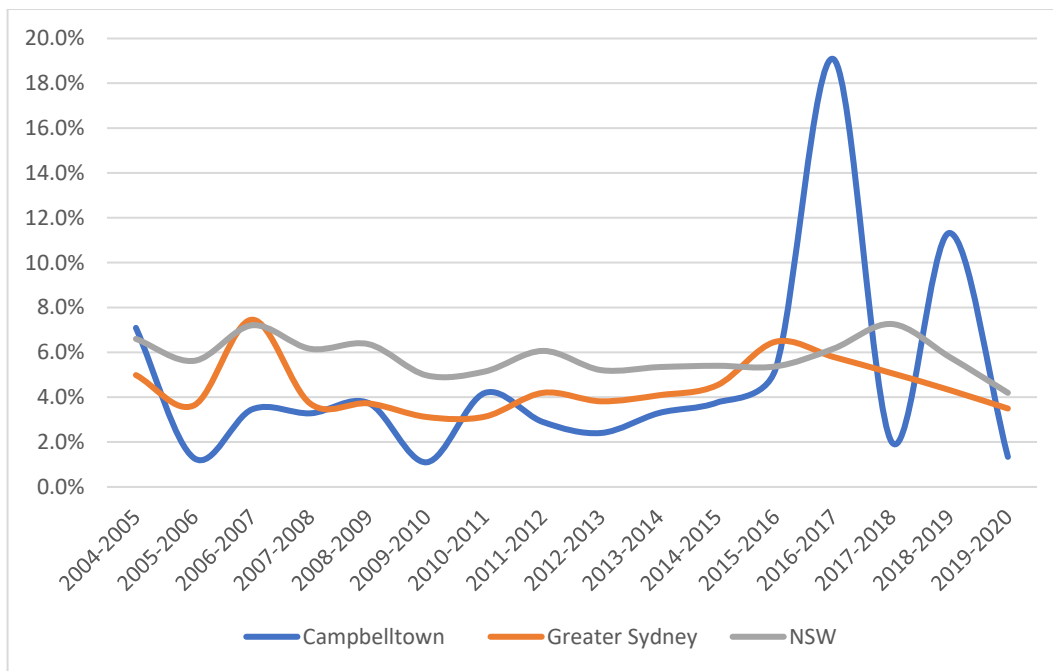


Incidence of all rural land ownership change in Camden (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Camden LGA, as compared to regional and state-wide rates of change.

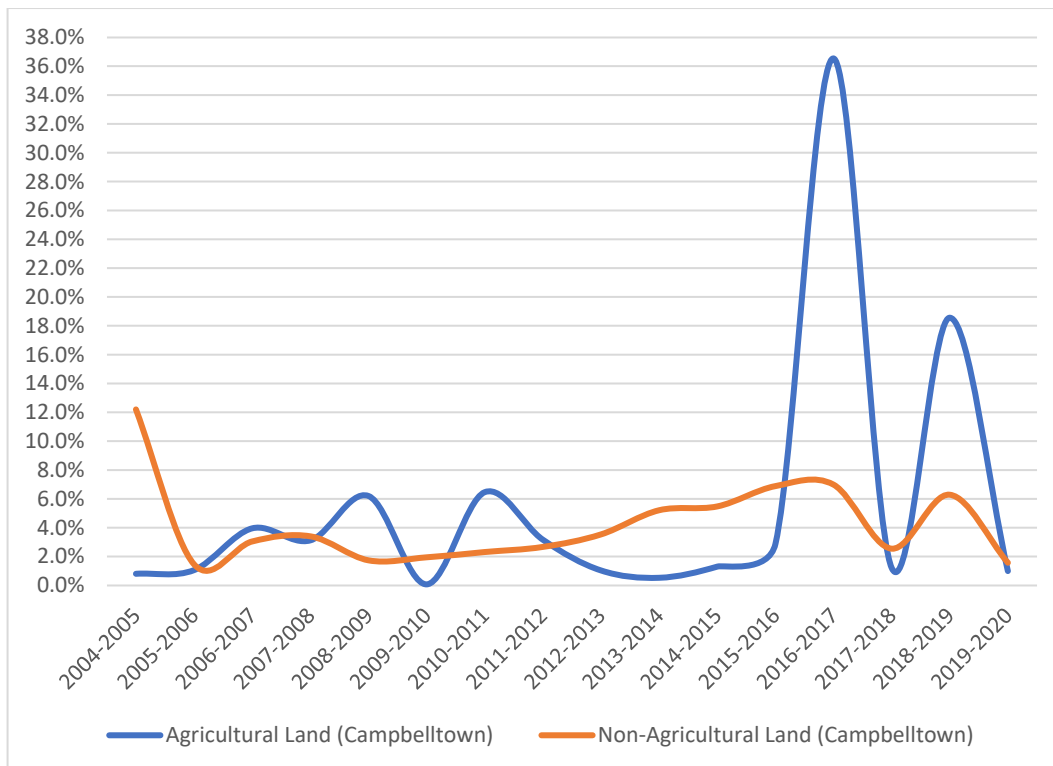


Incidence of agricultural land ownership changes in Camden (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Camden LGA, as compared to the rate of change for non-agricultural rural land.

Campbelltown

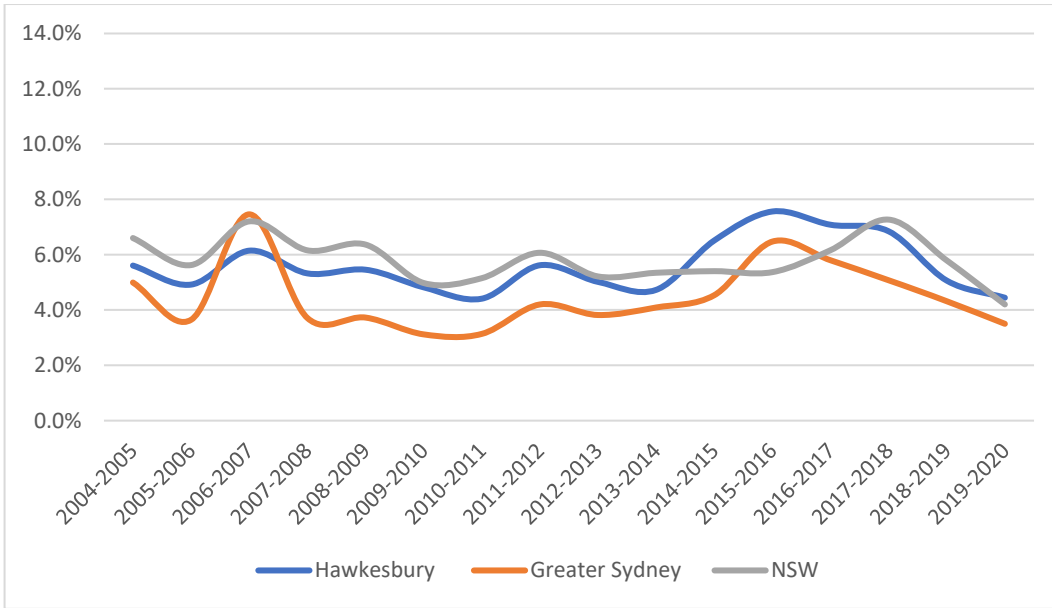


Incidence of all rural land ownership change in Campbelltown (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Campbelltown LGA, as compared to regional and state-wide rates of change.

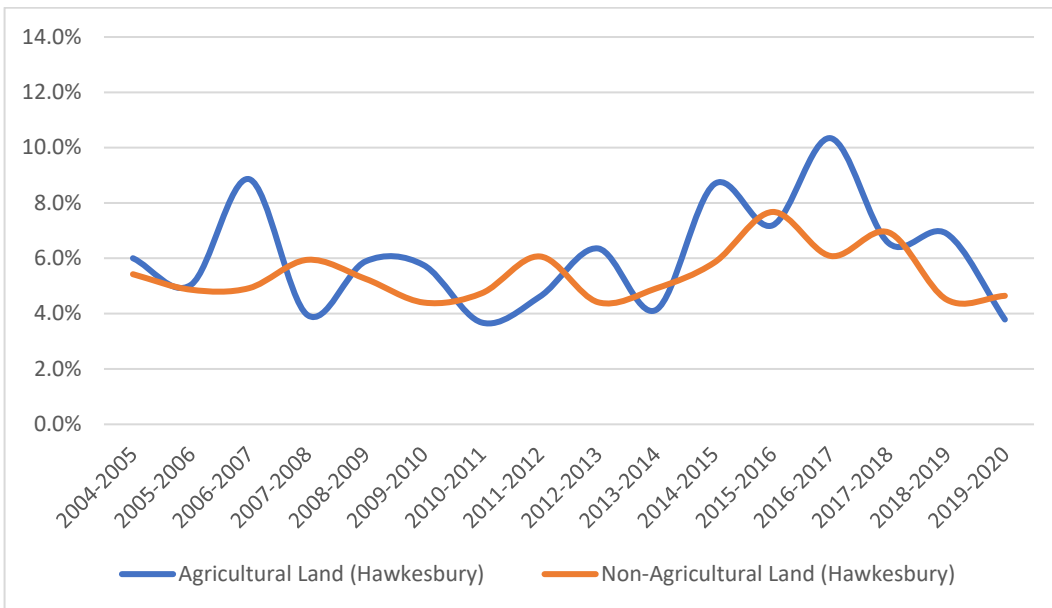


Incidence of agricultural land ownership changes in Campbelltown (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Campbelltown LGA, as compared to the rate of change for non-agricultural rural land.

Hawkesbury

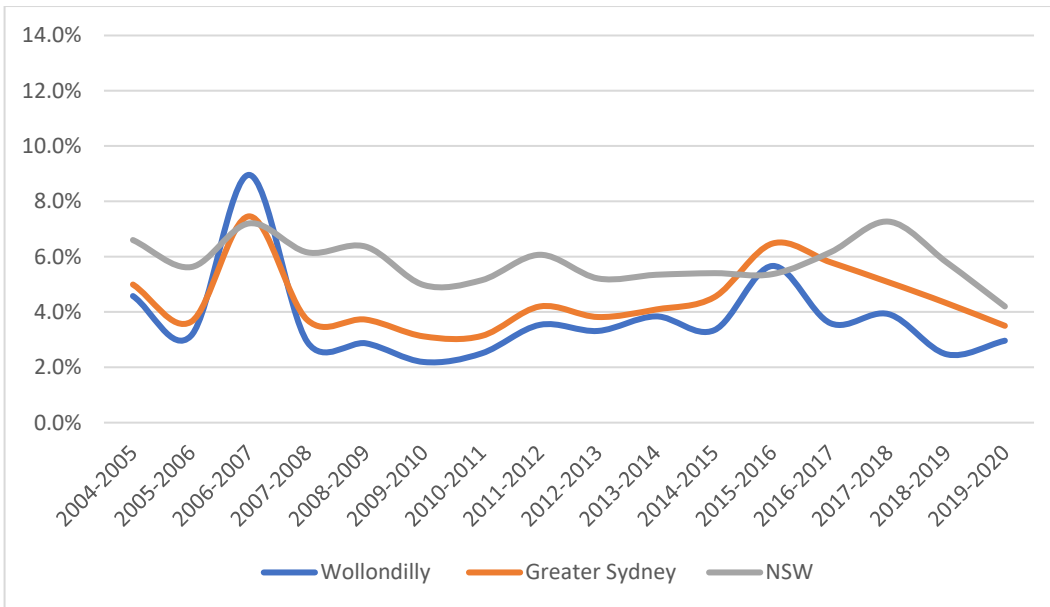


Incidence of all rural land ownership change in Hawkesbury (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Hawkesbury LGA, as compared to regional and state-wide rates of change.

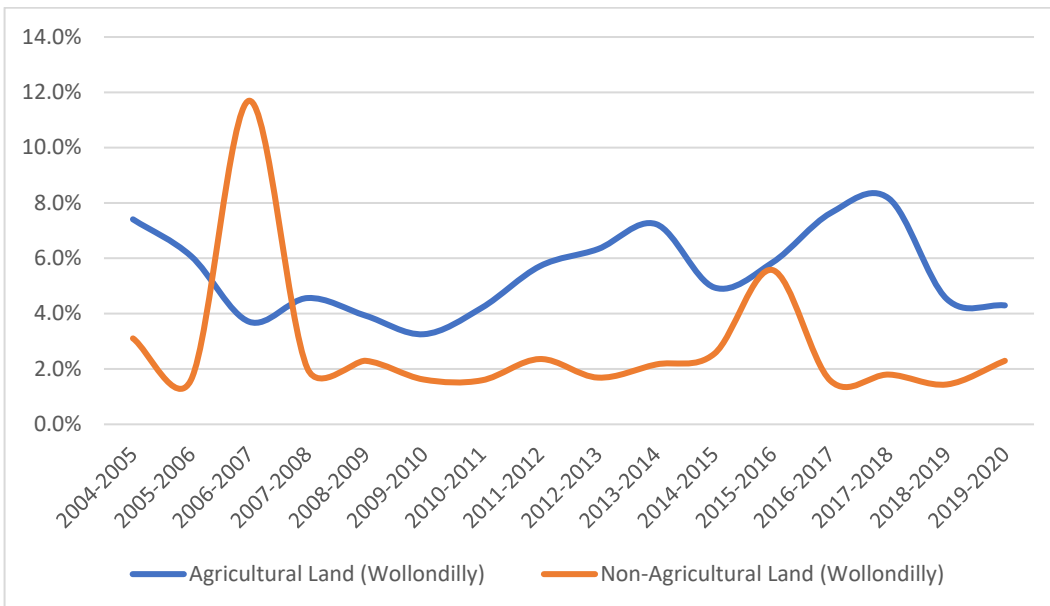


Incidence of agricultural land ownership changes in Hawkesbury (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Hawkesbury LGA, as compared to the rate of change for non-agricultural rural land.

Wollondilly



Incidence of all rural land ownership change in Wollondilly (% Area). Percentage of total area which changed owner/s by year for the period January 2004 - January 2020 for Wollondilly LGA, as compared to regional and state-wide rates of change.



Incidence of agricultural land ownership changes in Wollondilly (% Area). Percentage of land defined as agricultural which changed owner/s by year for the period January 2004 - January 2020 in Wollondilly LGA, as compared to the rate of change for non-agricultural rural land.

Appendix E: Metadata

| Field Name | Description | Details |
|---|--|---|
| OID | ObjectID | |
| cadid | Cadastre ID from respective layer | |
| BaselineCADID | Cadastre ID from Baseline (2004 layer) | Calculated by doing a spatial join between the year and the baseline, with the baseline layer converted into points. Where multiple baseline lots were located in the year's lots (amalgamation), the first value is assigned. |
| Area_m2 | Area in square metres | |
| LGAonly_baseline_agu sut25_LGA_NAME | LGA Name (From Baseline) | Calculated by matching the baseline's LGA field to the year's LGA field by joining it to the baseline field using the BaselineCADID as the joining field. This ensures that the LGA is assigned consistently to all lots across different years, regardless of shape changes, subdivisions, or amalgamations. LGA boundaries were assigned using the ABS 2016 boundaries. |
| LGAonly_baseline_agu sut25_Region | NSW Region (From Baseline, based on LGA) | Calculated by matching the baseline's Region field to the year's Region field by joining it to the baseline field using the BaselineCADID as the joining field. This ensures that the Region is assigned consistently to all lots across different years, regardless of shape changes, subdivisions, or amalgamations. Region boundaries were assigned using the ABS 2016 boundaries. |
| T2005_T2004_05a_cadid | cadid (from ownership table) | |
| T2005_T2004_05a_Owner_Category_2005 | Ownership category of Owner (1-12, details elsewhere) | For owner on 1 January 2005 |
| T2005_T2004_05a_Owner_category_SIMPLIFIED_2005 | Simplified Ownership Category (A-D, details elsewhere) | For owner on 1 January 2005 |
| T2005_T2004_05a_Owner1 | Owner name 1 | For owner on 1 January 2005 |
| T2005_T2004_05a_Owner2 | Owner name 2 | For owner on 1 January 2005 |
| T2005_T2004_05a_Owner3 | Owner name 3 | For owner on 1 January 2005 |

| | | |
|---|--|---|
| T2005_T2004_05a_Owner4 | Owner name 4 | For owner on 1 January 2005 |
| T2005_T2004_05a_Owner5 | Owner name 5 | For owner on 1 January 2005 |
| T2005_T2004_05a_New_lot_from_previous_year | 1 indicates that the cadastre ID was created in the calendar year 2004-05. So 1 means the CADID did not exist the year before, indicating a potential subdivision. Identifies lots that are the result of subdivision in the previous calendar year. | |
| T2005_T2004_05a_Amalgamation04_05 | Number indicates how many parcels (feature points) were inside the polygon from the former year's layer – indicating the number of aggregations that happened in the calendar year (2004-05) | This is calculated by spatially joining the layer with the previous year's layer (in point format) and doing a 'count' of number on points within the polygon. |
| T2005_T2004_05a_Subdivision05_06 | Number indicates how many parcels (feature points) were inside the polygon from the following year's layer - indicating the number of subdivisions | This is calculated by spatially joining the layer with the following year's layer (in point format) and doing a 'count' of number on points within the polygon. |
| T2005_T2004_05a_Amalg04_05 | If T2005_T2004_05a_Amalgamation04_05 >1, there is a "1" indicating an aggregation occurred using this parcel. If there is a 0 (or blank) there was no aggregation. | 1 indicates YES amalgamations in the 2004-05 calendar year. 0 indicates NO amalgamations in the 2004-05 calendar year. |
| T2005_T2004_05a_SDO5_06 | If T2005_T2004_05a_Subdivision05_06 >1, there is a "1" indicating a subdivision occurred using this parcel. If there is a 0 (or blank) there was no subdivision event | 1 indicates YES subdivisions in the 2005-06 calendar year. 0 indicates NO subdivisions in the 2005-06 calendar year. |
| T2005_T2004_05a_Seller_category | Ownership category of the previous owner | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Seller_category2 | Simplified Ownership category of the previous owner | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |

| | | |
|-----------------------------------|--|---|
| T2005_T2004_05a_Seller1 | Previous Owner name 1 | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Seller2 | Previous Owner name 2 | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Seller3 | Previous Owner name 2 | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Seller4 | Previous Owner name 3 | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Seller5 | Previous Owner name 3 | If the seller cells are blank, it means the parcel did not change hands in the 2004-05 calendar year. |
| T2005_T2004_05a_Similarity | Similarity score comparing owner name string to seller name string. Thresholds for likeness used on raw score. IF the score ≥ 70 , it was assigned a 1, ≤ 20 assigned a 0, otherwise raw score remains. The 70% threshold was decided based on manual check-up for similarity scores across a sample of years. 70% was the average value on which similarity was not a clear exact match. 20% was decided by manually comparing scores across a sample of years, it was the average score at which similarity was not a clear sale between completely different parties. | Similarity scores were calculated using pwrSIMILARITY plug-in (see RawSimilarity) |
| T2005_T2004_05a_Change_new | Derived from T2005_T2004_05a_Similarity, 1 indicates it was 0, 0 (a change occurred), 0 indicates it was $\neq 1$ (name was too similar so no change occurred), and 2 indicates the change similarity was between 20-70%. | Change represented as 2 includes: instances where seller and buyer share a surname (could mean a family transaction, a death or a marriage), where one or many of several owners changes while the rest remained the same, where there are substantial changes of company names or people names which cannot be categorised as an error). |

| | | |
|---|--|--|
| T2005_T2004_05a_RawSimilarity | Raw similarity score comparing owner name string to seller name string | Raw similarity scores were calculated using the pwrSIMILARITY function in Excel, downloaded as an Excel Add-In from Office Powerups: https://officepowerups.com/help-support/excel-function-reference/excel-text-analyzer/pwrsimilarity/ . The function compares the similarity of two strings in separate cells and returns a percentage indicating the degree of comparison between the two cells. By default, this comparison is case-sensitive, however all buyer and seller details are recorded in upper case, meaning that this default setting could be applied. The function provides the ability to vary the degree of sensitivity of the comparison, with sensitivity values ranging from 2 to 6. The value of the sensitivity parameter should be increased for larger blocks of text to provide a more rigorous comparison. In the context of its use in cleaning up the land transaction data, it was determined that a sensitivity value of 6 was most appropriate for two reasons: firstly, many entries are long strings of text and so a greater degree of sensitivity in analysing these blocks would be advantageous; and secondly, it was determined that so long as a constant threshold for determining whether a transaction was a non-transaction or a confirmed transaction, then a high sensitivity level would only affect the magnitude of the constantly applied thresholds, not the categorisation of results. |
| T2005_T2004_05a_Change | Derived from T2005_T2004_05a_Change_new, 1 indicates it as a 1 or 2 (one of the two types of changes occurred, 0 indicates it was a zero (no change) | 1 = there was an ownership change in the calendar year, 0 = no ownership change in the calendar year |
| LGALotsOwnersLU2004_2005_CDI_AgriLand_Percentage_of_TotalArea_m2 | Calculated from spatial join from ALUM land use layers. Represents the proportion of agricultural land/total cadastre parcel area. "Agricultural land" defined by specific classes (see Land Use Methods). | |
| LGALotsOwnersLU2004_2005_CDI_Agriculture_Sample | Derived from LGALotsOwnersLU2004_2005_CDI_AgriLand_Percentage_of_TotalArea_m2. If >50% =1, if <=50 =0. | |
| F_2005_ALUM2007_FINAL_Nature_conservation_110 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). | |
| F_2005_ALUM2007_FINAL_Managed_resource_protection_120 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). | |

| | |
|---|--|
| F_2005_ALUM2007_FI NAL_Other_minimal_u se_130 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Grazing_native_v egetation_210 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Production_nativ e_forestry_220 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Plantation_forest s_310 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Grazing_modified _pastures_320 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Cropping_330 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Perennial_horticu lture_340 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Seasonal_horticul ture_350 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Land_in_transitio n_360 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Irrigated_plantati on_forests_410 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Grazing_irrigated _modified_pastures_4 20 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Irrigated_croppin g_430 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Irrigated_perenni al_horticulture_440 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Irrigated_seasona l_horticulture_450 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Intensive_horticul ture_510 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Intensive_animal _production_520 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Manufacturing_a nd_industrial_530 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI NAL_Residential_and_f | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |

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| arm_infrastructure_540 | |
| F_2005_ALUM2007_FI_NAL_Services_550 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Utilities_560 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Transport_and_communication_570 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Mining_580 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Waste_treatment_and_disposal_590 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Lake_610 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Reservoir_dam_620 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_River_630 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Channel_aqueduct_640 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Marsh_wetland_650 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_Estuary_coastal_waters_660 | Secondary ALUM Land Use categories. Value = area (m ²) of the land use within the parcel (cadastre). |
| F_2005_ALUM2007_FI_NAL_OUTSIDE | Secondary ALUM Land Use categories. Value = area m ² of the cadastre that is this land use. Outside was used as a category in the 2007 ALUM layer, it represents areas outside of NSW (mainly in Victoria). |
| F_2005_ALUM2007_FI_NAL_UNMAPPED | No ALUM data. Value = area m ² . |