GHD: Tasmanian Rural Land Escalation Updated Report

Appendix 13

Tasmanian Networks Pty Ltd

Transend Networks Pty Ltd

Transend Networks Pty Ltd

Tasmanian Rural Land Escalation Rate Forecast

Updated Report

November 2013

Executive summary

GHD was engaged by Transend Networks Pty. Ltd. (Transend) to provide an updated forecast for escalation rates for Tasmanian rural land values. This work built on an initial forecast GHD provided in January 2012 by:

- Updating the model for new data and significant change in commodity price outlooks, government policy (e.g. water, carbon markets), international economy and land prices.
- Update impact estimates if necessary.
- Providing an overall forecast for Tasmanian rural land, as well as separate forecasts for the following land classes:
    - Plantation forests,
    - Native forests
    - Dryland agriculture
    - Irrigated agriculture

These forecasts will allow the company to optimise the timing of easement acquisitions for future works (2013-2032).

GHD's analysis tested the strength of the relationship between a range of independent variables and Tasmanian rural land values (see Table 1).

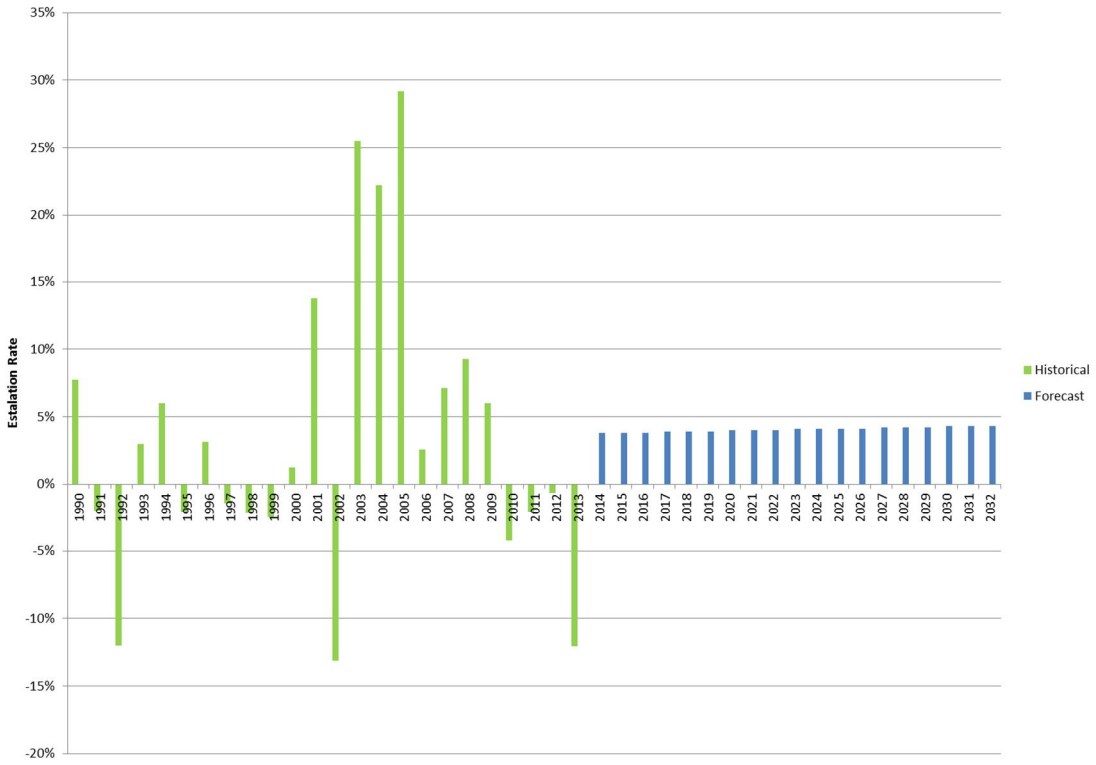
Table 1 Strength of relationships between independent variables and Tasmanian rural land prices

Independent Variable (source in brackets)	Unit	Strength of relationship (R^2 value)
Australian rural land values (ABS)	$A	96.70%
Exchange rates (RBA)	$A/$US	49.98%
Trade weighted index (RBA)	Index	74.91%
GDP (RBA)	Index	92.25%
Australian rural commodity values (OECD)	Index	67.25%
Farm terms of trade (ABS)	Index	41.97%
Woodchip (hardwood) prices (GTP)	Index	84.47%

Using the most strongly correlated variables a multi-regression analysis was used to generate a baseline forecast for Tasmanian rural land values. The forecast uses the trajectory of these independent variables to predict the impact on Tasmanian rural land values.

The results forecast annual escalation rates of between 3.8% and 4.3% per annum (real); see Figure 1 below.

Figure 1 Baseline forecast with historical escalation rates (real)



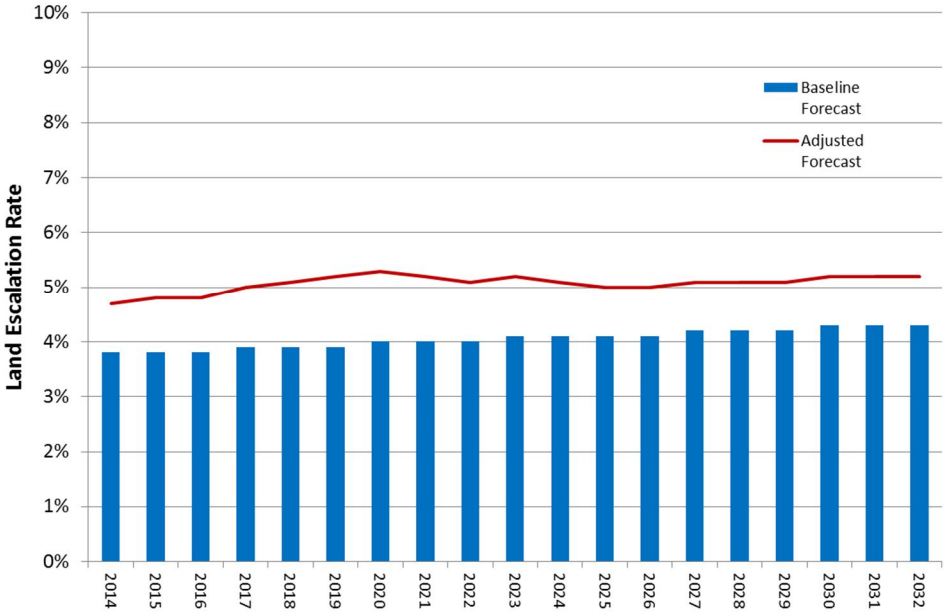
Analysis was undertaken of outlooks and confounding factors which may influence Tasmanian rural land values into the future, and therefore justify adjustments to the baseline forecast. This analysis considered the following:

- Commodity outlooks and industry developments (global food commodities, grain, livestock, dairy and forestry products)
- Climate change and related impacts (production gains, land use change, carbon markets)
- International demand for land (global market disparity)

The baseline forecast was adjusted accordingly to predict escalation rates of between 4.7% and 5.3% (real) between 2014 and 2032 (see Figure 2 below). The results suggest escalation rates will be higher than the baseline forecast. In the coming 5 years land prices will be influenced by structural adjustment occurring in mainland rural water allocations and the trend towards increased foreign investment. In the longer term higher escalation rates will be sustained through:

- Steady demand for food commodities
- Tasmania's relative advantage in climate change impacts and associated carbon market opportunities
- Continued demand from foreign investors

Figure 2 Baseline and adjusted escalation rate forecasts



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- were limited to those specifically detailed in section 1 of this Report;
- did not include site visits.

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions"), including (but not limited to) those listed in section 1.4 of this Report.

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1. Methodology

1.1 Data collection

Historical Tasmanian rural land value data was compiled from the Australian Bureau of Statistics (Australian System of National Accounts - ABS 5204.0). This data was used to calculate the annual escalation rates observed over the previous 23 years (1990-2013).

Data was collected for the parameters shown in Table 2. Annual averages were calculated for the period 1990 to 2013, and then annual escalation rates were calculated for this period.

Table 2 Data used in trend analysis

Data	Source	Measurement
Tasmanian rural land values	ABS	$A
Australian rural land values	ABS	$A
Exchange rates	RBA	$A/$US
Trade weighted index	RBA	Index
GDP	RBA	Index
Australian rural commodities[1]	OECD	Index
Farm terms of trade	ABS	Index
Woodchip (hardwood) prices	GTP Chip Index	Index

1.2 Multiple regression analysis

A multiple regression analysis was completed to compare the escalation rates observed for Tasmanian rural land values with the escalation rates observed in the trend data. This analysis established a quantifiable measure of the strength of the relationships between these parameters (R^2 value) to enable the development of a baseline forecast.

1.3 Outlooks and confounding factors

Having established the baseline forecast, analysis was undertaken on a range of factors likely to impact land valuations into the future. These factors included:

- Commodity outlooks and industry developments
  - Global food commodity outlooks
  - Grain
  - Livestock
  - Dairy
  - Forestry products
  - Biodiesel markets
- Climate change and related impacts
  - Estimated changes in rainfall
  - Production gains
  - Land use change (including irrigation expansion)

[1] Red meat, dairy and wheat prices

- Carbon market opportunities

- International demand for land
  - International rural land price comparisons and disparities

This analysis was used to quantify a likely impact and generate an adjusted baseline forecast.

1.4 Assumptions

- This report is based on economic modelling and forecasting using available information combined with the consultant's own judgements.
- Modelling uses a multiple regression analysis with an exponential forecast.
- The analysis is based on overall Tasmanian rural land classes and should not be used as a prediction for individual parcels of land.
- Results are stated in real values (adjusted for inflation).

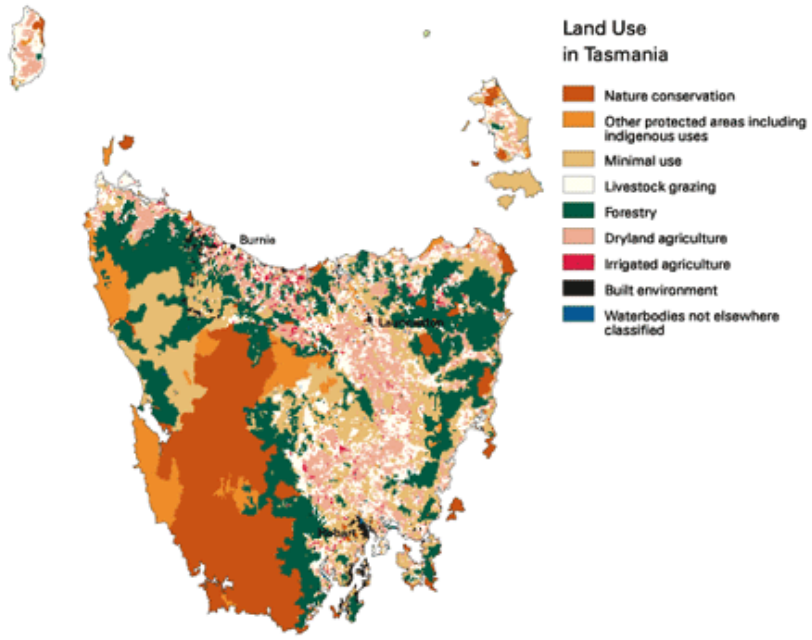
2. Analysis and Results

2.1 Context

A wide range of drivers impact both rural land use and rural land values in Tasmania. Terms of trade, productivity gains and commodity values are important factors for livestock and cropping enterprises, and will also determine the degree to which forest plantations and other intensive agricultural industries compete for land, particularly in high rainfall areas of the state.

Typically land use in Tasmania is clustered into specific growing zones, as shown in Figure 3 below.

Figure 3 Land use in Tasmania



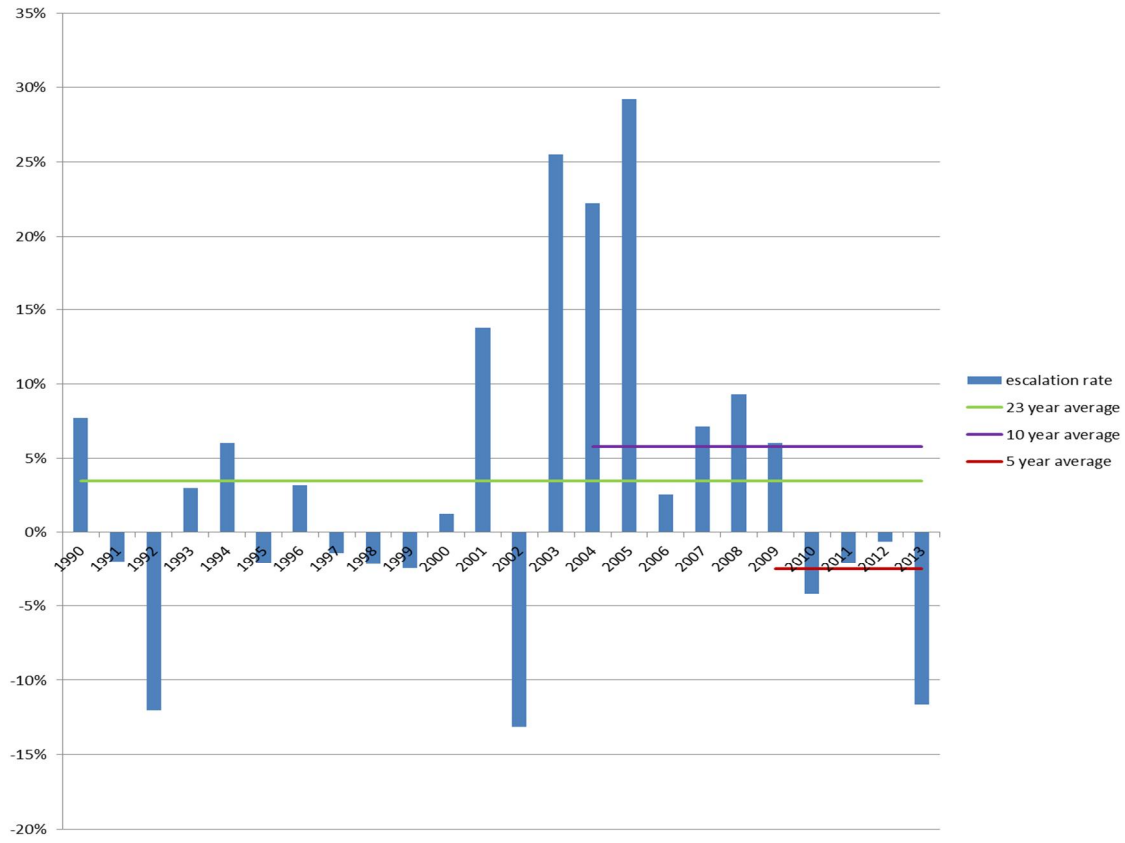
Source: Land Use of Australia Summary (1996/97)

2.2 Historical escalation rates

Tasmanian rural land escalation rates (real) from 1990 to 2013 are shown in Figure 4 below, on an annual basis. The results show strong recent growth in land values, particularly between 2004 and 2010, where escalation rates were regularly over 5% and peaked in 2006, when annual rural land values rose by over 29%. Since 2010 escalation rates have lagged behind CPI, with values falling by 12.03% (real) in 2012/13.

The chart also highlights the 23 year average escalation rate (3.45%), 10 year average (5.77%) and the 5 year average (-2.52%).

Figure 4 Historical Tasmanian rural land escalation rates (real)



Compilation of historical time series data provides the following average escalation rates for selected parameters since 1990.

Table 3 Average historical annual escalation rates

Parameters	Average escalation rates (1990-2012)
Inflationary parameters	
Tasmanian rural land values	3.45
Australian rural land values	4.46
Australian rural commodities	2.31
GDP	3.91
Woodchip (hardwood) prices	1.02
Non-inflationary parameters	
Exchange rates	1.31
Trade weighted index	1.09
Farm terms of trade	-1.10

2.3 Independent analysis

To determine which independent variables should be included in the analysis of Tasmanian land value escalation rates, the independent R^2 results in Table 4 give an indication of the strength of the relationship with the dependent variable (Tasmanian land values).

Table 4 Independent variable analysis

Measure	R^2	Gradient	Intercept
Australian rural land values	96.70%	0.025	0.24
Exchange rates	49.98%	11.94	-5.37
Trade weighted index	74.91%	0.25	-11.05
GDP	92.25%	0	-3.94
Australian rural commodities	67.25%	7.52	-6.32
Farming terms of trade	41.97%	-0.12	15.89
Woodchip (hardwood) prices	84.47%	0.15	-19.23

Variables with low R^2 or zero gradient values were excluded from the multiple regression analysis in order to give a more accurate indication of forecasted escalation rates. Therefore, exchange rates, GDP and farming terms of trade were not considered in the final regression analysis.

2.4 Multiple regression analysis

A multiple regression model was built to determine the relationship between the independent variables and the value of Tasmanian rural land.

The analysis found that 96.86% of the change in Tasmanian rural land values can be explained by the change in the independent variables.

The relationship between the variables was reflected in the following equation.

*Tasmanian rural land values = 0.01*Australian rural land values + 0.06*Trade weighted index + 0.06*Woodchip (hardwood) prices + 1.98*Australian rural commodities – 10.29 (+/- 0.29)*

Using the above equation to complete an exponential regression, the baseline forecast was generated for each year until 2032. Exponential regression was chosen over linear regression forecasting for the following reasons:

- It more closely reflects the trend in real-estate values in recent history
- The constrained nature of rural land supply
- The un-constrained nature of rural land demand.

2.5 Baseline forecast results

The baseline forecast results suggest real annual escalation rates of 3.8% to 4.3% (See Figure 5 and 6).

Figure 5 Historical and forecast of Tasmanian rural land values (real)[2]

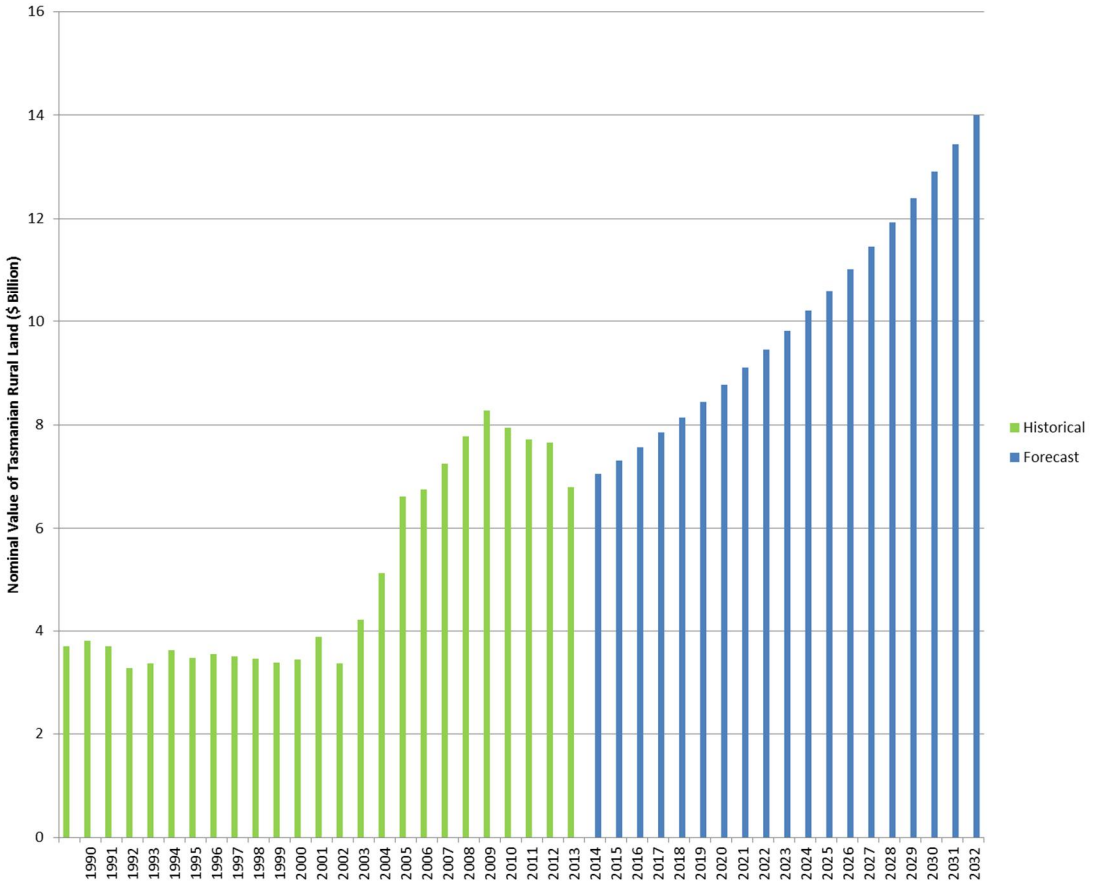
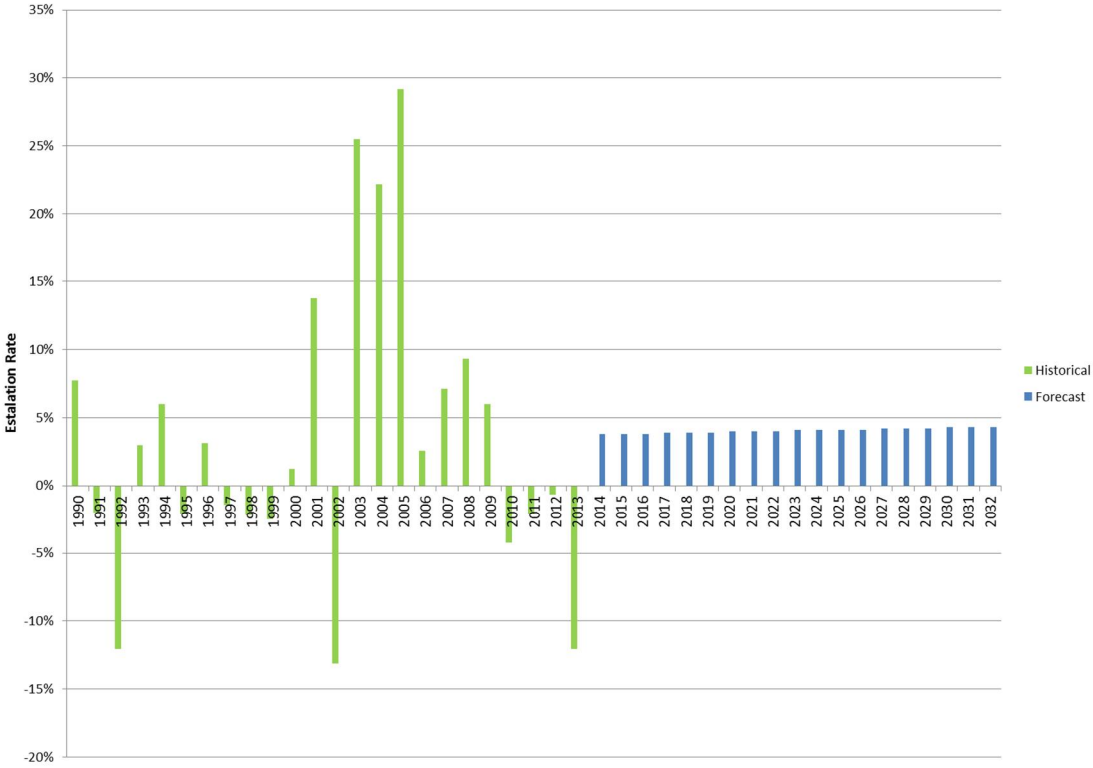


Figure 6 Baseline forecast with historical escalation rates (real)[3]



[2] CPI indexed to 2013 dollars

[3] Assumes future annual CPI of 2.7% (previous 23 year average)

2.6 Outlooks and confounding factors

This section examines the impact of a range of factors likely to impact the Tasmanian rural land market into the future, including:

- Climate change and related impacts
- International demand for land
- Commodity outlooks and industry developments

These factors are explored through existing literature in order to provide a forecast of the potential impact on escalation rates. The estimated impact of these factors will be applied to the baseline forecast to produce an adjusted forecast.

3.6.2 Climate change and related impacts

The likely impact of climate change on agriculture in Tasmania has been modelled in a series of studies by the Antarctic Climate and Ecosystems (ACE) CRC, including *Climate Futures for Tasmania: General Climatic Impacts*, *Impacts on Agriculture* and *Climate Modelling* reports. The ACE has simulated Tasmania's future climate with six global climate models. The most relevant drivers of climate change in Tasmania have been identified in the *General Climatic Impacts* report as:

- The Southern Annular Mode (SAM)
- El Niño Southern Oscillation (ENSO)
- Indian Ocean Dipole (IOD)
- Cut-off lows and blocking highs

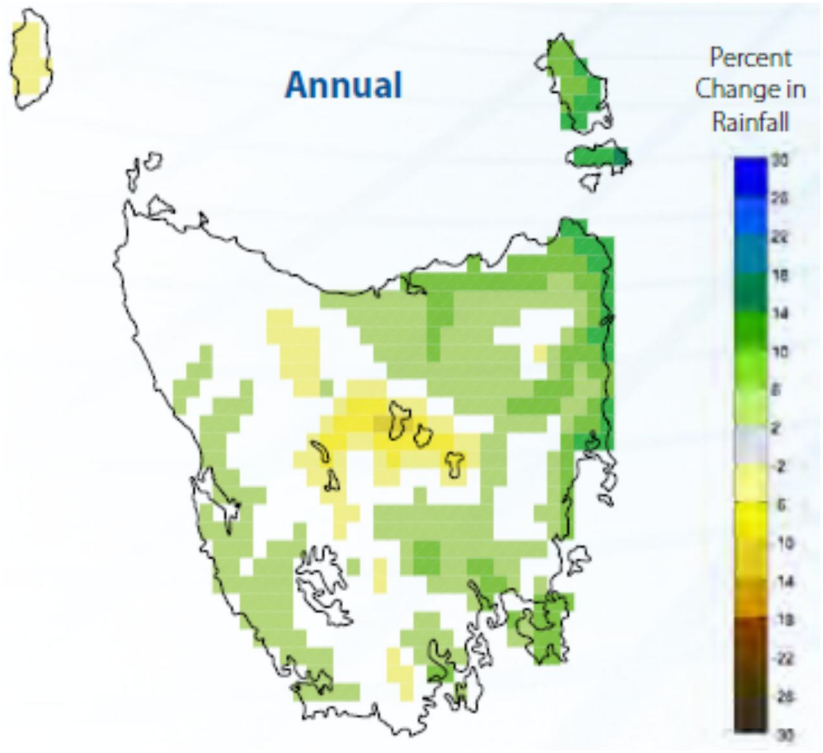
The *Impacts on Agriculture* report suggests projected changes to the Tasmanian climate due to rising greenhouse gases will have significant impacts on agricultural enterprises at farm, industry and regional scales.

The *Impacts on Agriculture* report estimates:

1. climatic changes (rainfall, temperature)
2. agricultural climatic indices
3. impacts on pasture production
4. impacts on grain crops
5. land use change
6. biosecurity impacts

Climatic changes projected by 2100 include average temperature across Tasmania rising 2.9%, evapotranspiration increasing in all regions of the state, relative humidity increasing by 0.5% to 1.5%, rainfall remaining within the historical range (however change in distribution towards the East Coast – see Figure 7) and increased runoff.

Figure 7 Estimated changes to annual rainfall by 2100



Source: ACE CRC 2010, Climate Futures for Tasmania impacts on agriculture

With current land use in the north east of Tasmania predominantly forestry, followed by dryland cropping and livestock enterprises, there is potential climatic upside to agricultural land viability.

Climatic indices suggest fewer frosts, similar incidence of drought and limited impacts on the majority of crops. The report also suggests an increase in available heat which will require some changes to crop types, and benefit higher gross margin crops such as viticulture.

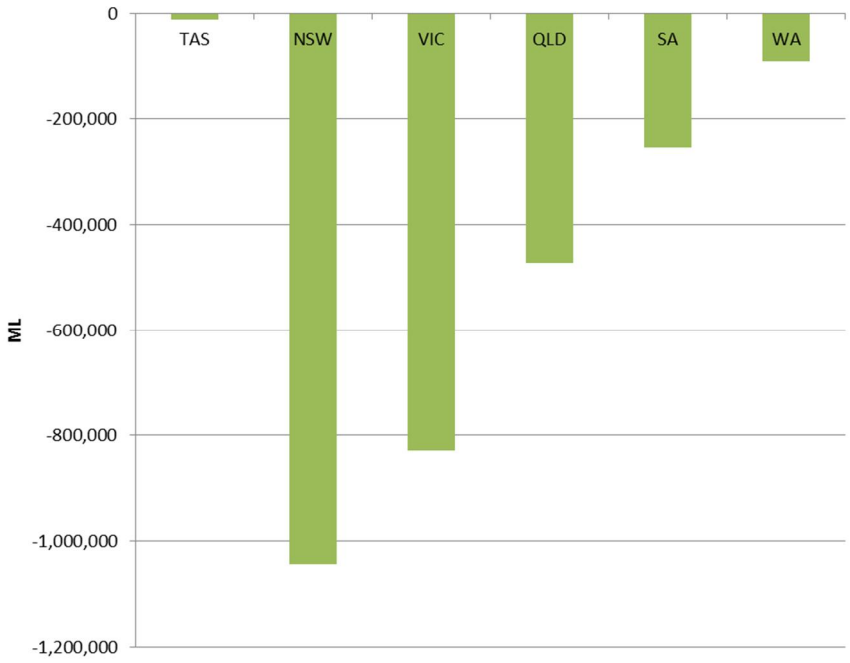
Production gains

Potential production increases for pastures is estimated at 10%-100% and wheat 10%-15% by 2085 (ACE CRC 2010). Increases in temperature on current temperature-limited land will allow for increased land use choices and therefore create higher economic returns and increased land values in Tasmania over the 21st century.

Land use change

The threat of climate change combined with ongoing structural adjustment in rural water allocations, is already having a definite impact on Tasmanian rural land use. Figure 8 below shows the relative change in agricultural water use in the 8 year period between 2005/6-2012/13. The results show that all states have reduced agricultural water use, however Tasmania experienced the lowest reduction, and the states within the Murray Darling Basin experienced the largest.

Figure 8 Change in annual agricultural water use (2005/6 – 2012/13)



Source: ABARES (Agriculture water use)

Further structural adjustments will occur in the Murray Darling Basin as a result of the Murray Darling Basin Plan which is proposing cuts of 1,468 GL/y. Meanwhile irrigation projects continue to be developed in Tasmania at a rapid rate.

An indication of growth in the irrigation sector was the creation in 2008 of the Tasmanian Irrigation Development Board (TIDB), to provide the high level drive and governance needed to deliver a major suite of water infrastructure projects, primarily the eleven irrigation schemes investigated under the SMART Farming proposal (Tasmania DPI 2011).

Carbon markets

The emergence of carbon pricing (either via a carbon tax, emissions trading scheme or direct action model) and the associated Carbon Farming Initiative, presents new opportunities for rural landholders.

The 2011 ABARES Outlook report titled *The economics of Australian agriculture's participation in carbon offset markets* concludes "given the varying opportunities for GHG abatement or removal across land-based activities, a carbon offset crediting scheme can be expected to induce some degree of structural change within the land-based activities sector of the economy".

The 2011 Australian Government Treasury report titled *Strong Growth, Low Pollution* estimates that despite increased input costs due to carbon markets, gross output in the agriculture sector as a whole is expected to increase from 2009–10 levels, rising 12% by 2019–20 and 130% by 2049–50. This output growth reflects ongoing productivity improvements and strong world demand for Australian agricultural goods.

Conclusions

Climate change modelling suggests many agricultural and forestry areas of the state will experience rainfall increases of 5-10%, while plant production due to increased $C0^2$ will increase plant production by between 10-100%.

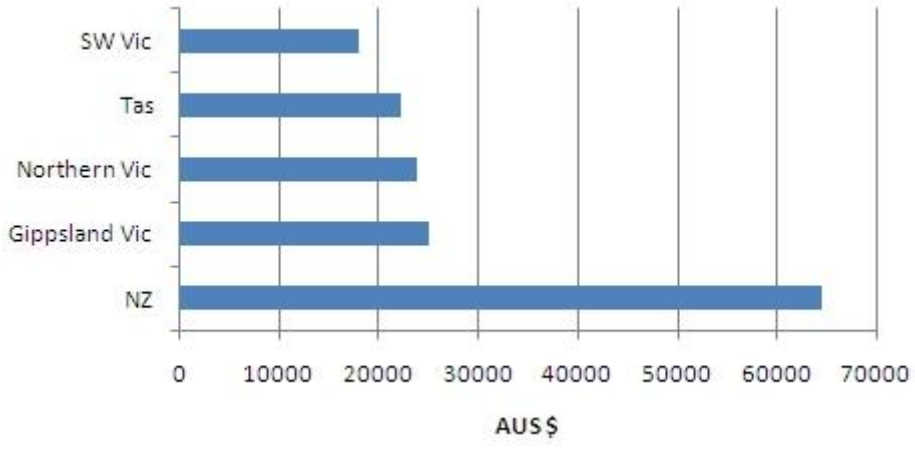
In the short term Tasmanian rural land can expect to see additional growth as adjustments occur in mainland water markets, irrigation infrastructure expansion occurs and carbon pricing is introduced. In certain areas of Tasmania these factors could produce significant step change in valuations (e.g. where cropping land becomes in demand for horticultural or viticultural purposes). The emerging carbon offsets market will also present new opportunities for agricultural and forestry land.

3.6.3 International demand for land

The recent increased foreign demand for Australian rural land has come from global companies (particularly mining companies), managed investment schemes, private equity investors and foreign governments acting to secure future food supplies. The ABARES report titled *Foreign Investment and Australian Agriculture* suggests one-tenth of Australian farmland is now owned or part-owned by foreign firms.

The relative cost of rural land in Tasmania remains low compared with mainland Australia and overseas countries. This is highlighted by a 2006/07 comparison by Red Sky Agricultural Pty Ltd, a dairy benchmarking company, which shows dairy farm affordability on a per hectare basis (Figure 9).

Figure 9 Dairy farm values per hectare[4]



Source: Red Sky 2006/07

The 2011 Knight Frank *Review of the International Farmland Market report* is optimistic about farmland investment, citing OECD estimates that food production will need to increase by 70% before 2050 to satisfy global population growth and changing consumption trends. While impressive, these figures need to be considered alongside the significant production gains being

[4] *Total farm assets divided by total farm area*

realised in the Former Soviet Union, Brazil, Argentina, China and other areas. The continued advancement of gene technology also has the potential to lift production and reduce waste.

The Knight Frank report highlights comparative land values in a selection of major global agricultural zones, shown in Table 5, which exemplifies the current disparity in global rural land values.

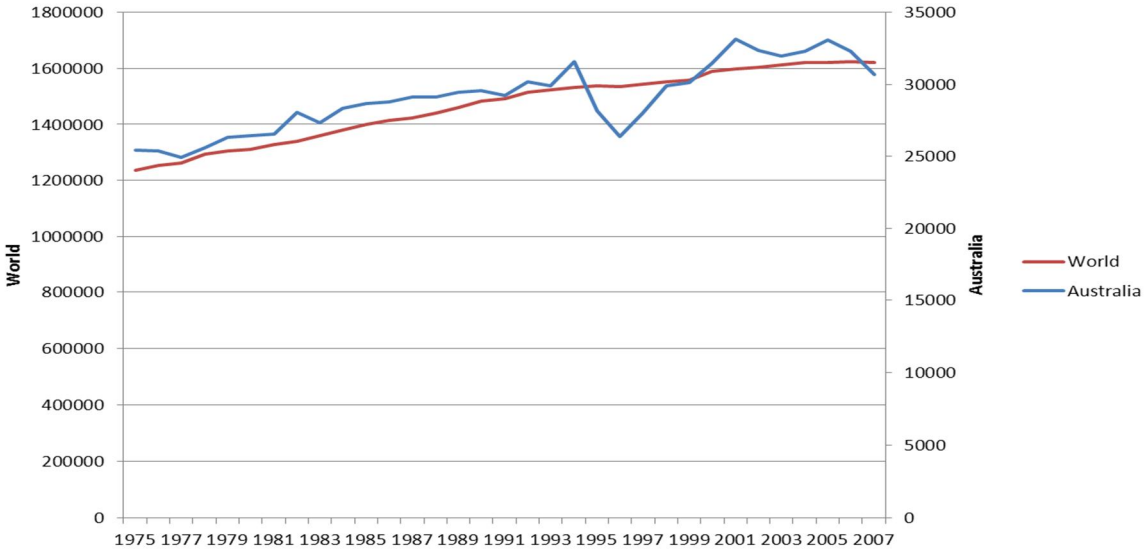
Table 5 Knight Frank International Farmland Index

Country	Farm land classification	Average (US$/ha)	Change (2010)
New Zealand	Dairy farms	23,000	-3%
England	Average all land types	22,000	13%
United States	Quality dryland in cornbelt states	16,000	8%
Brazil	Top sugar cane land in Sao Paulo	12,000	24%
Argentina	Central provinces	7,500	10%
Brazil	Dryland double-cropping in Mato Grosso	7,000	20%
Poland	Price dependent on size of holding	6,338	0%
Brazil	Dryland double-cropping in west Bahia	6,000	6%
Romania	Price dependent on size of holding	2,405	0%
Australia	Dryland arable with reliable rainfall	1,650	2%
Argentina	Northern provinces	1,350	10%
Canada	Saskatchewan province	1,300	7%
Zambia	Long leasehold	1,250	0%
Russia	Price dependent on size of holding and progress of freehold application	650	-10%
Brazil	Native bush with high cattle potential	300	11%
Ukraine	Five to ten year lease rights	250	0%

A separate Knight Frank *Wealth Report 2011* suggests Australian farmland is attractive to investors because it "combines the benefits of first-world governance and stability with the scale and prices of developing nations". However, as a major exporter, Australian commodities are affected by market and exchange rate volatility.

Statistics from the Food and Agriculture Organization of the United Nations (FAO) show that Australian gross capital stock in agricultural property (land and improvements) has generally followed a similar trend to global figures between 1975 and 2007 (Figure 10).

Figure 10 Gross capital stock in agricultural property*



Source: FAOSTAT Gross Capital Stock

* Figures shown in USD Million (2005 constant values)

These figures could suggest that price disparity between Australian and world values did not significantly change in this period. However the recent increase in foreign investment in Australian rural land suggests the market may be acting to take advantage of the disparity and therefore narrow the gap.

Conclusions

Tasmanian rural land remains considerably undervalued compared to mainland Australian and overseas rural land. The price disparity between Tasmanian and New Zealand dairy land is particularly distinct.

Barring government intervention, the trend towards increased foreign ownership of rural land in Australia is likely to continue. As global agribusinesses compete for finite resources, the disparity in Tasmanian rural land values compared with international values is likely to be narrowed in the coming 3-4 years.

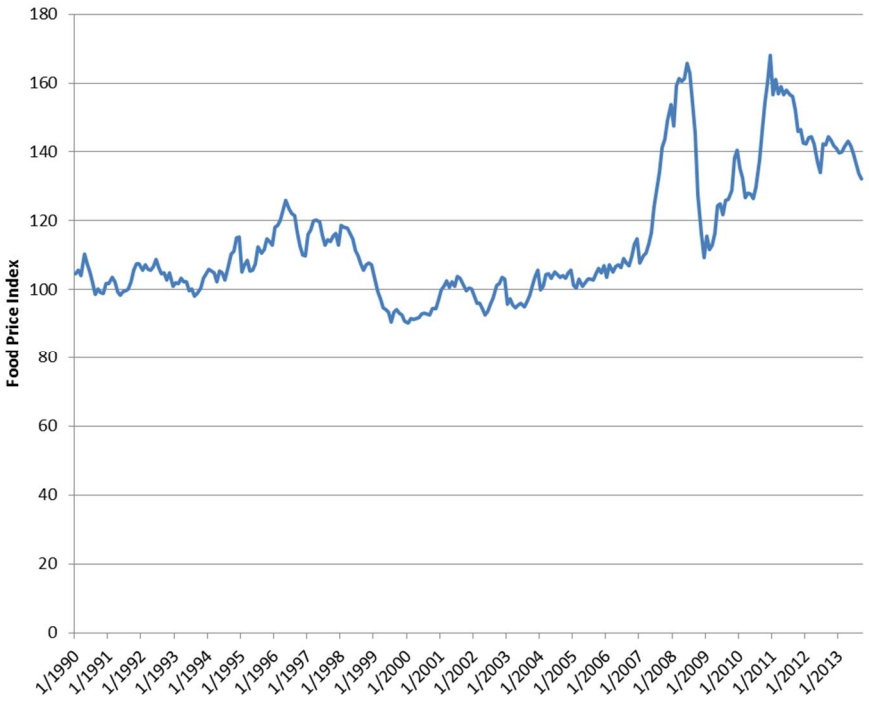
In the longer term the disparity will likely continue to narrow at a steady rate, resulting in increased demand and positive growth for Tasmanian rural land values.

3.6.1 Commodity outlooks and industry developments

Global food commodities

The developing potential for increased global food demand and resource shortages will have a major influence on the long term outlook for agricultural commodity prices. Since 2000 global food prices have trended upwards with considerable market volatility (see Figure 11).

Figure 11 Global food prices



Source: Food Price Index (UN Food and Agriculture Organisation)

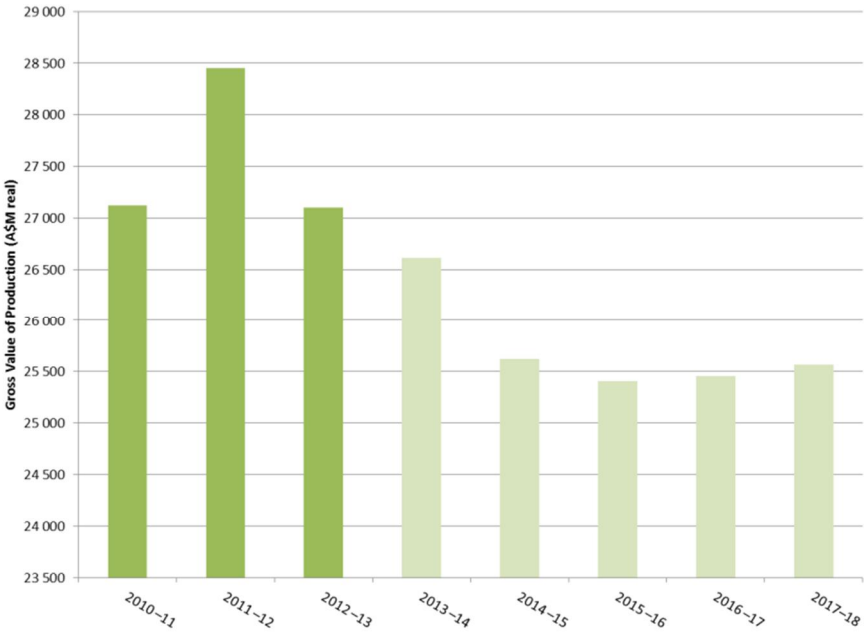
Despite some moderate price relief since 2010, the overall upwards trend in food prices is expected to continue as markets react to:

- Global population growth
- Growing affluence in Asian countries
- Parallel demand growth for fuel and resources including ethanol and biodiesel
- Reduced arable land available for agriculture.

Grain and oilseeds

According to the ABARES Commodity Forecasts (March quarter 2013), the gross value of production of grains and oilseeds in Australia is expected to decrease from $27.1B to $25.6B (real) (see Figure 12).

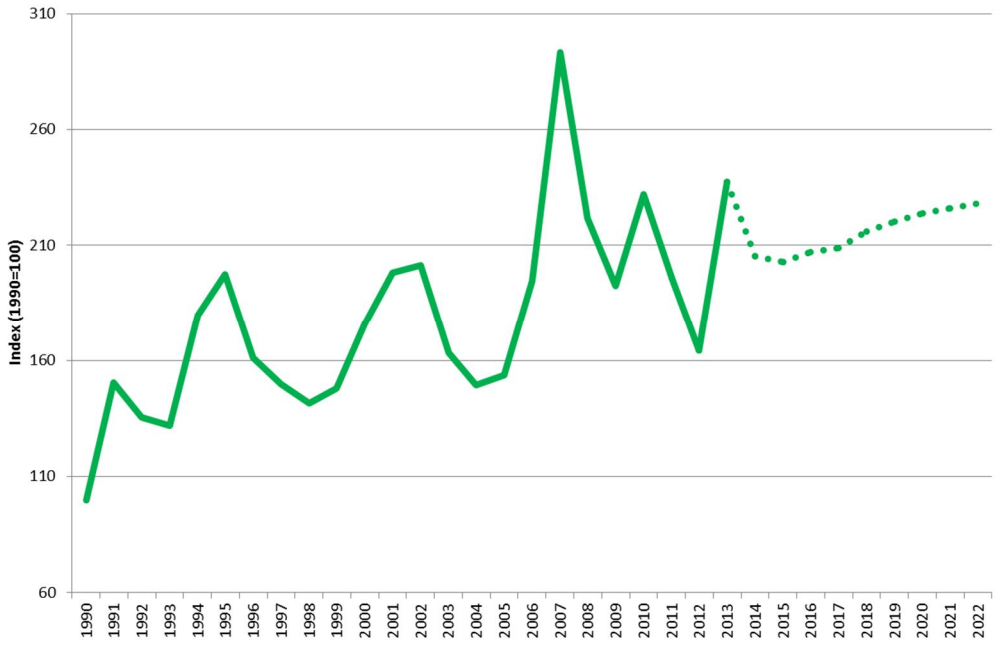
Figure 12 Historical and forecasted gross value of Australian grain and oilseed production



Source: ABARES Commodity Outlook March 2013

The above ABARES forecast is reflected in the OECD forecast for Australian wheat prices which are forecasted to decline in the short term and remain relatively flat.

Figure 13 Australian wheat prices: Historical and forecast

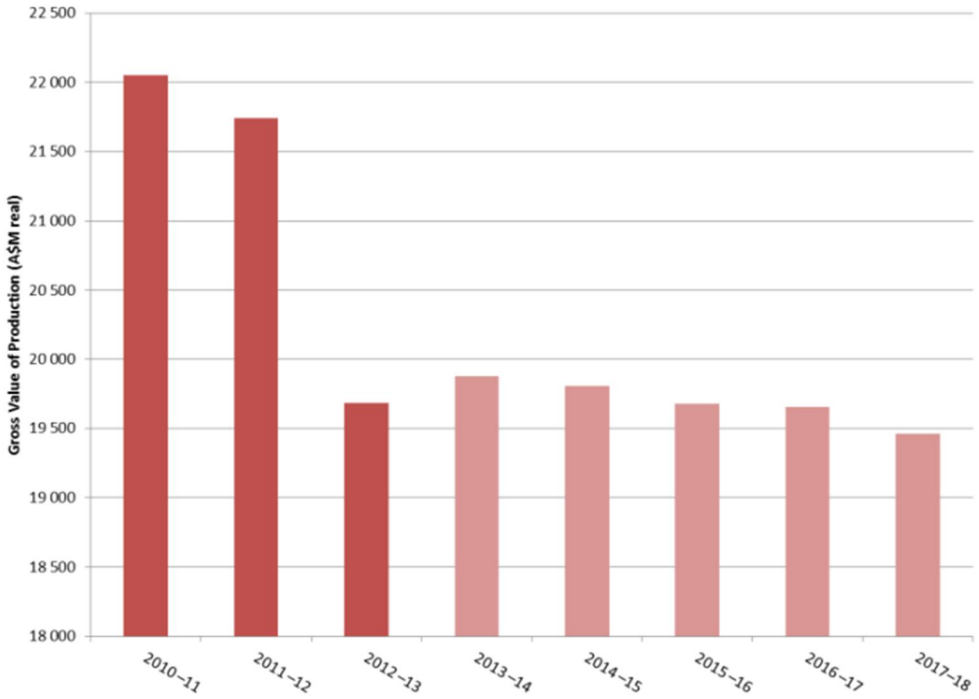


Source: OECD

Livestock

ABARES Commodity Forecasts (March quarter 2013) show that the gross value of livestock production has declined significantly in 2012-13, and is forecasted to remain depressed for the medium term (see Figure 14).

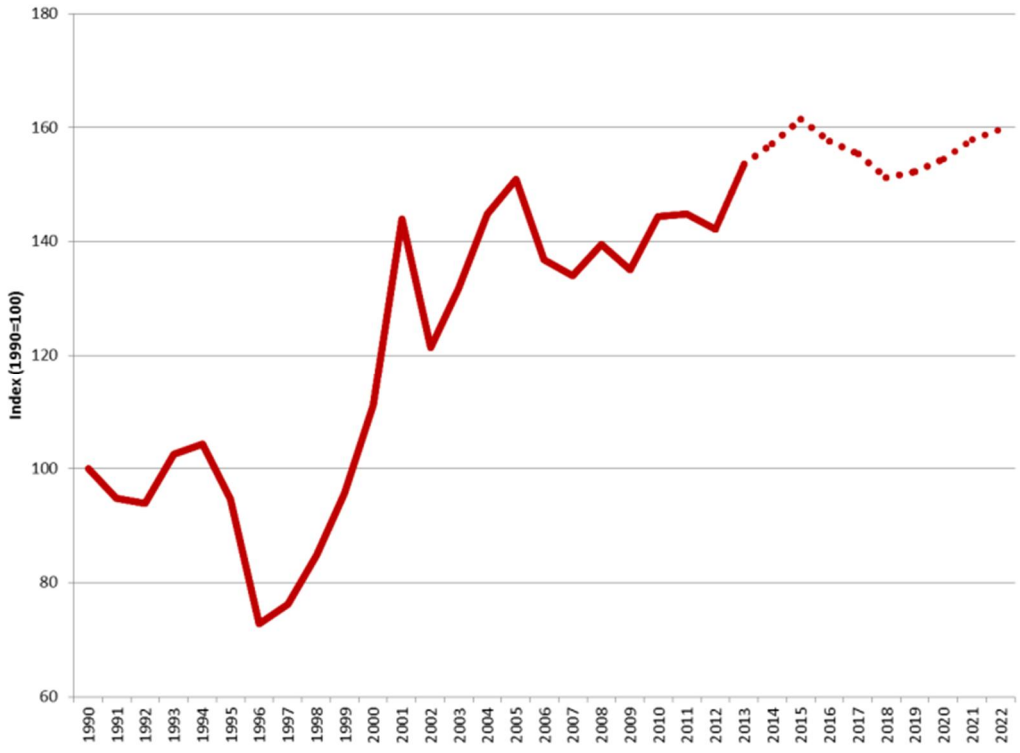
Figure 14 Historical and forecasted gross value of Australian livestock production



Source: ABARES Commodity Outlook March 2013

The OECD holds a similarly flat forecast for Australian beef prices until 2020 (see Figure 15).

Figure 15 Australian beef prices: Historical and forecast

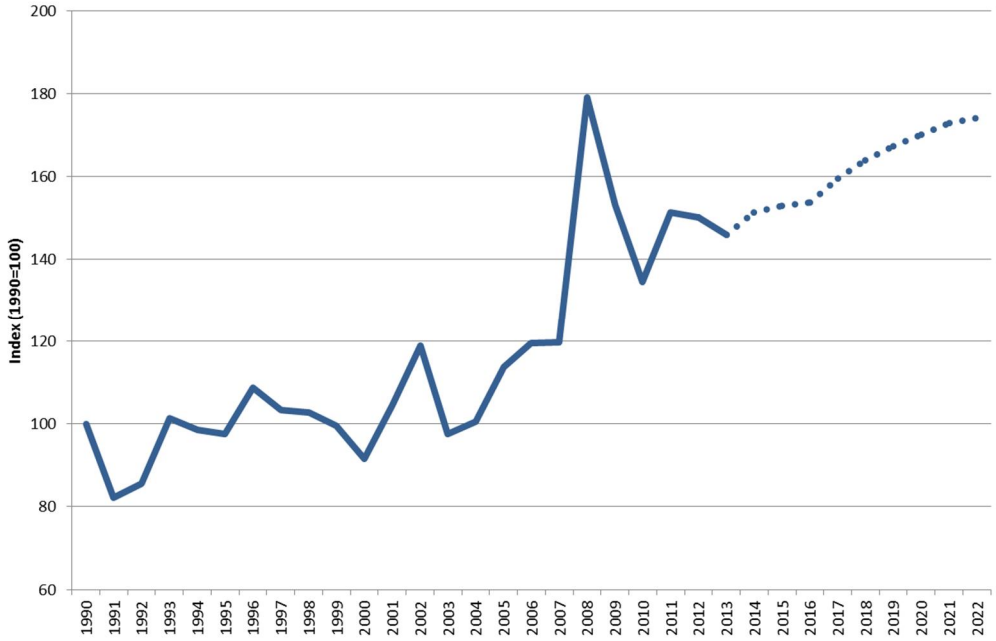


Source: OECD

Dairy

Australian milk prices are forecasted to steadily recover from recent low prices (Figure 16). Tasmanian dairy farm values are currently much lower in value than New Zealand dairy farm values (see Figure 9) and have strong future demand potential from foreign investors.

Figure 16 Australian milk prices: Historical and forecast



Source: OECD

Forestry Products

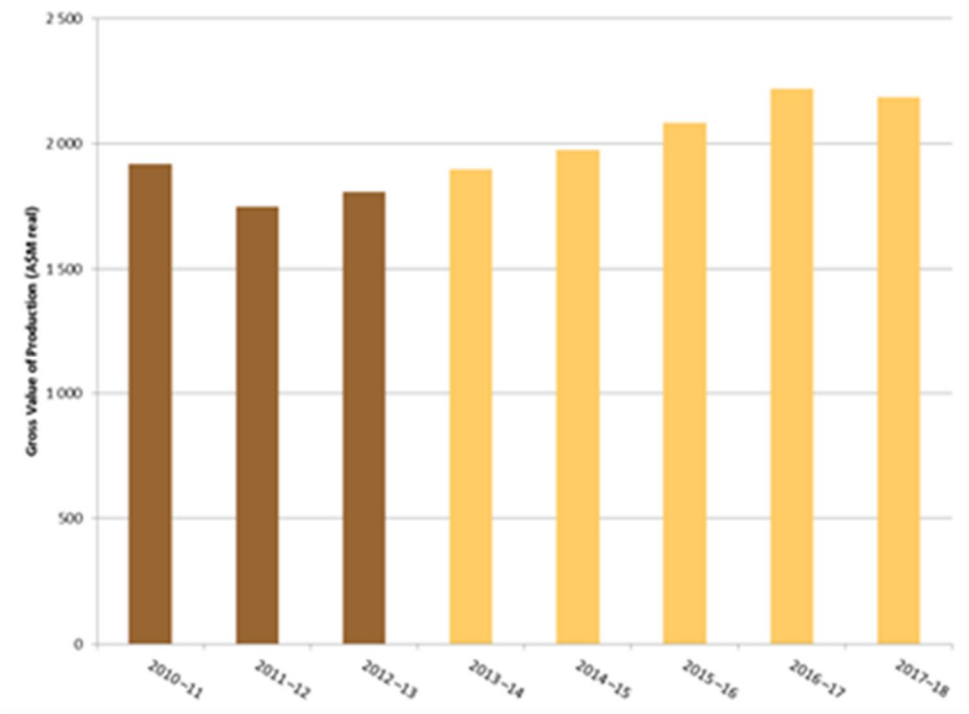
Tasmania has experienced significant investment in timber plantations in recent years, with plantation area increasing by 37% from 2005-2010 and 74% from 2000-2010 (ABARES 2010, Tasmania Regional Outlook). This expansion was primarily in hardwood plantations with the main driver being the Managed Investment Scheme (MIS) industry. The product from this expansion has been targeted at the hardwood pulpwood trade with Japan and China.

The forest industry in Tasmania has been affected by the recent global financial downturn and like the mainland forestry industry is experiencing issues arising from the collapse of some major managed investment scheme (MIS) companies (ABARES 2010, Tasmania Regional Outlook). As a consequence the expansion of plantations slowed dramatically after 2010, decreasing to only 1500 ha in 2011.

Plantation volume forecasts and the outlook in the short term for forestry products varies according to the plantation type and the product. In the absence of a strong domestic market provided by a pulp mill, the hardwood pulpwood market will continue to be highly competitive for some time with pressure on prices. Production is anticipated to steadily rise between now and 2032 (See Figure 18).

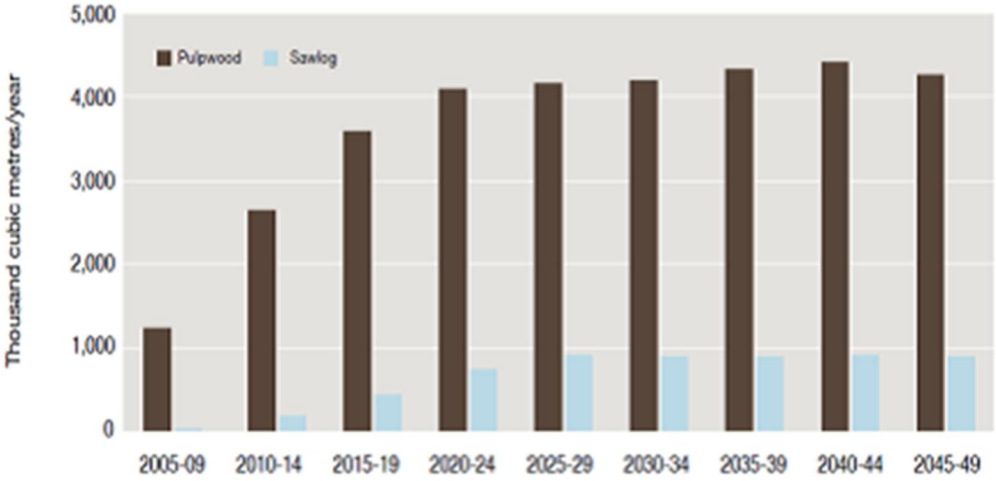
The softwood (pine) market is essentially a domestic market and it will vary with the state of the Australian housing industry. Softwood production levels are expected to remain reasonably steady beyond 2015 (see Figure 19).

Figure 17 Historical and forecasted gross value of forestry production



Source: ABARES Commodity Outlook March 2013

Figure 18 Tasmania forecasted plantation log supply - Hardwood



Source: DAFF Australian Plantation Log Supplies, 2007

Figure 19 Tasmania forecasted plantation log supply - Softwood

Source: DAFF Australian Plantation Log Supplies, 2007

Demand for forestry assets in Tasmania is expected to remain soft in the coming years due to the following factors;

- **Managed Investment Schemes (MIS)**

The MIS sector drove almost 1 million hectares of plantation establishment in Australia over the past decade before the combined effect of a volatile share market, reduced demand for MIS products and debt escalation led to liquidation of major MIS companies. Previous MIS held land and forestry assets are now being rationalised into traditional, institutional timber assets.

- **Collapse of Gunns Limited**

Gunns Ltd. was placed into voluntary administration on 25 September 2012. Liquidators are currently seeking to find buyers for the company's assets, including its Tasmanian forestry land and the proposed pulp mill near Launceston. The value of forestry land in Tasmania remains depressed due to general uncertainty and the impact of forced land sales.

There are reports of forest managers representing the superannuation industry expressing preliminary interest in the forest estate. This has been the pattern for the sale of the assets of the MIS schemes as they have become available. The pulp mill project is included in the sale process.

Biofuels

Biofuels are fuels made from renewable materials such as sugars, grains and oilseeds, with the most common biofuels being ethanol and biodiesel. Federal Government bodies are currently monitoring the development of the domestic biofuel industry, with the aim of reducing Australia's reliance on fossil fuels to contribute to the reduction of greenhouse gas emissions.

A report compiled by L.E.K Consulting, Advanced Biofuels Study: Strategic Direction for Australia found that *"Advanced Biofuels offer the potential for Australia to build a significant and sustainable new industry which could increase national fuel security, assist in reducing greenhouse gas emissions and stimulate regional development. The opportunity exists for Australia to capitalise on its comparative advantages and start laying the foundations now for what might be an industry of significant future value and scale, providing a substantial proportion of Australia's future fuel requirements."*

Increased market opportunities for biofuels in Australia will create a new source of demand for agricultural land in Australia.

2.7 Adjusted forecasts

The above analysis was used to estimate the potential impact of each of the three factors (international demand, climate change and commodity/industry outlook) on land escalation values (see Appendix A).

Impact estimates were applied to the baseline forecast to generate adjusted forecasts for overall rural land, as well as the following individual classes of rural land:

- Dryland agriculture
- Irrigated agriculture
- Plantation forests
- Native forests

The adjusted forecasts are provided in Table 6 and discussed below.

Table 6 Forecasted escalation rates

Year	Baseline Forecast	Adjusted forecast				
		Overall Rural Land	Dryland Agriculture	Irrigated Agriculture	Plantation Forests	Native Forests
2014	3.8%	4.7%	4.8%	4.9%	3.3%	3.8%
2015	3.8%	4.8%	4.9%	4.9%	3.5%	3.9%
2016	3.8%	4.8%	5.1%	5.1%	3.6%	4.0%
2017	3.9%	5.0%	5.3%	5.4%	3.7%	4.2%
2018	3.9%	5.1%	5.4%	5.4%	3.7%	4.3%
2019	3.9%	5.2%	5.4%	5.5%	3.7%	4.4%
2020	4.0%	5.3%	5.5%	5.5%	3.8%	4.5%
2021	4.0%	5.2%	5.2%	5.3%	3.8%	4.5%
2022	4.0%	5.1%	5.2%	5.4%	3.8%	4.4%
2023	4.1%	5.2%	5.2%	5.4%	3.9%	4.4%
2024	4.1%	5.1%	5.2%	5.5%	3.9%	4.3%
2025	4.1%	5.0%	5.1%	5.4%	3.8%	4.2%
2026	4.1%	5.0%	5.1%	5.3%	3.7%	4.1%
2027	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2028	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2029	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2030	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%
2031	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%
2032	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%

1.1.1 Overall rural land

Most agricultural commodity markets have made strong gains in recent years. Many markets are expected to consolidate in the near term as production catches up with demand and global economic uncertainty continues. Beyond this cycle, markets are supported by strong fundamentals i.e. increased demand set against a growing scarcity in natural resources.

Empirical evidence suggests weaker forestry market conditions in the short term. Moderate long term growth will be reliant on a recovery in north Asia and increased demand from China and other developing markets. If market conditions improve, well established infrastructure, government support and labour skills position Tasmania as a viable long term option for value-added forestry production.

The predicted growth of the Australian biofuels industry will provide new market opportunities for Australian agriculture and therefore contribute to the value of Tasmanian rural land.

1.1.2 Dryland Agriculture

Demand for dryland agricultural land in Tasmania will be driven largely by commodity outlooks in the livestock, grains and dairy industries; and demand from international and mainland investors.

On the basis of steady livestock export demand, livestock prices are expected to make modest, yet consistent gains in the short to medium term. In the longer term the upwards trend will likely continue as global food shortages drive red meat demand.

In the short term, grain prices are expected to ease from recent highs. However in the medium to longer term, prices will be sustained though global growth in demand.

The ongoing threat of climate change and constraints on agricultural water use in the Murray Darling Basin are likely to increase the relative value of Tasmanian dryland agricultural land.

1.1.3 Irrigated Agriculture

The ongoing expansion of irrigation infrastructure in Tasmania will substantially increase the production potential of large tracts of rural land.

In the short term the increased supply of irrigated land, with many schemes coming online within a short period, may constrain land values. However in the longer term Tasmanian irrigated land would be expected to become highly sought after, particularly by international and mainland investors seeking secure production.

As the irrigation roll out continues, the dairy, viticulture and horticultural sectors have been investing more heavily in preparation for increased production.

1.1.4 Plantation forests

Hardwood

The collapse of Gunns, changes to tax rules around managed investment schemes (MIS), and major charges in the hardwood pulpwood trade since 2009 have resulted in substantial stranded plantation forestry assets.

Export demand fell substantially during the 2009 Global Financial Crisis when Japan reduced its international purchase of hardwood by approximately 25%, while the rising Australian dollar made Australian exports more expensive. At the same time MIS producers were reluctant to reduce prices in response to the market.

The Chinese industry took this opportunity to drive prices considerably lower. Export volumes from the Tasmanian export woodchip industry reduced significantly. While there has since been some recovery, the species, E nitens , remains a less preferred species to its mainland competitor, E globulus.

In a scenario where there is no significant domestic processing industry (pulp mill) it is probable that the current area planted on leased land will be liquidated and the land will revert to alternate forms of agriculture as the trees are removed. As a result demand for land under plantation leases is expected to lag behind other rural land classes, until a viable processing or alternative market is established.

Until then, the value of leased plantation forested land will remain roughly equal to the value of equivalent dryland agricultural land, minus the costs associated with tree removal.

In the situation where the pulp mill project proceeds, wood supply from leased land will be a critical issue. Under this scenario the value of the leases paid will be determined by the productive capacity of the land and product transport distances – the normal determinants of commodity agricultural land prices.

Freehold plantation land will tend to maintain its price as a forestry asset class into the future. While the same scenarios apply for the hardwood estate as for the leased land, the difference will be the ability to convert the land to alternate species. Much of the hardwood estate will be suitable for growing pine, and in the absence of appropriate markets for the hardwood plantations it is entirely feasible for a large scale conversion of the estate to occur over a 10-20 year period.

Softwood

As previously stated the softwood industry is currently vertically integrated with a strong domestic focus for the solid wood lumber products, and, with the exception of the southern estate, exports for chip.

The majority of softwood is situated on crown land that is essentially long term leasehold.

Unlike most of the Australian softwood industry there is good access to ports for log export or the export of finished product. Accordingly in the event of a domestic downturn for building products there is potential to reach into alternate markets. With a range of markets available to this industry sector it would be reasonable to expect that returns will be reasonable and that land prices will be maintained.

1.1.5 Native forests

The value of Tasmanian native forest land is expected to be maintained or to slightly increase in relative value.

A primary characteristic of native forests is the large amount of quality pulpwood that they produce. Accordingly if they are to be harvested it is essential that there is a pulpwood industry available to them. The presence of markets for low value wood is therefore a key determinant in the ability to realise their value for wood production.

The opportunity to convert native forests to alternate land uses is extremely limited. The most easily recognised way to value this land is for its wood production capability.

The ash dominated forests are highly suited for sawlog production and the export of chip from these estates has been maintained at a small scale from Bell Bay, targeted primarily at Taiwan and mainland China.

The closure of large areas of the Tasmanian crown forest estate for wood production purposes will make the sawlogs from these forests more sought after. Accordingly it will be reasonable to expect that land prices will be maintained or will increase.

The peppermint gum dominated forests have had very constrained access to pulpwood markets for some time and their value as sawlog producing areas is generally significantly lower than the ash forests. Accordingly their value has been low and generally static.

A significant change that has the potential to impact on the value of these forests is the expected move to allow them to be used for energy purposes, attracting Renewable Energy Credits (RECs). These are available for the production of electricity from renewable sources. While the conventional markets of using thermal energy to produce electricity are not available in Tasmania, it is possible to use the Fischer Tropsch process to run conventional generators for electricity production in relatively small scale plants.

Technology is being developed which has the potential to allow the use of cellulose for the production of liquid fuels. These trends, coupled with the need to move away from the use of fossil fuels, will tend to increase the markets available to native forests and therefore increase the associated land value.

3. Conclusions

Tasmanian rural land is seen as a relatively safe and optimistic investment compared to both the Australian mainland and comparative international regions. Increased land use choices and improved economic returns are forecasted to underpin sustained growth to Tasmanian rural land values in the medium to long term.

The baseline and adjusted escalation rate forecasts are presented in Figure 20 and Table 7 below. The results suggest escalation rates will be higher than the baseline forecast particularly in the coming 5 years as structural adjustment occurs in mainland rural water allocations and the trend towards increased foreign investment continues. In the longer term higher escalation rates will be sustained through:

- Steady demand for food commodities
- Tasmania's relative advantage in climate change impacts and associated carbon market opportunities
- Continued demand from foreign investors

Figure 20 Escalation rate forecasts (real)

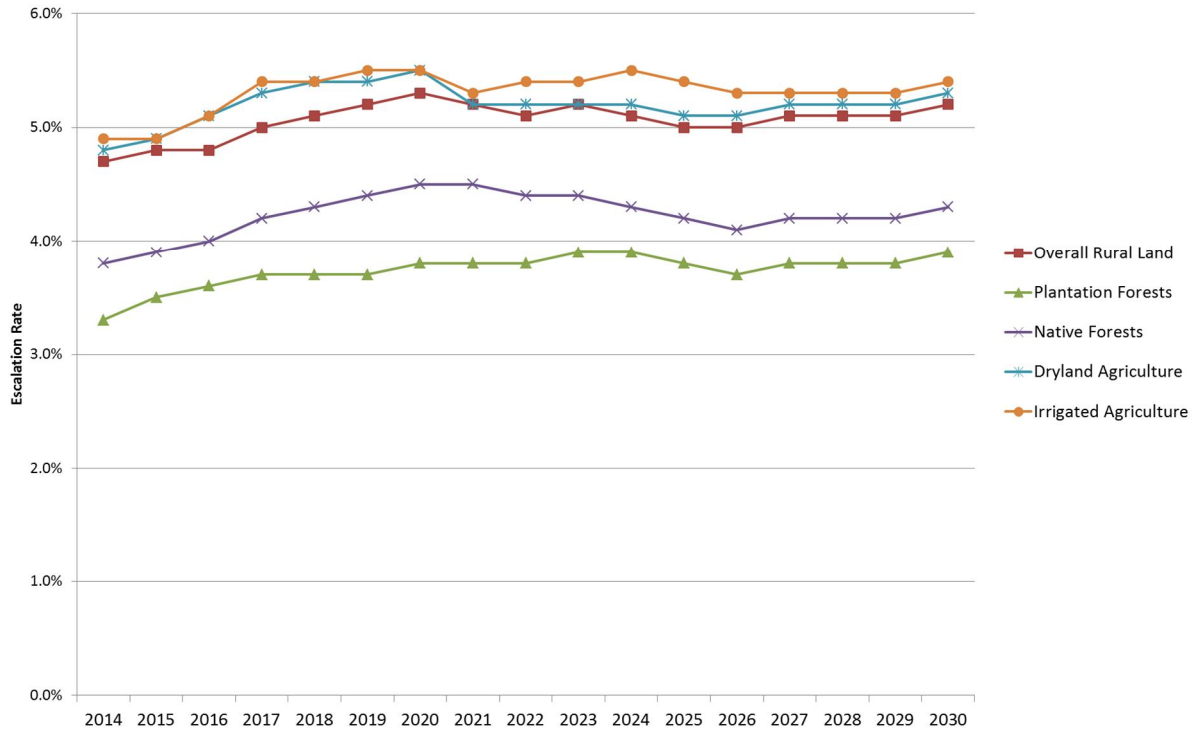


Table 7 Forecasted escalation rates

Year	Baseline Forecast	Adjusted forecast				
		Overall Rural Land	Dryland Agriculture	Irrigated Agriculture	Plantation Forests	Native Forests
2014	3.8%	4.7%	4.8%	4.9%	3.3%	3.8%
2015	3.8%	4.8%	4.9%	4.9%	3.5%	3.9%
2016	3.8%	4.8%	5.1%	5.1%	3.6%	4.0%
2017	3.9%	5.0%	5.3%	5.4%	3.7%	4.2%
2018	3.9%	5.1%	5.4%	5.4%	3.7%	4.3%
2019	3.9%	5.2%	5.4%	5.5%	3.7%	4.4%
2020	4.0%	5.3%	5.5%	5.5%	3.8%	4.5%
2021	4.0%	5.2%	5.2%	5.3%	3.8%	4.5%
2022	4.0%	5.1%	5.2%	5.4%	3.8%	4.4%
2023	4.1%	5.2%	5.2%	5.4%	3.9%	4.4%
2024	4.1%	5.1%	5.2%	5.5%	3.9%	4.3%
2025	4.1%	5.0%	5.1%	5.4%	3.8%	4.2%
2026	4.1%	5.0%	5.1%	5.3%	3.7%	4.1%
2027	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2028	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2029	4.2%	5.1%	5.2%	5.3%	3.8%	4.2%
2030	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%
2031	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%
2032	4.3%	5.2%	5.3%	5.4%	3.9%	4.3%

4. References

ABARES 2011, *Australian Commodities, March quarter 2011*, Canberra.

ABARES 2011, *Australian Commodities, December quarter 2011*, Canberra.

ABARES 2011, *Agriculture water use*, ABARES, Canberra.

ABARES 2011, *Commodity outlook and financial performance of key agricultural industries in Tasmania*, Regional Outlook Conference, Launceston, 2011.

ABARES 2011, *Foreign Investment and Australian Agriculture, Canberra.*

ABARES 2011, *Potential effects of climate change on forests and forestry: summary for Tasmania,* Canberra, August.

ABARES 2011, *The economics of Australian agriculture's participation in carbon offset markets*, Canberra.

ABARES 2010, *Australian commodity statistics*, Canberra.

ABARES 2010, *Australian farm survey results 2007-08 to 2009-10*, Canberra.

Antarctic Climate and Ecosystems (ACE) CRC 2010, *Climate Futures for Tasmania: General Climatic Impacts*.

Antarctic Climate and Ecosystems (ACE) CRC 2010, *Climate Futures for Tasmania: Impacts on Agriculture*.

Antarctic Climate and Ecosystems (ACE) CRC 2010, *Climate Futures for Tasmania: Climate Modelling.*

Australian Bureau of Statistics (ABS) 2011, *Australian System of National Accounts*, cat no. 5204.0, ABS, Canberra.

Australian Bureau of Statistics (ABS) 2011, *Water Use on Australian Farms, Australia*, cat. no. 4618.0, Canberra.

Australian Government 2011, *Strong Growth, Low Pollution: modelling a carbon price*, Canberra.

DAFF 2007, *Australian's Forestry Industry in the year 2020*, Australian Plantation Log Supplies.

Food and Agriculture Organization of the United Nations 2011, *FAOSTAT statistics for gross capital stock*, <http://faostat.fao.org/site/660/DesktopDefault.aspx?PageID=660#ancor>.

International Water Management Institute 2007, *Looking ahead to 2050: scenarios of alternative investment approaches*, Malaysia.

Knight Frank 2011, *Knight Frank Wealth Report*, London.

Knight Frank 2011, *Review of the International Farmland Market report, London*.

Land Commodities 2009, *The Land Commodities Global Agriculture and Farmland Investment Report.* Baar, Switzerland

L.E.K Consulting 2011, *Advanced Biofuels Study: Strategic Direction for Australia*.

OECD-FAO 2010, *OECD-FAO Agricultural Outlook 2010-2019 Highlights*.

Red Sky 2006/07, *Summary of farm performance: Dairy*.

Stewart, J.B., Smart, R.V., Barry, S.C. and Veitch, S.M. 2001. *1996/97 Land Use of Australia - Final Report,* National Land and Water Resources Audit, Canberra.

Tasmania DPI 2011, *Strategic Water Information and Monitoring Plan, Tasmania.*

Appendices

Appendix A – Forecast adjustments

Table 8 Overall forecast adjustments

Year	Baseline Forecast	International Land Demand	Climate change	Commodity / industry outlook	Adjusted forecast
2014	3.8%	0.5%	0.4%	0.0%	4.7%
2015	3.8%	0.5%	0.5%	0.0%	4.8%
2016	3.8%	0.5%	0.5%	0.0%	4.8%
2017	3.9%	0.6%	0.5%	0.0%	5.0%
2018	3.9%	0.7%	0.5%	0.0%	5.1%
2019	3.9%	0.7%	0.5%	0.1%	5.2%
2020	4.0%	0.7%	0.5%	0.1%	5.3%
2021	4.0%	0.5%	0.5%	0.2%	5.2%
2022	4.0%	0.4%	0.5%	0.2%	5.1%
2023	4.1%	0.3%	0.5%	0.3%	5.2%
2024	4.1%	0.2%	0.5%	0.3%	5.1%
2025	4.1%	0.1%	0.5%	0.3%	5.0%
2026	4.1%	0.1%	0.5%	0.3%	5.0%
2027	4.2%	0.1%	0.5%	0.3%	5.1%
2028	4.2%	0.1%	0.5%	0.3%	5.1%
2029	4.2%	0.1%	0.5%	0.3%	5.1%
2030	4.3%	0.1%	0.5%	0.3%	5.2%
2031	4.3%	0.1%	0.5%	0.3%	5.2%
2032	4.3%	0.1%	0.5%	0.3%	5.2%

Table 9 Dryland agriculture forecast adjustments

Year	Baseline Forecast	International Land Demand	Climate change	Commodity / industry outlook	Total impact adjustment
2014	3.8%	0.7%	0.3%	0.0%	4.8%
2015	3.8%	0.7%	0.4%	0.0%	4.9%
2016	3.8%	0.7%	0.4%	0.2%	5.1%
2017	3.9%	0.8%	0.4%	0.2%	5.3%
2018	3.9%	0.9%	0.4%	0.2%	5.4%
2019	3.9%	0.9%	0.4%	0.2%	5.4%
2020	4.0%	0.9%	0.4%	0.2%	5.5%
2021	4.0%	0.6%	0.4%	0.2%	5.2%
2022	4.0%	0.4%	0.5%	0.3%	5.2%
2023	4.1%	0.3%	0.5%	0.3%	5.2%
2024	4.1%	0.2%	0.5%	0.4%	5.2%
2025	4.1%	0.1%	0.5%	0.4%	5.1%
2026	4.1%	0.1%	0.5%	0.4%	5.1%
2027	4.2%	0.1%	0.5%	0.4%	5.2%
2028	4.2%	0.1%	0.5%	0.4%	5.2%
2029	4.2%	0.1%	0.5%	0.4%	5.2%
2030	4.3%	0.1%	0.5%	0.4%	5.3%
2031	4.3%	0.1%	0.5%	0.4%	5.3%
2032	4.3%	0.1%	0.5%	0.4%	5.3%

Table 10 Irrigated agriculture forecast adjustments

Year	Baseline Forecast	International Land Demand	Climate change	Commodity / industry outlook	Total impact adjustment
2014	3.8%	0.7%	0.4%	0.0%	4.9%
2015	3.8%	0.4%	0.4%	0.3%	4.9%
2016	3.8%	0.4%	0.6%	0.3%	5.1%
2017	3.9%	0.5%	0.6%	0.4%	5.4%
2018	3.9%	0.5%	0.6%	0.4%	5.4%
2019	3.9%	0.6%	0.6%	0.4%	5.5%
2020	4.0%	0.5%	0.6%	0.4%	5.5%
2021	4.0%	0.4%	0.5%	0.4%	5.3%
2022	4.0%	0.5%	0.5%	0.4%	5.4%
2023	4.1%	0.5%	0.4%	0.4%	5.4%
2024	4.1%	0.5%	0.4%	0.5%	5.5%
2025	4.1%	0.4%	0.4%	0.5%	5.4%
2026	4.1%	0.3%	0.4%	0.5%	5.3%
2027	4.2%	0.2%	0.4%	0.5%	5.3%
2028	4.2%	0.2%	0.4%	0.5%	5.3%
2029	4.2%	0.2%	0.4%	0.5%	5.3%
2030	4.3%	0.2%	0.4%	0.5%	5.4%
2031	4.3%	0.2%	0.4%	0.5%	5.4%
2032	4.3%	0.2%	0.4%	0.5%	5.4%

Table 11 Plantation forest forecast adjustments

Year	Baseline Forecast	International Land Demand	Climate change	Commodity / industry outlook	Total impact adjustment
2014	3.8%	0.0%	0.5%	-1.0%	3.3%
2015	3.8%	0.0%	0.5%	-0.8%	3.5%
2016	3.8%	0.0%	0.5%	-0.7%	3.6%
2017	3.9%	0.0%	0.5%	-0.7%	3.7%
2018	3.9%	0.0%	0.5%	-0.7%	3.7%
2019	3.9%	0.0%	0.5%	-0.7%	3.7%
2020	4.0%	0.0%	0.5%	-0.7%	3.8%
2021	4.0%	0.0%	0.5%	-0.7%	3.8%
2022	4.0%	0.0%	0.4%	-0.6%	3.8%
2023	4.1%	0.0%	0.3%	-0.5%	3.9%
2024	4.1%	0.0%	0.2%	-0.4%	3.9%
2025	4.1%	0.0%	0.1%	-0.4%	3.8%
2026	4.1%	0.0%	0.0%	-0.4%	3.7%
2027	4.2%	0.0%	0.0%	-0.4%	3.8%
2028	4.2%	0.0%	0.0%	-0.4%	3.8%
2029	4.2%	0.0%	0.0%	-0.4%	3.8%
2030	4.3%	0.0%	0.0%	-0.4%	3.9%
2031	4.3%	0.0%	0.0%	-0.4%	3.9%
2032	4.3%	0.0%	0.0%	-0.4%	3.9%

Table 12 Native forest forecast adjustments

Year	Baseline Forecast	International Land Demand	Climate change	Commodity / industry outlook	Total impact adjustment
2014	3.8%	0.0%	0.5%	-0.5%	3.8%
2015	3.8%	0.0%	0.5%	-0.4%	3.9%
2016	3.8%	0.0%	0.5%	-0.3%	4.0%
2017	3.9%	0.0%	0.5%	-0.2%	4.2%
2018	3.9%	0.0%	0.5%	-0.1%	4.3%
2019	3.9%	0.0%	0.5%	0.0%	4.4%
2020	4.0%	0.0%	0.5%	0.0%	4.5%
2021	4.0%	0.0%	0.5%	0.0%	4.5%
2022	4.0%	0.0%	0.4%	0.0%	4.4%
2023	4.1%	0.0%	0.3%	0.0%	4.4%
2024	4.1%	0.0%	0.2%	0.0%	4.3%
2025	4.1%	0.0%	0.1%	0.0%	4.2%
2026	4.1%	0.0%	0.0%	0.0%	4.1%
2027	4.2%	0.0%	0.0%	0.0%	4.2%
2028	4.2%	0.0%	0.0%	0.0%	4.2%
2029	4.2%	0.0%	0.0%	0.0%	4.2%
2030	4.3%	0.0%	0.0%	0.0%	4.3%
2031	4.3%	0.0%	0.0%	0.0%	4.3%
2032	4.3%	0.0%	0.0%	0.0%	4.3%

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