
Energy and Food Security: Is Australia Fragile or Resilient?¹

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The Australian state is not normally considered in the context of fragility. We challenge the assumption of Australian robustness by examining the way in which two potential vulnerabilities are framed and the way these issues are incorporated in to the political and institutional policy agendas. Food and energy security will be examined in the context of Australia as a complex adaptive system with an analysis of the vulnerabilities of these two issues as understood by different actors. While it can be argued that Australia has been resilient in the past, we argue that this state cannot be taken for granted for the future. There are vulnerabilities that could become triggers for unexpected changes, or which could tip towards greater vulnerability and fragility.

Complex Adaptive Systems and Resilience

The analytical framework of this paper is based on complex adaptive systems theory (CAS). From a systems view, a complex adaptive system is simply one where we allow for multi-dimensionality; emergent properties and learning.² CASs change in ways that are hard to predict, because they are premised on a degree of flexibility.³ Within this framework, resilience is considered to be a property of a system. Australia functions as an open system connected to, and embedded within, the rest of the world. As part of an open system, any variable might change and act as a tipping point and alter the system.

Originating in engineering and ecology disciplines, resilience has been adopted by a number of other disciplines (including economics) and is referred to in a range of policy areas such as critical infrastructure, emergency management, and supply chains. Cross-disciplinary perspectives have been particularly fruitful. For example, the relationship between social capital, state action and community resilience has been demonstrated in patterns of adaptation of communities to the challenges of

¹ This paper follows on from the work the authors undertook in the first stage of the Australian Academy of Science project, Australia 2050. The resulting book, M. R. Raupach et al., *Negotiating Our Future: Living Scenarios for Australia 2050* (Canberra: Australian Academy of Science, 2012) was launched by the Governor-General in February 2013.

² E. Mitleton-Kelly, 'Ten Principles of Complexity and Enabling Infrastructures', in E. Mitleton-Kelly (ed.), *Complex Systems and Evolutionary Perspectives on Organisations: The Application of Complexity Theory to Organisations* (Oxford: Elsevier Science Ltd, 2003), pp. 23-50.

³ M. Crozier, 'Rethinking Systems: Configurations of Politics and Policy in Contemporary Governance', *Administration and Society*, vol. 45, no. 4 (2010), pp. 504-25.

climate change.⁴ However, like a number of other concepts such as poverty, well-being or security, resilience is a contested term and there is no single universally accepted definition.⁵ However, based on our work with the Australian Academy of Science we can say that resilience is a property of a system, and when hit by a shock, a system can either recover its original form, or adapt and transform into something different, or collapse and cease to function. General resilience means the ability of a system to adapt to shocks while retaining its internal structure, function, feedbacks and, therefore, identity.⁶

The resilience perspective recognises that our world is a place of dynamic change. Changes occur in an interlinked way, so deliberate actions that aim to bring about a change in a specific area often lead to unanticipated and potentially unwanted consequences elsewhere.⁷ In today's environment this means low probability high impact risks and threats can arise with short lead times or at a slower incremental pace which fails to raise concerns. Such issues can arise from unexpected sources with unwanted consequences, and our contention is that such circumstances have the potential to lead to fragility.

Resilience is a Value-Neutral Term

While we generally think resilience is desirable, and governments present it as a desirable goal, it is important to acknowledge that resilience is the property of a system. Whether the resilience of a particular system is desirable or not, is therefore a value judgement, depending upon our view of the desirability of the system itself. Examples of nation-states that we might consider to be less than desirable but, to some extent, are resilient include North Korea and the former Soviet Union in World War Two.

Resilience is more than bouncing back, which implies a capability to return to a previous state or to a point of vulnerability. Even if people wanted to return to a previous state, changes in the physical, social and psychological reality of societal life, particularly after an unexpected disruption or disaster, can make this impossible.⁸ Instead, resilience means moving from a reactive state through a proactive state and on to one which has the capacity to

⁴ See, for example, W. N. Adger, 'Social Capital, Collective Action and Adaptation to Climate Change', *Economic Geography*, vol. 79, no. 4 (2003), pp. 287-404.

⁵ R. Reid and L. C. Botterill, 'The Multiple Meanings of "Resilience": An Overview of the Literature', *Australian Journal of Public Administration*, vol. 72, no. 1 (2013), pp. 31-40.

⁶ *Ibid.*, p. 8.

⁷ *Ibid.*, p. 55.

⁸ Rita Parker, 'Non-Traditional Threats and Security Policy Response', *The Journal of Defence and Security*, vol. 3, no. 1 (2012), pp. 1-11.

anticipate threats and challenges.⁹ In doing so, it means having a capacity to adapt to change without compromising fundamental values.

The Fragile State

The resilience of civil society and the extent of its vulnerability are influenced by a number of factors which determine if a nation-state is fragile. Over time, liberal democratic societies are considered to be more resilient than totalitarian states, because their adaptive capacity is able to draw upon networks of trust and reciprocity (and hence social capital) that are characteristic of civil society. However, the relationship between social capital and the state is a complex one, with interwoven public and private components that in turn reflect policy and governance.¹⁰ A liberal democratic state may (for example) undermine social capital by policies that are detrimental to community well-being, or which expose communities to major economic shocks. The issue of vulnerability and fragility requires consideration of the concept of the fragile state and the way concepts and issues are framed as part of the policy agenda. What is a 'fragile state'? The World Bank defines fragility in the context of "countries facing particularly severe development challenges: weak institutional capacity, poor governance, and political instability".¹¹

The Organisation for Economic Co-operation and Development (OECD), following this approach, refers to fragile states failing to meet a single development goal.¹² In a 2008 discussion paper, however, the OECD moves somewhat away from the emphasis on development, describing fragile states as "those that are unable to meet [their] population's expectations or manage changes in expectations and capacity through the political process".¹³ Energy and food security are two areas where expectations (particularly in a developed country such as Australia) are high, and managing change poses considerable challenges to the political process and to the values that underpin it.

By extension, we define a fragile state as one that *cannot* adapt to change without sacrificing its core values, i.e. its identity. The emphasis on values in

⁹ R. Parker, 'Managing for Resilience', in S. Cork (ed.), *Resilience and Transformation* (Canberra: CSIRO Publishing, 2010), pp. 31-7.

¹⁰ Productivity Commission, 'Social Capital: Reviewing the Concept and its Policy Implications', Commission Research Paper, Canberra, AusInfo, 2003, <<http://www.pc.gov.au/research/commission/social-capital>> [Accessed 8 November 2013], para. 2.3.

¹¹ World Bank Fragile and Conflict-Affected Countries Group, 'Fragility and Conflict: Supporting Peace and Development in Situations of Fragility and Conflict', Washington: World Bank, nd.

¹² DAC International Network on Conflict and Fragility, 'Fragile States 2013: Resource Flows and Trends in a Shifting World', Organisation for Economic Co-operation and Development (OECD), 2012, <<http://www.oecd.org/dac/incaf/FragileStates2013.pdf>> [Accessed 8 November 2013].

¹³ OECD, 'Concepts and Dilemmas of State Building in Fragile Situations: From Fragility to Resilience', OECD/DAC Discussion Paper, Paris, 2008, <<http://www.oecd.org/dac/incaf/41100930.pdf>> [Accessed 8 November 2013], p. 16.

this context aligns with the conceptualisation of values as being intrinsic to the political and policy processes.¹⁴ Note that, as with resilience, we are not making a value-judgement about the desirability of the values involved. While democratic states are usually considered to be less fragile (more resilient) than those that are not, and we would generally endorse democratic values, it is also the case that non-democratic states may prove to be resilient (as for example the Soviet Union showed itself to be in World War II). States whose core values are conflicted (Egypt, for example) may prove particularly fragile (in that they are vulnerable to rapid change caused by triggering events).

It is challenging to see Australia in this light. Institutional values—such as market-oriented liberalism, treating people fairly, and a moderate multiculturalism—seem quite robust. But they are not invulnerable, particularly in an era of rapidly changing global conditions where, even in a nation as economically fortunate as Australia, symptoms of alienation from mainstream political processes are apparent. While it is difficult to demonstrate that levels of trust in government in Australia are in fact declining, careful empirical work suggests that Australia has something of a ‘trust deficit’. As Bean notes, “only a minority of the adult population express social and/or political trust, a trend evident for some time”.¹⁵ All the sub-systems—political, economic, social and ecological—interact, but the political system is of particular importance, in that it encapsulates the policy-making and governance capacities of the state. We argue that the reflexivity of the political system, and hence its contribution to resilience or to fragility, is heavily dependent upon the way in which issues are perceived and contextualised or framed.

Framing

The way in which policy issues are framed is a key attribute of the responsiveness of the political system. ‘Framing’ in this sense is a simple analytical idea, denoting what is considered to be important (within the frame) and what is considered to be unimportant (outside the frame).¹⁶ The predominant framing rationale for Australian policymaking is economic rationalism—the belief in the power of markets, both to confer adaptation and to anchor decision-making in the realm of the individual and corporate worlds, rather than in that of the state.¹⁷

¹⁴ Jenny Stewart, *Public Policy Values* (Basingstoke: Palgrave Macmillan, 2009).

¹⁵ C. Bean, ‘Is there a Crisis of Trust in Australia?’, in S. Wilson et al. (eds), *Australian Social Attitudes: The First Report* (Sydney: UNSW Press, 2005), p. 138.

¹⁶ M. Y. Smith and R. Stacey, ‘Governance and Cooperative Networks: An Adaptive Systems Perspective’, *Technological Forecasting and Social Change*, vol. 54, no. 1 (1997), pp. 79-94.

¹⁷ Michael Pusey, *Economic Rationalism in Canberra: A Nation-Building State Changes its Mind* (Melbourne: Cambridge University Press, 1991).

This economic frame helps us to 'see' certain policy actions (for example regulation or re-regulation), but it is not a systems-view. For example, it may preclude perceptions of interconnections which may threaten the viability of the market system itself (for example, the global financial crisis was foreseen by relatively few analysts). Framing has a strong association with agenda-formation, because it affects the way in which policy problems are 'constructed' or understood. For example, proponents of agricultural development proclaim that Australia could become 'the food bowl of Asia', a framing of the issue that proclaims plenitude and an apparently convenient marketing strategy, while excluding from the agenda the more problematic aspects of such a strategy (for example environmental considerations).

Because viable policy agendas need to attract support from diverse interests, as well as being 'saleable' politically, framing tends to emphasise more, rather than less, palatable solutions. For example, in the wake of the Blue Mountains fires of October 2013, combating increased fire-intensity by stronger public management (through programs of hazard reduction) is likely to prove more acceptable politically than (for example) restricting re-building in fire-prone areas.

Energy

The way in which the term 'energy security' is framed influences the way it is presented, perceived and addressed as part of the policy process. Different actors define it in different ways. In international relations it generally refers to the politics of energy and resource management, whereas in economics, economists argue that energy supplies are determined by market forces and are therefore not a matter of security.¹⁸

The energy situation in Australia is complex; however, we can identify five key factors for consideration. First, Australia is energy rich in uranium, liquefied natural gas and black coal and these form the basis for our energy exports. But we are also a net importer of petroleum. Secondly, most of our imported oil transits through maritime choke points. For example, the Strait of Hormuz, leading out of the Persian Gulf; and the Strait of Malacca, linking the Indian and Pacific Oceans, are two of the world's most strategic choke points, and the most significant for Australia. Thirdly, although Australia is a net food exporter, oil imports impact food production, processing and distribution; and the food system is dependent on the transportation system which in turn is heavily dependent on imported oil. Fourthly, the International Energy Agency (IEA) sets a minimum oil stockholding requirement for member states like Australia. However, Australia does not meet its stockholding obligations. And fifthly, domestic refining capacity in Australia

¹⁸ V. Comolli, 'Energy Security', in B. Giegerich (ed.), *Europe and Global Security* (London: The International Institute for Strategic Studies, 2010).

is decreasing. After the Shell plant at Geelong and BP plant in Brisbane close there will be only three refineries remaining.

These facts lead to an examination of whether Australia's energy system is robust and resilient, or whether it is vulnerable and contributing towards the fragility of the nation-state and civil society. The way the issue of energy security is framed influences the way it is perceived. For example, closing a refinery does not necessarily affect energy security. Instead, it means that Australia needs to import more refined products, like petrol and diesel. Economists will argue that at a national level, a country should only compete in those industries where it enjoys a real competitive advantage. The logic is that if Australia can buy refined fuels from Asia more cheaply than it can produce them in Australia, then the most efficient use of resources is for Asian refineries to produce Australia's fuels. However, by framing the issue differently it can be argued that depending on trade to provide secure energy is a potential tipping point which could lead to increased vulnerability and possible fragility when the source or supply of energy is threatened.

Actions by non-state actors such as piracy or hijacking of oil tankers can affect energy security. Similarly, actions by another nation-state which produces or through which energy transits, can affect energy security and influence foreign policy freedom. For example, in 2009 Russian Gazprom and the Ukrainian Naftohaz Ukrainy failed to agree on price levels for that year. The subsequent deliberate disruption to the gas supply by Russia affected twelve European Union (EU) member states and six non-EU nation-states, including those that rely almost entirely on gas supplies from Ukraine such as Bulgaria and the Republic of Slovakia.¹⁹ Australia can be considered in similar terms. As a net importer of petroleum, Australia's oil imports transit other nation-states and it relies on external providers and sources of supply. As noted by Blackburn²⁰ forty per cent of Singapore's oil comes from the Middle East, and fifty-one per cent of Australia's imported petroleum products come from Singapore.

Returning to the point about Australia's oil stockholding, each of the twenty-eight member nation-states of the IEA has an obligation to have oil stock levels that equate to no fewer than ninety days of net imports. (This requirement excludes the three net exporting member-states of Canada, Denmark and Norway.) The minimum requirement is based on net imports of all oil, including both primary products such as crude oil and natural gas liquids (NGLs), and refined products but excludes naphtha and volumes of oil used for international maritime bunkers. The IEA is explicit about what can and cannot be counted to meet the obligation. Specifically, the IEA does not permit the inclusion of military stocks, volumes in tankers *at sea*, *in* pipelines or *at* service stations, or amounts held by end-consumers. Nor

¹⁹ Comolli, 'Energy Security', p. 180.

²⁰ John Blackburn, *Australia's Liquid Fuel Security* (Canberra: NRMA, 2013).

does it permit the inclusion of crude oil not yet produced. Member-states can meet their obligation through both stocks held exclusively for emergency purposes and stocks held for commercial or operational use, including stocks held *at* refineries, *at* port facilities, and *in* tankers *in* ports. In 2012 Australia held seventy-two days of stock. According to the IEA, Australia's holding for the first six months of 2013 was an average of sixty-four days of net imports, just two-thirds of the required ninety-day holdings.²¹

Energy Sector Actors

Drawing on the definition by Brown and others, that "Energy security refers to a resilient energy system",²² it is possible to probe whether Australia has a resilient energy system, or whether there are vulnerabilities in the system which would militate against its resilience. As noted in the earlier section on framing, there are a number of actors who influence the policy community and frame the issue of energy security in a particular way. Institutional actors representing Australia's oil industry, such as the Australian Institute of Petroleum (AIP), frame the issue in low-risk terms, citing diversity of supply, reliable supply chains, domestic refining capacity together with imported petroleum products and efficient supply management as providing a high level of liquid fuel security for Australia.²³ The Institute refers to the 2011 Liquids Fuel Vulnerability Assessment produced by ACIL Tasman²⁴ and 2012 Energy White Paper²⁵ as supporting evidence. The Assessment referred to by the Institute states that there has been no major disruption to supply, and there is an appropriate balance being maintained by suppliers. In turn, the 2012 Energy White Paper states that "Australia is linked into well-established global supply chains ... and import dependency itself does not imply an energy security threat".²⁶ The House of Representatives Standing Committee on Economics in its Report on Australia's Oil Refinery Industry in January 2013 framed the issue with a different emphasis when it stated, "Energy security is enhanced by diversifying options, as long as the market is able to supply those options in an affordable and reliable way".²⁷

The supply chain is a critical element of Australia's energy supply, but as noted by the former Federal Minister of Defence, Senator the Hon John Faulkner, it is not always reliable. In a speech in 2012 he stated, "Fuel supply is a critical factor ... While the fuel supply chain can meet current

²¹ International Energy Agency, 'Closing Oil Stock Levels in Days of Net Imports', 29 July 2013, <<http://www.iea.org/netimports.asp>> [Accessed 5 August 2013].

²² M. H. Brown, C. Rewey, T. Gagliano. *Energy Security* (Washington DC: National Conference of State Legislatures, 2003).

²³ Australian Institute of Petroleum, <<http://www.aip.com.au/>> [Accessed 8 November 2013].

²⁴ ACIL Tasman, *Liquids Fuel Vulnerability Assessment* (Canberra: ACIL Tasman, 2012).

²⁵ Commonwealth of Australia, *Energy White Paper 2012, Australia's Energy Transformation* (Canberra: Department of Energy, Resources and Tourism, 2012).

²⁶ *Ibid.*, p. xviii.

²⁷ Commonwealth of Australia, *Report on Australia's Oil Refinery Industry* (Canberra: House of Representatives Standing Committee on Economics, 2013), p. 68.

requirements, its resilience under the stress of major operations is much less certain.”²⁸ In October 2012 a major transport company responsible for delivery of fuel and LPG had a large portion of its tanker fleet grounded because its vehicles were found to be unsafe. This had a direct impact on fuel availability and fuel prices. Australia’s energy situation has also been commented on by the IEA,

Australia does not have public stocks, nor is there any minimum stockholding requirement imposed on oil companies operating in the country. The Australian government relies on the normal stockholding practices of the domestic oil industry to meet its 90-day net import obligations as a member of the IEA.²⁹

Normal industry practices are based on just-in-time delivery.

Our concern is the way different actors frame the energy issue separately from, instead of as part of, the complex adaptive system. We suggest that specific interest groups such as energy owners, producers, retailers, government institutions and specialist user groups, for example, motorist associations, frame the issue of energy in a particular way. They do not necessarily present issues associated with energy, its security and resilience, as part of a wider complex system of which Australia and its civil society are part. What appears to be lacking is the public voice of civil society in the energy debate.

We suggest that the energy situation has been framed from a retrospective viewpoint and it is not necessarily as robust as portrayed, nor are its potential future vulnerabilities being adequately addressed. Similar to the recent reports about climate change, we suggest we cannot rely on the past to forecast the future.

The global system to which Australia belongs is one of dynamic change and it is influenced by a number of factors and actors. The pace of change can be variable; it can occur at a slow and less obvious tempo (like the slowly boiling frog that does not realise until too late that it is literally in boiling water and in peril), or change can occur at short notice, or rapidly. For example, directional drilling and hydraulic fracturing known as ‘fracking’ have had a significant impact on international energy supply and demand. In particular it has led to an increase in US oil production. According to the Energy Information Administration, US oil production expanded by a record 790,000 barrels a day last year.³⁰

Dynamic change can also be influenced by seemingly unrelated or distant actions. For example, the financial and trade systems underpin all energy

²⁸ John Faulkner, Speech on the 2013 Defence White Paper, Lowy Institute, 9 August 2012.

²⁹ International Energy Agency, ‘Closing Oil Stock Levels in Days of Net Imports’.

³⁰ Lisa Murkowski, ‘Energy 2020: A Vision for American’s Energy Future’, United States Senate, Washington DC, 2013, < <http://bit.ly/Energy2020Doc> > [Accessed 8 November 2013].

supply chains and in turn those systems are influenced by the energy system. Current and future conflict in the Middle East could exacerbate the global financial situation and global energy security. Economic sanctions on Iran have already taken their toll. As reported by the US Energy Information Administration, crude oil production in Iran has fallen about 700,000 barrels per day since 2012, and exports have dropped even more dramatically, costing Iran about US \$3 billion to \$5 billion in revenue.³¹ Saudi Arabia is experiencing a domestic oil demand which has the potential to threaten its export revenues and OPEC's World Oil Outlook anticipates a decline in global demand for its oil to 2016 with production falling by 29.7 million barrels per day.³² Disruption to the energy supply chain, particularly of petroleum, would mean that Australia would need to compete with other nation-states for access to the same limited pool of available petroleum.

However, the issue is not just about oil rigs, tankers, pipelines and supply chains. Australia's food production, processing and distribution are dependent on petroleum. Dunlop notes that every person's food contains the distillate of sixty-six barrels of oil a year and we 'eat' 4.1 litres of diesel each day.³³ Given the vast distances and transportation requirements in Australia, it could be argued that a protracted energy crisis could lead to a food crisis.

Food

How resilient is Australian agricultural production? Could we see food security ever becoming an issue in Australia? How are the relevant issues being framed by actors? As with energy, the salient facts would, at face value, lead to few grounds for concern. Australia is a major exporter of food, both processed and unprocessed: in 2012, admittedly a year of good seasons, exports of rural products (excluding wool) amounted to \$33.2 billion.³⁴ In the same period, imports totalled \$9.1 billion. While the volume of food imports can be expected to continue to rise (especially if the Australian dollar continues at the high levels of 2012-13), Australia will clearly remain a net exporter of food. With intense competition pressure applied to the sector, there has been considerable re-structuring in agricultural production since the mid-1980s. During this period, key

³¹ US Energy Information Administration, 'Sanctions Reduced Iran's Oil Exports and Revenues in 2012', 26 April 2013, <<http://www.eia.gov/todayinenergy/detail.cfm?id=11011>> [Accessed 8 November 2013].

³² P. C. Glover and M. J. Economides, 'OPEC Fracked', *The Commentator*, <www.thecommentator.com/article/3339/opec_fracked> [Accessed 4 November 2013].

³³ I. Dunlop, 'Australia's Climate Change & Energy Dilemma—the Case for Emergency Action', *Climate Futures Seminar*, Macquarie University, Sydney, 11 June 2013.

³⁴ Australian Bureau of Statistics (ABS), '5302.0—Balance of Payments and International Investment Position, Australia, Sep 2012', *Time Series spreadsheets*, <<http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/5302.0Sep%202012?OpenDocument>> [Accessed 8 November 2013], table 101 Merchandise Exports by SITC Division on a Balance of Payments Basis, Chain Volume Measures—Quarter.

'traditional' sectors such as grains have become even more export-oriented.³⁵ There have also been changes in the composition of Australian food exports. Wine, for example, totalled almost \$3 billion in 2012, up from negligible levels in 1974-75.³⁶

However, when considered from the point of view of inter-dependencies across systems, Australian food security appears more problematic. Natural disasters (such as bushfires or floods, or human or animal pandemics) pose obvious threats to food supply chains.³⁷ With increasing concentration of production, most foods are transported internally across huge distances—the 'carbon footprint' of Australian food production is large. There is an obvious link with energy security. Logistical cycles are very short. As Blackburn's work has shown, in the event of an interruption in fuel supplies, stockholdings of chilled and frozen goods would be at seven days, and dry goods at nine days.³⁸

Other types of problem are emergent in character. The availability of water is an obvious and continuing concern, particularly in view of the probable impacts of climate change on a fragile ecology. Although we know that production adapts and changes after periods of drought, the resilience of systems such as the Murray-Darling Basin—despite extensive policy attention—must continue to be in doubt.

It is, however, on the social front that Australian agriculture appears to be struggling. Productivity growth has been enhanced by the substitution of capital for labour, associated with increases in the minimum viable farm size. However, over many years, this has meant a continuing attrition in the numbers employed in the sector and in turn, relentless pressure on farm families. In 1986, there were just over 250,000 farmers on the land in Australia. By 2001, that number had reduced to 180,000 with a projected further decline to 120,000 by 2030.³⁹ While some sectors, such as grain production, expanded both production and productivity between 1993-94 and 2002-03, others, particularly horticulture, presented a more static picture. Vegetable production, for example, contracted slightly in volume terms over the 1993-94 to 2002-03 period.⁴⁰ Only one horticultural sector of any size, the production of wine-grapes, has shown significant expansion. A declining agricultural workforce (in terms of overall numbers) has aged rapidly. In

³⁵ Productivity Commission, 'Trends in Australian Agriculture', Commission Research Paper, Canberra, 2005, <<http://www.pc.gov.au/research/commission/agriculture>> [Accessed 8 November 2013].

³⁶ Ibid.

³⁷ Department of Agriculture, Fisheries and Forestry, *Resilience in the Australian Food Supply Chain* (Canberra: Commonwealth of Australia, February 2012).

³⁸ Blackburn, *Australia's Liquid Fuel Security*.

³⁹ Neil Barr, 'The Micro-Dynamics of Change in Australian Agriculture: 1976-2001' (Canberra: Australian Census Analytical Program, Australian Bureau of Statistics, 2004), table 5.9.

⁴⁰ Department of Agriculture, Fisheries and Forestry, *Australian Agriculture and Food Sector Stocktake* (Canberra: Commonwealth of Australia, 2005), table 10.

2012, the median farmer age was fifty-three years, by far the oldest of any economic sector.⁴¹ Barr describes an “exodus of the young” from farming in the period from 1976 to 2004.⁴² Few farm families are able to make ends meet without outside employment in nearby towns and centres.⁴³ Tertiary enrolments in agricultural science have been in decline since the mid-1990s.⁴⁴ Despite these facts, the continuity of agriculture is taken for granted in the Australian psyche. Unlike many other countries, apart from hardship relief, little policy emphasis is placed on the maintenance of rural activity, or lifestyles. With few families on the land, communities shrink or die.

Adding to these difficulties, climate change and increasing seasonal variability expose Australian farmers to heightened levels of risk, particularly for cropping industries in low-rainfall areas.⁴⁵ If they occur, reduced rainfall and increasing temperatures will have their major negative impacts on the ‘Mediterranean’ regions of Australia (south-west Western Australia, the Eyre Peninsula, the Riverland area of South Australia and the irrigation areas of northern Victoria and southern New South Wales). However, even within particular regions, impacts will be highly variable, making the tasks of adaptation difficult to predict and even more difficult to coordinate.⁴⁶

Australian agriculture may be well-placed to take advantage of anticipated rises in world prices. However, meeting world food demands without over-exploiting the land is a different matter, entailing considerable risk.⁴⁷ Moreover, the profits from this expansion will, increasingly, go overseas as Australian agribusinesses are bought out by foreign-owned firms. While overseas capital has been vital to the development of rural Australia, the question arises: is an increasingly foreign-owned sector more or less resilient than one where control lies in Australian hands? Certainly, the tying of production to particular markets (for example through foreign direct investment from the United Kingdom) has historically been a source of vulnerability. Strategic investment by Chinese companies into the Australian farm sector carries these kinds of relationship into uncharted territory.

⁴¹ Australian Bureau of Statistics, ‘Labour Force and other Characteristics of Farmers’, Feature Article in 1301.0—Year Book Australia, 2012, 24 May 2012, <<http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1301.0~2012~Main%20Features~Home%20page~1>> [Accessed 8 November 2013].

⁴² Barr, ‘The Micro-Dynamics of Change in Australian Agriculture’, p. 64.

⁴³ *Ibid.*, p. 7.

⁴⁴ Office of the Chief Scientist, *Health of Australian Science* (Canberra: Commonwealth of Australia, May 2012), section 4.7.

⁴⁵ Government of Western Australia Department of Agriculture and Food, *Grains Industry Investment Profile*, Part 3 Impact of Climate Change on Cropping Systems (Perth: Government of Western Australia, 2008).

⁴⁶ CSIRO, ‘An Overview of Climate Change Adaptation in Australian Primary Industries—Impacts, Options and Priorities’, Report prepared for the National Climate Change Research Strategy for Primary Industries, February 2008.

⁴⁷ P. Langridge and S. Prasad, ‘Australia can’t Feed the World but it can Help’, *The Conversation*, 8 January 2013.

Food Sector Actors

Broadly speaking, farmer organisations (such as the National Farmers' Federation) have been economic rationalist in outlook.⁴⁸ The National Party, too, despite its origins as a collectivist, agrarian party has embraced the policy agenda of free trade and market dominance.⁴⁹ Industry supports to farming at both state and federal levels have been progressively dismantled since the 1980s. Largely urban-based environmental groups have had a profound impact upon the way in which Australia's productive systems are perceived, particularly those dependent upon irrigation. While farmers protested successfully against initial versions of the Murray-Darling Basin plan, they have been less successful in opposing foreign takeovers of Australian agribusiness. The 'wall of sound' emanating from the mainstream (largely foreign-owned) media frames the issue as one of market inevitability.⁵⁰ According to this view, those opposing any form of foreign direct investment should desist, lest overseas capital be scared away.⁵¹ As Australian production continues to be restructured along the contours prescribed by owners of capital largely based elsewhere, there are many grounds for concern. Where, in the long term, will food produced in Australia end up? What is the future of Australian agriculture as a basis for the continuing vitality of rural and regional communities? A dwindling agricultural workforce, fragmentation and privatisation of state-based agricultural extension and development services and a diminishing number of young people wanting to go on the land, is hardly a recipe for long-term food security.

Adaptation and the Political System

We have argued for the existence of a number of challenges to Australian resilience in two key sectors: a vulnerability to short-term factors in the case of energy and to long-term factors in the case of food production. Our analysis suggests that these challenges may well exceed existing adaptation capacity—indeed we have identified a number of factors (such as reductions in social capital flowing in part from poorly-framed policies) that we consider may erode that capacity.

We have argued for the primacy of the political system, particularly in a state-centred nation such as Australia, as the main means through which collective responses to challenges to resilience are identified and organised.

⁴⁸ National Farmers' Federation, 'History', <<http://www.nff.org.au/history.html>> [Accessed 23 October 2013].

⁴⁹ G. Cockfield, 'The National Party', in A. Fenna, J. Robbins and J. Summers (eds), *Government and Politics in Australia* (Sydney: Pearson, 2013).

⁵⁰ See, for example, the coverage by *The Australian* during early October 2013, of the takeover offer by Saputo for Warrnambool Cheese, and the offer by the American firm ADM for GrainCorp.

⁵¹ For an indicative post-2013 election example, see J. Sloan, 'Abbott Maintains Sensible Foreign Investment Policy', *The Australian*, 21 September 2013.

A number of factors suggest grounds for concern on this front. While organisations representing civil society are significant, they are themselves increasingly incorporated into the state through service-delivery arrangements and other forms of co-option.⁵² Adaptation relies heavily on the responsiveness of governance to the needs and wishes of citizens. But it also requires a willingness to take the tough decisions when these are needed. While we see heartening instances of policy responding to both these criteria (for example in the complex negotiations and decisions that have characterised the evolution of policy for the Murray-Darling Basin), a political system based on adversarial, party-based politics may fail in both representativeness (due to declining party membership) and toughness (due to a preoccupation by political leaders with short-term electoral advantage). The rise of minority, right-wing parties evident in Senate voting patterns in the 2013 Federal election suggests the disaffection of many voters with the traditional parties (the Liberal and National Parties and the Australian Labor Party). Voter turnout has been declining for some years,⁵³ and according to recent Australian Electoral Commission data informal voting (including some indicators of deliberate informal voting) has been on the increase.⁵⁴ Whether, on balance, these developments mean the political system is evolving in healthy directions, or not, remains to be seen.

Conclusion

We contend that the concept of a fragile state is not limited to economic indicators or to poor and desperate states. There are vulnerabilities in Australia that have the potential to act as triggers or which could tip towards greater vulnerability and fragility, and to less stability and less resilience. Such a situation would have a negative effect on civil society and the nation-state, particularly if sustained over a long period of time. When we think about Australia as part of an interconnected system, there are several vulnerabilities which become more real when we conceive them as potential security risks. Australia's energy and food are not traditionally framed as security risks, but they intersect and they have the potential to be tipping points towards increased fragility. In the current policy structure, food and energy have been framed separately and from a predominantly economic framework, rather than as integral components of a complex adaptive system which includes but is not dominated by economic considerations. As such, there is a degree of policy blindness to future vulnerabilities and potential fragilities. Low probability, high impact issues can have

⁵² G. Ramia and T. Carney, 'New Public Management, the Job Network and Non-profit Strategy', *Australian Journal of Labour Economics*, vol. 6, no. 2 (June 2003), pp. 253-75.

⁵³ International Institute for Democracy and Electoral Assistance, 'Voter Turnout Data for Australia', <<http://www.idea.int/vt/countryview.cfm?id=15>> [Accessed 4 November 2013].

⁵⁴ Australian Electoral Commission, 'Analysis of Informal Voting, House of Representatives, 2010 Federal election—Key Findings', <http://www.aec.gov.au/about_aec/research/paper12/key-findings.htm> [Accessed 4 November 2013]

unexpected consequences which could have a severe and negative impact on civil society.

It is our contention that by reframing Australia's food and energy systems through an analytical framework of complex systems thinking, adaptive capacity and resilience offers a way forward to see connections and relevant issues. Drawing on the points made at the beginning of this paper about resilience and applying them to food and energy security as part of a system, it is possible for that system to have the ability to adapt to shocks while retaining its internal structure, function, feedbacks and therefore its identity. Having a resilient system offers a way to adapt and to transform for the future to deal with those unexpected consequences so that we are sufficiently resilient in the future.

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