Global Megatrends and Australian supply chains

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Australian National Outlook: A world leading integrated framework



Material and energy intensive industries (Australia, 2012)



Aim: to provide a better understanding of Australia's physical economy – particularly the 'water-energy-food nexus' and the prospects for Australia's materials and energy-intensive industries.



Our analytical framework

FIGURE 3 OVERVIEW OF THE NATIONAL OUTLOOK ANALYTICAL FRAMEWORK, AND PROJECT FLOW



- The National Outlook is the most integrated and evidence-based national scenario assessment of these issues yet attempted.
- The analysis uses nine linked models to explore global and national trends and uncertainties.

Source: Hatfield-Dodds et al. (2015) Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970-2050.



Issues and scenarios explored





Higher emissions per dollar

 Each row is a different combination of domestic drivers

- Each column is a different combination of global drivers
- These combinations present 20 core scenarios that we have modelled in detail
- The four touchstone scenarios (in solid colours) illustrate a clear range of outcomes

- The analysis for the *National Outlook* adopts a scenario based approach to explore multiple uncertainties.
- Drivers: Global economic demand, global climate and GHG abatement, Australian resource efficiency, working hours, consumption mix, land sector markets and agricultural productivity.

Source: Hatfield-Dodds et al. (2015) Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970-2050.

Growth and living standards

A3. PER CAPTIA INCOME BY WORLD REGIONS, 2010 AND 2050



Source: CSIRO (2015) Australian National Outlook 2015 – Chart Overview: Economic activity Living standards, resource use, environmental performance and living standards, 1970–2050. CSIRO, Canberra.

- As the number of people in high income countries triples to 2050, so does the demand for Australian exports.
- By 2050 the world economy is projected to grow to be around three times larger than it is today, with average global income per person more than doubling from 2010 to 2050 across all scenarios



Agricultural prices are projected to trend upwards



Looking ahead, an upward trend in agricultural prices is likely as global supply falls behind the growth in global demand.

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- High population, strong abatement (M3)
- ----- High population, no abatement action (H3)
- Medium population, moderate abatement, higher global agricultural productivity (M2)

Source: Hatfield-Dodds et al. (2015) Australian National Outlook 2015: Economic activity, resource use, environmental performance and living standards, 1970-2050.



Agricultural output increases by 50% or more, even with land use shifting to other uses





www.csiro.au/nationaloutlook

FIGURE 14 PROFITABLE RURAL LAND USE COULD SHIFT DRAMATICALLY, RAISING CHALLENGES AND OPPORTUNITIES



Meeting the water-energy-food nexus will produce challenges and opportunities for rural land use and communities

 We can transform and enrich our economy and regional communities by meeting national and global food, fibre, energy, carbon sequestration, and conservation needs through new land sector markets, if we manage these transitions well.



Some sobering figures

- Agricultural outputs will have to increase by 70% to feed almost 10 billion people by 2050 (70% from population and 30% from income growth).
- 80 to 90% of the increase in crop production will need to come from improved yields and 10 to 20% from increased crop area (1.4 billion hectares).
- Annual global crop yields are currently increasing by about 1% suggesting that on the current trajectory we will only attain about half of the total increase needed by 2050.

200

190

180

170

160

150

130

120

2010

2015

2020

2025 2030

 Increases in the order of 1.4% will be required to meet the global demand





Megatrends impacting Australian rural Industries

A hungrier world - population growth will drive demand for food and fibre.

A bumpier ride - Globalisation, climate change and environmental change will reshape the risk profile for agriculture.

A wealthier world - A new middle class will increase food consumption, diversify diets and eat more protein.

Transformative technologies - advances in digital technology, genetic science and synthetics will change the way food and fibre products are made and transported.

Choosy customers - information empowered consumers of the future will have expectations for health, provenance, sustainability and ethics

A bumpier ride

A wealthier world

A hungrier

world

Transformative technologies

Choosy customers

Implications for Australia - A Hungrier World

- Australia is well positioned both in terms of geography and comparative advantage – to supply growing overseas markets. Currently export 40% of all milk produced.
- Improvements in productivity rely on strong innovation systems historically yielding high returns to Australian agriculture 8:12.
- Given over 90% of Australia's food needs are already met by in-country production, Australia will make an important contribution to global demand.
- Increasing demand for land to meet renewable energy and GHG mitigation could have implications for Australian Agriculture.





Implications for Australia - A Wealthier World

- GDP per capita is expected to rise from US\$14,000 per person per year to US\$17,000 by 2020 and \$28,000 by 2040.
- Calorie intake is projected to increase from current levels of 2,940 kcal/person/day to 3,050 kcal/person/year by 2030.
- Protein consumption in ASEAN is expected to increase by 120% and dairy by 50% by 2050.
- A critical competitive advantage for Australia is to maintain and extend it's reputation as a supplier of high-quality products with high environmental, health and safety standards. (e.g. organic certified food volume into China has risen from 135 million tonnes in 2003 to 1.96 billion tonnes in 2006 – with number of products rising from 231 to 3,010).





Implications for Australia - Choosy Customers

- Consumers across the world are increasingly interested in functional foods, those designed for specific health outcomes.
- In 2010 the global market estimate was US\$90.5 billion, with 38% of this from diary related products e.g. pro-biotic yoghurts, A2 milks etc.
- Increasingly consumers are interested in the provenance of foods, this is likely to play an increasing role in the future.
- There is a significant opportunity to increase and maintain market share by communicating the provenance, ethics and environmental performance of Australian produce.





Source: "Future of Global Functional Foods Market, June 2011," Leatherhead Foods Research



Implications for Australia - Transformative Technologies

- Increasingly we will see the application off robotics and GM to agriculture.
- Technology advancement in the field of energy will see continued expansion of biofuel production (68.3 million tonnes in 2006 to 130 million tonnes in 2012).
- By 2020 the market will still be dominated by first generation biofuels. with technologies for second generation yet to reach industrial scales.
- Big data systems and digital technologies may bring better risk management, with new technologies reducing food waste and improving shelf life.







Source: Hjkowicz et al., 2015

Implications for Australia – Bumpier ride

- Australia's production environment continues to become more challenging.
- More opportunistic production systems will be needed to respond to increasing climate variability.
- The effects of climate change on food production will vary geographically but overall there are more negative than positive impacts likely in Australia.
- Globalisation of supply chains increases the cost-effectiveness of inputs for agricultural production but if the supply chains are narrow this might lead to more risk.





Climate shocks are felt throughout the chain



Rockhampton - 1 January 2011



Ipswich - 12 January 2011



Gatton - 10 January 2011



Brisbane - 13 January 2011

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Climate chains: An Adaptive Value Chains self-assessment tool

- Climate chains is designed to assist businesses self-assess climate risk across their value chains.
- It provides businesses with a systematic approach to developing adaptation strategies across their chain by:
 - Understanding how climate impacts on their chains, now and into the future
 - Providing a collaborative platform for multiple users within the business and across the supply chain
 - Supporting monitoring of progress against managing climate risk

https://adaptivevaluechains.org/



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Adaptive Value Chains Self-Assessment Tool

Understand your value chain's climate risk exposure

Request a demo

Already have an account? Log in here.

Take the tour

Evaluating supply chain risk exposure











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